2005

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Calendar

Calendar 2005-2006

2005

June
17  Friday: Clinic orientation for third-year students.
20  Monday: Academic year begins for the third- and fourth-year classes.
24  Friday: Deadline for registration and initial payment of tuition for the third- and fourth-year classes.

July
4   Monday: Independence Day observance.

August
9   Tuesday: Orientation, matriculation and initial fee payment for the first-year class.
15  Monday: Academic year begins for the first- and second-year classes.
19  Friday: Deadline for registration and initial payment of tuition for the second-year class.

September
5   Monday: Labor Day observance.

November
24  Thursday: Thanksgiving Day observance.
25  Friday: Holiday for first- and second-year classes.

December
17  Saturday: Winter recess begins at 1 p.m. for all classes.

2006

January
3   Tuesday: Winter recess ends at 8 a.m. for all classes.
6   Friday: Deadline for payment of the balance of tuition for all classes.
16  Monday: Martin Luther King, Jr. Day observance.

March
26  Sunday: Spring recess begins for the first- and second-year classes.
31  Friday: Spring recess begins at 8 a.m. for the third- and fourth-year classes.

April
3 Monday: Classes resume for all classes.

May
5 Friday: Merit Scholarship activities.
6 Saturday: Merit Scholarship activities.
7 Sunday: Academic year ends at 5 p.m. for the graduating students.
12 Friday: Academic year ends at 5 p.m. for the second-year class.
19 Friday: Commencement.
26 Friday: Academic year ends at 5 p.m. for the first-year class.
29 Monday: Memorial Day observance.

June
2 Friday: Clinical clerkships and academic year end for third-year class after Practice of Medicine III.

Schedule of Clerkship and Elective Intervals

Weeks/Dates
1-4: June 20, 2005 - July 17, 2005
5-8: July 18, 2005 - August 14, 2005
9-12: August 15, 2005 - September 11, 2005
13-16: September 12, 2005 - October 9, 2005
17-20: October 10, 2005 - November 6, 2005
21-24: November 7, 2005 - December 4, 2005
29-32: January 16, 2006 - February 12, 2006
33-36: February 13, 2006 - March 12, 2006
37-40: March 13, 2006 - April 9, 2006
41-44: April 10, 2006 - May 7, 2006
45-48: May 8, 2006 - June 2, 2006* (clerkships only)

*Clinical clerkships end June 2, 2006 after Practice of Medicine III.

Final examinations for clinical clerkships are administered at the end of each clerkship. Exact date, time and location are announced by the coursemaster.
Mission Statement for Washington University

The mission of Washington University is the promotion of learning — learning by students and by faculty. Teaching, the transmission of knowledge, is central to our mission, as is research, the creation of new knowledge. Faculty composed of scholars, scientists, artists and members of the learned professions serve society by teaching; by adding to the store of human art, understanding, and wisdom; and by providing direct services such as health care.

Our goals are:
• to foster excellence in our teaching, research, scholarship and service;
• to prepare students with the attitudes, skills and habits of lifelong learning and with leadership skills, enabling them to be useful members of a global society; and
• to be an exemplary institution in our home community, St. Louis, as well as in the nation and the world.

To this end we intend:
• to judge ourselves by the most demanding standards;
• to attract people of great ability from all types of backgrounds;
• to encourage faculty and students to be bold, independent and creative thinkers; and
• to provide the infrastructure to support teaching, research, scholarship and service for the present and for future generations. Our institution is committed to the philosophy that teaching and research are best conducted in facilities where dedication to safety, health, and environmental stewardship is exemplary.

Objectives of the Educational Program for Medical Students

Washington University School of Medicine provides students with a supportive, stimulating and challenging environment in which to acquire a thorough foundation in scientific medicine and develop skills, professional attitudes and personal commitments necessary for the practice of medicine at the highest possible level of excellence. In addition, the medical school fosters a commitment to collegiality, respect of individuality, community involvement and leadership through many extracurricular organizations and activities supported by the school. The educational program is designed to ensure that each graduating student will demonstrate the following:
• Knowledge of core concepts and principles of human biology.
• Knowledge of the scientific foundations of medicine and medical practice including disease pathogenesis and treatment, illness prevention and health maintenance.
• Proficiency in applying the scientific method to the practice of medicine including the processes of problem identification, data collection, hypothesis formulation and the application of deductive reasoning to clinical problem-solving.
• Knowledge of human behavior and an understanding of the impact of ethnic and cultural characteristics, socioeconomic factors, and other social factors on the practice of medicine.
• Proficiency in obtaining an appropriate medical history, performing a physical examination, and performing basic procedures necessary for the practice of medicine.
• Cognitive skills essential to the formulation of clinical questions, critical evaluation of scientific and clinical data, and effective application of this data to clinical problem-solving.
• Efficient and effective utilization of educational resources, and proficiency in acquisition and assimilation of new information and practices.
• Recognition of uncertainty in clinical decision-making and current medical practices and an appreciation of the need to discard and replace obsolete information and practices.
• Effective oral and written communication skills with patients and their families, members of the academic and medical communities, and other members of the community at large.
• Commitment to provide compassionate care for all people.
• Dedication to inquiry and to life-long learning through self-education and self-assessment, and active participation as teachers of patients, colleagues and members of the community.
• Appreciation of the essential role of biomedical research in the advancement of medicine and a commitment to the spirit of collaboration and support of basic science and clinical research efforts.
• Dedication to high standards of professional integrity and ethical behavior in clinical practice and biomedical research.

Description of Undergraduate Medical Education Program by Year

First Year
The first-year curriculum focuses on the acquisition of a core knowledge of human biology, as well as on an introduction to the essentials of good patient care. Diversity among matriculants in undergraduate background, and in approaches to learning, is recognized and fostered. The courses are graded Pass/Fail, and a variety of didactic means are made available including lectures, small groups, extensive course syllabi, clinical correlations, and a Lotus Notes computerized curriculum database. The Practice of Medicine I uses regular patient interactions and integrative cases to teach students to skillfully interview and examine patients, as well as the fundamentals of bioethics, health promotion/disease prevention, biostatistics, and epidemiology. An optional summer research program between the first and second year provides an opportunity for students to explore various areas of basic science or clinical research.

Second Year
The second-year curriculum is focused on human pathophysiology and pathology. Through lectures, small group discussions, laboratory exercises and independent study, students acquire broad, detailed knowledge of mechanisms of disease pathogenesis, clinopathological relationships and fundamental principles of therapy. The Practice of Medicine II continues students’ introduction to the fundamentals of patient care, and emphasizes organizing and interpreting clinical information to form a problem list, differential diagnosis, and treatment plan. Students also learn how to accurately document and concisely present clinical information. Supervised clinical experiences and small group discussions further engender development of the professional attitudes and high ethical standards required for the third-year clinical clerkships.

Third Year
The overall goal of the third year is implementation of fundamental interactive clinical skills necessary for the practice of medicine at the highest possible level of excellence. Students achieve this goal by participating in intensive, closely supervised training experiences in the core clinical clerkships involving inpatient and ambulatory settings and interactions with patients who present a spectrum of emergent, urgent, routine and chronic clinical problems. Through these experiences, students exhibit growth and maturation in their abilities to take medical histories, perform complete physical examinations, synthesize findings into a diagnosis, formulate treatment plans, and document and present information in a concise, logical and organized fashion. During the clinical clerkships, students learn to use the biomedical literature and other educational resources in the service of their patients and in self-directed learning. Students also use their personal experiences and rapidly expanding knowledge of human behavior and ethnic, cultural, socioeconomic and other social factors to develop their own personal standards of compassionate, respectful and ethical behavior in the practice of medicine.

Fourth Year
The overall goals of the fourth year are to consolidate, enhance and refine the basic clinical skills developed during the clinical clerkships and to explore specialty areas within the field of medicine. This is accomplished by providing each student with optimal preparation for selecting and pursuing
graduate medical education opportunities in his/her chosen field of medical practice and/or research. Students may select from a broad array of clinical rotations and research experiences and may arrange extramural experiences.

History

The education of physicians at Washington University began in 1891. Under an ordinance enacted April 14, 1891, establishing a Medical Department of Washington University, the St. Louis Medical College (an independent medical college in St. Louis) was brought under the wing of the well-established University. The faculty of the college eagerly agreed to the union, stating "Most of the great medical schools of the world have always been integrant departments of universities, and the examples which America furnishes give added testimony to the fructifying influence of the contact of students and teachers of professional schools with the workers in universities." Eight years later, the Missouri Medical College (another independent college in the city) also joined Washington University, and thus the two most famous medical colleges in the city were merged with the University.

In 1909, Abraham Flexner began a survey of 155 medical schools in the United States and Canada for the Carnegie Foundation for the Advancement of Teaching. The survey created a national sensation. Some schools collapsed, others pooled their resources, while still others reorganized. The Medical School of Washington University did not escape criticism. In the report Flexner made to Henry Smith Pritchett, Ph.D., president of the Carnegie Foundation for the Advancement of Teaching and former professor of astronomy at Washington University, he said that one of two courses must be adopted: "The department must be either abolished or reorganized."

Dr. Pritchett mailed the report to Robert S. Brookings, a St. Louis merchant who was president of the Board of Directors of Washington University. Brookings was shocked and immediately went to New York to see Flexner, demanding proof that the conditions were as bad as described. Both returned to St. Louis and the two men went through the School. In less than two hours, Brookings was convinced that drastic action was necessary if the School was to be one of the foremost institutions of medical education and research. The meeting in 1909 of Brookings and Flexner was of unsurpassed significance in the history of the Washington University School of Medicine, for it led to the complete reorganization of the School and the establishment of the present Medical Center. Abraham Flexner inspired the dream of a model medical school; Robert Brookings accepted the challenge, and with the energy and vision which characterized all his enterprises, made the dream a reality.

No time was lost in making changes. The Bulletin of the Medical School for July 1910 made the following statement: "The Corporation of the University, becoming convinced that in no other direction could greater service be rendered than through a great, modern medical school, determined to reorganize the School and to place it in the front rank of American medical institutions. It has called to the heads of a number of leading departments the ablest men it could secure."

When Robert A. Barnes died in 1892, he left a will which directed the trustees of his estate to use $840,000 for the erection and equipment of a hospital "for sick and injured persons, without distinction of creed, under the auspices of the Methodist Episcopal Church, South." Investigation by the trustees into the cost of building a modern hospital convinced them that the sum was not large enough to build an efficient, fireproof building, and they therefore invested the trust. By 1912 the value had increased to $2 million, a sum which permitted the building of a hospital and left an endowment greater than the original fund.

At the same time the trustees were studying hospital construction, Robert Brookings was studying medical schools. It was apparent to everyone concerned that the two projects, the building of a medical school and the construction of a modern hospital, were so interrelated that the purpose of each would be more successfully fulfilled by an affiliation. A medical school would provide a highly trained staff and would assure the most modern methods and superior laboratory facilities for the
A teaching hospital would give patients superior care and, at the same time, provide the essential clinical experience consistent with modern medical teaching methods.

In the spring of 1912, construction was begun on the medical school and hospital buildings which today form the nucleus of the present center. The laboratories were moved from their old quarters in downtown St. Louis into the new buildings on Euclid Avenue and Kingshighway Boulevard during the summer of 1914, and late in the fall of the same year the activities of the Washington University Hospital were transferred to Barnes Hospital. Concomitantly, the St. Louis Children’s Hospital, then located on Jefferson Avenue, became affiliated with the School of Medicine and moved to its new quarters in the Medical Center.

On April 28, 29 and 30, 1915, exercises were held to celebrate the completion of this group of buildings designed to promote the practice, the teaching and the progress of medicine. The dedication ceremonies marked what Dr. William H. Welch of The Johns Hopkins University called "one of the most significant events in the history of medical education in America." Robert S. Brookings, the one man most responsible for the reorganization, voiced the hope that "our efforts will contribute, in some measure, to raising the standard of medical education in the West, and that we will add, through research activities, our fair quota to the sum of the world’s knowledge of medicine." These prophetic words have been realized.

In the ensuing years, the Medical Center has continued to grow, and now its facilities are among the best in the world. With the increase in size of the physical plant there has come a substantial increase in the number of the faculty; the expansion has been made without compromise to the standards that marked the early development of the Medical Center. As a result, significant achievements in both research and clinical areas have been steadily recorded.

### Faculty

The Washington University School of Medicine has one of the finest faculties of any medical school in the nation. Recognized for their distinguished achievements in original research, 13 faculty members have been elected to the National Academy of Sciences. Eighteen Nobel laureates have been associated with the School of Medicine.

During Fiscal Year 2004, 121 members of the faculty held individual or career development awards: 72 from the National Institutes of Health; one from the American College of Surgeons; one from the American Diabetes Foundation; one from the American Digestive Health Foundation; one from the American Federation for Aging; one from the American Foundation for AIDS Research; nine from the American Heart Association; one from the American Society of Clinical Oncology; one from the Aplastic Anemia and MDS International Foundation; two from the Arthritis Foundation; one from the Association of University Professors of Ophthalmology; six from Burroughs Wellcome Fund; one from the Jose Carreras Leukemia Foundation; two from the Crohn’s and Colitis Foundation of America; one from the Doris Duke Charitable Foundation; one from the John Douglas French Alzheimer’s Foundation; two from the Robert Wood Johnson Foundation; two from the W.M. Keck Foundation; two from the Leukemia Society of America, Inc.; one from the Muscular Dystrophy Association; two from the National Alliance for Research on Schizophrenia and Depression; one from the Neuroradiology Education and Research Foundation; two from the Orthopaedic Research and Education Foundation; two from the Pfizer Pharmaceuticals; two from Research to Prevent Blindness, Inc.; and one from the Whitaker Foundation.

The School of Medicine has 19 faculty members with Method to Extend Research in Time (MERIT) status, a special recognition given to only a few NIH grantees, which provides long-term, uninterrupted financial support to investigators who have demonstrated superior achievement during previous research projects.
In 2004-2005, the School employed 1,450 full-time, salaried faculty members in its 20 preclinical and clinical departments. The clinical departments are further strengthened by 1,150 part-time faculty members, a group of physicians who practice their medical specialties in St. Louis and are members of one or more of the staffs of the hospitals in the Washington University Medical Center.

**Students**

The School of Medicine attracts a student body of exceptional quality. The 2004 Entering Class of 123 students was selected from a pool of 3,921 applicants. The School is a national institution with 47 states and 28 countries represented in the current enrollment.

In 2005, the School conferred the M.D. degree upon 90 individuals. In addition, six students received the M.A./M.D. degrees and 18 students graduated with the M.D. and the Ph.D. degrees. Graduating students who participated in the 2004 National Residency Matching Program matched in programs recognized for high quality and selectivity. In the Alphabetical List of Students section, the graduates are listed by name, hometown, undergraduate and graduate schools attended and year of degree, type of postgraduate residency program, name of hospital and the city in which it is located.

The student body of the School of Medicine numbers 592 medical students. Programs also are conducted for 412 students who are pursuing graduate degrees in health administration, occupational therapy, physical therapy, psychiatric epidemiology or genetic epidemiology. The Division of Biology and Biomedical Sciences has extensive graduate training programs for 568 students seeking the Doctor of Philosophy degree in areas of Biochemistry, Chemical Biology, Computational Biology, Developmental Biology, Evolutionary and Population Biology, Immunology, Molecular Biophysics, Molecular Cell Biology, Biochemistry, Molecular Genetics, Molecular Microbiology and Microbial Pathogenesis, Neurosciences, Plant Biology and Quantitative Human and Statistical Genetics.

**Teaching Facilities**

The 230-acre Washington University Medical Center, spread over portions of 20 city blocks, is located along the eastern edge of Forest Park in St. Louis. Along the western edge of the park is the 169-acre Hilltop Campus of the University. A regularly scheduled shuttle bus, operated for the benefit of students, faculty and staff, brings the two campuses within 10 minutes of each other.

The medical center was incorporated in 1962. It now consists of the Washington University School of Medicine, Barnes-Jewish Hospital, St. Louis Children’s Hospital, Barnard Hospital and Central Institute for the Deaf, and is affiliated with BJC Health System. Two integral units of the Medical Center are the world-famous Mallinckrodt Institute of Radiology (MIR) and the Center for Computational Biology.

The medical center generates an annual financial impact of more than $2.3 billion for the St. Louis area, according to an economic model maintained by the St. Louis Regional Commerce and Growth Association. With nearly 20,000 employees, the combined medical center institutions are the second largest employer in the metropolitan area.

Unprecedented growth has occurred at the Medical Center over the past 10 years. At the School of Medicine alone during the past three years, more than $188 million has been expended on renovation and new construction. Capital improvements have added 1,010,000 square feet of space to the medical school during this same period. In the most recent fiscal year, more than $60 million of capital improvements were made at the School.

In the last 10 years, School of Medicine expansion has included the **Eric P. Newman Education Center**, the **CSRB North Tower Research Addition**, the **East McDonnell Sciences Building**, the **Specialized Research Facility - East**, the **Mallinckrodt Institute of Radiology East Imaging Research Facility**, the **McDonnell Pediatric Research Building**, the **Southwest Tower**, the
Center for Advanced Medicine, the acquisition of the Central Institute for the Deaf buildings, and the school's first dedicated teaching facility — the Farrell Learning and Teaching Center. This 110,000-square-foot, six-story facility, located at the corner of Scott and Euclid avenues, will be the home for all of the medical school teaching labs, small-group and seminar rooms, and all individual student study areas. A new lecture hall, case-study hall and café are located on the first floor of the building, which opens in September 2005.

The 45,160-gross-square-foot Eric P. Newman Education Center accommodates non-degree professional education for the Medical Center. The education center provides auditoriums, classrooms, meeting space and lecture halls to support and enhance a comprehensive education program. The 136,977-gross-square-foot, seven-story East McDonnell Sciences Building is a maximum-barrier research facility to accommodate higher brain function research and transgenic studies.

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The 10-story Clinical Sciences Research Building (CSRB) North Tower Research Addition, 201,349 gross square feet, consolidates all medical school specialized research into one structure. The top three floors of the addition house wet lab research space. The addition of 45,000 gross square feet and renovation of 22,000 gross square feet in the Mallinckrodt Institute of Radiology East Imaging Research Facility, East Building, provided space for the creation of an Imaging Center that houses four major MRI (Magnetic Resonance Imaging) units. Moreover, the new 230,000-square-foot McDonnell Pediatric Research Building adds new, state-of-the-art research facilities, 4.5 floors for the Department of Pediatrics, three floors for the Department of Molecular Microbiology, and one half floor for the Department of Medicine, is located on the corner of Euclid Avenue and Children’s Place. This new building includes a Barnes & Noble bookstore with a coffee shop on the ground floor level.

The Center for Advanced Medicine, located at the corner of Euclid and Forest Park avenues, is a shared facility between the School and BJC. This building brings all of the Medical Center's clinics together under one roof. The School of Medicine occupies 243,400 square feet in the Center for Advanced Medicine and 75,000 square feet on three floors in the new Southwest Tower. Located in the heart of the Center for Advanced Medicine is the 66,150 square foot Alvin J. Siteman Cancer Center. The Siteman Cancer Center is the only NCI-designated comprehensive cancer center in the region.

In addition, major renovations to existing buildings continue, with emphasis on research facilities. Within the last two years, renovations totaling $95 million have been completed. The Department of Genetics expanded in 2002 through renovations on the seventh and eighth floors of McDonnell Sciences Research Building and together with the Department of Pharmacology recently started up the Center for Genomics and Human Genetics with wet lab renovation of 12,000 square feet on the 5th floor of 4444 Forest Park. The Department of Biochemistry added another Nuclear Magnetic Resonance (NMR) Spectrometer in a small addition to Cancer Research Building. The Department of Ophthalmology expanded wet labs and offices on the 7th floor of McMillan and Maternity buildings. The Departments of Cell Biology and Internal Medicine jointly renovated research labs on the 5th floor of McDonnell Medical Sciences building. Ongoing improvements to the campus infrastructure are being made through the Public Realm Project, which is focused on landscape and streetscape enhancements.

The School of Medicine is divided into two segments. Clinical departments are predominantly located on the west side of the Medical Center, adjacent to hospital and patient areas. Preclinical departments are to the east. Research and instructional endeavors occupy the greater portion of the facilities, with more than 1.8 million gross square feet devoted to these activities. In the aggregate, the medical school occupies more than 5 million gross square feet of space.

The focal point of the preclinical teaching activities is the McDonnell Medical Sciences Building, the center of activity for entering medical students. The McDonnell Building, with 300,000 square feet of first-class research laboratories and classroom space, was made possible by James Smith McDonnell III, a generous benefactor of Washington University. Rising nine floors above ground, it contains administrative offices and two lecture halls on the first floor. Multidisciplinary teaching laboratories
for first- and second-year students, as well as offices and research laboratories for the seven basic science departments, are located on the upper floors. Modern centralized animal quarters are housed in the basement. In addition, two floors (15,467 gross square feet) of Olin Residence Hall have been converted into student carrels, classrooms and conference rooms. New teaching facilities are under way with the construction of the Farrell Learning and Teaching Center, with occupancy in August 2005.

The North and South Buildings, in which the work of several Nobel laureates has centered, have been renovated extensively. Along with the Cancer Research Building, they continue to provide space for laboratories, offices and some departmental facilities. The East Building houses an MRI facility, computer installation and other components of the Mallinckrodt Institute of Radiology. The East Building also houses several administrative office suites and a cyclotron.

A network of pedestrian bridges provides the ability to move freely among the major facilities, enhancing the interaction of all Medical Center institutions and benefiting research and patient care.

Other facilities owned or operated by Washington University include:

**Biotechnology Center.** This five-story facility was recently renovated into laboratories for the departments of Psychiatry, Internal Medicine, Neurology and Pathology.

**McMillan Hospital.** McMillan houses offices and research laboratories for the Departments of Neurological Surgery, Neurology, Ophthalmology and Visual Sciences and Otolaryngology.

**The Edward Mallinckrodt Institute of Radiology (MIR).** Mallinckrodt Institute is internationally recognized for excellence in teaching, research and clinical services. Housed in its own 13-story building, MIR also has satellite facilities in Barnes-Jewish, St. Louis Children’s and Wohl hospitals; the Clinical Sciences Research and East buildings; the Scott Avenue Imaging Center; the Center for Advanced Medicine; and the Knight Emergency and Trauma Center.

**Renard Hospital.** With consolidation of psychiatric patient care services in the West Pavilion, this eight-story structure provides additional office and laboratory space for the Department of Psychiatry.

**St. Louis Maternity Hospital.** Maternity Hospital houses offices for the Departments of Obstetrics and Gynecology, and Ophthalmology and Visual Sciences. A Perinatal Center and laboratories for research in the physiology of reproduction and Psychiatry clinical research are located in this building.

**West Building.** The West Building contains offices and research laboratories for the Departments of Pathology and Internal Medicine.

**David P. Wohl, Jr. Memorial Hospital.** Wohl Hospital, opened in 1953, provides offices and laboratories for the Departments of Medicine and Surgery.

**David P. Wohl, Jr. Memorial-Washington University Outpatient Clinics.** The remaining clinics are administered by Barnes-Jewish Hospital. The lower five floors contain clinical space and space for translational research. The first floor is home for the Chromalloy American Kidney Dialysis Center. The upper five floors are devoted to research facilities for several departments of the School of Medicine.

**4444 Forest Park.** This 294,302-gross-square-foot building houses administrative offices of various medical school departments, the Program in Physical Therapy, the Program in Occupational Therapy and a major research facility for the Department of Genetics and the Genome Sequencing Center, including the new Center for Genomics and Human Genetics.

**Bernard Becker Medical Library.** Founded in 1911, the Washington University Medical School Library is one of the oldest and most comprehensive medical libraries west of the Mississippi. The Bernard Becker Medical Library serves as an information and technology services hub for the Medical
Center and extends its services and resources to the global health science community.

The facility, completed in 1989, integrates biomedical information resources and information technology. The eight-level, 114,000-square-foot structure has a capacity for more than 300,000 volumes. The biomedical resource collection includes more than 200,000 volumes, some 2,000 audiovisual items and over 2,000 current journal subscriptions.

Information Services, as part of the Communication and Outreach Division, answers a wide range of questions covering biomedical and general information. Staff may be contacted by telephone, (314) 362-7085, by electronic mail, reference@medicine.wustl.edu, or at the Information Services desk on Level 1 of the library. Information Services offers individual and group training in database searching. Audience-specific classes can be designed for Medline, Evidence Based Medicine or information management software. Training sessions can be held in the library or off site.

Becker catalog provides complete and current information about the library’s collections. It includes access to over 1,400 electronic full-text journals, 50 online books, and numerous selected web sites. Ovid Online is the library’s premier tool for searching and retrieving biomedical journal literature. Other valuable electronic resources include the Web of Science, Journal Citation Reports and the Cochrane Library. Remote access for these products is available for office or home use. Materials not owned by Becker Medical Library can be obtained through interlibrary loan and document delivery service.

Instructional Technologies and Library Systems (ITLS) offers computer programs, a network of advanced personal computer workstations, and a large computer education classroom. The staff supports student computing. ITLS has been instrumental in supporting the use of high-capacity networks and digital imaging technology in the medical curriculum. ITLS also supports peripheral computer laboratories at other education sites within the Medical Center.

The Becker Library’s technology divisions provide the capability for electronic mail, Internet access and a wide array of specialized software services for all faculty, students and Medical Center collaborators. The facility consists of a broad complement of high-performance servers to accommodate the heterogeneous needs of the Medical Center. A help desk service is available to all faculty and staff during normal working hours. These divisions also ensure that network-based information resources available from the library are disseminated effectively to all Medical Center collaborators.

Access and Collection Management Services manages the print collection, archives and rare books. Some 2000 volumes from the now closed Central Institute for the Deaf library were added to Becker’s book and journal collection in 2003. The library’s Archives and Rare Books unit includes almost 22,000 volumes and outstanding collections such as the Bernard Becker Collection in Ophthalmology, the CID-Max Goldstein Collection in Speech and Hearing, the H. Richard Tyler Collection in Neurology, and the Paracelsus Collection of the St. Louis Medical Society. The archives of the Medical Center contain the records and private papers of the School, memorabilia and oral histories of individuals who have made important contributions to American medicine. Among the manuscript collections are papers of William Beaumont, Joseph Erlanger, E.V. Cowdry, Evarts Graham and Carl Cori.

The Bernard Becker Medical Library takes pride in providing the latest biomedical information and technology services to the Medical Center. For detailed information about the library’s programs and services visit: beckerweb.wustl.edu.

Library hours and telephone numbers:

Monday-Thursday: 7:30 a.m. - midnight
Friday: 7:30 a.m. - 10 p.m.
Saturday: 8:30 a.m. - 6 p.m.
Sunday: 12 p.m. - midnight
Expanded study hours during exam periods and holiday hours are posted as needed.
Barnes-Jewish Hospital, a 1,390-bed teaching and research facility, is the largest hospital in Missouri, with 581,639 inpatient admissions, outpatient, and emergency department visits from patients around the world. It provides clinical experience for medical students for all clinical departments except Pediatrics. The medical staff is composed exclusively of members of the faculty of the School of Medicine.

Rated by U.S. News & World Report as one of the top 10 hospitals in the country, Barnes-Jewish Hospital has a premier reputation in patient care, medical education, research and community service. Its areas of expertise include cancer, cardiology, cardiothoracic surgery, endocrinology, gastroenterology, geriatrics, gynecology, infectious diseases, nephrology, neurology, neurosurgery, ophthalmology, orthopaedic surgery, otolaryngology, pulmonary disease, rheumatology, transplantation and urology.

St. Louis Children’s Hospital. Since 1879, St. Louis Children’s Hospital has been at the forefront of pediatric medicine, with physicians, nurses and staff who dedicate their lives to the care of children. The hospital provides a full range of health services to children and their families throughout its 300-mile service area, as well as nationally and internationally. Its spectrum of pediatric specialty services includes newborn medicine, cardiology, neurosurgery and the world’s largest pediatric lung transplant program. In 2005, Child magazine ranked St. Louis Children’s Hospital one of the 10 Best pediatric hospitals in America.

St. Louis Children’s Hospital also provides an array of community outreach services, including pediatric mobile health vans, injury prevention programs, educational classes on parenting and child development, as well as patient and parent support groups. The hospital also operates the 454-KIDS Answer Line, a free child health information service and physician referral line staffed by pediatric registered nurses and referral specialists.

BJC HealthCare is one of the largest nonprofit health-care organizations in the United States, delivering services to residents primarily in the greater St. Louis, southern Illinois and mid-Missouri regions. With net revenue of $2.6 billion, BJC serves urban, suburban and rural communities and includes 13 hospitals and multiple community health locations. Services include inpatient and outpatient care, primary care, community health and wellness, workplace health, home health, community mental health, rehabilitation, long-term care and hospice.

Through a collaboration among Barnard Free Skin and Cancer Hospital, Barnes-Jewish Hospital and Washington University, medically indigent patients with cancer or diseases of the skin receive free care from Washington University physicians at the Alvin J. Siteman Cancer Center and Barnes-Jewish Hospital. Barnard Free Skin and Cancer Hospital also houses the Washington University General Clinical Research Center (GCRC), a support center for Washington University clinical investigators.

Central Institute for the Deaf. Founded in 1914 as a place where teachers, hearing and speech professionals, and parents work together to help children with hearing loss, Central Institute for the Deaf (CID) is an internationally recognized center for oral deaf education, preparing its students to participate and succeed in mainstream educational settings. CID teachers use the auditory-oral method, helping deaf children learn to speak, listen and read with proficiency without the use of sign language. CID’s acoustically enhanced "quiet school" features the Joanne Parrish Knight Family Center, serving children and their families from birth to 3. CID preschool-kindergarten and primary-middle school programs serve students ages 3 to 12. CID school children have come from 48 U.S. states and 24 other countries.

CID outreach services include mainstream transitional assistance for students, continuing education
workshops for professionals, and evaluations and curricula used to help hearing-impaired children in all U.S. states and at least 33 countries throughout the world.

CID is financially independent from, but closely affiliated with, CID at Washington University School of Medicine, which continues to operate CID-developed clinic, research and academic programs that benefit children and adults with hearing loss. The University acquired these programs in September of 2003 along with state-of-the-art facilities at the CID campus, 4560 Clayton Avenue, on the south side of the School of Medicine. CID continues to provide faculty and practicum sites for the University’s graduate degree programs in deaf education and audiology. CID teachers and pediatric audiologists continue to work closely with its speech and hearing scientists in studies involving children with hearing loss.

The Alvin J. Siteman Cancer Center at Washington University School of Medicine and Barnes-Jewish Hospital is world-renowned for its basic science, translational research and patient care. The Siteman Cancer Center, which holds more than $125 million in extramural funding for cancer research, is organized into eight research programs (Cancer Genetics, Cancer and Developmental Biology, Tumor Immunology, Hematopoietic Development and Malignancy, Cellular Proliferation, Oncologic Imaging, Prevention and Control, Clinical and Translational and Clinical Research). The Siteman Cancer Center also provides 14 shared resource facilities to its more than 240 research members. Shared resource facilities include: Bioinformatics Core, Biostatistics Core, Clinical Trials Core, Embryonic Stem Cell Core, Hereditary Cancer Core, High-Speed Cell Sorter Core, Molecular Core Laboratory, Multiplexed Gene Analysis Core, Pharmacology Core, Proteomics Core, Small Animal Cancer Imaging Core, Health Behavior and Outreach Core, Good Manufacturing Practice Facility and Tissue Procurement Core.

Other hospitals. The following hospitals also are associated with the School of Medicine, and various members of their staffs hold University appointments:
- Barnes-Jewish West County Hospital
- Barnes-Jewish St. Peters Hospital
- Christian Hospitals Northeast and Northwest
- Metropolitan St. Louis Psychiatric Center
- Missouri Baptist Medical Center
- Veterans Administration Medical Center
- Shriners Hospital for Children
Research Activities

Grants and contracts totaling more than $468 million supported faculty research efforts at the School of Medicine in fiscal year 2004. Substantial additional support was provided directly to faculty investigators by the Howard Hughes Medical Institute. During the same time period, gifts and grants from private sources, including alumni, individuals, foundations, corporations and other organizations totaled $53.2 million from 7,159 entities.

The School of Medicine received $372 million from the National Institutes of Health in grants during the federal fiscal year ending Sept. 30, 2004, making it the fourth-largest recipient of NIH dollars among the 121 U.S. medical schools in fiscal year 2003. That money came in 689 separate awards, 597 of which were designated as research grants, with the remainder primarily funding training and education activities. NIH research grants supported the investigations of at least 836 full-time faculty members.

The Johns Hopkins University: $449,470,782
University of Pennsylvania: $393,623,671
University of California, San Francisco: $379,851,608
Washington University: $371,719,472

The many medical firsts at the School of Medicine include:

- Served as a major contributor on the international team that produced the finished human genome sequence.
- Generated cells that, when injected into the spinal cords of rats, reinsulate nerve axons and improve mobility.
- Developed a genetic test that detects whether an individual will develop a form of thyroid cancer and would benefit from thyroid removal — the first surgical prevention of cancer based on genetic test results.
- Developed a rating scale used worldwide to diagnose Alzheimer's disease.
- Created the first PET scanner, a device that images the brain at work.
- Helped pioneer the use of insulin to treat diabetes.
- Developed a blood test for early diagnosis of prostate cancer.
- Proposed the now-common practice of taking aspirin to help prevent heart attacks.
- Developed a surgery to remove damaged portions of emphysema patients' lungs, dramatically improving function.
- Pioneered research into excitotoxity and brain injury.
- Developed a cure for hepatitis B in cases diagnosed early.
- Created a surgical cure for atrial fibrillation.
- Performed the world’s first nerve transplant using nerve tissue from a cadaver donor.
- Developed a blood test that quickly and safely identifies whether a heart attack patient will require invasive treatment.
- Performed innovative larynx restoration surgery for the first time in the United States.
- Helped pioneer cochlear implant technology.
- Demonstrated that bacteria, not stress, cause ulcers.
- Performed the first surgical lung removal.
- Pioneered the use of surgery and medication to lower eye pressure in glaucoma patients to prevent further vision loss.
- Grew embryonic animal tissue transplants into fully functional kidneys in an animal host.

Ongoing research includes:

- Identifying biologic markers that predict the onset of Alzheimer's disease.
- Studying the effects of alcohol and anesthesia on the developing brain.
- Improving pain management strategies for children.
• Developing and using nanoparticles for molecular imaging and targeted drug delivery for cancer and clogged arteries.
• Pioneering the use of magnets to guide catheters.
• Imaging language areas in adult and pediatric brains during recovery from stroke to observe natural rehabilitation patterns.
• Developing drug therapies for histoplasmosis and malaria.
• Determining how microorganisms naturally residing in the gut contribute to human health and disease.
• Investigating weight loss approaches including low-carbohydrate diets, liposuction, gastric bypass surgery and extreme caloric restriction.
• Developing and using new imaging tools to study how nervous system cells form connections.
• Determining the mechanism by which antidepressant medications work in the brain.
• Identifying anatomical and genetic markers of schizophrenia.
• Leading efforts to identify the underlying cause of recurrent urinary tract infections.
• Developing treatments to compensate for individual genetic traits that interfere with drug performance.

BioMed 21
To meet the challenge posed by the current revolution in the biomedical sciences, the School of Medicine has devised a bold new strategy called BioMed 21 to support translational research. Three new units — the Center for Genome Sciences, the Division of Clinical Sciences and the Center for Biological Imaging — accessible to faculty on both the Hilltop and medical campuses, will catalyze and support emerging forms of bioresearch and rapidly convert the knowledge of the genetic blueprint into effective, individualized medical treatments. The university has dedicated more than $300 million to the project, including both private support and NIH funding. BioMed 21 is currently supporting construction of the interdisciplinary Center for Genome Sciences; later will come construction of a $150 million building for translational research and an $18 million facility to spur development of mouse models for human diseases. See biomed21.wustl.edu to learn more.

Curriculum

Table of Courses

Lectureships and Visiting Professorships

Course Evaluations

Adviser System

The curriculum is an evolving product of prolonged and continuing study, by both faculty and students, of the present and probable future course of medical science and medical practice, and of the ways in which medical education can be kept abreast of this course. Our students enter medical school with diverse backgrounds and interests and upon graduation undertake a wide variety of careers. The curriculum provides the basic knowledge and skills essential for their further professional development. Modern medical education can no longer hope to be comprehensive; it must be selective. Yet students must develop facility in the understanding and use of several related technical languages: those of anatomy, chemistry, physiology and clinical medicine. They must share responsibility for the care of the patient. They also must learn how these areas of endeavor are interrelated, how the organization and needs of society influence the methods of providing medical care, and how new knowledge is acquired and old knowledge re-evaluated.

The curriculum includes a core experience based upon a sequence of courses that introduces students to the many domains and disciplines of medicine. The principles, the methods of investigation, the problems and the opportunities in each of the major disciplines of medical science and medical practice are presented in such a way as to help students select the career best suited to their abilities and goals.

In the final year of the medical school curriculum, the required elective program helps students to
decide where major interests lie. It also enables them to benefit from the wide range of specialized knowledge and skills found in the faculty and lays the foundation for lifelong learning and application of principles. The elective program permits students to select, according to their desires, the areas they wish to explore or to study in depth.

**Table of Courses/Coursemasters 2004-2005**

**First Year**

First-year courses are taught during the 38-week academic year.

<table>
<thead>
<tr>
<th>Course No./Course Title</th>
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<tbody>
<tr>
<td>M75 503  Cell and Organ Systems Biology</td>
</tr>
<tr>
<td>Paul C. Bridgman, Ph.D., 362-3449 (Histology)</td>
</tr>
<tr>
<td>Robert S. Wilkinson, Ph.D., 362-2300 (Physiology)</td>
</tr>
<tr>
<td>M05 501A Human Anatomy and Development</td>
</tr>
<tr>
<td>Glenn C. Conroy, Ph.D., 362-3397</td>
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<tr>
<td>M30 523  Immunology</td>
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<tr>
<td>Andrey S. Shaw, M.D., 362-4614</td>
</tr>
<tr>
<td>M30 511  Medical Genetics</td>
</tr>
<tr>
<td>Alison J. Whelan, M.D., 362-7800</td>
</tr>
<tr>
<td>M30 526  Microbes and Pathogenesis</td>
</tr>
<tr>
<td>Henry V. Huang, Ph.D., 362-7059</td>
</tr>
<tr>
<td>Scott J. Hultgren, Ph.D., 362-7059</td>
</tr>
<tr>
<td>M15 502  Molecular Foundations of Medicine</td>
</tr>
<tr>
<td>Linda J. Pike, Ph.D., 362-9502</td>
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<tr>
<td>M35 554  Neural Sciences</td>
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<tr>
<td>David C. Van Essen, Ph.D., 362-7043</td>
</tr>
<tr>
<td>Timothy E. Holy, Ph.D., 362-0086</td>
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<tr>
<td>W. Thomas Thach Jr., M.D., 362-3538</td>
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<tr>
<td>M25 507  The Practice of Medicine I</td>
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<tr>
<td>Robert J. Rothbaum, M.D., 362-3480</td>
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<tr>
<td>• Clinical Skills</td>
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<tr>
<td>Katherine E. Henderson, M.D., 362-3480</td>
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<tr>
<td>• Ethics and Health Policy</td>
</tr>
<tr>
<td>Rebecca Dresser, J.D., 454-7116</td>
</tr>
<tr>
<td>• Health Promotion/Disease Prevention</td>
</tr>
<tr>
<td>Jane M. Garbutt, MBChb, FRCP., 362-3480</td>
</tr>
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<td>• Interpreting Illness</td>
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<tr>
<td>Stephen S. Lefrank, M.D., 454-7116</td>
</tr>
<tr>
<td>• Patient-Physician Communication</td>
</tr>
<tr>
<td>Kellie L. Flood, M.D., 362-3480</td>
</tr>
<tr>
<td>• Scientific Method of Clinical Medicine and Research</td>
</tr>
<tr>
<td>Jay F. Piccirillo, M.D., 362-3480</td>
</tr>
</tbody>
</table>

2004-2005 Selectives
M04 • General Selectives
Koong-Nah Chung, Ph.D., 362-4395

M04 • Medical Humanities
Stephen S. Lefrak, M.D, 454-7116

A selective is 10 clock hours in duration. Examples of selective offerings from last year include:

582 Alzheimer’s Disease
5881 Analysis of Clinical Data
5877 Basic Neuroscience
537 Cardiovascular Control Mechanism
5017 Clinical Correlations in Neuroscience
5381 Clinical Immunology
5351 Complementary and Alternative Medicine
530 Contemporary Molecular Immunology
522H Dealing with Sick Folks
587K Discussions in Medical Economics and Public Policy
5874 Doctor as Health Protector and Client
538H Doctors on Film
5871 Ethics in Neurological Practice
5302 Frontiers in Leukemia
5068 Fundamentals of Molecular Cell Biology
586H Health and Human Rights
5001 History of Medicine
5292 Impact of Genomics on Human Disease
587L International Health
5013 Introduction to Emergency Medicine
536B Introduction to Surgery
500A Journal Club
5882 Longitudinal Patient Assessment
524H Major Religious Traditions
5061 Medicine of Laughter
5667 Microcirculation
587E Neighborhood Health Clinic
526 New Diseases, New Pathogens
5362 Patient Communication Skills in OB/GYN
516H Patient, Physician, and Drama
587B Pediatric Medicine
537H Physicians and Literature
534A Progression of Kidney Disease
5392 Protein Structure
598 Psychiatry and Literature
5144 Signal Transduction
535H Social Medicine
899 Special Study
587D STATS
528H Terminal Illness and Death
533 Tropical Medicine
587G Wash Univ Medical Plunge (WUMP)

**Second Year**

Second-year courses are taught during the 36-week academic year.
<table>
<thead>
<tr>
<th>Course No/Course Title</th>
<th>Instructor(s)</th>
<th>Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>M25 611B Cardiovascular Disease</td>
<td>Dana R. Abendschein, Ph.D.</td>
<td>362-8909</td>
</tr>
<tr>
<td>M25 614 Dermatology</td>
<td>Lynn A. Cornelius, M.D., Jeffrey E. Petersen, M.D.</td>
<td>362-8187, 996-8810</td>
</tr>
<tr>
<td>M35 632 Diseases of the Nervous System</td>
<td>Allyson Zazulia, M.D.</td>
<td>362-6378</td>
</tr>
<tr>
<td>M55 660B Clinical Topics in Otolaryngology</td>
<td>Joel A. Goebel, M.D., James M. Hartman, M.D.</td>
<td>747-0553, 367-7346</td>
</tr>
<tr>
<td>M25 615A Endocrinology and Metabolism</td>
<td>William E. Clutter, M.D.</td>
<td>362-8094</td>
</tr>
<tr>
<td>M25 620A Gastrointestinal and Liver Diseases/Nutrition</td>
<td>Deborah C. Rubin, M.D.</td>
<td>362-8940</td>
</tr>
<tr>
<td>M25 625A Hematology and Oncology</td>
<td>Scot G. Hickman, M.D.</td>
<td>289-6308</td>
</tr>
<tr>
<td>M25 605A Infectious Diseases</td>
<td>Nigar Kirmani, M.D.</td>
<td>454-8214</td>
</tr>
<tr>
<td>M45 635B Obstetrics/Gynecology</td>
<td>Andrea P. Stephens, M.D.</td>
<td>362-1016, 362-3126</td>
</tr>
<tr>
<td>M60 665 Pathology</td>
<td>Erika C. Crouch, Ph.D.</td>
<td>454-8462</td>
</tr>
<tr>
<td>M65 640 Pediatrics</td>
<td>Leonard B. Bacharier, M.D.</td>
<td>454-6299</td>
</tr>
<tr>
<td>M25 607 The Practice of Medicine II</td>
<td>Megan Wren, M.D.</td>
<td>362-3480</td>
</tr>
<tr>
<td>• Clinical Skills</td>
<td>Katherine E. Henderson, M.D.</td>
<td>362-3480</td>
</tr>
<tr>
<td>• Ethics and Health Policy</td>
<td>Rebecca S. Dresser, J.D.</td>
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</tr>
<tr>
<td>• Interpreting Illness</td>
<td>Stephen S. Lefrak, M.D.</td>
<td>454-7116</td>
</tr>
<tr>
<td>• Medicine Patient Sessions</td>
<td>Katherine E. Henderson, M.D.</td>
<td>362-3480</td>
</tr>
<tr>
<td>• Neurology Patient Sessions</td>
<td>Allyson Zazulia, M.D.</td>
<td>362-6378</td>
</tr>
<tr>
<td>• Ophthalmology</td>
<td>Morton E. Smith, M.D.</td>
<td>362-3480</td>
</tr>
<tr>
<td>• Patient-Physician Communication</td>
<td>Kellie L. Flood, M.D.</td>
<td>362-3480</td>
</tr>
<tr>
<td>• Radiology</td>
<td>Sanjeev Bhalla, M.D.</td>
<td>362-3480</td>
</tr>
</tbody>
</table>
• Scientific Method of Clinical Medicine and Research
  Jay F. Piccirillo, M.D., 362-7394

M70 670A  Principles of Pharmacology
  Douglas F. Covey, Ph.D., 362-1726

M85 676A  Diseases of the Nervous System: Psychiatry
  Laura J. Bierut, M.D., 362-3492
  Melissa A. Swallow, M.D., 362-2440

M25 612B  Pulmonary Diseases
  Michael B. Lippmann, M.D., 289-6306

M25 613B  Renal and Genitourinary Diseases
  Stanley Misler, Ph.D., M.D., 454-7966
  David Windus, M.D., 362-7211

M25 606A  Rheumatology
  Leslie E. Kahl, M.D., 454-7279

**Third Year**

Clinical Clerkship (Third) Year is a 48-week academic year.

**Course No./Course Title**

**Required Clerkships:**

M95 790  Integrated Surgical Disciplines Clerkship (12 Weeks)
  Valerie Halpin, M.D., 362-8029

M25 710  Medicine Clerkship (12 Weeks)
  Thomas M. De Fer, M.D., 362-8050

M35 720  Neurology Clerkship (4 weeks)
  Robert Naismith, M.D., 362-3293

M85 770  Psychiatry Clerkship (4 weeks)
  Kevin J. Black, M.D., 747-2013

Women's and Children's Health Clerkships (12 weeks):

M65 760  • Pediatrics Clerkship
  Angela M. Sharkey, M.D., 454-6299
  Kathleen A. McGann, M.D., 454-6299

M45 730  • Obstetrics/Gynecology Clerkship
  Andrea P. Stephens, M.D., 362-1016, 362-3126

**Selective Clerkships: (choice of one block)**

M25 714  • Ambulatory: Emergency Medicine Clerkship (4 weeks)
  Mark Levine, M.D., 362-6743
  Sandy Sineff, M.D., 362-7959
Fourth Year

Elective (Fourth) Year is a 44-week academic year.

To qualify for the Doctor of Medicine degree at Washington University School of Medicine, fourth-year students are required to participate in a minimum of 36 weeks of electives (full-time clinical or research courses). Two-thirds of the minimum required time for the Elective Year must be taken exclusively in residence in the Washington University School of Medicine elective course program. A complete listing of fourth-year elective offerings at Washington University School of Medicine is available through the Office of the Associate Dean for Medical Student Education. Students may participate in clinical electives of four weeks duration. If a student takes a research elective, that elective must be of at least six weeks’ duration.

A maximum of 12 weeks’ credit is allowed for full-time elective coursework taken at other academic institutions. These may be clinical or research electives. Students desiring credit for work to be done at other institutions must petition the Associate Dean for Medical Student Education. Absolutely no credit will be granted for electives undertaken prior to approval from the appropriate administrative committees.

Credit may be given for elective work done at any point in the standard four-year Doctor of Medicine degree program so long as participation conforms to current elective guidelines, and a) the student is a duly registered, full-time student for a minimum of three years and nine months, including scheduled vacation time, and tuition is paid for four complete academic years; or b) if transferring into the third-year class, the student is a duly registered, full-time student for a minimum of 22 months and tuition is paid for two complete academic years.

Students are encouraged to take lecture-seminar elective courses, but such offerings are optional. Clock hours for the year total 1,386 (36 weeks). Remuneration for work done while participating in electives for credit is prohibited.

Lectureships and Visiting Professorships
Several established lectureships enable the School to bring to the Medical Center each year distinguished guests who contribute significantly to the richness of student life.

**Ben T. Abelson Memorial Lectureship in Pediatric Hematology-Oncology.** Established by Mrs. Ben T. (Ann) Abelson, the first lecture was held on January 8, 1988.

**Harry Alexander Visiting Professorship.** Established in 1964 by former house staff and friends of Dr. Harry Alexander to provide an annual visiting professor in the Department of Medicine.

**Alpha Omega Alpha Lectureship.** Given each year by a faculty member of the students’ selection.

**Daniel R. Biello Memorial Lectureship.** Established in 1986 by friends, students and colleagues of Dr. Daniel R. Biello to provide an annual lectureship devoted to advances in radiology and nuclear medicine.

**George H. Bishop Lectureship.** Supported by funds made available by friends interested in the advancement of neurology.

**Daniel Bisno, M.D., Memorial Lecture on Ethics in Ophthalmology.** Established in 2001 by David C. Bisno, M.D., in memory of his father.

**Estelle Brodman Lectureship Fund.** Established in 1981 by friends and colleagues of Dr. Brodman in honor of her distinguished contributions to the School of Medicine.

**The James Barrett Brown Visiting Professorship in Plastic and Reconstructive Surgery.** Created in 1969 by patients, friends, colleagues and former students to honor Dr. Brown.


**H. Marvin Camel Lectureship.** Established in 1999 by family, friends and colleagues to honor Dr. H. Marvin Camel’s retirement.

**Glover H. Copher Lectureship in Cancer.** Founded in 1971 with endowment provided by Dr. Copher and friends.

**The Carl F. and Gerty T. Cori Visiting Professorship.** Established in 1985 in honor of Nobel Laureates Carl and Gerty Cori by the Edward Mallinckrodt, Jr. Foundation, colleagues, faculty and former students.

**Philip R. Dodge Lectureship.** Established in 1987 by friends and colleagues to provide an annual lectureship in the Department of Pediatrics.

**Joseph Erlanger Lectureship.** Established in 1989 by the Department of Cell Biology and Physiology to honor Dr. Erlanger.

**I. Jerome Flance Visiting Professorship.** Established in 1977 by former students and friends of Dr. Flance to provide annually a visiting professor in the Division of Pulmonary Diseases.

**Julia Hudson Freund Lecture in Oncology.** Established in 1982 by S.E. Freund in memory of his wife to provide a visiting lectureship in clinical oncology in the Division of Oncology. This was endowed in 2002 by the Harry and Flora D. Freund Memorial Foundation.

**Harvey A. and Dorismae Hacker Friedman Lecture on Aging.** Established in 2001 to honor the Friedmans for their instrumental role in helping to create the Center for Aging and for their ongoing leadership and support.

**Edwin F. Gildea, Jr. Lectureship in Psychiatry.** Established in 1978 by friends, colleagues and
former students of Dr. Gildea.

**Joseph J. Gitt Visiting Professorship in Clinical Neurology.** Established in 1971 by his family and friends to honor Dr. Gitt.

**Graham Colloquium.** A gift from Mr. and Mrs. Evarts Graham, Jr., in 1963 to encourage opportunities for students to expand their views on social, philosophical, artistic and political topics.

**The Evarts A. Graham Lecture.** Established in 1985 by the Washington University Alumni of the Phi Beta Pi medical fraternity to honor the memory of Dr. Evarts A. Graham.

**Samuel B. Guze Lectureship.** Established in 1990 by friends and colleagues to honor Dr. Guze.

**Carl Gayler Harford Lectureship.** Established in 1977 by the family of one of Dr. Harford’s patients in gratitude for his contributions to teaching clinical medicine and virology.

**Alexis F. Hartmann, Sr. Lectureship.** Established in 1960 by friends interested in pediatrics to provide an annual lecture in Dr. Hartmann’s honor.

**Alex H. Kaplan Visiting Professorship/Lectureship.** Established in 1986 by Dr. and Mrs. Alex H. Kaplan to support a visiting psychoanalyst.

**Michael and Irene Karl Lectureship in General Internal Medicine.** Created in 1983 by Mr. and Mrs. Meyer Kopolow to provide an annual lectureship in honor of Drs. Michael and Irene Karl.

**The Jack and Barry Kayes Lectureship in Ophthalmology and Visual Sciences.** Established in 2001 by Dr. Jack and Mrs. Barry Kayes to endow a lectureship in the Department of Ophthalmology and Visual Sciences.

**Charles Kilo, M.D. Lectureship in Internal Medicine.** Established in 1998 by Mrs. Ola H. Blodgett to pay tribute to the expert and compassionate care provided by Dr. Charles Kilo.

**David M. Kipnis Lectureship in Molecular Biology and Pharmacology.** Established in 1998 to provide an annual lecture in honor of Dr. Kipnis.

**Robert S. Klayman Memorial Lecture.** Established in 1997 by Mrs. Robert S. Klayman, in memory of her husband, to support an annual lecture on Parkinson’s Disease Research.


**Paul E. Lacy Lectureship in Pathology.** Established in 1987 by The Kilo Diabetes and Vascular Research Foundation in honor of Dr. Lacy’s many contributions to pathology and diabetes research, and to recognize his collaboration over the years with the co-founders of The Kilo Foundation.

**William M. Landau Lectureship.** This lectureship was established in 1995 by friends, family and colleagues of Dr. Landau.

**Marvin and Barbara Levin Visiting Lectureship.** Established in 1997 by Dr. Marvin & Mrs. Barbara Levin to support an endocrinology lectureship in Medicine.

**Irwin Levy Memorial Fund.** Supports the Dr. Irwin Levy Visiting Lectureship in Neurology, which was established in 1978 by Mr. and Mrs. Meyer Kopolow.

**Oliver H. Lowry Lectureship.** Established in 1978 by friends, colleagues and former students of Dr. Lowry.

**H. Relton McCarroll, Sr. Visiting Professorship in Orthopaedic Surgery.** Created in 1972 by

G. Leland Melson II Lectureship. Established in 1993 in memory of Dr. Melson by his friends and colleagues.

J. Neal and Lois Middelkamp Lectureship. Established in 2001 by Dr. J. Neal and Lois Middelkamp to support a pediatric lectureship in infectious diseases and advances in pediatric education for medical students, residents and pediatricians, all life-long interests of Dr. Middelkamp.

The Dr. and Mrs. William B. Mill, Jr. Lectureship. Established in 2001 in the Department of Radiation Oncology by Dr. and Mrs. William B. Mill, Jr. This was given in recognition of the career accomplishments of Carlos A. Perez, M.D., and the impact he had on the professional development of Dr. Mill.


Carl A. Moyer Visiting Professorship of Surgery. Established in 1978 by The Harry Freund Memorial Foundation to support an annual lecture in honor of Dr. Moyer’s contribution to surgery.

National Kidney Foundation — Saulo Klahr, M.D. Lectureship. Established in 1991 by the Kidney Foundation to honor Dr. Klahr, past president of the National Kidney Foundation and the John E. and Adaline Simon Professor and Vice Chair of the Department of Medicine at Washington University.

Joseph H. Ogura Lectureship. Established in 1977 by friends and colleagues of Dr. Ogura as a tribute to his numerous scientific accomplishments and contributions to the School of Medicine and graduate medical education, and his commitment to patient care.

Carlos A. Perez Endowed Lectureship in Oncology. Established in 2002 in the Department of Radiation Oncology by Dr. Perez’s friends, colleagues, and current and former trainees in grateful recognition for his inspiration, guidance and leadership.

Dr. Roy H. Petrie Lectureship. Established in 2000 with gifts from various donors in memory of Roy H. Petrie, M.D.

Rose and Samuel Pollock Surgical Lectureship. Established in 1976 by Dr. Joseph H. Pollock in memory of his parents.

The Probstein Oncology Lectureship. Established in 1985 by Mr. and Mrs. Norman K. Probstein in appreciation of professional services provided by William Fair, M.D., former head of the urology division of the Department of Surgery, and Carlos Perez, M.D., professor emeritus of radiology and head of radiation oncology at the Medical Center’s Mallinckrodt Institute of Radiology.

James A. Purdy Endowed Lectureship. Established by Elekta Oncology Systems, Ltd. in 2002 to honor Dr. James Purdy for his contributions to the field of Radiation Oncology.

Eli Robins Lectureship in Psychiatry. Established in 1977 by friends, colleagues and former students of Dr. Robins.

Peggy Sansone Memorial Lectureship. Created in 2002 by Anthony F. Sansone, Jr. and the Peggy Sansone Special Angel Foundation to promote the exchange of ideas and scientific information on the topic of depression and the role of spirituality in personality development, happiness and mental health. The lecture is a memorial to Mr. Sansone’s wife, Peggy Sansone.

Julio V. Santiago Leadership. Established in 1999 by the Department of Pediatrics as a lasting tribute to Julio V. Santiago, M.D., for his long-standing contributions to the areas of diabetes,
endocrinology and metabolism.

The Rena Schechter Memorial Lectureship in Cancer Research in the Department of Medicine. Established in 1996 by Dr. Samuel E. Schechter to create a lectureship in cancer research in memory of his wife, Rena Schechter.

Dr. Alexander and Helena Schonfeld Lectureship. This lectureship was established in 1994 by Mrs. Helena Schonfeld, in honor of her son, Gustav Schonfeld, Professor of Medicine at Washington University School of Medicine.

Henry G. Schwartz Lectureship. Created in 1983 by former residents and colleagues from the neurosurgery department to honor Dr. Schwartz.

Wendell G. Scott Memorial Lectureship. Established in 1972 by friends and colleagues of Dr. Wendell G. Scott.

Major G. Seelig Lectureship. Established in 1948 in the field of surgery by friends of Dr. and Mrs. Seelig.

Philip A. Shaffer Lectureship. Founded in 1957 by friends of Dr. Shaffer in recognition of his accomplishments in biochemistry.

Earl E. and Wilma Shephard Orthopaedics/Otolaryngology Memorial Lecture. Established in 1994 through a bequest by Dr. and Mrs. Shephard.

Frank O. Shobe Lectureship. Established in 1986 by friends of Dr. Shobe to honor him as a physician and teacher.

Donald C. Shreffler Genetic Lectureship. Established in 1995 by Mrs. Donald C. Shreffler as a memorial to her husband.

Eduardo Slatopolsky Lectureship. Established in 1988 by Mr. and Mrs. William Wolff in honor of Dr. Slatopolsky's 25-year association with the School.

C. R. Stephen, M.D., F.F.A.R.C.S. Fund for Lecture and Clinical Research in Anesthesiology. Established in 1986 by former students, residents, faculty and friends in honor of Dr. Stephen, first Head of the Department of Anesthesiology.

Sterling Drug Visiting Professorship in Pharmacology. Established in 1986 to honor Ernst Zander, M.D., former medical director of Sterling Drug, Inc.

Arthur W. Stickle Lectureship in Pediatric Ophthalmology. Established by Arthur and Emily Stickle in 1995 with their generous gift in recognition of Dr. Stickle’s medical training in the Department of Ophthalmology and Visual Sciences and his special professional contribution to the field of pediatric ophthalmology.

Strunk Family Lectureship in Asthma. Established in 2005 by Dr. Robert C. Strunk and his family to provide lectures in the area of pediatric asthma.

The Richard A. and Betty H. Sutter Visiting Professorship in Occupational and Industrial Medicine. Established in 1985 by Dr. and Mrs. Sutter to encourage opportunities for students, faculty, other physicians and the St. Louis community to expand the understanding and practice of occupational medicine.

Jessie L. Ternberg Pediatric Surgery Visiting Lectureship. Made possible from a fund established in 1977 by Mr. Meyer Kopelow to honor Dr. Ternberg.

Robert J. Terry Lectureship (1939) and Visiting Professorship (1982). Established by alumni
Donald L. Thurston Memorial Lectureship. Established in 1988 by his wife, Dr. Jean Holowach Thurston, and his colleagues and friends, the lecture-ship is devoted to the history of biomedical advances.

Leonard J. Tolmach Lectureship. Established in 1995, this lectureship was endowed by friends and colleagues to honor the legacy of Dr. Tolmach. The lecture theme is radiation biology in clinical radiation oncology.

Mildred Trotter Lectureship. Established in 1975 by friends and former students of Mildred Trotter to bring a distinguished woman scientist to the School of Medicine each year.

Rudolph A. Tuteur Pulmonary Lectureship. This lectureship is endowed by family, friends, patients and colleagues of the Tuteur family to memorialize Rudolph A. Tuteur. The goal of this annual fall event is to promote further understanding of problems associated with chronic pulmonary disease from which he suffered.

Dr. Todd Wasserman Visiting Lectureship in Radiation Oncology. Established in 2004 by Dr. Wasserman and funded by MedImmune, Inc. and friends and colleagues of Dr. Wasserman’s.

Course Evaluations

Systematic course evaluation is performed for each year of the curriculum by faculty peers, teaching faculty and students. This system permits problem identification, ensures timeliness of feedback, promotes discussion of new teaching methodologies, allows curriculum inventory, recommends changes in course offerings and provides better integration of the curriculum. These reviews are guided through a Curriculum Evaluation Committee (CEC) for each of the preclinical years of instruction and another CEC to evaluate both clinical years (i.e., CEC I = first year, CEC II = second year, CEC III = third and fourth years).

The Office of the Associate Dean for Medical Student Education oversees the evaluation system, which is coordinated by Ms. Kelly Noll in the Curriculum Evaluation Office (362-3404). The collected data are forwarded to the respective coursemasters, the Committee on Medical Education and the Academic Affairs Committee.

Adviser System

Student advising occurs within two broad programs.

1. Clinical Advisers: The first-year students are assigned in small groups to selected faculty advisers, representing both basic science and clinical faculty. These groups meet on an informal basis, usually in the hospital setting. The students and faculty member explore mutually interesting topics which may include seeing patients, observing procedures, discussing health insurance or reading journal papers. The advisers serve as faculty contacts but do not have any formal academic advisory role.
Each first-year student is invited to join one of the three academic societies. Entering students are divided equally among the societies. Incoming first-year students and their faculty advisers share the same academic society.

2. Career (fourth-year) Advisers: Each third-year student selects a fourth-year adviser from a list of potential faculty advisers. In most cases, the adviser is a faculty member in the field in which the student will be seeking a residency appointment. The career advisers have responsibility for reviewing the student’s choice for fourth-year electives and making appropriate recommendations for the structure and content of the elective year. In addition, fourth-year advisers serve as valuable resources for information about residency programs.

In addition to the advising programs described, students seek informal advising from faculty with whom they have had contact, either through classroom work, research or clerkships. Students also have faculty and alumni contact through membership in the academic societies.

**Degree Programs**

The Washington University School of Medicine offers four programs leading to the M.D. degree: a regular four-year program, a five-year program, the M.A./M.D. program and a combined M.D./Ph.D. program.

*Doctor of Medicine*

*Master of Arts and Doctor of Medicine*

*Doctor of Philosophy*

*Doctor of Medicine and Doctor of Philosophy*

**Doctor of Medicine**

By conferring the M.D. degree, the University certifies that the student is competent to undertake a career as a doctor of medicine. It certifies further that, in addition to medical knowledge and skills, the graduate possesses qualities of personality — compassion, emotional stability and a responsible attitude — essential to an effective professional life.

A course of medical education for the M.D. degree ordinarily consists of a minimum of four years of study. Students recommended for the Doctor of Medicine degree must be of good moral character, they must have completed an entire academic course of instruction as matriculated medical students, they must have passed all required subjects or the equivalent and have received satisfactory grades in the work of the full academic course, and they must have discharged all current indebtedness to the University. Individuals applying for licensure must be at least 21 years of age. The school requires that students planning to practice clinical medicine take the USMLE Step 1 and Step 2 examinations.

At the end of the final academic year, students who have fulfilled these requirements will be eligible for the M.D. degree.

**Five-Year Program**

In addition to the regular four-year program leading to the M.D. degree and the M.A./M.D. degree program, students are permitted to spend one additional year in an academic program in a medical or medically related field. In exceptional circumstances, an additional year may be permitted. The student may receive a stipend but may not be considered an employee of the University. The program
Master of Arts and Doctor of Medicine

The objective of the M.A./M.D. Program is to provide one full year of individual, full-time, in-depth research experience for medical students in preparation for a career in academic medicine. Program participants absent themselves from medical school and spend 12 months working on basic biomedical research or hypothesis-driven clinical research in the lab of a faculty member. Degree requirements include a presentation before a research advisory committee, submission of a publication-quality manuscript and participation in a research ethics seminar.

No academic credit toward the M.D. degree will be given, but research and thesis may be continued as senior elective for credit. Fellowship stipends and other support are available through the Howard Hughes Medical Institute (basic science research), Doris Duke Foundation (clinical research), the National Institute of Diabetes & Digestive & Kidney Diseases (GI, hepatology, endo-crinology, nutrition, nephrology and hematology research) and the J. Max Rukes Fund (endocrine and metabolism research). Students unable to qualify for one of these awards may also apply for support from the dean of the medical school. Funding amounts may vary and some of these sources have deadlines in early January. Please contact the M.A./M.D. program administrator at (314) 747-6787 for details.

Doctor of Philosophy

The Division of Biology and Biomedical Sciences offers predoctoral programs in Biochemistry, Chemical Biology, Computational Biology, Developmental Biology, Evolutionary and Population Biology, Immunology, Molecular Biophysics, Molecular Cell Biology, Molecular Genetics, Molecular Microbiology and Microbial Pathogenesis, Neurosciences, Plant Biology, and Quantitative Human and Statistical Genetics. These educational activities are organized on an interdepartmental basis by the faculty of all clinical and preclinical departments of the School of Medicine, as well as the departments of Biology and Chemistry in the School of Arts & Sciences. All degrees are awarded through the Washington University Graduate School of Arts & Sciences. Additional information about the Divisional programs may be obtained by contacting:

Graduate Studies Office
Washington University School of Medicine
660 S. Euclid Ave., Campus Box 8226
St. Louis, MO 63110-1093
(800) 852-9074
http://dbbs.wustl.edu

Doctor of Medicine and Doctor of Philosophy
Washington University offers a combined M.D./Ph.D. degree program that utilizes the resources of the Division of Biology and Biomedical Sciences, the Program in Biomedical Engineering, and the School of Medicine under the auspices of the Medical Scientist Training Program (MSTP). The purpose of the program is to train individuals in medicine and biomedical research to prepare them for careers as physician scientists. The program was inaugurated in 1969, and is one of the oldest and largest in the country. The program, normally completed in seven years, has been highly successful; more than 80 percent of those who have completed postgraduate training are actively involved in research programs at leading institutions.

All students in the program receive financial support in the form of stipends (currently $22,500 per year), health coverage, disability and life insurance, and full tuition remission for both the M.D. and Ph.D. phases of training.

Only students who have spent the equivalent of at least two semesters in laboratory research should apply to the Medical Scientist Training Program. Applicants must meet the requirements for admission to both the School of Medicine and the Graduate School of Arts and Sciences, although the Graduate Record Examination is not required. In addition, students planning to concentrate in disciplines related to the chemical or physical sciences should have completed mathematics through calculus, physics and physical chemistry, and advanced organic chemistry. A course in differential equations also is recommended. For those students whose major interests are in the more biological aspects of medical science, the quantitative requirements for chemistry are less extensive, but a strong background in mathematics, chemistry and physics is still important. Although most individuals enter the program as first-year students, applications will be accepted from students in their first or second year at this medical school. The program matriculates approximately 25 new students each year, which represents one-fifth of the entering medical school class.

The program consists of three parts: 1) two years of an enhanced medical curriculum, 2) at least three years of original research toward a thesis to satisfy the requirements for the Ph.D. degree, and 3) at least 15 months of clinical training based on a student’s career goals. Both degrees are awarded at the completion of the program.

Funding support commences when the student begins the program, either in June or at the beginning of the medical school year. Students matriculating in June undertake a research rotation with a faculty member of their choosing.

While the Medical Scientist Training Program includes all medical courses required for the M.D. degree, it incorporates a high degree of flexibility for individuals through a wide range of electives and graduate courses, some of which may be taken during the first year of the medical curriculum. Every effort is made to individualize each student’s curriculum based on previous background and current interests. The medical and Ph.D. curricula are integrated, which permits students to take Ph.D. coursework in lieu of certain medical school coursework. In this way, students may substantially meet the coursework requirements of the Ph.D. program during the first two medical school years. The MSTP director and co-director meet with students individually to help them decide on a personalized curriculum and appropriate laboratory rotations. Lab rotations are executed over the summer.

The MSTP Committee monitors the performance of each student, and a high scholastic standing as well as a commitment to research is expected.

Students normally spend between three and five years in the Graduate School of Arts and Sciences or the School of Engineering satisfying the following requirements:

1) Completion of required graduate coursework;
2) Successful performance in qualifying examinations;
3) Execution of original research suitable for a dissertation;
4) Defense of the thesis; and
5) Completion of a one-semester teaching assistantship.

The Ph.D. degree may be obtained in the Program in Biomedical Engineering or any of the programs of
the Division of Biology and Biomedical Sciences. The Division, now in its 31st year, is a leader in interdisciplinary biomedical education. Member departments of the Division include all clinical and preclinical departments of the Medical School, as well as the Departments of Biology and Chemistry. These departments jointly provide training in the following interdisciplinary programs:

- Biochemistry
- Chemical Biology
- Computational Biology
- Developmental Biology
- Evolutionary and Population Biology
- Immunology
- Molecular Biophysics
- Molecular Cell Biology
- Molecular Genetics
- Molecular Microbiology and Microbial Pathogenesis
- Neurosciences
- Plant Biology
- Quantitative Human and Statistical Genetics

Students may conduct research under any of the faculty affiliated with these programs or faculty in the Biomedical Engineering program.

A series of monthly seminars featuring physician scientists is held for M.D./Ph.D. students. These seminars are aimed at stimulating student interest in clinical medicine, increasing awareness of major research problems in clinical medicine and exposing students to diverse career paths in academic medicine.

M.D./Ph.D. students attend an annual weekend retreat during which students present their research. The retreat also features discussions led by experts on topics selected by students.

To keep students in the Ph.D. phase of training up to date on their clinical skills, monthly opportunities are offered for clinical interactions. Students are matched individually with a clinical mentor in the specialty of their choice. These interactions include going on rounds and attending conferences.

A special two-week non-graded tutorial for M.D./Ph.D. students facilitates their transition into the clinical phase of training.

MSTP students are required to complete a minimum of 15 months of clinical training. Opportunities exist to meet part of the requirement while engaged in Ph.D. training. Students may opt to do up to 24 months of clinics. The intensive clinical training is the last formal requirement for the M.D. degree. Both the Ph.D. and M.D. degrees will be granted at the conclusion of clinical training.

Application Procedure: Students interested in applying to the Medical Scientist Training Program must apply to Washington University School of Medicine, which participates in the American Medical College Application Service (AMCAS). The MSTP application may be downloaded after July 1 at www.mstp.wustl.edu. Those who wish additional information about the program may contact:

Medical Scientist Training Program
Washington University School of Medicine
Campus Box 8226, 660 S. Euclid Ave.
St. Louis, MO 63110-1093
(800) 852-4625
E-mail: mstp@dbbs.wustl.edu
Web site: www.mstp.wustl.edu
Preparation for the Study of Medicine

Entrance requirements to the School of Medicine include:

1. Evidence of superior intellectual ability and scholastic achievement;
2. Completion of at least 90 semester hours of college courses in an approved college or university;
3. Completion of the Medical College Admission Test of the Association of American Medical Colleges;
and
4. Evidence of character, a caring and compassionate attitude, scientific and humanitarian interests, effective communication skills, and motivation suitable for a career in medicine.

Chemistry, physics and mathematics provide the tools for modern biology, for medicine and for the biological basis of patient care. Thus, a firm grounding in these subjects is essential for the study of medical sciences. Entering students are expected to have had at least the equivalent of one-year courses at the undergraduate level in physics and biology; to have studied mathematics through calculus, including integral equations and differential equations; and to have a background in chemistry, including one year of general or inorganic chemistry and one year of organic chemistry. Effective May 2005, course work in biochemistry is encouraged although not required. In addition one semester of biochemistry can be substituted for one semester of organic chemistry. Similarly, one semester of statistics can be substituted for one semester of calculus. In selected instances, one or more of these prerequisites may be waived by the Committee on Admissions, but applicants are strongly advised to pursue their interests in these and in other areas of science.

A major goal of undergraduate college work should be development of the intellectual talents of the individual. This often involves the pursuit of some area of knowledge in-depth, whether in the humanities, social sciences or natural sciences. At the same time, a diversity of background is encouraged in order to provide a necessary foundation for cultural development. Specific courses, other than the few in the natural sciences, are not prerequisites because a great variety of courses may prepare students for the many roles they may play in their medical careers.

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Policy for International Students

The admission decision at Washington University School of Medicine is based on academic and personal merit and not on the ability of the student to pay the costs of education. However, individuals who are not citizens of the United States of America or who do not hold U.S. Permanent Resident Visa status are not eligible for financial aid due to regulations covering many programs used by the School to fund financial assistance. Therefore, in order for the School to complete the required documents
which are necessary for issuance of a visa, the student must document, by a date and in a manner designated by the School, that the necessary amount of funds, as established by the School, is available to pay the costs of education (tuition and living expenses) for the anticipated period of enrollment, normally four years. Documentation of the required amount of financial resources may be by a letter of credit or by deposit of funds in an escrow account with a bank designated by the School.

Application Procedure

Washington University School of Medicine participates in the American Medical College Application Service (AMCAS) of the Association of American Medical Colleges. AMCAS provides a centralized system for applying to any participating medical school with only one application and one set of official transcripts of academic work.

The AMCAS Application for Admission, common to all participating medical schools, is distributed by the AMCAS and pre-professional advisers. Applicants are urged to file their applications as early as possible.

Applicants to the first-year class must submit their AMCAS application so that it is postmarked no later than December 1 of the year prior to that in which they want to matriculate. On receipt of the application from AMCAS, the Office of Admissions promptly contacts the applicant regarding the additional steps to be taken to complete the application. These include completing a supplemental application via the Internet at medschool.wustl.edu/admissions, submission of letters of recommendation and payment of a nonrefundable Application Service Fee of $50. Applicants can check the status of their application via the Internet at the same web site as noted above. Once the application is complete, the Committee on Admissions evaluates it.

The Committee would like to interview every applicant; however, since this would involve several thousand applicants, it is physically impossible to accomplish. Therefore, selected applicants are invited for a personal interview, as well as a tour of the School of Medicine and the Washington University Medical Center. This visit provides an opportunity for the applicant to meet and talk with students and faculty members.

If an applicant is planning an interview trip that will include the St. Louis area, it is appropriate to contact us by e-mail (wumscoa@wustl.edu) or letter to the Interview-Appointments Secretary, Committee on Admissions, Box 8107, Washington University School of Medicine, 660 S. Euclid Ave., St. Louis, MO 63110-1093, to inquire if an interview has been authorized.

Communication by facsimile and e-mail is encouraged. The fax number for the Committee on Admissions is (314) 362-4658. The e-mail address is wumscoa@wustl.edu. The inquiry should be made at least three weeks in advance of the anticipated travel. The Office of Admissions is open weekdays from 8:30 a.m. to 5 p.m. Central Time.

Admission decisions are made by the Committee on Admissions on a rolling schedule beginning October 15. Applicants are notified as soon as a final decision has been made on their application, but by April 15, every applicant should be notified whether he or she is accepted, on the waiting list, or not accepted.

Upon notification of acceptance for admission to the School, the applicant is required to file a Statement of Intent within two weeks. Three options are presented: 1) accept the offer of admission and submit the $100 acceptance deposit; 2) accept the offer of admission, submit the $100 deposit and request financial aid materials; or 3) decline the offer of admission. The $100 acceptance deposit reserves a place in the class and is applied to the tuition charge at the time of matriculation. If an accepted applicant withdraws from the class with written notification to the Admissions Office prior to May 15, the deposit is refunded. The School of Medicine abides by the traffic rules regarding
application timelines as established by AMCAS. Accepted applicants who are non-compliant with AMCAS traffic rules and medical school deadlines may have their acceptance into the class rescinded.

**Background Checks and Screening for Controlled Substances**

Effective in 2005, students entering the School of Medicine who will have contact with patients will be required to have criminal background checks and screening for controlled substances (THC-cannabis, cocaine, opiate, amphetamine, PCP-phencyclidine) in order to qualify for participation in clinical activities at Washington University School of Medicine affiliated clinical facilities. Drug screening will be conducted during student orientation prior to the start of classes. Incoming, prematriculant students will be disqualified to study at the School of Medicine if they do not consent to background checks, if they have significant positive findings on the background checks, or if they have illicit substances detected on drug screening without a bona fide medical indication. Disqualified prematriculant students will be precluded from matriculation and will not be registered as students in the School of Medicine.

**Full-Tuition Scholarships**

In 1978, the School of Medicine established a scholarship program that based selection on merit rather than financial need. As one of the first merit scholarship programs for medical students, the Distinguished Student Scholarship Program has recognized and rewarded academic excellence and personal achievement for 28 years. And, to honor outstanding alumni of Washington University, the Medical Center Alumni Association created in 1989 the Distinguished Alumni Scholarship Program. In 1998, the Barnes-Jewish Hospital Medical Staff Association committed to funding one full-tuition, four-year scholarship to one student in each entering class. Beginning with the 2002-2003 academic year, one additional “named” scholarship was made available through the generosity of a donor.

Most merit-based scholarships are awarded to students in the first-year class and are subject to annual renewal. Recipients of these scholarships are expected to maintain academic excellence. If a scholarship is not renewed, the student may file for financial aid from the School. For scholarship recipients who document financial need above the full-tuition scholarship, additional funds are available to provide support up to the total cost of education. Scholarship recipients may not concurrently participate in the School’s Medical Scientist Training Program or the Armed Forces Health Professions Scholarship Program.

Now known as the Distinguished Scholars Program, its aim is to attract and enroll the most outstanding students in the School of Medicine, thus enriching the scholarly environment and broadening the scope of learning for all students. Scholarship recipients are selected on intelligence, character, personal accomplishments and goals, motivation for medicine, aptitude for science, leadership potential, communication skills and diversity of life experience. Scholarships awarded under this Program include the Distinguished Student Scholars, (DSS), Distinguished Alumni Scholars (DAS), The Barnes-Jewish Hospital Scholars and Danforth Scholars in Medicine.

**Distinguished Student Scholarships**

Up to five full-tuition scholarships may be awarded annually to members of the entering first-year class. In early fall 2005, selected applicants for admission to the School's 2006 first-year class will be invited to file applications for scholarship consideration. Final selection of scholarship recipients will be made by a committee of the faculty and will be based on demonstrated superior intellectual
achievement as well as an assessment of the applicant’s character, attitude, motivation and maturity. The announcement of the 2005-2006 scholarship recipients will be made during the week following the on-campus interviews on Saturday, May 6, 2006.

Distinguished Alumni Scholarships

Up to four full-tuition scholarships are awarded annually to members of the entering first-year class. The application procedure and selection process are the same as for the Distinguished Student Scholarships. Since 1989, Distinguished Alumni Scholarships have been named in honor of:

- Walter F. Benoist, M.D.
- Leonard Berg, M.D.
- Grace E. Bergner, M.D.
- Stanley J. Birge, M.D.
- Eugene M. Bricker, M.D.
- J. William Campbell, M.D.
- David B. Clifford, M.D.
- Justin J. Cordonnier, M.D.
- John D. Davidson, M.D.
- Robert C. Drews, M.D.
- Ronald G. Evens, M.D.
- I.J. Flance, M.D.
- James W. Fleshman, M.D.
- Mark E. Frisse, M.D.
- Bernard T. Garfinkel, M.D.
- Deborah J. Gersell, M.D.
- David Goldring, M.D.
- Sidney Goldring, M.D.
- Samuel B. Guze, M.D.
- Paul O. Hagemann, M.D.
- Alexis F. Hartmann, M.D.
- Alexis F. Hartmann Jr., M.D.
- John C. Herweg, M.D.
- Robert S. Karsh, M.D.
- John M. Kissane, M.D.
- Ira J. Kodner, M.D.
- Allan E. Kolker, M.D.
- Stuart A. Kornfeld, M.D.
- Nicholas T. Kouchoukos, M.D.
- William M. Landau, M.D.
- Virgil Loeb, M.D.
- Maurice Lonsway, M.D.
- Robert H. Lund, M.D.
- Alan P. Lyss, M.D.
- Philip W. Majerus, M.D.
- Gerald Medoff, M.D.
- Paul A. Mennes, M.D.
- J. Neal Middelkamp, M.D.
- Benjamin Milder, M.D.
- Barbara S. Monsees, M.D.
- Carl V. Moore, M.D.
- D. Michael Nelson, M.D., Ph.D.
- Robert C. Packman, M.D.
- Charles W. Parker, M.D.
- Mary L. Parker, M.D.
- Alan L. Pearlman, M.D.
- Frederick D. Peterson, M.D.
- Gordon W. Philpott, M.D.
- Gary A. Ratkin, M.D.
Distinguished Alumni Scholarship Program honorees 2005-2006:

Marc R. Hammerman, M.D., '72
Timothy J. Ley, M.D., '78
David G. Mutch, M.D., '78
Bradley T. Thach, M.D., '68

Barnes-Jewish Hospital Medical Staff Association Scholarship

One full-tuition, four-year scholarship will be awarded to a student in each entering class beginning in 1999. Selection of the Barnes-Jewish Hospital Medical Staff Association Scholar is the same as for the Distinguished Student Scholarship.

Third-Year Class Transfer Program

Each year, Washington University School of Medicine accepts a limited number of transfer students into its third-year class depending on the availability of positions. Transfer applications are accepted from well-qualified second-year students who are enrolled in good standing and eligible to continue in their L.C.M.E.-accredited U.S. medical schools. Applicants must also have a compelling personal reason for requesting transfer and must have the full approval of the dean of their current school. Accepted students are required to successfully complete the USMLE Step 1 examination.

Transfer application forms for admittance into the third-year class are available after October 1 for the following academic year. The deadline for submission of applications is March 31. Those applicants selected for interview will be invited to visit the Medical Center. Applicants will be notified of the decision of the Committee on Admissions by May 15 or when a position becomes available. Inquiries should be directed to:

Third-Year Class Transfer Program
Washington University School of Medicine
Campus Box 8077, 660 S. Euclid Ave.
St. Louis, MO 63110-1093
Phone: (314) 362-6844
Fax: (314) 362-4658
E-mail: wumscoa@msnotes.wustl.edu
Financial Information

Cost of Education

Registration, Payment of Financial Obligations and Refunds

Financial Assistance

Cost of Education

For the first-year class matriculant, tuition and housing rates for the 2005-2006 academic year are listed below. Students who enter in 2005 will benefit from a tuition stabilization plan, which provides that their annual tuition of $39,720 will be constant for up to five consecutive years. The items listed below provide an estimate of the expenses for a single student in the 38-week first-year class. The total of these figures suggests a basic minimum budget of approximately $50,436. Allowances for entertainment, travel, clothing and other miscellaneous items must be added to this estimate.

Tuition (includes Student Health Service and Microscope Lending Plan): $39,720
Books, supplies and instruments: $1,892
Housing and food: $8,824

Student Health Service

The Student Health Service provides comprehensive health care, including hospitalization, for all full-time students in the School of Medicine. Long-term group disability insurance is provided for medical students. All full-time students in the School of Medicine are covered by a $10,000.00 life insurance benefit, with the option to convert to an individual portable policy prior to graduation.

Microscope Lending Plan

Microscopes that meet the technical requirements set by the faculty are provided at no additional charge to each student in the first- and second-year classes. The plan saves students the high cost of microscope purchase and makes available to them a superior quality instrument.

Registration, Payment of Financial Obligations and Refunds

For the convenience of our students, the Washington University billing system provides a central financial account against which most student expenses incurred at the University will be posted, including but not limited to tuition, dormitory charges, parking, library fines, etc. This policy, when referring to tuition and other charges, includes any and all charges posted to this account.

All payments of tuition and other University charges are due and payable on the dates specified in the published calendars of the programs in the School of Medicine. Failure of a student to register when required and pay tuition and other charges incurred on or before the date specified in the published calendar will result in a late fee of $50 to be added to the amount due. The late fee will be imposed seven (7) days after the due date if full payment has not been received. Tuition and other charges are usually payable twice a year, at registration time and again at the middle of the academic year as listed on the schedule on the academic calendar.
Any payment due from the student and not paid by the specified date will accrue interest at the usury rate in effect on the first business day of the month in which the payment is due. This fee will be imposed on any accounts not paid in full within 30 days of the due date. Any amount not paid when due plus accrued interest thereon must be paid in full within three months of the due date to avoid suspension from classes.

If a student fails to settle such unpaid amounts within three months of the original due date, the School will not release the student’s academic record, grade reports or transcript pending settlement of the unpaid account. A student who has not satisfied all of his/her delinquent financial obligations to Washington University (tuition, Olin Residence Hall rental, parking, etc.) one month before the end of the end of the academic year will not be allowed to progress to the next academic year, or be issued a diploma.

Students who rely on financial aid funds to meet their obligations should submit their applications for processing according to application deadlines published by the Office of Financial Aid. Deadlines allow for receipt of financial aid funds if applications are filed by the deadline. The Office of Student Financial Aid will assist students with loan applications and financial planning upon request.

A student who withdraws from the School will receive a pro rata refund of tuition and appropriate fees. The refund will be based on the ratio of the class days enrolled (from the first day of classes to the termination date) to the total number of class days in the term for which tuition and fees were paid. It is understood that the date on which a student formally notifies the Registrar’s Office in writing of the decision to withdraw from the School of Medicine shall be regarded as the termination date, with no retroactive clause to be accepted. A prospective date will be accepted, however. If tuition and fees were paid entirely or in part by financial aid from the School, the refund will be applied first to the total repayment of the accounts from which financial aid was drawn, with any remaining refund balance given to the student. Financial aid received in excess of the costs of tuition and fees must be refunded by the student to the School on the same pro rata basis as calculated for the tuition refund outlined above. Examples of the application of the refund policy may be requested from the Registrar’s Office.

Financial Assistance

The ability to finance a medical education at Washington University does not influence the student selection process. As all students accepted for admission have proven scholastic ability, financial assistance is awarded solely on the basis of documented financial need which cannot be met by student and family resources. Students who consider themselves financially independent of their parents must arrange for loans to replace the amount of support parents are analyzed to have the potential to contribute. The School of Medicine’s Office of Financial Aid (Box 8059) will assist students in making these arrangements.

In responding to the Admissions Committee’s offer of admission, an accepted student may request financial aid application materials. The Financial Aid Office acknowledges the student’s intent and provides instructions for completing the FAFSA. Everyone applying for financial aid must complete a Free Application for Federal Student Aid (FAFSA) and designate Washington University School of Medicine, School Code #G24620, as a recipient. Medical school financial aid application documents and detailed instructions will be made available after January 1, 2006.

The financial aid application materials solicit information about the applicant and parents, including a detailed description of resources and liabilities. If an applicant’s parents are separated or divorced, the financial information is required from both biological parents (excluding income and assets of their spouse, if remarried). If the applicant is married, similar information is required of the spouse. The School expects the applicant to complete and submit the financial aid documents within two weeks
from the date the applicant receives them. Official copies of both biological parents’ and the applicant’s U.S. Individual Income Tax Returns complete the data required for financial aid consideration.

While "permanent residents" of the United States are eligible for most federal financial aid programs, need-based financial aid from Washington is only awarded if the applicant and both biological parents can provide official, audited documents with the same detailed information as provided on a U.S. income tax return. All information is held in strict confidence.

Financial aid awards are credited toward payment of tuition and fees. Proceeds from loans may be disbursed directly to the borrower. The loan portion of an award will be funded through the resources of the School of Medicine or through the federal Stafford Loan program. All loans awarded by the committee are free of interest while a student is enrolled in the School. Financial aid awards are made for a given academic year. Students may reapply for financial assistance in succeeding years if they remain in good academic and personal standing, and if there is continued financial need. Awards made to a student may vary from year to year, depending upon the student’s needs and upon the availability of funds to the Committee. Students are responsible for filing applications for renewal of awards in the spring of each year.

The committee holds that students receiving assistance have an obligation to notify the committee in writing if their financial situation changes, for example, through employment or receipt of a scholarship not anticipated at the time the application was submitted.

First- and second-year students are urged not to accept employment during the academic year. A number of fourth-year students find employment in hospitals within the Medical Center. The personnel office provides assistance to students’ spouses seeking employment.

**Standards for Satisfactory Academic Progress for Financial Aid Eligibility**

Federal law and regulations require that all students receiving financial assistance from Federal Title IV funds maintain satisfactory academic progress. The policy presents the standards adopted by the Washington University School of Medicine and applies to all students.

In order to maintain satisfactory academic progress, the maximum time frame of full-time enrollment for completion of each program is as follows:

- Four-year M.D. program: 6 years
- Five-year M.D. program: 7-1/2 years
- M.A./M.D. program: 7-1/2 years (or 9 years if a 2-year M.A. is pursued)

Periods of non-enrollment are NOT counted in the measurement of satisfactory academic progress but all periods of attendance, regardless of whether the student received Title IV aid, are counted.

This policy is applied in the context of each individual student’s enrollment status in order to accommodate the student who does not enroll on a full-time basis. For example, if a student enrolls in a four-year program, the full-time student would meet the 150 percent maximum after six years of full-time enrollment, and the half-time student is expected to complete in twelve years. If a student vacillates between full-time and half-time enrollment, that student would have a maximum time frame between six and 12 years, and the maximum time frame for that student would be continuously adjusted.

Academic requirements for the M.D. degree include the satisfactory completion of the curriculum designated by the faculty. The progress of each student working toward an M.D. degree is monitored carefully by the Committee on Academic Evaluation of Students (CAES). Refer to the Assessing Academic Achievement area of the Admissions and Educational Program section.

A student failing to meet the standards of progress as determined by the Committee on Academic Evaluation of Students shall be placed on financial aid probation. While on probation the student may receive financial assistance for one trimester, semester or equivalent time period. At the conclusion of
this period, the student must have achieved compliance with each standard. A student who does not achieve compliance with each standard by the conclusion of the probationary period is suspended from financial aid eligibility. The Office of Student Financial Aid must notify a student of implementation of probationary status and/or suspension.

A student shall be reinstated for financial aid eligibility at such time as that student has completed satisfactorily sufficient coursework to meet the standards of progress. A student on financial aid probation or suspension may appeal that status by indicating in writing to the Director of Student Financial Aid the existence of mitigating circumstances which should result in reinstatement of financial aid eligibility. Each appeal will be considered on its merit by the Committee on Student Financial Aid.

The Director of Student Financial Aid shall have primary responsibility for enforcement of this policy. The director shall provide in writing to each student at the time of initial enrollment a copy of this policy. The director shall ascertain at the time of each disbursement of funds and prior to certification of a financial aid application that the student is in compliance with the policy.

Scholarship Funds

**Helen M. Aff-Drum Scholarship Fund.** Established in 1988 to provide scholarship support to financially deserving medical students.

**African-American Medical Alumni Scholarship.** A two-year full tuition scholarship supported by African-American alumni and friends of the School of Medicine will be awarded to a student in the first-year class for academic excellence, personal achievement and service to the African-American community.

**American Medical Association — Education and Research Foundation Medical Student Assistance Fund.** Begun in 1983, donors’ gifts supplement the Foundation’s gift to support excellence and contribute to the Distinguished Student Scholarships and Distinguished Alumni Scholarships Program.

**Anderson Student Scholarship.** Established through bequest in 2001 by Rolf L. Anderson, M.D., ’62.

**Isak and Breine Ascher Scholarship Fund.** The late Dr. Eduard Ascher, M.D., ’42, established this scholarship through a trust to memorialize his parents, who were lost in the Holocaust during WWII. He chose Washington University School of Medicine because of their willingness to "give a chance" to an Austrian refugee.

**Dr. William Monroe Baker Fund.** Established in 1988 under the will of Miss Lola Braxton in memory of Dr. Baker to provide scholarship assistance to worthy students who would be otherwise unable to obtain a medical education.

**Barnes-Jewish Hospital Medical Staff Association Scholarship.** Established in 1998 by the Barnes-Jewish Hospital Medical Staff Association to provide financial assistance to students based on academic excellence.

**Floyd A. and Rita Sue Barnett Scholarship Fund.** Established in 1994 from a trust agreement (1989) of Floyd and Rita Sue Barnett for scholarships for students who are academically well-qualified and financially deserving.

**The Dr. Joseph A. and Helene H. Bauer Scholarship Fund.** Created in 1987 by Dr. and Mrs. Joseph A. Bauer to provide scholarship support to academically well-qualified and financially deserving medical students.

**Albert G. Blanke, Jr. Endowed Scholarship Fund.** Established by a generous gift in 1982, the fund provides scholarship assistance for deserving students in the School of Medicine.
Isabel Valle Brookings Scholarship Fund. Established in 1957 by Isabel Valle Brookings (Mrs. Robert S.) for scholarships and loans in the School of Medicine.

Jane Stewart and Robert S. Brua, M.D. Scholarship Fund. Established in 1996 through the generosity of Dr. Brua.

Ruth Elizabeth Calkins Scholarship Fund. Established by Dr. Delevan Calkins in honor of his granddaughter.

Gilbert L. Chamberlain, M.D. Scholarship Fund. Created in 1971 by Dr. Gilbert L. Chamberlain to be used to aid worthy students in acquiring their medical education.

Dr. Pierre I. Chandeysson Scholarship Fund. Created in memory of Dr. Chandeysson by his daughter, Carol M. Chandeysson, to provide scholarship assistance to worthy students.

Cecil M. Charles — Nu Sigma Nu Medical Student Scholarship Fund. Established by the Nu Sigma Nu Medical Fraternity in memory of Dr. Charles.

Dr. Larry T. Chiang Endowed Scholarship. Established in 2003 to endow a scholarship fund for medical students from China or Taiwan. Besides academic achievement, criteria includes positive attitude and determination to succeed.

Class of 1945 Scholarship Fund. Established by the alumni from the class of 1945 in honor of their 45th reunion.

Class of 1956 Scholarship Fund. Established in 1996 by members of the class of 1956 in honor of their 40th reunion.

Class of 1961 Scholarship Fund. Established in 2001 by the members of the class of 1961.

Class of 1964 Scholarship Fund. Established in 1993 by the alumni from the class of 1964 to support scholarships.

Class of 1968 Scholarship Fund. Established in 1998 by the alumni from the class of 1968 in honor of their 30th reunion to support student scholarships.


Class of 1971 Scholarship Fund. Established in 1999 by members of the class of 1971 in honor of their 25th reunion.

Class of 1972 Scholarship Fund. Established in 1999 by members of the class of 1972 in honor of their 25th reunion.


Class of 1974 Scholarship Fund. Established in 2002 by members of the class of 1974 for their 25th reunion and to honor the memory of their classmate, Jonathan Mann.


Class of 1978 Scholarship Fund. Established in 2002 by members of the class of 1978 in honor of
their 25th reunion.

**Grace Strong Coburn Scholarship Fund.** Created in 1962 through the bequest of Mrs. Grace Strong Coburn for scholarships in the School of Medicine.

**Jack W. Cole, M.D. Scholarship.** Established in 2002 by Mrs. Ruth Kraft Cole, in memory of her late husband, a 1944 graduate of WUSM, and to recognize Dr. Cole’s deep appreciation for the education he received. Preference will be given to a student pursuing a career in academic medicine.

**T. Griswold Comstock Scholarships.** Established under the will of Marilla E. Comstock for students who would otherwise be unable to obtain a medical education.

**Frederick J. Cornwell, Jr. Scholarship Fund.** For scholarship and other financial help for worthy medical students and for medical students, interns and residents to use for research purposes.

**Clark and Mildred Cox Scholarship.** Established in 1998 with a donation from the Clark Cox Trust for scholarships for women.

**Arpad Csapo, M.D. Memorial Scholarship Fund.** Established in 1982 by Elise Csapo in memory of her husband, and by his friends and colleagues to provide assistance for students who have shown promise in fields relating to reproductive medicine.

**William H. and Elizabeth Gray Danforth Scholars Program.** Established in 1998 in honor of Chancellor Danforth’s retirement. The Scholar recipients must demonstrate outstanding academic promise and a record of community service that reflects Dr. Danforth’s values and actions.

**Harriet Arey and John D. Davidson Scholarship.** Established in 2000 by Harriet Arey and John D. Davidson for scholarships in the School of Medicine.

**Davie Family Scholarship.** Established by Joseph Davie, M.D. ’68, and his family to support scholarships for deserving medical students.

**Paul and Ruth DeBruine Scholarship.** Established in 1994 by Dr. and Mrs. Paul DeBruine in honor of his 35th medical school reunion to provide scholarship support to academically well-qualified and financially deserving medical students.

**Distinguished Minority Student Scholarships.** Up to seven full-tuition scholarships are awarded to students in each first-year class for academic excellence and personal achievement.

**Dr. Charles Drabkin Scholarship Fund.** Created in 1964 to provide financial assistance to medical students.

**Hazel B. Duncan Scholarship.** This fund was established in 2003 through the bequest of Hazel B. Duncan, NU26.

**Robert B. Fickel, D.D.S. Scholarship Fund.** Received in 1990 and given in memory of Dr. Fickel’s uncle, W. H. Fickel, M.D. ’12. Awards are made to students after their first year of study.

**Carl Fisch Scholarship Fund.** Created in memory of Dr. Fisch by his daughter, Marguerite F. Blackmer. Provides support to students who demonstrate financial need.

**Flance Medical Scientist Traineeship.** Established in honor of faculty member and alumnus I. Jerome Flance, M.D. ’35 by the Harry Edison Foundation for support of a student in the Medical Scientist Training Program.

**George F. Gill Scholarship Fund.** Instituted in memory of a former clinical professor of pediatrics.

**Helen H. Glaser Scholarship for Women Medical Students.** Established in 1999 by Robert J.
Glaser, M.D., emeritus trustee and former faculty member, in memory of his wife, Helen H. Glaser, M.D. ‘47.

**Anne T. and Carl Goetsch Scholarship.** This fund was established in 2003 through the bequest of Dr. Anne T. Goetsch, M.D. ‘41, HS44, and Dr. Carl Goetsch, HS43, to support medical students.

**Norman M. and Eleanor H. Gross Scholarship Fund.** Established in 2001 through a bequest from Mr. Gross for financially needy medical students.

**Paul H. and Lila L. Guttman Student Aid Fund.** Established in 1976 to provide financial assistance to qualified medical students.

**Paul O. and Nancy P. Hagemann Scholarship Fund.** Established by Dr. and Mrs. Hagemann to assist academically well-qualified students with documented financial need.

**Lee B. & Virginia G. Harrison Memorial Student Fund.** Established in 1996 for scholarships for students who intend to pursue a career in internal medicine or family practice. Dr. Harrison was a 1927 graduate of the School of Medicine.

**Harvielle-Bailey Scholarship.** Established in 1970 under the will of Miss Isabel Bailey Harvielle as a memorial to Dr. Charles Poplin Harvielle and Dr. Steele Bailey, Jr., alumni of the School.

**Ronald C. and Nell W. Hertel Endowed Scholarship for the School of Medicine.** Established in 1995 and endowed in 2005 in memory of Mrs. Nell Hertel to provide financial aid to medical students.

**Dr. and Mrs. Charles Y. (Yueh-Gin Gung) Hu Scholarship Fund.** Established in 2002 to provide a scholarship to a medical student of Chinese descent.

**Dr. Grace Huse Memorial Fund.** Provides scholarship awards for deserving Washington University medical students.

**Jackson Johnson Scholarship Fund.** Provided through a bequest in 1930 from Jackson Johnson.

**Dr. Lorraine A. Johnsrud Scholarship Fund.** Established in 1983 as a memorial to Lorraine from her classmates, friends and family to assist deserving medical students in the funding of their medical expenses.

**Stanley C. Jones Scholarship Fund.** Established in 1995 under the will of H. Roberta Jones as a memorial to her husband.

**Henry J. Kaiser Family Foundation — Medical Century Club Scholarship Fund.** Following the foundation’s generous gift in 1980 for medical student scholarships, the Medical Century Club accepted the challenge to raise new scholarship funds to match an additional gift from the foundation.

**Jay and Ronnie Kaiser Endowed Scholarship.** Established in 2004 by Dr. Jay, MD72, and Mrs. Ronnie Kaiser in appreciation of the financial aid Dr. Kaiser received as a student and to provide support for medical students.

**George D. Kettelkamp Scholarship Fund.** Established in 1969 by Mrs. Kettelkamp in memory of her husband, an alumnus of the School of Medicine.

**M. Kenton King, M.D. Scholarship Fund.** Created by the Executive Faculty to honor Dr. King at the time of his retirement in 1989 as Dean of the School of Medicine after having served in that position for 25 years.

**Albert F. Koetter, M.D. Scholarship Fund.** Established in 1978 by Mrs. Stella Koetter Darrow in memory of her father, an alumnus and former faculty member of the School of Medicine. At least one full-tuition scholarship is awarded annually on the basis of academic achievement and financial need.
**Anne L. Lehmann Scholarship Fund.** Established in 1983 to grant continued scholarship support to medical students.

**Life and Health Insurance Medical Research Scholarship Fund.** Established for the training of promising scholars intent upon a career in research and academic medicine.

**Life Insurance Medical Scholarship Fund.** Created in 1972 from residual funds in the Life Insurance Medical Research Fund, scholarship support is now awarded to students in the M.D. degree program.

**Maude L. Lindsey Memorial Scholarships.** Created in 1976 to assist students in the School of Medicine.

**John R. Lionberger, Jr. Medical Scholarship Endowment Fund.** Created in 1982 by Dr. John R. Lionberger to be used to aid worthy students in acquiring their medical education.

**E.A. Marquard Memorial Student Scholarship.** Established in 1994 from the E. Alfred Marquard Memorial Student Loan Fund to provide scholarships for deserving and needy financially deserving medical students.

**Alma Mavis Scholarship Fund.** Created in 1988 under the will of Alma Mavis to assist students intending to practice family (general) medicine.

**Eliza McMillan Scholarship Fund.** Provides assistance to young women in any of several schools of the University to secure an education.

**Medical Center Alumni Scholarship Fund.** Awarded on the basis of academic achievement and financial need.

**Roy B. and Viola Miller Memorial Fund.** Created in 1963 through the bequest of Roy B. Miller to provide scholarships for medical students and for post graduate students engaged in study and research in the medical sciences.

**The Warren S. and Dorothy J. Miller Scholarship Fund.** Established in 1982 through the bequest of Dorothy J. Miller to provide scholarships for any students engaged in studies leading to the degree of Doctor of Medicine and especially for those students with an aptitude and desire for the general practice in internal medicine.

**Joseph J. and Ernesta G. Mira Scholarship Fund.** Established in 1988 by Dr. and Mrs. Mira to provide assistance to students from the Alton, Illinois area, including the counties of Madison, Jersey, Calhoun, Greene and Macoupin.

**John and Ruth Musselman Medical Scholarship.** Established in 1997 by the John & Ruth Musselman Medical Scholarship Trust to provide scholarships to deserving students.

**Mr. and Mrs. Spencer T. Olin Fellowships for Women.** Provides for annual financial support to women in any of several disciplines. Application deadline is February 1.

**Spencer T. and Ann W. Olin Medical Fellowships.** Created in an effort to help fill the continuing shortage of physicians who pursue careers in biomedical research, the awards are primarily for students in the Medical Scientist Training Program.

**Dr. Roy W. Osterkamp Memorial Scholarship.** The fund was established in 2003 by Mrs. Linda Osterkamp Desloge and Mrs. Lila Osterkamp Haberberger, in memory of their father, Dr. Roy W. Osterkamp, DE36. Preference will be given to a student pursuing a career in a medical field related to dental medicine.
Dr. Sidney F. and Dora K. Pakula Scholarship Fund. Established in 2001 by Dr. and Mrs. Lawrence C. Pakula in memory of Dr. Pakula’s parents to support student scholarships.

William B. Parker Scholarship Fund. Established in 1976 by the School of Medicine in honor of William B. Parker’s 51 years of service to the School.

William A. Peck, M.D. Scholars in Medicine. Established in 2002 to recognize Dr. Peck’s 14 years of service to the Medical Center and Washington University community. University trustees, faculty, staff, alumni and friends honored Dr. Peck with gifts to this scholarship.

Phi Beta Pi — Charles Ruggieri Scholarship Fund. Established in 1985 by the Washington University Alumni of the Phi Beta Pi medical fraternity to honor Charles Ruggieri and to assist deserving medical students enrolled in Washington University School of Medicine with the funding of their undergraduate medical education.

Philpott Family Scholarship Fund. Established in 1995 by the Philpott family to provide support for medical students with financial need and excellent academic achievement.

The George M. (M.D. ’32) and George K. (M.D. ’64) Powell Medical Student Scholarship Fund. Established in 1984 by Mrs. George M. Powell in grateful appreciation for the medical education provided to her husband and son by the Washington University School of Medicine, which so positively affected the lives of the Powell families.

Henry and Louise Reller Scholarship. To be given to medical students in the name of the parents of Louise Reller.

Lyman K. Richardson, M.D. Scholarship Fund. Established in 1993 by Mrs. Ellen Richardson to provide scholarship support to medical students.

Samuel Jennings Roberts Scholarship Fund. Created to provide scholarships for any students engaged in study leading to the degree of Doctor of Medicine.

Robert Allen Roblee Scholarship Fund. Established in 1948 through the gift of Mrs. Joseph H. Roblee for students in the School of Medicine.

Thomas W. and Elizabeth J. Rucker Scholarship Fund. Created in 1956 under the will of Eugenia I. Rucker, in memory of her mother and father.

J. Max Rukes Scholarship Fund. Established in 1987, the fund provides scholarship support to deserving medical school students who are doing research in endocrinology or the chemistry of metabolism.


Robert G. and Maxine W. Scheibe Scholarship. Established in 1999 by Robert G. Scheibe, a 1960 Washington University graduate who also received his medical degree here in 1964 and his wife, Maxine, who is a 1966 graduate of the Washington University School of Nursing.

William H. and Ella M. Schewe Fund. Established to provide financial assistance to worthy students in the medical school.

Scholars in Medicine Program. Established in 1999 with gifts from individual donors to create scholarships to support medical students in the name of the donor.

School of Medicine Scholarship Fund. Created in 1970 to provide financial assistance for medical students.

Edna Schrick, M.D. Scholarship Fund. Established in 1992 by Dr. Schrick to provide scholarship
support to female medical students.

**Senior Merit Scholarship.** Established by an anonymous alumnus of the School of Medicine, it provides a full-tuition scholarship to a senior student who has earned a distinguished record of academic and personal achievements during the first three years in the medical school.

**Dr. John B. Shapleigh Scholarship Fund.** Established in 1926 with the bequest of Dr. John B. Shapleigh and supplemented by contributions from Mrs. Shapleigh and Miss Margaret Shapleigh.

**Alexander Balridge Shaw Scholarship Fund.** Created in 1958 through the bequest of Roy A. Shaw in memory of his father, Dr. Alexander Balridge Shaw.

**William T. Shearer and Lynn Des Prez Underrepresented Minorities Scholarship.** Created by William T. Shearer, M.D. ’70, and his wife, Lynn Des Prez. Scholarships are awarded to medical students from underrepresented minorities with preference given to African-American students.

**Dr. Edward Hiroshi Shigeoka Scholarship Fund.** Created in 1988 by Dorothy F. Shigeoka in memory of her husband, Dr. Edward Hiroshi Shigeoka, to help disadvantaged and deserving students pursue their careers in medicine.

**Ernie Simms Scholarship Fund.** Founded in 1984 by friends, colleagues and former students of Professor Simms in recognition of his contributions to scholarly research and teaching in the Department of Microbiology and Immunology.

**Stanley B. Smith, M.D., Scholarship Fund.** Established in 2001 in memory of Samuel and Dora Smith, Dr. Smith’s parents, to support student scholarships.

**Southern Medical Association Student Scholarship.** Awarded to a third-year student in recognition of outstanding academic achievements of a physician-in-training.

**Beulah B. Strickling Scholarship Fund.** Established in 1960 with a bequest from Mrs. Beulah B. Strickling.

**Marleah Hammond Strominger Scholarship.** Established in 1971 by the family and friends of Marleah Hammond Strominger. The recipient shall be a motivated student with need for financial assistance and shall come from a disadvantaged background.

**Mary and Ernst Stuehrk Scholarship Fund.** Established in 1987 to assist medical students with documented financial need.

**Edwin H. and Virginia M. Terrill Scholarship Fund.** Established in 1964 with the bequest of Dr. Edwin H. Terrill, an alumnus. It was Dr. Terrill’s hope that scholarship recipients would repay into the fund the amount of the award.

**Mildred Trotter Scholarship Fund.** For students with documented financial need, the fund was established in 1979 by Dr. and Mrs. Paul Guttman, and supplemented by former students of Dr. Trotter, as a tribute to her many years of teaching in the Department of Anatomy.

**Hiromu Tsuchiya Scholarship Fund.** Created to provide scholarships in the School of Medicine.

**Tuholske-Jonas-Tuholske Medical Scholarship Fund.** Established in 1974 by Rose T. Jonas in memory of her father, husband and brother. The recipient shall be a senior student preparing to enter the field of surgery, obstetrics and gynecology, or internal medicine.

**Dr. Cornelia M. Van Prooyen Scholarship Fund.** Established in 1987, the fund provides scholarship support and other financial assistance to female medical students.

**George S. and Aspasia N. Vellios Scholarship Fund.** Established by Frank Vellios, M.D. ’46, in
honor of his parents. Scholarships are awarded to deserving medical students with financial need.

**Louis H. Waltke and Marie Waltke Memorial Fund for Medical Education.** Created in 1984 to provide scholarships and fellowships at the School of Medicine.

**Dr. George S. Wilson Scholarship Fund.** Established in 1988 with the bequest of Dr. George S. Wilson to provide scholarship support to medical students.

**George and Irene Wolf Medical Scholarship Fund.** Established by the donors to benefit students in the School of Medicine.

**Dr. Mitchell and Elaine Yanow Scholarship Fund.** Established in 2002 by the children of Dr. and Mrs. Yanow to honor the memory of their parents and to provide support for deserving medical students.

**George Zografakis Memorial Scholarship Fund.** Created by the family and friends of Dr. Zografakis, a distinguished faculty member in the Department of Surgery.

**Loan Funds**

**Auer-Rosenfeld Memorial Loan Fund.** Established by Mrs. Elizabeth Auer to be used for educational loans to students.

**Dr. John C. Boetto Loan Fund.** Established in 1993 by a bequest from Mrs. Josephine D. Boetto as a memorial to her son to provide loans for deserving medical students.

**Otto W. Brandhorst Loan Fund.** Created in 1985 by the estate of Fern Crawford. This fund supports loans to students in the School of Medicine.

**Dr. Harold A. Budke Loan.** Established in 1998 to provide financial assistance to needy and deserving medical students.

**Harold A. Budke, M.D., Loan Fund II.** Established in 2001 with a bequest from the estate of Etta Elise Wedemeyer to provide loans to needy and deserving female students who will practice family medicine, internal medicine or obstetrics-gynecology medicine.

**Class of 1947 Loan Fund.** Established in 1996 by members of the class of 1947 in honor of their 50th reunion.

**Jess K. Goldberg Memorial Loan Fund by Ophelia H. Kooden and Violet G. Sachs.** Created in 1970 to provide zero-interest loans for medical students in memory of the donors’ brother who passed away while attending medical school.

**Health Professions Student Loan Fund.** Established by federal legislation for medical students with a demonstrated financial need. Loans are available for long terms at favorable rates.

**William Randolph Hearst Medical Scholars Loan Fund.** In 1989, the Hearst Foundation provided funding for a new and innovative loan program which provides interest-free loans to students in their last year of study.

**Ursula Hecker Loan Fund.** Established in 1967 by a bequest from Ursula Lee Hecker for the use and benefit of worthy, deserving and needy medical students.

**Kathy E. Holden Loan Fund.** Established by Mrs. Roland Holden and the Roland and Ruby Holden Foundation in honor of her granddaughter, Kathy E. Holden, and in recognition of W. Edwin Dodson, M.D., to support loans to deserving medical students.

**Horncrest Foundation — School of Medicine Loan Fund.** In 1982, the trustees of the Horncrest
Foundation approved a proposal on behalf of the School of Medicine to match up to a generous annual cap for five year loan funds solicited by the School. The campaign was extremely successful and now provides loan funds to students with documented financial need.

**W. K. Kellogg Foundation Loan Fund.** Provides financial assistance to medical students in need of such aid.

**Gustel and Edith H. Kiewitt Scholarship Loan Fund.** Provides loan funds for medical students.

**Medical Scholars Loan Program.** Established in 1985 by members of the William Greenleaf Eliot Society, this fund provides an interest-free source of long-term student loans. Annual contributions from alumni and friends support this perpetual and growing resource upon which current and future medical students will draw.

**George W. Merck Memorial Loan Fund.** Established in 1959 by The Merck Company Foundation, the original purpose of the loan was modified in 1983 to provide loans to graduating students which would help bridge the transition from student to resident physician.

**Mound City Medical Forum Minority Student Emergency Loan Fund.** Established in 1988 by the Mound City Medical Forum, a professional organization of black physicians in St. Louis and a component society of the National Medical Association, the fund provides short-term, no-interest loans for minority students.

**Edward F. Musgrave Loan Fund.** Established in 1981 by Mrs. Jeannette L. Musgrave. The fund supports medical student loans.

**Goldie H. Penn and Lloyd L. Penn, M.D. Student Loan Fund.** Dr. Penn, M.D. ’33 established the fund in 1977 to aid well-qualified and deserving students.

**Perkins Student Loan.** A federal program (formerly National Direct Student Loan) to provide loans to students with financial need. Permits repayment over an extended period at a favorable interest rate.

**Dr. William C. and Elva Pratt Loan Fund.** Established in 1982 for medical students with demonstrated financial need.

**G. H. Reinhardt Memorial Scholarship Loan Fund.** Established in 1947 through the bequest of G. H. Reinhardt.

**Aline Rixman Loan Fund.** Created in 1940 by William Rixman in memory of his wife, the fund is used to alleviate unexpected financial emergencies of medical students.

**James L. and Dorothy Rouner Loan Fund.** Established in 1997 by Dr. James and Mrs. Dorothy Rouner to be used for medical students pursuing a career in primary care—general internal medicine.

**Caroline O. Schlesinger Loan Fund.** Established in 1969 to provide financial support for medical students.

**School of Medicine Student Loan Fund.** Established to make loans to students with documented financial needs.

**Washington University Medical Center Alumni Association Loan Fund.** Provides emergency loans to medical students.

**The Alan A. and Edith L. Wolff Loan Fund.** Established in 1993 by Mrs. Edith L. Wolff to provide loans to students with demonstrated financial need who are in their final year of study for the Doctor of Medicine degree.
Assessing Academic Achievement

Committee on Academic Evaluation of Students

Evaluation and Grading System

Actions for Academic Review

Individual Study Program

Tutorial Assistance Program

Leave of Absence

Policy on Student Status and Benefits During Research Year or Leave of Absence

Appeals Process for CAES Decisions

Research Integrity Policy

Procedures Concerning Breach of Professional Integrity

Liability Insurance

United States Medical Licensing Exams (USMLE)

Committee on Academic Evaluation of Students

Responsibility of the Committee

Overall evaluation of academic performance by students at Washington University School of Medicine will be made by the Committee on Academic Evaluation of Students (CAES). The deliberations of the CAES are generally positive in approach and are committed to the ultimate aim of assisting students to successfully complete the courses of study required by the School. The principle that careful selection of students will minimize attrition from the School is strongly endorsed by the CAES. The CAES has several important roles, including:

1. Approving promotion of students to a subsequent year of study.
2. Recommending to the Executive Faculty those students who have successfully completed all the prescribed requirements of the School and are qualified to receive the Doctor of Medicine degree.
3. Requiring entry of a student into an individualized program of study.
4. Deciding upon matters of academic disciplinary action, including instances of unprofessional behavior brought to CAES.

It is also the ultimate responsibility of the CAES to decide whether each student meets the academic and ethical standards necessary to enter the profession of medicine.

The rules governing operation of the CAES apply to students in the following categories:

1. Students who are engaged in the preclinical and clinical education requirements for the MD degree.
2. Students in a five year MA/MD degree program taking the pre-clinical or clinical portion of their MD education.

3. Students in the Medical Scientist Training Program (MSTP) taking the pre-clinical and clinical portion of their MD education.

4. Those selected students with a prior medically relevant PhD who have been approved by the Medical Scientist Training Placement Curriculum Committee (MSTPCC) and are enrolled in the MD portion of their education.

Membership of CAES

A) Appointed and Ex-Officio Membership
There will be 12 voting faculty members of the CAES, and membership will be appointed for a four-year term by the Dean of the School of Medicine following nomination of suitable individuals by the department heads. Initial appointments will be staggered for periods of one-, two-, three- and four-year terms.

A faculty member may be reappointed to serve on CAES. Membership will be equally divided between clinical and preclinical departments. In addition, CAES membership will include, in ex officio capacity, the Registrar (non-voting) and the Associate Dean of Students (non-voting). The Associate Deans of Medical Student Education, Admissions, Diversity Programs and the Director of the Student Health Service may attend CAES meetings as non-voting observers.

B) Guests
A course master, who is not a member of the CAES but who has submitted a Fail/Incomplete grade for a student, which is to be discussed at a meeting of the CAES, will be present at the meeting to provide information concerning the student’s performance. Alternatively, a course master will send a designated representative. In the event that a course master or designated representative is not present, final action for that student will be deferred until adequate information concerning the student’s performance is available.

Chair of CAES

A faculty member will be appointed by the Dean from within the CAES committee to serve as chair. The term of the chair will be four years.

Meeting Frequency

CAES meetings must occur in a timely manner after final examinations or re-examinations (i.e., as soon as practical after grades are submitted to the Registrar). Generally grades will be submitted to the Registrar within 15 days of the completion of an examination or within four days of a re-examination. A meeting of the Committee also may be convened at any time such that timely review of student performance and action thereupon is provided.

Quorum for CAES Meetings

Seven voting members must be present to consider items of academic disciplinary action (i.e., recommendation for dismissal from enrollment or entry into Individual Study Program).

The Evaluation and Grading System
General

A) Students are required to take all examinations at the specified time. A student may be excused from this rule for extenuating circumstances at the discretion of the course master. Extenuating circumstances are defined as sudden personal illness, extreme family circumstance, or significant professional obligation. Doctor appointments of a routine nature or vacation time are not considered to be extenuating circumstances for which students can be exempted from the regularly scheduled exam date. Such occasions will be promptly reported to the Registrar. In the event of a student's inability to attend a scheduled examination due to sudden illness, extreme family circumstance, or significant professional obligation, the student is required to inform the course master prior to the examination and to be evaluated by the Student Health Service. In the event that the student cannot reach the relevant course master, the student should contact the Associate Dean for Student Affairs. At his or her discretion, the Associate Dean for Medical Student Education may occasionally approve an exam date change for the entire class if the need arises. However, this is an exception, as the complete schedule is reviewed prior to the start of each academic year by course masters and student representatives.

B) In order to continue their studies at Washington University School of Medicine, students must demonstrate the principles of professionalism, including sound judgment, honesty and integrity, responsibility, a sensitivity and compassion for individual needs, an ability to synthesize and apply knowledge and the capability of becoming a safe and effective physician. Serious or repeated breaches of these principles, when related to academic matters, will be referred to the CAES for review.

C) At the annual CAES meeting, the Committee will vote to recommend promotion of students who have successfully completed all the requirements of the current academic year to the studies of the subsequent year.

D) At the conclusion of each academic year, students receive a grade report which indicates the grade achieved in each course. When all the official grades have been received, the official transcript, in addition to listing courses and grades achieved, lists the grade distribution in each course (with the exception of selective and elective courses).

E) Prior to graduation, students are required to complete and pass all coursework. Occasionally students are permitted to complete equivalent coursework at other institutions with the permission of the responsible department and written notification to the Registrar.

F) It is the responsibility of students who feel that personal concerns, health problems, or any other factors may be adversely affecting their academic performance to bring such matters to the attention of the Director of the University Health Service or the Associate Dean of Student Affairs for possible accommodations.

Grading System

A) First Year

Courses in the first year curriculum are evaluated on a Pass (P) or Fail (F) basis. For purposes of the official grade records of the School of Medicine, grades used for the first year are:

P = Pass, indicating satisfactory performance
F* = Fail
E = Temporary grade, makeup of failed exam pending
I** = Incomplete, temporary grade pending completion of course requirements, replaced with an F if not removed within 30 days
L = Successful audit
NG = Course credit earned, students not graded
W = Withdrawal from a course
Z = Unsuccessful audit
Failure of any examination which comprises a significant portion of the final grade (typically 20 percent or more) must be reported by the course master to the Associate Dean for Student Affairs.

In the event of a failure of a single exam within the course, the course master may allow one attempt at remediation of this examination. The scheduling of a remedial examination will be agreed upon by the course master and student but shall not extend beyond 30 days after the end of the course or academic year, whichever occurs first. Days of recess for Winter Break or Spring Break will not be counted in the 30 days. A grade of “E” will be submitted by the course master if the remedial examination is not accomplished within the course dates. This grade will stand on the academic record until it is replaced with a valid final grade of Pass or Fail. Grades of “E” that are not resolved within 30 days will be replaced with a grade of Fail (F). If the student successfully remediates the examination, and has otherwise passed the course, a Pass (P) will be recorded by the Registrar. A student may remediate only one examination in any course.

*Any grade of F remains on the student’s academic record. When the course is repeated or remediated the new grade will appear as a separate entry in addition to the failing grade.

**Incomplete (I) indicates that, because of a delay excused by the course master, the student has not completed the requirements to pass a course.

B) Second and Subsequent Years

For purposes of the official grade records of the School of Medicine, the following grades are used for subsequent years:

H = Honors, reflecting a truly outstanding performance
HP = High Pass, awarded for excellent/very good work
P = Pass, indicating satisfactory performance
F* = Fail
I** = -Incomplete, temporary grade pending completion of course requirements, replaced with an F if not removed within 30 days
Cr#/NCr# = Credit/No Credit for some second-year courses
L = Successful audit
NG= Course credit earned, students not graded
W = Withdrawal from a course
Z = Unsuccessful audit

*Any grade of F remains on the student’s academic record. When the course is repeated or remediated, the new grade will appear as a separate entry in addition to the failing grade. A failing grade will be recorded on the official educational record when a student fails the subject examination (defined as scoring at less than the 10th percentile as reported by the NBME) for the second time. A failing grade will be recorded when a student fails the clinical portion of the clinical clerkship or elective. In both events, the failing grade remains on the student’s official educational record. When the course is remediated, the new grade also will appear on the student’s official educational record.

**Incomplete (I) indicates that, because of a delay excused by the course master, the student has not completed the requirements to pass a course.

C) Grade Reporting

Final grades will be submitted to the Registrar by course masters within 10 working days of the final examination or final class meeting for the first two years. For third and fourth years, grades are due within 10 working days of the receipt of standardized examination scores or the last day of the rotation if no examination is given. A web-based University system, WEBSTAC, provides timely access to grades for the first two years. Grades and evaluations of student clinical performance are submitted on a standardized form and are available for review in the Office of Student Affairs throughout the academic year. Final grades for the clinical clerkships and electives are recorded in the University.
student information system at the end of the academic year and are subsequently available on WEBSTAC, which is updated quarterly. A paper copy of final grades is available upon request from the Registrar's office.

D) Grade Point Average, Class Ranking and Grade Distributions

The School of Medicine does not calculate grade point averages. Hours of credit appearing on the transcript reflect clock hours scheduled for the course or clinical rotation. For the purpose of residency applications only, students are placed in the upper, middle or lower third of the class according to a formula which considers weighting of courses and each academic year. This ranking is not recorded on the permanent academic record and therefore does not appear on transcripts. It may appear in the student’s dean’s letter. At the conclusion of the academic year, when all the official grades have been received, the official transcript, in addition to listing courses and grades achieved, gives the grade distribution in each course with the exception of elective and selective courses.

E) Grade Appeals

A student who wishes to appeal his/her grade should file his/her request for review along with the basis for the appeal with the course master within 30 days of the course completion. If reasons beyond the student’s control delay the resolution of the appeal past the 30-day deadline, the Registrar must be notified so that the final transcripts, grade distributions and match rankings for the academic year can be held pending resolution of the matter. If this notice is not filed with the Registrar prior to the deadline, the grade cannot be accepted. Students participating in the residency match should also notify the office of career counseling that a grade appeal is in process.

NO GRADE CHANGES ARE PERMITTED FOR THE ACADEMIC YEAR AFTER JULY 15.

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**Actions for Academic Review**

**General**

A) "Actions for Academic Review” refer to procedures used at the School in the event that a student fails a course or fails to complete a course in the requisite time.

B) In the event of any initial failure of a course offered at the School, the student will meet with the Associate Dean for Student Affairs to formulate a plan to remediate such failure.

C) If the Registrar has recorded a Fail or Incomplete grade in two or more courses in a single year or cumulatively three courses between years, the student's academic performance will be referred to CAES for review and determination of a course of action. Actions for Academic Review shall be referred to CAES for consideration by the Associate Dean for Student Affairs or Registrar’s office.

D) Refer to Individual Study Program (ISP) in this document for guidelines pertaining to students engaged in an ISP.

E) When the performance of a student is referred to CAES for potential academic review, the following rules will apply:

1. No student may take more than three years to complete the coursework required for the first two years. The end of such a “three-year” period is defined as 36 months from the date of matriculation to the School. Time periods included in a “Leave of Absence” are not counted in these 36 months.

2. In the absence of extenuating circumstances, no student may take more than two academic years
to complete the coursework required in the first-year curriculum.

3. The Associate Dean of Student Affairs shall notify the student of the course(s) for which academic review is proposed and the date and time at which the CAES will address the matter. The Associate Dean for Student Affairs, the Registrar, the course master(s) or their designated representatives shall present the matter to the CAES in a closed and confidential CAES meeting.

4. The student shall be permitted, upon written request, in advance of the CAES meeting, to appear on his or her own behalf. At the student's written request, he or she may be accompanied by a member of the faculty or staff of the School of Medicine for guidance and support. Alternatively, again following written request, the student may be accompanied by a fellow student enrolled in the School of Medicine.

5. A record of the CAES meeting shall be preserved for purposes of review by the School of Medicine’s Appeals Committee, as necessary. The CAES’s decision shall be by majority vote and shall be communicated, in writing, to the student by the Registrar’s office.

6. For students referred for course failure, CAES meetings will have, in addition to the grade report forms for the course for which the student is referred to CAES, a complete record of the student’s academic performance and the student file.

7. The maximum number of attempts to pass any individual course during enrollment in the School, including time in an ISP, will be three.

8. Throughout the enrollment of a student, it is within the jurisdiction of CAES to terminate the enrollment of a student who has demonstrated serious academic failure or breaches listed under Evaluation and Grading System in this document. Such a course of action for serious academic failure will generally apply to a student for whom the Registrar has recorded Fail/Incomplete grades in three or more subjects.

F) Cumulative Academic Review/Academic Warning

Prior to promotion to the clinical year, the CAES will review the cumulative academic record of each student brought forth by the Associate Dean for Student Affairs to determine whether the student’s academic performance justifies advancement to the clinical phase of the medical education without warning. Typically, three remediated examinations and/or failing grades during the first two years of the curriculum would raise concerns about the student’s fund of knowledge and readiness to participate in clinical care of patients. Students with overall records indicating such serious academic failure may be dismissed, may be required to repeat specific preclinical course work, or may be advanced to the third year with academic warning.

Upon notification of advancement with academic warning into the clerkship year, the student must meet with the Associate Dean for Student Affairs to: 1) review the planned clerkship schedule in order to consider schedule changes to facilitate successful clinical experiences, 2) pursue available resources for academic intervention, and 3) address any additional problems that may arise. It is recommended that these students seek tutorial assistance through each clerkship course master.

A third-year student who has received an academic warning after the first two years and then fails any component of a clinical clerkship may be dismissed from the school.

G) Physicianship/Professionalism Concern Forms

The Associate Dean for Student Affairs will report serious or repeated breaches of professionalism to CAES if the violations are related to academic matters (see Procedures Concerning Breaches of Professional Integrity in this document for additional information and procedures related to non-academic matters). Action may include probation or dismissal, and CAES also may rule that the Dean’s letter/MSPE should include a citation regarding the matter. Additional consequences may include a program of remediation or additional oversight.
**First Year**

A) If a student has received a Fail/Incomplete grade in a single first-year course, the Associate Dean for Student Affairs will meet with the student to formulate a plan from the following options:
   1. Take a re-examination in the course at a time prescribed by the course master before August of the following academic year, OR
   2. Enroll in and successfully complete, at the level designated by the course master, a summer course at a different institution, such course being completed and passed by the beginning of classes for the second year.

B) A student who, for a single course, fails the re-examination taken to remediate a failed course or fails to successfully complete an approved summer course will be referred for CAES to review and propose a recommended course of action. The CAES may require such a student to enter an ISP or may terminate enrollment. Alternatively, the CAES may permit a re-examination. If this re-examination is failed, enrollment will be terminated.

C) A student for whom the Registrar has recorded a Fail/Incomplete grade in two or more courses during the first year will be referred to CAES for determination of a course of action.

D) For students referred to CAES (under Actions for Academic Review, First Year, in this document), the Committee may decide to permit the student to take re-examinations, if a re-examination has not already been taken, in the courses for which Failed/Incomplete grades have been recorded. Such re-examinations will generally occur during the last week of the inter-academic year break. If such a re-examination is failed, the student may be required to enter an ISP or be dismissed from enrollment in the School.

E) The Associate Dean for Student Affairs also may request that the CAES review performance of a student who has demonstrated poor academic performance, either by demonstrating poor academic performance in two or more courses at interval evaluations conducted throughout the course, or by failing two or more examinations that are remediated within the course. In such instances the CAES may recommend a course of action.

If Fail/Incomplete grades have been recorded for two or more courses or a single re-examination, the CAES may require that a student enter an Individual Study Program or that enrollment in the School be terminated. If a student has failed three attempts to pass a course, enrollment will be terminated.


**Second Year**

A) Regarding courses of the second year, the Associate Dean for Student Affairs will meet with the students in the following categories regarding taking a re-examination.
   1. A student for whom a Fail or Incomplete grade has been recorded in a single complete yearlong course in the second year curriculum, OR
   2. A student for whom a Fail or Incomplete grade has been recorded in one or two block-long courses.

B) Re-examinations in complete courses in Pathology or Clinical Medicine generally will be offered during the last week of the inter-academic year break, prior to entry into the third year. Re-examinations for students who have failed one or two block-long courses generally will be offered at a time determined by the course master and the Associate Dean for Student Affairs. All re-examinations must be offered to students and completed by them prior to the start of the next academic year.

Students who fail a re-examination of a single course will be referred to the CAES to determine a course of action. The CAES may decide that the student must enter an ISP. Alternatively, a re-examination may be offered. If the re-examination is failed, enrollment will be terminated.
C) Students in the second year for whom the Registrar has recorded Fail/Incomplete grades under the following categories will be referred to CAES for review and resolution of a recommended course of action:
1. Two yearlong courses, OR
2. Three or more block-long courses, OR
3. One complete yearlong course and two block-long courses, OR
4. A student for whom the Registrar has recorded a Fail/Incomplete grade in any re-examination.

D) At review by CAES for students referred to above, the Committee may decide to permit the student to take re-examinations, if a re-examination has not already been taken, in the courses for which Failed/Incomplete grades have been recorded. Such re-examinations will generally occur during the last week of the inter-academic year break. The CAES may allow the student to defer beginning the clinical rotations so that re-examinations may be taken up to 12 weeks after the beginning of the usual cycle of clinical clerkships. Such extra time, used for study and preparation, will ordinarily mean that the student will not have the usual unscheduled time in the elective year. In the event that a Fail/Incomplete grade is recorded at a re-examination, CAES may require that a student enter an Individualized Study Program (ISP) or that enrollment in the School of Medicine be terminated.

In the event that CAES decides not simply to permit re-examination, the CAES may require that the student enter an Individualized Study Program as detailed below, or that enrollment in the School be terminated.

E) The Associate Dean for Student Affairs also may request that the CAES review performance of a student who has demonstrated poor academic performance in two or more courses at interval evaluations conducted throughout the course when such performance has been reported to the Associate Dean. In such instances the CAES may recommend a course of action.

F) No student will be permitted to begin clinical rotations of the third year until all first- and second-year courses have been successfully completed.


**Third and Subsequent Years**

A) Regarding performances beyond the second year, the Associate Dean for Student Affairs will meet with a student for whom a single Fail/Incomplete grade has been entered regarding the requirements stipulated by the relevant course master to remediate the grade entered. Options will generally include a re-examination or repeating all or a portion of the course. If a Fail/Incomplete grade has been entered following the prescribed remediation, the student will be referred to the CAES to determine a course of action. When such a student is referred to the CAES, the CAES may permit a re-examination or re-taking or repeating all or a portion of the course. If the course is failed a third time, enrollment in the School of Medicine will be terminated.

B) A student beyond the second year for whom the Registrar has recorded two or more failing grades in the clinical rotations or electives will be referred to CAES for review and proposal of a course of action.

C) Any student who fails to achieve a passing grade (defined as greater than or equal to 10th percentile as reported by the NBME) on any two or more subject (shelf) examinations conducted as part of the evaluation of clerkships will be referred to CAES for review and proposal of a course of action.

D) The Associate Dean for Student Affairs also may request that the CAES review performance of a student who has demonstrated poor academic performance in two or more courses at interval evaluations conducted throughout the course when such performance has been reported to the Associate Dean. In such instances the CAES may recommend a course of action.
E) For students referred to CAES, the Committee may endorse or amend the recommendations of course masters from whom Fail/Incomplete grades have been entered for students beyond the second-year curriculum regarding a necessary course of action to remediate the grades entered. In the event that a student fails such a course of remediation, as defined by the course master and approved by the CAES, CAES may require that the rotation be repeated or that enrollment of a student in the School be terminated. Students generally will be permitted three attempts to achieve a passing grade in any clerkship course. If three failing examination grades or final clerkship grades have been submitted for a course, enrollment will be terminated.

F) A student who advances to the clinical years with academic warning and who fails any component of a clerkship will be referred to CAES for action, including possible termination.


**Individual Study Program**

The educational program is designed to assist the specialized needs of all medical students in an individualized and personalized manner. Tutorial assistance is available to any student at any time as detailed below. Occasionally students who have difficulty in handling the normal academic course load will be required to enter an Individualized Study Program (ISP), requiring five years to complete rather than four years.

The following rules govern students engaged in an ISP:

A) Recommendation requiring entry into an ISP is made by the CAES after careful consideration of the student’s academic performance at intervals throughout the curriculum.

B) The intent of an ISP is to optimize the prospect that the student will successfully complete the curriculum.

C) The specific program of any ISP (i.e., the content and sequences of courses) will be determined by the student and the Associate Dean for Student Affairs with input from relevant course masters and the CAES. The specific recommendations of the CAES will generally be adopted. The CAES may delineate for the student required to enter an ISP the consequences of a Fail/Incomplete grade recorded in any course once the student has entered the ISP. The plan for execution of an ISP, once established, will be recorded in the student’s file in the Registrar’s office and a copy provided to the student.

D) Unless extenuating circumstances exist, ISP students are required to take the examinations for a particular course in their usual temporal relationship to the course work. Requests for consideration of unusual circumstances should be recorded in the student’s file in the Registrar’s office.

E) In the event that a Fail or Incomplete grade is recorded for a student after entry into an ISP, a re-examination schedule will be determined by CAES. If a Fail/Incomplete grade is recorded for the re-examination of a single course for which two previous final examinations have been failed, enrollment in the School of Medicine will be terminated. If a Fail or Incomplete is recorded for the re-examination of a single course which the student has not previously failed, the student may be permitted to repeat the course.

F) At the completion of the time for their ISP, students who have not successfully completed and received a grade of Pass or above in the usual courses of the first- and second-year curricula by the
start of the second six-week period in the year of the clinical clerkship will be dismissed from enrollment in the School.

**Tutorial Assistance Program**

Students experiencing difficulty in any course may request tutorial assistance. Such requests should initially be directed towards the course masters and thereafter to the Associate Dean for Student Affairs. Students who are repeating courses will be offered the opportunity for tutorial assistance. CAES also may require that a student seek tutorial assistance.

**Leave of Absence**

A) A student may request a leave of absence for academic or personal reasons by submitting a statement in writing to the Office of Student Affairs. Such a statement should include indication of the beginning and anticipated ending dates and a brief statement of the reason (academic or personal). Requests for leave of absence must be approved by the Associate Dean for Student Affairs. Leaves of absence shall be granted for no more than one year, but in unusual cases may be renewed by CAES for additional years after discussion with the Associate Dean for Student Affairs. Students requiring a personal leave of absence for medical reasons must submit a supporting letter from the Director of the Student Health Service.

B) In extreme cases where a student may pose a danger to others, an involuntary leave of absence may be imposed. In such a matter the following procedure applies:

1. The Chancellor or his designate may impose an involuntary leave of absence when there is evidence that a student has committed an offense under these rules or the University’s Judicial Code and there is evidence that the continued presence of the student on the University campus or as a participant in a clinical rotation poses a substantial threat to himself or herself, to patients or to the rights of others to continue their normal University function and activities.

2. Imposition of the involuntary leave of absence may result in denial of access to the campus, prohibition of class attendance and/or prohibition of participation in clinical rotations.

3. If an involuntary leave of absence is imposed, the suspending authority shall prepare a written notice of the imposition and shall have the notice mailed certified or personally presented to the student. The written notice shall include a brief statement of the reasons therefor, and a brief statement of the procedures provided for resolving cases of involuntary leave of absence under these rules.

4. The student shall be given an opportunity to appear personally before the suspending authority within five business days from the date of service of the notice of imposition of the involuntary leave of absence. If the student asks to appear personally before the suspending authority, only the following issues shall be considered:
   a) Whether the suspending authority’s information concerning the student’s conduct is reliable, and
   b) Whether under all the circumstances, there is a reasonable basis for believing that the continued presence of the student on campus or in clinical rotations poses a substantial threat to the student, to patients or to the rights of others to engage in their normal University functions and activities.
5. Within one week of the date of imposition of the involuntary leave of absence, the suspending authority shall either file a statement of charges against the student with the University Judicial Board (and shall have the statement or charges served, by mail or personal service, upon the student and the dean of the school or college or director of the program in which the student is enrolled) or initiate proceedings under these rules to convene a Disciplinary Committee.

6. A temporary suspension shall end when: 1) rescinded by the suspending authority, or 2) upon the failure of the suspending authority to promptly file a statement of charges with the University Judicial Board or a Disciplinary Committee, or 3) when the case is heard and decided by the University Judicial Board or the Disciplinary Committee.

Return of students from involuntary leave of absence requires clearance of both the Director of the Student Health Service and the Associate Dean for Student Affairs.

C) Students receiving financial aid should be advised that at the end of 60 days or more leave of absence, the grace period for loan repayment during a leave of absence may be exhausted. In such cases there will be an obligation for the student to start payments. According to the federal rules under which loans are made, the use of a grace period during a leave of absence will generally mean that the schedule for loan repayment may be changed. Students who are receiving financial assistance should consult with the Financial Aid Office to determine the implications of a Leave of Absence for their financial aid.

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**Policy on Student Status and Benefits During Research Years or Leave of Absence**

**M.D./Ph.D.**

Student status is maintained while in the research phase of the M.D./Ph.D. program. Students are registered in the graduate school during the research years. Both student health and disability coverage are provided by the Division of Biology and Biomedical Sciences.

**M.A./M.D.**

Student status is maintained while in the research phase of the M.A./M.D. program. Students are registered in the graduate school during the research year. Both student health and disability coverage are provided.

**Five-Year M.D. Program**

Research Year Here: Student status is maintained throughout the approved research year. In exceptional circumstances, a second research year may be permitted. The student may receive a stipend, but may not be considered an employee of the university. Students are registered in the School of Medicine. Both disability and student health coverage are required and are payable by the student. Outside funding often covers such fees.

Research Year Away: Student status is maintained throughout the approved research year. Students are registered in the School of Medicine. Both disability and student health coverage are optional with proof of like coverage. The cost of either elected coverage is payable by the student. Outside funding often allows these costs.

**Leave of Absence**

Leave of Absence Year Here: Student status is not maintained during the leave of absence though benefits of student health coverage and disability insurance are optional throughout an approved leave. Costs are payable by the M.D. program students. M.D./M.A. and M.D./Ph.D. students may
request support for these costs from the Division of Biology and Biomedical Sciences if funds are available. The Office of Financial Aid should be consulted for information regarding loan repayment and grace periods when on a leave of absence.
Leave of Absence Year Away: Same as Leave of Absence Year Here.

Appeals Process for CAES Decisions

The School of Medicine has the right and responsibility to assure that each student, during the time of enrollment, demonstrates levels of academic achievement and ethical stature appropriate to the practice of medicine. The School also must ensure provision of fairness in discharging those rights and responsibilities.

An Appeals Committee, composed of faculty members appointed by the Dean of the School of Medicine, shall be created to review decisions under academic review. A quorum of this committee shall consist of five members.

Within 20 days of the date on which an Academic Disciplinary Action decision is rendered by CAES, the student may request, in writing to the Registrar, that the School of Medicine’s Appeals Committee review the record of such CAES decision or that the Appeals Committee request that the CAES consider additional information which was not previously presented to CAES. The letter to the Registrar should include the basis for the appeal as well as any new information of relevance.

The Appeals Committee shall review the record of the CAES decision solely to determine whether the pertinent CAES procedures were followed and whether all relevant information was considered by the CAES. If the appeal is based on a contention that all relevant information was not presented to CAES, the appeal must provide the Appeals Committee with adequate reason why the student did not present this information at the CAES meeting in question.

On all appeals the Appeals Committee may either remand the matter to the CAES for reconsideration with its explanation for the remand, or deny the appeal. If the matter is remanded to CAES, all documents, minutes of the Appeals Committee meeting, and information submitted by or for the student in support of the appeal will be made available to CAES. However, the Appeals Committee shall not substitute its opinions of the merit of matter and appeal for those of CAES. The Appeals Committee shall provide its decision in writing to the Dean, the student, the CAES, the Associate Dean for Student Affairs and the Registrar.

The Appeals Committee shall determine whether the student may continue his or her curriculum pending its review of a CAES decision.

Within 20 days of the date of the Appeals Committee’s decision or referral back to CAES, the student may request, in writing, that the Dean of the School of Medicine review the decision of the Appeals Committee. The decision of the Dean shall be final.

Research Integrity Policy

Allegations of breach of research integrity policy are the primary responsibility of the Research Integrity Committee of the School of Medicine. Complaints regarding students enrolled for the MD degree will be directed promptly to that committee. The Research Integrity Committee will promptly
investigate the charges and report its conclusions and recommendations to the Dean who will convene
a Disciplinary Committee according to the guidelines below.

For further information, refer to the Research Integrity Policy web site:
www.wustl.edu/policies/research.html.

Procedures Concerning Breaches of Professional Integrity

Matters involving possible breaches of professional integrity shall be brought to the attention of the
Associate Dean for Student Affairs. The individual(s) raising the questions of possible misconduct shall
present them in writing to the Associate Dean for Student Affairs, including the completion of a
Physicianship/Professionalism Concern Form along with other detailed information as necessary and
shall be reminded of their confidentiality. Behavior inappropriate to the medical profession shall mean
breaches of personal confidence and trust, including cheating or unauthorized use of materials during
examinations; abuse, misrepresentations or other seriously improper conduct in relation to patients or
colleagues, including breaches of confidentiality; and other misconduct, misrepresentation or failure in
personal actions or in meeting obligations, so as to raise serious unresolved doubts about the integrity
of the student to enter the practice of medicine. The Associate Dean for Student Affairs will identify
which of the following categories is applicable to the matter which will be addressed accordingly:

A) Academic/Educational
At the discretion of the Associate Dean for Student Affairs, serious or repeated breaches of
professionalism (if raising concern about a pattern of behavior) will be referred to CAES if the concern
is academically/educationally related. In this case, the Associate Dean for Student Affairs will follow
procedures and guidelines outlined under Actions for Academic Review in this document.

B) Non-academic/Non-educational
For matters unrelated to the academic/educational setting, the Associate Dean for Student Affairs will
follow the disciplinary procedures as follows:

1. The Associate Dean for Student Affairs shall convene a meeting with the Associate Dean for
   Admissions or the Associate Dean for Medical Student Education to review the complaint and decide
   whether further action is necessary.

2. If further inquiry is deemed necessary, the Associate Dean for Student Affairs and one of the
   Associate Deans listed above will discuss the complaint with the student.

3. If the Associate Dean for Student Affairs considers the matter sufficiently serious or if it represents
   repeated offenses so as to raise concern about a pattern of behavior, a recommendation will be made
to the Dean to convene a Disciplinary Committee.

4. Appointment to a Disciplinary Committee will be made by the Dean and will include five faculty
   members and one (non-voting) academic representative from the Office of Student Affairs. Appointees
   will decline if assurances of their impartiality in the matter are not evident. The Dean will appoint a
   chairperson who will be responsible for applying correct procedure to the hearing. The Registrar will
   attend the meeting to record the minutes. A simple majority will prevail (three out of five votes),
   except when the motion is for recommending to the Dean dismissal from enrollment in the school,
   where four out of five votes will be required. The recommendation of the Disciplinary Committee will
   be forwarded to the Dean who will decide upon the disciplinary action to be taken.

5. If the Disciplinary Committee is convened, the Associate Dean for Student Affairs will forward all
   information concerning the matter to the Committee.
6. The Disciplinary Committee shall, whenever possible, convene within one to two weeks after the initial meeting between the student and the Associate Dean for Student Affairs.

7. Prior to the meeting of the Disciplinary Committee, the Associate Dean for Student Affairs will inform the student in writing regarding the time, date and place of the meeting, that the proceedings are completely confidential, and that the student may bring a faculty member, staff member or fellow student of the School of Medicine for guidance and support. A copy of the complaint will be provided to the student.

8. The following guidelines will be applied to the conduct of the Disciplinary Committee and these will be made available to members of the committee at the opening of the meeting. The aim of the Committee is to provide fair and prompt review of the inquiry. The Committee is not positioned in an adversarial role against the student but simply to review the evidence as presented and determine its decision regarding disciplinary action. The Committee has neither the advantages nor limitations inherent in a court of law. Innocence of the student being questioned will be presumed. No facts or conclusions will be assumed. The decision as to whether the student perpetrated the alleged act will be made solely on the basis of evidence and testimony presented at the meeting. During the hearing the student will have access to all the evidence presented. The record of such proceedings will be held confidentially with access restricted to Committee members, the student involved, and members of the Administration involved in the proceedings.

9. All who appear before the Committee are assured that their appearance occurs without fear of repercussions from their testimony.

10. After the meeting and decision of the Disciplinary Committee, the Associate Dean for Student Affairs will inform the student verbally and in writing of the result within three working days.

11. The student will have access to the written record of the meeting’s proceedings.

12. Unless it is determined by the Associate Dean for Student Affairs that extraordinary circumstances exist (e.g., physical threat to others), the student will be permitted to continue in the usual academic activities during the disciplinary proceedings.

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**Liability Insurance**

Washington University provides general liability insurance for all students or practicums while participating in required clinical experiences. In addition, Washington University voluntarily provides a defense and indemnification benefit for matriculated students who are candidates for the M.D. degree at the School of Medicine (WUSM).

The benefit is provided to WUSM students for defense and indemnification of claims arising out of activities which are part of academic programs and only while a student is acting in his or her capacity as a medical student enrolled in the undergraduate medical program at the School of Medicine. This policy is subject to terms, conditions, limitations and exclusions, and each request for defense/indemnification will be decided on a case-by-case basis at the sole discretion of the University.

Defense/indemnification will not be provided for any criminal act or any act committed while in violation of any law or ordinance or University program guideline, or where the injury or damage resulted from intentional wrongdoing, gross negligence or recklessness, or in the event that the action or proceeding is brought by or on behalf of Washington University. This indemnification does not cover any liability which is insured elsewhere, but it may be in excess of any amount payable under any other such insurance.
Any incident, either actual or alleged involving patient injury which could lead to a claim, which you have knowledge of must be reported immediately to the Risk Management Office of the School of Medicine, 362-6956.

If you have any questions about Washington University’s professional liability program, please feel free to call the Risk Management Office.

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**United States Medical Licensing Exam (USMLE)**

Washington University School of Medicine students who anticipate practicing clinical medicine, are required to take the USMLE Step 1 and 2 examinations.

The USMLE is designed to "assess a physician’s ability to apply knowledge, concepts, and principles, and to demonstrate fundamental patient-centered skills, that are important in health and disease and that constitute the basis of safe and effective patient care.” The USMLE represents a single uniform examination for medical licensure in the United States, and as such, is a minimum requirement for obtaining a medical license.

The USMLE consists of four separate examinations. "Step 1 assesses whether you understand and can apply important concepts of the sciences basic to the practice of medicine, with special emphasis on principles and mechanisms underlying health, disease, and modes of therapy. Step 1 ensures mastery of not only the sciences that provide a foundation for the safe and competent practice of medicine in the present, but also the scientific principles required for maintenance of competence through lifelong learning.” Step 1 is taken after completing the second year at WUSM.

Step 2 consists of two separate examinations, Step 2 CK (Clinical Knowledge) and Step 2 CS (Clinical Skills) which are taken at different times. "Step 2 assesses whether you can apply medical knowledge, skills, and understanding of clinical science essential for the provision of patient care under supervision and includes emphasis on health promotion and disease prevention. Step 2 ensures that due attention is devoted to principles of clinical sciences and basic patient-centered skills that provide the foundation for the safe and competent practice of medicine.” Step 2 exams are taken after completing the third year but prior to graduation from WUSM.

"Step 3 assesses whether you can apply medical knowledge and understanding of biomedical and clinical science essential for the unsupervised practice of medicine, with emphasis on patient management in ambulatory settings. Step 3 provides a final assessment of physicians assuming independent responsibility for delivering general medical care.” Step 3 is taken following graduation and during internship/residency training.

Further information can be obtained from the USMLE Bulletin of Information published by the National Board of Medical Examiners, and is available, along with application forms and information, at: [http://www.usmle.org](http://www.usmle.org).
St. Louis

St. Louis is one of the most livable areas in the United States, with a cost of living that ranks consistently lower than many other comparable cities. For recreation, the lively arts, and great everyday living, St. Louis is a city of opportunity and variety.

The Gateway Arch — St. Louis’ preeminent symbol — represents the joining of old and new on the historic Mississippi riverfront. Rising in front of a dramatic skyline, the Arch symbolizes St. Louis’ role as the Gateway to the West. Today, as in the past, St. Louis is a prominent cultural and commercial city, linking the north and south, east and west, through its traditions and its view of the future. The Arch itself, designed by Eero Saarinen, is a remarkable sculptural achievement and an incredible engineering feat, worthy of its dramatic setting. It frames the commercial center of downtown and the Old Courthouse, where in 1847 Dred Scott argued his right to be a free man.

Ambitious renovation and architectural experimentation characterize busy downtown St. Louis. The Old Post Office and the massive Romanesque Union Station have been revitalized. Union Station houses a hotel and expansive shopping mall, inviting convention visitors and tourists to explore commerce St. Louis-style. New corporate headquarters buildings downtown display the variety of modern architecture evident in major metropolitan centers around the nation. Members of the Washington University School of Architecture consult with local firms in the creation of new structures and the refurbishing of the old. A housing area in the fashionable Central West End, home to the Washington University Medical Center, is the design of a School of Architecture professor.

Though the St. Louis area has nearly 2.5 million residents, living here is simple and affordable. A convenient, modern highway system and a simple city plan allow easy access to all parts of the city and its many activities. A light rail line — MetroLink — runs from Lambert Airport through Laclede’s Landing in the downtown area and on to Illinois. A stop at the medical center makes this mode of...
transportation especially convenient for medical school faculty, students and staff.

A keynote to St. Louis is variety. Any taste in housing, cuisine, lifestyle and leisure activities can be found in the greater St. Louis area, but St. Louis is less expensive than comparable cities. Attractive, affordable residential communities abound here, many of them within a two-mile radius of Washington University. The Central West End, University City and Clayton — all of which border Washington University — provide attractive housing and recreational opportunities. To the north, small shops, galleries and ethnic restaurants dot the main street of University City. Adjacent to the Washington University Medical Center and close to the Hilltop Campus is the Central West End — fashionable, trendy and restored to its late-19th century grandeur. To the west are the elegant homes and multifamily dwellings of Clayton. Those who come to St. Louis to be associated with the University find apartments that range in price from $450-$650 per month, and purchase properties ranging from $90,000 and up, all in the immediate area. For those who desire a more suburban lifestyle, west St. Louis County is a growing and beautiful area.

Cultural Opportunities

Once settled, new St. Louisans discover the rich recreational and cultural life here. The effects of the St. Louis renaissance are easily seen in its theaters, galleries and festivals. The Saint Louis Symphony, among the finest in the nation, performs at historic Powell Hall. Symphony members bring their skills to the community through teaching and chamber concerts as well. Several hold appointments in the Washington University music department, which also has close ties with the St. Louis Conservatory and Schools for the Arts (CASA), an institution offering high-level, intense training in music and the arts. In the downtown area, the rich St. Louis traditions in jazz, blues and ragtime music are continued in a number of lounges and clubs.

The Opera Theatre of St. Louis has been enormously successful, nationally and internationally, bringing English-language versions of the classics and presentation of contemporary operas to the stage. The Repertory Theatre of St. Louis has an extensive annual season, which includes experimental works and traditional dramas. The Stages St. Louis Theatre Co.; Kirkwood Theatre Guild; West End Players Guild; Act., Inc.; Historyonics Theatre Co.; and the Saint Louis Black Repertory Company enrich the dramatic offerings available in the immediate area. On campus, Edison Theatre offers the very highest quality in national and international programs in theater, dance and music each season.

Broadway comes to St. Louis at the Fox Theatre, a $2 million renovation of a 1929 example of exotic cinema temple art. Galleries sprinkled throughout the area bring the most current in visual arts to St. Louis, while antique shops remind us of the past. St. Louisans tend to be avid moviegoers. Supplemented by the standard movie fare available throughout the metropolitan area are two theaters close to campus, the Hi-Pointe and the Tivoli, both offering excellent foreign films. The St. Louis International Film Festival takes place every fall.

When the St. Louis Art Museum was built for the 1904 World’s Fair, much of the Washington University collection was housed in it. Standing on a hill in Forest Park, the museum was called the jewel of the Fair. By 1929, it exhibited the entire University art collection and provided space for fine arts students and faculty shows. Though in 1960 Washington University built its own museum — the Gallery of Art housed in Steinberg Hall — and moved its collection there, ties with the St. Louis Art Museum remain very close. Students in art and in business intern at the Art Museum, working in arts management and gallery organization.

St. Louis also features Laumeier Sculpture Park, which displays 60 large-scale sculptures representing artists of international renown. St. Louis has two major historical museums as well: the Missouri Historical Society in Forest Park and the Museum of Westward Expansion under the Gateway Arch.

Recreation

For recreation, St. Louisans may use any of 93 parks that dot the metropolitan area. In Forest Park, which lies between the two Washington University campuses, are the Art Museum, The Muny (an
outdoor theater), the famed St. Louis Zoo, municipal golf courses, tennis and handball courts, a skating rink, and acres of paths, picnic areas, gardens and wooded groves. Tower Grove Park is in south St. Louis, and adjoining it is the Missouri Botanical Garden, world famous for its research, collections and facilities. The Garden’s professional staff members hold positions on the Washington University faculty and make the extensive research facilities available to students.

Farther afield, St. Louis residents find outdoor adventure in the countryside beyond the city. In the Ozark Mountains, on the rivers of Missouri, on the lakes of neighboring Illinois, variety abounds. Camping, hiking, floating, rock climbing and caving are among the many possibilities within a few hours’ drive of St. Louis. For sailors, there is Carlyle Lake in Illinois. And for those with rod and reel, the Missouri streams are made to order.

The Washington University Athletic Complex provides outstanding resources to athletes at every level of ability. Open to all members of the University community, it includes an eight-lane, 25-meter stretch pool, two complete gymnasiums, weight rooms, racquetball courts, a complete outdoor tennis complex and a track complex. Built on the site of the 1904 Olympic games, this state-of-the-art facility offers recreational opportunities year-round for students, faculty and staff.

For the spectator, St. Louis is a splendid sports town. For more than a century, it has hosted one of the oldest traditions in baseball — the St. Louis Cardinals. Dizzy Dean and the Gas House Gang, Stan Musial, Lou Brock, Ozzie Smith and Mark McGwire are all part of Cardinal history.

St. Louis’ NFL Rams brought home the Superbowl trophy in 2000, after being welcomed to the community in the fall of 1995. The St. Louis Blues ice hockey team moved here in 1967 and enjoy a winning history. St. Louis also supports a number of semi-pro sports teams.

Employment

St. Louis is a great place to work; job opportunities are varied and abundant. Many companies are distinguished for their excellent working conditions, and commuting is easier than in many large cities.

Many major corporations are located here, as are a variety of retail, transportation and banking organizations. Among the top firms in town are Anheuser-Busch, Emerson and Boeing. Many support services have grown up around these corporations — including law, accounting, data processing, advertising, public relations and design firms, as well as photographic and audio-visual studios.

One of the largest employers is the Washington University Medical Center — made up of the School of Medicine and several teaching hospitals. Illustrative of the productive ties between University and community, Pfizer supports the Mentors in Medicine Program, which trains residents to do clinical research, and the Young Scientist Program, a student-run initiative that brings inner-city high school students into research laboratories.

The John M. Olin School of Business at Washington University enjoys a rich and varied partnership with the business community. As a laboratory for internship opportunities, entrepreneurship study, and student practicums offered through Olin’s Center for Experiential Learning, St. Louis plays an integral role in the education of undergraduate and graduate business students. In turn, Olin creates value for area businesses by matching top Olin talent with pivotal positions in their firms. Moreover, Olin delivers Executive MBA and leadership development programs to help individuals and organizations succeed. Olin faculty teach in these programs and consult with area corporations desiring to explore new opportunities for growth and development.

Similarly, the School of Law has close ties with the St. Louis legal community and, through its clinical program, offers internships in private and local government offices and in state and federal courts. In addition, the law school is fortunate in the active and interested role of the local bar associations in the development of the school’s special programs.

The George Warren Brown School of Social Work also is linked in many ways to the St. Louis social work community. Students find practicum assignments throughout the area, and both students and
faculty do research and consult with local agencies.

A strong partnership exists between technologically based businesses and industries in St. Louis and the School of Engineering & Applied Science. Engineering faculty members regularly undertake collaborative research and consulting projects with area firms such as Boeing, Monsanto and Emerson. At the undergraduate level, the cooperative education program gives engineering students an opportunity to apply what they learn in the classroom in alternating periods of employment, both in St. Louis and nationwide. A unique program offered in conjunction with the University of Missouri-St. Louis is designed to allow nontraditional students from St. Louis to earn undergraduate degrees in civil, electrical, and mechanical engineering. The Henry Edwin Sever Graduate School of Engineering & Applied Science offers programs of instruction and research leading to specialized master's degrees and to the Doctor of Science degree; in addition, a three-year degree program offered in conjunction with the Olin School of Business leads to the MS-BME/MBA degree. Most of the graduate programs offered may be pursued by both full-time and part-time students. Numerous locally employed engineers, scientists, and technical managers have earned master's degrees through part-time study, or have completed significant portions of the requirements for their Doctor of Science degrees while they were part-time students. There is a network of more than 80 faculty members associated with Department of Biomedical Engineering, representing numerous divisions of the University, including many from the School of Medicine. This network provides innumerable opportunities for collaborative research and research training in a diverse array of biomedical engineering activities.

In addition to their ties to local business, both the Hilltop Campus and the School of Medicine at Washington University are dedicated to the support of K-12 education. Students from the medical school participate in a variety of outreach programs, including Students Teaching AIDS to Students (STATS), designed to teach awareness and responsible behavior to junior high school students; the Young Scientist Program, an interactive learning experience that brings high school students to the Medical Center; and health and preventive programs on drug and sex education.

In short, Washington University enjoys a special relationship with St. Louis.

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**Housing**

Those who come to St. Louis to be associated with the Washington University School of Medicine find apartments which range in price from $450-$650 per month, all in the immediate area. The Apartment and Housing Referral Services, located in Millbrook Square on the Hilltop Campus, maintains listings of housing appropriate for married and single students. For information, contact Apartment and Referral Services at Campus Box 1059, 6926 Millbrook Blvd., St. Louis, MO 63130 or (314) 935-5092.

The Spencer T. Olin Residence Hall, (314) 362-3230, located at 4550 Scott Ave. in the Medical Center, has accommodations for approximately 200 single men and women. The building was made possible by generous gifts from Spencer T. Olin, alumni and friends of the School of Medicine. Olin Hall is planned for the convenience of students in the medical or paramedical sciences, and includes shared cooking facilities, a gymnasium, weight room, laundry room and penthouse with a recreational area and large-screen television with satellite system. Every effort is made to provide an atmosphere that not only aids residents in meeting their study obligations, but also recognizes their privileges as graduate students.

The rates for rooms during 2005-2006 are:

<table>
<thead>
<tr>
<th>Summer 2005 (May 21 - July 31)</th>
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<tbody>
<tr>
<td>Single Room: $960</td>
</tr>
<tr>
<td>Large Single: $1,180</td>
</tr>
<tr>
<td>Solo Suite: $1,410</td>
</tr>
<tr>
<td>Double Room: $660*</td>
</tr>
</tbody>
</table>
Double Suite: $960*

School Year: Mid August-Mid May (Nine Months)
Single Room: $3,210
Large Single: $3,850
Solo Suite: $4,610
Double Room: $2,160*
Double Suite: $3,210*

*Price per student

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**Security**

Security at the School of Medicine is the responsibility of Protective Services. Uniformed Protective Services Officers are on duty 24 hours a day, seven days a week to provide for personal safety, reduce the opportunity for crime, apprehend law violators, provide crime prevention and awareness training and assist in enforcement of University rules and regulations. Armed Response Officers and unarmed Public Safety Officers are radio-dispatched. They respond immediately to telephone calls made to 362-HELP (4357). Officers patrol the campus on foot, on bicycles and in marked mobile units. Contract Agency guards staff a few fixed posts to supplement the in-house officers.

The Medical School access control program makes the campus easily accessible after hours and on weekends. Faculty, staff and students are issued a photo identification badge that identifies the wearer as a member of the medical school community. The badge has a magnetic strip that activates the computerized door lock entrances to the School’s buildings. These entrances have two-way intercoms for direct communication with Protective Services’ Communications Officers, as do direct-ring telephones located outside selected campus buildings and "Code Blue" emergency telephones on surface parking lots and in the garages.

Each year Protective Services publishes a summary of statistical information concerning campus crime as required by federal law, on the medical school web page at medschool.wustl.edu/~fmd/proserv.htm. Information may be found on the web pages under "Our Students" or "Our Staff" under the heading "Resources and Information." A daily crime log, information on crime prevention tips and the many services and programs provided by Protective Services also appear on the web. For a printed copy of the annual security report, contact Washington University School of Medicine, Protective Services Department, Campus Box 8207, 660 S. Euclid Avenue, St. Louis, MO 63110, or by calling (314) 362-4814.

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**Parking**

Parking is available on various surface lots and the Clayton Garage owned by the School of Medicine. The surface lots are located near a variety of sites within the Medical Center. Although surface parking space is limited, parking is generally available in the 1,500-space WUSM employee/student garage located at the corner of Clayton and Taylor avenues. The Clayton Garage is undergoing a 700 space addition which should be completed in spring 2006. Shuttle service is available for transportation from one site to another in accordance with specific shuttle schedules. If additional information, maps or shuttle schedules are needed, please contact Transportation Services at (314) 362-6824 or stop by our office in Olin Residence Hall, 4550 Scott Avenue. If you are interested in carpooling, vanpooling, or Metro Transit passes or coupon books, please contact the WUSM Transportation Service's Office.
For additional information regarding Hilltop shuttle routes and times, please see the following web site:

http://transportation.wustl.edu
Gold Line: Medical School, Lewis Center, Northwest Loop/North by Northwest
Red Line: West Campus, Galleria, Wohl Center
Green Line: Lewis Center, University City Loop

Check Cashing

Personal checks may be cashed at the Cashier’s Office (Room 107, first floor McDonnell Sciences Building). Hours are 9 a.m. to 4 p.m., Monday through Friday. Limit for personal checks is $100 per check or a total of $100 per day. A charge of 25 cents per check is made for this service. Limit for Washington University checks is $200 per day. Your Washington University identification card must be presented when checks are cashed.

Bulletin Boards

Bulletin boards are located on the wall outside the Admissions Office, on the first and second floors of the McDonnell Sciences Building, on the first floor of Olin Residence Hall, and in the lounge on the ground floor of the Bernard Becker Medical Library. Please check these frequently.

Lockers

Student lockers with combination padlocks are located on the third and fourth floors of the Farrell Learning and Teaching Center. Locker assignments are made by the Registrar’s Office for a nominal fee to cover the cost of the padlock. Only padlocks issued by the Registrar’s Office may be used.

Mail

First-class student mail sent to the School of Medicine will be put in student mailboxes. This will most probably serve as a temporary mailing address and be used only until students are settled in St. Louis. It is important that mail addressed and sent to the School of Medicine include both student status (WUMS = Washington University Medical Student) and year, as follows:

Jane Doe, WUMS I
Washington University School of Medicine
Campus Box 8077
660 S. Euclid Ave.
The Student Health Service provides a complete service for full-time students registered in the School of Medicine. Services are provided through a self-funded program included in tuition costs. Services include professional care by staff physicians: Internists, Allergists, Dermatologists and Counselors, with referrals to other consultants. Services are available by appointment on-site at 4525 Scott Ave, Suite 3420, Monday – Friday from 8:00am – 4:00pm. The Health Service has implemented an after-hour coverage monitored by Dr. Winters. The students are able to call 362-3526 after hours for non-urgent care. All medications, diagnostic tests, x-rays and consultations ordered by the physicians are covered 100% with a small co-payment, in the absence of private insurance. In addition, the Health Service offers full major medical benefits including labor and delivery. Care for urgent illness, emergency care is available at the Emergency department of Barnes-Jewish Hospital.

There is a maximum lifetime benefit per student of $1,000,000. The student or his/her family is responsible for meeting the costs of hospital care in excess of those paid by the Student Health Service. There are no benefits for outpatient care or medication away from the Medical Center. The responsibility of the Student Health Service for hospitalization and emergency care will end 30 days after an individual ceases to be an officially enrolled student. The School of Medicine also offers a disability and life insurance policy to all full-time students registered in the medical and allied professional schools of the medical campus. The Student Health Service offers easy access to medical and psychiatric care so that physical and emotional problems will not interfere with university life. Subsequent medical care is provided as long as full-time enrollment is maintained in the School of Medicine.

The Health Service also pre-screens every incoming student prior to their arrival at the medical school to ensure all federal requirements have been met regarding communicable diseases. Entering students are required to have a medical examination within one year of matriculation and to show proof of immunity to measles (rubeola), rubella and mumps and a tetanus booster within 10 years. The Health Service tracks all immunizations during and prior to enrollment. Statements of Health for internships and practicums are provided.

Spouses, Dependents

Students frequently ask if they can purchase health coverage for their spouse and/or dependents. The Health Service has arranged a few options for you to review. A detailed description of the plans and applications are available at the medical campus Health Service.

Dental Care

There is no provision for treatment of dental problems through the Student Health Service, other than for injury to a sound natural tooth. Students frequently ask where to get dental care at a reasonable cost. Two sources of care have been identified. Students may obtain the names of private dentists that offer quality low cost routine dental care from the Health Service.

The other option is students can purchase dental coverage through a group plan offered through the
Health Service. Students who wish to purchase this plan should contact the Health Service for a detailed description of the coverage and application form. Student Health Service will collect the year premium at the time of enrollment. Enrollment for this plan will close August 30 and will not re-open until August 1 the following year with no exception. A similar individual plan is also available to the spouse of a student enrolled in the dental plan.

**Counseling Services**

Students within the Medical Center may have concerns over poor concentration, ineffective study habits, anxiety over their performance, low self-esteem, getting along with others, grief or depression. The psychiatry and clinical psychology staff members are available to help students cope with these concerns. Initial evaluations are made at the Medical Campus Health Service. Subsequent care may be at the Medical Campus or a designated physician’s office. Call 362-3523 for more information. All records are confidential and may not be seen by anyone without the student’s written consent.

**Disability Insurance**

All students are covered by group disability insurance. A student who is completely disabled for six consecutive months is eligible to receive $500 per month benefit. Coverage increases to $1,300 per month in the third year. Individual disability policies are issued to fourth-year students, increasing the total monthly benefit to $2,000. Individual policies are portable, guaranteed issue, and can be increased after graduation up to a maximum $4,700 per month benefit. Call (314) 362-2346 for more information.

**Life Insurance**

All students are covered by a $10,000 life insurance benefit. Call (314) 362-2346 for more information.

**Dress Code**

While the Washington University School of Medicine does not have a written dress code, it is expected that all students will dress in attire that is appropriate for a professional.

Appropriate attire in the clinical setting is especially important, not only because the student will be part of the team representing the medical profession to patients, but also because the student will be representing the School of Medicine.

Appropriate attire for male students on the clinical services includes man-tailored shirt and tie, trousers or slacks and closed toe shoes. Appropriate attire for female students includes a dress, a blouse, tailored shirt or sweater, and slacks or skirt. Both men and women should wear a short white jacket with the appropriate hospital identification card clearly visible.

**Student Organizations**

Students at Washington University School of Medicine are active participants in medical student Organizations on the local, state and national levels. The American Medical Student Association (AMSA), the Student National Medical Association (SNMA), the American Medical Women’s Association (AMWA), the Asian-Pacific American Medical Students Association (APAMSA), the Medical Student
Section of the American Medical Association (AMA-MSS), the Missouri State Medical Association (MSMA), the Organization of Student Representatives (OSR) in the Association of American Medical Colleges (AAMC) and the Student Organized Community Clinic (SOCC) provide forums for addressing the educational, social and political concerns of medical students. The School of Medicine supports student participation in these national organizations and provides partial funding for travel and other expenses on an annual basis. Medical Student Government (MSG), represents the student interests, supports social and educational activities and expands the perspectives of the future graduates of the medical school.

**Academic Societies**

To foster communication between students and faculty, three academic societies — The Joseph Erlanger and Evarts Graham Society, The Carl and Gerty Cori Society, and The Oliver Lowry and Carl Moore Society — meet independently throughout the academic year to enjoy a social hour, dinner and conversation. The societies promote a collegial environment for the medical school’s diverse faculty and student body. Medball held in March of each year – is hosted in partial by the academic societies and provides a formal social evening with medical faculty and medical students.

**AMA-MSS**

Washington University has an active chapter of the American Medical Association Medical Student Section. WUSM students are involved at the local, state and national levels and represent Washington University in policy development.

**AMSA**

On the local level, AMSA is the major student organization at the School of Medicine. The chapter’s annual activities include a speaker series and several community service projects. In recent years, the service projects have included an ongoing blood pressure screening program done in conjunction with the American Heart Association.

**AMWA**

The American Medical Women’s Association is a national organization designed to address issues of concern to women in medicine. Washington University has an active student group and funding is available for student representation at regional and national meetings.

**APAMSA**

The Asian-Pacific American Medical Students Association was founded to address issues and needs specific to Asian-Pacific American medical students. To that end, it serves as a support group for students, fosters student-faculty interaction and promotes cultural awareness, as well as providing a framework for community service programs.

**Forum for International Health and Tropical Medicine**

The Forum for International Health and Tropical Medicine (FIHTM) was formed to promote awareness of international health concerns and facilitate international health experiences for medical students. In addition, the group has worked closely with administration in the design of a formalized international health elective program and funding structure.

**Program for Women in Science and Medicine**

The Program for Women in Science and Medicine is designed to foster interaction among women at all levels at the medical school. The program sponsors a variety of informal discussions, receptions and dinners with informative speakers throughout the academic year.

**SNMA**

The Student National Medical Association (SNMA) is the oldest and largest medical student organization focused around the needs and concerns of African-American, Latino and Native American medical students. This organization is concerned with providing services to medically underserved communities, promoting minority student recruitment and retention to schools that train health personnel and assisting in ways to provide quality education to minorities and women. Washington University has an active SNMA chapter, and funds are available for representation at regional and national meetings as well as for community service activities.
Student Organized Community Clinic (SOCC)
As the number of uninsured citizens in America continues to rise, the Student Organized Clinic provides an important service to the community of St. Louis. The clinic provides the sole access that many patients have to the healthcare system. It provides a close up look at how severe the problem of the uninsured in America is for our student volunteers.

Washington University Medical Center Housestaff Auxiliary (WUMCHA)
WUMCHA is an organization comprised of female medical students, residents, fellows, attending physicians, female spouses, partners and "significant others" of those affiliated with Washington University Medical Center, including Barnes-Jewish and Children’s hospitals, the School of Medicine and Mallinckrodt Institute of Radiology. The purpose of the organization is to provide friendship and social support among its members. In addition to sponsoring numerous recreational and educational activities, WUMCHA publishes a Welcome Guide, as well as a directory of members. Annual dues are $30 and information about membership and applications can be obtained by contacting Molly Dubberke at (314) 835-0019 or mollydubberke@yahoo.com.

Community Service Experience
Participation in a host of community service projects nurtures the students’ altruistic nature and provides an alternative educational experience. University-sponsored, student-run, community-based service activities include the Perinatal Project, which provides information concerning well-baby care and prenatal care to women from lower socioeconomic groups and the Drug Education Project, which educates inner-city youngsters concerning the effects of drug and alcohol abuse. The Reproductive Health Project provides sex education to middle school students. The Students Teaching AIDS to Students (STATS) Program allows trained medical students to provide sixth- and seventh-graders with information about AIDS. The combined efforts of medical students, faculty, middle school teachers, parents and speakers with AIDS have made STATS a very successful program. The CoMoTion project serves as a clearinghouse for students to participate in a series of St. Louis outreach programs. Through this project, students have worked in a soup kitchen and shelters for the homeless, supervised a women’s center and organized a holiday gift drive for homeless families. The Domestic Violence Action (DVA) group has introduced domestic violence issues into the medical school curriculum. These students also organize yearly symposiums on domestic violence for health care workers from the community. Pediatric Care Organization matches children in the St. Louis area who are suffering from chronic illnesses and the siblings of these children with big brothers and big sisters from Washington University School of Medicine. Other community based groups include The Clown Docs, students who learn the basics of clowning and perform to patients; Community CPR trains medical students to become instructors in CPR for the medical school curriculum and in the community of St. Louis. The Mental Health Outreach Program (MHOP) works to increase the awareness of mental health issues among medical students and the general public. Smoking Cessation Project trains medical students to assist patients in smoking cessation through group and individual counseling utilizing the American Lung Association Freedom from Smoking program.

Student Publications
Students organize and spearhead several publications at the School of Medicine. The Dis-Orientation Guide is produced annually as a student-to-student guide to the curriculum and the city.

Intramural Program
Students enrolled in Washington University School of Medicine enjoy an active and diverse Intramural (IM) Program. The IM Program offers students the opportunity to participate in a wide range of sports. Utilizing the state-of-the-art facilities in the
University’s Athletic Complex, medical students pursue personal athletic interests and enjoy interaction with students enrolled in both undergraduate and graduate degree programs. The IM Program provides an excellent opportunity to socialize with colleagues as well as other graduate students. Differences in curricular demands among participants are considered in scheduling games so that neither academic nor athletic goals are compromised.

Traditionally, the School of Medicine is represented each year by teams or individuals in over 10 intramural sports. In recent years, medical student teams competed in men’s and women’s flag football, soccer, volleyball, cross country, basketball, swimming, softball, and track and field as well as coed ultimate Frisbee, volleyball, inner tube water polo and softball. In addition, there are different levels of competition so that the needs of both the competitive and recreational athlete can be met.

The School has always made a strong showing in both the mixed and graduate school division, as evidenced by the many championship T-shirts team members sport.

**Transcript Service**

The transcript service is run individually by the first- and second-year classes. It is a self-funded program in which written transcripts are produced for each lecture during the school year. Students alternate various duties, including tape recording, transcribing, copying and distributing the transcripts. It is a voluntary cooperative effort involving interested students (almost all students join) for a relatively modest fee, and is widely viewed as a valuable endeavor.

**Primary Care Summer Preceptorship**

Students appreciate early and sustained patient contact. Since 1996 the school has sponsored a primary care preceptorship program for students during the summer between their first and second years of classes. Students select a preceptor in internal medicine, pediatrics or family practice and spend up to eight weeks observing that physician’s clinical practice. A stipend is provided to the student. Although many of the preceptors are in St. Louis, others, particularly alumni, are located in cities throughout the country. Applications should be made to Leslie Kahl, M.D., Box 8077.

**Student Research Fellowships**

Student research is an important part of the educational program. Fellowships in basic science or clinical areas will be awarded each year to selected students who undertake research projects under the direction of faculty members. Research allows students to discover firsthand the problems and rewards of obtaining and assessing new information, thus adding another dimension to their experience as investigators.

Most students take the opportunity for research during the summer after their first year of classes, but
incoming students to the school also are eligible. All research must be carried out at the School of Medicine. Students will be awarded a fellowship and stipend for a two-month program. Inquiries should be made to Student Research Fellowships, Koong-Nah Chung, Ph.D., Box 8107.

**Alpha Omega Alpha**

Alpha Omega Alpha is a national medical honor society. Members are selected by a standing AOA committee during the final year of medical school. Selection is based upon academic performance during the first three years, in addition to other qualities such as leadership. Approximately one-sixth of the class is elected to AOA.

Students elected to AOA are honored at an awards dinner during the final year and at a special AOA lecture.

**Awards and Prizes**

Washington University School of Medicine publicly recognizes and rewards at two annual events outstanding scholarship, research accomplishments and community service of individual students. In December, the Student Awards Luncheon acknowledges academic excellence earned during the first three years of study. As part of the festive commencement activities in May, graduates are recognized for meritorious research and clinical achievements accomplished during their medical school careers.

**The Academic Women’s Network Leadership Award.** Presented to a woman or women in the graduating class who has or have demonstrated outstanding leadership in service to or advancement of women in the community. The 2005 recipients: Virginia Margaret Pierce and Kristina Ai Toncray.

**Morris Alex, M.D. Prize.** Awarded each year to the medical student who is outstanding among his or her peers in the second-year Clinical Medicine course. The 2005 recipient: Jennifer M. Boland.

**Alpha Omega Alpha Book Prize.** Awarded to a member of the graduating class who has performed outstandingly for the entire medical course. The 2005 recipient: Ian Gordon Ashley Dorward.

**American Academy of Neurology Medical Student Prize for Excellence in Neurology.** Awarded to a member of the graduating class for excellence in clinical neurlogy and outstanding personal qualities of integrity, compassion and leadership. The 2005 recipient: Luigi Maccotta.

**American College of Physicians Michael M. Karl, M.D. Book Award.** Presented annually to a member of the graduating class committed to a career in internal medicine, in recognition of highest achievement in the field of internal medicine. The 2005 recipient: Benjamin Douglas Womack.

**American College of Physicians Award for Excellence in Physical Diagnosis.** Two recipients are selected annually based on their outstanding performance in the second-year Clinical Medicine course. The 2005 recipient: Adam T. Froemming.

**American College of Physicians Clerkship Award.** Established in 1992 to be awarded to a student completing the third year of study with meritorious achievement in the Internal Medicine Clinical Clerkship. The 2005 recipient: Denise R. Flinn.

**American Medical Women’s Association Glasgow-Rubin Memorial Achievement Citations.**
Presented to women medical students graduating in the top 10 percent of their class. The 2005 recipients: Kathryn Ann Gold, Virginia Margaret Pierce, Karen Elaine Reisiger, Shailaja Janaki Sathy, and Pooja Manjula Swamy.

**American Medical Women’s Association Glasgow-Rubin Memorial Award.** Presented to a woman graduating first in her class. The 2005 recipient: Cynthia Elise Rogers.

**Association for Academic Surgery Student Research Award.** Recognizes outstanding research efforts by a graduating medical student interested in a surgical career.

**The Ruth Bebermeyer Award.** Established in 2001 by the WUMCAA executive council to honor Ruth Bebermeyer for her many years of dedicated service to WUMCAA (1990-2000) and to the students of the School of Medicine. The award is given to "a student who has shown extraordinary kindness and sensitivity to the needs of others," whether those others be fellow students, patients, or just people in general. The 2005 recipients: Kristina A. Toncray and Benjamin D. Womack.

**Alexander Berg Prize.** Awarded to the student presenting the best results in research in molecular microbiology. The 2005 recipient: Dawn Marie Wetzel.

**Jacques J. Bronfenbrenner Award.** Provided by Dr. Bronfenbrenner’s students in memory of his inspiration as a teacher and a scientist, and awarded to the member of the graduating class who, as judged by the Department of Medicine, has done the most outstanding work in infectious diseases or related fields. The 2005 recipient: Virginia Margaret Pierce.


**Dr. Harvey Butcher Prize in Surgery.** Awarded annually in memory of Dr. Harvey Butcher to the member of the graduating class who, as judged by the Department of Surgery, shows the greatest promise for general surgery. The 2005 recipient: Anson Michael Lee.

**Kehar S. Chouke–George Gill Prize in Anatomy.** Awarded annually to a first-year medical student who has demonstrated superior scholarship in anatomy. The 2005 recipient: Kevin L. Ard.

**Class of 2001 Award.** Established by the Class of 2001 as its gift to the medical school. Awards are to be given to third-year medical students in recognition of outstanding performance in the areas of community service and student group activities in the first two years of medical school. The 2005 recipient: Cynthia J. Herrick and Carol A. Lin.

**Class of 2003 Award** is dedicated to the memory of three classmates, who died in a car accident, and is awarded to a first year student recognized by peers as being selfless, exceptionally kind to others, and dedicated to the highest standards in medicine. The 2005 recipient: James C. Hudspeth.

**Carl F. and Gerty T. Cori Prize in Biochemistry.** Awarded at the end of the first year to the members of the class who has demonstrated superior scholarship in Biochemistry. The 2005 recipient: Laurel B. Barrett.

**Edmund V. Cowdry Prize in Histology.** Established in 1969 to honor Dr. Cowdry; awarded to a medical student in the first-year class who has performed meritoriously in microscopic anatomy. The 2005 recipient: Heba N. Iskandar.

**Antoinette Frances Dames Award in Cell Biology and Physiology.** Awarded annually to members of the first-year class who have demonstrated superior scholarship in these fields. The 2005 recipient: Oluwadamilola M. Fayanju.

**Elisabeth L. Demonchaux Prize in Pediatrics.** Established in 1985, the prize is awarded annually to
a graduating student who has done outstanding work in pediatrics. The 2005 recipient: Kristina Ai Tonocray.

**Distinguished Minority Medical Student Scholarship Prizes.** Provided by African-American alumni and friends of Washington University School of Medicine, the prizes are awarded to Minority Scholarship recipients in recognition of their achievements in the first and second year of the curriculum. The 2005 recipients: Madeleine B. Courtney-Brooks, Oluwadamilola M. Fayanju, and Eugenia C. Garvin.

**Steven Dresler Prize.** Awarded to a graduating student who has demonstrated a commitment to promoting social good, civil rights and civil liberties through social action and volunteerism. The 2005 recipient: Wei Ling Lau.

**Dr. William Ellis Award.** Established in 1990 by Dr. Ellis and awarded to a senior student in recognition of meritorious research in ophthalmology. The 2005 recipient: Yang Sun.

**The Endocrine Society Medical Student Achievement Award.** Recognizing a graduating medical student who has shown special achievement and interest in the general field of endocrinology. The 2005 recipient: Mollie Rebecca Gordon.

**The Family Health Foundation of Missouri Scholarship Award.** Presented in recognition of academic achievement of a graduating medical student entering the specialty of family practice. The 2005 recipient: John Allan Campbell.

**George F. Gill Prize in Pediatrics.** Awarded to a member of the graduating class who has demonstrated superior scholarship in pediatrics. The 2005 recipient: Erica Renee Freeman.

**Alfred Goldman Book Prize in Diseases of the Chest.** Created in 1972 as an annual award to be given to a student selected by the faculty for outstanding clinical work or research in diseases of the chest or pulmonary physiology. The 2005 recipient: Kevin Frederick Wilson.

**Max and Evelyn Grand Prize.** Established in 1985 by Dr. M. Gilbert Grand, the prize is awarded annually to a fourth-year medical student for excellence in ophthalmic research or clinical ophthalmology. The 2005 recipient: Rebecca Colleen Stacy.

**Peter Halstead Hudgens Award.** Established by Dr. Richard W. Hudgens, in memory of his son, this award recognizes a graduating student for excellence in research and clinical psychiatry. The 2005 recipient: Cynthia Elise Rogers.

**R.R. Hannas Award for Excellence in Emergency Medicine.** Offered annually by the Missouri Chapter of the American College of Emergency Physicians for exceptional performance in emergency medicine.

**Dr. John Esben Kirk Scholastic Award.** Established in 1975 and awarded to a graduating student of high scholastic standing. The 2005 recipient: Cynthia Elise Rogers.

**Louis and Dorothy Kovitz Senior Prize in Surgery.** Senior award in surgery recognizing a member of the graduating class who has shown the most outstanding ability, zeal and interest in surgical problems. The 2005 recipient: Michael Cohen.

**I. Wallace Leibner Award.** Established in 1988 in memory of Dr. Leibner, the award is given to the member of the graduating class who has demonstrated outstanding ability in the clinical practice of medicine. The 2005 recipient: Virginia Margaret Pierce.

**Irwin Levy Prize in Neurology and Neurological Surgery.** Established in 1980 by friends of Dr. Levy as a tribute to his commitment to clinical teaching. Provides a prize for the student who presents the best performance in the neurology and neurological surgery clerkships.
Oliver H. Lowry Prize in Pharmacology. Awarded to a second-year medical student for academic excellence in pharmacology. The 2005 recipient: Gina N. LaRossa.

Edward Massie Prize for Excellence in Cardiology. Awarded to the member of the graduating class, selected by the director of the Division of Cardiovascular Disease in the Department of Medicine, who has done the most outstanding clinical or basic research work in the field of cardiovascular disease. The 2005 recipient: Josephine Dondoyano Hidalgo.

Howard A. McCordock Book Prize in Pathology. Awarded at the end of the second year to a member of that class for general excellence in pathology. The 2005 recipient: Karla M. Fredricks.

McGraw-Hill/Appleton & Lange Medical Student Book Award. Awarded annually to medical students for high scholastic standing. The 2005 recipients: Marios Giannakis and Thomas S. Shane.

Medical Center Alumni Scholarship Fund Prize. Given annually to a student who has shown excellence in his or her work during the preceding year. The 2005 recipient: Anne M. Drewry.

Medical Fund Society Prizes. One prize awarded annually to a graduating student who has excelled in the study of internal medicine; one prize awarded annually to a student of the fourth-year class who has excelled in the study of surgery. No individual is eligible for both prizes. The 2005 recipients: Kathryn Ann Gold (Medicine) and Yiing Lin (Surgery.)


Dr. Helen E. Nash Academic Achievement Award. Given annually to a student who has exhibited to an unusual degree the qualities of industry, perseverance, determination and enthusiasm. The prize is given in honor of Dr. Helen Nash, a pediatrician noted in the St. Louis community for her commitment to excellence, tireless advocacy on behalf of children and endless enthusiasm for the field of medicine. The 2005 recipient: Cynthia E. Rogers.

The Dr. Philip Needleman Pharmacology Prize. Established by his family in 1989 to honor Dr. Needleman, who was Chairman of the Department of Pharmacology from 1976-1989. This annual award is given to a member of the graduating class for outstanding research in pharmacology.


Roy Peterson Award in Anatomy. Awarded for outstanding performance in the Gross Anatomy course in recognition of Dr. Peterson’s many contributions as a teacher in the School of Medicine. The 2005 recipient: Heba N. Iskandar.

The Richard and Mildred Poletsky Education Fund. Established in 1995 by the family of Mr. Richard Poletsky, an alumnus of Washington University. A prize is awarded annually to a professional student in the health sciences whose interest is in research on dementia and care of demented patients.

Dr. Philip Rosenblatt Award in Pathology. Given to a medical student for distinguished performance during an elective in pathology or laboratory medicine. The 2005 recipient: Ji Lu.

St. Louis Pediatric Society Senior Prize. Presented to the senior student showing the greatest promise in clinical pediatrics. The 2005 recipient: Marie Rogers Waterhouse.
David F. Silbert Outstanding Teaching Assistant Award. Established in memory of Dr. David Silbert, it is awarded to a teaching assistant in a medical school course in recognition of a commitment to teaching. The 2005 recipients: Robert C. Lindsley and Danielle K. Scheidenhelm.

John R. Smith Memorial Fund Award. Created in 1982, it is awarded to a medical student who has done meritorious clinical and/or research work in the Division of Cardiovascular Disease within the Department of Medicine. The 2005 recipient: Sabrina Jill Stone.

Dr. Margaret G. Smith Award. Given to a woman medical student for outstanding achievement in the first two years of medical school. The 2005 recipient: Shuchi Anand.

Society for Academic Emergency Medicine Excellence in Emergency Medicine Award. Based on demonstrated excellence in the specialty of emergency medicine, it is awarded to a senior medical student at Commencement. Samuel D. Soule Award in Obstetrics and Gynecology. Presented to a member of the third- or fourth-year class for meritorious achievement in either basic or clinical investigation in obstetrics and gynecology. The 2005 recipient: Beth Marie Lewkowski.

Jessie L. Ternberg Award. Presented to a woman graduating from the School of Medicine who best exemplifies Dr. Ternberg's indomitable spirit of determination, perseverance and dedication to her patients. The 2005 recipient: Virginia M. Pierce.

Washington University Internal Medicine Club Research Award. Awarded to the member of the graduating class who has done the most significant research in any area of internal medicine. The 2005 recipient: Meagan Anne Jacoby.

Washington University Summer Research Prize. The award recognizes a student for meritorious research in the Summer Research Fellowship Program at Washington University School of Medicine. The 2005 recipients: Jennnifer Y. Chu and Devon Snow.

Samson F. Wennerman Prize in Surgery. Donated by his wife, Zelda E. Wennerman, and awarded annually to the fourth-year student who has demonstrated promise in the field of surgery. The 2005 recipient: Carlo Obet Martinez.

Doris P. and Harry I. Wexler Fund. Established in 1998 by a bequest from Mrs. Wexler, the prize is awarded annually for research in multiple sclerosis and in alternate years research in eye disease.

Park J. White, M.D. Prize. Created in 1992 in honor of the centennial of the birth of Dr. White, who was a distinguished pediatrician, social activist and pioneer teacher of medical ethics. He introduced the first course on medical ethics to students in 1927. The prize is awarded to a student for outstanding performance in the ethics elective offered by the Program for the Humanities in Medicine. The 2005 recipient: Nada Mufid Kawar.

Hugh M. Wilson Award in Radiology. Given annually to a graduating medical student in recognition of outstanding work in radiology-related subjects, either clinical or basic science. The 2005 recipient: Yasha Kadkhodayan.

The Wynder Prize in Preventive Medicine. An annual prize established in 1994 and awarded to senior medical students who have done the best research in preventive medicine. The 2005 recipient: Heidi Linda Sandige.

James Henry Yalem Prize in Dermatology. Established by Charles Yalem in memory of his son and awarded annually to a member of the fourth-year class for outstanding work in dermatology. The 2005 recipient: Kara Ellen Sternhell.

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Residency Training

Although not required by all states for licensure, postgraduate residency training in an approved hospital is considered essential preparation for the practice of medicine. Most Washington University graduates serve three or more years of residency training, and many will gain additional experience as postdoctoral fellows.

In order to aid students in obtaining desirable residency appointments, an active counseling program is maintained. Students in their first, second and third year can participate in career counseling workshops in which they are given very specific information about subspecialties. They are encouraged to look at their own interests, attributes and priorities and, with this information, begin to make decisions about the specialty best suited for them. In addition, small group conferences are held for students to meet with faculty members from a variety of the specialty divisions at Washington University in order to learn more about the fields that they are interested in.

During their third and fourth year, students interact closely with the Career Counseling Office, which provides them with individual counseling to help plan for the residency application process. Students receive general background information about the kinds of residencies available, special issues concerning certain extremely competitive residencies and help identifying faculty members for further assistance. The Career Counseling Office maintains a web site (residency.wustl.edu) where students can find information regarding 20 different residency specialties. As the number of residencies may gradually decrease to closely approximate the number of graduates applying, students must make their choices with considerable care. The School participates in the National Resident Matching Program, which offers distinct advantages to applicants.

Results of these efforts have been gratifying. The PGY-1 residencies selected in the most recent residency matching (2005) are identified in the Alphabetical List of Students area in the Register of Students section.

The School maintains an active interest in its graduates and is pleased to assist them in subsequent years as they seek more advanced training or staff appointments in the communities in which they settle.

Postdoctoral Training

Those departments that offer postdoctoral fellowships individualize such educational activity up to a maximum of 36 months of academic time. Such fellowships lead integrally to certification by the appropriate specialty and/or subspecialty boards of the American Medical Association.

Fellowship And Other Funds
Alexander and Gertrude Berg Fellowship Fund. Created in 1952 through the bequest of Gertrude Berg to provide a fellowship in the Department of Molecular Microbiology.

Glover H. Copher Fellow in Surgical Research. Established in 1971 to support a postdoctoral fellow in surgery.

William H. Danforth Loan Fund for Interns and Residents in Surgery. Provides financial assistance in the form of loans for postdoctoral students in surgery.

Frederick Lee Hawes Fellowship in Congestive Heart Failure. Established in 1998 to provide a one-year fellowship in congestive heart failure.

Antonio Hernandez, Jr. Fellowship in Pediatric Cardiology. Established in 1987 as a memorial to Dr. Hernandez.

Leopold and Theresa Hofstatter Fellowship. Established in 2000 from the estate of Leopold and Theresa Hofstatter to be used to support fellowships in neurological research.

J. Albert Key Fellowship Fund. Provides a stipend for a fellow in orthopaedic surgery.

Louis and Dorothy Kovitz Fellowship Fund. Established in 1970 by an alumnus and his wife to provide support for research by qualified residents or students interested in surgery, at the discretion of the Head of the Department of Surgery.

Carol B. and Jerome T. Loeb Teaching Fellowships at the School of Medicine. Established in 2004 to honor and thank St. Louis area physicians with clinical excellence to encourage teaching that excellence to residents and students.

Stephen I. Morse Fellowship. Established in 1980 by Carl and Belle Morse in memory of their son; awarded to predoctoral or postdoctoral students pursuing research careers in microbiology, immunology and infectious diseases.

William D. Owens Anesthesiology Research Fellowship. Established in 2000 in honor of William D. Owens, M.D. This fund will allow an individual to do a clinical or basic research fellowship for a two-year period.

Julio Santiago Fellowship. Established in 1998 in memory of Dr. Julio Santiago by the John Henry and Bernadine Foster Foundation to provide one year of advanced training for a Pediatric Metabolism/Diabetes Fellow.

The Esther and Morton Wohlgemuth Foundation Fellowship. Established to support a fellow in the Division of Cardiovascular Diseases.

Continuing Medical Education

The study of medicine is a lifelong process with continuing medical education being an integral part of the continuum. Since 1973 the School of Medicine has supported this learning endeavor through the operation of the Continuing Medical Education Program. Continuing Medical Education's mission is to provide learning opportunities through periodic courses, regularly scheduled conferences, and enduring materials related to all areas of medical practice to local, national and international physicians and other health professionals that result in improved skills, attitude, competency and performance and increased knowledge in order to improve health care.
Pursuant to this mission, the objectives of the continuing medical education program include:

- Enable the acquisition of new knowledge and skills through periodic courses, regularly scheduled conferences, and enduring materials for the delivery of quality patient care.
- Translate the results of research to clinical diagnosis and treatment for practicing physicians.
- Apply educational approaches in support of continuous quality improvement in healthcare delivery.
- Integrate clinical outcome measures for delivery of quality patient care into the educational process.
- Assist physicians' adaptation to changing healthcare delivery environments.
- Support faculty development as postgraduate medical educators and leaders.

Each year more than 40 symposia and more than 150 recurring academic rounds and conferences as well as videos and monographs are provided with CME credit by this office. About 8,000 registrants attend these courses annually and receive more than 100,000 hours of instruction. CME-Online provides educational programs via the Internet. Since starting in 2000, the program has grown to include more than 90 hours of potential CME credit. The URL is cme.wustl.edu. The educational program is fully accredited by the Accreditation Council for Continuing Medical Education and provides credits to physicians seeking them for the Physician's Recognition Award of the American Medical Association, as well as various other types of state and specialty recertification and relicensure activities.

Medical Alumni and Development Programs

The Department of Medical Alumni and Development Programs works with individuals and organizations to secure the human and financial resources necessary to help the School of Medicine achieve and maintain excellence in research, teaching, and patient care.

Washington University Medical Center Alumni Association

The Washington University Medical Center Alumni Association (WUMCAA) was organized more than 60 years ago to foster a continuing spirit of fellowship among graduates, and to maintain and enhance the tradition of excellence of the School of Medicine. Membership is provided to graduates and former house staff of the Medical Center.

The association complements the goals and purposes of the School of Medicine through a variety of programs for its members and current students. Involvement in these activities also provides the opportunity to continue the relationships begun as students and to develop rewarding professional associations.

Student-Alumni Programs

The Office of Medical Alumni and Development Programs and the Alumni Association assist students in a variety of ways. The Association makes a substantial financial commitment each year to support 16 Distinguished Alumni Scholars. These promising medical students receive full tuition, four-year scholarships in honor of great teachers and mentors who were also alumni of the School of Medicine. The Association also provides an activity fund for both the first- and second-year classes and sponsors a reception for the graduating class, their families, and faculty.

In addition, the Association provides financial support to a number of student-initiated community service activities, including a variety of health education programs in public schools and clinics.

Medical Alumni and Development coordinates an alumni resource bank that arranges more formal contacts between alumni and students. Alumni volunteers host students who wish to spend time with a practicing physician, provide information to help students choose a specialty, serve as preceptors for
clerkships and electives, and provide overnight lodging to fourth-year students going on residency interviews.

**Reunions and Other Events**

The Annual Reunion is held in May for medical classes who return at five-year intervals, beginning with the class observing its 10th year following graduation and continuing through the class celebrating its 65th reunion. The reunion schedule includes a scientific program, social events, tours of the Medical Center and the presentation of Alumni/Faculty, Alumni Achievement and Distinguished Service awards. Award recipients are chosen on the basis of personal accomplishment, professional achievement and/or service to the School of Medicine. Members of the graduating class are special guests at the awards banquet and are officially welcomed into Association membership.

The Alumni Office sponsors special alumni activities in selected cities across the United States. Volunteers from each area assist in sponsoring these events, which help alumni to stay abreast of the educational and research activities at the School of Medicine. The Alumni Office also compiles class newsletters for selected classes, including recent graduates and those in the "Diamond+" years (all those classes who have celebrated their 60th reunion).

**Alumni Support**

Supporting their school generously is a tradition for a large percentage of alumni of the medical school and the affiliated health programs. Each year alumni and friends make gifts to the Annual Fund, which supports the School’s departments, divisions and health care professional programs, as well as scholarships and low-interest loan programs for students. Alumni also designate gifts for special purposes within the School, including specific research, education and training programs.

In 1977, School of Medicine members of the Eliot Society created the Alumni Endowed Professorship Program, through which gifts are used to establish an Alumni Endowed Chair in the School’s departments. Nine such chairs have been created thus far.
Washington University Policy on Sexual Harassment

I. Introduction and Policy Statement

Washington University is committed to having a positive learning and working environment for its students, faculty, and staff and will not tolerate sexual harassment.

Sexual harassment is an attack on the dignity of individuals and the integrity of the University as an institution of learning. Academic freedom can exist only when every person is free to pursue ideas in a non-threatening, non-coercive atmosphere of mutual respect. Sexual harassment is reprehensible and threatening to the careers, educational experience, and well-being of all members of our community.

Sexual harassment is a form of discrimination that violates University policy. It is also illegal under state and federal law.

This Policy applies to all members of the Washington University community. It allocates responsibilities for helping to ensure that University policy is fairly applied, explains the processes by which complaints of sexual harassment may be brought forward, and provides sanctions for sexual harassment, which may range from reprimands to termination or dismissal, depending on the severity of the offense. If you believe you have been sexually harassed, Sections IV and V describe options about what you can do and where you can get help. If you believe you have been falsely accused of sexual harassment, the procedures set out below are also available to you. Those charged with implementation of this Policy will, whenever appropriate, encourage and assist those who believe they may have been sexually harassed to pursue the assorted informal means outlined in Section IV below for securing the cessation of unwelcome and offensive conduct.

II. What is Sexual Harassment?

For the purposes of this statement, Washington University has adapted the Equal Employment Opportunity Commission (EEOC) definition of sexual harassment for an academic community: Sexual harassment is defined as any unwelcome sexual advance, request for sexual favor, or other unwelcome verbal or physical conduct of a sexual nature, whether committed on or off campus, when

(1) submission to such conduct is made, either explicitly or implicitly, a term or condition of an individual's employment or academic advancement;

(2) submission to or rejection of such conduct by an individual is used as the basis, or threatened to be used as the basis, for employment or academic decisions or assessments affecting an individual;

(3) such conduct has the purpose or effect of unreasonably interfering with an individual's work or educational performance or creating an intimidating or hostile environment for work or learning. Such conduct will typically be directed against a particular individual or individuals and will either be abusive or severely humiliating, or will persist despite the objection of the person targeted by the speech or conduct.

Sexual harassment includes but is not limited to situations where one person has authority over another. In such situations, sexual harassment is particularly serious because it may unfairly exploit the power inherent in a faculty member’s or supervisor’s position.

Sexual harassment can be verbal, visual, physical, or communicated in writing or electronically. Some conduct obviously constitutes sexual harassment — such as a threat that a grade or promotion will depend on submission to sexual advance. But whether particular conduct constitutes sexual harassment will often depend on the specific context of the situation, including the participants’ reasonable understanding of the situation, their past dealings with each other, the nature of their professional relationship (e.g., supervisor-subordinate, colleague, etc.), and the specific setting. The
inquiry can be particularly complex in an academic community, where the free and open exchange of ideas and viewpoints preserved by the concept of academic freedom may sometimes prove distasteful, disturbing or offensive to some. Examples of conduct which may constitute sexual harassment include but are not limited to:

- requests for sexual favors
- hugging, rubbing, touching, patting, pinching, or brushing another’s body
- inappropriate whistling or staring
- veiled suggestions of sexual activities
- requests for private meetings outside of class or business hours for other than legitimate mentoring purposes
- use in the classroom of sexual jokes, stories, or images in no way germane to the subject of the class
- remarks about a person’s body or sexual relationships, activities or experience
- use of inappropriate body images to advertise events

Members of the University community can expect to be free from sexual harassment, and thus all members of the University community should guard against it. The fact that someone did not intend to sexually harass an individual is generally not considered a sufficient defense to a complaint of sexual harassment, although the reasonableness of the accused’s perceptions may be considered. In most cases, it is the effect and characteristics of the behavior on the complainant and whether a reasonable person similarly situated would find the conduct offensive that determine whether the behavior constitutes sexual harassment.

III. Confidentiality

The University will strive to protect, to the greatest extent possible, the confidentiality of persons reporting harassment and of those accused of harassment. Because the University has an obligation to address sexual harassment, however, the University cannot guarantee complete confidentiality where it would conflict with the University’s obligation to investigate meaningfully or, where warranted, take corrective action. Even when some disclosure of the University’s information or sources is necessary, it will be limited to the extent possible. The University will, to the extent permitted by law, keep confidential all records of complaints, responses and investigations. The records maintained by the Sexual Harassment Response Coordinator shall be available only to the Coordinator and, to the extent necessary, to administrators and other supervisors charged with responding to allegations of harassment. Allegations of sexual harassment shall not be placed in student records or personnel files unless, after appropriate investigation, such allegations have been sustained. Records maintained by the Coordinator of allegations which do not lead to formal hearings or personnel actions will be discarded after five years unless there are additional, more recent complaints against the same person.

If you want to discuss possible harassment in a more confidential setting or clarify your feelings about whether and how you wish to proceed, you may want to consult a social worker, therapist, or member of the clergy, who is permitted, by law, to assure greater confidentiality. Clergy and counseling resources on campus are listed in Bearings, Ternion, and Safety and Security on the Hilltop Campus. In addition, any member of the University community may contact the Student Counseling Services at 935-5980 for a confidential discussion and, if desired, referral to off-campus resources.

IV. Seeking Advice; Making a Complaint

If you believe that you have been sexually harassed, you have a number of response options, both formal and informal. Some people may wish to pursue informal means instead of or before making a formal complaint; others will not. If an informal procedure is ineffective, the formal procedures will remain open to you. You should select the route you feel most appropriate for your circumstances. However you wish to proceed, you may consult at any time with the Hilltop or Medical Center Sexual Harassment Response Coordinator (listed in the Appendix), whose responsibilities include assisting students, faculty and staff with sexual harassment issues, be they general or specific, formal or informal. You may wish to work with the Coordinator to select an approach.
A. Informal Procedures

1. If you feel comfortable dealing with the situation without assistance, you can:
   a. Clearly say "no" to the person whose behavior is unwelcome.
   b. Communicate either orally or in writing with the person whose behavior is unwelcome. The most useful communication will have three parts:
      (1) A factual description of the incident(s) including date, time, place and specific action.
      (2) A description of the writer's feelings, including any consequences of the incident.
      (3) A request that the conduct cease.
   Frequently such a communication will cause the unwelcome behavior to stop, particularly where the person may not be aware that the conduct is unwelcome or offensive.

2. If you would like to proceed informally, but with the assistance of someone else, you can:
   a. Ask the person's supervisor, e.g., department chair, dean, director, housing office representative, academic advisor, or resident advisor, to speak to the person whose behavior was unwelcome. The purpose of such conversations is the cessation of unwelcome behavior.
   b. Consult with the Coordinator or one of the Sexual Harassment Response Advisors listed in the Appendix and specifically charged with responding to sexual harassment inquiries and complaints. These individuals are thoroughly familiar with University policy on sexual harassment and are available to consult with victims of sexual harassment, those charged with sexual harassment, witnesses, and supervisors of parties to a complaint. They can provide information about informal actions that might remedy the situation and discuss University policy on sexual harassment and procedures for resolving complaints.
   c. Ask the Coordinator to mediate or arrange for mediation. Mediation is discussion and negotiation, with the help of a third party, designed to permit the parties to reach a mutually agreeable resolution of a dispute. If a person complaining of sexual harassment seeks mediation, the person accused of harassment agrees, and the Coordinator concludes that mediation would be consistent with the University's legal obligations in responding to and preventing sexual harassment, the Coordinator may mediate or arrange for mediation.

B. Formal Procedures

Whether or not you have attempted to resolve a sexual harassment claim through informal means, you may initiate a formal sexual harassment grievance proceeding by filing a written complaint. This process may lead to a formal hearing at which evidence will be considered and witnesses heard. If this is the course you wish to take, the Coordinator can assist you in filing a complaint.

Complaints, prepared with or without the assistance of the Coordinator, can be filed with the following Committees, with a copy to the Coordinator for your campus:

Complaints against faculty or staff:

Faculty and Administrative Affirmative Action Committee
(complaints by faculty and administrators)

Title IX Grievance Committee
(complaints by students)

Human Resources Advisory Committee
(complaints by staff)

All of these committees may be contacted

c/o Office of Human Resources
North Brookings Hall, Room 126
Campus Box 1184
935-5990
Hearing procedures are set out in the Washington University Discrimination and Sexual Harassment Hearing Procedures. These procedures may be obtained from the Office of Human Resources or from any of the Sexual Harassment Response Coordinators or Advisors.

Complaints against students or student groups:
Office of the Judicial Administrator
Women's Building, Room B27
Campus Box 1136
935-4062

Hearing procedures are set out in the University Judicial Code, found in Bearings and Washington University Faculty Information. These procedures may also be obtained from the University Judicial Administrator or from the Sexual Harassment Response Coordinator or Advisors.

Whether or not you choose to file a formal complaint, the University may be required, or may otherwise deem it necessary and protective of the academic community, to commence its own investigation.

V. Protection of Rights

The University will not tolerate retaliation or discrimination against persons who report or charge sexual harassment or against those who testify, assist, or participate in any investigation, proceeding, or hearing involving a complaint of sexual harassment. In this context, retaliation means speech or conduct that adversely affects another's terms or conditions of employment or education and is motivated by an intent to harm the targeted person because of his or her participation in the filing or investigation of an allegation of sexual harassment. Any such retaliation — or any encouragement of another to retaliate — is a serious violation of University policy and law, independent of whether the particular claim of sexual harassment is substantiated. If you believe you have been subjected to retaliation in violation of this rule, you may use the procedures described above to complain and seek redress.

The University seeks to protect the rights of all persons, accusers and accused, to fair procedures. Accusations of sexual harassment typically have injurious and far-reaching effects on the careers and lives of accused individuals. Allegations of sexual harassment must be made in good faith and not out of malice. Knowingly making a false or frivolous allegation of sexual harassment, whether in a formal or informal context, will be treated as a serious offense under this policy and, where it applies, the University Judicial Code. If you believe you have been falsely accused of sexual harassment you may use the procedures of this policy or the University Judicial Code, where applicable, to seek redress. See Section IV, above.

VI. Obligations of Vigilance and Reporting

The University can respond to specific instances and allegations of harassment only if it is aware of them. The University therefore encourages anyone who believes that he or she has experienced sexual harassment to come forward promptly with inquiries, reports or complaints and to seek assistance from the University. In addition, any University employee who becomes aware of instances or allegations of sexual harassment by or against a person under his or her supervisory authority must report it to those charged with responding to such allegations and reports: the appropriate dean, director or department head or other similar administrator or to the Sexual Harassment Response Coordinator or one of the Advisors. It shall be the responsibility of these individuals to respond to allegations and reports of sexual harassment or refer them to other University officials for such response.

Any dean, director or department head, or other similar administrator who becomes aware of information indicating a significant likelihood of sexual harassment must report such information to the Sexual Harassment Response Coordinator for the appropriate campus. These administrators must respond not only when they receive a specific complaint or report alleging improper activity, but also
when such matters come to their attention informally. Unconfirmed or disputed allegations should be clearly labelled as such and reports should indicate any steps already taken to investigate or otherwise respond. Administrators may wish to consult with the Coordinator or any of the Advisors prior to investigating or otherwise responding to any situation involving alleged harassment.

VII. Possible Sanctions

Possible sanctions for a person found guilty of behavior in violation of this policy include but are not limited to the following:

• oral or written reprimand, placed in personnel file
• required attendance at a sexual harassment sensitivity program
• an apology to the victim
• oral or written warning
• loss of salary or benefit, such as sabbatical or research or travel funding
• transfer or change of job, class or residential assignment or location (i.e., removing the person from being in a position to retaliate or further harass the victim)
• fine
• demotion
• suspension, probation, termination, dismissal or expulsion

While counseling is not considered a sanction, it may be offered or required in combination with sanctions. Where alcohol is involved in the sexual harassment, such counseling may include an alcohol abuse program.

If students or student groups are guilty of sexual harassment any of the sanctions set forth in the University Judicial Code may also be invoked.

VIII. Education

The best way to deal with sexual harassment is to prevent it. Education is essential to eliminating sexual harassment. Washington University has developed an ongoing training program. Please call a Sexual Harassment Response Coordinator or Advisor to find out more about these programs, what sexual harassment is, how to respond to it, and what to do when someone asks for advice about sexual harassment.

Appendix: Sexual Harassment Coordinators and Advisors (as of June 30, 2001)

Hilltop Campus
Coordinator: Ann Prenatt, 935-8046
Advisors: Kathy Steiner-Lang (complaints by students and others), 935-5910;
To be named (complaints by faculty and others); Pamela Lokken (complaints by staff and others),935-5752

Medical Campus
Coordinator: Barbara Cant, 362-4900
Advisors: Leslie Kahl (complaints by students and others), 362-7481;
Apryle Cotton (complaints by faculty, staff and others), 362-7198
Please Note: Other Advisors will be appointed, including men. All appointments are subject to change.
I. Policy Statement

Washington University School of Medicine (WUSM) is committed to having a positive learning and working environment for its students, faculty, and staff. All individuals have the right to enjoy an environment free from all forms of conduct that can be considered harassing, threatening or intimidating. In addition, academic freedom can exist only when every person is free to pursue ideas in a non-threatening atmosphere of mutual respect. WUSM is committed to protecting the academic freedom and freedom of expression of all members of the school community and this policy against abusive conduct will be applied in a manner that protects those freedoms. Abusive conduct is reprehensible and threatening to the careers, educational experience, and well being of all members of our community and will not be tolerated. This policy applies to all students, faculty and staff and is in addition to the Washington University Policy on Sexual Harassment.

II. What is Abusive Conduct?

Abusive conduct is behavior that creates an intimidating environment and is likely to interfere with an individual's work or education. This conduct can be verbal, visual, physical, or communicated in writing or electronically. Such conduct is typically directed against a particular individual or individuals. It includes, but is not limited to, situations where one person has authority over another. In such situations, abusive conduct is particularly serious because it may unfairly exploit the power inherent in a faculty member’s or supervisor’s position.

Examples of conduct that may be considered abusive include but are not limited to:
- Threatening or intimidating behavior or words (written or oral)
- Obscenities/profanities (verbal or gestures) directed at a person
- Threatening or obscene gestures, jokes or cartoons
- Degrading a person or a group on the basis of a personal or cultural characteristic
- Taunting, jeering, mocking or humiliating another person through acts or words
- Screaming and/or yelling at or around others
- Insulting someone, especially in the presence of others
- Endangering the safety of an individual or individuals

In considering a complaint under this policy, the following understandings shall apply:

1. Abusive conduct must be distinguished from behavior which, even though unpleasant or disconcerting, is appropriate to the carrying out of certain instructional, advisory, or supervisory responsibilities. In the context of patient care clear and direct communication may be necessary in order to deliver safe, effective, appropriate and timely clinical treatment.

2. Instructional responsibilities require appropriate latitude for pedagogical decisions concerning the topics discussed and methods used to draw students into discussion and full participation.

The fact that someone did not intend to be abusive is generally not considered a sufficient defense to a complaint, although the reasonableness of the accuser’s perceptions may be considered. In most cases, it is the characteristics and the effect of the behavior on the complainant and whether a reasonable person would find the conduct abusive that determines whether the behavior was abusive.

III. Reporting Abusive Conduct

The Medical School can respond to specific instances and allegations of abusive conduct only if it is aware of them and therefore encourages anyone who believes that he or she has experienced abusive conduct to come forward promptly with inquiries, reports, or complaints and to seek assistance. In addition, any faculty member, manager, or employee who becomes aware of instances or allegations of abusive conduct, by or against a person under his or her supervisory authority, is required to report it to the appropriate dean, director, department head or other similar administrator or to the Human Resources Department. Once a complaint is received, it is the responsibility of the dean, director, department head or similar administrator to respond to the allegations and reports of abusive conduct and take corrective action, if appropriate, or to work with Human Resources to develop such a response and corrective action, if appropriate. All complaints and their resolution must be reported to
IV. Protection of Rights

1. Retaliation means conduct that adversely affects another’s terms or conditions of employment or education and has the effect of harming a person for filing a complaint or for participating in the investigation. Retaliation can take many forms. Examples include but are not limited to:
   • Reassignment of work duties without good reason
   • Loss of job benefits (i.e., travel)
   • Loss of salary
   • Termination
   • Threats

Against the Complainant: It is a violation of this policy to retaliate against persons who report or make a charge of abusive conduct or against those who testify, assist, or participate in any investigation involving a complaint. Any such retaliation — or any encouragement of another to retaliate — is a violation of this policy, independent of whether the particular claim is substantiated.

Against the Respondent: Lodging a complaint is not proof of prohibited conduct. A complaint shall not be taken into account during reappointment, tenure, promotion, merit, or other evaluation or review until a final determination has been made that the policy has been violated.

2. Knowingly False or Malicious Complaints:
   Accusations of abusive conduct typically have injurious and far-reaching effects on the careers and lives of accused individuals. Therefore allegations must be made in good faith and not out of malice. Knowingly making a false or frivolous allegation will not be tolerated and will subject the person making such a report to disciplinary action.

V. Possible Sanctions

Possible sanctions for a person found to exhibit abusive conduct include but are not limited to the following:

In many situations, the following examples of sanctions may be sufficient
   • oral or written reprimand
   • required attendance at a sensitivity program
   • apology to the victim
   • oral or written warning

In certain situations, the following sanctions may also need to be considered.
   • loss of salary or benefit, such as sabbatical or research or travel funding
   • loss of non-salary benefits (i.e., travel funding)
   • demotion
   • suspension, probation, termination

While counseling is not considered a sanction, it may be offered or required in combination with sanctions.
1. To define standards of conduct among all members of the Washington University Medical Center community generally, and specifically within the teacher/learner relationship.

2. To specify a procedure for reporting potential student mistreatment or abuse.

3. To create an administrative mechanism for handling alleged incidents of mistreatment or abuse.

4. To develop a monitoring system to identify individuals or departments whose abusive behavior persists despite intervention.

II. Preamble

The goal of the Washington University Medical Center is to provide patient care, medical education, and biomedical research of the highest quality. Accomplishing this goal depends in part on an atmosphere of mutual respect and collegiality among all those who work here. Disrespectful or abusive conduct of any kind at the Medical Center will not be tolerated. To this end, the School’s Committee on the Professional Treatment of Medical Students endorses the Professional Service Commitments outlined by Washington University School of Medicine, as well the standards put forth by the Barnes-Jewish Hospital BJH Cares campaign. These documents address the broad issues of respectful behavior among all members of our Medical Center community. The current document focuses instead on the special issues presented by the teacher/learner relationship, and applies to all years of the medical school curriculum.

Our students are exceptionally talented individuals, dedicated to becoming outstanding physicians, who have selected this medical school for their training. Effective learning is possible only in an environment where students can trust their teachers to treat them fairly and with respect. The teacher may be a faculty member, resident, student, or other member of the health care team. One manner in which the teacher/learner relationship is unique is that students are vulnerable, depending on many of their teachers for evaluations and recommendations. In addition, medical education includes mastering not just pathophysiology but also the essentials of professional behavior. Students learn professional behavior primarily by observing the actions of their teacher role models. Unprofessional, disrespectful or abusive behavior by teachers is antithetical to standards of professional conduct that medical students are expected to master. These behaviors by teachers may also be self-perpetuating, as students come to believe that such behavior is appropriate when they assume the role of teacher.

III. Responsibilities of Teachers and Learners

The teacher-learner relationship confers rights and responsibilities on both parties. Behaving in ways that embody the ideal student-teacher relationship fosters respectful behavior, minimizes the likelihood of student mistreatment or abuse, and optimizes the educational experience for students.

A. Responsibilities of Teachers

- Be prepared and on time.
- Provide learners with most current materials.
- Treat students fairly, respectfully, and without bias related to their age, race, gender, sexual orientation, disability, religion or national origin.
- Give students timely, constructive and accurate feedback.
- Distinguish between the Socratic method, where insightful questions are a stimulus to learning and discovery, and over-aggressive questioning, where detailed questions are repeatedly presented with the endpoint of embarrassment or humiliation of the student.

B. Responsibilities of Learners

In all settings:
- Be courteous and respectful of teachers and fellow students regardless of their age, race, gender, sexual orientation, disability, religion or national origin.
- Treat fellow students as colleagues, not competitors.
- Take responsibility for maximizing your educational experience by addressing conflicts and
discomforts which may impede your learning.
• Be an enthusiastic learner.
• Be trustworthy and honest.
• Know your limitations and ask for help when needed.

In the clinical setting:
• Put the patients’ welfare first.
• Know what’s going on with your patients.
• Take the initiative to educate yourself about their illness.
• Put patient welfare ahead of your educational needs.
• Treat all patients and members of the health care team respectfully, regardless of their age, race, gender, sexual orientation, disability, religion or national origin.
• Be compassionate.
• Respect patients’ privacy.

IV. Unprofessional and Abusive Behaviors

The responsibilities of teachers and students listed above constitute examples of respectful and professional behaviors. These should be our standards. Some behaviors which fall outside of these guidelines are clearly abusive. More commonly, however, they represent poor judgment, unprofessional behavior or mistreatment. Determining whether a given behavior constitutes abuse or unprofessional behavior is often a matter of perception. It involves a subjective assessment of the intentions of the doer and how the behavior in question was perceived by the recipient. The behaviors listed below in Section A are clearly abusive. Students who feel they may have been abused should discuss the incident or behavior in question with the individuals listed in Section V of this policy. Other disrespectful or unprofessional behaviors, such as (but not limited to) those noted in Section B, may also disrupt the student’s educational experience. Students who feel they have been treated in this manner may also discuss the incident or behavior with other students, faculty members or residents, coursemasters, or the individuals listed in Section V of this policy. Students are encouraged to take responsibility for addressing issues which may be detrimental to their educational experience.

A. What is Clearly Student Abuse
1. Unwanted physical contact (such as hitting, slapping, kicking, pushing) or threats of same.
2. Sexual harassment (see the institution’s policy on sexual harassment above).
3. Discrimination based on age, race, gender, sexual orientation, disability, religion or national origin.
4. Requiring students to perform personal chores (i.e., running errands, babysitting, etc).

B. Disrespectful or Unprofessional Behavior
(This list is not intended to be all-inclusive, but to provide examples of inappropriate behaviors.)
1. Repeated questioning of a student with the primary intent to humiliate or embarrass.
2. Grading based on factors other than performance or merit.
3. Coercing students to do something they find morally objectionable.
4. Public humiliation.
5. Requiring excessive menial, noneducational chores. Work related to the care of patients contributes to the efficient functioning of the team, but must be balanced with educational opportunities.

V. What to do if You Believe That You Have Been Abused or Mistreated

First, carefully examine the circumstances of the incident or incidents which occurred. Discuss the event with someone else who witnessed it, or with another student or individual whose judgment you trust. Do they come under the behaviors listed in Section A above? If so, meet with your coursemaster and describe what happened. If the coursemaster takes action to settle the complaint, he/she will submit a written report of these actions to the Associate Dean for Medical Student Education. If you are not satisfied with your interaction with the coursemaster, or do not feel comfortable approaching him/her, meet with the Associate Dean for Medical Student Education. The Associate Dean will follow the procedure listed below.
If you determine that you have been treated disrespectfully or in an unprofessional manner, but have not been abused as described in Section A above, it may still be appropriate to pursue your complaint. You may do this by directly approaching the person whom you feel mistreated you, or by seeking assistance from another student, faculty member, resident, the coursemaster, or the Associate Dean for Medical Student Education. The goal of this process is to foster your educational experience by minimizing behaviors which detract from it.

The University will keep confidential all records of complaints, responses and investigations, to the extent permitted by law. Please refer to the University’s policy on sexual harassment above for details regarding confidentiality.

VI. Procedure for Handling Complaints of Student Abuse

The Associate Dean for Medical Student Education will be responsible for hearing complaints of student abuse (as described under Section A above) which are not settled at the coursemaster level. (Complaints settled by the coursemaster will also be relayed to the Associate Dean in writing.) He/she will be responsible for reviewing the complaint and obtaining additional information. If the initial review discloses that the complaint warrants further review, he/she will convene an ad hoc committee to hold a hearing. The accused will be notified in writing of the complaint and the policy for handling such complaints, and will be invited to attend the hearing. A confidential copy of the notification will be sent to the accused’s department chair (for faculty and residents), training program director (for residents), or the Associate Dean for Student Affairs (for students).

If, however, the initial review discloses that the complaint has no merit, the Associate Dean for Medical Student Education will dismiss it. The student will be notified and may appeal to the Associate Dean for Student Affairs, who will convene an ad hoc committee to address the complaint.

The ad hoc committee will meet to review the facts of the complaint, and may receive written or oral testimony. All materials will be held confidential by the committee. The accused may attend the hearing, and will be provided the opportunity to rebut the complaint. The chair of the ad hoc committee will submit a written report of the committee’s findings to the Associate Dean for Medical Student Education. The Associate Dean will notify the accused and the student in writing of the findings. The department chair, program director or Associate Dean for Student Affairs will also be notified (see above), and will be responsible for determining disciplinary actions, which will not be disclosed to the accusing student. The Associate Dean for Medical Student Education will be notified in writing of any disciplinary action taken. Record of the proceedings will be kept by the Associate Dean for Medical Student Education. All complaints of student abuse brought to the Associate Dean will be cross-checked to determine if the accused has been cited previously.

VII. Appeals Process

If the accused is a faculty member and wants to appeal the decision of the ad hoc committee or the disciplinary action of the supervisor, a written appeal may be submitted to the University’s Committee on Faculty Rights, which will follow its policy for review. If the accused is a resident physician, a written appeal may be submitted to the Associate Dean for Graduate Medical Education.

If the accused is a student, a written appeal may be submitted to the Dean of the School of Medicine. The Dean or his designate will conduct an appeal review by examining the proceedings of the ad hoc committee as well as any new facts the accused student offers for consideration. The Dean or designate will notify the accused student in writing of his decision. There will be no further appeal.
It is the goal of Washington University to assist students with disabilities in removing the barriers their
disability may pose and provide support in facing the challenge of pursuing an education at
Washington University.

Washington University recognizes and accepts its professional, legal and moral responsibility to avoid
discrimination in the acceptance and education of qualified students with disabilities and to provide
reasonable accommodations to such students consistent with the principles embodied in the law.
These guidelines apply to students seeking admittance as well as to those who become disabled while
they are enrolled.

Washington University makes every effort to ensure that all qualified applicants and students can
participate in and take full advantage of all programs and opportunities offered within the University.
Washington University does not discriminate in access to its programs and activities on the basis of
age, sex, sexual orientation, race, disability, religion, color or national origin.
All students in educational programs at the School of Medicine, those seeking admittance, as well as
those who become disabled while they are enrolled, must possess those intellectual, ethical, physical
and emotional capabilities required to undertake the full curriculum and to achieve the levels of
competence required by the faculty and the profession.

In this regard, we will be guided by the principles outlined below.

**A. Responsibilities of the Student**

1. Disclosure of Disability
   It is the responsibility of a student who has a disability to disclose it and request accommodation from
   the Dean for Student Affairs or Program Director. The School encourages students with disabilities to
   identify themselves as early as possible in order to optimize the mobilization of resources and
   available accommodations.

2. Diagnosis of Disability
   Students who are in academic difficulty that might be a consequence of a disability are encouraged to
   avail themselves of diagnostic services that may lead to accommodations. Furthermore, such students
   are encouraged to explore with the administration of their academic unit the possibility of a disability if
   the inquiry is relevant to educational performance and there is evidence of educational performance
   problems.

3. Documentation of Disability and Request for Accommodation
   The disability, its functional impact and requested accommodation(s) must be documented. If the
   student discloses a disability and requests accommodation, the School requires documentation of the
   disability from a qualified professional. The student is financially responsible, unless there are
   extraordinary and compelling circumstances, for the costs related to the documentation by an
   appropriately educated and trained professional. The information provided by the professional must be
   factual, objective and technically valid, and must establish clearly that the disability substantially limits
   one or more of the student's major life activities. The professional(s) who evaluate the student should
   identify options for management of the disability. Based on this information, the affected student then
   should request in writing the accommodations which he or she requests be made. The Dean for
   Student Affairs or Program Director and the student should work together to arrive at reasonable
   accommodations. The School may also require a second expert opinion for which the School may be
   financially responsible under extraordinary and compelling circumstances. The School reserves the
   right to request as much detailed information from the student and/or the professional(s) as is
   necessary to assess the scope of the disability and/or the reasonable accommodations.

**B. Responsibilities of the School**

1. Review of Requests for Accommodation
Requests for accommodations will usually be reviewed by the Dean for Student Affairs or Program Director. An ad hoc assessment team may be convened which may include the Dean for Student Affairs, the educational Program Director (or curriculum supervisor), selected members of the Disabilities Oversight Committee (See Section B.5 below) and other consultants as appropriate to the individual circumstances. The assessment team usually should include (1) individuals who understand the curriculum in question; (2) a person who is knowledgeable about the Americans with Disabilities Act; (3) a person with authority to authorize accommodations and cause them to be implemented.

2. Responsibilities for Accommodation
The School of Medicine is responsible for the costs incurred in making accommodations which are not unduly burdensome or unreasonable. Accommodations may include but may not be limited to academic modifications which do not fundamentally alter the nature of the program, auxiliary services, modifications of the circumstances and methods of qualification examinations, classroom modifications and others. The School’s responsibility to accommodate ends when a student with a disability (1) refuses reasonable accommodations; (2) is unable, with reasonable accommodations, to fulfill the essential requirements of the program; (3) fulfills the essential requirements and graduates; or (4) transfers to another institution. The School is not required to provide an accommodation which fundamentally alters the nature of the program, is unduly burdensome or is unreasonable.

3. Confidentiality
Information pertaining to a student’s disability and accommodations will be maintained in a file that is kept confidential and separate from the student’s academic record. Appropriate faculty, staff and administrators may be informed regarding the disability, limitations, restrictions and accommodations when they have a need to know such information.

4. Application of CAES Policies
The policies and procedures of the School regarding promotion and retention are contained in the CAES Policies for each academic unit. These policies and procedures govern the relationship between the School and all students, including those with disabilities. The School is not obligated to retain a student with a disability who poses a significant threat to the health or safety of others when there is no reasonable accommodation that either eliminates or sufficiently reduces that risk.

5. Disabilities Oversight Committee
There shall exist a standing Disabilities Oversight Committee composed of members designated by the Dean of the School of Medicine. The committee shall have the following responsibilities: periodic review of requests for accommodations and accommodations granted, provide recommendations regarding accommodations for disabilities, to serve as requested on disability appeals committee. This group serves as a resource regarding issues of significance to the institution and to students with disabilities.

C. Appeals

A student with a disability who believes that a request for accommodation has been improperly denied or who perceives that he or she has been discriminated against on the basis of a disability should direct his or her appeal to the Dean of the School of Medicine. As needed, the Dean of the School of Medicine may assemble an advisory group to review appeals and make recommendations. This group may include, but may not be limited to, the following: the chair of the committee that oversees academic evaluation and advancement of students for the particular academic unit, students, and/or representatives of the Disabilities Oversight Committee.
Article I:

Name, Purpose, and Membership

A. The name of this organization shall be the Medical Student Government of The Washington University School of Medicine.

B. The purpose of the Medical Student Government shall be the advancement of student interests and welfare to achieve excellence in academic pursuits and professional interactions.

C. The Medical Student Government shall represent all students pursuing a medical degree who are in good standing with the University.

Article II:

Class Officers

A. Offices: Each Class shall elect the following officers: President, Medical Education Representative (MER), Representative to the Organization of Student Representatives (OSR Rep) of the Association of American Medical Colleges (AAMC), Representative to the Graduate-Professional Council (GPC Rep), and a Social Chair/Committee.

B. Duties: Each class officer shall have specific responsibilities:
1. President: Each class shall elect one President. This person shall serve as the official spokesperson for the class in dealings with the Student Government and with the University. The President shall disseminate information regarding medical student affairs and activities. The President shall have oversight and approve of all moneys spent by the Social Chair/Committee. The President shall perform any and all duties that are unique to the class represented.
2. MER: The MER shall represent the class at all meetings of the MERs and Curriculum Evaluation Committee and serve as a liaison between students and faculty on curricular matters. The MER shall poll the class as needed regarding course evaluations and selection of recipients for the various Faculty Awards presented each year.
3. OSR Rep: The OSR Rep shall keep class members up to date with news from the OSR and from the AAMC. The OSR Rep shall represent the University at regional and national meetings of the OSR under an agreement with the University.
4. GPC Rep: The GPC representatives shall represent the School of Medicine at GPC meetings and shall inform the GPC of issues affecting the School of Medicine, learn about issues affecting other schools, discuss and find solutions to problems affecting the whole graduate and professional student population, and plan and advertise social activities that foster communication between all graduate and professional students. The Reps shall be the liaison to the other programs within the School of Medicine, as well as to the rest of the University community. In addition, the four Reps will divide the responsibilities of serving on the Professional and Graduate Students Coordinating Committee (ProGrads), the Medical Campus Committee (temporarily named), and other inter-school/division committees as needed.
5. Social Chair/Committee: The Social Chair/Committee shall organize social functions for class members and interact with other Social Chairs/Committees to organize social functions with other classes and within the University community. The Social Chair/Committee shall consult and obtain approval from the class President for all moneys spent on such functions.

C. Elections: An Election Official designated by the Student Government shall be responsible for the organization and execution of all elections held for offices specified under the Constitution, including President, MER, OSR, GPC, and social chair. Elections shall be held for each of the class officer positions according to the following format:
1. Voting Eligibility: All students who will be a member of the class during the term for which the elected officers will serve will be eligible to vote in the election. For elections for first- and second-year
offices, a member of the class will be considered to be an individual who is currently planning on taking the M.D. course of study for the upcoming year. For elections for third- and fourth-year offices, a member of the class will be considered to be an individual who is planning on taking the M.D. course of study anytime during the upcoming two years, including any individual planning to pursue an M.A. degree for one year during either the third or fourth year of medical school. Efforts should be made by the appointed election official to extend the opportunity to vote to students who will be entering their respective classes in the upcoming year, including but not limited to the large number of M.D./Ph.D. students returning for their clinical clerkships.

2. Nominations: All students who will be a member of the class during the term for which the elected officers will serve, as defined in Article II. C. 1., will be eligible to be nominated for the election. Nominations for each office shall be held starting at least one week prior to the election and ending no later than three days prior to the election. Nominations shall be submitted in writing to the Election Official. Any student eligible to run for office may nominate him/her or another medical student in good standing. Candidates must have the firm intention of carrying out all the duties and obligations of the office for the entire term.

3. Elections and Terms: All terms shall begin upon election. Regular elections shall be held according to the following schedule:
   a. First Year: Elections shall be held within three to six weeks of the beginning of the first-semester classes. Each position carries a term of one academic year.
   b. Second Year: Elections shall be held within six weeks prior to the completion of the first academic year. Each position carries a term of one academic year.
   c. Third and Fourth Year: Elections shall be held within six weeks prior to the completion of the second academic year. Each position carries a term of two academic years.

4. Class Officer Balloting: To be elected a candidate must receive a simple majority (greater than 50 percent) of the votes cast for that particular office by at least a quorum of one-half of the eligible voters. Write-in candidates shall be allowed on this ballot. Absentee ballots shall be allowed if they are given in writing to the Election Official prior to the day of election. Ballot counting shall be the responsibility of the Election Official under the observation of a witness agreeable to all candidates.

5. Class Officer Runoff Procedures: If no candidate receives a simple majority for a particular position, a runoff between the top two candidates shall be held within three days of the initial election. Write-in candidates will not be allowed on this ballot. To be elected a candidate must receive the most votes cast for that particular office by at least a quorum of one-half of the eligible voters.

6. Social Chair Election Procedure: Social chair elections will be conducted in conjunction with MSG class officer elections. A maximum of four social chairs can be elected into office. Candidates do not have to receive a majority of votes to be elected into office. All other MSG election procedures apply.

7. Appeals: All decisions are made by the Election Official during the election period. Appeals may be made by a candidate in writing to the Chair of the Medical Student Government and will be reviewed and ruled on by a group consisting of the current President, MER, OSR, and GPC from each of the four classes; the decisions of this group will be considered final.

8. Vacant Offices: If any office is vacated before its set term, an election will be held for that office using the procedures outlined above within three weeks of the vacancy. If a current class officer runs for the vacated office, that officer must vacate the post he/she occupies.

9. Removal from Office: In the unfortunate event that a class officer is not fulfilling his/her obligations and duties, MSG by a two-thirds majority of a quorum of one-half may vote to recommend that an officer be removed from office to the class that elected the officer. A vote of recall shall then be held within one week. If a three-fourths majority of a quorum of two-thirds of a class votes to recall the officer, the officer shall be removed from office. An election for vacant office shall then be held.

D. M.D./Ph.D. Research Students: There shall be a Representative of the M.D./Ph.D. students who are outside the core medical curriculum. This Representative shall be selected by a method chosen by the Medical Scientist Training Program (MSTP.) In addition, this individual shall be a full voting member of the MSG.

E. Technology Liaison: The responsibilities of the class appointed Technology Liaison include serving as the representative to the administration regarding the availability and utilization of technology and addressing related class concerns. In addition, the Technology Liaison will work with Instructional Technologies and Library Systems (ITLS) to provide new services and assist the MER with technology-related education initiatives. One Technology Liaison will be appointed for each medical
school class after the class-wide elections have taken place. After a call for applications from the class, the four (4) elected MSG members of that class review each application and select the Technology Liaison by consensus. The term of the Technology Liaison will be the same as the elected officials of that class.

**Article III:**

*The Medical Student Government*

A. Membership: The Student Government shall consist of the President, the MER, the OSR Rep, and the GPC Rep from each of the four classes, as well as a Representative of M.D./Ph.D. Students. In addition, the Student Government may offer a non-voting position to a duly elected representative of any student group which is recognized nationally, regionally or within the Medical School so long as such a group is open to all medical students without discrimination and that such a group is not in conflict with the goals of the Student Government.

B. Purpose and Responsibilities: The Student Government shall carry out the business of the Student Government pursuant to the goals stated in Article I. The purpose of the Student Government shall be to represent and promote the interests and concerns of the medical student body through activities including but not limited to:

1. Forming and representing official student body opinions for interaction with the University, its Administration and other groups associated with medical education.
2. Serving as a forum for interaction between student groups.
3. Serving as a forum for student-initiated curricular review and reform in the pursuit of academic excellence.
4. Promoting interaction among the School of Medicine students, faculty and administration, and with the wider University community.
5. Establishing a funding mechanism and budget with the associated collection and disbursements of funds for activities pursuant to goals stated in Article I.
6. Organizing elections for class officers and any other official representative of the student body at large.
7. Exercising any such additional authority as may be granted to it by the School of Medicine or by other organizations, so long as such authority is consistent with the purposes stated in Article I.
8. Posting agenda of all meetings for public reference.
9. Formulating all rules and bylaws necessary for the Student Government to carry out the responsibilities and powers granted through this constitution. Such rules and bylaws shall require a simple majority of a quorum of two-thirds of the voting Student Government members.
10. The Student Government shall meet regularly and at intervals of no more than six weeks.
11. Representatives from the various student groups sitting on the Student Government shall keep the Student Government informed of all activities associated with their posts in the form of a written brief to be presented at the Student Government meeting as appropriate for their group’s activities.

C. Student Government Offices: There shall be a Student Government Chair and Vice-Chair elected from the voting members of the Student Government. Election shall require a simple majority of the voting Student Government. The election shall be held within six weeks prior to the completion of the academic year. The terms of these offices shall be one academic year.

1. Student Government Chair: The Student Government Chair shall preside at all meetings of the Student Government and have specific responsibilities:
   a. The Chair shall serve as official representative and spokesperson for the Student Government to the University, its Administration, and to other groups associated with medical education.
   b. The Chair shall be responsible to ensure the duties of the Student Government are carried out efficiently and in a timely manner.
   c. The Chair shall report the names of the Class Officers to the Dean, and post such a list for public reference.
   d. The Chair shall be responsible for overseeing and maintaining records and to set the agenda for such meetings in written form for distribution to Student Government members prior to each meeting.
   e. The MSG shall be responsible for overseeing and maintaining records of all financial transactions of
the Student Government. The second-year class president shall regularly update the Student Government on its financial standing, and must make all financial records available to any medical student, member of the Administration, or to any official of the University. All transactions shall require the signatures of the Chair and the Vice-Chair.
f. The Chair shall be empowered to call for standing and ad hoc committees to evaluate and make recommendations about specific areas of concern to the Student Government, the School of Medicine and its students. MSG shall appoint these committees.
g. The Chair shall be empowered to designate another Student Government member to take on one or more of his/her duties.

Article IV:

Ratification and Amendments

A. In 1993 this Constitution was ratified by a 2/3 majority of a quorum of one-half of the student body pursuing a medical degree.

B. This Constitution can be amended by either a 2/3 majority of a quorum of one-half of the students in their first, second, and third years, or by a unanimous vote of the elected members of the Medical Student Government.

Fourth-Year Class Officers

President
Tom Shane

Medical Education Representative (MER)
Gita Mody

Representative to the Organization of Student Representatives (OSR Rep)
Aaron Robison

Representative to the Graduate Professional Council (GPC Rep)
Daniel Ma

Third-Year Class Officers

President
Derek Williams

Medical Education Representative (MER)
Jennifer Chu

Representative to the Organization of Student Representatives (OSR Rep)
Monica Ghei

Representative to the Graduate Professional Council (GPC Rep)
Anna Terry

Second-Year Class Officers

President
Steve Sperry

Medical Education Representative (MER)
Noopur Gangopadhyay

Representative to the Organization of Student Representatives (OSR Rep)
Washington University Medical Campus Policy on HIV and HBV Infection

In 1992, the Executive Faculty of the School of Medicine formally adopted a medical campus policy on Human Immunodeficiency Virus (HIV) and Hepatitis B virus (HBV) infections. This policy was updated in 2001 to include Hepatitis C virus (HCV) infections. The purpose of the policy is to provide guidelines to prevent or reduce the transmission of these infectious agents between patients and health care workers.

The policy deals with: 1) the University’s responsibilities to infected patients (including obligation to treat, confidentiality and appropriate serologic testing), 2) appropriate health and safety precautions and procedures for faculty, students and staff (including compliance with CDC guidelines, blood and body fluid precautions and handling of needles or sharp instruments), and 3) the University’s responsibilities to faculty, staff or students who are infected with HIV, HBV, or HCV infection (including admission to medical school, participation in clinical rotations, serologic testing confidentiality and medical treatment).

The policy makes a distinction between class I activities (those involving no risk of transmission from infected health care workers to patients, such as routine physical examinations, dressing changes, intravenous line placement) and class II activities (those that involve the potential for transmission of HIV, HBV, or HCV from infected health care workers to patients, such as invasive surgical procedures in which trauma to a health care worker is possible).

This policy is comprehensive, and a complete copy is available to any interested student through the Office for Student Affairs.

Technical Standards Statement

Graduates of Washington University with a Doctor of Medicine degree are expected to have broad competence in the basic skills that underlie the general practice of medicine and surgery. All graduates must be able to take a history, examine a person, synthesize the findings into a diagnosis and plan of evaluation and treatment independently. Thus, medical students must possess the requisite sensory, motor, communicative and cognitive capabilities to accomplish these requirements in a reliable manner in order to be competent and safe medical practitioners.

Non-Discrimination Statement
Washington University encourages and gives full consideration to all applicants for admission, financial aid, and employment. The University does not discriminate in access to, or treatment or employment in, its programs and activities on the basis of race, color, age, religion, sex, sexual orientation, national origin, veteran status, or disability. Present Department of Defense policy governing ROTC and AFROTC programs discriminates on the basis of sexual orientation; such discrimination is inconsistent with Washington University policy. Inquiries about compliance should be addressed to the University’s Executive Director of Human Resources, Washington University, Campus Box 1184, One Brookings Drive, St. Louis, MO 63130-4899, (314) 935-5990. The School of Medicine is committed to recruiting, enrolling and educating a diverse student body.

**Student Academic Records and Transcripts**

The Family Educational Rights and Privacy Act of 1974 (FERPA) provides current and former students of the University with specific rights of access to and control over their student record information. In compliance with the statute, appropriate federal regulations, and guidelines recommended by the American Association of University Registrars and Admissions Officers, the University has adopted procedures that implement these rights.

A copy of the University policies regarding educational records and the release of student record information may be obtained from the medical school’s Registrar’s Office.

Transcript requests may be made in person or by writing to the Registrar’s Office. Faxes are accepted (314/362-4658.) The written request must include your name, signature, date of birth and approximate dates of attendance.

**Voter Registration**

The 1998 Higher Education Act requires all postsecondary institutions to make available voter registration forms to all degree-seeking students.

Voter registration forms are made available to students at various sites on campus several months prior to each federal election cycle. The next federal election will occur on Tuesday, November 7, 2006. Registration forms will be available early in the Fall, 2006 semester, on the Medical Campus at the Student Affairs Office, Room 100, McDonnell Sciences Building.

To register to vote in Missouri, you must:
- be a citizen of the United States
- be a resident of Missouri (new residents may register immediately, but proof of residency shall be required.)
- register at least 28 days prior to the election
- be at least 17-1/2 years of age (you must be 18 to vote)
- not be on probation or parole after conviction of a felony, until finally discharged from such probation or parole
- not be convicted of a felony or misdemeanor connected with the right of suffrage
- not be adjudged incapacitated by any court of law
- not be confined under a sentence of imprisonment.

For additional information on voter registration, contact: Secretary of State
Departments

Department of Anatomy and Neurobiology

The structure of the human body is presented in two courses: Gross Anatomy, offered in the first semester, and Microscopic Anatomy, which extends over the first and second semesters. A third course, Neural Sciences, is taught at the end of the second semester. Gross Anatomy is largely a laboratory course, and lectures deal with anatomical principles and human growth and development. Instruction in Microscopic Anatomy focuses on cell and tissue biology, with laboratory sessions paralleling the lectures in these areas. This is a component of the Cell and Organ Systems Biology course jointly taught with the Department of Cell Biology and Physiology. Neural Sciences is an integrated course that deals with the structure, function and development of the nervous system from molecular, cellular and systems perspectives. Throughout all three courses, attention is paid to the results of recent investigations and to major developments in each field. In addition, the departmental faculty have a lead role in many graduate courses that may be taken as electives by students in any of the four years. The department is well-equipped for specialized work in several areas, including gross anatomy, electron microscopy, tissue culture and all aspects of neurobiology.

Courses

First Year

M35 554 NEURAL SCIENCES
Instructors: David C. Van Essen, Ph.D., 362-7043; Timothy E. Holy, Ph.D., co-coursemaster, 362-0086; W. Thomas Thach Jr., M.D., 362-3538
Neural Sciences is an intensive seven-week course that covers the structure, function and development of the nervous system as seen from molecular, cellular and systems-oriented perspectives. The emphasis is on the organization and function of the nervous system in health, but there is frequent reference to the clinical relevance of material presented. The course includes regular lectures, conference sessions and laboratories, plus a number of clinically oriented presentations. Computer-aided instructional programs, accessible from a variety of locations, provide auxiliary modes of self-paced learning and review. The midterm and final emphasize the core body of important facts and principles presented in lectures and laboratories. (SPRING ONLY).

M05 501A HUMAN ANATOMY AND DEVELOPMENT
Instructor: Glenn C. Conroy, Ph.D., 362-3397
The course is based largely on the dissection of the human body. Lectures on functional and topographic anatomy emphasize the principles of organization of the various systems of the body. Lectures on developmental anatomy stress organogenesis as an adjunct to understanding the normal and abnormal anatomy. An extensive museum of labeled dissected specimens is housed in the dissecting room for ready reference by students who encounter abnormalities or variations in their dissections. Frequent use of CT and MRI scans, radiographs and cross-sections aid in the synthesis of knowledge gained through dissection into clinically useful information. Radiologic anatomy and clinical correlation conferences further aid in this process. Cross-listed with L41 (Bio) 501.

M75 503 CELL AND ORGAN SYSTEMS BIOLOGY
Instructor: Paul C. Bridgman, Ph.D., 362-3449
The structure of cells, tissues and organs is studied with regard to the functional significance of the morphological features. Lectures integrate histology with cell biology and physiology. The laboratories consist of the study of prepared slides, electron micrographs, and digital images. A dual view microscope will be provided for each pair of students. Limited space is available for non-medical students with instructor’s permission. This course is cross-listed in Department of Cell Biology and Physiology.

**Selectives**

M04 552 GENETICS AND MOLECULAR BIOLOGY OF ION CHANNELS  
Instructor: Lawrence B. Salkoff, Ph.D., 362-3644  
A functional genomics approach to studying membrane excitability. How the new DNA sequence data from genomic and EST sequencing projects can be exploited to get a comprehensive picture of gene families that contribute to membrane excitability. How DNA sequence data can contribute to understanding questions of physiology, development, regulation and structure-function relationships.

**Fourth Year**

**Electives**

The department offers a number of graduate-level courses that may be taken as electives by medical students. The department participates in the Division of Biology and Biomedical Sciences, which also offers courses relevant to anatomy and neurobiology. These course descriptions are presented in the section on Biology and Biomedical Sciences.

L41 (Bio) 5571 CELLULAR NEUROBIOLOGY  
L41 (Bio) 5641 COMPUTATIONAL NEUROSCIENCE  
L41 (Bio) 5651 NEURAL SYSTEMS  
L41 (Bio) 567 ADVANCED TUTORIALS IN NEURAL SCIENCE  
L41 (Bio) 590 RESEARCH OPPORTUNITIES  

*Note -- The number preceding the course title indicates that the course is offered by the Division of Biology and Biomedical Sciences and carries credit in the Graduate School of Arts and Sciences.*

M05 810 ADVANCED DISSECTION  
Instructor(s): Staff, 362-3397  
Location: North Building  
Elective Contact: Glenn Conroy, Ph.D., 362-3397  
Other Information: Self Study. Pass/Fail. Contact Dr. Conroy one week prior to the start of the elective.

Enrollment limit per period: 14  
Valid start weeks for 4-week blocks are: Weeks 29, 33, 37 and 41.

Different regions of the body will be dissected in detail. A period of four weeks should be allowed for each region: head and neck, thorax and abdomen, and superior and inferior limbs. Surgical approaches, cross-sections, X-rays and CT scans can be studied.  
Student time distribution: A minimum of 40 hours is required  
Major teaching responsibility: N/A  
Patients seen/weekly: N/A  
On call/weekend responsibility: N/A  

M05 820 TEACHING ASSISTANT IN HUMAN ANATOMY  
Instructor(s): Glenn Conroy, Ph.D., 362-3397
Location: North Building  
Elective Contact: Glenn Conroy, Ph.D., 362-3397  
Other Information: Self Study. Pass/Fail. Students should contact Dr. Conroy one week prior to the start of the elective.

Enrollment limit per period: 4  
Valid start weeks for 4-week blocks are: Weeks 13, 17 and 21.  

Offers the student the opportunity to review human anatomy by assisting the Anatomy faculty in teaching first-year medical students in the Anatomy laboratory.  
Student time distribution: N/A  
Major teaching responsibility: N/A  
Patients seen/weekly: N/A  
On call/weekend responsibility: N/A

Research

(M05 900)

Cross-listed with L41 (Bio) 590


Andreas Burkhalter, Ph.D., 4th Floor North Building, 362-4068. Development and synaptic organization of cortical circuits.


James M. Cheverud, Ph.D., 3rd Floor North Building, 362-4188. Evolutionary quantitative genetics, genetics of growth and morphology, gene mapping for obesity and diabetes-related traits in mice.

Glenn C. Conroy, Ph.D., 3rd Floor North Building, 362-3397. Comparative primate anatomy and human evolution.

Gregory DeAngelis, Ph.D., 3rd Floor East McDonnell, 747-2253. Neural circuits underlying visual perception of 3D space; sensory integration mediating self-motion perception.

J. David Dickman, Ph.D., Central Institute for the Deaf, 747-7221. Neural circuits of motion detection, spatial orientation, and development of motion receptors.

Timothy E. Holy, Ph.D., 4th Floor North Building, 362-0086. Neural mechanisms of the detection and recognition of pheromones.


Lawrence B. Salkoff, Ph.D., 9th Floor McDonnell Science Building, 362-3644. Genetics and molecular biology of ion channels.

Paul J. Shaw, Ph.D., 9th Floor McDonnell Science Building, 362-2703. Molecular genetics of sleep and circadian rhythms.

Lawrence H. Snyder, M.D., Ph.D., 3rd Floor East McDonnell, 747-3530. Computational and cognitive issues in cortical control of eye and arm movement.


W. Thomas Thach, M.D., 2nd Floor East McDonnell, 362-3538. Neural control of posture, movement and motor learning; cognitive functions of the cerebellum.


Rachel O. Wong, Ph.D., 4th Floor McDonnell Science Building, 362-4941. Development of neuronal connectivity in the central nervous system.

Faculty

 DAVID C VAN ESSEN, PHD  Head of the Department of Anatomy and Neurobiology, Edison Professor of Neurobiology
 CHARLES H ANDERSON, PHD  Research Professor of Neurobiology
 DORA ANGELAKI, PHD  Alumni Endowed Professor of Neurobiology
 NANCY L BAENZIGER, PHD  Research Associate Professor of Neurobiology
 DENNIS L BARBOUR, MD, PHD  Assistant Professor of Neurobiology
 KEVIN J BLACK, MD  Associate Professor of Neurobiology
PAUL C BRIDGMAN, PHD  Professor of Neurobiology
ESTELLE BRODMAN, PHD, BS  Professor Emeritus of Medical History in Anatomy
RANDY L. BUCKNER, PHD, MA  Associate Professor of Neurobiology
ANDREAS H BURKHALTER, PHD  Professor of Neurobiology
HAROLD BURTON, PHD  Professor of Neurobiology
JAMES M CHEVERUD, PHD  Professor of Anatomy
THEODORE J CICERO, PHD  Professor of Neurobiology
GLENN C CONROY, PHD  Professor of Anatomy
MAURIZIO CORBETTA, MD  Professor of Neurobiology
JOHN G CSE-RANSKY, MD  Professor of Neurobiology
GREGORY C DEANGELIS, PHD  Associate Professor of Neurobiology
J. DAVID DICKMAN, PHD  Associate Professor of Neurobiology
KRIRER T DIKRANIAN, MD, PHD  Instructor in Anatomy
SUSAN M FITZPATRICK, PHD  Adjunct Assistant Professor of Neurobiology
JAMES E. GALVIN, MD, MS  Assistant Professor of Neurobiology
ROBERT W GERBEAU, PHD  Associate Professor of Neurobiology
MARK PAUL GOLDBERG, MD  Professor of Neurobiology
URSULA W. GOODENOUGH, PHD  Associate Professor of Anatomy
DAVID I GOTTLIEB, PHD  Professor of Neurobiology
M. ROSARIO HERNANDEZ-NEUFELD, DDENT  Associate Professor of Neurobiology
STEPHEN M HIGHSTEIN, MD, PHD  Professor of Neurobiology
TIMOTHY E. HOLY, PHD  Assistant Professor of Neurobiology
VLADIMIR JIVKOV KEFALOV  Assistant Professor of Neurobiology
ROBYN SUE KLEIN, MD  Assistant Professor of Neurobiology
CHRISTOPHER J LINGLE, PHD  Professor of Neurobiology
ARTHUR D LOEWY, PHD  Professor of Anatomy and Neurobiology
PETER DAVID LUKASIEWICZ, PHD  Professor of Neurobiology
STEVEN JAMES MENNERICK, PHD  Assistant Professor of Neurobiology
DAVID NORMAN MENTON, PHD  Associate Professor Emeritus of Anatomy, Lecturer in Anatomy
DANIEL MORAN, PHD  Assistant Professor of Neurobiology
JEFFREY J NEIL, MD, PHD  Assistant Professor of Neurobiology
BRUCE L NOCK, PHD  Associate Professor of Neurobiology
MICHAEL L NONET, PHD  Associate Professor of Neurobiology
KAREN LAUREL O’MALLEY, PHD  Professor of Neurobiology
TAE SUNG PARK, MD  Professor of Neurobiology
JOEL S PERLMUTTER, MD  Associate Professor of Neurobiology
STEVEN E PETERSEN, PHD  Professor of Neurobiology
ROY R PETERSON, PHD  Professor Emeritus of Anatomy
JANE PHILLIPS CONROY, PHD  Professor of Anatomy
JOSEPH L PRICE, PHD, BA  Professor of Anatomy and Neurobiology
MARCUS E RAICHLE, MD  Professor of Neurobiology
KEITH M RICH, MD  Associate Professor of Neurobiology
STEVEN MARK ROTHMAN, MD  Professor of Neurobiology
JOSHUA BENNETT RUBIN, MD, PHD  Assistant Professor of Neurobiology
LAWRENCE B SALKOFF, PHD  Professor of Neurobiology
BRADLEY L SCHLAGGAR, MD, PHD  Assistant Professor of Neurobiology
PAUL JOSEPH SHAW, PHD  Assistant Professor of Neurobiology
DWAYNE DEANGELO SIMMONS, PHD  Research Associate Professor of Neurobiology
ROBERT J SINCLAIR, PHD  Research Assistant Professor of Neurobiology
LAWRENCE H SNYDER, MD, PHD  Associate Professor of Neurobiology
JOSEPH H STEINBACH, PHD  Professor of Neurobiology
PAUL H TAGHERT, PHD  Professor of Neurobiology
W. THOMAS THACH, JR, MD  Professor of Neurobiology
KURT A THOROUGHMAN, PHD  Assistant Professor of Neurobiology
ROBERT LAWRENCE TYCHSEN, MD  Associate Professor of Neurobiology
MIA C WALLACE  Research Scientist of Neurobiology
MARK EDWARD WARCHOL, PHD  Research Associate Professor of Neurobiology
AGUAN D WEI, PHD  Research Assistant Professor of Neurobiology
RALF WESSEL, PHD  Assistant Professor of Neurobiology
MARK B WILLARD, PHD  Professor of Neurobiology
MICHAEL WONG, MD, PHD  Assistant Professor of Neurobiology
RACHEL OI WONG, PHD  Professor of Neurobiology
THOMAS A WOOLSEY, MD  Professor of Anatomy and Neurobiology
CHARLES F ZORUMSKI, MD  Professor of Neurobiology

Department's Website
Department of Anesthesiology

Anesthesiology is a medical specialty encompassing a broad range of medical and scientific activities. The clinical practice of anesthesiology includes: 1) assessment of, consultation for and preparation of patients for anesthesia; 2) provision of insensibility to pain during surgical, obstetric, therapeutic and diagnostic procedures; 3) monitoring and restoration of physiologic homeostasis during the perioperative period, as well as homeostasis in the critically ill or seriously injured patient; 4) diagnosis and treatment of painful syndromes; and 5) clinical management and teaching of cardiopulmonary resuscitation (CPR). The realm of scientific investigation in anesthesiology also spans a broad range. Scientific efforts at the cellular and molecular levels are directed to understanding the molecular mechanisms of anesthesia and analgesia. Clinical research in anesthesia includes broad epidemiological approaches to identifying indicators of outcome as well as prospective clinical studies examining new technologies, anesthetic agents and methods.

The Department of Anesthesiology presents the student with the opportunity to: 1) acquire and apply pharmacologic knowledge related to anesthetic, narcotic, paralytic and sedative drugs and to drugs affecting the autonomic nervous system; 2) understand and apply the basic principles of airway management and mechanical ventilation; 3) understand and apply the principles of cardiopulmonary resuscitation; 4) understand and apply the technical skills and anatomic and pharmacologic knowledge used in performing regional nerve blocks; 5) learn and apply the fundamental principles of acute and chronic pain management; and 6) learn and apply the basic principles of critical care medicine.

Anesthesiology bridges the gap between basic science and clinical medicine. It provides experience in the clinical evaluation and management of patients, and in applied physiology and pharmacology. The Department of Anesthesiology offers student experiences in the operating room, the intensive care unit, the pain clinic and the laboratory.

This clerkship introduces all of the basic aspects of anesthetic practice, including preoperative assessment, intraoperative anesthetic administration, placement and interpretation of invasive and non-invasive physiologic monitoring, airway management and regional anesthetic administration. Students taking this clerkship work one-on-one with attending anesthesiologists and are an integral part of the anesthetic care team. By the end of the clerkship, the student should be able to provide (under supervision) anesthesia for an uncomplicated surgical procedure. This rotation offers a unique opportunity for the student to work directly with attending physicians and to acquire fundamental skills (airway management, invasive monitoring, regional anesthesia) applicable to all aspects of acute medicine.

Students who have taken the anesthesia clerkship in the third year may elect to repeat this rotation in the fourth year. These students will be exposed to more complicated cases and techniques, and will be given increased responsibility for perioperative patient management. Students who have taken the clerkship in the third year also may elect to take an elective in the subspecialty areas of Cardiothoracic Anesthesiology, Pediatric Anesthesiology or Anesthesia for Neurosurgery. Students taking these electives will be exposed to surgical cases of increased complexity requiring specialized invasive monitoring and anesthetic techniques.

A four-week elective also is offered in critical care medicine that is designed to familiarize the student with the diagnosis and treatment of the critically ill surgical patient. This is accomplished by the student becoming an integral part of the intensive care team. Students learn techniques of mechanical ventilation, hemodynamic monitoring, resuscitation and vasoactive drug treatment while managing all aspects of patients assigned to their care.

The clerkship in pain management offers the student the opportunity to participate in comprehensive, multidisciplinary management of acute, chronic and cancer pain problems. Students will be expected to assist in the care of both inpatients and outpatients. Students will learn fundamental aspects of pain management, which should provide the knowledge with which to manage routine acute and cancer pain in their subsequent practice.
Special electives in basic science research as it applies to anesthesiology can be arranged with the principal investigators in the Anesthesiology Research Unit, under the direction of Joe Henry Steinbach, Ph.D. These laboratories focus on various aspects of molecular neurobiology, including ion channel structure and function, G-protein molecular biology, molecular mechanisms of volatile anesthetic action and genetics of anesthetic responsiveness. Arrangements for these special electives are made through the specific investigators: Walter A. Boyle III, M.D.; Zhou-Feng Chen, Ph.D.; C. Michael Crowder, M.D., Ph.D.; Alex S. Evers, M.D.; Narasimhan Gautam, Ph.D.; Richard S. Hotchkiss, M.D.; Christopher J. Lingle, Ph.D.; Joseph H. Steinbach, Ph.D.; or Robert W. Gereau, Ph.D.

Courses

Fourth Year

Electives

M10 805 ANESTHESIOLOGY
Instructor(s): Joseph Kras, MD., 747-0300
Location: Barnes-Jewish Hospital, South Campus
Elective Contact: Gerri Neumann, 362-4449
Other Information: Please contact the department student secretary, Gerri Neumann, at 362-4449 prior to the elective for specific instructions. Students should meet in the Clinical Simulation Center, 3rd floor Barnes-Jewish Hospital Service Building, 8:30 a.m. first day of elective.

Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

This clinical elective is designed to familiarize the student with basic aspects of anesthesiology practice. The primary teaching method is patient care in an instructional setting (one-on-one). The student will learn the basics of preoperative evaluation of surgical patients, preanesthetic medication, intraoperative patient management and intraoperative monitoring. The student will be taught practical perioperative fluid and electrolyte therapy, airway management skills, the placement and interpretation of invasive monitoring devices, and regional anesthetic techniques. The student will be an integral part of the anesthesia care team and will participate actively in the anesthetic management of surgical patients. The rotation will also include practical management of some common medical and surgical emergencies using a clinical simulator. By the end of the rotation, we expect that the student will independently (under supervision) provide anesthesia for uncomplicated surgical procedures.

Student time distribution: Inpatient 85%, Conferences/Lectures 15%; Subspecialty Care 100%
Major teaching responsibility: Single attending and/or Resident
Patients seen/weekly: 15
On call/weekend responsibility: One Saturday morning

M10 811 CARDIOTHORACIC ANESTHESIOLOGY
Instructor(s): Seema Deshpande, M.D., 362-1355
Location: Barnes-Jewish Hospital, South Campus
Elective Contact: Lydia Swink, 362-1196
Other Information: Students should meet at the offices of the Division of Cardiothoracic Anesthesia, 3rd Floor Barnes-Jewish Service Building, 8:30 a.m. first day of elective.

Enrollment limit per period: 2
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

This clinical elective offers practical experience in the perioperative assessment and management of
surgical patients undergoing cardiothoracic procedures. The student, as part of the cardiothoracic anesthesia team composed of faculty members, fellows and residents, will learn basic principles of airway management and lung ventilation, essential aspects of pharmacologic treatment of hemodynamic abnormalities and cardiac dysrhythmias, and management of intraoperative coagulation disturbances. Emphasis will be placed on the interpretation of intraoperative hemodynamic data, echocardiographic finding (TEE), and laboratory results in clinical decision making and treatment approach during anesthesia and surgery. During this rotation, the student will also gain practical experience in endotracheal intubation and the placement of intravenous lines, and invasive monitoring lines, including radial artery and pulmonary artery catheters. At the conclusion of the rotation, the student will have a better understanding of invasive monitoring and data interpretation, as well as a more systematic approach to the management of intra- and post-operative hemodynamic, pulmonary and coagulation abnormalities. The students are expected to attend the didactic sessions of CTA and the Department of Anesthesiology. A presentation or paper will be assigned.

Student time distribution: Inpatient 100%; Subspecialty Care 100%
Major teaching responsibility: Seema Deshpande, M.D.
Patients seen/weekly: 15
On call/weekend responsibility: None

M10 812 PEDIATRIC ANESTHESIA
Instructor(s): Gary Hirshberg, M.D.; David Moore, M.D.; and David Murray, M.D., 454-6215
Location: 5th Floor, St. Louis Children’s Hospital
Elective Contact: David Moore, M.D., 454-6215
Other Information: Students should contact Martha Severn, 454-6215, one week prior to the start of the elective.

Enrollment limit per period: 2
Valid start weeks for 4-week blocks are: Weeks 9, 13, 17, 21, 25, 29, 33, 37 and 41.

This clinical elective is designed to teach the theory and practice of pediatric anesthesiology and pain management. It features individualized instruction with faculty who specialize in the perioperative care of pediatric patients. The elective consists of three weeks of active participation with pediatric anesthesiologists at St. Louis Children’s Hospital and Shriners Hospital for Children learning preanesthetic assessment, the performance of routine anesthetics (which includes instruction and practice in pediatric airway skills), and the management of post-anesthesia care and pain therapies. The final week is tailored to meet the student’s individual needs and career goals. Possibilities include exposure to sedation and anesthesia for procedures outside of the operating rooms, and to subspecialties including cardiovascular anesthesia, neurosurgical anesthesia, and acute and chronic pediatric pain management. Students also will have an opportunity to learn the management of some common medical emergencies in the Clinical Simulation Center.

Student time distribution: Inpatient 10%, Outpatient 80%, Conferences/ Lectures 10%; Subspecialty Care 100%
Major teaching responsibility: Attending, fellows; students will generally spend most of each day with a single attending
Patients seen/weekly: 25
On call/weekend responsibility: None

M10 819 CARDIOTHORACIC CRITICAL CARE
Instructor(s): Charl de Wet, M.D., Coursemaster; Eric Jacobsohn, M.D.; Laureen Hill, M.D.; Michael Avidan, M.D.; and Nat Levy, M.D.
Location: Barnes-Jewish Hospital, South Campus
Elective Contact: Maureen Arends, 747-4155
Other Information: Students should meet in the cardiothoracic intensive care unit, 2300 ICU, 2nd Floor Barnes-Jewish Service Building, 7:30 a.m. first day of elective.

Enrollment limit per period: 4
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.
This clinical elective offers practical experience in the postoperative management of cardiothoracic patients. The student will be fully integrated into the intensive care team and have the opportunity to contribute to the management of critically ill patients. Students will be afforded the opportunity to follow specific patients over the course of their stay on the ICU, during which time they will gain insight into holistic management of patients with multi-organ dysfunction. The CTICU environment is both challenging and exciting. Cardiorespiratory physiology and pharmacology will be demonstrated at the patients’ bedside, an invaluable and unforgettable learning experience. Students will have numerous opportunities to assist with and learn procedures, such as central lines, chest tubes, bronchoscopy and pulmonary artery catheter insertion. Principles of management and resuscitation of hemodynamically unstable patients following surgery will be emphasized. At the conclusion of the rotation, the student will have a better understanding of shock, sepsis, multi-organ failure, organ system support and compassionate withdrawal of life support. An exciting teaching program will be prepared for the students. Students will be encouraged to present on their patient at morning ward rounds, during which constructive feedback and interactive teaching will occur. Students will present on a topic related to one of their patients at the end of the block.

Student time distribution: Inpatient 100%; Subspecialty Care 100%
Major teaching responsibility: Eric Jacobsohn, M.D.
Patients seen/weekly: 15
On call/weekend responsibility: None

M10 820 CRITICAL CARE
Instructor(s): Walter Boyle, M.D., 747-3581, Coursemaster;
Timothy Buchman, Ph.D., M.D.; J. Perren Cobb, M.D.; Craig Coopersmith, M.D.; Alex Evers, M.D.; Eric Jacobsohn, M.D.; Laureen Hill, M.D.; Richard Hotchkiss, M.D.; George Tseng, M.D.; Omokhaye Higo, M.D.; John Mazuski, M.D.; and Doug Schuerer, M.D.
Location: Barnes-Jewish Hospital, South Campus
Elective Contact: Vickie Kamp, 747-3581
Other Information: Students should meet in Surgical Intensive Care Unit, 7:00 a.m. first day of elective.

Enrollment limit per period: 4
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

This clinical elective is designated to familiarize the student with the management of the critically ill patient. The setting is the 8400 Surgical Intensive Care Unit at Barnes-Jewish Hospital. The student will receive individualized training in critical care management including stabilization of the critically ill or injured patient, cardiovascular assessment and invasive hemodynamic monitoring, management of the airway and mechanical ventilator support, and other aggressive support as needed. The student will function as an integral member of the surgical intensive care unit team, which consists of physicians with specialty training in critical care, critical care fellows, house staff from surgery, anesthesiology, and other specialties, pharmacists, and nutrition experts. The student will actively participate in daily rounds with members of the team and will be actively involved in the management of critically ill patients from all the surgical specialties except cardiothoracic and neurosurgery. Practical experience will be gained in placement and interpretation of invasive and non-invasive cardiovascular monitors, the recognition and treatment of shock syndromes including trauma and burns, airway management and the use of mechanical ventilation, the diagnosis and treatment of renal insufficiency, management and treatment of infectious problems including septic shock, management of fluids and electrolytes, and nutrition.
Student time distribution: Inpatient 80%, Conferences/Lectures 20%; Subspecialty Care 100%
Major teaching responsibility: Attendings
Patients seen/weekly: 50
On call/weekend responsibility: Variable

M10 821 PAIN MANAGEMENT
Instructor(s): Robert A. Swarm, M.D., 747-0101
Location: Barnes-Jewish Hospital, South Campus
Elective Contact: Robert A. Swarm, M.D., 747-0101
Other Information: Students should report to 10th Floor CAM Building, 8:00 a.m. first day of elective.

Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

Severe, uncontrolled pain is an all-too-often consequence of acute or chronic illness. Pain management students will be involved in the multidisciplinary management of acute and chronic pain, and master the treatment guidelines with which greater than 90 percent of cancer patients’ pain can be successfully managed. This rotation is centered at Barnes-Jewish Hospital, but students also may be involved with patient care at St. Louis Children’s Hospital.

Student time distribution: Inpatient 30%, Outpatient 60%, Conferences/ Lectures 10%; Subspecialty Care 100%
Major teaching responsibility: Attendings
Patients seen/weekly: 70
On call/weekend responsibility: One weekend per rotation

M10 822 ANESTHESIA FOR NEUROSURGERY
Instructor(s): Rene Tempelhoff, M.D., and Kimiko Fukui, M.D., 362-2553
Location: Barnes-Jewish Hospital, South Campus
Elective Contact: Rene Tempelhoff, M.D., 362-2330
Other Information: Students should meet on 3rd Floor Barnes-Jewish Hospital, South Campus, Department of Anesthesiology, 7:00 a.m. first day of elective.

Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

Challenging neurosurgical procedures. Student will become familiar with complex procedures for brain monitoring, cardiovascular support and airway management and will be exposed to all kinds of neurosurgical ailments.

Student time distribution: Inpatient 80%, Conferences/Lectures 20%; Subspecialty Care 100%
Major teaching responsibility: Attending, fellow, and senior resident
Patients seen/weekly: 8
On call/weekend responsibility: None

M10 823 OBSTETRICAL ANESTHESIA
Instructor(s): Laila Bottros, M.D., 362-1374
Location: Barnes-Jewish Hospital, South Campus
Elective Contact: Laila Bottros, M.D., 362-1374
Other Information: Students should report to 5400 Labor and Delivery, 7:00 a.m. first day of elective.

Enrollment limit per period: 1
Valid start weeks for 2 or 4-week blocks are: Weeks 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, and 43.

The medical students will learn the different analgesia/anesthetic options for the labor patient. They will also learn how the physiological adaptations of pregnancy influence anesthetic management. They will be actively involved in the parturient's management, i.e. starting an IV, placement of spinal, epidural or CSE (combined spinal epidural) anesthetics. They will also attend the OB anesthesia conferences and interview patients in labor (with an OB anesthesia attending).

Student time distribution: Inpatient 90%, Conferences/Lectures 10%; Subspecialty Care 100%
Major teaching responsibility: Attending, Senior Resident
Patients seen/weekly: 20
On call/weekend responsibility: None (optional)

Faculty

ALEX S EVERS, MD  Head of the Department of Anesthesiology, Henry E Mallinckrodt Professor of Anesthesiology
NABIL ABBOUD, MD  Associate Professor of Anesthesiology
SIRAJUDDIN AGHA, MBBS  Assistant Professor of Anesthesiology
GUSTAV AKK, PHD  Research Assistant Professor of Anesthesiology
SHARMA ANSHUMAN, MD  Associate Professor of Anesthesiology
MICHAEL SIMON AVIDAN, MBBCH  Assistant Professor of Anesthesiology
GEORGE RICHARD BENZINGER, III, MD, PHD  Instructor in Anesthesiology
BRAD BERNSTEIN, MD  Instructor in Anesthesiology
ROBERTO CARLOS BLANCO DUARTE, MD  Instructor in Anesthesiology
MATTHEW S BODNER, MD  Assistant Professor of Anesthesiology
LAILA M BOTTROS, MD  Assistant Professor of Anesthesiology
WALTER A BOYLE, III, MD  Associate Professor of Anesthesiology
TIMOTHY G BUCHMAN, MD, PHD  Professor of Anesthesiology
LAURA FRANCESCA CAVALLONE, MD  Instructor in Anesthesiology
JAN CERNOVSKY, MD  Instructor in Anesthesiology
JAMES CHANDLER, MBCHB  Instructor in Anesthesiology
ZHOUFENG CHEN, PHD  Assistant Professor of Anesthesiology
ALBERT MURRAY COHEN, MD  Assistant Professor of Anesthesiology (Pending Executive Faculty Approval)
JENNIFER W COLE, MD  Associate Professor of Anesthesiology
CRAIG M COOPERSMITH, MD  Associate Professor of Anesthesiology
THOMAS E COX, MD  Assistant Professor of Anesthesiology
CHARLES M CROWDER, MD, PHD  Associate Professor of Anesthesiology
JANE-LORELIE CUETO, MD  Instructor in Anesthesiology
PRITI DALAL, MBBBS  Instructor in Anesthesiology
BAKUL DAVE, MD  Assistant Professor of Anesthesiology
VICTOR G DAVILA-ROMAN, MD  Professor of Anesthesiology
THOMAS ALLEN DAVIS, MD  Associate Professor of Anesthesiology
CHARL JOHAN DE WET, MBBCH  Assistant Professor of Anesthesiology
SEEMA DESHPANDE, MD  Instructor in Anesthesiology
GEORGE J DESPOTIS, MD  Associate Professor of Anesthesiology
MICHAEL N DIRINGER, MD  Professor of Anesthesiology
JAMES J FEHR, III, MD  Assistant Professor of Anesthesiology
BEVERLY J FIELD, PHD, BA  Instructor in Anesthesiology
KIMIKO FUKUI, MD  Instructor in Anesthesiology
PRABHU REDDY GALIVETI, MBBS  Instructor in Anesthesiology
NARASIMHAN GAUTAM, PHD  Professor of Anesthesiology
ROBERT W GEREAU, PHD  Associate Professor of Anesthesiology
DANIEL PATRICK GILLEN, MD  Assistant Professor of Anesthesiology (Pending Executive Faculty Approval)
THOMAS JAMES GOBLIRSCH, MD  Assistant Professor of Anesthesiology
BARRY A GRAFF, MD  Assistant Professor of Anesthesiology
RUSSELL J.L. GROENER, MBCHB  Assistant Professor of Anesthesiology
CYRENE DAWN GROTHAUS-DAY, MD, JD  Assistant Professor of Anesthesiology
ANTHONY HERBERT GUARINO, MD  Instructor in Anesthesiology
ASHISH GULVE  Instructor in Anesthesiology
CHARLES B HANTLER, MD  Professor of Anesthesiology
ROYCE DANIEL HAYES, MD  Instructor in Anesthesiology
DANIEL LUKE HELSTEN, MD  Instructor in Anesthesiology
ROBERT E HEROLD, MD  Assistant Professor of Anesthesiology
LAUREEN L HILL, MD  Associate Professor of Anesthesiology
GARY E HIRSHBERG, MD  Professor of Anesthesiology
CHARLES W HOGUE, JR, MD  Associate Professor of Anesthesiology
BARBEL HOLTZMANN, MD, BS  Associate Professor of Anesthesiology
RICHARD S HOTCHKISS, MD  Professor of Anesthesiology
HAWPENG STEPHEN HSU, MD  Assistant Professor of Anesthesiology
HUI JUAN HU, PHD  Research Instructor in Anesthesiology
CATHERINE IFUNE, MD, PHD  Assistant Professor of Anesthesiology
SELMA E.H.O. ISHAG, MD, PHD  Assistant Professor of Anesthesiology
ERIC JACOBSOHN, MD  Associate Professor of Anesthesiology
JAMES JAY JENKINS, MD  Associate Professor of Anesthesiology
MATTHEW B JONES, MD  Assistant Professor of Anesthesiology
IVAN M KANGRA, MD, PHD  Associate Professor of Anesthesiology
MENELAOS KARANIKOLAS, MD  Instructor in Anesthesiology
FARZANA KARIM, PHD  Research Instructor in Anesthesiology
SHAHREDAD KHODAMORADI, MD  Assistant Professor of Anesthesiology
TESSA MARIE KING, MD  Assistant Professor of Anesthesiology
JOSEPH F KRAS, DDS, MD  Associate Professor of Anesthesiology
VLADIMIR KREJCI, MD  Instructor in Anesthesiology
CATHERINE P KRUCYLAK, MD  Assistant Professor of Anesthesiology
ANAND LAKSHMINARASIMHACHAR, MBBS  Instructor in Anesthesiology
VENKATA LAKSHMA LANKA, MBBS  Instructor in Anesthesiology
DEMETRIOS G LAPPAS, MD, PHD  Professor Emeritus of Anesthesiology
CHRIS CHENG-FU LEE, MD, PHD  Assistant Professor of Anesthesiology
BARBARA L. LEIGHTON, MD  Professor of Anesthesiology
CHRISTOPHER J LINGLE, PHD  Professor of Anesthesiology
QIANJIN LIU, MD, PHD  Assistant Professor of Anesthesiology
BARRY P MARKOVITZ, MD  Associate Professor of Anesthesiology
JOHN D M'CALLISTER, MD  Associate Professor of Anesthesiology
DRAGAN MIJUSKOVIC, MD  Instructor in Anesthesiology
DAVID LAWRENCE MOORE, MD  Assistant Professor of Anesthesiology
MUHAMMAD A. MUNIR, MD  Instructor in Anesthesiology
DAVID J MURRAY, MD  Professor of Anesthesiology
PETER NAGELE, MD  Instructor in Anesthesiology
JOAN M NIEHOFF, MD  Assistant Professor of Anesthesiology
CARL HELGE NIELSEN, MD  Professor of Anesthesiology
MARGARET MARY OAKLEY, MD  Assistant Professor of Clinical Anesthesiology
IRENE OPAI-TETTEH, MD  Instructor in Anesthesiology
FRANCISCO JAVIE ORELLANA RAMOS, MBBS  Instructor in Anesthesiology
IGOR OTAHAL, MD  Instructor in Anesthesiology
WILLIAM D OWENS, MD  Professor Emeritus of Anesthesiology
PATRICIA A. PENKOSKE  Instructor in Anesthesiology
MITCHELL R PLATIN, MD  Assistant Professor of Anesthesiology
DEBRA D PULLEY, MD  Associate Professor of Anesthesiology
RAMESH RAMAIAH, MBBS  Instructor in Anesthesiology
SRIKIRAN RAMARAPU, MBBS  Instructor in Anesthesiology
RAHUL RASTOGI, MBBS  Assistant Professor of Anesthesiology
JEBADURAI RATNARAJ, MD  Assistant Professor of Anesthesiology
NECITA L ROA, MD  Associate Professor of Anesthesiology
FRANK EDWARD ROBBINS, MD  Assistant Professor of Anesthesiology
ALBERT ROOS, MD  Professor Emeritus of Anesthesiology
JULIO CESAR ROSEMBERG, MD  Assistant Professor of Anesthesiology (Pending Executive Faculty Approval)
PAULA J RUSHING, MD  Assistant Professor of Anesthesiology
RICHARD A. SARGENT, MD, BS  Assistant Professor of Anesthesiology
TORSTEN C. SCHREIBER  Instructor in Anesthesiology
CHARLES R SCHROCK, MD  Assistant Professor of Anesthesiology
MONICA SCUTARIU, MD  Instructor in Anesthesiology
JAMES M SHEAR, MD  Associate Professor of Anesthesiology
JIRI SOUPAL, MD  Instructor in Anesthesiology
DUSICA STAMENKOVCIC, MD  Instructor in Anesthesiology
JOSEPH H STEINBACH, PHD  Russell and Mary Shelden Professor of Anesthesiology
CHARLES RONALD STEPHEN, MD  Professor Emeritus of Clinical Anesthesiology
ROBERT A SWARM, MD  Associate Professor of Anesthesiology
YOLANDA TECUANHUEY  Instructor in Anesthesiology
RENE TEMPELHOFF, MD  Professor of Anesthesiology
RAGHU P TERKONDA, MD  Assistant Professor of Anesthesiology
SENTHIL KUMAR THIYAGARAJAN, MBBS  Instructor in Anesthesiology
JOSEPH M THORNHILL, MD  Assistant Professor of Anesthesiology (Pending Executive Faculty Approval)
SILVESTRE A TOMELDAN, JR, MD  Instructor in Anesthesiology
TOMASZ TORLINSKI, MD  Instructor in Anesthesiology
GEORGE S TSENG, MD  Assistant Professor of Anesthesiology
ANDREA VANNUCCI, MD  Instructor in Anesthesiology
SWARUP VARADAY, MBBS  Instructor in Anesthesiology
GERSHON RAM VOLOTZKY, MD  Assistant Professor of Anesthesiology
LAWRENCE SIDNEY WALDBAUM, MD  Assistant Professor of Anesthesiology
ALINE VIVIAN WANG, MD  Assistant Professor of Anesthesiology (Pending Executive Faculty Approval)
BRETT D WOLFF, MD  Assistant Professor of Anesthesiology
XIAOMING XIA, PHD  Research Assistant Professor of Anesthesiology
XIAOBIN YI, MD  Instructor in Anesthesiology
ALEXANDER H YOUNG, MD  Instructor in Anesthesiology

Department's Website
Department of Biochemistry and Molecular Biophysics

The department participates in Medical School teaching in the first year as well as offering a number of specialized courses in the major fields of biochemistry and biophysics. Students in the School of Medicine or those in the Graduate School of Arts and Sciences may enroll in these courses and pursue research work under the direction of members of the faculty. The interests of the faculty, listed below, cover many aspects of biochemistry and biophysics with special emphasis on structure/function relationships in proteins and nucleic acids, enzymology, metabolic regulation, molecular biology of gene expression and protein biosynthesis, signal transduction, and the dynamics of cytoskeletal structures.

Courses

First Year

M15 502 MOLECULAR FOUNDATIONS OF MEDICINE
Instructor: Linda J. Pike, Ph.D., 362-9502

This course is designed primarily for medical students and will cover fundamental aspects of biochemistry and cell biology. The course begins with a treatment of protein structure and the function of proteins in the cytoskeleton and cell motility. The principles of enzyme kinetics and regulation are then discussed and basic pathways for the synthesis and metabolism of carbohydrates and lipids are introduced. This leads into a discussion of membrane structure and the function cellular organelles in biological processes including energy production, protein degradation and protein trafficking. Non-medical students should register under L41 (Bio) 5319.

Fourth Year

Electives

Descriptions of the elective courses are listed under the Division of Biology and Biomedical Sciences. In some instances, these courses are offered in alternate years. The faculty member in charge of the course should be contacted for specific times.

L41 (Bio) 5312 MACROMOLECULAR INTERACTIONS
L41 (Bio) 5325 PROTEIN STRUCTURE AND FUNCTION
L41 (Bio) 5384 ADVANCED CELL BIOLOGY/BIOCHEMISTRY OF MEMBRANES
L41 (Bio) 5456 ADVANCED CRYSTALLOGRAPHY
L41 (Bio) 5461 MOLECULAR RECOGNITION
L41 (Bio) 5464 COMPUTATIONAL BIOCHEMISTRY
L41 (Bio) 548 NUCLEIC ACID AND PROTEIN BIOSYNTHESIS

Note — The number preceding the course title indicates that the course carries credit in the Graduate School of Arts and Sciences.

Research
(M15 900)

Cross-listed with L41 (Bio) 590


Wayne M. Barnes, Ph.D., 3rd Floor North Building, 362-3351. Plant and DNA polymerase genetic engineering.

Peter M. J. Burgers, Ph.D., 1st Floor South Building, 362-3872. Molecular biology of yeast chromosomal DNA replication and DNA repair.

Peter T. Chivers, Ph.D., 1st Floor South Building, 362-1496. Mechanisms of metalloregulation. Protein structure/function relationships.


Elliot L. Elson, Ph.D., 2nd Floor McDonnell Science Building, 362-3346. Cellular mechanics and cytoskeletal structure and function.


Jo Holt, Ph.D., 1st Floor South Building, 362-4406. Allosteric control mechanisms in human hemoglobin: Kinetics and thermodynamic-linkage analysis, multi-angle light scattering.


John E. Majors, Ph.D., 2nd Floor South Building, 362-1135. Control of eukaryotic gene expression.


F. Scott Mathews, Ph.D., 2nd Floor South Building, 362-1080. X-ray crystallographic studies of proteins and enzymes.

Linda J. Pike, Ph.D., 2nd Floor Cancer Research Building, 362-9502. Phosphoinositides and the role of
caveolae/DIGs in signal transduction.

Jay Ponder, Ph.D., 208 Center for Computational Biology, 362-4195. Computational modeling of protein structure and energetics. Protein engineering.

William R. Wikoff, Ph.D., 2nd Floor South Building, 362-0727. Virus structure, assembly, and maturation studied by x-ray crystallography and related biophysical techniques.

Faculty

CARL FRIEDEN, PHD  Raymond H Wittcoff Professor of Biochemistry and Molecular Biophysics, Head of the Department of Biochemistry and Molecular Biophysics

GARY K ACKERS, PHD  Professor of Biochemistry and Molecular Biophysics

USHA P ANDLEY, PHD  Assistant Professor of Biochemistry and Molecular Biophysics

NATHAN A BAKER, PHD  Assistant Professor of Biochemistry and Molecular Biophysics

WAYNE MORRIS BARNES, PHD  Associate Professor of Biochemistry and Molecular Biophysics

BARBARA I BROWN, PHD  Professor Emerita of Biological Chemistry

DAVID HENRY BROWN, PHD  Professor Emeritus of Biological Chemistry

PETER M BURGERS, PHD  Professor of Biochemistry and Molecular Biophysics

PETER TRISTRAM CHIVERS, PHD  Assistant Professor of Biochemistry and Molecular Biophysics

DAVID PAUL CISTOLA, MD, PHD  Associate Professor of Biochemistry and Molecular Biophysics

SUDHA MAHAJAN COWSIK, PHD  Research Instructor in Biochemistry and Molecular Biophysics

ENRICO DI CERA, MD  Professor of Biochemistry and Molecular Biophysics

GEORGE ROBERT DRYSDALE, PHD  Professor Emeritus of Biochemistry and Molecular Biophysics

SARAH C.R. ELGIN, PHD  Professor of Biochemistry and Molecular Biophysics

ELLIOIT L ELSON, PHD  Alumni Endowed Professor of Biochemistry and Molecular Biophysics

JUDY ANN FEE, PHD, BS  Research Instructor in Biochemistry and Molecular Biophysics

WILLIAM A FRAZIER, III, PHD  Professor of Biochemistry and Molecular Biophysics

DAVEND H FREMONTE, PHD  Associate Professor of Biochemistry and Molecular Biophysics

GREGORY I GOLDBERG, PHD  Professor of Biochemistry and Molecular Biophysics

DAVID I GOTTLIEB, PHD  Associate Professor of Biochemistry and Molecular Biophysics

VICTOR GUALLAR, PHD  Assistant Professor of Biochemistry and Molecular Biophysics

KATHLEEN HALL, PHD  Professor of Biochemistry and Molecular Biophysics

WILLIAM F HOLMES, PHD  Associate Professor Emeritus of Biological Chemistry

JO MARIE HOLT, PHD  Research Assistant Professor of Biochemistry and Molecular Biophysics

STUART A KORNFELD, MD  Professor of Biochemistry and Molecular Biophysics
Department's Website

http://www.biochem.wustl.edu/

Department of Cell Biology and Physiology

The department offers instruction to medical and graduate students. The Cell and Organ Systems course is designed to provide first-year medical students with a foundation for their further study of clinical and applied physiology. The Molecular Cell Biology course for first-year graduate students conveys an understanding of fundamental cell biology research strategies and principles. In addition, advanced courses open to medical and graduate students provide for more detailed study of specific areas of cell biology, physiology and cellular biophysics.
The research interests of our faculty, listed in more detail below, encompass a range of key fields within cell biology and physiology. Our research on the biology of cells focuses on apoptosis, cell cycle control, cytoskeleton, extracellular matrix, intracellular transport, ion channels, stem cell differentiation and yeast cell biology. Our physiology research emphasizes diabetes, epithelial transport, muscle contractile activation, peripheral circulation, prion disease biology, and cardiovascular, neuro-, renal, and respiration physiology.

**Courses**

**First Year**

M75 503 CELL AND ORGAN SYSTEMS BIOLOGY  
Instructor: Robert S. Wilkinson, Ph.D., 362-2300  
This course integrates and extends the basic principles of cell biology and physiology to the functions of the major organ systems of the body; i.e., muscle, cardiovascular, renal, respiratory, gastrointestinal and endocrine. Limited space is available for non-medical students with instructor’s permission. This course is cross-listed in the Department of Anatomy and Neurobiology.

**Selectives**

M04 519 CASE PROBLEMS IN BIOCHEMISTRY AND CELL BIOLOGY  
Instructors: Thomas H. Steinberg, M.D., 362-9218; Samuel L. Stanley Jr., M.D., 362-1070; Ellen Li, M.D., Ph.D., 362-1072  
In this elective, a problem-oriented approach will be used to explore the connections between basic science and clinical medicine. Each group of six to eight students will be confronted with clinical cases. Under the guidance of a faculty facilitator, the goal will be to understand the clinical aspects of the cases and to delve into the scientific issues that arise from them. No previous medical or surgical experience is required. This course is cross-listed in Department of Medicine.

M04 534A PROGRESSION OF KIDNEY DISEASE  
Instructor: Jeremiah J. Morrissey, Ph.D., 454-7464  morrisse@im.wustl.edu  
Polycystic Kidney Disease (PKD) is the leading genetic-based disease contributing to end-stage disease and renal replacement therapy. The multiplicity of genetically distinct human and animal diseases displaying polycystic kidneys indicates the heterogeneity of this disease constellation which can be referred to as ciliopathies. The fact that PKD is a ciliogenic disorder has broadened the potential gene repertoire that can contribute to cystic kidneys and underscores the fact that PKD is a systemic disorder that additionally contributes to hepatic, pancreatic and vascular abnormalities. In this selective we will compare and contrast three primary genetic loci contributing to PKD, several secondary modifier loci that influence the severity of PKD and recent developments linking ciliary structures to epithelial cell proliferation, differentiation and cystogenesis. Translational research therapeutic options that inhibit and/or delay cystogenesis will be discussed in addition to MRI studies that measure renal failure as cystogenesis progresses.

M04 537 CARDIOVASCULAR CONTROL MECHANISMS  
Instructors: Jeffrey M. Gidday, Ph.D., 286-2795; Dana R. Abendschein, Ph.D., 362-8925  
A hands-on demonstration of various aspects of cardiovascular physiology in an anesthetized pig. Topics covered will include differences between left and right ventricular pressures, arterial pulse wave velocity, respiratory heart rate reflex, carotid sinus reflex, effects of drugs such as nitrates and alpha- and beta-receptor agonists on the heart and circulation, effects of vagal stimulation on...
cardiopulmonary dynamics, and responses to myocardial ischemia and infarction.

M04 561 BRAIN BLOOD VESSELS
Instructor: Thomas A. Woolsey, M.D., 362-3601
This course considers structure, development, flow regulation and disease of cerebral blood vessels. Four general themes are: 1) the architecture of cerebral vessels, 2) regulation of cerebral blood flow during neural activity, 3) the blood-brain barrier, and 4) brain blood vessel development. Students select topics and papers for presentation from a menu. For the final session, students study a clinical problem and present their analysis to the rest of the group.

M04 5667 MICROCIRCULATION
Instructor: Jeffrey M. Gidday, Ph.D., 286-2795
The homeostatic functions of the microcirculation include the active regulation of metabolite exchange with parenchymal cells, immune surveillance, and a multifaceted response to injury and disease. This elective provides an overview of the normal and abnormal cell biology and physiology of the microcirculation.

Four sessions will be organized around conceptual presentations and laboratory demonstrations by the instructor, and two-part topic presentations by students following independent library research that focuses on basic physiology and clinically relevant pathophysiology. Basic physiology research topics might include: regulation of tissue blood flow and vascular tone, propagated vasodilation, hemodynamics and rheology of erythrocytes and leukocytes, cell biology of the endothelium, control of capillary permeability, and angiogenesis. Common disease entities involving microcirculatory dysfunction include: stroke and myocardial ischemia, diabetes, inflammation, tumor angiogenesis, retinopathy of prematurity, pulmonary edema, various autoimmune diseases, as well as the adaptive cardiovascular responses to exercise or high altitude. This selective is cross-listed in Department of Neurological Surgery.

M04 596 ION CHANNELS AND DISEASE
Instructor: Colin G. Nichols, Ph.D., 362-6630
Ion channels are present in all cells and direct intracellular events by controlling the membrane electrical activity. Many widely used clinical drugs act by altering the behavior of ion channels, and it is now becoming clear that many diseases, including epilepsy, hyperinsulinism, certain cardiac arrhythmias and cystic fibrosis result directly from inherited ion channel mutations. We will consider the basis of ion channel diseases and ion channel modulation therapies. Students will research a topic of choice in the library over two to three weeks and then present their findings to the whole class. After the initial course meeting, we will not meet formally for three weeks, and will then meet once per week for presentations.

Fourth Year

Electives

Descriptions of the following courses may be found under Division of Biology and Biomedical Sciences.

L41 (Bio) 5062 CENTRAL QUESTIONS IN CELL BIOLOGY
L41 (Bio) 5068 FUNDAMENTALS OF MOLECULAR CELL BIOLOGY
L41 (Bio) 5122 CELL-MATRIX INTERACTIONS
L41 (Bio) 5132 CELL MOTILITY AND CYTOSKELETON JOURNAL CLUB

Note — The number preceding the course title indicates that the course carries credit in the Graduate School of Arts and Sciences. See course descriptions in the Graduate Programs section of this catalog.
Research

(M75 900)

Cross-listed with L41(Bio)590


John Cooper, M.D., Ph.D., 416 McDonnell Science Building, 362-3964. The roles of actin and microtubules in cell motility and the cell cycle.

Phyllis I. Hanson, M.D., Ph.D., 4625 Cancer Research Building, 747-4233. Study of protein-protein and protein-membrane interactions involved in neuronal and synaptic membrane trafficking using biochemical, biophysical, and cell biological techniques.


John Heuser, M.D., 4900 South Building, 362-6948. Development of new methods for visualizing cells and molecules in three dimensions by means of electron microscopy, and for capturing macromolecular mechanisms through rapid freezing techniques.

Keith A. Hruska, M.D., 5th Floor McDonnell Pediatric Research Building, 286-2772. The research in the laboratory focuses on new therapies for chronic kidney disease, osteoarthritis and their complications. The mechanisms of action of these therapies for nephropathy, vascular calcification and renal bone disease are being analyzed, as are mechanisms enabling cartilage transplantation.

James Huettner, Ph.D., 6600 Cancer Research Building, 362-6628. Excitatory amino acid receptors and synaptic transmission in the central nervous system; neural differentiation of embryonic stem cells.


Robert Mecham, Ph.D., 4606 Cancer Research Building, 362-2254. Understanding the complex process of extracellular matrix assembly and organization, including studying the intracellular pathways used to transport matrix components to the cell surface and identifying helper or accessory proteins that facilitate trafficking and matrix assembly. Cell-matrix interactions in development and cellular mechanisms associated with connective tissue remodeling in vascular disease and heritable diseases of connective tissues.


Colin Nichols, Ph.D., 4624 Cancer Research Building, 362-6630. The molecular mechanisms of potassium channel regulation and how potassium channels link metabolism to excitability in different physiological and disease states.


Philip Stahl, Ph.D., 4912 South Building, 362-6950. Signal transduction, membrane trafficking events and the mechanism of endocytosis and phagocytosis including the role of low molecular weight GTPases Ras and Rab. Molecular cell biology of the mannose receptor family of endocytic/phagocytic and signal transducing receptors — structure, function and role of innate immunity.

Sheila A. Stewart, Ph.D., 514 McDonnell Science Building, 362-3934. Molecular mechanisms by which telomerase controls cellular mortality and immortality.

Heather L. True-Krob, Ph.D., 514 McDonnell Science Building, 362-3934. Biological consequences of yeast prions - in both their capacity to function as a novel epigenetic elements, and in their utility to serve as a tractable model for the analysis of protein misfolding and aggregation that occurs in several neurodegenerative disorders.


Faculty

PHILIP DAMIEN STAHL, PHD Head of Department of Cell Biology and Physiology, Edward Mallinckrodt Jr Professor of Cell Biology and Physiology

DANA RAY ABENDSCHEIN, PHD Associate Professor of Cell Biology and Physiology

YOUSEF ABU-AMER, PHD Associate Professor of Cell Biology and Physiology

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F. SCOTT MATHEWS, PHD  Professor of Cell Biology
ROBERT PAUL MECHAM, PHD  Alumni Endowed Professor of Cell Biology and Physiology
ROBERT W MERCER, PHD  Professor of Cell Biology and Physiology
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KELLE HARBERT MOLEY, MD  Associate Professor of Cell Biology and Physiology
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ALBERT ROOS, MD  Professor Emeritus of Cell Biology and Physiology
FREDERICK P ROSS, PHD  Research Professor of Cell Biology and Physiology
JOSEPH L ROTI ROTI, PHD  Professor of Cell Biology and Physiology
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YORAM RUDY  Professor of Cell Biology and Physiology
YOEL SADOVSKY, MD  Professor of Cell Biology and Physiology
SHIRLEY ANN SAHRMANN, PHD  Professor of Cell Biology and Physiology
MITSUYOSHI SAITO, DDENT, PHD  Instructor in Cell Biology and Physiology
LINDA J SANDELL, PHD  Professor of Cell Biology and Physiology
PAUL HENRY SCHLESINGER, MD, PHD  Associate Professor of Cell Biology and Physiology
CLAY F SEMENKOVICH, MD  Professor of Cell Biology and Physiology
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JASON WEBER, PHD  Assistant Professor of Cell Biology and Physiology
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ROBERT S WILKINSON, PHD  Professor of Cell Biology and Physiology
THOMAS A WOOLSEY, MD  Professor of Physiology
KEVIN E YARASHESKI, PHD  Associate Professor of Cell Biology and Physiology

Department's Website

http://www.cellbio.wustl.edu/

James S. McDonnell Department of Genetics

The Department of Genetics is at the forefront in developing new methods for physical and genetic mapping of the human genome and for identifying and isolating genes responsible for a range of human phenotypes, Mendelian traits and common/complex disease. The department supports a broad program of preclinical and graduate instruction in genetics, with research opportunities ranging from established experimental organisms to humans, and from molecular genetics to population genetics.

A significant portion of the first-year course in basic medical sciences is devoted to human and clinical genetics, with emphasis on the impact of new genetic technologies on the practice of medicine. This includes specialized selective courses in addition to the core genetic curriculum. Advanced training in clinical genetics and in genetic research is available from the faculty in the Department of Genetics and from geneticists with principal appointments in many other departments within the School of Medicine.

The Department of Genetics offers a broad range of training in virtually all major areas of modern genetics. Numbered among the faculty are world leaders in genetic mapping, new methods of DNA manipulation and cloning, computational biology, developmental genetics, neurogenetics, human genetics, and population and evolutionary genetics. Research opportunities with experimental organisms include genetic studies with zebrafish, fruit flies, nematodes, yeast, bacteria, and the alga chlamydomonas.

Advanced courses and seminars are offered that focus on such subjects as the genetics of complex disease, gene expression, genetic mapping, molecular genetics, genetic epidemiology, biostatistics, computational biology, developmental genetics, microbial genetics, immunogenetics, cancer genetics, and population and evolutionary genetics. Extraordinary opportunities for research training and experience are available in all of these areas and at all levels. The programs are tailored to meet the needs of medical students, graduate students, and both M.D. and Ph.D. postdoctoral students pursuing advanced training in biomedical research.
Courses

First Year

**M30 511  MEDICAL GENETICS**
For full description, see Department of Pediatrics.

Fourth Year

Electives

For complete descriptions, see Division of Biology and Biomedical Sciences.
L41 (Bio) 5235 GENETICS JOURNAL CLUB
L41 (Bio) 5484 GENOMICS AND DEVELOPMENT OF C. ELEGANS JOURNAL CLUB
L41 (Bio) 5488 GENOMICS
L41 (Bio) 5491 ADVANCED GENETICS
L41 (Bio) 5495 COMPUTATIONAL MOLECULAR BIOLOGY
L41 (Bio) 5911 CLASSICAL EXPERIMENTS IN MOLECULAR GENETICS

Note — The number preceding the course title indicates that the course carries credit in the Graduate School of Arts and Sciences.

Research

(M20 900)

Cross-listed with L41 (Bio 590)

Anne Bowcock, Ph.D., 331 Biotechnology Building, 747-3261. Molecular genetics of human disease.


Susan K. Dutcher, Ph.D., 875 McDonnell Science Building, 362-2765. Studies on the role of centrioles and basal bodies in the assembly of cilia and cleavage furrows using molecular genetics and biochemical approaches.

Sean Eddy, Ph.D., Room 5404, 4444 Forest Park Building, 362-7666. Computational biology: RNA and protein structure prediction; genome analysis.


Warren Gish, Ph.D., Room 4186A, 4444 Forest Park Building, 286-1826. Research and development of automated systems for gene prediction, identification and annotation. Emphasis is on combining biological knowledge with the use of rapid search methods and information theory.

Mark Johnston, Ph.D., Room 5403, 4444 Forest Park Building, 362-2735. Transcriptional control mechanisms in eukaryotic cells, diabetes in yeast and mechanisms of signal transduction.


Elaine Mardis, Ph.D., 4444 Forest Park Building, Room 4122, 286-1805. Technology development for high-throughput genome sequencing with an emphasis on methods development and the implementation of robotics. Microarray-based studies of gene expression levels in organisms including C. elegans and human.

Rob Mitra, Ph.D., 4444 Forest Park Building, Room 4184, 362-2751. Systems Biology, Technology Development, and High-Throughput Nucleic Acid Analysis. Students performing research in my lab would investigate one of two questions. 1) How can we utilize the wealth of knowledge obtained by sequencing the human genome to better understand, diagnose and treat human disease? 2) Can we improve our understanding of cellular processes by taking a quantitative, systems approach to collecting and analyzing biological data?

To address the first question, we are developing polony technology — a technology for rapid, low-cost analysis of nucleic acids. We are using this technology to collect genotype, haplotype, and sequence information from patient DNA in order to understand the genetic factors that cause predisposition to disease. Using the same technology, we are investigating the mechanisms by which pharmaceuticals cause side effects.

To address the second question, we are performing computational analyses on genome-wide expression data to understand transcriptional and biochemical networks in the yeast S. cerevisiae. To accelerate our progress in building these quantitative models, we are developing technologies for the absolute (molecules per cell rather than fold-change) quantification of mRNA, as well as high-throughput quantification of protein levels. We hope that an integrated genomic, proteomic, and computational approach will answer questions about the connectivity, structure, and robustness of biochemical and genetic networks in yeast.


Tim Schedl, Ph.D., 870 McDonnell Science Building, 362-6162. Germ cell development in the model organism Caenorhabditis elegans. The major focuses are: control of the decision to proliferate or enter the meiotic pathway, control and coordination of meiotic prophase progression and gametogenesis, and control of meiotic maturation and ovulation.

James Skeath, Ph.D., 812A McDonnell Science Building, 362-0535. Identification of the genes and the elucidation of the molecular mechanisms that regulate the early events of Drosophila central neurogenesis; illumination of the mechanisms that form, pattern and specify the individual identities of the progenitor cells of the Drosophila embryonic CNS.


Richard K. Wilson, Ph.D., 4444 Forest Park Building, Room 4122, 286-1804. Genome research. Large-scale DNA sequence analysis of genomes and expressed genes (cDNAs) from H. sapiens, mouse, C. elegans, C. briggsae, A. thaliana and S. cerevisiae. Development of novel technology for large-scale DNA sequence analysis and genetic analysis.

Tanya Wolff, Ph.D., 829 McDonnell Science Building, 362-1509. Epithelial polarity and cell movement in the Drosophila eye. Major emphasis is placed on studying the genes and pathways required for the establishment, interpretation and transduction of the polarity signal.
Faculty

H. MARK JOHNSTON, PHD  Professor of Genetics, Interim Head of The Department of Genetics, Mc Donnell Professor of Molecular Genetics

PING AN, MD  Research Assistant Professor of Genetics (Pending Executive Faculty Approval)

DOUGLAS E BERG, PHD  Professor of Genetics

INGRID B BORECKI, PHD  Research Associate Professor of Genetics

ANNE M BOWCOCK, PHD  Professor of Genetics

MICHAEL R. BRENT, PHD  Associate Professor of Genetics

JEREMY D. BUHLER, PHD  Assistant Professor of Genetics

JAMES M CHEVERUD, PHD  Professor of Genetics

SANDRA W CLIFTON, PHD  Research Assistant Professor of Genetics

C. ROBERT CLONINGER, MD  Professor of Genetics

J. PERREN COBB, MD  Associate Professor of Genetics

BARAK COHEN, PHD  Assistant Professor of Genetics

JANET M CONNOLLY, PHD  Research Professor of Genetics

JONATHAN R CORBETT, PHD  Research Instructor in Genetics

JOSEPH C. CORBO, MD, PHD  Assistant Professor of Genetics

JAMES P CRANE, MD  Associate Professor of Genetics

SETH DANIEL CROSBY  Research Instructor in Genetics

LI DING, PHD  Research Instructor in Genetics

IAN WILLIAM DUNCAN, PHD  Associate Professor of Genetics

SUSAN K. DUTCHER, PHD  Professor of Genetics

CARLA L. EASTER, PHD  Research Instructor in Genetics

SEAN R EDDY, PHD  Associate Professor of Genetics, Howard Hughes Medical Institute Assistant Investigator in Genetics

SARAH C.R. ELGIN, PHD  Professor of Genetics

JUSTIN C. FAY, PHD  Assistant Professor of Genetics

MARY F FEITOSA, PHD  Research Assistant Professor of Genetics (Pending Executive Faculty Approval)

NARASIMHAN GAUTAM, PHD  Professor of Genetics

WARREN R GISH, PHD  Research Associate Professor of Genetics
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ALAN SHIELS, PHD  Associate Professor of Genetics
JAMES B SKEATH, PHD  Associate Professor of Genetics
JOHN G SPIETH, PHD  Research Associate Professor of Genetics
GARY D STORMO, PHD  Professor of Genetics
BRIAN K SUAREZ, PHD  Associate Professor of Genetics
ALAN ROBERT TEMPLETON, PHD  Professor of Genetics
RICHARD D TODD, MD, PHD  Professor of Genetics
MICHAEL TOMASSON, MD  Assistant Professor of Genetics
ZSOLT URBAN, PHD  Assistant Professor of Genetics
WESLEY CHARLES WARREN, PHD  Research Assistant Professor of Genetics
MICHAEL C WENDL, D SC, PHS  Research Instructor in Genetics
MICHAEL PETER WHYTE, MD  Professor of Genetics
RICHARD K WILSON, PHD  Professor of Genetics
TANYA WOLFF, PHD  Assistant Professor of Genetics
JI XU  Research Instructor in Genetics
SHIAW-PYNG YANG, D SC  Research Assistant Professor of Genetics
MING YOU, MD, PHD  Professor of Genetics
KAI YU, PHD  Research Assistant Professor of Genetics (Pending Executive Faculty Approval)
WEIXIONG ZHANG, PHD, MS  Associate Professor of Genetics

Department's Website

http://www.genetics.wustl.edu/

John Milliken Department of Medicine

The Department of Medicine’s general medicine teaching services at Barnes-Jewish Hospital and the Veterans Administration Medical Center (St. Louis) are under the following directors:

Barnes-Jewish Hospital, Kenneth S. Polonsky, M.D.
(Chairman, Department of Medicine)

Veterans Administration Medical Center, Lewis R. Chase, M.D.

In addition, for the purposes of both teaching and research, the Department of Medicine is divided into specialty divisions and sections at Barnes-Jewish Hospital under the following chiefs:

Allergy and Immunology
H. James Wedner, M.D., Acting Chief
Instruction in Medicine is provided during all four years of the medical curriculum, beginning with The Practice of Medicine I in the first year. Teaching in the second year has two main objectives: the correlation of the basic sciences with clinical aspects of disease and training in the technical methods of physical examination and laboratory diagnosis. By the beginning of the third year, the student is ready for supervised clinical study of individual patients.

A clinical clerkship of 12 weeks, divided into three four-week periods, is served by third-year students
on the medical services of the department. In the final year, students may elect a subinternship in general medicine and a series of elective courses in the medical specialties.

Courses

First Year

M25 507 THE PRACTICE OF MEDICINE I
Instructor: Robert J. Rothbaum, M.D., 286-2546
This course employs a variety of teaching techniques, instructors, and venues. Some, like lectures, will be familiar. Others, such as one-on-one interviews in the hospital, will be new. Some course material is easily formatted into solid blocks such as the teaching of statistical methods. Other content streams throughout the course, like interviewing techniques and history interpretation. Particular areas may be stimulating and rewarding, and other areas may seem irrelevant or overemphasized. As with patients, each of you comes with a unique past and active history, previously formed interests, and individual goals. Your prior contacts and personal experiences in science or medicine also influence you. It is impossible to account for all of these unique features so we designed the course to accommodate a variety of learning interests and styles. Some will resonate with you; others may not. We hope to provide an opportunity for you to hone the skills that you already possess and acquire new skills necessary and important to the practice of medicine.

We intertwine the various content areas in order to highlight the inter-relationships inherent in the practice of medicine. We attempt to relate your basic science course material to the clinical and patient-based information. In particular, the Integrative Cases are designed to mesh basic science content with clinical questions. The practice of medicine is both a science and an art. We hope to demonstrate the complementary nature of these outlooks.

This course unfolds over three years. The first year course, POM I, contains six sections: Patient/Physician Communication; Clinical Skills; Experience of Illness; Ethics; Scientific Method of Clinical Medicine and Research; and, Health Promotion and Disease Prevention.

Objectives for POM I include:

1. Students can describe and analyze the scientific methodology of clinical studies and apply the results to individuals or groups of patients.

2. Students can perform a complete history and physical examination with thoroughness, accuracy, sensitivity, and compassion.

3. Students can investigate the influence of culture, religion, ethnicity, socioeconomic factors, and politics on the seeking and provision of medical care.

4. Students can examine and analyze their personal and professional competencies, limitations, and behaviors.

Sections:

1. Patient-Physician Communication/History-Taking Section

Patient and caregiver engage in an intimate and delicate relationship. Although everyday skills such as listening and asking questions appear easily mastered, compassionate inquiry into confidential areas in an anxiety-laden environment requires a special combination of patience, quiet confirmation, and observation. Learning certain guideposts and checkpoints for orientation and direction can prove useful.
2. Clinical Skills
This content area focuses on history-taking, physical examination, presentation of history and physical exam findings, and selected ambulatory skills.

3. Experience of Illness
The Practice of Medicine is an interpretive activity, and while it relies on complex knowledge and sophisticated technology, it is not a science. Medicine’s goal is to alleviate suffering and to do so, brings a body of practical knowledge to bear in individual cases.

Physicians interpret the symptoms and signs from the patient, who has already interpreted their symptoms into a story of their malady. Thus while modern medicine is founded on complex knowledge of biological science, attained by arduous work, interpretive skill is required for physicians to function. Medicine begins with the understanding of the patient and continues in therapeutic action on behalf of the patient. To do this requires that we understand how to interpret it, both medically and in a way meaningfully understood by the patient.

4. Ethics
Since the earliest days of medicine, physicians have recognized that they have special ethical responsibilities to their patients. Many medical ethics principles have endured through the centuries, but changing technologies and social conditions require physicians to apply these principles to new situations over time.

5. Scientific Methods of Clinical Medicine and Research
This section delineates the variety of statistical techniques and methodologies of interpretation of clinical and research data.

6. Health Promotion and Disease Prevention
The objectives of this section include: to understand they important of Health Promotion and Disease Prevention; to understand different levels of prevention; and, to be familiar with possible preventive interventions.

**Selectives**

**M04 514 CARDIOVASCULAR BIOPHYSICS**
Instructor: Sándor J. Kovács, Ph.D., M.D., 454-8146
This elective is intended for students with a background in the physical sciences: physics, mathematics, engineering, computer sciences and comparable fields. Topics covered vary according to the interest of the staff and the clinical spectrum encountered during the course of the elective. Included are quantitative cardiovascular physiology and pathophysiology, nonlinear dynamics and its application to physiology, biophysics, ultrasonics, biomechanics and biomedical engineering. The focus of the elective is the application of quantitative mathematical and engineering principles to solve real problems encountered in clinical practice. Participation in weekly seminars and familiarity with selected topics of current research are included. This course is offered in alternate years (2003-2004).

**M04 519 CASE PROBLEMS IN BIOCHEMISTRY AND CELL BIOLOGY**
Instructors: Thomas H. Steinberg, M.D., 362-9218
In this selective, the "problem-oriented" approach is used to explore the connections between basic science and clinical medicine. A group of seven to nine students will examine clinical cases. Under the guidance of a faculty "facilitator," the goal is to understand the clinical aspects of the cases and to delve into the scientific issues that arise from them. No previous medical or surgical experience is required. This selective is cross-listed in Department of Cell Biology and Physiology.

**M04 533 TROPICAL MEDICINE**
Instructor: Daniel E. Goldberg, M.D., 362-1514
Washington University School of Medicine has several faculty members who are actively researching diseases specific to developing countries. This elective is designed to bring these individuals together,
in an informal discussion forum with students, to highlight the problems particular to geographical medicine. The elective will cover issues including eradication, prevention and treatment, immunology and vaccine development, as well as descriptions of the different disease syndromes. This selective is cross-listed in Department of Molecular Microbiology.

**Second Year**

Teaching by the Department of Medicine is designed to: 1) prepare students for the transition from the preclinical sciences to the study of the sick patient at the bedside, 2) help them analyze the clinical manifestations of disease in terms of the responsible mechanisms, and 3) introduce them to the techniques of examination that are used regularly on all clinical services. This instruction is undertaken jointly with members of other clinical departments and is coordinated with subject matter presented by the Department of Pathology.

The major areas of clinical medicine are presented in detail to illustrate the application of biochemical, physiological and anatomical information to the understanding of pathological states. Cardiovascular, renal, neurological, gastrointestinal, pulmonary, hematomal, metabolic, nutritional and developmental diseases are discussed. Emphasis is placed on the use of fundamental information in approaching clinical problems as a way of thinking that prepares the student for a lifetime of medicine, during which new information will constantly be acquired.

**M25 607 THE PRACTICE OF MEDICINE II**

Instructor: Megan Wren, M.D., 362-8050


The goal of The Practice of Medicine (TPM) is to provide students with a set of knowledge, skills and attitudes essential to patient care regardless of specialty. TPM II is a continuation of TPM I and will build on concepts introduced during TPM I. TPM II will continue to address various interfaces between patients, physicians and society and will also introduce approaches to clinical thinking and decision-making in the context of today’s socio-economic and cultural environment. The sections of TPM II include Advanced Physical Examination, Case Development, Communication, Ethics and Health Policy, Health Promotion/Disease Prevention, Interpreting Illness, Ophthalmology, Patient Sessions, Radiology and Scientific Methods. The learning objectives for each section of TPM II emphasize topics and skills utilized in all fields of medicine, and the majority of the coursework for TPM II will be taught in small groups or through clinical experiences. 77.5 clock hours.

**M25 605A INFECTIOUS DISEASES AND MEDICAL MICROBIOLOGY**

Instructor: Nigar Kirmani, M.D., 454-8217

The infectious disease pathophysiology course emphasizes both organism-specific and organ-specific approaches to diseases caused by microbes. The course expands on material presented briefly in the first year concerning bacteria, viruses, fungi and parasites, and their involvement in human disease. Mechanisms of disease production, clinical manifestations and therapy are discussed, along with public health implications. In addition to lectures, small group case discussions enable students to apply the information they learn to clinical situations.

**M25 606A RHEUMATOLOGY**

Instructor: Leslie E. Kahl, M.D., 454-7279

The rheumatology pathophysiology course begins with an overview of the structure, function and physiology of the normal joint. The pathophysiology of both localized joint disorders such as osteoarthritis and infectious arthritis are presented, along with systemic inflammatory disorders including rheumatoid arthritis, lupus and vasculitis. Diagnosis, pharmacologic management and rehabilitation of these conditions are included. In small group sessions, students interview patients and observe the characteristic physical findings of these disorders.

**M25 611B CARDIOVASCULAR DISEASE**
Instructor: Dana R. Abendschein, Ph.D., 362-8909
The purpose of this course is to consider the mechanisms and manifestations of acquired and congenital cardiovascular disorders as well as their pharmacologic treatment. Lectures and small group discussions that emphasize the major areas of cardiac pathophysiology and pharmacology are provided.

M25 612B PULMONARY DISEASE
Instructor: Michael B. Lippmann, M.D., 289-6306
The objectives of the pulmonary pathophysiology course include review of normal pulmonary physiology as related to specific pulmonary disease states. The focus of the course will largely be upon presentations in lectures concerning pathophysiologic principles of abnormal lung structure and function. In addition, case study problems will be discussed.

M25 613B RENAL AND GENITOURINARY DISEASES
Instructor: Stanley Misler, Ph.D., M.D., 454-7719; David Windus, M.D., 362-7261
This course uses basic principles of renal physiology and ion homeostasis to understand commonly encountered fluid and electrolyte disorders (especially hyper/hypo-natremias, acidoses/alkaloses) and the action of diuretic drugs. It also applies basic principles of urinary system anatomy and physiology to the understanding of diseases affecting glomerular and/or tubular function, and micturition. Lectures and problem sessions focus special attention on: 1) how a working knowledge of fundamentals, a few simple diagnostic tests and a little arithmetic manipulation can have important predictive value; and 2) how the courses of acute and chronic renal failure are both adaptive and maladaptive for the organism. The course also introduces basic principles of dialysis and transplant through on-site visits to treatment centers.

M25 614 DERMATOLOGY
Instructor: Jeffrey Petersen, M.D., 996-8810
The Dermatology second-year course is designed to teach medical students how to describe skin lesions and the pathophysiological basis and clinical characteristics of major dermatologic diseases. Major categories of clinical skin diseases and their most prominent constituents will be discussed, including papulosquamous diseases, blistering diseases, infectious diseases, and benign and malignant neoplasms.

M25 615A ENDOCRINOLOGY AND METABOLISM
Instructor: William E. Clutter, M.D., 362-8067
This course aims to develop understanding of the pathophysiology, clinical manifestations and diagnosis of common endocrine disorders. History, physical examination and interpretation of diagnostic laboratory tests are emphasized. Principles of treatment of endocrine disorders and pharmacology of relevant drugs also are discussed. Students are expected to apply their knowledge in clinical case discussions.

M25 620A GASTROINTESTINAL AND LIVER DISEASES/NUTRITION
Instructor: Deborah C. Rubin, M.D., 362-8935
This course discusses the pathophysiologic mechanisms related to the diseases of the gastrointestinal tract including esophagus, stomach, small and large intestines, liver, gallbladder and pancreas. The emphasis is on changes that occur in normal physiology, biochemistry, anatomy, immunology and cell biology that result in human gastroenterologic diseases. Included also are lectures on the pharmacology of gastrointestinal drugs and basics of human nutrition in clinical practice. Lectures are supplemented by group seminars that focus on clinical case presentations.

M25 625A HEMATOLOGY AND ONCOLOGY
Instructor: Scot G. Hickman, M.D., 289-6308
The hematology and oncology pathophysiology course exposes students to common hematologic disorders and hematologic malignancies. The course utilizes lectures, clinical case discussions and practical sessions involving microscopy.

**Third Year**

M25 710 MEDICINE CLERKSHIP
Instructor: Thomas M. De Fer, M.D., 362-8050
The medicine clerkship provides supervised study of patients in both inpatient and ambulatory settings. For the inpatient rotations, students are assigned as clinical clerks to patients admitted to the cardiology and general medical teaching services of Barnes-Jewish Hospital and Veterans Administration Medical Center. For the outpatient rotations, students rotate through the ambulatory general medicine clinics at Barnes-Jewish Hospital and a community-based internal medicine practice. Teaching is provided by the chief of service, attending physicians, house staff, consultants, chief residents and regularly scheduled conferences. Formal instruction is given regarding core internal medicine topics during the clerkship.

Clinical Pathological Conference
The clinical course, laboratory and radiologic studies, and pathological findings of a patient are discussed using a problem-solving format at a weekly conference by members of the Departments of Medicine, Pathology and Radiology.
Daniel M. Goodenberger, M.D., chief residents and medical staff; Louis P. Dehner, M.D., and pathology staff

M25 707 PRACTICE OF MEDICINE III
Instructors: Robert Rothbaum, M.D., Megan E. Wren, M.D., 286-2546
In this course, themes and topics introduced in POM I and II are revisited and refocused on the students’ ongoing clinical experiences. The course consists of quarterly sessions focused on common clinical challenges and experiences. Each session begins with a short talk or panel discussion. Faculty preceptors then facilitate small group discussions as students reflect on their recent clinical experiences and dilemmas. As students exchange problematic scenarios and questions, the group develops potential solutions and management schemes.

Recent topics include:
1. My most challenging or rewarding clinical experience. Who, what, when, where, and why?
2. Medical errors and patient safety: What happens and why?
3. Ethics: What challenges occur? How are decisions made?
4. Doctoring: Am I the doctor that I expected I would be?

Planned topics:
1. Family violence: Recognition, investigation, and intervention.
2. Pharmaceuticals: What factors influence prescribing behavior and why?
3. How to care when you cannot cure: How physicians can cope when treating patients with chronic or terminal illness.

M25 714 AMBULATORY: EMERGENCY MEDICINE
Instructors: Mark Levine, M.D., 362-6743; Sandy Sineff, M.D., 362-7959
The WUMS III Ambulatory Care Rotation takes place in the main emergency department of Barnes-Jewish Hospital. Three to five students at a time are assigned to this four-week rotation. Students will spend their first day in an orientation session that will include a brief survival in the ED introduction and a suture lab. Domestic violence is covered during this four-week rotation. A course "text" will be provided for the students on orientation day and is theirs to keep. On day two, students will begin primarily evaluating non-emergent patients in the emergency department (EM 2)
and report directly to an attending or senior resident. There are four hours of mandatory conferences per week: 8-10 a.m. on Tuesdays and 8-10 a.m. on Wednesdays. There will be an opportunity to participate in EMS. Students can expect to gain a wide range of skills in evaluating a variety of complicated and non-complicated patients. At the end of their rotation, students should be familiar with the approach to complex medical conditions like heart attacks, undifferentiated abdominal pain, and complications of pregnancy as well as the "bread and butter" of complaints of ambulatory medicine such as lacerations, simple respiratory tract infections and minor trauma.

WUMS III will be graded on their ability to make a formal patient presentation during a shift, their clinical skills, and their conference attendance. There will be a written test on the last Friday of the rotation based entirely on the material provided to the students at the start of the rotation.

M26 713 AMBULATORY: FAMILY MEDICINE
Instructor: Walton Sumner II, M.D., 454-8164
The Family Medicine clerkship offered in the third and fourth years allows medical students to work one-on-one with board-certified family physicians in outlying areas of Missouri and Illinois, and in other states. Students may review preceptor profiles and comments that previous students made about preceptors. The clerkship makes every effort to accommodate student preferences for working with specific preceptors. Most students will work with a single preceptor for the duration of the four-week rotation. Students may work with small groups, potentially including family medicine residents. The student will work closely with preceptors on a daily basis in the physician's office. Students often accompany their preceptor on nursing home visits, hospital rounds, medical conferences and other educational activities. Housing will be provided to students working outside the immediate St. Louis vicinity. Weekend call schedules are arranged with the preceptor: students can often return to St. Louis on the weekends. Each student will receive a description of the goals and objectives for the four-week rotation, a physical copy of the Manual of Family Practice textbooks, and handheld computers with additional commercial clinical reference materials to use during the rotation. Students maintain patient encounter logs on hand-held computers, and receive short email assignments during this rotation. Grades are calculated from preceptors' subjective evaluations (normalized for the preceptor), essay responses, and an evaluation of students' attention to primary care issues.

M25 740 DERMATOLOGY CLERKSHIP
Instructor: Lynn Cornelius, M.D., 454-8622
The goal of the dermatology clerkship is to provide a guide for the student to appreciate dermatology within the broader perspectives of medicine and biology. The student will develop familiarity with dermatologic vocabulary, learn to recognize and initiate therapy of common dermatologic disorders and become cognizant of uncommon or complicated dermatologic problems that require specialty care. Emphasis will be placed on careful history taking and physical examination. Students will always work under the direction of the resident physician and the attending physicians in the clinic setting.

The student will participate in outpatient care at the following hospitals and affiliated clinics: Barnes-Jewish Hospital, Children's Hospital, Barnes-Jewish West County Hospital, the Veterans Administration Medical Center and Connectcare Hospitals. These hospital settings will provide the student with ample exposure to a diverse patient population. Students will attend all clinical teaching rounds and conferences in addition to the basic science and cutaneous histopathology conferences. Normal workday hours are 8 a.m. to 5 p.m. with no night or weekend on-call responsibilities. Each student is provided with copies of the two recommended textbooks, Principles of Dermatology by B. Looking and The Color Atlas and Synopsis of Clinical Dermatology by T. B. Fitzpatrick for use during the clerkship; the textbooks are returned to the clerkship coordinator at the end of the clerkship for use by other students rotating in the dermatology division. The rotation attending physician and the resident physician will submit an evaluation based on the student's clinical skills, presentation, attitudes, overall performance and the end-of-rotation written exam score.
M25 750 GERIATRIC CLERKSHIP  
Instructor: David B. Carr, M.D., 286-2706  
The primary goal of the four-week clerkship in Geriatrics is to provide an opportunity for students to gain proficiency in the principles of geriatric evaluation, including the medical, psychological, social and functional assessments of older adults. Direct, hands-on experience with patients is a major feature of the clerkship. Students are expected to participate in the evaluation of three to five patients per week, in a variety of settings including the hospital Acute Care for the Elderly (ACE) unit on 3200 North Campus, the Older Adult Outpatient Assessment Program (Storz Building) and the Long Term Care Setting (Barnes Extended Care in Clayton). Students will also participate on the gerorehabilitation service, hospice and geropsychiatry rounds, and attend geriatric conferences while on the rotation.

Students are assigned to a variety of attendings to enhance the experience. There is no night call or call on weekends. Participation on the hospital consult service will occur depending on volume. The day normally begins at 8 a.m. and is usually finished by 5 p.m. There will be time to read the detailed syllabus/bibliography. Students will be asked to present a brief topic of their choice at the end of the rotation and demonstrate knowledge of the geriatric screens and assessments.

M25 730 PHYSICAL MEDICINE AND REHABILITATION  
Coursemaster: Oksana Volshteyn, M.D., 454-7757  
Clerkship in PM&R for third-year medical students provides an opportunity to gain basic knowledge and clinical skills in evaluation and management of a wide range of neurological and musculoskeletal diseases and conditions that require specialized rehabilitative medical and therapeutic care. Students spend two weeks on the Spinal Cord Injury Unit (SCI) and two weeks on the Brain Injury (BI) and Stroke Unit at The Rehabilitation Institute of St. Louis. Students are expected to be a part of the rehabilitation team, follow three to five patients, participate in daily morning rounds, participate in performing consults, and attend team meetings and family conferences.

Students are required to attend several outpatient clinics such as SCI, BI, Amputee and Stroke. During the entire rotation, students work with PM&R residents and fellows, and under direct guidance of the NeuroRehabilitation faculty. The usual duty hours are 7:30 a.m. to 5 p.m. weekdays, and 8 a.m. to noon on Saturdays. There is no night call.

Students are required to attend all PM&R curriculum lectures and conferences. On the first day of rotation, students meet with the PM&R program director to go over goals, objectives and schedules. Upon completion of the rotation, students are required to fill out the evaluation form to provide feedback regarding rotation experience.

Fourth Year

Electives

M25 801 HONORS MEDICINE - GENERAL MEDICINE  
Instructor(s): Thomas De Fer, M.D., 362-8050  
Location: Barnes-Jewish Hospital  
Elective Contact: Yvonne McLaughlin, 362-8050  
Other Information: Students will receive e-mail communication regarding where to report on the first day prior to the beginning of the period.

Enrollment limit per period: Limit 7/period for Weeks 1, 5, and 9; 4/period for Weeks 13, 17, and 21; and 2/period for Weeks 25, 29, 33, 37, and 41. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.
The purpose of the "Honors Medicine" elective (subinternship) is the development of expertise in the care of hospitalized patients in a well-supervised teaching environment. Subinterns act as their patients' interns under the supervision of residents and attending physicians. Subinterns have the same on-call and admitting schedules as the interns on their teams and are assigned up to two new patients on each admitting day. Because of a lack of appropriate call rooms, subinterns are not required to spend call nights in the hospital. Except in emergencies, subinterns are the first individuals to evaluate patients admitted to medical service teams. A diagnostic and therapeutic approach to the patient is planned in consultation with the resident. Subinterns assume primary responsibility for the daily care of their patients, under the supervision of resident and attending physicians. This includes evaluation on daily rounds, scheduling and obtaining results of diagnostic studies, planning therapy, making arrangements for care after discharge and communicating with patients and their families. Subinterns attend the same conferences as the house staff.

Student time distribution: Inpatient 90%, Conferences/Lectures 10%; Primary Care 50%, Subspecialty Care 50%
Major teaching responsibility: Attending, chief resident, and resident
Patients seen/weekly: 8-12
On call/weekend responsibility: Yes

M25 805 RHEUMATOLOGY
Instructor(s): Richard Brasington, M.D.; Leslie Kahl, M.D.; and Prabha Ranganathan, M.D., 454-7279
Location: Barnes-Jewish Hospital, 5C Center for Advanced Medicine
Elective Contact: Department secretary, 454-7279
Other Information: Students should contact the Rheumatology office, 454-7279 prior to first day for assignment.

Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Students will be involved in the diagnostic work-up and management of patients with rheumatic illnesses including systemic lupus erythematosus, rheumatoid arthritis, vasculitis (polyarteritis, Wegener's, temporal arteritis), spondyloarthopathies (ankylosing spondylitis, Reiter's syndrome), osteoarthritis, gout and regional musculoskeletal problems. By working closely with a faculty member, fellows and medical residents, students become integral and active members of the rheumatology service for inpatient consultations and outpatient clinics at Barnes-Jewish Hospital. An emphasis is placed on the physical examination of joints and the musculoskeletal system, synovial fluid analysis, and interpretation of diagnostic tests and radiographs. Students attend a rheumatology conference held weekly. An extensive collection of self-study materials, including reprints, textbooks, slides and CD-ROM discs is available.

Student time distribution: Inpatient 40%, Outpatient 50%, Conferences/ Lectures 10%; Subspecialty Care 100%
Major teaching responsibility: Attendings
Patients seen/weekly: ~25 per student
On call/weekend responsibility: None

M25 807 HONORS MEDICINE - VA MEDICAL CENTER
Instructor(s): Lewis R. Chase, M.D., 289-7030
Location: St. Louis Veterans Affairs Medical Center
Elective Contact: Lewis R. Chase, M.D., 289-7030
Other Information: Students meet in A701 VA Medical Center, 7:30 a.m. first day of elective.

Enrollment limit per period: 4
Valid start weeks for 4-weeks blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Subinternship in medicine offers practical experience in the care of patients. Subinterns are an integral part of the house staff team, working under the supervision of a resident and attending physician. Their responsibilities for patients assigned to them are similar to those of interns. Patients are followed
by the subintern throughout all levels of care including ICU, telemetry, stepdown, and general wards. Subinterns take night call with their team and participate in the teaching conferences of the Department of Medicine.

Student time distribution: Inpatient 80%, Conferences/Lectures 20%; Subspecialty Care 100%
Major teaching responsibility: Single attending, chief resident and team resident
Patients seen/weekly: 6.8 on average
On call/weekend responsibility: Every fourth night

M25 809 HYPERBARIC MEDICINE AND PROBLEM WOUND MANAGEMENT
Instructor(s): John Davidson, M.D., and staff, 205-6818
Location: St. Luke's Hospital; Barnes- Jewish Hospital
Elective Contact: John D. Davidson, M.D., 205-6818 or pager 424-2626
Other Information: Interested students should contact Dr. John D. Davidson to discuss in what way this elective can be tailored to their particular interests and goals. Mini-electives of one to two weeks duration can be arranged. (PLEASE contact Dr. Davidson at 205-6818 three weeks prior to the first date of elective to try to tailor the elective as much as possible to your primary interests.)

Enrollment limit per period: 2
Valid start weeks for 2-week blocks are: Weeks 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, and 43.

The specialty of hyperbaric medicine centers on the use of oxygen under increased atmospheric pressure as a drug for the treatment of many disparate diseases and clinical problems. This elective allows a student to have an acquaintance with this technology, which has a definite role in a wide range of differing specialties including emergency medicine, otolaryngology, plastic and reconstructive surgery, military medicine, rheumatology, dermatology, oral surgery, radiation oncology, internal medicine, neurology and psychiatry, to name a few.

Since students going into these specialities do not need to learn about hyperbaric medicine in depth, but nevertheless would benefit by some exposure to it, we can arrange a mini-elective of one to two weeks duration. This "exposure elective" can be tailored to a student's special field of interest just as we attempt to do in the usual four-week program. Please call Dr. John D. Davidson for more information.

Student time distribution: Inpatient 3%, Outpatient 92%, Conferences/ Lectures 5%; Subspecialty Care 100%
Major teaching responsibility: John D. Davidson, M.D., and Georgia Endicott, Chief Technician
Patients seen/weekly: 20
On call/weekend responsibility: Attending physician will call student regarding select cases

M25 810 GERIATRIC MEDICINE
Instructor(s): David Carr, M.D., 286-2700
Location: Washington University, Health Key Building
Elective Contact: David Carr, M.D., 286-2700
Other Information: Meet at the Division of Geriatrics office, Health Key Building, 4488 Forest Park Blvd., Suite 201, 9:00 a.m. first day of elective.

Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Students will participate in patient care at the rehabilitation center, the skilled nursing facility Barnes-Jewish Extended Care in Clayton, the inpatient geriatric consultation service, the outpatient primary care and geriatric consultation center, and the acute care for the elderly (ACE) unit located at 3200 North Campus. Attendance at scheduled research and clinical conferences in geriatric medicine, memory and aging, geropsychiatry, and hospice meetings is also required.

Student time distribution: Inpatient 20%, Outpatient 80%; Primary Care 20%, Subspecialty Care 80%
Major teaching responsibility: Attendings
Patients seen/weekly: 10-15
On call/weekend responsibility: None

M25 811  CLINICAL INTERNAL MEDICINE - HOSPITALIST
Instructor(s): Mark Thoelke, M.D., 747-1499
Location: Barnes-Jewish Hospital, South Campus
Elective Contact: Sharon Morgan, Course Coordinator, 747-1499
Other Information: Students meet at the South Campus office, 662B Wohl Hospital, 8:15 a.m. first
day of elective. Sharon Morgan, Course Coordinator, 747-1499.

Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This course allows the student to work one-on-one with hospitalist physicians on a patient care team.
The student acts as the intern under the direct supervision of the attending physician. Daily
responsibilities include admission history and physicals, daily notes, and discharge summaries on
assigned patients. S/he also will have the opportunity to perform indicated procedures on all patients
on this service. Students are encouraged to participate in Department of Medicine conferences.
Student time distribution: Inpatient 95%, Conferences/Lectures 5%; Primary Care 100%
Major teaching responsibility: Group of four hospitalist attendings

Patients seen/weekly: 10
On call/weekend responsibility: None

M25 814  CLINICAL EMERGENCY MEDICINE, BARNES-JEWISH HOSPITAL
Instructor(s): Mark Levine, M.D. 362-6743, and Sanford Sineff, M.D., 362-7959
Location: Wohl Clinic
Elective Contact: Cora Sias, 747-4156, or Sanford Sineff, M.D., 362-7959
Other Information: Contact Emergency Medicine Division office at 747-4156, for scheduling one week
prior to the rotation.

Enrollment limit per period: Limit 3/period for Weeks 1, 5, 9, 13, 17; and 6/period for Weeks 21, 25,
29, 33, 37, and 41
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This rotation offers practical experience in the evaluation and management of acutely sick and injured
patients. Students will function as subinterns, initially evaluating their assigned patients and
developing a plan for further diagnostic studies and therapy. They will report to a senior level resident
or an attending physician. The student can expect to get an opportunity to perform a wide variety of
procedural skills such as suturing, splinting, peripheral and central venous access, and
cardiopulmonary resuscitation. Shifts will be eight hours and students will rotate between day, evening
and night shifts, including weekend shifts, in order to gain maximum exposure to all types of
emergencies. A core content of lectures will be provided. Students are offered the opportunity to ride
with EMS and/or Arch, though this is optional and not required or evaluated. Students desiring a letter
of recommendation from Dr. Larry Lewis, Chief of Emergency Medicine, must take this WUMS IV
Emergency Medicine rotation.
Student time distribution: Outpatient 80%, Conferences/Lectures 20%; Primary Care 60%,
Subspecialty Care 40%
Major teaching responsibility: Attendings and senior residents (PGY 3 & 4)
Patients seen/weekly: ~5 per shift
On call/weekend responsibility: Evenings and weekends; no on call

M25 821  INPATIENT CARDIOLOGY
Instructor(s): Andrew Kates, M.D., 362-1291; Craig Reiss, M.D.; Benico Barzilai, M.D.; Michael
Beardslee, M.D.; Alan Braverman, M.D.; Keith Mankowitz, M.D.; and Srihari Thanigaraj, M.D.
Location: 4104 Queeny Tower
Elective Contact: Andrew Kates, M.D., 362-1292
Other Information: Students meet in Room 4104 Queeny Tower, 9:00 a.m. first day of elective.

Enrollment limit per period: 2
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Students will participate as members of the Barnes-Jewish Cardiology at Washington University Consultative Team. They will be part of a team composed of faculty members, fellows, residents, and nurse specialists that sees a large population of cardiac patients and follows them through all aspects of their in-hospital care. Emphasis will be placed on physical examination and the interpretation of modern cardiac diagnostic tests in clinical decision making.

Student time distribution: Inpatient 75%, Outpatient 15%, Conferences/ Lectures 10%; Primary Care 5%, Subspecialty Care 95%
Major teaching responsibility: Attending and fellow
Patients seen/weekly: 10-15
On call/weekend responsibility: None

M25 822 HONORS MEDICINE - CARDIOLOGY
Instructor(s): Thomas De Fer, M.D., 362-8050
Location: Barnes-Jewish Hospital
Elective Contact: Yvonne McLaughlin, 362-8050
Other Information: Students will receive e-mail communication regarding when/where to report on the first day prior to the beginning of the period.

Enrollment limit per period: Limit 2/period for Weeks 1, 5, 9, 13, 17, 21, and 1/period for Weeks 25, 29, 33, 37, and 41.
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

The structure and functioning of the "Honors Medicine-Cardiology" elective (subinternship) is very similar to the general medicine subinternship (M25 801). The basic purpose is to develop expertise in the care of hospitalized patients in a well-supervised teaching environment. The majority of patients admitted to the service will have a cardiology diagnosis as the main reason for admission. Some general medical problems will also be seen. All attendings on the service are cardiology subspecialists. Cardiology fellows act as the chief resident for the service on a monthly basis. Subinterns act as their patients’ interns under the supervision of residents and attending physicians. Subinterns have the same on-call and admitting schedules as the interns on their teams and are assigned up to two new patients on each admitting day. Because of a lack of appropriate call rooms, subinterns are not required to spend call nights in the hospital. Except in emergencies, subinterns are the first individuals to evaluate patients admitted to medical service teams. A diagnostic and therapeutic approach to the patient is planned in consultation with the resident. Subinterns assume primary responsibility for the daily care of their patients, under the supervision of resident and attending physicians. This includes evaluation on daily rounds, scheduling and obtaining results of diagnostic studies, planning therapy, making arrangements for care after discharge and communicating with patients and their families. Subinterns attend the same conferences as the internal medicine house staff. There are also several conferences specific to the cardiology service.

Student time distribution: Inpatient 90%, Conferences/Lectures 10%; Primary Care 25%, Subspecialty Care 75%
Major teaching responsibility: Attending, chief resident, and resident
Patients seen/weekly: 8-12
On call/weekend responsibility: Yes

M25 823 CLINICAL CARDIOLOGY — VA HOSPITAL
Instructor(s): Wade Martin, M.D., 289-6329
Location: John Cochran VA Hospital
Elective Contact: Wade Martin, M.D., 289-6329
Other Information: Students should meet in Room B206, 2nd Floor, VA Hospital.
Enrollment limit per period: 2
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.*

The major purpose of this elective in clinical cardiology at the John Cochran VA Hospital is to improve evaluation and management skills for diagnosis and treatment of important cardiovascular conditions such as coronary artery disease including acute myocardial infarction, congestive heart failure, hypertension, and valvular heart disease. The rotation is designed to be flexible enough to accommodate a wide variety of course objectives but includes the opportunity to participate in 1-3 outpatient clinics per week; 1-4 weeks of inpatient intensive care, telemetry, or cardiology consultation rounds; and ECG, stress testing, nuclear imaging, or echocardiographic reading sessions, cardiac catheterization and electrophysiologic procedures. The emphasis will be on improvement of the ability to diagnose and treat cardiovascular disease on the basis of information obtained from a thorough history and physical examination that is integrated with data from appropriate highly targeted laboratory studies in a manner that optimizes patient outcome and minimizes risk and costs.

Student time distribution: Inpatient 45%, Outpatient 55%, Conferences/Lectures 5-10%; Primary Care 25%, Subspecialty Care 75%
Major teaching responsibility: Attendings and fellows
Patients seen/weekly: 20
On call/weekend responsibility: Varies

M25 825 CARDIAC ARRHYTHMIAS AND ELECTROPHYSIOLOGY
Instructor(s): Timothy Smith, D.Phil., M.D., 454-7834
Location: Barnes-Jewish Hospital, North Campus
Elective Contact: Timothy Smith, M.D., or Yvonne O'Connell, 454-7834
Other Information: Students meet in the Cardiology Division, 4th Floor Kingshighway Building, Barnes-Jewish Hospital, North Campus, 8:00 a.m. first day of elective.

Enrollment limit per period: 2
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This elective provides the student with exposure and teaching in the diagnosis and treatment of complex cardiac rhythm disturbances. Specifically, the student is expected to evaluate patients referred for evaluation and treatment of complex or life-threatening rhythm disturbances, unexplained syncope or sudden cardiac death. Rounds are made daily on hospitalized patients, and students are welcome to observe electrophysiologic studies or implantation of pacemakers and defibrillators. This elective also provides an intensive opportunity to learn clinical electrocardiography and the systematic use of anti-arrhythmic drugs. Finally, since patients with chronic, complex rhythm disturbances frequently have organic heart disease, a broad-based exposure to general cardiology is also part of this elective.

Student time distribution: Inpatient 80%, Outpatient 10% (optional), Conferences/Lectures 10%; Subspecialty Care 100%
Major teaching responsibility: Attending physician
Patients seen/weekly: 2 new consults/day
On call/weekend responsibility: None

M25 827 HEART FAILURE/CARDIAC TRANSPLANTATION
Instructor(s): Joseph G. Rogers, M.D., 454-7009
Location: Barnes-Jewish Hospital, North Campus, Suite 4455
Elective Contact: Joseph G. Rogers, M.D., 454-7009
Other Information: Students should page the attending physician, 8:00 a.m. first day of elective.

Enrollment limit per period: 2
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This rotation is intended to provide trainees with a comprehensive experience managing patients with
advanced heart failure. In addition to daily rounds, trainees are invited to attend both heart failure and transplant clinics. Further, the curriculum is supplemented by a comprehensive syllabus that contains the critical literature pertinent to this patient population. The trainees will also have experience with the evaluation of patients for operative heart failure therapies and will have the opportunity to observe these surgical procedures.

Student time distribution: Inpatient 70%, Outpatient 10%, Conferences/ Lectures 20%; Subspecialty Care 100%

Major teaching responsibility: Attendings

Patients seen/weekly: 30

On call/weekend responsibility: None

M25 830 DERMATOLOGY
Instructor(s): Dermatology staff, 454-8622
Location: 7705 Wohl Hospital
Elective Contact: Rosemarie Brannan, 454-8622
Other Information: Students should contact the Dermatology office (454-8622) prior to first day for room assignment.

Enrollment limit per period: 4
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

The aim of this elective is to provide a guide for the student so that s/he is able to appreciate dermatology within the broader perspectives of medicine and biology. Emphasis will be placed on the dermatologic variations encountered in a normal physical examination of the skin, the identification of common skin diseases, dermatologic clues to systemic disease, as well as those dermatologic conditions that are life threatening. The student will participate in outpatient care in the Barnes-Jewish Hospital and affiliated clinics. Students will attend all clinical teaching rounds and conferences in addition to the basic science and cutaneous histopathology conferences.

Student time distribution: Inpatient 25%, Outpatient 50%, Conferences/ Lectures 25%; Specialty Care 100%

Major teaching responsibility: Course master for rotation, private attending and senior resident

Patients seen/weekly: 20-25

On call/weekend responsibility: None

M25 831 PEDIATRIC DERMATOLOGY
On call/weekend responsibility: None
Instructor(s): Susan Mallory, M.D., 454-2714
Location: 3N48 Children’s Hospital
Elective Contact: Rosemarie Brannan, 454-8622
Other Information: Call 454-2714 prior to first day of elective. Reporting time is 7:45 a.m. first day of elective.

Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This clinical rotation will be available to students interested in dermatology, pediatrics or both. Students will follow the dermatology rotation (M25 830) with an emphasis on pediatric dermatology by attending pediatric dermatology clinics, seeing consults, etc. Enthusiastic students will have an opportunity to write up a case report if they wish, but need to notify Dr. Mallory before the course. Students can take either this elective or M25 830 — not both.

Student time distribution: Inpatient 1%, Outpatient 74%, Conferences/Lectures 25%; Subspecialty Care 100%

Major teaching responsibility: Single attending

Patients seen/weekly: 50-100
M25 836  CLINICAL GASTROENTEROLOGY AND HEPATOLOGY  
Instructor(s): Jeffrey S. Crippin, M.D., 454-8141  
Location: Barnes-Jewish Hospital, East Pavilion  
Elective Contact: Jeffrey S. Crippin, M.D., 454-8141  
Other Information: Students meet in the Digestive Disease Clinical Center, street level East Pavilion, Barnes-Jewish Hospital, 8:00 a.m. first day of elective.  

Enrollment limit per period: 4  
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.  
The GI Hepatology elective is integrated into a very active inpatient/outpatient and endoscopy service at Barnes-Jewish Hospital. Students will participate in the evaluation of inpatients and outpatients with a spectrum of gut and liver disorders, will make patient rounds with the faculty and fellows, and have responsibility for patients on whom consultations have been requested. In addition, they will observe biopsy, endoscopic, and intubation techniques and participate in outpatient clinic and GI conferences.  
Student time distribution: Inpatient 50%, Outpatient 40%, Conferences/ Lectures 10%; Subspecialty Care 100%  
Major teaching responsibility: Attending and fellows  
Patients seen/weekly: 12 new  
On call/weekend responsibility: None  

M25 838  MEDICINE CONSULT SERVICE  
Instructor(s): Christopher Gutjahr, M.D., 362-1707  
Location: Barnes-Jewish Hospital, South Campus  
Elective Contact: Patty Lotz, 362-1707  
Other Information: Students should meet in the Division of Hospital Medicine office, 15th Floor Queeny Tower, 8:30 a.m. first day of elective.  

Enrollment limit per period: 1  
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41. Two week rotations are also available.  
The focus of the Medicine Consult Service elective is the evaluation and management of medically complex patients admitted to the hospital on non-medicine services. The issues involved with perioperative management are particularly stressed. The student will function as a member of the consult service team. Duties will include performing initial consultations and follow-up care under the supervision of a Hospital Medicine attending and a senior medical resident. Attendance at Department of Medicine and division conferences is encouraged.  
Student time distribution: Inpatient 90%, Conferences/Lectures 10%; Primary Care 100%  
Major teaching responsibility: Consult Service attending (from the Division of Hospital Medicine)  
Patients seen/weekly: 10-15  
On call/weekend responsibility: None  

M25 844  HEMATOLOGY AND HEMOSTASIS  
Instructor(s): Philip Majerus, M.D.; Morey Blinder, M.D.; and Stuart Kornfeld, M.D., 362-8801  
Location: 8441 Clinical Sciences Research Building  
Elective Contact: Morey Blinder, M.D., 362-8857  
Other Information: Students meet in Barnes-Jewish Hospital North, 7900 Nursing Division, 8:00 a.m. first day of elective.  

Enrollment limit per period: 2  
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.  
Activities planned include work-up of patients at Barnes-Jewish Hospital under the supervision of the hematology fellow and his staff consultant; attendance at clinical rounds three to five hours weekly; participation in out-patient clinics; experience in various procedures, especially blood and bone
marrow morphology and in interpretation of coagulation tests. Weekly student rounds with a senior staff person.

Student time distribution: Inpatient 80%, Outpatient 10%, Conferences/Lectures 10%; Subspecialty Care 100%

Major teaching responsibility: Attending and fellow

Patients seen/weekly: 3-5

On call/weekend responsibility: None

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M25 847  BONE AND MINERAL DISEASES

Instructor(s): Roberto Civitelli, M.D.; Michael Whyte, M.D.; Reina Villareal, M.D.; Kathryn Diemer, M.D.; Antonella Rastelli, M.D.; and Dwight Towler, M.D., Ph.D

Location: Barnes-Jewish Hospital

Elective Contact: Michael Whyte, M.D., 872-8305 or 454-8410

Other Information: Students will meet in the Division of Bone and Mineral Diseases, 7th Floor Steinberg, Barnes-Jewish Hospital.

Enrollment limit per period: 2

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

The course is designed to acquaint the student with the clinical, radiological and pathological manifestations of disorders of bone and mineral metabolism, their etiology and pathogenesis, and to expose him/her to current concepts of therapy. The student will see patients at Barnes-Jewish Hospital, St. Louis Children’s Hospital and Shriners Hospital for Children.

Acquired and heritable bone diseases will be studied in the context of derangements of mineral homeostasis with emphasis on vitamin D and peptide hormone metabolism and skeletal formation and remodeling. The role of non-invasive methods for measuring bone mass in the diagnosis and management of skeletal diseases also will be stressed.

While students rotate through the Division of Bone and Mineral Metabolism, they will be asked to participate in the weekly divisional conferences. Faculty and medical students will present interesting cases for discussion or the students can present a pertinent topic they have researched during their rotation presenting the recent medical literature on topics related to bone metabolism, bone densitometry, and patient care issues involving osteoporosis, metabolic bone disease, Paget’s disease, congenital bone diseases or other topics encountered during their clinical experience.

Responsibilities: Shriners Hospital Wednesday a.m./p.m. (Dr. Whyte); CAM BMD teaching service, Thursday; Bone Research Conference Friday 9 a.m. Brown Room; Bone Health Case Conference, 7101 Steinberg conference room, North Campus, Friday 11 a.m. or 3 p.m.

Student time distribution: Inpatient 5%, Outpatient 80%, Conferences/ Lectures 15%; Subspecialty Care 100%

Major teaching responsibility: Attendings

Patients seen/weekly: ~20

On call/weekend responsibility: None

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M25 850  HEMATOLOGY AND ONCOLOGY IV

Instructor(s): Scot Hickman, M.D.; Ravi Vij, M.D.; and Vorachart Auethavekiat, M.D., 289-6308

Location: John Cochran VA Hospital

Elective Contact: Scot Hickman, M.D., 289-6308

Other Information: Students should contact Dr. Hickman prior to first day of elective.

Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

The student will have major inpatient and outpatient exposure to the management of the following: non-small cell and small cell lung cancer, carcinoma of the colon, prostate cancer, lymphoma and
leukemia. A wide variety of more esoteric tumors and hematological pathology may be encountered. In addition to diagnosis, staging, and management, general oncological topics such as pain management, hypercalcemia of malignancy and malignant effusions will be discussed. The weekly schedule includes morphology sessions, multidisciplinary conferences and tutorial sessions with the student alone, which will require prior literature review.

Student time distribution: Inpatient 47.5%, Outpatient 47.5%, Conferences/Lectures 5%; Primary Care 25%, Subspecialty Care 75%

Major teaching responsibility: Attendings and some fellow teaching input as well

Patients seen/weekly: 25
On call/weekend responsibility: None

M25 855  CLINICAL INFECTIOUS DISEASES
Instructor(s): Victoria Fraser, M.D., 454-8215
Location: Barnes-Jewish Hospital, North Campus
Elective Contact: Cindy Waterman, 454-8214
Other Information: Students should contact Cindy Waterman at 454-8214 first morning of elective.

Enrollment limit per period: 6
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Study of patients with infectious diseases. The elective is designed to teach students the fundamentals of evaluating clinical problems in infection and formulating plans for workup and therapy. Students see consultations in infectious diseases in every part of Barnes-Jewish Hospital under the supervision of a faculty member who rounds with them every day. They work closely with medical residents and infectious disease fellows, follow their own patients and play an important role in their management. They are expected to read the literature about their patients and participate in clinical conferences. They attend teaching rounds and conferences and lectures in infectious diseases.

Student time distribution: Inpatient 90%, Conferences/Lectures 10%; Subspecialty Care 100%

Major teaching responsibility: Single attending and fellow

Patients seen/weekly: 15 new consults
On call/weekend responsibility: None

M25 865  INTENSIVE CARE MEDICINE - BARNES-JEWISH NORTH
Instructor(s): Stephen S. Lefrak, M.D., and staff, 454-7116
Location: Barnes-Jewish Hospital, North Campus
Elective Contact: Stephen S. Lefrak, M.D., 454-7116
Other Information: Students meet at the MICU (8th Floor Barnes-Jewish Hospital, North Campus), 9:00 a.m. first day of elective.

Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This elective in intensive care is offered in the Intensive Care Unit at Barnes-Jewish Hospital, North Campus. This unit has 10 intensive care beds providing intensive nursing care and life-support technology. The patients represent a mixture of patients with primarily medical problems. Patient care responsibility includes night call. In addition to patient responsibility, there are regularly scheduled conferences and attending rounds.

Student time distribution: Inpatient 100%; Subspecialty Care 100%

Major teaching responsibility: Attendings and residents

Patients seen/weekly: 8
On call/weekend responsibility: Every third night

M25 867  MEDICAL INTENSIVE CARE
Instructor(s): Marin Kollef, M.D., 454-8764
Location: Barnes-Jewish Hospital, South Campus
This elective is offered as an opportunity to gain additional experience in acute, primary care medicine. The elective is an advanced course in patient care involving complex medical problems. Responsibilities involve working up new patients with the MICU team, case presentations and attendance at conferences. Conferences consist of attending rounds Monday through Saturday, radiology rounds Monday through Saturday, pulmonary conference and medical grand rounds on Thursday, and critical care conference once each month. Call schedule is every third night.

Student time distribution: Inpatient 90%, Conferences/Lectures 10%; Subspecialty Care 100%
Major teaching responsibility: Attendings and residents
Patients seen/weekly: 3
On call/weekend responsibility: Yes

Students taking this elective see patients with endocrine and metabolic diseases in the Outpatient Consultation office and inpatients at Barnes-Jewish Hospital and the General Clinical Research Center. They will present these cases at formal rounds. They will also participate in informal rounds with the division and at divisional seminars. Extensive interaction with patients with diabetes and a diabetes education program are included, as is involvement with patients with thyroid, pituitary, adrenal, gonad, and metabolic bone disease, as well as lipid disorders. Ample opportunities will be provided for discussions of patient problems with the members of the division.

Student time distribution: Inpatient 20%, Outpatient 70%, Conferences/Lectures 10%; Subspecialty Care 100%
Major teaching responsibility: Faculty consultant for inpatients, individual faculty one-on-one for outpatients, and program director for both
Patients seen/weekly: 8-10
On call/weekend responsibility: Elective for students
Students will gain experience in the initial treatment of newly diagnosed malignancies and the outpatient management of oncology patients. Participation in multidisciplinary tumor conferences will stress a combined-modality approach to management, incorporating chemotherapy, radiotherapy and surgery. Students will see patients with a variety of malignancies, including lymphoma, myeloma, and tumors of the lung, breast, and colon. Management of hypercalcemia and other paraneoplastic syndromes, as well as cancer pain management will be covered.

Student time distribution: Outpatient 85%, Conferences/Lectures 15%; Subspecialty Care 100%
Major teaching responsibility: Oncology attendings and occasionally fellows
Patients seen/weekly: 30-50
On call/weekend responsibility: None

M25 876  EXERCISE PHYSIOLOGY/HEALTH MAINTENANCE
Instructor(s): Ali A. Ehsani, M.D.; John O. Holloszy, M.D.; and Ted Weiss, Ph.D., 362-2392
Location: Irene Walter Johnson Building, Room 421
Elective Contact: Lisa Patterson, secretary, 362-2392
Other Information: Students meet in 424B Irene Walter Johnson Building, 9:00 a.m. first day of elective.
Enrollment limit per period: 1
Valid start dates for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Includes performing and interpretation of exercise testing, assessment of functional capacity and measurement of oxygen uptake. Students will participate in the management of patients undergoing exercise training.

Student time distribution: Outpatient 99%, Conferences/Lectures 1%; Subspecialty Care 100%
Major teaching responsibility: Attending
Patients seen/weekly: 5
On call/weekend responsibility: None

M25 880  PULMONARY MEDICINE--BARNES-JEWISH HOSPITAL
Instructor(s): Daniel Rosenbluth, M.D., and staff, 454-8762
Location: 5th Floor Kingshighway Building, North Campus
Elective Contact: Lisa Wetzel, 454-8762
Other Information: Students should page Pulmonary Consult Fellow, 7:30 a.m. first day of elective.
Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Students will acquire skills in the evaluation and management of patients with pulmonary diseases and in the interpretation of pulmonary function tests. They will gain experience in outpatient Lung Center and attend regular pulmonary and critical care medicine conferences.

Student time distribution: Inpatient 60%, Outpatient 20%, Conferences/ Lectures 20%; Subspecialty Care 100%
Major teaching responsibility: Multiple attendings, fellows, and residents
Patients seen/weekly: 20
On call/weekend responsibility: None

M25 882  PULMONARY MEDICINE--VA HOSPITAL
Instructor(s): Carlos Daughaday, M.D., 289-6306
Location: John Cochran VA Hospital
Elective Contact: Carlos Daughaday, M.D., 289-6306
Other Information: Students meet in B501 John Cochran VA Hospital, 8:30 a.m. first day of elective.
Enrollment limit per period: 2
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.
Students will participate in several ambulatory care activities of the Pulmonary Section, including outpatient consultations of common respiratory disorders such as COPD, obstructive sleep apnea, lung cancer and tuberculosis, and follow-up of primary care patients with pulmonary disease. In addition, students will round in medical intensive care units, interpret pulmonary function tests, participate in bronchoscopy and attend scheduled teaching conferences of the Pulmonary Division.

Student time distribution: Inpatient 30%, Outpatient 50%, Conferences/Lectures 20%; Subspecialty Care 100%
Major teaching responsibility: Several attendings
Patients seen/weekly: 6-10 (by student)
On call/weekend responsibility: None

M25 883 TRANSFUSION MEDICINE
Instructor(s): Lawrence Tim Goodnough, M.D., 362-1546
Location: Barnes-Jewish Hospital
Elective Contact: Donna Sprankle, 362-3186
Other Information: Students should preschedule their rotation with Dr. Goodnough. Students should meet Dr. Goodnough on the 2nd floor of Barnes Service Building, first day of elective.

Enrollment limit per period: 2
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This elective is designed to introduce the student to the clinical aspects of blood banking and interventional hematology. The four-week elective will consist of regular didactic sessions with senior staff, teaching conferences, participation in daily clinical rounds and exposure to developing programs. The student will develop clinical skills in areas related to transfusion practice, blood conservation and evaluation of transfusion reactions. Complex hematologic diseases such as the coagulopathies and diseases that require apheresis will serve to instruct in current clinical practice along with evolving applications of interventional hematology, such as photopheresis and peripheral stem cell harvest for marrow transplantation.

Student time distribution: For July, November and March: Inpatient 50%, Conferences/Lectures 50%; For remainder of year: Inpatient 100%; Subspecialty Care 100%
Major teaching responsibility: Attendings
Patients seen/weekly: 20-25
On call/weekend responsibility: Optional

M25 884 BONE MARROW TRANSPLANTATION AND STEM CELL BIOLOGY
Instructor(s): John F. DiPersio, M.D., Ph.D., 362-9339
Location: Bone Marrow Transplant Unit 13-100
Elective Contact: John F. DiPersio, M.D., Ph.D., or Diane Oliver, 454-8306
Other Information: Students meet in the Bone Marrow Transplant Unit, 8:30 a.m. first day of elective.

Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Intense four-week clinical rotation exposing interested fourth-year medical students to the clinical world of bone marrow transplantation and to the basic science of hematopoiesis and stem cell biology. Students will be primarily responsible for the care of autologous and allogeneic BMT recipients. In addition they will be exposed to methods of stem cell harvest, cryopreservation, and immunophenotyping. This rotation plans to provide motivated students with an ideal mix of clinical medicine and basic science.

Student time distribution: Inpatient 60%, Outpatient 20%, Conferences/ Lectures 20%; Subspecialty Care 100%
Major teaching responsibility: Attending on service as well as all BMT physicians
Patients seen/weekly: 10-20
On call/weekend responsibility: None
M25 885 OCCUPATIONAL/ENVIRONMENTAL MEDICINE
Instructor(s): Bradley Evanoff, M.D., M.P.H., 454-8638
Location: Barnes-Jewish Hospital, North Campus
Elective Contact: Bradley Evanoff, M.D., M.P.H., 454-8638
Other Information: Students should meet at 8302 Barnes-Jewish Hospital, North Campus, 9:00 a.m. first day of elective.

Enrollment limit per period: 1 (2, by special arrangement)
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41. (Students may take this elective for up to 8 weeks.)

This elective is designed to introduce students to both the clinical treatment and the prevention of work-related injuries and illnesses. Clinical activities will include the diagnosis and treatment of workers with illnesses due to chemical exposure and repetitive motion, as well as acute injuries. Preventive activities will include work site visits and intervention projects, as well as involvement with work site health promotion and policy making. Specific activities are flexible depending on the students’ interests. Students are also urged to contact Dr. Evanoff if they wish to participate in research projects concerning the epidemiology of work-related diseases.

Students may elect to participate in the Interdisciplinary Environmental Clinic at Washington University. Based in the law school, the clinic involves interdisciplinary teams of students (law, engineering, environmental science) taking principal responsibility, under faculty supervision, for cases and projects on behalf of environmental and community organizations. The medical student(s) would assist clinic students by evaluating the human health impacts involved in one or more of the clinic's cases, and presenting such information to the client organization(s) and others. Among the cases on which medical students might participate are: (1) air pollution associated with proposed cement plant upwind of the St Louis metropolitan area; (2) lead poisoning of children in the City of St. Louis; (3) lead poisoning of children and long-term exposure of adults to lead and possibly other metals in Herculaneum, Missouri; (4) air and water pollution caused by concentrated animal feeding operations (factory farms) in northern Missouri. Students choosing this option will work with the Environmental Clinic staff and with Dr. Evanoff to evaluate and present evaluations of human health impacts of environmental exposures.

Student time distribution: Outpatient 20%, Conferences/Lectures 10%, Reading/Research 70%; Subspecialty Care 100%
Major teaching responsibility: Attending
Patients seen/weekly: 10
On call/weekend responsibility: None

M25 887 CLINICAL CARDIOVASCULAR MEDICINE
Instructor(s): Thomas F. Martin, M.D., 573-308-1301
Location: Phelps County Regional Medical Center, Rolla, MO
Elective Contact: Thomas F. Martin, M.D., 573-308-1301
Other Information: Students should meet at Phelps County Regional Medical Center, 1000 W. 10th Street, Rolla, MO, 8:00 a.m. first day of elective. Ask Intensive Care Unit secretary to page Dr. Martin.

Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, and 37.

Clinical cardiology with some internal medicine in a rural setting. Room and board provided.
Student time distribution: Inpatient 50%, Outpatient 50%; Subspecialty Care 100%
Major teaching responsibility: Attending
Patients seen/weekly: 80
On call/weekend responsibility: None

M25 890 CLINICAL NEPHROLOGY
Instructor(s): Daniel Coyne, M.D., 362-7211
Location: Chromalloy American Kidney Center, Barnes-Jewish Hospital
Elective Contact: Yolanda Richardson, 362-7211
Other Information: Students meet in the Acute Dialysis Center, Division 14300, Barnes-Jewish Hospital, 9:00 a.m. first day of elective. Ask for the Renal Fellow on the Consult Service.

Enrollment limit per period: 2
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Students assist in both the inpatient and outpatient areas to diagnose patients with acute and chronic renal failure, glomerulonephritis, and electrolyte disorders. The student is a full member of the inpatient renal consult service, diagnosing and treating patients with acute and chronic renal disease and electrolyte disorders. Students will learn electrolyte management, drug dosing, dialysis procedures and complications, kidney biopsy reading and the management of acute and chronic renal failure. Students are also encouraged to spend three half-days in the outpatient center rotating to the General Renal Clinics, the Renal Stone Clinic and the Transplant Clinic. Throughout the rotation, students work closely with two attendings and two renal fellows.

Student time distribution: Inpatient 80%, Outpatient 10%, Conferences/Lectures 10%; Primary Care 20%, Subspecialty Care 80%
Major teaching responsibility: Two attendings and two renal fellows
Patients seen/weekly: Four consults per week
On call/weekend responsibility: Saturday a.m. rounds desirable but not required

M25 893 ADULT ALLERGY AND CLINICAL IMMUNOLOGY
Instructor(s): H. James Wedner, M.D., 454-7937 or 454-7377
Location: 5002 Steinberg Pavilion, Barnes-Jewish Hospital, North Campus
Elective Contact: Amy Sleeter, 454-7376 or Kristy Smith, 454-7377
Other Information: Students meet in Room 5001, Steinberg Pavilion, Barnes-Jewish Hospital, North Campus, 8:00 a.m. first day of elective.

Enrollment limit per period: 2
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

Students will participate in the allergy consult service at Barnes-Jewish Hospital, North and South Campus. The student will serve as the primary allergy consult for inpatient and Emergency Room consultation and present each patient to the allergy fellows on call and the attending physician. Students will attend The Adult Allergy Clinic, Pediatric Allergy Clinic and the outpatient clinics at The Asthma & Allergy Center at Barnes-Jewish West County Hospital. Conferences on selected topics in allergy and clinical immunology will be held with the attending staff two to three afternoons a week.

Student time distribution: Inpatient 10%, Outpatient 75%, Conferences/ Lectures 15%; Subspecialty Care 100%
Major teaching responsibility: Attending and staff
Patients seen/weekly: 12
On call/weekend responsibility: Optional

M25 896 INTERDISCIPLINARY MUSCULOSKELETAL MEDICINE
Instructor(s): Leslie Kahl, M.D., 454-7257
Location: 6304 Kingshighway Building
Elective Contact: Robert Groszewski, 454-7279
Other Information: Students report to 6307 Kingshighway Building, 8:30 a.m. first day of elective.

Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This elective will present interdisciplinary musculoskeletal medicine in an ambulatory setting. Students will attend clinics and selected conferences in adult rheumatology, pediatric rheumatology, sports
medicine/orthopaedics, osteoporosis/bone health, and physical medicine. A reading list will be provided.

Student time distribution: Outpatient 70%, Conferences/Lectures 30%; Subspecialty Care 100%
Major teaching responsibility: Multiple attendings, occasionally a fellow
Patients seen/weekly: 15-20
On call/weekend responsibility: None

M80 809  AMBULATORY CARE — JACQUELINE MARITZ LUNG CTR
Instructor(s): Daniel Rosenbluth, M.D., 454-8762
Location: Barnes-Jewish Hospital, North Campus, Lung Center, 3rd Floor
Elective Contact: Lisa Wetzel, 454-8762
Other Information: Students meet in the Lung Center, 8th Floor, CAM, North Campus, 8:00 a.m. first day of elective.

Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 17, 21, 25, 29, 33, 37, and 41.*

The Jacqueline Maritiz Lung Center houses the ambulatory care activities of the Divisions of Pulmonary Medicine, Thoracic Surgery, and Allergy/Immunology, as well as the pulmonary function laboratory. The student will rotate through (1) both general pulmonary and subspecialty clinics in Pulmonary Medicine (cystic fibrosis, transplantation, emphysema, etc.), (2) Thoracic Surgery new patient clinics, (3) Allergy/Immunology clinic, and (4) interpretation of pulmonary function tests. Chest imaging is also emphasized in the evaluation process. The rotation can be streamlined to meet areas of emphasis desired by individual students.

Student time distribution: Outpatient 100%, Conferences/Lectures 3-5 wk; Primary Care 15%, Subspecialty Care: 85%
Major teaching responsibility: Multiple attendings
Patients seen/weekly: 10 to ?
On call/weekend responsibility: None

Research

(M25 900)

Dana R. Abendschein, Ph.D., 9924 Clinical Sciences Research Building, 362-8925. Research in this basic science laboratory is focused on responses of the arterial wall to injury and on mediators of coagulation that may contribute to acute rethrombosis after coronary fibrinolysis and accelerated restenosis after coronary angioplasty. Current studies are designed to define the time after vessel injury that the luminal surface remains procoagulant, to define the molecular expression of determinants of procoagulant activity associated with the site of injury and their changes with time, and to determine whether agents that inhibit the activity of procoagulant moieties can alter vascular remodeling leading to decreased acute thrombosis and subsequent restenosis in animal models of vascular injury. Students will be expected to observe procedures in experimental animals, to participate in analyses of procoagulant moieties and vascular wall proteins, and to participate in weekly laboratory meetings.

John P. Atkinson, M.D., 10th Floor Clinical Sciences Research Building, 362-8391. A clinical research elective is offered in evaluation of patients with complement deficiency states and complex rheumatic disease syndromes.

Michael E. Cain, M.D., 4208 Steinberg Building, 747-3032. Delineation of mechanisms responsible for clinical arrhythmias, improved identification of patients at risk for developing sudden cardiac death,
evaluation of new antiarrhythmic agents, evaluation of new antitachycardia pacing devices, signal-averaged ECGs and catheter ablation of arrhythmias.

Roberto Civitelli, M.D., 502-3 Yalem, and 7th Floor Steinberg Building, North Campus, 454-8408. The biology of cell-cell interactions and communication in bone via gap junctions and cell adhesion molecules. Function of connexins and cadherins in transcriptional control of osteoblast differentiation, osteoclastogenesis, and mechanotransduction. Modulation of mesenchymal lineage allocation and osteogenic differentiation by cadherins and beta-catenin signaling.

Philip E. Cryer, M.D., 552 Barnard Hospital, 362-7635. Studies of the physiology and pathophysiology of metabolic regulation in normal humans and patients with diabetes mellitus with a focus on hypoglycemia.

Nicholas O. Davidson, M.D., 910 CSRB North Tower, 362-2027. Genetic pathways for nonalcoholic fatty liver disease (NAFLD) and colorectal cancer development. We have two major areas of research interest. Our laboratory is interested, first, in the molecular mechanisms of hepatic steatosis, and the pathogenesis of NAFLD. This is the most prevalent liver disease in the US, likely affecting a quarter of the population. We have generated genetically manipulated mouse strains that offer insights into the mechanisms of hepatic steatosis. The student would work as part of a team, designing and conducting experiments that will test hypotheses concerning the mechanisms and consequences of hepatic steatosis. These studies will primarily involve mouse genetics, examining the expression of candidate genes under a variety of nutritional and pharmacologic settings that modulate hepatic lipid metabolism. In addition we are using microarrays to study the spectrum of genetic changes that may predict the extent of hepatic lipid accumulation in patients with steatohepatitis. Our goal is to test hypotheses using mouse genetics and to extend these studies to examine the same pathways in humans with NAFLD. Our second area of interest concerns the genetic pathways involved in colorectal cancer, the second leading cause of cancer-related deaths. We have developed a novel strain of mice in which the dominant effects of mutations in the APC tumor suppressor gene have been abrogated through deletion of an RNA binding protein, apobec-1. This deletion has a major effect on the expression of cox-2, abrogating the increase in expression seen in human colonic adenomas and wild type mouse intestinal adenomas. These findings suggest that apobec-1 is a genetic modifier of colon cancer development. We will study the importance of apobec-1 expression in human colon cancer specimens and continue our murine genetic studies of this novel pathway for modulating colon cancer development and progression.

Thomas M. DeFer, M.D., tdefer@im.wustl.edu or defert@msnotes.wustl.edu, 6604 Wohl Hospital, 362-8050, Special Projects in Medical Education. Through special arrangement with and approval by the coursemaster, 4th year students will participate in special projects in medical education. Typical projects will require approximately four weeks to complete. These four weeks can occur consecutively (preferred) or be spread out somewhat as needed. Medical education projects should be aimed at improving the curriculum, student experience, and/or administration of the Internal Medicine Clerkship or the Subinternship. Interested students should contact the coursemaster via phone or e-mail to discuss the proposed project. Those who are interested but would like guidance in designing a project should also contact the coursemaster. This is open only to Washington University School of Medicine students.

Bradley Evanoff, M.D., M.P.H., 454-8638. Occupational medicine epidemiology research. My research involves the use of epidemiology methods to characterize associations between diseases and work-related exposures. I am also doing studies that evaluate the detection and treatment of work-related musculoskeletal diseases. During an elective in occupational medicine epidemiology research, students will learn how to use epidemiologic methods to investigate disease processes by working on a mutually agreed-on topic of interest related to occupational diseases. Other activities can include work site visits and intervention projects, as well as involvement with work site health promotion and policy making. Elective length is variable depending on individual circumstances. Please contact Dr. Evanoff to discuss this research.

Mitchell H. Grayson, M.D., 6615 Clinical Sciences Research Building, 454-7412. Dendritic cells in viral airway disease. Our laboratory is interested in understanding the recruitment of dendritic cells to murine airways and their subsequent effects on the immune response. In particular we are interested in the role that dendritic cells play in the generation of an asthmatic phenotype after viral infection. We use a murine viral model (Sendai virus) that generates changes in murine lung consistent with that seen in human asthma. Ongoing investigations include examining the phenotypic changes in dendritic cells in the murine airway following viral infection and the mechanisms underlying the recruitment and trafficking of these dendritic cells. Participants in this elective will learn cell culture, animal model, and flow cytometric techniques amongst others.

Richard W. Gross, M.D., Ph.D., 4525 Scott Avenue, East Building, 362-2690. Lipid mediators of signal transduction in the cardiovascular system. Characterization of regulatory mechanisms responsible for the liberation of lipid second messengers during cellular activation.

Marc R. Hammerman, M.D., 7704 Wohl Clinic, 362-8233. Studies characterizing the transplantation of kidney and pancreatic anlage as a means to "grow new organs" in the settings of end-stage chronic renal failure and diabetes mellitus.

John O. Holloszy, M.D., 2nd Floor West Building, 362-3506. The research in our laboratory deals with the roles of exercise in the prevention and reversal of abdominal obesity, insulin resistance and diabetes. Much of our research is directed to elucidation of the mechanisms by which exercise activates glucose transport and enhances insulin sensitivity in muscle. Our current research is focused on the signaling pathways by which exercise activates glucose transport and enhances insulin sensitivity in muscle.

Keith A. Hruska, M.D., 5th Floor McDonnell Pediatric Research Building, 286-2772. The research in the laboratory focuses on new therapies for chronic kidney disease, osteoarthritis and their complications. The mechanisms of action of these therapies for nephropathy, vascular calcification and renal bone disease are being analyzed, as are mechanisms enabling cartilage transplantation.

Robyn S. Klein, M.D., Ph.D., 7273 McDonnell Pediatric Research Building, 286-2140. Co-localization of chemokine and glutamate receptors in cultured neurons. The student will join a neuroimmunology laboratory engaged in understanding the role of neuronal chemokine receptors in glutamate signaling. The project will entail using immunohistochemical techniques and confocal microscopy to co-localize chemokine and glutamate receptors on a variety of subtypes of neurons that have been grown in vitro.


Sandor J. Kovacs, Ph.D., M.D., 4428 Kingshighway Building, 454-8097. For students with math, physics and engineering background. Cardiovascular biophysics research elective concentrates on physiologic modeling and comparison of model predictions to in vivo human data. Minimum of eight weeks of elective time.

Jack Ladenson, Ph.D., 362-3186. Development of monoclonal and single-chain antibodies for use in research and in diagnostic testing.

Marc S. Levin, M.D., Deborah C. Rubin, M.D., 922 Clinical Sciences Research Building, 362-8933, 362-8935. Students will be members of a collaborative research team headed by Drs. Levin and Rubin (Associate Professors, Department of Medicine) investigating the mechanisms underlying the intestinal adaptive response that occurs to compensate for loss of functional small intestine. The student will have the opportunity to learn basic molecular biology and physiology as it relates to small intestinal growth, development and function. Examples of techniques that are used in these studies include small animal surgery (mice and rats), molecular biological techniques including PCR, Northern blotting, vector construction for production of transgenic and knockout mouse models, in situ hybridization and immunohistochemistry.
Lawrence M. Lewis, M.D., 362-4362. Emergency Medicine Research Elective. This elective offers an opportunity to investigate a wide variety of clinical questions relevant to the practice of emergency medicine. Our current projects include: biomechanics and pathophysiology of mild traumatic brain injury, toxicology, outcomes based research in asthma and geriatric abdominal pain, and public policy issues including access to healthcare and ED overcrowding. A preceptor will assist students with literature review, study design and data analysis. Students with original research ideas will be encouraged to complete their work to the point of abstract presentation or manuscript preparation. Interested students should contact the Emergency Medicine Division (362-4362).

Philip W. Majerus, M.D., 8th Floor Clinical Sciences Research Building, 362-8801. Biochemistry of platelets, regulation of lipid metabolism in tissue culture; mechanism of platelet thrombus formation.

Jeffrey D. Milbrandt, M.D., Ph.D., 101 Biotechnology Center, 362-4650. We have several ongoing projects in our laboratory. 1) The biological function of the GFL family of neurotrophic factors (GDNF, neurturin, persephin and artemin) that signal through a receptor complex containing the Ret tyrosine kinase. These factors promote survival of multiple neuronal populations including dopaminergic neurons, which degenerate in Parkinson's disease, motor neurons, which are affected in Lou Gehrig's disease and most neurons of the peripheral nervous system. 2) The biological roles of Egr2/Nab2 in regulating the Schwann cell myelination program and how abnormal function of these transcription factors result in peripheral neuropathies. 3) The development of prostate cancer, especially the role of Egr1 in regulating the PIN to invasive carcinoma transition and the role of the Nkx3.1 homeodomain protein in tumor initiation.

Stanley Misler, M.D., Ph.D., 815 Yalem Building, Barnes-Jewish Hospital, 454-7719. Stimulus-secretion coupling in endocrine cells (B-islet cells and adrenal chromaffin cells) examined using single-cell assays of secretion (capacitance measurements, amperometry).

Aubrey Morrison, M.D., 8843 Wohl Clinic, 454-8495. Post transcriptional control of the cyclooxygenase gene(s) by the lymphokines IL-1 and TNF. Interactions of RNA-binding proteins with the 3'-UTR of cyclooxygenase 2 mRNA and their effects on mRNA stability and translational efficiency are evaluated.

John W. Newcomer, M.D., 4412 Renard Building, 362-5939. Clinical memory research; research concerning the control of weight and glucose and lipid metabolism. This elective offers the student a broad exposure to clinical protocols related to the neurochemical regulation of memory performance and glucose metabolism, including protocols in patients with schizophrenia. Students will have an opportunity to focus on a particular project of interest.

Richard E. Ostlund, M.D., 8804 Wohl Hospital, 362-8286. Our laboratory focuses on the prevention and treatment of coronary heart disease by studying cholesterol absorption, detoxification and elimination from the body. Direct patient studies that use new stable isotopic cholesterol tracers and mass spectrometry techniques complement in vitro work on the biochemistry of cholesterol transport in cultured cells.

Curtis A. Parvin, Ph.D., Room 2435 Kingshighway Building, Barnes-Jewish Hospital, North Campus, 454-8436. The application of biostatistical theory to data analysis issues in laboratory medicine, with particular emphasis on statistical approaches to characterizing the performance and quality of laboratory tests.

M. Alan Permutt, M.D., 5th Floor Wohl Hospital, 362-8680. Studies of genetic susceptibility to diabetes in humans and experimental animal models through use of recombinant DNA techniques. Families with multiple diabetic members are being characterized clinically, and diabetes genes are being mapped. Islet cDNA genes are being cloned and sequenced to define genes involved in insulin secretion. Mutations in genes are being defined with hereditary disorders of insulin secretion. An Islet B-cell Functional Genomics Center in the lab studies global gene expression profiles in health and disease.

Katherine Ponder, M.D., 8818 Cancer Science Research Building, 362-5188. Gene Therapy for Genetic Diseases. Our laboratory is interested in using gene therapy to treat genetic deficiencies such as lysosomal storage diseases and hemophilia A and B. We have developed a retroviral vector that can
be efficiently delivered to the liver of mice and dogs, and results in expression that is sufficient to reduce most of the clinical manifestations of these genetic diseases. Current studies focus upon assessing the immunological consequences of gene therapy, and devising ways to block immune responses to the therapeutic gene when and if they occur. In addition, we are further testing the clinical effect of this gene therapy approach in these and other models of disease.


Daniel P. Schuster, M.D., 4462 Clinical Sciences Research Building, 362-3776. Molecular imaging studies of the lung. Students will be introduced to murine and other animal models of lung injury and inflammation, techniques involving positron emission tomography and nuclear medicine, mathematical modeling and pulmonary physiology. Specific projects involving questions relevant to pulmonary edema, neutrophilic inflammatory lung disease, or pulmonary gene expression imaging will be assigned according to the student’s individual interests. Students with any expertise in bioengineering or computer science are especially invited to apply.


Samuel L. Stanley, Jr., M.D., 7244 McDonnell Pediatric Research Building, 286-0432. Dr. Stanley’s lab is interested in the host response to pathogens, including potential bioterrorism agents. Work in the laboratory has focused on developing models to better understand the immunopathogenesis of E. histolytica and shigella infections, and the design and evaluation of recombinant-antigen based vaccines to stimulate mucosal and parenteral immune responses against enteric pathogens. More recently, the laboratory has begun new studies focusing on poxvirus infections, performing translational research looking at the genetic basis for susceptibility to poxvirus infections.

Phyllis K. Stein, Ph.D., Suite 402, Bank of America Building, 4625 Lindell Blvd (Lindell and Euclid), 286-1350. Clinical Significance of Heart Rate Variability and ECG-Derived Waveform Parameters Obtained from Continuous Ambulatory Monitoring. This elective affords the opportunity to perform research in heart rate variability or in other measurements, like QT variability or T-wave alternans that can be derived from continuous ECG monitoring from Holter recordings or polysomnography recordings in the sleep lab. Data are also available from mice. Many possible projects are available using our many large existing datasets, using the thousands of stored studies in the sleep lab or involving de novo data collection in a clinical or animal population. Also, many possible directions for this research are available from applying traditional and non-linear HRV to different populations, developing methods to quantify ultradian heart rate variability patterns, to developing novel ECG analysis techniques, etc. Also, we are involved with the Cardiovascular Health Study (CHS), a large population-based longitudinal study of risk factors for heart disease and stroke among community-dwelling people >65 years old. There is a subset of this population who had Holter recordings (~1400 at baseline, ~800 of the same people 5 years later, and ~370 minority subjects recorded at the same time as the second CHS recording). These recordings have already been analyzed by us so there is a large amount of heart rate variability data available. There is also a subset of the CHS which is known to have died suddenly and we have developed a matched control group. We also have electronic sleep studies at two time points for about 300 of the same people who also participated in the Sleep Heart Health Study. Thus, there is also an opportunity in the CHS dataset for studies on the relationship of heart rate variability (and QT variability) and a huge number of clinical and demographic factors among the elderly.

Thomas H. Steinberg, M.D., 7105 McDonnell Pediatric Research Building, 362-9218. We study cell-cell communication mediated by gap junction proteins and P2 (purinergic) receptors. Specific models include bone cells (osteoblasts and osteoclasts), pancreatic islet cells, and macrophages. In addition we are investigating the mechanisms by which gap junction proteins and P2 receptors are involved in the coordination of calcium signaling among cells.
Douglas M. Tollefsen, M.D., Ph.D., 8th Floor Clinical Sciences Research Building, 362-8830.
Biochemical and physiologic studies of the interactions of plasma protease inhibitors with coagulation proteases. The student will become acquainted with standard biochemical techniques, such as column chromatography, absorption spectroscopy and radioisotope methods, as well as in vivo thrombosis models in mice. Minimum of 12 weeks required.

John Turk, M.D., Ph.D., 6609 Wohl Clinic, 362-8190. Phospholipid signaling mechanisms in pancreatic islets. Experience in mass spectrometric analysis of complex lipids is available.

H. J. Wedner, M.D., 5002 Steinberg Pavilion, Barnes-Jewish Hospital, North Campus, 454-7937 or 454-7377. Asthma Care in the Inner City. Students will participate in ongoing studies of the delivery of asthma care to inner-city children and adults. The emphasis will be on direct contact between the asthmatic patients and the student, along with an asthma counselor.

H. J. Wedner, M.D., 5002 Steinberg Pavilion, Barnes-Jewish Hospital, North Campus, 454-7937 or 454-7377. Biology of pollen and fungal allergens. Our laboratory has been characterizing the important allergenic proteins from molds and pollen. The allergens are identified using skin test sensitive individuals, and the proteins are isolated and characterized by a combination of physiochemical and molecular biological techniques. These studies should lead to better forms of allergy immunotherapy. Students will participate in the isolation, characterization and modification of major allergens from a number of molds including Epicoccum nigrum and several pollens including those from white oak and Parthenium hysterophoros, a newly recognized allergen.

Samuel A. Wickline, M.D., 4402 Barnes-Jewish Hospital, 454-8635. Both clinical and basic research programs are offered in the area of cardiovascular bioengineering in association with the new Institute for Biological and Medical Engineering at Washington University. The Institute sponsors a graduate program in biomedical engineering, which is conducted as a joint venture between the medical school and the School of Engineering and Applied Science. Advanced imaging projects are available in: 1) cardiovascular magnetic resonance (Dr. Samuel Wickline, Director of Cardiovascular Magnetic Resonance Laboratory, 454-7459); 2) ultrasonics/physical acoustics (Dr. Samuel A. Wickline, Co-Director of Cardiovascular Division and Director of Medical Ultrasonics Laboratory, 454-8635); and 3) cardiovascular biophysics (Dr. Sandor Kovacs, Director of Cardiovascular Biophysics Laboratory, 454-8097). These laboratories feature quantitative approaches to determine the structure, organization and function of cardiovascular tissues with direct clinical applications in magnetic resonance imaging and echocardiography. The program in magnetic resonance imaging comprises assessment of cardiac function, flow, perfusion, angiography and mathematical modeling of stress-strain relationships. The ultrasound and acoustics program comprises ultrasonic tissue characterization of the structure and composition of heart and vascular tissues that reflect fundamental physical properties of materials. The cardiovascular biophysics program is concerned with development of noninvasive techniques useful for mathematical modeling of heart function. In each venue, clinical correlation and case studies are presented and clinical research with direct patient contact is stressed.

Faculty

KENNETH S POLONSKY, MBCHB Head of the Department of Internal Medicine, Busch Professor of Medicine
CHARLES C ABEL, MD Assistant Professor of Clinical Medicine
DANA RAY ABENDSCHEIN, PHD Associate Professor of Medicine
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PETER UWE FISCHER, D SC  Visiting Associate Professor of Medicine
SIMON FISHER, MD, PHD  Assistant Professor of Medicine
NORMAN FISHMAN, MD  Assistant Professor of Clinical Medicine
SEAN C. FITZMAURICE, MD  Instructor in Emergency Medicine in Medicine
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FELICITAS Z GATACHALIAN, MD  Instructor in Clinical Medicine
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WILLIAM M GEE, MD  Instructor in Clinical Medicine
LAWRENCE D GELB, MD  Retiree - Associate Professor of Medicine
EDWARD M GELTMAN, MD  Professor of Medicine
KENNETH W GENTSCH, MD  Instructor in Clinical Medicine
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STEPHEN JAMES GIDDINGS, MD, PHD  Associate Professor of Medicine
RALPH V GIESELMAN, MD  Professor Emeritus of Clinical Medicine
MARYE J GLEVA, MD  Assistant Professor of Medicine
<table>
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<tr>
<th>Name</th>
<th>Title and Affiliation</th>
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<tbody>
<tr>
<td>ANDREW S GOLD, MD</td>
<td>Instructor in Clinical Medicine</td>
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<td>ANNE CAROL GOLDBERG, MD</td>
<td>Associate Professor of Medicine</td>
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<td>DANIEL E GOLDBERG, MD, PHD</td>
<td>Professor of Medicine, Howard Hughes Medical Institute Investigator in Medicine</td>
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<tr>
<td>GREGORY I GOLDBERG, PHD</td>
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LESTER T REESE, MD  Professor of Clinical Medicine (Dermatology)
MARGARET REIKER, MD, PHD  Instructor in Clinical Medicine
CRAIG K REISS, MD  Associate Professor of Medicine
JACQUELINE LEVY REISS, MD  Instructor in Clinical Medicine
MICHAEL P RETTIG, PHD  Research Instructor in Medicine
MICHAEL W RICH, MD  Associate Professor of Medicine
LOIS F. RICHARD, MD, PHD  Instructor in Medicine
TERRENCE E RIEHL, PHD  Research Instructor in Medicine
ROBERT D RIFKIN, MD  Associate Professor of Medicine
DANIEL S RING, MD  Instructor in Clinical Medicine (Dermatology)
LISA B RING, MD  Instructor in Clinical Medicine (Dermatology)
PAUL ARTHUR ROBIOLIO, MD  Assistant Professor of Clinical Medicine
H. BRYAN ROGERS  Instructor in Clinical Medicine
SHARON ALICIA ROGERS  Research Instructor in Medicine
FELICE A ROLNICK, MD  Instructor in Clinical Medicine
DANIEL B ROSENBLUTH, MD  Associate Professor of Medicine
LISA R ROSS, MD  Assistant Professor of Clinical Medicine
WILLIE RAY ROSS, MD  Assistant Professor of Medicine
MARCOS ROTHSTEIN, MD  Associate Professor of Medicine
ERNEST TUTTLE ROUSE, III, MD  Instructor in Clinical Medicine
ERNEST T ROUSE, JR, MD  Professor Emeritus of Clinical Medicine
JEREMY ROWER, MD  Instructor in Clinical Medicine
DEBORAH C RUBIN, MD  Professor of Medicine
MYRA L. RUBIO, MD  Instructor in Medicine
YORAM RUDY  Professor of Medicine
BRENT E RUOFF, MD  Associate Professor of Emergency Medicine in Medicine
TONYA RUSSELL, MD  Assistant Professor of Medicine
JOSEPH F RUWITCH, JR, MD  Professor of Clinical Medicine
KENNETH J RYBICKI, MD, PHD  Instructor in Clinical Medicine
ROSHAN I SABAR  Instructor in Clinical Medicine
MEHRDAD SAEED-VABA, MD  Instructor in Clinical Medicine
SHABBIR H SAFDAR  Professor of Clinical Medicine
KAORI A. SAKURAI  Instructor in Clinical Medicine
LLEWELLYN SALE, JR, MD, BA  Professor Emeritus of Clinical Medicine
CHRISTINE JOAN SALTER, MD, DC  Instructor in Clinical Medicine
ROBERT J SALTMAN, MD  Associate Professor of Clinical Medicine
NANDAKUMAR SAMBANDAM  Research Assistant Professor of Medicine
JOHN MARK SAMET, MD  Instructor in Clinical Medicine
LAWRENCE E SAMUELS, MD  Instructor in Clinical Medicine (Dermatology)
GUADALUPE SANCHEZ, MD  Instructor in Clinical Medicine (Dermatology)
MARK STEVEN SANDS, PHD  Associate Professor of Medicine
DANIEL JOSE SANTA CRUZ, MD  Instructor in Clinical Medicine
RICHARD ALBERT SANTOS  Instructor in Medicine
EVELIO E. SARDINA, MD, PHD  Instructor in Clinical Medicine
DEBRA SCARLETT, MD  Instructor in Medicine (Dermatology)
LAWRENCE R SCHACHT, MD  Instructor in Clinical Medicine
JEAN SCHAFFER, MD  Associate Professor of Medicine
RICHARD O. SCHAMP, MD  Instructor in Clinical Medicine
MARK SCHEPERLE, MD  Instructor in Clinical Medicine
ALVIN K SCHERGEN, MD  Instructor in Clinical Medicine
TANIA L SCHMID, MD  Instructor in Clinical Medicine
ROBERT JAY SCHNEIDER, MD  Assistant Professor of Clinical Medicine
GUSTAV SCHONFELD, MD  Samuel E Schechter Professor of Medicine
SANFORD S SINEFF, MD  Instructor in Emergency Medicine in Medicine
GARY SINGER, MD  Assistant Professor of Clinical Medicine
JASVINDAR SINGH, MD  Assistant Professor of Medicine
JAMES C SISK, MD  Associate Professor Emeritus of Clinical Medicine (Dermatology)
DONALD A SKOR, MD  Associate Professor of Clinical Medicine
EDUARDO SLATOPOLSKY, MD  Joseph Friedman Professor of Renal Diseases in Medicine
RAYMOND P SMITH, MD  Instructor in Clinical Medicine
TIMOTHY W. SMITH, MD, PHD  Assistant Professor of Medicine
ALLEN D SOFFER, MD  Instructor in Clinical Medicine
RAND WASHBURN SOMMER, MD  Associate Professor of Clinical Medicine
ROSS B SOMMER, MD, BA  Associate Professor Emeritus of Clinical Medicine
STEVEN M. SORSCHER  Assistant Professor of Medicine (Pending Executive Faculty Approval)
PABLO SOTO, MD  Instructor in Medicine
HANI CHARLES SOUDAH, MD, PHD  Assistant Professor of Clinical Medicine
WILLIAM F SOUTHWORTH, MD  Assistant Professor of Clinical Medicine
MICHAEL L SPEARMAN, MD  Instructor in Clinical Medicine
JOHN SPERTUS  Adjunct Professor of Medicine
ALAN R SPIVACK, MD  Assistant Professor of Clinical Medicine
ERIK CHRISTIAN STABELL, MD  Instructor in Clinical Medicine
SAMUEL LEONARD STANLEY, JR, MD  Professor of Medicine
RICHARD A. STEET, PHD  Instructor in Medicine
PAUL M STEIN, MD  Associate Professor of Clinical Medicine
PHYLLIS K STEIN, PHD  Research Associate Professor of Medicine
RICHARD IAN STEIN, PHD  Research Assistant Professor of Medicine
THOMAS H STEINBERG, MD  Associate Professor of Medicine
WILLIAM F STENSON, MD  Professor of Medicine
SHEILA ANN STEWART-WIGGLESWORTH, PHD  Assistant Professor of Medicine
JAMES ANDREW STOKES, MD  Instructor in Clinical Medicine
JOSHUA M. STOLKER, MD  Assistant Professor of Medicine
CHRISTIAN D STONE, MD  Assistant Professor of Medicine
BRADLEY P STONER, MD, PHD  Associate Professor of Medicine
GREGORY A STORCH, MD  Professor of Medicine
STEPHEN P STORFER, MD  Instructor in Clinical Medicine
HAMSA SUBRAMANIAN  Instructor in Clinical Medicine
ELBERT P TRULOCK, III, MD  Rosemary and I Jerome Flance Professor of Pulmonary Medicine in Medicine
DAVID J TUCKER, MD  Instructor in Clinical Medicine
DOLORES R TUCKER, MD  Assistant Professor of Clinical Medicine (Dermatology)
JOHN W TURK, MD, PHD  Professor of Medicine
PETER G TUTEUR, MD  Associate Professor of Medicine
JOHN H UHLEMANN, MD  Assistant Professor of Clinical Medicine (Dermatology)
BRIAN ULLERY  Instructor in Emergency Medicine in Medicine
ALBERT LEE VAN AMBurge, III, MD  Assistant Professor of Clinical Medicine
PATRICIA ANDERS VANVALKENBURGH, PHD  Instructor in Medicine
EMMANUEL A VENKATESAN  Instructor in Clinical Medicine
IVELISSE ANN VERRICO, MD  Assistant Professor of Medicine (Pending Executive Faculty Approval)
RAVI VIJ, MBBS  Instructor in Medicine
ANITHA VIJAYAN, MD  Assistant Professor of Medicine
DENNIS T VILLAREAL, MD  Associate Professor of Medicine
REINA VILLAREAL, MD  Assistant Professor of Medicine
HERBERT W VIRGIN, IV, MD, PHD  Assistant Professor of Medicine
OKSANA VOLSHTEYN, MD  Assistant Professor of Medicine
DEEPAK VOORA  Instructor in Medicine (Assistant Director, Medical Services)
STANLEY G VRIEZELAAr, MD  Instructor in Clinical Medicine
HARRY LEE WADSWORTH, MD  Instructor in Clinical Medicine
ALAN D WAGGONER  Research Associate Professor of Medicine
JASON CASS WAGNER  Instructor in Emergency Medicine in Medicine
STANLEY M WALD, MD  Associate Professor of Clinical Medicine
MARK WALKER, PHD  Instructor in Medicine
DAVID WALLACE, MD  Instructor in Clinical Medicine
DAVID A WALLS, MD  Instructor in Clinical Medicine
JAMES W WALSH, MD  Assistant Professor of Clinical Medicine
MATTHEW JOHN WALTER, MD  Instructor in Medicine
MICHAEL J WALTER, MD  Assistant Professor of Medicine
RICHARD COBURN WALTERS, MD  Instructor in Clinical Medicine (Dermatology)
DAVID K. WARREN, MD  Assistant Professor of Medicine
SCOTT P WASSERSTROM, MD  Instructor in Clinical Medicine
AMY L. WATERMAN, PHD  Assistant Professor of Medicine
HUGH R WATERS, MD  Instructor Emeritus in Clinical Medicine
JASON WEBER, PHD  Assistant Professor of Medicine
H. JAMES WEDNER, MD  Professor of Medicine
GARY J WEIL, MD  Professor of Medicine
KATHERINE N WEILBAECHER, MD  Assistant Professor of Medicine
CARLA JOY WEINHEIMER  Research Assistant Professor of Medicine
LEONARD B WEINSTOCK, MD  Associate Professor of Clinical Medicine
ALAN N WEISS, MD  Professor of Medicine
PETER DOUGLAS WEISS, MD  Instructor in Clinical Medicine
ALVIN S WENNEKER, MD  Professor of Clinical Medicine
DARREN E WETHERS, MD  Instructor in Clinical Medicine
ALISON J WHELAN, MD  Associate Professor of Medicine
NEIL HARRIS WHITE, MD  Professor of Medicine
MICHAEL PETER WHYTE, MD  Professor of Medicine
BURTON M WICE, PHD  Research Assistant Professor of Medicine
CYNTHIA A WICHELMAN, MD  Assistant Professor of Emergency Medicine in Medicine
SAMUEL A WICKLINE, MD  Professor of Medicine
JOHN F WIEDNER, MD  Instructor in Clinical Medicine
DEBORAH A WIENSKI, MD  Instructor in Clinical Medicine
DENISE WILFLEY  Professor of Medicine
CONSUELO WILKINS, MD  Assistant Professor of Medicine
MICHAEL P WILLIAMS, PHD  Adjunct Instructor in Medicine
MONIQUE WILLIAMS, MD  Instructor in Medicine
NANCY J WILLIAMS, MD  Instructor in Clinical Medicine
WENDELL WILLIAMS, MD  Instructor in Clinical Medicine
GEORGE A WILLIAMS, III, MD  Assistant Professor of Clinical Medicine
R. JEROME WILLIAMS, JR, MD  Associate Professor of Clinical Medicine
CHRISTINE E WILMSEN CRAIG, MD  Instructor in Clinical Medicine
MONITA ELAINE WILSON, PHD  Research Assistant Professor of Medicine
DAVID WILLIAM WINDUS, MD  Associate Professor of Medicine
PATRICK M WINTER, PHD  Research Instructor in Medicine
KAREN WINTERS, MD  Assistant Professor of Medicine
KEITH FREDERIC WOELTJE, MD, PHD  Associate Professor of Medicine
EDWARD M WOLFE, MD  Instructor in Clinical Medicine (Dermatology)
GERALD WOLFF, MD  Assistant Professor of Clinical Medicine
Principles of pharmacology are taught as part of the second-year curriculum of medical school. This course elaborates essential concepts in pharmacology that provide the basis for understanding the mechanisms of drug action for individual classes of drugs discussed elsewhere in different blocks of a newly integrated second-year curriculum.

Research in the department emphasizes application of the tools of genetics, molecular and cell biology, genomics and bio-organic chemistry to define mechanisms that regulate cell fate, differentiation and senescence, and to devise ways of modulating these processes in vivo. A principal focus is on developmental biology using a series of genetically manipulable model organisms. Students participate
with the staff in a series of weekly journal clubs discussing recent papers in the literature as well as their own work and that of their colleagues.

Courses

Second Year

M70 670A PRINCIPLES OF PHARMACOLOGY
Instructor: Douglas F. Covey, Ph.D., 362-1726
The purpose of this course is to provide basic information relating to the underlying principles that apply to pharmacology. Topics addressed include: mechanisms of receptor-mediated drug action, pharmacokinetics, drug metabolism, toxicology, developmental pharmacology and the autonomic nervous system. Students who have not completed the first year of the medical school curriculum must have permission from the coursemaster to enroll in this course.

Research

FOURTH YEAR

(M70 900)
Cross-listed with L41 (Bio) 590


Douglas F. Covey, Ph.D., 3rd Floor McDonnell Science Building, 362-1726. Medicinal chemistry of steroids.

George W. Gokel, Ph.D., 3rd Floor McDonnell Science Building, 362-9297. Novel synthetic organic compounds for use as model systems for biological processes, especially pore formation in bilayers, membrane structure and interactions, and alkali metal cation-pi interactions.

Jeffrey I. Gordon, M.D., 5th Floor 4444 Forest Park, 362-7243. Gut development; symbiotic host-microbial interactions in the mouse and human gut.

Gregory A. Grant, Ph.D., 4th Floor Biotechnology Science Building, 362-3367. Mechanism of allosteric regulation in enzymes.


Jeanne M. Nerbonne, Ph.D., 3rd Floor McDonnell Science Building, 362-2564. Regulation of membrane excitability; structure, function and regulation of voltage-dependent ion channels.

David M. Ornitz, M.D., Ph.D., 3rd Floor South Building, 362-3908. Regulation of organogenesis in the mouse by members of the fibroblast growth factor family. Biochemical and genetic analysis of the
otopetrin gene family in the mouse vestibular system.


Faculty

DAVID M ORNITZ, MD, PHD Interim Head of the Department of Molecular Biology and Pharmacology, Alumni Endowed Professor of Molecular Biology and Pharmacology

SHRIKANT ANANT, PHD, MS Assistant Professor of Molecular Biology and Pharmacology

CAROLYN J ANDERSON, PHD Associate Professor of Molecular Biology and Pharmacology

THOMAS J BARANSKI, MD, PHD Assistant Professor of Molecular Biology and Pharmacology

MONICA BESSLER, MD, PHD Associate Professor of Molecular Biology and Pharmacology

IRVING BOIME, PHD Professor of Molecular Biology and Pharmacology

WALTER A BOYLE, III, MD Assistant Professor of Molecular Biology and Pharmacology

ROSS CAGAN, PHD Professor of Molecular Biology and Pharmacology

SHIMING CHEN, PHD Assistant Professor of Molecular Biology and Pharmacology

ZHOUFENG CHEN, PHD Assistant Professor of Molecular Biology and Pharmacology

RICHARD A CHOLE, MD, PHD Professor of Molecular Biology and Pharmacology

DOUGLAS FLOYD COVEY, PHD Professor of Molecular Biology and Pharmacology

CHARLES M CROWDER, MD, PHD Associate Professor of Molecular Biology and Pharmacology

NICHOLAS O DAVIDSON, MD Professor of Molecular Biology and Pharmacology

AARON DIANTONIO, MD, PHD Assistant Professor of Molecular Biology and Pharmacology

ALEX S EVERS, MD Professor of Molecular Biology and Pharmacology

GEORGE W GOKEL, PHD Professor of Molecular Biology and Pharmacology

JUDITH P GOLDEN, PHD Instructor in Molecular Biology and Pharmacology

JEFFREY I GORDON, MD Dr Robert J Glaser Distinguished University Professor of Molecular Biology and Pharmacology, Director of the Center for Genome Sciences

GREGORY ALAN GRANT, PHD Professor of Molecular Biology and Pharmacology

RICHARD WARREN GROSS, MD, PHD Professor of Molecular Biology and Pharmacology

ROBERT O HEUCKEROTH, MD, PHD Assistant Professor of Molecular Biology and Pharmacology

DAVID MICHAEL HOLTZMAN, MD Professor of Molecular Biology and Pharmacology

RICHARD S HOTCHKISS, MD Professor of Molecular Biology and Pharmacology
JAMES J HSIEH, MD, PHD  Assistant Professor of Molecular Biology and Pharmacology
F. EDMUND HUNTER, JR, PHD  Professor Emeritus of Molecular Biology and Pharmacology
STACEY S. HUPPERT, PHD  Instructor in Molecular Biology and Pharmacology
MA.XENIA GARCIA ILAGAN, PHD  Instructor in Molecular Biology and Pharmacology
SHIN-ICHIRO IMAI, MD, PHD  Assistant Professor of Molecular Biology and Pharmacology
EUGENE MALCOLM JOHNSON, JR, PHD  Professor of Molecular Biology and Pharmacology
DANIEL P KELLY, MD  Professor of Molecular Biology and Pharmacology
DAVID M KIPNIS, MD  Professor of Molecular Biology and Pharmacology
RAPHAEL KOPAN, PHD  Professor of Molecular Biology and Pharmacology
STEPHEN K KORNFIELD, MD, PHD  Associate Professor of Molecular Biology and Pharmacology
PAUL THOMAS KOTZBAUER  Assistant Professor of Molecular Biology and Pharmacology
KRISTEN KROLL, PHD  Assistant Professor of Molecular Biology and Pharmacology
RUTH E. LEY  Instructor in Molecular Biology and Pharmacology
FANXIN LONG, PHD  Assistant Professor of Molecular Biology and Pharmacology
LIANG MA, PHD  Assistant Professor of Molecular Biology and Pharmacology
HOWARD MCLEOD, PHS  Professor of Molecular Biology and Pharmacology
JASON C MILLS, MD, PHD  Assistant Professor of Molecular Biology and Pharmacology
AUBREY R MORRISON, MBBS  Professor of Molecular Biology and Pharmacology
LOUIS MUGLIA, MD, PHD  Associate Professor of Molecular Biology and Pharmacology
PHILIP NEEDLEMAN, PHD  Adjunct Professor of Molecular Biology and Pharmacology
JEANNE M NERBONNE, PHD  Alumni Endowed Professor of Molecular Biology and Pharmacology
ARTHUR H NEUFELD, PHD  Professor of Molecular Biology and Pharmacology
DAVID R PIWNICA-WORMS, MD, PHD  Professor of Molecular Biology and Pharmacology
DEBORAH C RUBIN, MD  Professor of Molecular Biology and Pharmacology
DAVID RUDNICK, MD, PHD  Assistant Professor of Molecular Biology and Pharmacology
JOHN HALL RUSSELL, PHD  Professor of Molecular Biology and Pharmacology
SCOTT SAUNDERS, MD, PHD  Assistant Professor of Molecular Biology and Pharmacology
ANNE LIESE M SCHAEFER, PHD, JD  Instructor in Molecular Biology and Pharmacology
JEAN SCHAFFER, MD  Associate Professor of Molecular Biology and Pharmacology
ALAN L SCHWARTZ, MD, PHD  Professor of Molecular Biology and Pharmacology
QUN SHA, MD, PHD  Instructor in Molecular Biology and Pharmacology
THEODORE C SIMON, PHD  Assistant Professor of Molecular Biology and Pharmacology
ERICA D SONNENBURG, PHD  Instructor in Molecular Biology and Pharmacology
THADDEUS S. STAPPENBECK, MD, PHD  Assistant Professor of Molecular Biology and Pharmacology
The Department of Molecular Microbiology teaches introductory courses in microbiology and pathogenic microorganisms for first-year medical students and graduate students. The department also offers a number of advanced courses, primarily designed for graduate students, but open to medical students. Advanced elective research activities are offered by faculty in the department.

Courses

**First Year**

M30 526 MICROBES AND PATHOGENESIS  
Instructor: Henry V. Huang, Ph.D., 362-2755  
The challenge of this course is to emphasize the importance of understanding molecular and cellular paradigms of how pathogenic microbes interact with their hosts and cause disease. Selected pathogenic microbes, including bacteria, viruses, parasites and fungi, will be utilized as models to explain general principles of host-pathogen interactions and their consequences. Mechanisms by which microbes evade host defenses to cause acute and chronic infections will be highlighted. Problems facing the medical community in the 21st century such as rising antibiotic resistance and tropical diseases will be addressed. The main objective of this course is to teach students how to think about microbial pathogenesis in a way that will provide them a conceptual framework that relates mechanisms of pathogenesis to symptomology and pathophysiology.

**Selectives**

M04 526 NEW DISEASES, NEW PATHOGENS  
Instructor: David B. Haslam, M.D., 454-6050  
This selective will focus on the process by which new etiologic agents of disease have been discovered. Special attention will be paid to the logical process by which a causative role is attributed to a newly discovered pathogen. This selective will also focus on understanding the process of identification and characterization of virulence determinants. Examples will be taken from bacterial, protozoan, viral and fungal pathogens.

M04 533 TROPICAL MEDICINE  
Instructor: Daniel E. Goldberg, M.D., Ph.D., 362-1514  
Washington University has several faculty members who are actively researching diseases specific to developing countries. This elective is designed to bring these individuals together, in an informal discussion forum with students, to highlight the problems particular to geographical medicine.
selective will cover issues including eradication, prevention and treatment, immunology and vaccine
development, as well as description of the different disease syndromes themselves. This selective is
cross-listed in Department of Medicine.

**Fourth Year**

**Electives**

At present, the primary enrollees in the following courses are students working for a Ph.D. degree in
one of the basic sciences. However, these courses are recommended for interested medical students,
especially those who may be considering a career in medical research, such as MSTP students.
Emphasis is placed on the organization and function of living systems at the molecular level. The
courses combine formal lectures with student-directed seminars. Course descriptions are presented
under Division of Biology and Biomedical Sciences.

L41 (Bio) 5217 SPECIAL TOPICS IN MICROBIAL PATHOGENESIS
L41 (Bio) 5392 MOLECULAR MICROBIOLOGY AND PATHOGENESIS

*Note — The number preceding the course title indicates that the course carries credit in the Graduate
School of Arts and Sciences.*

**Research**

**(M30 900)**

*Cross-listed with L41 (Bio) 590*

John P. Atkinson, M.D., 10th Floor Clinical Sciences Research Building, 362-8391. Binding to and
signaling by microbes interacting with human complement receptors and regulatory proteins
(lab-based project) or chart-based analysis of a group of patients with vasculitic syndromes (clinical
project).

Douglas E. Berg, Ph.D., 8th Floor McDonnell Pediatric Research Building, 362-2772. Helicobacter
pylori: mechanisms of gastric colonization and disease; bacterial genetic diversity and individual host
specificity; mechanisms and evolutionary costs of drug resistance; molecular epidemiology and
evolution.

Stephen M. Beverley, Ph.D., 9th Floor McDonnell Pediatric Research Building, 747-2630. Molecular
genetics of protozoan parasites and tropical diseases; biosynthesis of the parasite surface, genomics,
virulence and drug action or resistance.

Keril Blight, Ph.D., 9th Floor McDonnell Pediatric Research Building, 286-0065. Molecular Biology of
Hepatitis C Virus. Our laboratory studies hepatitis C virus (HCV) which has emerged as one of the
primary causes of chronic liver disease, with an estimated 170-200 million carriers throughout the
world. HCV replication is thought to occur on the surface of rearranged membranes derived from the
endoplasmic reticulum (ER), however the role of individual HCV proteins and how components of the
virus and host cell assemble to productively replicate the HCV RNA genome are not known. Our work
combines recently developed cell culture replication systems with genetic and biochemical approaches
to investigate the fundamental mechanisms of membrane-associated HCV replication and the
determinants of the virus-host interaction.

Current efforts are directed towards identifying and characterizing interactions among the HCV
non-structural proteins essential for assembly of functional HCV replication complexes. We have
begun to define specific domains and sequences of viral proteins that alter the ability of HCV to
replicate. Research projects are aimed at identifying viral sequences critical for HCV replication, defining interactions between HCV proteins and host factors required for productive replication and understanding how viral proteins rearrange membranes of the ER to provide an environment conducive for HCV replication.

Another emphasis of the laboratory is directed towards defining the role of highly conserved RNA elements in the HCV genome. These efforts are coupled with experiments aimed at defining host proteins interacting with these essential sequences and determining the functional importance of RNA-protein interactions in HCV replication.

Michael Caparon, Ph.D., 10th Floor McDonnell Pediatric Research Building, 362-1485. Molecular genetics and pathogenicity of the streptococci and other pathogenic gram positive bacteria.

Michael S. Diamond, M.D., Ph.D., 7th Floor McDonnell Pediatric Research Building, 362-2842. The research in our laboratory focuses on the interface between viral pathogenesis and the host immune response. Two globally important mosquito-borne RNA viruses are studied, the West Nile encephalitis and Dengue hemorrhagic fever viruses. Studies with Dengue virus (DV) have focused on identifying the host and viral factors that modulate the severity of an infection. Another direction for the laboratory is the investigation of the pathogenesis of West Nile virus infection (WNV) and the immune system response that prevents dissemination in the central nervous system. By infecting genetically and functionally immunodeficient mice with WNV, cells and molecules of the immune system are identified that are essential to the resolution of viral infection.

Tamara L. Doering, M.D., Ph.D., 10th Floor McDonnell Pediatric Research Building, 747-5597. The Doering lab studies the opportunistic fungal pathogen, Cryptococcus neoformans. We focus on synthesis of the main virulence factor of this organism, its polysaccharide capsule, with the dual motivations of elucidating basic biology and identifying potential drug targets. Current approaches include those of biochemistry, cell and molecular biology, and genetics.

M. Wayne Flye, M.D., Ph.D., 5108 Queeny Tower, 362-7145. Biochemical and gene regulation of local and systemic immune responses by the environment and cells of the liver and gastrointestinal tract with particular attention to the Kupffer cell.


David B. Haslam, M.D., 6th Floor McDonnell Pediatric Research Building, 286-2888. Our laboratory is investigating the trafficking of shiga toxin within human cells. In particular, we are examining the role of chaperones in the endoplasmic reticulum in toxin transport into the cytoplasm.


Hsiu-San Lin, M.D., Ph.D., Room A10, Center for Advanced Medicine, 362-8525. Differentiation and function of mononuclear phagocytes.

Jeffrey S. McKinney, M.D., Ph.D., 6105 McDonnell Pediatric Research Building, 286-2912. The molecular pathogenesis of E. coli and Salmonella infections. We employ novel RNA-based techniques of bacterial gene regulation to dissect host-pathogen interactions, using E. coli and Salmonella as model systems. We also study the diverse capabilities and functions of RNA in vitro and in vivo and are designing new RNA molecules amenable to in vitro evolution and to studies of RNA biology in bacteria.

Virginia L. Miller, Ph.D., 8th Floor McDonnell Pediatric Research Building, 286-2891. Molecular basis of pathogenicity of the enteric pathogens Yersinia enterocolitica, Salmonella typhmurium, and Klebsiella pneumoniae.


Lee Ratner, M.D., Ph.D., 562 McDonnell Sciences, 362-8836. Structure and function of human retroviruses, including HTLV-I, a cause of leukemia, and HIV, the cause of AIDS. The major focus is in studying the regulation of virus infectivity, replication, assembly and pathogenicity.


L. David Sibley, Ph.D., 9th Floor McDonnell Pediatric Research Building, 362-8873. We are studying the intracellular survival mechanisms of protozoan parasites. Current approaches include high-resolution real-time microscopy, genetic mapping and genomic analyses.

Samuel L. Stanley, Jr., M.D., 7th Floor, McDonnell Pediatric Research Building, 362-1070. We study the protozoan parasite Entamoeba histolytica, the cause of amebic dysentery and amebic liver abscess, focusing on developing models to better understand the pathogenesis of amebic infection, novel targets for anti-amebic drug design, and the nature of the host immune and inflammatory response to enteric pathogens. We are also interested in the immunogenetics of infectious diseases, and how genetic factors increase susceptibility or resistance to select agents and emerging infections.

Joseph W. St. Geme, M.D., 6th Floor McDonnell Pediatric Research Building, 286-2887. The molecular mechanism of Haemophilus influenzae pathogenicity. H. influenzae is an important cause of human respiratory tract and systemic diseases and a source of substantial morbidity. We are principally interested in characterizing the bacterial and host cell determinants of H. influenzae interaction with respiratory epithelium, an essential early step in the pathogenesis of disease. We anticipate that these studies will assist efforts to develop a strategy for the universal prevention of Haemophilus disease and provide insights into other mucosal pathogens.

Gregory Storch, M.D., 2N52 St. Louis Children’s Hospital, 454-6079. In this elective, the student will participate in a research project involving the application of techniques of molecular biology, especially the polymerase chain reaction and nucleotide sequencing, to the diagnosis of the infectious diseases. Infectious agents currently under investigation include human cytomegalovirus, Epstein-Barr virus, BK polyoma virus, Ehrlichia, Mycoplasma pneumoniae, and Borrelia. Studies are also directed at molecular detection and analysis of resistance to antimicrobial agents.

Patrick M. Stuart, Ph.D., 1216 McMillan, 362-9336. Virology. Investigate the role viral-induced immune responses play in corneal pathology seen in both primary and recurrent herpes infections of the eye. Characterize the role that apoptotic pathways play in herpetic diseases of the eye. To develop and characterize anti-herpetic vaccines as well as immunologically-based tolerance procedures that are
effective in preventing recurrent herpetic keratitis.

Transplantation. Investigate the role that the interaction of Fas with Fas ligand plays in corneal allograft acceptance and neovascularization of the cornea. In addition, we are studying the role that this interaction plays in the development of immune tolerance that allows the immune system to ignore transplantation antigens leading to allograft acceptance.

Herbert Virgin, M.D., Ph.D., 1754 West Building, 362-9223. We work on issues at the interface of virology and immunology by analyzing aspects of immunity that control infection and aspects of viral structure/genetics that contribute to virulence, disease and oncogenesis. We study the pathogenesis and latency of the dsDNA enveloped murine cytomegalovirus and gammaherpesvirus 68.

Joseph P. Vogel, Ph.D., 10th Floor McDonnell Pediatric Research Building, 747-1029. Legionella pneumophila, the causative agent of Legionnaires’ pneumonia, replicates inside alveolar macrophages by preventing phagosome-lysosome fusion.

Faculty

STEPHEN M BEVERLEY, PHD  Head of the Department of Molecular Microbiology, Marvin A Brennecke Professor of Molecular Microbiology

NATALIA S AKOPYANTS, PHD, MS  Assistant Research Scientist of Molecular Microbiology

JOHN PATTERSON ATKINSON, MD  Professor of Molecular Microbiology

WANDY L. BEATTY, PHD  Research Instructor in Molecular Microbiology

DOUGLAS E BERG, PHD  Alumni Professor of Molecular Microbiology

KERIL J. BLIGHT, PHD, BS  Assistant Professor of Molecular Microbiology

TAMARA L. BRENT, MD, PHD  Associate Professor of Molecular Microbiology

MICHAEL G CAPARON, JR., PHD  Professor of Molecular Microbiology

SUSAN E CULLEN, PHD  Adjunct Professor of Molecular Microbiology

MICHAEL DIAMOND, MD, PHD  Assistant Professor of Molecular Microbiology

DEBORAH E DOBSON, PHD  Research Associate Professor of Molecular Microbiology

KAREN W DODSON, PHD  Instructor in Molecular Microbiology

WILLIAM MICHAEL DUNNE, JR., PHD  Professor of Molecular Microbiology

LINDA G EISENBERG, PHD  Instructor in Molecular Microbiology

JULIAN B FLEISCHMAN, PHD  Associate Professor Emeritus of Molecular Microbiology

M. WAYNE FLYE, MD, PHD, MA  Professor of Molecular Microbiology

DANIEL E GOLDBERG, MD, PHD  Professor of Molecular Microbiology

WILLIAM E GOLDMAN, PHD  Professor of Molecular Microbiology

EDUARDO GROISMAN, PHD  Professor of Molecular Microbiology, Howard Hughes Medical Institute Investigator in
Department of Neurological Surgery

Instruction in neurological surgery begins with an introduction to the anatomy and physiology of the nervous system presented in the first-year course in neural sciences directed by the Department of Anatomy and Neurobiology with participation of the neurosurgery faculty. In the second year, the Department of Neurological Surgery presents the course in Diseases of the Nervous System in conjunction with the Departments of Neurology, Pathology, Molecular Biology and Pharmacology, Medicine and Pediatrics. The course emphasizes how knowledge derived from basic or clinical investigations leads to improvements in clinical care. In the third year, students participate in a four-week clerkship in Neurology, which introduces students to the clinical care of patients with diseases of the nervous system. Neurosurgical faculty members also work with the neurologists in providing lectures, demonstrations and teaching exercises in patients with neurological diagnoses as part of the Clinical Medicine course. Some students may elect to fulfill their neurology requirement by rotating on the neurosurgery service. Neurosurgical diagnosis, critical care, operative treatment and ethical issues in patient management are emphasized. In the fourth year, students may choose from several advanced electives including clinical externships in neurosurgery and experiences in basic or clinical/translational research.

The Divisions within Neurological Surgery are:

The James L. O'Leary Division of Experimental Neurology and Neurological Surgery: Thomas A. Woolsey, M.D. (Director)

The Division of Pediatric Neurosurgery: Jeffrey R. Leonard, M.D.; Matthew D. Smyth, M.D.; Tae Sung Park, M.D.

The Center for the Study of Nervous System Injury is based in the Department of Neurology with participation by neurosurgery faculty members, Ralph G. Dacey Jr., M.D.; Jeffrey M. Gidday, Ph.D.; Tae Sung Park, M.D.

The Center for Spinal Cord Injury (with Neurology)

Areas of Neurosurgical specialization include:

Epilepsy Surgery: Joshua L. Dowling, M.D.

Cranial Base Surgery: Michael R. Chicoine, M.D.; Robert L. Grubb Jr., M.D.; Gregory J. Zipfel, M.D.

Pituitary Surgery: Michael R. Chicoine, M.D.; Ralph G. Dacey Jr., M.D.; Gregory J. Zipfel, M.D.

Neuro-Oncology: Michael R. Chicoine, M.D.; Ralph G. Dacey Jr., M.D.; Keith M. Rich, M.D.

Pediatric Neurosurgery: Jeffrey R. Leonard, M.D.; Matthew D. Smyth, M.D.; Tae Sung Park, M.D.

Cerebrovascular Surgery: Michael R. Chicoine, M.D.; Ralph G. Dacey Jr., M.D.; Robert L. Grubb Jr., M.D.; Keith M. Rich, M.D.; Gregory J. Zipfel, M.D.


Surgical Management of Pain: Joshua L. Dowling, M.D.

Courses
First Year

Selectives
M04 5667 MICROCIRCULATION
Instructor: Jeffrey M. Gidday, Ph.D., 286-2795
The homeostatic functions of the microcirculation include the active regulation of metabolite exchange with parenchymal cells, immune surveillance, and a multifaceted response to injury and disease. This elective provides an overview of the normal and abnormal cell biology and physiology of the microcirculation. Four sessions will be organized around conceptual presentations and laboratory demonstrations by the instructor, and two-part topic presentations by students following independent library research that focuses on basic physiology and clinically relevant pathophysiology. Basic physiology research topics might include: regulation of tissue blood flow and vascular tone, propagated vasodilation, hemodynamics and rheology of erythrocytes and leukocytes, cell biology of the endothelium, control of capillary permeability, and angiogenesis. Common disease entities involving microcirculatory dysfunction include: stroke and myocardial ischemia, diabetes, inflammation, tumor angiogenesis, sickle cell anemia, retinopathy of prematurity, pulmonary edema, various autoimmune diseases, as well as the adaptive cardiovascular responses to exercise or high altitude. (This selective is cross-listed in the Department of Cell Biology & Physiology).

Third Year

Third Year Clerkship opportunities
Up to two students may elect to obtain their neurology clerkship experience on the neurosurgery service or they can choose neurosurgery as part of the surgical specialty rotations. Third-year students participate with the residents and attendings on hospital rounds, evaluate patients in the neurosurgery outpatient department and participate in the neurosurgical operating room. The main objectives of the rotation include: 1) the evaluation of comatose or head-injured patients; 2) clinical presentation, diagnostic work-up and treatment of cervical and lumbar disc disease; and 3) evaluation and treatment of patients with hemorrhagic and ischemic stroke.

Fourth Year

Elective
M40 805 NEUROSURGERY
Instructor(s): Ralph Dacey, Jr., M.D., 362-3571
Location: McMillan Hospital
Elective Contact: Ralph Dacey, Jr., M.D., 362-3571
Other Information: Students should contact Dr. Dacey prior to the first day of the elective.
Enrollment limit per period: 7
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

The goal is to provide an overview of neurological surgery. Responsibilities will include patient workup, pre-, intra- and postoperative care, diagnostic procedures, daily resident and weekly grand rounds, clinics, Saturday morning lectures for Junior class, and weekly combined Neurology, Neurosurgery, and Neuropathology conferences.
Student time distribution: Outpatient 90%, Conferences/Lectures 10%; Subspecialty Care 100%
Major teaching responsibility: N/A
Patients seen/weekly: 125
On call/weekend responsibility: None
Research

(M40 900)

Michael R. Chicoine, M.D., 5th Floor McMillan, 362-3414. The biology of brain tumors. One area of research focuses on the aggressive nature of certain meningiomas, including their tendency to invade the parenchyma of the brain, cranial nerves, cerebral arteries, dura and bone. The second area of research focuses on the invasive behavior of gliomas. Both of these research topics are investigated using human brain tumor tissue obtained at the time of neurosurgical operations.

Ralph G. Dacey, Jr., M.D., 5th Floor McMillan, 362-3571. Research on the cerebral microcirculation: Our studies focus on examination of molecular mechanisms in the endothelial cells and smooth muscle cells in the intracerebral microcirculation. In vitro techniques for studying isolated perfused microvessels are used to examine questions centered on endothelial smooth muscle cell integration of cerebral blood flow responses.

Jeffrey M. Gidday, M.D., 286-2795. Research in our laboratory is aimed at understanding the mechanisms responsible for vascular dysfunction in brain, retina, and spinal cord in the setting of ischemia, episodic hypoxia, trauma and diabetes. Our studies employ videomicroscopic methods in transgenic mice and other animals to directly visualize oxidative, inflammatory and proteolytic injury processes in the CNS microcirculation. Cerebral and retinal endothelial cell cultures are also used concomitantly as in vitro models of microvascular injury. Another interest in the laboratory is developing models for, and elucidating the mechanisms of, robust neuroprotection in CNS tissues by sublethal hypoxic or ischemic stress, a process called preconditioning.

Robert L. Grubb, Jr., M.D., 5th Floor McMillan, 362-3567. Research on cerebral circulation and metabolism, utilizing short-lived cyclotron produced isotopes of oxygen, carbon and nitrogen is performed in humans. Positron emission tomography is used to measure cerebral circulation and metabolism in patients with severe head injuries, intra-cerebral hemorrhages and atherosclerotic carotid artery occlusive disease. Opportunities exist for the application of computer systems to biological modeling and data processing.

T. S. Park, M.D., 1S46 St. Louis Children’s Hospital, 454-2811. Chemical and molecular mechanisms of neutrophil-mediated microvascular injury following ischemia in the brain. Neutrophil-endothelial adherence and consequent endothelial cell injury are studied in hypoxia-reperfusion models of whole animals and cultured endothelial cells. The role of nitric oxide, peroxynitrite, elastase and myeloperoxidase products on neutrophil and endothelial cells in neutrophil-endothelial interactions is under investigation. Clinical outcome of selective dorsal rhizotomies for treatment of spastic cerebral palsy, and selective amygdalohippocampectomy for treatment of intractable mesial temporal lobe epilepsy in childhood.


Thomas A. Woolsey, M.D., 3807 North Building, 362-3600. Dr. Woolsey studies structure, function, development, plasticity and blood flow in the central nervous system. The somatosensory system of rodents is the model system where each whisker has discrete and easily recognizable groups of neurons and projections at each central stations from the brainstem to the cerebral cortex. Currently under study are: (1) mechanisms of dynamic changes in the cerebral microcirculation with neuronal activity; (2) pattern formation in central neural pathways including the roles of functional activity growth factor; (3) brain function changes in models of stroke, tumors, and seizures; (4) interactions of groups of neurons for processing of sensory information.

Neill Wright, M.D., 5 McMillan, 362-3630, wrightk@nsurg.wustl.edu. Molecular aspects of spine fusion.
Research in our laboratory is focused on the molecular aspects of spinal fusion. Our current focus is on the interactions between bone morphogenetic proteins (BMPs), proteins involved in many biological processes but also heavily implicated in the initiation of bone healing, and their receptors. Research tools used in our laboratory include in vitro manipulation of protein-receptor interactions, as well as animal studies.

Faculty

RALPH G DACEY, JR, MD  Head of the Department of Neurological Surgery, Henry G and Edith R Schwartz Professor of Neurological Surgery
ANDREAS H BURKHALTER, PHD  Associate Professor of Neurobiology in Neurological Surgery
MICHAEL R CHICOINE, MD  Assistant Professor of Neurological Surgery
WILLIAM S COXE, MD  Professor Emeritus of Neurological Surgery
DEWITTE T CROSS, III, MD  Associate Professor of Neurological Surgery
COLIN PIETER DERDEYN, MD  Associate Professor of Neurological Surgery
HANS H DIETRICH, PHD  Research Assistant Professor of Neurological Surgery
MICHAEL N DIRINGER, MD  Professor of Neurological Surgery
JOSHUA L DOWLING, MD  Assistant Professor of Neurological Surgery
ROBERT E DRZYMALA, PHD  Associate Professor of Neurological Surgery
MOKHTAR H GADO, MBBCH  Professor of Neurological Surgery
JEFFREY M GIDDAY, PHD  Associate Professor of Neurological Surgery
ROBERT L GRUBB, JR, MD  Herbert Lourie Professor of Neurological Surgery
MATTHEW A HOWARD  Adjunct Assistant Professor of Neurological Surgery
JEFFREY R. LEONARD, MD, BS  Assistant Professor of Neurological Surgery
CHRISTOPHER J MORAN, MD  Professor of Neurological Surgery
TAE SUNG PARK, MD  Shi Hui Huang Professor of Neurological Surgery
STEVEN E PETERSEN, PHD  Associate Professor of Neurological Surgery (Neuropsychology)
WILLIAM JOHN POWERS, MD  Professor of Neurological Surgery
YOLANDA MARIE RANGEL  Research Instructor in Neurological Surgery
KEITH M RICH, MD  Associate Professor of Neurological Surgery
PAUL SANTIAGO, MD  Assistant Professor of Neurological Surgery
GORDON L SHULMAN, PHD  Research Scientist of Neurological Surgery (Neuropsychology)
MATTHEW D SMYTH, MD  Assistant Professor of Neurological Surgery
Department of Neurology

Neurology concerns itself with the diseases of brain, spinal cord, peripheral nerves and muscles. An introduction to the anatomy and physiology of the nervous system is presented in the first-year neuroscience course by the Department of Anatomy and Neurobiology, with participation of faculty from the Department of Neurology. A first-year selective called "Clinical Correlations in Neuroscience" is available, which is an opportunity for interested students to shadow physicians in neuro-related fields and attend basic science or clinical conferences. In the second year, the Department of Neurology presents the course in "Diseases of the Nervous System" in conjunction with the Departments of Pathology, Neurosurgery, and Ophthalmology. The course emphasizes the pathophysiology, pathology, clinical manifestations, and treatment of the major neurological and neurosurgical diseases. The Department also participates in the Practice of Medicine course, providing lectures, demonstrations and teaching exercises with patients in neurological physical diagnosis.

In the third year, a four-week clerkship in Neurology introduces students to the clinical care of patients with diseases of the nervous system. Questions pertaining to neurosurgical treatment, neurorehabilitation and ethical issues in management also are addressed. In the fourth year, opportunities exist for many varieties of advanced clinical or research experience. A four-year residency program prepares medical graduates for specialization in neurology. Subspecialty fellowship programs routinely provide additional training in epilepsy; electrophysiology; EMG; sleep medicine; cerebrovascular disease and stroke; neuroimmunology; neurological critical care; neuromuscular disease; neuropsychology; and movement disorders.

Three divisions exist within Neurology: the Division of Adult Neurology, the Division of Pediatric and Developmental Neurology, and the Division of Neuropsychology.

**Division of Neuropsychology:** Steven E. Petersen, Ph.D. (Division Director), Francis Miezin, B.S., M.S., Bradley Schlaggar, M.D., Ph.D., Gordon L. Shulman, Ph.D.

**Division of Pediatric and Developmental Neurology:** Edwin Trevathan, M.D., M.P.H. (Division Director), Janice Brunstrom, M.D., Anne Connolly, M.D., Philip Dodge, M.D., W. Edwin Dodson, M.D., Kevin Ess, M.D., Ph.D., Paul Golumbek, M.D., Ph.D., Chris Gurnett, M.D., Ph.D., Jeffrey Neil, M.D., Ph.D., Michael Noetzel, M.D., Author Prensky, M.D., Steven Rothman, M.D., Bradley Schlaggar, M.D.,
In addition, several sections of faculty members are established for specialized research and teaching purposes. They include:

**Aging and Dementia Section:** John C. Morris, M.D. (Section Head), David A. Balota, Ph.D., Randall Bateman, M.D., Carolyn Baum, Ph.D., Angela Berry, M.S.N., Robert Brendza, Ph.D., Virginia D. Buckles, Ph.D., David Carr, M.D., Mary A. Coats, B.S.N., Alexander W. Dromerick, M.D., Janet M. Duchek, Ph.D., Dorothy F. Edwards, Ph.D., James E. Galvin, M.D., Alison Goate, DPhil, David M. Holtzman, M.D. (Department Chairman), Terri L. Hosto, M.S.W., David Johnson, Ph.D., Eugene M. Johnson, Jr., Ph.D., Thomas M. Meuser, Ph.D., Pamela Millsap, M.S.N., Anne Fagan Niven, Ph.D., Janice L. Palmer, M.S., Stacy Schneider, M.S.N., Yvette I. Sheline, M.D., B. Joy Snider, M.D., Ph.D., Martha Storandt, Ph.D., Christy Tomlinson, M.S.N.

**Hope Center for Neurological Disorders:** Mark P. Goldberg, M.D. (Director), Randall Bateman, M.D., Philip V. Bayly, Ph.D., Robert Brendza, Ph.D., David Brody, M.D., Ph.D., Janice E. Brunstrom, M.D., Maurizio Corbetta, M.D., Anne Cross, M.D., Ralph G. Dacey, Jr., M.D., Gabriel A. de Erausquin, M.D., Ph.D., Anne Fagan-Niven, Ph.D., James E. Galvin, M.D., MSc., Jeffrey M. Gidday, Ph.D., Allison Goate, Ph.D., David I. Gottlieb, Ph.D., David M. Holtzman, M.D. (Department Chairman), Krzysztof Hyrc, Ph.D., Mark F. Jacquin, Ph.D., Eugene M. Johnson Jr., Ph.D., Jin-Moo Lee, M.D., Ph.D., Jeffrey D. Milbrandt, M.D., Ph.D., Jeffrey J. Neil, M.D., Ph.D., Yannan Ouyang, Ph.D., Tae Sung Park, M.D., Alexander Parsadanian, Ph.D., Joel S. Perlmutter, M.D., William J. Powers, M.D., Steven M. Rothman, M.D., Anneliese M. Schaefer, Ph.D., Christian Sheline, Ph.D., B. Joy Snider, M.D., Ph.D., Liu-Lin Thio, M.D., Ph.D., Michael Wong, M.D., Ph.D., Jian Xu, Ph.D., Kelvin A. Yamada, M.D., Xiao-Feng Yang, M.S., M.D., Kejie Yin, M.D., Ph.D.

**Cerebrovascular Disease Section:** William J. Powers, M.D. (Section Head), Mark P. Goldberg, M.D. (Co-Head), Janice E. Brunstrom, M.D., Maurizio Corbetta, M.D., Colin P. Derdeyn, M.D., Michael N. Diringer, M.D., Alexander W. Dromerick, M.D., Dorothy F. Edwards, Ph.D., Robert Fucetola, Ph.D., David M. Holtzman, M.D. (Department Chairman), Jin-Moo Lee, M.D., Ph.D., Abdul Nassief, M.D., Jeffrey J. Neil, M.D., Ph.D., Michael J. Noetzel, M.D., Marcus E. Raichle, M.D., Steven M. Rothman, M.D., Bradley L. Schlaggar, M.D., Ph.D., Kelvin A. Yamada, M.D., Allyson Zazulia, M.D.

**Clinical Neurophysiology Section:** Muhammad T. Al-Lozi, M.D., Lawrence Eisenman, M.D., Ph.D., Edwin Trevathan, M.D., M.P.H. (Section Heads), Anne M. Connolly, M.D., Stephen P. Duntley, M.D., Kevin Ess, M.D., Ph.D., Christina Gurnett, M.D., Ph.D., Glenn Lopate, M.D., Liu Lin Thio, M.D., Ph.D., Michael Wong, M.D., Ph.D., Kelvin A. Yamada, M.D., John Zempel, M.D., Ph.H.

**Adult/Pediatric Epilepsy and Sleep Section:** Stephen Duntley, M.D. (Section Co-Head), Lawrence Eisenman, M.D., Ph.D. (Section Co-Head), Edwin Trevathan, M.D., M.P.H. (Section Co-Head), Kelly Brown, M.D., W. Edwin Dodson, M.D., Kevin Ess, M.D., Ph.D., Christina Gurnett, M.D., Ph.D., Jean Holowch-Thurston, M.D., Neale Lange, Timothy Lynch, M.D., Jay Piccirillo, Steve Rothman, M.D., Helena Schotland, Liu Lin Thio, M.D., Ph.D., Michael Wong, M.D., Ph.D., Kelvin Yamada, M.D., John Zempel, M.D., Ph.D.

**Neuroimaging Section:** William J. Powers, M.D. (Section Head), Kevin Black, M.D., Maurizio Corbetta, M.D., Colin P. Derdeyn, M.D., Francis Miezin, M.S., Jeffrey J. Neil, M.D., Ph.D., Joel S. Perlmutter, M.D., Steven E. Petersen, Ph.D., Bradley Schlaggar, M.D., Ph.D., Gordon L. Shulman, Ph.D., Tom O. Videen, Ph.D., Allyson Zazulia, M.D.

**Movement Disorders Section:** Joel S. Perlmutter, M.D. (Section Head), Kevin J. Black, M.D., Gammon Earhart, Ph.D., Tamara Hershey, Ph.D., William M. Landau, M.D., Lori McGee-Minnich, B.S., B.S.N., William J. Powers, M.D., Brad A. Racette, M.D., Bradley L. Schlaggar, M.D., Ph.D., Samer Tabbal, M.D., W. Thomas Thach Jr., M.D.

**Neuroimmunology Section:** D. Anne Cross, M.D. (Section Head), Becky J. Parks, M.D., Robert T. Naismith, M.D.
Neurological Critical Care Section: Michael N. Diringer, M.D. (Section Head/Director—NNICU), Katia Axelrod, M.D., Rajat Dhar, M.D., Wiley Hall, M.D., Salah Heyrouz, M.D.

Neuromuscular Diseases Section: Alan Pestronk, M.D. (Section Head), Muhammad T. Al-Lozi, M.D., Anne M. Connolly, M.D., Americo Fernandes, M.D., Julaine M. Florence, P.T., Paul Golumbek, M.D., Glenn Lopate, M.D., Oliver Ni, M.D., Zeng Wang, M.D.

Stroke and Brain Injury Recovery Section: Maurizio Corbetta, M.D. (Section Head), David Brody, M.D., Lisa Connor, Ph.D., Alexander Dromerick, M.D., Robert Fucetola, Ph.D., Thy Huskey, M.D., Jay Kottage, M.D., Frances Tucker, Ph.D.

Spinal Cord Injury Recovery Section: Oksana Volshteyn, M.D. (Section Head), Neringa Juknis, M.D., Ph.D., Rimma Ruvinskaya, M.D.

Courses

First Year

Selectives

M04 5017-01 Clinical Correlations in Neuroscience
Instructor: Allyson Zazulia, M.D., 362-7241
Clinical faculty for this selective are members of the Departments of Neurology, Pediatric Neurology, Neurosurgery, Neuro ICU, Radiology, Pathology and Psychiatry. Students will shadow physicians, attend rounds, and meet for seminars and demonstrations to discuss particular patient cases and research studies. Teaching Objective—to gain exposure to medical career options involving neuroscience.

Second Year

M35 632 Diseases of the Nervous System
Instructor: Allyson Zazulia, M.D., 362-7241
The goal of this course is to provide an introduction to diseases of the central and peripheral nervous systems, including their clinical manifestations, pathology, pathophysiology and pharmacotherapy. The course includes reading assignments, lectures, laboratories, conferences and clinical presentations.

Third Year

M35 720 Neurology Clerkship
Instructor: Robert Naismith, M.D., 362-3293
A full-time, four-week clerkship is provided on the inpatient neurology services at Barnes-Jewish Hospital south. Patients are assigned to students who evaluate and follow them with the resident staff and discuss them regularly in conferences with the senior neurological staff. Students also work in the neurology clinic under staff supervision and attend a series of lectures on neurosurgical problems. The goal of this rotation is to gain expertise in the evaluation and treatment of patients with neurologic diseases.

Up to two students may elect to obtain their clerkship experience on the neurosurgery service. Up to two students may elect a two-week experience in outpatient pediatric neurology. Students participate in the neurology specialty clinics at Children’s Hospital, working under the supervision of pediatric neurology fellows and senior staff.
M25 730 Physical Medicine and Rehabilitation Clerkship
Instructor: Oksana Volshteyn, M.D., 454-7757
Clerkship in PM&R for third-year medical students provides an opportunity to gain basic knowledge and clinical skills in evaluation and management of wide range of neurological and musculoskeletal diseases and conditions that require specialized rehabilitative medical and therapeutic care. Students spend two weeks on Spinal Cord Injury Unit (SCI) and two weeks on Brain Injury (BI) and Stroke Unit at The Rehabilitation Institute of St. Louis. Students are expected to be a part of the rehabilitation team, follow two to three patients, participate in daily morning rounds, participate in performing consults, attend team meetings and family conferences.

Students are required to attend several outpatient clinics such as SCI, BI, Amputee and Stroke. During the entire rotation, students work together with PM&R residents and fellows, and under direct guidance of the NeuroRehabilitation faculty. The usual duty hours are 7-7:30 a.m. to 5 p.m. on weekdays and 8 a.m. to noon on Saturdays. There is no night call.

Students are required to attend all PM&R curriculum lectures and conferences. On the first day of rotation, students meet with the PM&R program director to go over goals, objectives and schedules. Upon completion of the rotation, students are required to fill out the evaluation form to provide feedback regarding rotation experience.

Fourth Year

Electives

M35 815 CONSULT NEUROLOGY
Instructor(s): Robert Naismith, M.D., 362-3296
Location: Barnes-Jewish Hospital and Emergency Rooms
Elective Contact: Carol Lane, 362-3296
Other Information: Students should page neurology consult resident, 8:00 a.m. first day of elective. Obtain pager number in advance from Carol Lane, 362-3296. Enrollment limit per period: 2
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

The student will evaluate patients with neurological manifestations of medical, surgical and psychiatric diseases and participate in their care under the supervision of the consult resident and attending physician. The student also will attend weekly clinical conferences, including Neurology Grand Rounds. Student time distribution: Inpatient 90%, Outpatient 5%, Conferences/ Lectures 5%; Subspecialty Care 100%
Major teaching responsibility: Single attending and resident
Patients seen/weekly: 10-15
On call/weekend responsibility: No call/weekends until noon Saturday

M35 816 INPATIENT NEUROLOGY SUBINTERNSHIP
Instructor(s): Robert Naismith, M.D.
Location: 11400 Barnes-Jewish Hospital
Elective Contact: Carol Lane, 362-3296
Other Information: Students should report to 11400 Barnes-Jewish, 7:00 a.m. first day of elective. Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

Students will function as a subintern on the inpatient neurology service under the supervision of the junior resident, the chief resident, and the attending physicians. The student will also attend weekly clinical conferences. This elective would be a good option for Wash U students who are interested in a career in Neurology, or would like additional Neurology experience before their residency. It would also be good for visiting students interested in Neurology who would like a closer look at our program. Student time distribution: Inpatient 100%
Major teaching responsibility: Attending physicians, chief residents, junior resident
Patients seen/weekly: 6
On call/weekend responsibility: Every 6th night

M35 851 CLINICAL ASPECTS OF AGING AND DEMENTIA
Instructor(s): John C. Morris, M.D., and James E. Galvin, M.D., 286-2683
Location: Health Key Building
Elective Contact: Tom Meuser, Ph.D. or Mary Coats, M.S.N. 286-2683
Other Information: Contact Dr. Meuser prior to first day of elective to set up orientation. Students should report to the Memory and Aging Project in the Health Key Building at 4488 Forest Park Avenue, 8:30 a.m. first day of elective. Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 9, 13, 33 and 37.

This elective focuses on the distinction of dementia from healthy aging and on the differential diagnosis of dementia, including Alzheimer’s disease, dementia with Lewy bodies, frontotemporal dementias, cerebrovascular disorders, and affective disorders. The student will gain proficiency in interviewing techniques and in the neurologic examination of the geriatric patient, be introduced to neuropsychological, neuropathological, radiologic and other biomedical procedures important in the diagnostic evaluation of the aged, and consider clinical trials of experimental agents used in memory disorders and practical aspects of the management of the demented patient and his or her family.
Student time distribution: Outpatient 80%, Conferences/Lectures 20%; Subspecialty Care 100%
Major teaching responsibility: Single attending
Patients seen/weekly: 6-10
On call/weekend responsibility: None

M35 860 PEDIATRIC NEUROLOGY
Instructor(s): Edwin Trevathan, M.D., 454-6042
Location: 12E25 St. Louis Children’s Hospital
Elective Contact: Brenda McCall, 454-6042
Other Information: Students report to Dr. Trevathan at St. Louis Children’s Hospital, 8:30 a.m. first day of elective. Enrollment limit per period: 1(Inpatient); 1(Consultation Office Service)
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

We offer two senior electives: 1) On our Inpatient Elective the student participates as a full member of the neurology ward team and is directly responsible for a proportion of patients on the service under the direction of the senior pediatric neurology resident. The student may take night call every third or fourth night, during which time s/he is responsible for the medical care of the entire ward, as well as for emergency admissions under supervision of a pediatric resident. Formal teaching rounds with the attending pediatric neurologist are held three times a week, and informal teaching rounds are held daily with the senior residents. 2) On our Outpatient Elective the student will attend daily outpatient clinics, during which time s/he will be able to evaluate outpatient problems under faculty guidance. There are pediatric neurology clinics five days a week, in addition to teaching conferences. This elective allows students to see many new and return patients in a tutorial type of setting since patients are immediately reviewed with senior faculty.
Student time distribution: Inpatient rotation 80%, Outpatient rotation 80%, Conferences/Lectures 20%; Subspecialty Care 100%
Major teaching responsibility: Inpatient: Single attending and senior resident, Outpatient: Multiple attendings
Patients seen/weekly: Inpatient: 5-9, Outpatient: 20-25
On call/weekend responsibility: Inpatient: 5-9, Outpatient: 20-25

M35 861 NEUROLOGY/NEURSURGERY ICU
Instructor(s): Michael Diringer, M.D., and Venkatesh Aiyagari, M.D., 362-2999
Location: 10400B Barnes-Jewish Hospital
Elective Contact: Liz Vansickle, 362-2999  
Other Information: Students report to 10400 ICU, 8:30 a.m. first day of elective. Enrollment limit per period: 2  
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

The student will be integrated into the Critical Care Team that provides care in the Neurology/Neurosurgery ICU. Diseases frequently encountered include intracerebral hemorrhage, head trauma, subarachnoid hemorrhage and stroke. The student will follow patients, participate in rounds and perform some procedures under supervision. Daily didactic sessions will be provided as conferences or lectures from the ICU attending.  
Student time distribution: Inpatient 80%, Conferences/Lectures 20%; Subspecialty Care 100%  
Major teaching responsibility: Fellows and residents  
Patients seen/weekly: 25  
On call/weekend responsibility: Variable  

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M35 870  EPILEPTOLOGY  
Instructor(s): Edwin Trevathan, M.D., 454-6042  
Location: Epilepsy Monitoring Unit, Barnes-Jewish Hospital, South Campus 11400  
Elective Contact: Jewell Carter, 362-7845  
Other Information: Students meet at 9:00 a.m. first day of elective. Enrollment limit per period: 2  
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 29, 33, 37 and 41.

Students will be involved, mainly as observers, in diagnosing and managing both surgical and medical patients with epileptic disorders. The patients are in outpatient and inpatient settings. They are also required to do one patient write up each and one talk on a topic relevant to epilepsy.  
Student time distribution: Inpatient 25%, Outpatient 50%, Conferences/ Lectures 25%; Subspecialty Care 100%  
Major teaching responsibility: Attendings and fellows  
Patients seen/weekly: 40  
On call/weekend responsibility: None  

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M35 871  CLINICAL NEUROIMMUNOLOGY & MULTIPLE SCLEROSIS  
Instructor(s): Becky Parks, M.D.  
Location: 3rd Floor McMillan  
Elective Contact: Kathleen Harrison, 362-3307  
Other Information: Contact Dr. Parks to arrange time to report on first day of elective. Enrollment limit per period: 1  
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

Students will have the opportunity to interview and examine new and follow-up patients with multiple sclerosis and other immunological conditions of the central nervous system at the neurology clinic at the CAM, as well as patients receiving infusions in the Minor Procedure Center. They will learn the differential diagnosis of and method of evaluating patients with, or thought to have, multiple sclerosis, and will assist in filling out the necessary forms required for testing. They will learn about evaluation and treatment of spasticity, neurogenic bladder, fatigue, cognitive dysfunction and depression. Students will follow the daily progress of patients admitted to the hospital.

This elective will familiarize the student with the treatments for MS: immune-modulating, immunosuppressive and symptomatic. The student will also become very familiar with interpretation of abnormal brain MRI.

3rd year medical students rotating as part of a core rotation will be expected to attend the required conferences for 3rd year students. Students choosing this elective to gain additional experience in the field of Neurology will be expected to attend Neurology Grand Rounds on Friday morning. Students with particular interest in the basic aspects of neuro-immunology may be invited to attend a journal club with Dr. Anne Cross.
Student time distribution: Inpatient 10%, Outpatient 80%, Conferences/Lectures 10%; Subspecialty Care 100%
Major teaching responsibility: Becky Parks, M.D.
Patients seen/weekly: 20
On call/weekend responsibility: None

M80 807 PHYSICAL MEDICINE AND REHABILITATION
Instructor(s): Oksana Volshteyn, M.D., 454-7757, volshteyno@neuro.wustl.edu
Location: Suite 2304, Rehabilitation Division, Neurology Department, 4444 Forest Park
Elective Contact: Donna Barbier, 454-7757, barbierd@neuro.wustl.edu
Other Information: Students report to Suite 2304, Rehabilitation Division, Neurology Department, 4444 Forest Park, 8:00 a.m. first day of elective.

Rotation location – The Rehabilitation Institute of St. Louis, 4455 Duncan Ave. Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

The elective is designed to provide the student with a broad introduction to the field of Physical Medicine and Rehabilitation. Major objective of this clinical elective is to achieve greater knowledge of the neurological and musculoskeletal diseases and their treatment, and gain understanding of basic principals of rehabilitation. The student will learn the clinical and rehabilitative care of patients with strokes, traumatic brain injury, spinal cord trauma and diseases and limb amputations. Student will gain clinical skills in evaluating in management of functional impairments. Students will be expected to participate in daily rounds on inpatient rehabilitation units with the clinical care team, follow 3-5 patients, attend multidisciplinary team conferences and family meetings, attend outpatient rehabilitation clinics in spinal cord, stroke, traumatic brain injury and amputee. Teaching and supervision is provided by the psychiatry and neurology faculty of the Division of Rehabilitation. Rehabilitation and neurology residents are involved in student teaching as well. Students are required to participate in didactic teaching conferences within the PM&R residency.

This rotation is particularly useful for students considering careers in rehabilitation, neurology, geriatrics, primary care, neurosurgery or any other field that will require experience in the evaluation and management of patients with physical impairment and disabilities.

Student time distribution: Inpatient 80%, Outpatient 10%, Conferences/Lectures 10%; Subspecialty Care 100%
Major teaching responsibility: Attending faculty and residents
Patients seen/weekly: 20
On call/weekend responsibility: None

Research

(M35 900)

David B. Clifford, M.D., 362-9731. Clinical treatment of neurologic manifestations of AIDS, including peripheral neuropathy, AIDS Dementia, and progressive multifocal leukoencephalopathy. Quantitative virologic correlations are a particular area of concentration with current studies.

Maurizio Corbetta, M.D., 2112 East Building, 747-0426. The elective will provide hands-on experience in using functional neuroimaging (PET and fMRI) to map regions of the human brain responsible for vision and attention, and to study recovery of function in patients with cognitive deficits (aphasia, neglect) and brain injury.
Anne H. Cross, M.D., 3rd Floor McMillan, 362-3293. Understanding interactions of the immune system with the central nervous system as it relates to multiple sclerosis and other neuroimmunological disorders. Our goal is to understand how immune cells cross the blood-brain barrier and initiate the cascade of events leading to lesions of multiple sclerosis.

Mark P. Goldberg, M.D., 201 Biotechnology Center (Center for the Study of Nervous System Injury), 362-3258. Web-based neurology education. The student will select a topic and target audience, then develop web-based materials to teach the topic. Target audiences may include medical students, patients or family members, or allied health professionals. Most topics will be related to stroke. Completed projects will appear on the Internet Stroke Center web site (www.strokecenter.org) or the education web site of the Department of Neurology. Web development skills are welcome but NOT required.

David H. Gutmann, M.D., Ph.D., 306 Biotechnology Center, 362-7149. Neuro-oncology Research. Our laboratory is interested in the molecular pathogenesis of human nervous system tumors. We are approaching this problem by determining the function of several relevant nervous system tumor suppressor genes in vitro as well as by developing animal models in which these genes and their downstream signaling partners have been genetically altered in vivo. In addition, we have several studies ongoing to identify novel genes associated with tumor formation and malignant progression. The studies ongoing in my laboratory are focused on understanding the basic molecular biological alterations critical for the development and progression of nervous system cancers in an effort to ultimately identify potential targets for future cancer therapies as well as to define genetic markers for improved tumor classification and prognostic stratification.

Individuals affected with the neurofibromatosis 1 (NF1) and tuberous sclerosis complex (TSC) cancer predisposition syndromes develop brain tumors (astrocytomas) at an increased frequency. Our laboratory is studying the function of the NF1 and TSC tumor suppressor gene products in the regulation of astrocyte proliferation both in vitro and in vivo. Mouse models for NF1 and TSC astrocytomas have been developed and are presently being characterized. In addition, our laboratory has been actively involved in the development and characterization of specific mouse models for sporadic human astrocytomas. We have generated several transgenic and conditional knockout mouse strains for studies aimed at better understanding the molecular pathogenesis of astrocytomas. Individuals with the neurofibromatosis 2 (NF2) inherited cancer predisposition syndrome develop meningiomas at an increased frequency. The NF2 gene product, merlin, belongs to the Protein 4.1 family of molecules that link the actin cytoskeleton to cell surface glycoproteins. Studies in our laboratory have focused on the mechanism(s) by which merlin regulates cell proliferation and tumor growth. In addition, we have identified a second Protein 4.1 tumor suppressor that we have shown is also important in the pathogenesis of meningiomas. Studies on these novel Protein 4.1 tumor suppressors will likely expand our understanding about the signaling processes involved in contact inhibition growth arrest.

Steven E. Petersen, Ph.D., 2108 East Building, 362-3319. This lab is interested in the functional localization of higher brain processes, particularly those processes related to language, memory and visual attention. Our main approach to these issues is the use of PET and fMRI activation, but we also study task performance in normal and selected patient populations.

Marcus E. Raichle, M.D., Neuro Imaging Laboratory, 2nd Floor East Building, 362-6907. In vivo brain hemodynamic, metabolic and functional studies of human cognition and emotion using cyclotron-produced isotopes and emission tomography (PET) as well as functional magnetic resonance imaging (fMRI) in humans. See also Steven E. Petersen, Ph.D.

B. Joy Snider, M.D., Ph.D., Biotechnology Building Room 225, 747-2107. Protein degradation and calcium homeostasis in cellular models of neurodegenerative disorders. We study regulation and dysfunction of the ubiquitin-proteasome system in cultured cells, including primary neuronal cultures. A second set of projects is aimed at elucidating the role of intracellular calcium homeostasis in neuronal dysfunction and death.

Kel Yamada, M.D., 204 Biotechnology Center, 362-3533, 454-6120. Research on mechanisms modulating synaptic transmission in the central nervous system using electrophysiological techniques...
in neuronal cell cultures, in brain slices, and in live rodents. Studies are relevant to epilepsy, neonatal brain injury, and stroke.

Faculty

DAVID MICHAEL HOLTZMAN, MD  Andrew B. and Gretchen P. Jones Professor of Neurology, Head of the Department of Neurology
ANINDA BHAT ACHARYA, MD  Instructor in Clinical Neurology
MUHAMMAD TAHER AL-LOZI, MD  Associate Professor of Neurology
C. ROBERT ALMLI, PHD  Associate Professor of Neurology
DENIS IAN ALTMAN, MBBCH  Associate Professor of Clinical Neurology
LIZETTE ALVAREZ-MONTERO, MD  Instructor in Clinical Neurology
SYLVIA AWADALLA, MD  Associate Professor of Neurology
YEKATERINA V. AXELROD, MD  Instructor in Neurology
DAVID ANTHONY BALOTA, PHD  Professor of Neurology
JANET MARIE BALOTA, PHD  Assistant Professor of Neurology
RANDALL JOHN BATEMAN, MD  Instructor in Neurology
M. CAROLYN BAUM, PHD  Professor of Neurology (Occupational Therapy)
MAX PRELY BENZAQUEN  Instructor in Clinical Neurology
LEONARD BERG, MD  Professor Emeritus of Neurology
ANGELA LAMBERT BERRY  Research Instructor in Neurology
JOSEPH T BLACK, MD  Professor of Clinical Neurology
KEVIN J BLACK, MD  Associate Professor of Neurology
LYNN BENNETT BLACKBURN, PHD  Assistant Professor of Clinical Neurology
JAIME A. BOERO  Assistant Professor of Neurology (Pending Executive Faculty Approval)
JAMES SCOTT BONNER, MD  Instructor in Clinical Neurology
JACK BOTWINICK, PHD  Professor Emeritus of Neurology (Psychology)
ROBERT P. BRENDA, PHD  Research Instructor in Neurology
DAVID L BRODY, MD, PHD  Instructor in Neurology
KELLY M BROWN, MD  Assistant Professor of Neurology
JANICE E BRUNSTROM, MD  Assistant Professor of Neurology
VIRGINIA D BUCKLES, PHD  Research Associate Professor of Neurology
JOHN J BURNS, PHD Adjunct Professor of Neurology
GARRETT C BURRIS, MD Associate Professor of Clinical Neurology
NIGEL JOHN CAIRNS, PHD Research Associate Professor of Neurology
DAVID J CALLAHAN, MD Assistant Professor of Clinical Neurology
RUSSELL C. CANTRELL, MD Instructor in Clinical Neurology
DAVID B CARR, MD Associate Professor of Neurology
BILLIE RUTH CLARK, PHD Assistant Professor of Neurology
DAVID B CLIFFORD, MD Melba and Forest Seay Professor of Clinical Neuropharmacology in Neurology
MARY A COATS Research Instructor in Neurology
LAWRENCE A COBEN, MD Associate Professor Emeritus of Neurology
ANNE MAUREEN CONNOLLY, MD Associate Professor of Neurology
MAURIZIO CORBETTA, MD Norman J. Stupp Professor of Neurology
DOROTHY ANNE CROSS, MD Professor of Neurology
GIOVANNI D’AVOSSA, MD Instructor in Neurology
DIANE L. DAMIANO, PHD Research Associate Professor of Neurology
GABRIEL A DE ERAUSQUIN, MD, PHD Assistant Professor of Neurology
MICHAEL R DEBAUN, MD, MS Associate Professor of Neurology
COLIN PIETER DERDEYN, MD Associate Professor of Neurology
SUSAN DEUSINGER, PHD Professor of Neurology
MICHAEL N DIRINGER, MD Professor of Neurology
PHILIP ROGERS DODGE, MD Professor Emeritus of Neurology
WILLIAM EDWIN DODSON, MD Professor of Neurology
JOSEPH M DOOLEY, JR, MD Associate Professor of Clinical Neurology
ALEXANDER W DROMERICK, MD Associate Professor of Neurology
STEPHEN P DUNTLEY, MD Associate Professor of Neurology
DOROTHY F EDWARDS, PHD Associate Professor of Neurology
LAWRENCE N EISENMAN, MD, PHD Assistant Professor of Neurology
SVEN GUSTAV ELIASSON, MD, PHD Professor Emeritus of Neurology
JUAN ESCANDON, MD Assistant Professor of Clinical Neurology
KEVIN C ESS, MD, PHD Instructor in Neurology
JULAINE MARIE FLORENCE, DPT Research Associate Professor of Neurology
BENNETT DAVID FRANK, MD, PHD Instructor in Clinical Neurology
ROBERT FUCETOLA, PHD Assistant Professor of Neurology
JAMES E. GALVIN, MD, MS Assistant Professor of Neurology
ALISON GOATE, PHD  Professor of Neurology
MARK PAUL GOLDBERG, MD  Professor of Neurology
JAMES M GOLDRING, MD, PHD  Instructor in Clinical Neurology
PAUL T GOLUMBEK, MD, PHD  Instructor in Neurology
DAVID B GRAY, PHD  Associate Professor of Neurology
ROYAL GENE GRUENEICH, PHD  Assistant Professor of Clinical Neurology
CHRISTINA A. GURNETT, MD, PHD  Instructor in Neurology
DAVID H GUTMANN, MD, PHD  Donald O. Schnuck Family Professor of Neurology
JOSEPH HANAWAY, MD  Assistant Professor of Clinical Neurology
WILLIAM B HARDIN, JR, MD, BA  Assistant Professor Emeritus of Clinical Neurology
J MICHAEL HATLELID, MD  Associate Professor of Clinical Neurology
TAMARA G HERSHEY, PHD  Assistant Professor of Neurology
TERRI L HOSTO  Research Instructor in Neurology
MICHAEL J. HOWARD, PHD  Research Instructor in Neurology
CHUNG HSU, MD, PHD  Adjunct Professor of Neurology
THY N HUSKEY, MD  Assistant Professor of Neurology
KRZYSZTOF HYRC, PHD  Research Instructor in Neurology
TERRIE E INDER  Adjunct Associate Professor of Neurology
JOE INUKAI  Research Assistant Professor Emeritus of Neurology
PAMELA C. JACKSON  Research Instructor in Neurology
MARK F JACQUIN, PHD  Research Professor of Neurology
DAVID K JOHNSON, PHD  Research Instructor in Neurology
EUGENE MALCOLM JOHNSON, JR, PHD  Professor of Neurology
NERINGA JUKNIS, MD  Instructor in Neurology
RICHARD T. KATZ, MD  Associate Professor of Clinical Neurology
SYED AHMED KHADER, MD  Instructor in Clinical Neurology
JAYARATHNE KOTTAGE, MD  Assistant Professor of Neurology
PAUL THOMAS KOTZBAUER  Assistant Professor of Neurology
ASHOK KUMAR, MD  Assistant Professor of Clinical Neurology
WILLIAM M LANDAU, MD  Professor of Neurology
JIN-MOO LEE, MD, PHD  Assistant Professor of Neurology
WALTER LEMANN, III, MD  Associate Professor of Clinical Neurology
TIEN-SUNG TOM LIN, PHD  Professor of Neurology
GLENN LOPATE, MD  Associate Professor of Neurology
WARREN E LUX, MD  Adjunct Associate Professor of Neurology
TIMOTHY M LYNCH, MD  Assistant Professor of Neurology (Pending Executive Faculty Approval)
JOHN F MANTOVANI, MD  Associate Professor of Clinical Neurology
SOE S MAR, MD  Assistant Professor of Neurology (Pending Executive Faculty Approval)
ROBERT P MARGOLIS, MD  Assistant Professor of Clinical Neurology
LEONARD N MATHESON, PHD, MA  Associate Professor of Neurology
LORI MCGEE-MINNICH, BS  Research Instructor in Neurology
DAVID F MENDELSON, MD  Assistant Professor Emeritus of Clinical Neurology
THOMAS M MEUSER, PHD  Research Assistant Professor of Neurology
FRANCIS M MIEZIN  Research Scientist of Neurology
JEFFREY D MILBRANDT, MD, PHD  Professor of Neurology
PAMELA F MILLSAP  Research Instructor in Neurology
JOHN CARL MORRIS, MD  Harvey A and Dorismae Hacker Friedman Professor of Neurology
ROBERT T NAISMITH, II, MD  Assistant Professor of Neurology (Pending Executive Faculty Approval)
HYUNWOO NAM  Visiting Assistant Professor of Neurology
ABDULLAH M NASSIEF, MD  Assistant Professor of Neurology
JEFFREY J NEIL, MD, PHD  Allen P. and Josephine B. Green Professor of Neurology
ANNE FAGAN NIVEN, PHD  Research Associate Professor of Neurology
MICHAEL JUSTIN NOETZEL, MD  Professor of Neurology
BARBARA JEAN NORTON, PHD  Associate Professor of Neurology
YANNAN OUYANG, PHD  Research Assistant Professor of Neurology
JANICE LYNN PALMER  Research Instructor in Neurology
BECKY J PARKS, MD  Assistant Professor of Neurology
ALEXANDER PARSADANIAN, PHD  Research Assistant Professor of Neurology
ALAN L PEARLMAN, MD  Professor Emeritus of Neurology
DAVID M PEEPLES, MD  Instructor in Clinical Neurology
JOEL S PERLMUTTER, MD  Professor of Neurology
ALAN PESTRONK, MD  Professor of Neurology
STEVEN E PETERSEN, PHD  James S. McDonnell Professor of Cognitive Neuroscience in Neurology
DANIEL PHILLIPS, MD, BS  Assistant Professor of Clinical Neurology
JOSE A PINEDA SOTO, MD  Assistant Professor of Neurology
SHULAMIT PORTNOY  Professor of Neurology
WILLIAM JOHN POWERS, MD  Charlotte and Paul Hagemann Professor of Neurology
ARTHUR L PRENSKY, MD  Professor Emeritus of Neurology
BRAD ALAN RACETTE, MD  Associate Professor of Neurology
MARCUS E RAICHLE, MD  Professor of Neurology
DAVID MARTIN REISLER, MD  Assistant Professor of Clinical Neurology
JAMES R ROHRBAUGH, MD  Associate Professor of Clinical Neurology
HERBERT E ROSENBAUM, MD  Professor of Neurology
STEVEN MARK ROTHMAN, MD  Stein Professor of Neurology
JOSHUA BENNETT RUBIN, MD, PHD  Assistant Professor of Neurology
RIMMA RUVINSKAYA, MD  Assistant Professor of Neurology
SHIRLEY ANN SAHRMANN, PHD  Professor of Neurology (Neurophysiology)
ANNELIESE M SCHAEFER, PHD, JD  Instructor in Neurology
BRADLEY L SCHLAGGAR, MD, PHD  Assistant Professor of Neurology
STACY LYNN SCHNEIDER  Research Instructor in Neurology
EARL R SCHULTZ, MD, BS  Professor of Clinical Neurology
NICOLE JOY SCHWARZE, PHD  Instructor in Neurology
CHRISTIAN T SHELLE, PHD  Research Assistant Professor of Neurology
YVETTE I SHELLE, MD  Associate Professor of Neurology
GORDON L SHULMAN, PHD  Research Scientist of Neurology
ELI R SHUTER, MD  Associate Professor of Clinical Neurology
TODD B SILVERMAN  Instructor in Clinical Neurology
BARRY A. SINGER  Assistant Professor of Clinical Neurology
BARBARA JOY SNIDER, MD, PHD  Assistant Professor of Neurology
ABRAHAM Z SNYDER, MD, PHD  Research Associate Professor of Neurology
RICHARD S SOHN, MD  Associate Professor of Neurology
TARA V. SPEVACK, PHD  Instructor in Clinical Neurology
JENNIFER S STITH, PHD  Assistant Professor of Neurology
MARTHA STORANDT, PHD  Professor of Neurology (Psychology)
IN SOOK SUNWOO, MD  Instructor Emerita in Neurology
SAMER D TABBAL, MD  Assistant Professor of Neurology
SANDRA L TATE, MD  Instructor in Clinical Neurology
W. THOMAS THACH, JR, MD  Professor of Neurology
KWEE L THIO, MD, PHD  Assistant Professor of Neurology
JEAN HOLOWACH THURSTON, MD  Professor Emeritus of Neurology (Neurochemistry)
JEFFREY B. TITUS, PHD  Instructor in Clinical Neurology
CHRISTY MARIE TOMLINSON  Research Instructor in Neurology
DEPARTMENT'S WEBSITE

http://www.neuro.wustl.edu/

DEPARTMENT OF OBSTETRICS AND GYNECOLOGY

The Department of Obstetrics and Gynecology has clinical teaching services located at Barnes-Jewish Hospital and Missouri Baptist Hospital under the following director:

George A. Macones, M.D.,
Professor and Head, Department of Obstetrics and Gynecology

In addition, for the purposes of teaching, clinical care and research, the Department of Obstetrics and Gynecology is divided into subspecialty divisions under the following directors:
Gynecologic Oncology: David G. Mutch, M.D.
Maternal-Fetal Medicine: Yoel Sadovsky, M.D.
Reproductive Endocrinology and Infertility: Randall R. Odem, M.D.
Gynecology: Rebecca P. McAlister, M.D.
Instruction in Obstetrics and Gynecology is provided during all four years of the medical curriculum, beginning with an introductory course in the first year as a component of Clinical Medicine. Teaching in the second year is designed to correlate basic science with the physiologic basis of normal pregnancy and parturition, reproductive biology and gynecologic malignancies. All third-year medical students participate in a 12-week clinical clerkship in Women’s and Children’s Health. This is divided into three four-week components of pediatrics, maternal-infant health and gynecology. In the fourth year, students may elect a subinternship in the listed clinical subspecialties or a research elective.

Courses

First Year

As a component of the course in Clinical Medicine offered by the Department of Medicine, the student is introduced to the essentials in the medical history and examination for the gynecological evaluation of the adult woman patient.

Second Year

Second-year students are introduced to obstetrics and gynecology with lectures in reproductive biology that apply and expand upon pelvic anatomy and gynecologic and obstetric physiologic principles taught in the first year.

M45 635B OBSTETRICS AND GYNECOLOGY
Instructor: Andrea L.P. Stephens, M.D., 362-3126
The obstetrical component of this course emphasizes the physiologic basis of normal pregnancy, parturition, and labor and delivery, and adaptations of other organ systems to pregnancy. Pathophysiology of pregnancy and deviations from normal labor will also be introduced. The gynecologic component of the course reviews embryology and includes the topics pediatric and adolescent gynecology, amenorrhea, abnormal uterine bleeding, menopause, surgical anatomy, and diagnosis and treatment of gynecologic neoplasms.

Third Year

M45 730 OB/GYN CLERKSHIP
Instructor: Andrea L.P. Stephens, M.D., 362-3126
Comprehensive study of the reproductive health needs of women is the focus of the curriculum. Opportunity for supervised active participation is emphasized in outpatient clinics, routine and high-risk obstetrics, care of the infertile and oncology patient, including surgical case management. Students are assigned as clinical clerks to rotations at Barnes-Jewish Hospital and Missouri Baptist Hospital. Faculty, house staff and nurse practitioners provide teaching for this rotation. Students participate in all teaching conferences offered by the department; core curriculum topics are presented in a seminar series and in small group sessions with faculty preceptors.

Fourth Year

Fourth-year students wishing to take an externship or research elective can choose from a variety of courses.
Electives

M45 804  OB/GYN OUTPATIENT CARE SUBINTERNSHIP
Instructor(s): Andrea L. P. Stephens, M.D., 362-4211
Location: Room 210, Maternity Hospital, Barnes-Jewish Hospital, South Campus
Elective Contact: Patti Hill, 362-1016
Other Information: Students should call Dr. Stephens’ office at 362-4211, 9 a.m. first day of elective for instructions. Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

This experience is designed to acquaint the student with the diagnosis and care of outpatients. While primarily located in the Gynecology Clinic and Outpatient Surgery unit, it should provide a more general overview of how to evaluate, diagnose and provide definitive treatment (both medical and surgical) without hospital admission. The subintern will spend three to four half days weekly participating in outpatient surgery under the supervision of attendings and house staff, and five to six additional half days in clinic and private offices. Students will receive a better understanding of mechanisms utilized in providing surgical care to outpatients and an introduction to both the style and substance of office care.
Student time distribution: Outpatient 100%; Primary Care 100%
Major teaching responsibility: Attendings
Patients seen/weekly: 5-10/day
On call/weekend responsibility: None

M45 810  OB-GYN ENDOCRINOLOGY-INFERTILITY SUBINTERNSHIP
Instructor(s): Randall Odem, M.D.; Jerald Goldstein, M.D.; Kelle Moley, M.D.; Cathy Naughton, M.D., and Valerie Ratts, M.D., 286-2421
Location: 4444 Forest Park Avenue, Suite 3100
Elective Contact: Randall Odem, M.D., 286-2421
Other Information: Students report to Dr. Odem first day of elective. Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

The subintern will participate (in the office and hospital) in the study and treatment of women with reproductive endocrine disorders and infertility. S/he will attend and present in conferences, attend surgery, observe assisted reproductive technology procedures, have assigned reading and be an integral part of the reproductive endocrine service. Opportunities for clinical research projects in reproductive endocrinology are also available.
Student time distribution: Inpatient 10%, Outpatient 75%, Conferences/Lectures 15%; Primary Care 10%, Subspecialty Care 90%
Major teaching responsibility: Attendings, fellow, and residents
Patients seen/weekly: 100
On call/weekend responsibility: None

M45 825  GYNECOLOGY ACROSS A WOMAN'S LIFE-SPAN
Instructor(s): Diane Merritt, M.D., 362-1016
Location: Room 208 Maternity Hospital, Barnes-Jewish Hospital, South Campus
Elective Contact: Patti Hill, 362-1016, or e-mail merrittd@msnotes.wustl.edu
Other Information: Suggested reading and schedule may be obtained prior to the start of the rotation. Contact Dr. Merritt by e-mail (merrittd@msnotes.wustl.edu). Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 13, 17, 21, 25, 29, 33, 37, and 41. (NOTE: Dr. Merritt will be out of the office from August 1-15, 2005.)

This clinical experience is designed to acquaint the student with outpatient gynecology as it impacts the patient at various times in her lifespan (infancy, adolescence, reproductive years, peri- and post-menopause). Sexuality and sexual dysfunction, congenital anomalies of the reproductive tract, contraception, fertility, menopause and hormone therapy, pediatric and adolescent gynecology, and outpatient management are the focus of this elective. (Obstetrics is not.) The student will spend five
half-days a week in clinic seeing patients with Dr. Merritt. The student will also attend departmental conferences and be responsible for independent reading assignments in outpatient gynecology.

Student time distribution: Outpatient 100%; Subspecialty Care-Gyn 100%
Major teaching responsibility: Attending and independent reading
Patients seen/weekly: 20-40 per clinic day
On call/weekend responsibility: None

M45 830  GYN ONCOLOGY SUBINTERNSHIP
Instructor(s): David Mutch, M.D., 362-3181
Location: Maternity Hospital, Barnes- Jewish Hospital, South Campus
Elective Contact: David Mutch, M.D., 362-3181
Other Information: Students report to Dr. Mutch, 3rd Floor Maternity Hospital, 9 a.m. first day of elective. Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

The subintern will take part in the work-up of tumor patients prior to surgery and/or radiotherapy, assist in pelvic operations, help render postoperative care and review pathology specimens and slides. S/he will participate in GYN Tumor Clinic sessions, make hospital rounds with house staff, consultations and attend OB-GYN conferences. Opportunities for clinical or basic research project in gynecologic malignancy are also available.

Student time distribution: Inpatient 70%, Outpatient 20%, Conferences/ Lectures 10%; Primary Care 20%, Subspecialty Care 80%
Major teaching responsibility: Attendings, fellows, and residents
Patients seen/weekly: 40
On call/weekend responsibility: Weekend rounds

M45 840  MATERNAL-FETAL MEDICINE SUBINTERNSHIP
Instructor(s): Gil Gross, M.D., 747-1336; D. Michael Nelson, M.D., Ph.D.; Yoel Sadovsky, M.D.; Joseph Shumway, M.D.
Location: Maternity Hospital, Barnes- Jewish Hospital, South Campus
Elective Contact: Gil Gross, M.D., 747-1336
Other Information: Students report to Antepartum Service (ward 5300), 7:30 a.m. first Monday of elective. If the first day is a holiday, call ahead to Dr. Gross for instructions. Enrollment limit per period: 1, unless cleared by course master.
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

Sub-interns will participate in the antepartum management of high-risk hospitalized patients as well as complicated outpatients through the High-Risk Obstetrics Clinics and the Center for Diabetes in Pregnancy. Examples include diabetes, hypertension, renal disease, hematologic abnormalities, preterm labor and others. Antepartum evaluation and monitoring of the pregnant woman and her fetus are emphasized. Supervision is by the antepartum chief resident and a maternal-fetal medicine faculty member. An opportunity for intense labor and delivery experience with the Night Team is also encouraged. Students will spend time observing both genetic counseling and diagnostic obstetric ultrasound examinations. The student will prepare a brief talk on a topic of his/her interest during the course of the rotation.

Student time distribution: Inpatient 60%, Outpatient 35%, Conferences/ Lectures 5%; Subspecialty Care 100%
Major teaching responsibility: Attendings and residents
Patients seen/weekly: Inpatient: 20; Outpatient: 20
On call/weekend responsibility: Overnight/weekend call optional — student self-scheduled

M45 856  OB/GYN ULTRASOUND - GENETICS
Instructor(s): Jeffrey Dicke, M.D., 454-8135
Location: Ultrasound Unit, 1st Floor Barnes-Jewish Hospital, North Campus
Elective Contact: Jeffrey Dicke, M.D., 454-8135
Other Information: Students should contact Dr. Dicke prior to first day of elective. Enrollment limit per period: 1
Valid start weeks for 2-week blocks are: Weeks 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41 and 43.

The student will learn the principles and techniques of non-invasive screening for fetal disorders, observe the performance of invasive prenatal diagnostic procedures and learn the standards and guidelines for performance of the antepartum obstetrical ultrasound examination and female pelvic examination. The student will also gain experience in pedigree analysis and familial risk factor assessment working with genetic counselors. Opportunities for participation in clinical research are also available.

Student time distribution: Outpatient 90%, Conferences/Lectures 10%; Primary Care 30%, Subspecialty Care 70%
Major teaching responsibility: The four attendings of the ultrasound section
Patients seen/weekly: 40
On call/weekend responsibility: None

M65 833  SPECIAL TOPICS IN REPRODUCTIVE HEALTH
Instructor(s): F. Sessions Cole, M.D., 454-6148
Location: 5S20 St. Louis Children's Hospital
Elective Contact: F. Sessions Cole, M.D., 454-6148
Other Information: Students meet at 5S20 St. Louis Children's Hospital, 8:00 a.m. first day of elective. Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

Students will participate in clinical experiences in four clinical modules: contraception, sexually transmitted diseases, abortion and special topics (HIV infection and adolescence). Required reading will include relevant review articles. Clinical experiences will be primarily ambulatory.

Student time distribution: Outpatient 90%, Conferences/Lectures 10%; Primary Care 30%, Subspecialty Care 70%
Major teaching responsibility: Attendings
Patients seen/weekly: 10
On call/weekend responsibility: None

Research

(M45 900)

Irving Boime, Ph.D., 319-320 McDonnell Science Building, 362-2556. Our laboratory is concerned with the biosynthesis of the gonadotropin hormones in the placenta and pituitary. Specifically, these interests can be divided into two general categories: 1) Structure-function studies that deal with the determinants for secretion, sorting and biological activity of these hormones. Such work includes the design of analogs for potential clinical use. 2) Factors governing expression of several placental and pituitary hormone genes. The approaches to these problems involve the use of site-directed mutagenesis and transgenic animals.

Kelle H. Moley, M.D., Room 616, Maternity Hospital, 362-1765. Preimplantation Embryogenesis and Glucose Transporter Biology. From animal and human studies it is clear that mammalian embryos are vulnerable to injury during the preimplantation stage of development. Glucose transport and metabolism are critical for blastocyst formation and further development. The primary focus of our laboratory is how early preimplantation glucose transport and metabolism affects the outcome of pregnancy at a molecular level. An elective in our lab would allow exposure to bench work in reproductive biology.
Glucose enters the blastocyst via one of four facilitative glucose transporters, GLUT1-3, and the novel insulin-regulated transporter we recently cloned, GLUT8. We have shown that murine maternal hyperglycemia leads to down regulation of GLUT1-3 at the blastocyst stage and that this event triggers apoptosis via pathways involving BAX, p53 and caspases. In the murine diabetic model, this increase in apoptosis results in fetal resorption or malformation. Both these adverse pregnancy outcomes are more common in diabetic women. One focus of our lab is how decreased intracellular glucose triggers apoptosis and how this manifests as pregnancy loss or malformation.

We have also demonstrated that hyperinsulinemia and high IGF-1 levels, associated with polycystic ovary syndrome, lead to decreased insulin-stimulated glucose transport and increased apoptosis at a blastocyst stage. We are interested in how GLUT8 and the insulin signalling pathways are involved in apoptosis, blastocyst development and metabolism. Dysregulation of this transporter is responsible for the apoptosis at this stage and thus may be related to the increased miscarriage rate experienced by these women. Projects in the lab are also investigating mechanisms responsible for GLUT8 translocation and fusion with the plasma membrane involving v- and t-SNARE proteins. Visit our website at www.obgyn.wustl.edu/moleylab/index.asp.

Yoel Sadovsky, M.D., 503 Maternity Hospital, 747-0937. In our laboratory we focus on reproductive development and function. First, we study the mechanisms that determine placental differentiation during human pregnancy. This process proceeds from mononucleated cytotrophoblast to a terminally differentiated syncytiotrophoblast, and may be disrupted by diverse insults such as hypoxia and malnutrition, which lead to fetal growth restriction. We have developed a novel method that incorporates gene-specific variability to improve expression analysis in DNA microarrays. Using our software we integrate DNA micro-arrays and real-time expression analysis to correlate phenotypic changes with alterations in gene expression. We utilize siRNA to alter gene expression and assess the activity of proteins that play a central role in trophoblast injury and repair, such as the PPAR family of proteins.

Our lab also dissects the molecular mechanisms underlying gonadal function. We focus on the nuclear receptor steroidogenic factor 1 (SF-1). This orphan nuclear receptor is essential for reproductive and endocrine homeostasis, and required for intact development of both female and male gonads. We have cloned co-regulators of SF-1, and utilize molecular and gene ablation approaches to dissect their function. We have identified a synergistic regulation of luteinizing hormone (LH)-? by SF-1 and early growth response-1 (Egr-1), and currently analyze the mechanism and significance of this synergy in vivo.

Faculty

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DENISE MICHELLE WILLERS, MD  Assistant Professor of Obstetrics and Gynecology
Instruction begins in the first year with examination of the eye and a lecture on various aspects of ocular disease. During the second year, all students receive (via e-mail) the “Ophthalmology Case of the Week.” During the third year, students are given the opportunity during the surgery block to spend four weeks on the ophthalmology services. In addition, during the third year there are lectures given to students during the Internal Medicine and Surgery rotations. All students work on the American Academy of Ophthalmology’s “Case Studies for Medical Students.” The emphasis is on ocular manifestations of common systemic diseases, ocular trauma, and common eye diseases such as cataract and glaucoma. In the fourth year, four-week clinical or research electives are offered.

Courses

First Year

Introduction to clinical ophthalmology begins in the first year with a lecture and practicum (peer exam) on taking an ocular history and performing an ocular exam. Emphasis is on ophthalmoscopy. Morton E. Smith, M.D.; staff

Second Year

During the second year, all students receive (via e-mail) the “Ophthalmology Case of the Week.” All students are expected to review each case and submit a diagnosis (via reply e-mail). Toward the end of the second year (April) all students convene for a “feedback/oral quiz” session with Morton E. Smith, M.D.

Third Year

Third Year clerkship opportunities

In the third year, students are given the opportunity to spend four weeks of their surgery rotation on the ophthalmology service. The students work closely with the ophthalmology residents and review the differential diagnosis of the “red eye,” how to interpret an ophthalmologic consult note, and how to handle an ocular emergency in the emergency room. During this rotation, there is again emphasis on the use of the ophthalmoscope. All third-year students must complete the American Academy of Ophthalmology’s “Case Studies in Ophthalmology for Medical Students” and attend the periodic “feedback/oral exam” session with Morton E. Smith, M.D., staff.
**Fourth Year**

**Electives**

M50 801  OPHTHALMOLOGY  
Instructor(s): Morton E. Smith, M.D., 747-5559 or 362-5722  
Location: McMillan Hospital, Room 114, Barnes-Jewish Hospital, South Campus  
Elective Contact: Morton Smith, M.D., 747-5559 or Mary Hitt, 362-5722  
Other Information: All students interested in this senior elective must meet with Dr. Morton E. Smith in March of year WUMS III. Students should report to Room 114, McMillan Hospital, 8:00 a.m. first day of elective. Enrollment limit per period: 6  
Valid start weeks are: June, Mid-August, Mid-September.  

This elective is for senior students who plan to apply for a residency in ophthalmology. The student rotates through one or more specific clinics including the general eye clinic at Barnes-Jewish Hospital and/or the subspecialty clinics of the full time faculty of the Washington University Medical School Department of Ophthalmology and Visual Sciences (e.g. pediatric ophthalmology clinic at St. Louis Children's Hospital, neuro-ophthalmology service, cornea/external disease service, etc.) The student's responsibilities progress from observation (including observing surgery) to complete eye exam to presentation of patients to the director of that particular service. Several cases must be presented to Dr. Morton Smith. The student must also work on the "Case Studies in Ophthalmology for Medical Students" (from the American Academy of Ophthalmology) and present the answers to these cases in the form of an oral exam to Dr. Morton Smith. The students must attend all conferences as well as Grand Rounds, Wednesday Night Seminar for residents, and spend one night a week (until 9 p.m.) with the ophthalmology resident on call for emergencies. By the end of the four-week rotation, the student is expected to be proficient in taking an ocular history and performing a complete eye exam including slit lamp biomicroscopy and indirect ophthalmoscopy. All students interested in this senior elective must meet with Dr. Morton E. Smith in March of year WUMS III. The final grade of the student is determined by the narrative input from the director of the particular service(s) through which the student rotated, plus the case presentations to Dr. Smith, plus the oral quiz on the "Case Studies" book. The grades at Washington University are Honors, High Pass, Pass, Fail.  
Student time distribution: Inpatient 5%, Outpatient 80%, Conferences/ Lectures 15%; Subspecialty Care 100%  
Major teaching responsibility: Attendings, fellows and residents  
Patients seen/weekly: 40  
On call/weekend responsibility: 1 night per week (until 9:00 p.m.)

**Research**

*(M50 900)*

Usha P. Andley, Ph.D., 1114-B McMillan, 362-7167. Crystallins and lens cell biology. Crystallins play an essential refractive role and maintain lens transparency. However, the role of the molecular chaperone alpha-crystallin is still poorly understood. Recently, Dr. Andley's laboratory has shown that ?? or ??-crystallin expression alters the regulation of lens epithelial cell growth, and protects cells from stress-induced death. Mutations in these proteins are the basis of several inherited cataracts. Using genetic approaches, the laboratory is now focusing on visualizing DNA synthesizing cells in vivo in the alphaA and alphaB knockout mice, and the interaction of alphaA and alphaB with cell cycle proteins. These studies use confocal microscopy, flow cytometric and biochemical techniques to study the role of alpha-crystallin in the cell cycle. Time-lapse video microscopy is being used to visualize the protein in living cells. Other studies focus on the role of alphaA in the cross talk between cell proliferation and apoptosis in the lens epithelium.  

Steven Bassnett, Ph.D., 109 McMillan, 362-1604. Currently, we are using advanced microscopic...
techniques to elucidate the cellular basis of accommodation and presbyopia.

David C. Beebe, Ph.D., 101 McMillan, 362-1621. My laboratory is interested in the molecular and cellular mechanisms that regulate the development of the anterior segment of the eye (the lens and cornea) and the mechanisms responsible for the formation of maturity-onset cataracts.

For our studies of eye development, we are using tissue-specific gene targeting to demonstrate the importance of signaling by specific growth factors for the normal formation and function of the lens and cornea. This powerful new approach allows us to delete genes that are essential for normal cell function and differentiation in only one or a few tissues in the eye. Coupled with the gene targeting approach, we are using high density “gene chip” microarrays to follow changes in the expression of >10,000 genes in a single experiment. Combining these approaches has allowed us to reveal the mechanisms underlying eye development and function with a sensitivity and specificity not previously attainable. Our gene chip studies have uncovered several unexpected patterns of gene expression in the lens. Several projects are available in the laboratory to follow up on these findings and to extend our work on the lens to the development and renewal of the corneal epithelium.

Cataracts are the leading cause of blindness worldwide and cataract surgery is the most expensive procedure in the US Medicare budget. We recently provided evidence that changes in the eye with aging (specifically, degeneration of the vitreous body and separation of the vitreous body from the surface of the retina) cause the lens to be exposed to higher levels of oxygen and that oxygen toxicity is the cause of the most common type of age-related cataracts. One or two clinically related projects are available to confirm and extend these observations.

Shiming Chen, Ph.D., 618 McMillan, 747-4350. Molecular basis of retinal specific gene expression and hereditary retinal degeneration. This elective is for students who are interested in gaining research experience in molecular vision and retinal diseases. The research will mainly focus on transcription factors that are expressed in the retinal photoreceptor cells and required for the normal development of photoreceptor function and/or linked to photoreceptor degenerative diseases. Students will learn basic molecular and biochemical approaches commonly used for (1) studying target genes and regulatory network for tissue-specific transcription factors, (2) in vitro functional analysis of mutated factors carrying genetically identified mutations as a tool to find phenotype and genotype correlations, and (3) how to apply the above knowledge to develop early diagnosis and therapeutic interventions to the photoreceptor diseases. Both hands-on experience and experimental design skills will be covered during the course. A small project will be assigned to each student. By the end of the course, each student will give an oral presentation on the progress of the project in a lab meeting and/or a departmental seminar setting.


Mae Gordon, Ph.D., 1125 Old Shriners, 362-3716.
1. Multicenter randomized clinical trial to determine if medical treatment of ocular hypertension prevents or delays glaucomatous optic nerve damage.


M. Rosario Hernandez, D.D.S., 108 McMillan, 747-1448. Molecular and cellular mechanisms underlying glaucomatous optic neuropathy in humans. The broad objective of our research is to demonstrate the role of reactive astrocytes in the specific changes that occur in the optic nerve head in glaucoma. Elevated intraocular pressure is the major risk factor in glaucoma, a common blinding disease. The mechanisms of retinal ganglion cell loss are unknown but most evidence points to the optic nerve head as the site of injury to the axons.

Our laboratory investigates cellular and molecular mechanisms involved in intraocular pressure-related
axon degeneration and in optic nerve head remodeling in human glaucoma. We are focused on the role of astrocytes in the pathogenesis of glaucoma and on defining astrocyte responses to elevated intraocular pressure compared with other forms of cellular stress. These studies are conducted in human optic nerve heads with glaucoma using morphological and molecular techniques adapted for our samples. The findings in human tissues are further tested in a primate model of experimental glaucoma and in acute axonal damage in optic nerve transection.

We have developed several in vitro models using cultured human optic nerve astrocytes to test the effects of elevated pressure and to compare with other mediators of neural degeneration. Using microarrays, we have identified molecular pathways that may be involved in the transition of quiescent astrocytes to the reactive phenotype in response to elevated pressure that are promising targets to test in the future.

David A. Leib, Ph.D., 1114C McMillan, 362-3826. Latency, pathogenesis and molecular genetics of herpes simplex virus.


Judy Ogilvie, Ph.D., 2019 CID Building, 977-0280, ogilviej@vision.wustl.edu. Photoreceptor cell development, degeneration, and protection.
1. Neurotrophic factors protect rod photoreceptors in many animal models of retinal degeneration. Paradoxically, numerous studies have failed to localize the corresponding receptors to rods, suggesting indirect action through other cells. Our lab is investigating the endogenous role of these factors in the retina and how they act on photoreceptors using mutant mice and retinal organ culture.
2. Mucopolysaccharidoses are a family of lysosomal storage diseases. We are investigating whether gene therapy improves retinal structure and function in mouse models of MPS diseases.

J. Mark Petrash, Ph.D., 1115 McMillan, 362-3335. Molecular biology of inherited vision diseases. A senior elective is available for medical students who wish to participate in ongoing research on mechanisms of cataract and diabetic eye disease. Candidates will utilize laboratory procedures such as real time PCR, confocal microscopy, and assist with characterization of transgenic animal models of inherited eye diseases.


Alan Shiels, Ph.D., 625 McMillan, 362-1637, shiels@vision.wustl.edu. Molecular Genetics of Eye Disorders. Our research aims to map, identify and characterize genetic determinants of familial eye disorders including (but not limited to); cataract and glaucoma. This senior elective will involve ascertainment, recruitment and clinical review of families with eye disorders from the St. Louis population in conjunction with molecular genetic studies:

1. Genetic linkage/association studies: Genome-wide markers are being used to map genes for early-onset forms of cataract and glaucoma. To date we have been involved in mapping seven loci for clinically distinct forms of autosomal dominant cataract on chromosomes 1p, 1q, 2q, 13q, 17p, 21q and 22q. These mapping studies will provide a molecular basis for understanding the clinical heterogeneity of inherited cataract and glaucoma and will complement further mapping strategies designed to identify genetic determinants of age-related cataract and glaucoma.

2. Pathogenetic studies: We have identified cataract-associated mutations in the human genes for crystallins (CRYAA, CRYBB1, CRYGD) and connexins (GJA3, GJA8), and the mouse gene for an aquaporin (AqP0). Crystallins establish a high cytoplasmic refractive index, connexins mediate the intercellular transport of ions and second messengers, and aquaporins facilitate water transport across cell membranes. Transgenic and expression profiling techniques are being used to characterize the
pathologic mechanisms resulting from underlying mutations in these genes and provide new insights regarding lens development in health and disease.

Patrick M. Stuart, Ph.D., 1215 McMillan, 362-6774. Virology. Investigate the role viral-induced immune responses play in corneal pathology seen in recurrent herpetic keratitis. Also study the role that Yersinia enterocolitica-produced superantigen plays in both the pathogenesis of this organism as well as its possible connection to the development of the autoimmune disease, Reiters Syndrome.

Patrick M. Stuart, Ph.D., 1207B McMillan, 362-9336.

Larry Tychsen, M.D., 2S89 Eye Clinic, St. Louis Children’s Hospital, 454-6026. Pediatric Ophthalmology:
1. Development of the visual brain and eye alignment.
2. Visual cortex development, ocular alignment, strabismus.

Russell Van Gelder, M.D., Ph.D., 1204 McMillan, 362-4286.
1. Molecular biology of circadian photoreception.
2. Uveitis and ocular inflammation.
3. Polymerase chain reaction diagnosis and discovery of uveitis pathogens.

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N. REX GHORMLEY, OD Adjunct Instructor in Ophthalmology and Visual Sciences
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MAE ETSUKO GORDON, PHD Professor of Ophthalmology and Visual Sciences
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GEORGE J HAROCOPOS, MD Instructor in Ophthalmology and Visual Sciences
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CHARLES R HARRIS Instructor in Clinical Ophthalmology and Visual Sciences
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M. ROSARIO HERNANDEZ-NEUFELD, DDENT Professor of Ophthalmology and Visual Sciences
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JANIS LYNN HOLT, MD Instructor in Ophthalmology and Visual Sciences
DOUGLAS LEE HUFF, OD Adjunct Instructor in Ophthalmology and Visual Sciences
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JEFFREY H JACOB, OD, BS  Adjunct Instructor in Ophthalmology and Visual Sciences
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GLEN P JOHNSTON, MD  Associate Professor Emeritus of Clinical Ophthalmology and Visual Sciences
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STEPHEN A KAMENETZKY, MD  Associate Professor of Clinical Ophthalmology and Visual Sciences
JACK KAYES, MD  Professor of Clinical Ophthalmology and Visual Sciences
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STEVEN M KYMES  Research Instructor in Ophthalmology and Visual Sciences
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STEVEN F LEE, MD  Instructor in Clinical Ophthalmology and Visual Sciences
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JAMES E MILLER, MD  Professor Emeritus of Clinical Ophthalmology and Visual Sciences
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ROBERT F MUNSCH, MD  Instructor in Clinical Ophthalmology and Visual Sciences
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DAVID BRIAN SEIBEL, OD  Adjunct Instructor in Ophthalmology and Visual Sciences
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JAMES BANKS SHEPHERD, III, MD  Instructor in Ophthalmology and Visual Sciences
STEVEN M SHIELDS, MD  Assistant Professor of Clinical Ophthalmology and Visual Sciences
ALAN SHIELS, PHD  Associate Professor of Ophthalmology and Visual Sciences
HOWARD NEWTON SHORT, MD  Instructor in Clinical Ophthalmology and Visual Sciences
CARLA J SIEGFRIED, MD  Associate Professor of Ophthalmology and Visual Sciences
CHARLES D SIGNORELLI, OD  Adjunct Instructor in Ophthalmology and Visual Sciences
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<tr>
<th>Name</th>
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<tr>
<td>MORTON EDWARD SMITH, MD</td>
<td>Professor Emeritus of Ophthalmology and Visual Sciences, Lecturer in</td>
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<td>CLAUD RANDALL SNOWDEN, OD</td>
<td>Adjunct Instructor in Ophthalmology and Visual Sciences</td>
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<td>MITCHEL L WOLF, MD</td>
<td>Associate Professor of Ophthalmology and Visual Sciences</td>
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Department's Website

http://ophthalmology.wustl.edu/

Department of Orthopaedic Surgery

The Department of Orthopaedic Surgery has educational activities at several affiliated hospitals including Barnes-Jewish Hospital, St. Louis Children’s Hospital, Shriners Hospital for Children,
Barnes-Jewish West County Hospital and the Veterans Affairs Medical Center. Students have the opportunity to gain experience on the following services: Hand; Shoulder and Elbow; Spine; Sports Medicine; Trauma; Foot and Ankle, Physiatry (Rehab); Multiservice Orthopaedics at the Veterans Affairs Medical Center; and Pediatric Orthopaedic Surgery. It is anticipated that students will assist in the care of patients in the surgical wards, scrub in on operative procedures, attend outpatient clinics and participate in the coverage of the Emergency Room while working with orthopaedic house staff and attending surgeons. All students on Orthopaedic Surgery also participate in program-wide conferences on Tuesday, Wednesday and Thursday mornings in addition to service conferences at each of the individual hospitals.

Courses

**Third Year**

The third-year student rotations are four weeks in length. Because of the popularity of the specialty, several rotations have been established within the third-year clerkship, M95 790 Integrated Surgical Disciplines. These include: Pediatric Orthopaedic Surgery at Shriners Hospital with Perry L. Schoenecker, M.D.; Pediatric Orthopaedic Surgery at St. Louis Children’s Hospital with J. Eric Gordon, M.D.; General Orthopaedic Surgery at the Veterans Administration Medical Center with Gary A. Miller, M.D.; Sports Medicine at Barnes-Jewish West County campus with Matthew J. Matava, M.D.; Orthopaedic Hand Surgery at Barnes-Jewish Hospital and affiliated institutions with Martin I. Boyer, M.D. and Charles A. Goldfarb, M.D.; an all-clinical orthopaedic elective; and a Physical Medicine and Rehabilitation elective with Heidi Prather, D.O., and John P. Metzler, M.D. In addition to operative and clinical experience, students participate in weekly tutorials on orthopaedic physical examination with faculty members.

**Fourth Year**

**Electives**

M95 839  ORTHOPAEDIC SPORTS MEDICINE
Instructor(s): Rick Wright, M.D., 747-2543
Location: Barnes-Jewish Hospital, Barnes-Jewish West County Hospital
Elective Contact: Orthopaedic Surgery Education Office, 747-2543, orthsurg@msnotes.wustl.edu
Other Information: Students should contact the Education Office prior to the first day of the elective.

Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 25, 29, 33, 37 and 41.

This clinical elective is available for four weeks during which the student participates in orthopaedic conferences, outpatient clinics, surgical cases and patient rounds on the Sports Medicine service. Student time distribution: Inpatient 48%, Outpatient 47%, Conferences/ Lectures 5%; Subspecialty Care 100%
Major teaching responsibility: Rick Wright, M.D.
Patients seen/weekly: Varies
On call/weekend responsibility: Varies

M95 840  ORTHOPAEDIC SURGERY - FOOT/ANKLE
Instructor(s): Jeff Johnson, M.D., 747-2543
Location: Barnes-Jewish Hospital, Barnes-Jewish West County Hospital
Elective Contact: Orthopaedic Surgery Education Office, 747-2543, orthsurg@msnotes.wustl.edu
Other Information: Students should contact the Education Office prior to the first day of the elective.
Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

This clinical elective is available for four weeks during which the student participates in orthopaedic conferences, outpatient clinics, surgical cases and patient rounds. The medical students electing this rotation will serve as an active and integral part of the orthopaedic team.
Student time distribution: Inpatient 48%, Outpatient 47%, Conferences/Lectures 5%; Subspecialty Care 100%
Major teaching responsibility: Faculty attendings and resident mentors
Patients seen/weekly: Varies
On call/weekend responsibility: Varies - generally one weekend call every two weeks

M95 842A ORTHOPAEDIC SHOULDER/ELBOW SURGERY
Instructor(s): Ken Yamaguchi, M.D., 747-2543
Location: Barnes-Jewish Hospital
Elective Contact: Orthopaedic Surgery Education Office, 747-2543, orthsurg@msnotes.wustl.edu
Other Information: Students should contact the Education Office prior to the first day of the elective.

Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

Clinical elective available, during which time the student will work with attending surgeons primarily at Barnes-Jewish Hospital. Activities will include participation in the care of hospitalized inpatients, participation in inpatient and outpatient procedures, attendance at designated attending office hours, attendance at designated orthopaedic conferences and dissection of upper-extremity anatomical specimens.
Student time distribution: Inpatient 48%, Outpatient 47%, Conferences/Lectures 5%; Subspecialty Care 100%
Major teaching responsibility: Faculty attendings and resident mentors
Patients seen/weekly: Varies
On call/weekend responsibility: Varies - generally one weekend call every two weeks

M95 842B ORTHOPAEDIC SHOULDER/ELBOW SURGERY
Instructor(s): Leesa Galatz, M.D., 747-2543
Location: Barnes-Jewish Hospital
Elective Contact: Orthopaedic Surgery Education Office, 747-2543, orthsurg@msnotes.wustl.edu
Other Information: Students should contact the Education Office prior to the first day of the elective.

Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

Clinical elective available, during which time the student will work with attending surgeons primarily at Barnes-Jewish Hospital. Activities will include participation in the care of hospitalized inpatients, participation in inpatient and outpatient procedures, attendance at designated attending office hours, attendance at designated orthopaedic conferences and dissection of upper-extremity anatomical specimens.
Student time distribution: Inpatient 48%, Outpatient 47%, Conferences/Lectures 5%; Subspecialty Care 100%
Major teaching responsibility: Faculty attendings and resident mentors
Patients seen/weekly: Varies
On call/weekend responsibility: Varies - generally one weekend call every two weeks

M95 845A ORTHOPAEDIC HAND AND UPPER EXTREMITY SURGERY
Instructor(s): Martin I. Boyer, M.D., 747-2543
Location: Barnes-Jewish Hospital, Barnes-Jewish West County Hospital
Elective Contact: Orthopaedic Surgery Education Office, 747-2543, orthsurg@msnotes.wustl.edu
Other Information: Students should contact the Education Office prior to the first day of the elective.

Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 25, 29, 33, 37 and 41.

Clinical elective available, during which time the student will work with attending surgeon primarily at Barnes-Jewish Hospital. Activities will include participation in the care of hospitalized inpatients, participation in inpatient and outpatient procedures, attendance at designated attending office hours, attendance at designated orthopaedic conferences and dissection of upper-extremity anatomical specimens.

Student time distribution: Inpatient 48%, Outpatient 47%, Conferences/ Lectures 5%; Subspecialty Care 100%
Major teaching responsibility: Faculty attending and resident mentors
Patients seen/weekly: Varies
On call/weekend responsibility: Varies - generally one weekend call every two weeks

M95 845B  ORTHOPAEDIC HAND AND UPPER EXTREMITY SURGERY
Instructor(s): Charles Goldfarb, M.D., and Paul Manske, M.D., 747-2543
Location: Barnes-Jewish Hospital, Shriners Hospital for Children, and St. Louis Children's Hospital
Elective Contact: Orthopaedic Surgery Education Office, 747-2543, orthsurg@msnotes.wustl.edu
Other Information: Students should contact the Education Office prior to the first day of the elective.

Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

Clinical elective available, during which time the student will work with attending surgeons primarily at Barnes-Jewish Hospital. Activities will include participation in the care of hospitalized inpatients, participation in inpatient and outpatient procedures, attendance at designated attending office hours, attendance at designated orthopaedic conferences and dissection of upper-extremity anatomical specimens. Please note that the hand/upper extremity fellow assigned to Dr. Manske's service will also participate in the instruction of students choosing this elective.

Student time distribution: Inpatient 48%, Outpatient 47%, Conferences/ Lectures 5%; Subspecialty Care 100%
Major teaching responsibility: Faculty attending and resident mentors
Patients seen/weekly: Varies
On call/weekend responsibility: Varies - generally one weekend call every two weeks

M95 845C  ORTHOPAEDIC HAND AND UPPER EXTREMITY SURGERY
Instructor(s): Richard H. Gelberman, M.D., 747-2543
Location: Barnes-Jewish Hospital, Barnes-Jewish West County Hospital
Elective Contact: Orthopaedic Surgery Education Office, 747-2543, orthsurg@msnotes.wustl.edu
Other Information: Students should contact the Education Office prior to the first day of the elective.

Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

Clinical elective available, during which time the student will work with attending surgeon primarily at Barnes-Jewish Hospital. Activities will include participation in the care of hospitalized inpatients, participation in inpatient and outpatient procedures, attendance at designated attending office hours, attendance at designated orthopaedic conferences and dissection of upper-extremity anatomical specimens.

Student time distribution: Inpatient 48%, Outpatient 47%, Conferences/ Lectures 5%; Subspecialty Care 100%
Major teaching responsibility: Richard Gelberman, M.D.
Patients seen/weekly: Varies
On call/weekend responsibility: Varies - generally one weekend call every two weeks

M95 846  ORTHOPAEDIC TRAUMA
Instructor(s): Joseph Borrelli, M.D., 747-2543, and William Ricci, M.D., 747-2543
Location: Barnes-Jewish Hospital
Elective Contact: Orthopaedic Surgery Education Office, 747-2543, orthsurg@msnotes.wustl.edu
Other Information: Students should contact the Education Office prior to the first day of the elective.

Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

Clinical elective available for a four-week period, during which time the student will work in orthopaedic trauma at Barnes-Jewish Hospital. Activities will include participation in the care of hospitalized inpatients, participation in inpatient and outpatient procedures, attendance at designated orthopaedic conferences and participation in ongoing research projects.
Student time distribution: Inpatient 48%, Outpatient 47%, Conferences/ Lectures 5%; Subspecialty Care 100%
Major teaching responsibility: Faculty attendings and resident mentors
Patients seen/weekly: Varies
On call/weekend responsibility: Varies - generally one weekend call every two weeks

M95 848  ORTHOPAEDIC PEDIATRIC SURGERY
Instructor(s): Eric Gordon, M.D., 747-2543
Location: St. Louis Children’s Hospital
Elective Contact: Orthopaedic Surgery Education Office, 747-2543, orthsurg@msnotes.wustl.edu
Other Information: Students should contact the Education Office prior to the first day of the elective.

Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

Clinical elective available for four weeks during which time the student will work with attending surgeon primarily at St. Louis Children’s Hospital observing and assisting in outpatient and inpatient care. To be included are activities in the OR, ER, and outpatient clinics. Attendance at and participation in the weekly pediatric orthopaedic conference activities required.
Student time distribution: Inpatient 48%, Outpatient 47%, Conferences/ Lectures 5%; Subspecialty Care 100%
Major teaching responsibility: Faculty attendings and resident mentors
Patients seen/weekly: Varies
On call/weekend responsibility: Varies - generally one weekend call every two weeks

M95 849  ORTHOPAEDIC SPINE SURGERY IN ADULT PATIENTS
Instructor(s): Brett Taylor, M.D., 747-2543
Location: Barnes-Jewish Hospital
Elective Contact: Orthopaedic Surgery Education Office, 747-2543, orthsurg@msnotes.wustl.edu
Other Information: Students should contact the Education Office prior to the first day of the elective.

Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

This clinical elective is available for four weeks during which time the student will work with the attending surgeon primarily at Barnes-Jewish Hospital observing and assisting when appropriate in outpatient and inpatient care. To be included are activities in the OR, ER, and outpatient clinics. Attendance at and participation in the weekly orthopaedic conference activities is required. The spine
fellow assigned to this service will serve as a primary contributor to the student’s education experience on this rotation.

Student time distribution: Inpatient 48%, Outpatient 47%, Conferences/ Lectures 5%; Subspecialty Care 100%
Major teaching responsibility: Faculty attending, spine fellow assigned to this service and resident mentors
Patients seen/weekly: Varies
On call/weekend responsibility: Varies - the student generally participates in Trauma call in the Barnes-Jewish Hospital ER at least once during the week. Additional subspecialty at-home call may be included if desired.

M95 855A RECONSTRUCTIVE & JOINT PRESERVATION SURGERY
Instructor(s): Robert L. Barrack, M.D.
Location: Barnes-Jewish Hospital
Elective Contact: Orthopaedic Surgery Education Office, 747-2543, orthsurg@msnotes.wustl.edu
Other Information: Students should contact the Education Office prior to the first day of the elective.

Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

Clinical elective available, during which time the student will work with the attending physician on the Adult Reconstruction and Joint Preservation/Replacement service. This rotation is primarily centered at Barnes-Jewish Hospital and includes care of hospitalized inpatients, participant in inpatient and outpatient procedures, attendance at designated office hours, and attendance at and participation in orthopaedic educational conferences and anatomy sessions.
Student time distribution: Inpatient 48%, Outpatient 47%, Conferences/ Lectures 5%; Subspecialty Care 100%
Major teaching responsibility: Faculty attendings, fellow and resident mentors
Patients seen/weekly: Varies
On call/weekend responsibility: On call one weekend every two weeks

M95 855B RECONSTRUCTIVE & JOINT PRESERVATION SURGERY
Instructor(s): John Clohisy M.D.
Location: Barnes-Jewish Hospital, Barnes-Jewish West County Hospital
Elective Contact: Orthopaedic Surgery Education Office, 747-2543, orthsurg@msnotes.wustl.edu
Other Information: Students should contact the Education Office prior to the first day of the elective.

Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

Clinical elective available, during which time the student will work with the attending physician on the Adult Reconstruction and Joint Preservation/Replacement service. This rotation is primarily centered at Barnes-Jewish Hospital and includes care of hospitalized inpatients, participant in inpatient and outpatient procedures, attendance at designated office hours, and attendance at and participation in orthopaedic educational conferences and anatomy sessions.
Student time distribution: Inpatient 48%, Outpatient 47%, Conferences/ Lectures 5%; Subspecialty Care 100%
Major teaching responsibility: Faculty attendings, fellow and resident mentors
Patients seen/weekly: Varies
On call/weekend responsibility: On call one weekend every two weeks

M95 855C RECONSTRUCTIVE & JOINT PRESERVATION SURGERY
Instructor(s): Stephen Burnett, M.D.
Location: Barnes-Jewish Hospital
Elective Contact: Orthopaedic Surgery Education Office, 747-2543, orthsurg@msnotes.wustl.edu
Other Information: Students should contact the Education Office prior to the first day of the elective.

Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

Clinical elective available, during which time the student will work with the attending physician on the Adult Reconstruction and Joint Preservation/Replacement service. This rotation is primarily centered at Barnes-Jewish Hospital and includes care of hospitalized inpatients, participant in inpatient and outpatient procedures, attendance at designated office hours, and attendance at and participation in orthopaedic educational conferences and anatomy sessions.
Student time distribution: Inpatient 48%, Outpatient 47%, Conferences/ Lectures 5%; Subspecialty Care 100%
Major teaching responsibility: Faculty attendings, fellow and resident mentors
Patients seen/weekly: Varies
On call/weekend responsibility: On call one weekend every two weeks

M95 859  ORTHOPAEDIC ONCOLOGY
Instructor(s): Douglas J. McDonald, M.D., 747-2543
Location: Barnes-Jewish Hospital
Elective Contact: Orthopaedic Surgery Education Office, 747-2543, orthsurg@msnotes.wustl.edu
Other Information: Students should contact the Education Office prior to the first day of the elective.

Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

This clinical elective, centered primarily at Barnes-Jewish Hospital, is available for four weeks during which the student participates in orthopaedic conferences, outpatient clinics, surgical cases and patient rounds on the Musculoskeletal Oncology service.
Student time distribution: Inpatient 48%, Outpatient 47%, Conferences/ Lectures 5%; Subspecialty Care 100%
Major teaching responsibility: Douglas J. McDonald, M.D.
Patients seen/weekly: Varies
On call/weekend responsibility: Varies

M95 8991  ORTHOPAEDIC SURGERY EXTERNSHIP (Visiting Students Only)
Instructor(s): Martin I. Boyer, M.D., and Rick Wright, M.D.
Location: 11300 West Pavilion
Elective Contact: Orthopaedic Surgery Education Office, 747-2543, orthsurg@msnotes.wustl.edu
Other Information: Students meet in the Education Office (6102 Queeny Tower), 8:00 a.m. first day of the elective.

Enrollment limit per period: Varies
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

Students rotate on Orthopaedic Services for two- or four-week blocks. Students typically participate in two weeks of hand and upper extremity surgery with Dr. Martin Boyer and two weeks of sports medicine with Dr. Rick Wright. Please contact the Orthopaedic Education Office for further information. E-mail address: orthsurg@msnotes.wustl.edu.
Student time distribution: Inpatient 48%, Outpatient 47%, Conferences/ Lectures 5%; Subspecialty Care 100%
Major teaching responsibility: Faculty attendings and resident mentors
Patients seen/weekly: Varies
On call/weekend responsibility: Varies - generally one weekend call every two weeks

Research
Various orthopaedic surgery research opportunities are available with the following faculty attendings. If interested, please contact the Education Office at 747-2543, orthsurg@msnotes.wustl.edu or contact the faculty member directly.

Yousef Abu-Amer, Ph.D.
Robert L. Barrack, M.D.
Joseph Borrelli, M.D.
Martin I. Boyer, M.D., F.R.C.S. (C)
Stephen Burnett, M.D., F.R.C.S. (C)
John Clohisy, M.D.
Matthew Dobbs, M.D. Leesa Galatz, M.D.
Richard H. Gelberman, M.D.
Charles A. Goldfarb, M.D.
J. Eric Gordon, M.D.
Lawrence G. Lenke, M.D.
Jueren Lou, M.D.
Matthew J. Matava, M.D.
William Ricci, M.D.
Linda Sandell, Ph.D.
Perry Schoenecker, M.D.
Matt Silva, Ph.D.
Brett Taylor, M.D.
Stavros Thomopoulos, Ph.D.
Rick Wright, M.D.
Ken Yamaguchi, M.D.

Faculty

RICHARD H GELBERMAN, MD Fred C Reynolds Professor of Orthopaedic Surgery, Head of the Department of Orthopaedic Surgery

YOUSEF ABU-AMER, PHD Associate Professor of Orthopaedic Surgery

ROBERT L BARRACK, MD Charles F and Joanne Knight Distinguished Professor of Orthopaedic Surgery

DONALD R BASSMAN, MD Instructor in Clinical Orthopaedic Surgery

JOSEPH BORRELLI, MD Associate Professor of Orthopaedic Surgery

MARTIN I BOYER, MD Associate Professor of Orthopaedic Surgery

DONALD H BRANCATO, MD Instructor in Clinical Orthopaedic Surgery

KEITH HAPP BRIDWELL, MD Professor of Orthopaedic Surgery

ROBERT STEPHEN BURNETT, MD Assistant Professor of Orthopaedic Surgery

ROBERTO CIVITELLI, MD Professor of Orthopaedic Surgery

JOHN C CLOHISY, MD Associate Professor of Orthopaedic Surgery

MARSHALL B CONRAD, MD Associate Professor of Clinical Orthopaedic Surgery

MATTHEW DOBBS, MD Assistant Professor of Orthopaedic Surgery
JAMES P EMANUEL, MD Instructor in Clinical Orthopaedic Surgery
ROBERTA FACCIO Assistant Professor of Orthopaedic Surgery
LEESA GALATZ, MD Assistant Professor of Orthopaedic Surgery
JEROME J GILDEN, MD Professor Emeritus of Orthopaedic Surgery
LOUIS ARNOLD GILULA, MD Professor of Orthopaedic Surgery
JORDAN GINSBURG, MD Assistant Professor of Clinical Orthopaedic Surgery
CHARLES A GOLDFARB, MD Assistant Professor of Orthopaedic Surgery
J. ERIC GORDON, MD Associate Professor of Orthopaedic Surgery
MARK E. HALSTEAD, MD Instructor in Orthopaedic Surgery
RONALD C HERTEL, MD Instructor in Clinical Orthopaedic Surgery
ZHENGMIN HUANG, PHD Research Assistant Professor of Orthopaedic Surgery
DEVYANI M. HUNT, MD Instructor in Orthopaedic Surgery
GLEN E JOHNSON, MD Instructor in Clinical Orthopaedic Surgery
JEFFREY E JOHNSON, MD Associate Professor of Orthopaedic Surgery
ROBERT S KRAMER, MD Instructor in Clinical Orthopaedic Surgery
ROBERT E KUHLMAN, MD Assistant Professor Emeritus of Clinical Orthopaedic Surgery
ADAM J. LABORE, MD Instructor in Orthopaedic Surgery
ROBERT CRAIG LANDER, MD Instructor in Clinical Orthopaedic Surgery
W. EDWARD LANSCHE, MD Instructor in Clinical Orthopaedic Surgery
LAWRENCE G LENKE, MD Professor of Orthopaedic Surgery
J. OTTO LOTTES, MD, BS Assistant Professor Emeritus of Clinical Orthopaedic Surgery
SCOTT J LUHMANN, MD Assistant Professor of Orthopaedic Surgery (Pending Executive Faculty Approval)
CHARLES IRWIN MANNIS, MD Instructor in Clinical Orthopaedic Surgery
PAUL R MANSKE, MD Professor of Orthopaedic Surgery
MATTHEW J MATAVA, MD Assistant Professor of Orthopaedic Surgery
AUDREY MCALINDEN, PHD Research Assistant Professor of Orthopaedic Surgery
JOHN A MCCARTHY, MD Research Instructor in Orthopaedic Surgery
DOUGLAS J. MCDONALD, MD Professor of Orthopaedic Surgery
JOHN P METZLER, MD Instructor in Orthopaedic Surgery
GARY ARTHUR MILLER, MD Associate Professor of Orthopaedic Surgery
MARVIN R MISHKIN, MD Assistant Professor of Clinical Orthopaedic Surgery
HARRY C MORGAN, MD, BS Associate Professor of Clinical Orthopaedic Surgery
ALAN H MORRIS, MD Instructor in Clinical Orthopaedic Surgery
MARGARET MARY OAKLEY, MD Instructor in Clinical Orthopaedic Surgery
Otolaryngology is presented to students in the first-, second-, third- and fourth-year classes. Physical diagnosis skills are taught in the first year. Clinically oriented lectures and a physical diagnosis workshop are presented to second-year students. In the third year of the medical curriculum, four-week elective rotations on one of the services in East Pavilion, the Veterans Administration Medical Center or St. Louis Children’s Hospital are offered. During this period, there is teaching at the bedside, in the operating room and in the clinic, supplemented by daily afternoon lectures, Grand Rounds on Wednesdays, and an introduction to audiology.

Fourth-year students interested in ENT as a specialty may take a two- to four-week elective designed to give them exposure to patient care, both in the outpatient clinic and the operating room and postoperative setting. An additional four-week elective that provides comprehensive ambulatory experience is offered to students headed for primary care.
The postgraduate program in Otolaryngology at Washington University consists of one year of general surgery and four years of otolaryngology. A two-year research position is offered for two selected candidates from each class. During the clinical years of training, residents rotate on various services, which include the Head and Neck Surgery Service at Barnes-Jewish Hospital, the ENT Clinic, Otology, the Veterans Administration Medical Center, St. Louis Children’s Hospital and Facial Plastic and Reconstruction. During that time, the resident serves in all aspects of patient care, including the outpatient clinic, inpatient hospital care and the operating room, as well as the various ENT diagnostic laboratories, such as vestibular and audiology. An increasing degree of responsibility is given to residents as they proceed during the training program, depending upon the year in training and the resident’s professional development during this time. Didactic teaching consists of a basic science course during the first year of clinical residency and a two-year rotating core curriculum lecture series throughout the residency. There is also a temporal bone otology course, as well as a head and neck dissection course. Additional conferences include Grand Rounds, Morbidity and Mortality Conference, Journal Club, Otology Conference and Joint Tumor Conference. During the clinical years, residents are expected to participate in clinical and/or basic research and to publish papers in peer-reviewed journals, and they are expected to make presentations at the lectures or Grand Rounds. They are encouraged to submit papers and to make presentations at regional and national otolaryngology meetings. There is a national course consisting of literature given by the American Academy of Otolaryngology in which residents are expected to participate throughout the year. There is also an In-Training Examination given by the American Academy of Otolaryngology that all residents must take on a yearly basis. Throughout their residency, residents receive training in all aspects of otolaryngology, including general otolaryngology; head and neck cancer surgery; microvascular reconstructive techniques; facial plastic surgery; trauma; otology and neurotology; pediatric otolaryngology, including pediatric endoscopy; and allergy and endoscopic nasal sinus surgery.

CENTRAL INSTITUTE FOR THE DEAF AT WASHINGTON UNIVERSITY SCHOOL OF MEDICINE

Washington University School of Medicine assumed ownership of CID’s hearing research, adult clinical care and advanced degree programs, as well as of its newly built 66,000-square-foot campus and research facilities at 4560 Clayton Avenue in the Washington University Medical Center in September 2003. These programs are now part of Washington University School of Medicine’s Department of Otolaryngology. They continue to advance CID’s mission to help people with hearing loss under the name CID at Washington University School of Medicine. The additional research laboratories have given the University one of the largest otolaryngology departments in the world, creating an international powerhouse in the field of hearing and deafness.

The University manages CID’s graduate degree programs through its newly named Program in Audiology and Communication Sciences offering a Ph.D. degree in Speech and Hearing Sciences, an AuD degree in Audiology, and a M.S. degree in Deaf Education (See the Graduate Programs’ “Program in Audiology and Communication Sciences.”) CID provides faculty and practicum sites for the programs in deaf education and audiology and collaborates on applied research studies involving children with hearing loss. The Spencer T. Olin Hearing Clinic, on the CID campus, is in the Division of Adult Audiology. Work also continues in the Harold W. Siebens Hearing Research Center, which houses the Fay and Carl Simons Center for Biology of Hearing and Deafness and the Center for Childhood Deafness and Adult Aural Rehabilitation. All of the CID at Washington University School of Medicine programs share a campus with the CID Oral School and Outreach Center.

Courses

First Year
Otolaryngology Clinical Skills
Instructor: Joel A. Goebel, M.D., 747-0553
Introductory lecture and group sessions pertaining to the complete head and neck examination. After the one-hour lecture, students will be divided into small groups to learn the otoscopic, nasal, oral cavity and neck examination to be proctored by physicians from the ENT department.

Second Year

M55 660B Clinical Topics in Otolaryngology
Instructors: James M. Hartman, M.D., 362-8641; Joel A. Goebel, M.D., 747-0553
This course consists of eight introductory lectures on common diseases of the head and neck, including head and neck carcinoma, hearing loss and dizziness, otitis media, sinusitis, otolaryngologic emergencies, and facial fractures. Each lecture is highlighted by case presentations and treatment options in addition to pathophysiology. This course follows the physical examination practicum given earlier in the academic year.

Fourth Year

Electives

M55 801 OTOLARYNGOLOGY
Instructor(s): Joel Goebel, M.D., 747-0553
Location: 9916 McMillan
Elective Contact: Maria Harrington, 747-0553
Other Information: Students considering a career in otolaryngology should speak to Dr. Goebel prior to scheduling this elective. Prior to first day of elective student should contact Dr. Goebel to discuss options of elective and to ascertain starting time and location. Enrollment limit per period: Limit 3/period for Weeks: 1, 5; Limit 2/period for Weeks: 9, 13, 17, 21, 25, 29, 33, 37, 41.
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

This two-week elective is an extremely flexible program consisting of several options:

General Ear, Nose and Throat Service: Student functions as a junior resident at either Barnes-Jewish Hospital or John Cochran VA Medical Center. At Barnes-Jewish Hospital, participation in clinic, hospital inpatient and operating room settings would expose student to a broad spectrum of patients. At the
VA Hospital the emphasis would be on head and neck tumors.

Head and Neck Service - Barnes-Jewish Hospital: Student functions as junior resident on ENT hospital floor with great deal of exposure to head and neck surgery.

Pediatric Otolaryngology - St. Louis Children’s Hospital: Student participates as a junior resident, involved in pre- and postoperative surgical care as well as outpatient medical care.

Preceptorships: Student is assigned to a private practitioner’s office functioning in his/her office as well as hospital service.

Other options can be entertained and formulated according to the student’s particular needs. Students participating in this elective will be required to spend an afternoon or morning in the Audiology/Vestibular Laboratory learning fundamentals of audiological and vestibular evaluation. Attendance at Monday afternoon conferences as well as Grand Rounds on Wednesday mornings is expected.

Student time distribution: Inpatient 20%, Outpatient 70%, Conferences/Lectures 10%; Primary Care 40%, Subspecialty Care 60%

Major teaching responsibility: Attending physicians and residents

Patients seen/weekly: 100

On call/weekend responsibility: At student’s discretion

M55 803  PEDIATRIC OTOLARYNGOLOGY
Instructor(s): David W. Molter, M.D., 454-2136
Location: 3S35 St. Louis Children's Hospital
Elective Contact: Patty Tampow, 454-2136

Other Information: Students should report to 3S35, St. Louis Children's Hospital, 8:30 a.m. first day of elective. Enrollment limit per period: 2

This course is offered as either a 2 or 4 week duration. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41. Valid start weeks for 2-week blocks are: Weeks 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39 and 41.

The student will actively participate in the clinical office, inpatient consultations, and surgery with the attending staff at St. Louis Children's Hospital. Care would be taken to provide experience in the common problems one would see in primary care pediatrics or family practice. Participation in sub-specialty/multidisciplinary clinics such as the Cleft & Craniofacial clinic is encouraged. Opportunity will be provided to learn the fundamentals of audiological evaluation. Students participating in this elective will attend academic conferences in both the pediatric and adult divisions.

Student time distribution: Inpatient 50%, Outpatient 40%, Conferences/ Lectures 10%; Primary Care 30%, Subspecialty care 70%

Major teaching responsibility: Attending physician and residents

Patients seen/weekly: 100

On call/weekend responsibility: At student’s discretion

M55 820  PRACTICUM IN ADULT CLINICAL AUDIOLOGY
Instructor(s): Michael Valente, Ph.D., 362-7489
Location: 11th Floor, Center for Advanced Medicine (CAM)
Elective Contact: Michael Valente, Ph.D., 362-7489

Other Information: Students should contact Dr. Valente to schedule this elective. Enrollment limit per period: 8

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

Guidance provided in the administration and interpretation of audiometric tests. Emphasis on defining the severity of auditory dysfunction in addition to identifying sites of pathological processes. Theoretical bases of acoustics, anatomy and physiology, and electronics reviewed as they relate to
auditory assessment. Modification of conventional test paradigms and hearing aid procedures covered according to each student's interests and needs.

Student time distribution: Inpatient 10%, Outpatient 80%, Conferences/ Lectures 10%; Primary Care 50%, Subspecialty Care 50%

Major teaching responsibility: Audiology staff

Patients seen/weekly: 120

On call/weekend responsibility: None

M55 831 NEUROTOLOGY
Instructor(s): Joel Goebel, M.D., 747-0553
Location: 9th Floor McMillan
Elective Contact: Maria Harrington,
747-0553
Other Information: Students should contact Dr. Goebel if interested in this elective. Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

Active student participation in the physical exam, advanced testing and management of patients with balance dysfunction. Attend patient clinic two days a week and test patients on ENG, rotary chair and computerized platform three days a week. Research participation welcome with prior arrangements.

Student time distribution: Outpatient 80%, Conferences/Lectures 20%; Primary Care 10%, Subspecialty Care 90%

Major teaching responsibility: Attending

Patients seen/weekly: 40

On call/weekend responsibility: None

M55 833 AMBULATORY OTOLARYNGOLOGY FOR THE PRIMARY CARE PHYSICIAN
Instructor(s): Joel Goebel, M.D., F.A.C.S., 747-0553
Location: Barnes-Jewish Hospital and St. Louis Children's Hospital clinics
Elective Contact: Maria Harrington, 747-0553
Other Information: Students should contact Maria Harrington, 9906 McMillan, 747-0553, prior to the start of this elective. Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 9, 13, 17, 21, 25, 29, 33, 37 and 41.

This course offers a four-week exposure to ambulatory care of patients with diseases of the head and neck. Eight half-day sessions per week will be offered in attending clinics for general otolaryngology, head and neck cancer, otology and pediatric otolaryngology. Two half-day sessions are reserved for audiology, vestibular lab and voice lab experience. Surgical exposure is available for selected cases as identified by the student and attending physician, but the main goal of this rotation is outpatient diagnosis and management.

Student time distribution: Outpatient 100%; Primary Care 50%, Subspecialty Care 50%

Major teaching responsibility: Attendings and residents

Patients seen/weekly: >100

On call/weekend responsibility: None

M80 841 ART OF ASKING QUESTIONS/PROBLEM SOLVING
Instructor(s): J. Gail Neely, M.D., F.A.C.S., 362-7344
Location: 9th Floor McMillan
Elective Contact: J. Gail Neely, M.D., 362-7344
Other Information: Student should report to Carole Bradshaw, 804 McMillan, 8:30 a.m. first day of elective. Enrollment limit per period: 2

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

Medical Intelligence: The Art of Asking Questions and Efficient Clinical Problem Solving. The pressures of continued learning, competitive residency searches, and time constraints can erode the joy and the
efficiency of the fundamental principles of medicine, the fiduciary responsibilities to appreciate human values and to practice intelligent medicine. This is a one-on-one mentored program of independent study designed to increase the student’s efficiency and enjoyment of the intelligent practice of medicine. The student will set the course of their study. Working with the mentor on a daily basis and using the facilities of the institution, they will learn to efficiently think through clinical cases, use science and the techniques of clinical medicine to expand their understanding of the topic, and to express their selves effectively. The underlying efficiencies of thought pivot upon the art of asking questions while examining a patient and while reading for discovery.

Student time distribution: N/A
Major teaching responsibility: N/A
Patients seen/weekly: N/A
On call/weekend responsibility: None

Research

(M55 900)

The type of research will depend upon the current phase of the research program in each laboratory. Students should contact the director of each laboratory to negotiate.

Barbara A. Bohne, Ph.D., and Gary W. Harding, M.S.E., 1141 and 1144 Shriners Building, 362-7497. Studies of structure and function of the abnormal cochlea. The structure and function of the normal and damaged cochlea are studied in this laboratory. Several projects utilize the chinchilla for determining mechanisms of cell degeneration in the hearing organ following exposure to different ototoxicants such as noise. The chinchilla is excellent for these studies because its hearing is similar to that of humans, it is free of spontaneous middle ear disease and it is feasible to perform surgery on its middle and inner ears, including survival surgery. Current projects with chinchillas involve: a) injecting an inert tracer particle into the endolymphatic space to determine if, when and for how long the boundaries of the space are disrupted after a particular experimental treatment; and b) using a novel histological preservation technique termed "survival-fixation" to identify changes in the coupling of the tectorial membrane to the hair-cell stereocilia in animals which have sustained a temporary or a permanent loss of hearing. Certain inbred mice have hereditary hearing losses or develop early age-related hearing loss. Therefore, mice are being used to identify some of the genetic bases for variations in susceptibility to ototoxicants and the age of onset of presbycusis.

Brian T. Faddis, Ph.D., 1020 McMillan, 747-3665, faddisb@wustl.edu. Mechanisms of Middle/Inner Ear Damage. Our lab is interested in the cellular and molecular mechanisms associated with cell injury and tissue destruction in the middle and inner ears. We are currently studying the ability of nitric oxide to activate osteoclastic bone resorption, commonly seen in such middle ear diseases as cholesteatoma and chronic otitis media. We are interested in the roles of specific isoforms of nitric oxide synthase and possible interactions between them. Another focus in the lab is the study of cellular mechanisms of noise-induced hearing loss and how this can be exacerbated by simultaneous exposure to environmental toxins such as common workplace chemicals. Again, nitric oxide may play a key role in this injury because of the variety of NOS isoforms present in these tissues.

A wide variety of techniques are employed to gain a broad understanding of these disease processes at molecular, cellular and organismal levels. We use real time RT-PCR and in situ hybridization to study changes in gene expression, cell and organ culture models to assess injury models in more controlled environments, histological techniques for routine light and electron microscopy, western blotting and immunofluorescence to examine protein and structural changes within cells and tissues, and auditory brainstem response thresholds to correlate hearing sensitivity to specific cellular and molecular challenges.

Students in the lab will typically take some time to become familiar with a variety of projects and techniques before selecting a specific area or project for more in depth and independent study. Students or residents with specific but unrelated research questions that may benefit from the techniques we employ are also welcome to discuss the possibility of conducting these studies in the lab.
Joel A. Goebel, M.D., 8th Floor McMillan, 747-0553. Clinical research testing of posture and ocular motor control. Projects include headshake testing of the vestibulo-ocular reflex (VOR), interlaboratory rotary chair studies, dynamic posturography and outcome research in dizzy patients.

Bruce H. Haughey, M.D., 9903 McMillan, 362-0365. Work in progress is investigating the functional results of allotransplantation of the canine hemitongue. Successful recovery has been observed in five chronic animals, but inhibited in some cases by allograft rejection, despite immunosuppression. Much scope exists for further study of the immunosuppression of tongue tissue and its functional recovery. A new primate study is now approved. Also in progress are clinical studies of rehabilitation following reconstructive surgery of head and neck cancer resections, as well as a clinical data base and a study of outcomes of treatment for recurrent head and neck cancer.

Stephen M. Highstein, M.D., Ph.D., 4566 Scott Avenue, East McDonnell Science Building, 362-1012. The gain of the vestibulo-ocular reflex (VOR) in alert squirrel monkeys can be plastically adapted either acutely over 4-5 hours or chronically over weeks by employing visual/vestibular interactive stimulation. We study the neural substratum of motor learning and memory for this behavior with, a) intracellular and extracellular recording, b) neuroanatomical techniques for marking single neurons and c) chemical block of selected CNS sites. The patterns of response of single and multiple neurons have led us to construct mathematical models of the neural circuits involved. Brain sites implicated include the brainstem and cerebellum.

We also study the determinants of the response dynamics (phase and gain) of the vestibular horizontal semicircular canal by a) recording intracellularly from hair cells in situ in different regions of the crista, b) patch-clamping hair cells isolated from defined regions of the crista, c) measuring the motion of the cupula of the canal using laser interferometry and/or video microscopy, d) injecting identified primary afferents with tracer to elucidate their peripheral origins and central projections, and e) recording chronically in natural settings, from primary afferents and efferents that have regenerated through a multichannel sieve recording electrode. We have arrived at a general theory of the contributions of the biomechanical and neural factors that shape the responses of the canal nerve.

Timothy E. Hullar, M.D., 2110 Central Institute for the Deaf Building, 362-8641. Function of Vestibular Nerve Afferent Types. Our laboratory's efforts reflect the principal investigator's clinical interest in problems of balance and equilibrium. Studies of the peripheral vestibular system have traditionally used linear analysis to estimate the neural signal transmitted by primary vestibular afferents in response to a particular rotation or linear acceleration of the head. This technique, however, does not adequately or accurately represent the information supplied by the vestibular nerve to the brain. An improved understanding of the vestibular system's function in health and disease requires novel, statistics-based representations of the information transmitted by primary vestibular-nerve afferents. Current projects to achieve this include anatomic studies using light and electron microscopy, digital image processing, and recordings of rodent (mouse and chinchilla) eye movements and neuronal discharges in response to head accelerations.

These studies lead directly to studies with normal and vestibular-deficient human subjects. Interpretation of rotation and linear acceleration is often impaired in patients, and we plan to apply our new understandings of the vestibular periphery to relate vestibular stimulation and perception in humans.

Finally, we are studying the cetacean (whale and dolphin) vestibular system in an effort to understand better possible pathologic mechanisms for the effect of anthropogenic noise (ie sonar) on these animals. Ongoing studies include measuring cetacean head movements using trained aquarium animals such as bottlenose dolphins and using microCT techniques to make detailed anatomic measurements of the cetacean inner ear.

A student's involvement in the lab would be tailored to his or her background and interest. Possibilities range from hands-on animal surgery to analysis and interpretation of digitized anatomic images. Opportunities exist for summertime and school year projects as well as a yearlong full-time research experience.
Judith E. C. Lieu, M.D., 3S35 Children’s Hospital and 8th Floor McMillan, 454-2138. Clinical Outcomes Research in Pediatric Otolaryngology. The Clinical Outcomes Research office performs clinical epidemiology and health services research. (Please reference the research elective offered by Dr. Jay Piccirillo in otolaryngology for more details.) These techniques and methodologies are used to investigate clinical problems seen in pediatric otolaryngology. Projects include the follow-up and evaluation of newborn hearing screening programs, progression of hearing loss in children, and evaluation of unilateral hearing loss. Other projects of the student’s choosing that would utilize these research techniques may also be pursued.

J. Gail Neely, M.D., F.A.C.S., 9902 McMillan, 362-7344. Facial Motion Analysis Laboratory: Clinical research application of subtracted digitized image light reflectance. The student(s) will participate in videotaping normal subjects and patients with facial paralysis and synkinesis, in using a unique computer program to analyze dynamic surface deformations during facial expression, and using spreadsheet and statistical applications in order to quantitatively define outcomes during treatments of disorders of the facial nerve.

Jay F. Piccirillo, M.D., 8th Floor McMillan, 362-7394. The Clinical Outcomes Research Office of the Division of Research performs basic and applied clinical epidemiology and health services research. Clinical epidemiology is the study of the diagnosis, prognosis and evaluation of treatment. The scientific methodology of clinical epidemiology is based on the architecture of clinical research, biostatistics and data processing. Part of this methodology is borrowed from public health epidemiology and is applied to the uniquely clinical situations that clinicians face. Clinical epidemiology, therefore, is a methodology that can be applied to the study of any and all human disease and illness. Health services research can be defined as efforts to determine how the health system functions so that its performance can be improved. This definition makes the field essentially activist in nature.

Steven B. Scholnick, Ph.D., 10th Floor McMillan, 362-7549, scholnis@msnotes.wustl.edu. Molecular genetics of head and neck tumors. Our goals are twofold: to reach a better understanding of the biology of head and neck cancer and to use that understanding to develop better clinical markers for the assessment of tumor behavior and patient prognosis. To achieve these goals we are using molecular genetic techniques to identify tumor suppressor genes whose inactivation is correlated with poor outcome. Our data suggest that one such gene maps to a small interval within band p23.2 of chromosome 8. In our efforts to clone this gene, we have assembled a BAC contig of this interval as well as a detailed transcript map. We are now analyzing potential candidates for the putative suppressor.

A variety of potential projects will be available ranging from molecular genetic techniques which detect inactivation of these genes, through cell biological investigation of their function as a tumor suppressor, to investigation of their use as a clinical tool for predicting patient prognosis and selecting appropriate treatments.

Dwayne D. Simmons, Ph.D., 4560 Clayton Ave., Central Institute for the Deaf, Lab 2118, 747-7272. Investigations of Synapse Formation in the Inner Ear. Understanding the development of sensorineural connections within the vertebrate inner ear could provide additional insights into congenital hearing and balance disorders. Research in this laboratory concerns the development of peripheral and central auditory pathways, and in particular, how mature synaptic connections are established. One of our primary aims is to gain additional insight into the underlying developmental mechanisms that give rise to the normal structural and functional patterns seen in the adult. Our studies use molecular, anatomical and physiological techniques to characterize neurons as they develop in both the rodent brainstem and inner ear. Currently, we are investigating the nature and diversity of early cholinergic synapses in the rodent inner ear and in particular, the mechanisms associated with nicotinic acetylcholine receptor regulation during synaptogenesis. Using various transgenic mouse models, we are investigating the cellular and molecular cues that give rise to the synaptic remodeling that occurs prior to the onset of hearing.

To study synaptogenesis after traumatic insult, we use the bullfrog amphibian papilla (AP) as a model.
The bullfrog AP is a low-frequency mechanosensitive endorgan that shares structural and functional similarities with the mammalian cochlea. However, unlike the cochlea, the bullfrog AP has a peripheral growth margin, permitting in vitro studies of synaptic development. It also can be cultured with an intact statoacoustic ganglion and displays both hair cell repair and regeneration after trauma-induced damage, making it useful for comparing these recovery processes. In our studies of the AP, we use an in vitro culture system that supports both hair cell and neuronal regeneration to study how hair cells acquire, organize, and maintain their synaptic machinery.

Students are initially assigned general projects that allow them to become familiar with one or more techniques (western blot analysis, immunocytochemistry, electron microscopy, fluorescence imaging, culture, otoacoustic emissions). After a certain of proficiency, students then may identify specific research questions to address.

Faculty

RICHARD A CHOLE, MD, PHD  Lindburg Professor of Otolaryngology, Head of the Department of Otolaryngology
MARC BRUCE ABRAMS, DDS  Instructor in Clinical Otolaryngology
BENARD C ADLER, MD  Professor Emeritus of Clinical Otolaryngology
NAWAL MONA AHMED  Instructor in Clinical Otolaryngology (DDS)
LOUIS ALTSHULER, DDS  Assistant Professor Emeritus of Clinical Otolaryngology
MURRAY HOWARD APPELBAUM, DDS  Instructor in Clinical Otolaryngology (DMD)
SEAN B BAILEY, MD  Instructor in Clinical Otolaryngology
JIANXIN BAO  Research Assistant Professor of Otolaryngology
PERRY J BARTELS, DDS  Instructor in Clinical Otolaryngology
MARY ELAINE BASSE  Assistant Research Scientist of Otolaryngology
PABLO M BLAZQUEZ GAMEZ  Research Assistant Professor of Otolaryngology
BARBARA ANN BOHNE, PhD  Professor of Otolaryngology (Neurobiology)
GREGORY HARRIS BRANHAM, MD  Associate Professor of Otolaryngology
DOUGLAS A CARANO, DDS  Instructor in Clinical Otolaryngology (DDS)
JEFFREY D CARRON, MD  Assistant Professor of Otolaryngology (Pending Executive Faculty Approval)
CHAD PHADUNG CHADARATANA, MD  Instructor in Clinical Otolaryngology
WILLIAM W. CLARK, PhD  Professor of Otolaryngology
RANDALL A CLARY, MD, MS  Associate Professor of Otolaryngology
GENE C COHEN, DDS  Instructor in Clinical Otolaryngology (DDS)
SHELDON C COHEN, DDS  Instructor in Clinical Otolaryngology
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JOHN MICHAEL CONOYER, MD  Instructor in Clinical Otolaryngology
JOHN D DAHM, MD  Instructor in Clinical Otolaryngology
LISA DAVIDSON, PHD  Instructor in Otolaryngology
RICHARD DAVIDSON, DDENT  Instructor in Clinical Otolaryngology (DMD)
J. DAVID DICKMAN, PHD  Associate Professor of Otolaryngology
NORMAN STEVEN DRUCK, MD  Assistant Professor of Clinical Otolaryngology
JULIA D EDGAR  Research Instructor in Otolaryngology
TAMARA KAY EHLERT, MD  Instructor in Clinical Otolaryngology
CARL F EHRlich, MD  Assistant Professor of Otolaryngology
BRIAN T FADDIS, PHD  Research Assistant Professor of Otolaryngology
JAMES A FERNANDEZ, MD  Instructor in Clinical Otolaryngology
JEFFREY T FIERSTEIN, MD  Assistant Professor of Clinical Otolaryngology
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JAMES W FORSEn, JR, MD  Associate Professor of Otolaryngology
JOHN MURRAY FREDRICKSON, MD  Professor Emeritus of Otolaryngology
WILLIAM D GAY, DDENT  Associate Professor of Otolaryngology
JOEL GOEBEL, MD  Professor of Otolaryngology, Vice Chairman of Otolaryngology
RICHARD I GOLDBERG, DDENT  Instructor in Clinical Otolaryngology (DMD)
BARRY STEVEN GOLDENBERG, DDENT  Instructor in Clinical Otolaryngology (DMD)
JAMES DEAN GOULD, MD  Instructor in Clinical Otolaryngology
JASON M. HANSON, MD  Instructor in Clinical Otolaryngology
GARY WILLIAM HARDING  Research Associate Professor of Otolaryngology
BRUCE H HAUGHEY, MBCHB  Professor of Otolaryngology
JAY FREDRICK HAUSER, DDENT  Instructor in Clinical Otolaryngology
JACQUES A HERZOG, MD  Assistant Professor of Clinical Otolaryngology
STEPHEn M HIGHSTEIN, MD, PHD  Professor of Otolaryngology
IRA J. HIRSH, PHD, MA  Research Professor of Audiology in Otolaryngology
LAWRENCE M HOFFMAN, DDENT  Instructor in Clinical Otolaryngology (DMD)
LAURA KAY HOLDEN  Assistant Research Scientist of Otolaryngology
TIMOTHY ALLEN HOLDEN  Assistant Research Scientist of Otolaryngology
DEE JAY HUBBARD, PHD, MA  Adjunct Assistant Professor of Otolaryngology (Speech Pathology)
TIMOTHY EVERETT HULLAR, MD  Assistant Professor of Otolaryngology
DONALD R INGRAM, MD  Assistant Professor Emeritus of Clinical Otolaryngology
ARNOLD SCOTT JACOBSON, DDENT  Instructor in Clinical Otolaryngology (DMD)
SUSAN JERGER  Adjunct Research Professor of Otolaryngology
TIMOTHY N KAISER, MD  Assistant Professor of Clinical Otolaryngology
EUGENIA KARDARIS  Instructor in Clinical Otolaryngology (DDS)
ROANNE KAY KARZON, PHD, MS  Adjunct Assistant Professor of Otolaryngology
ANDREW M KIM, DDENT  Instructor in Clinical Otolaryngology
JUNE LESLIE KLEINFELD, DDENT  Instructor in Clinical Otolaryngology (DMD)
GEORGE R KLETZKER, MD  Assistant Professor of Clinical Otolaryngology
KENNETH E KRAM, DDENT  Instructor in Clinical Otolaryngology (DMD)
LAURENCE A LEVINE, DDENT, MD  Associate Professor of Clinical Otolaryngology
JUDITH E LIEU, MD  Assistant Professor of Otolaryngology
MICHAEL LILLMARS, DDENT  Instructor in Clinical Otolaryngology (DDS)
ROBERT DOUGLAS LOWE, DDENT  Instructor in Clinical Otolaryngology (DMD)
RICHARD W MAACK, MD  Instructor in Clinical Otolaryngology
ROBERT R MAC DONALD III, MD  Instructor in Clinical Otolaryngology
SUSAN E MACKINNON, MD  Professor of Otolaryngology
KAMLESH R MAKWANA, DDENT  Instructor in Clinical Otolaryngology (DDS)
MARSHALL S MANNE, DDENT  Instructor in Clinical Otolaryngology (DDS)
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ALICIA B MATAYOSHI  Instructor in Clinical Otolaryngology (DDS)
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MURRAY D MCGRADY, MD  Instructor in Clinical Otolaryngology
JOHN W MCKINNEY, MD, BS  Instructor in Clinical Otolaryngology
DAVID W. MOLTER, MD  Assistant Professor of Otolaryngology
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JOHN GAIL NEELY, MD  Professor of Otolaryngology
JOHANNA GRANT NICHOLAS, PHD  Research Associate Professor of Otolaryngology
BRIAN NUSSENBAUM, MD  Assistant Professor of Otolaryngology
KEVIN KENNETH OHLEMILLER, PHD  Research Associate Professor of Otolaryngology
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RUEDIGER THALMANN, MD  Professor Emeritus of Otolaryngology, Lecturer in Otolaryngology
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LLOYD E THOMPSON, MD  Assistant Professor of Clinical Otolaryngology
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LORA MAUREEN VALENTE  Assistant Professor of Otolaryngology (Pending Executive Faculty Approval)
MICHAEL VALENTE, PHD  Professor of Otolaryngology (Audiology)
THOMAS J VERALDI, DDENT  Instructor in Clinical Otolaryngology
WAYNE A VIERS, MD  Associate Professor of Clinical Otolaryngology
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CALVIN H WEISS, DDENT  Instructor in Clinical Otolaryngology (DDS)
Department's Website

http://oto.wustl.edu/

Department of Pathology and Immunology

The Department of Pathology and Immunology is involved in the teaching of Pathology and Immunology, in the clinical diagnosis of disease, and in research on the molecular basis of disease and immunology.

The Department is responsible through its Pathology divisions for studying the pathogenesis and the biochemical and anatomical basis of diseases. Pathologists do research on disease processes using molecular, genetic and structural analysis. Pathologists have the responsibility for the cytological and anatomical diagnosis of diseases, and for developing novel chemical and histological approaches for the analysis of them, particularly early cancers and infectious diseases. The Divisions of Anatomic Pathology (with Louis P. Dehner, M.D., as director and Jeffrey E. Saffitz, Ph.D., M.D., heading its Autopsy Service), Laboratory Medicine (headed by Jack H. Ladenson, Ph.D.) and Neuropathology (with Robert E. Schmidt, M.D., Ph.D.) have faculty involved in teaching, clinical service and research. Prominent areas of research include experimental diabetes, hematology, bone pathophysiology, cancer, and cardiac and vascular pathology.

The department teaches an extensive course in the second year of the curriculum and presents a number of conferences that third- and fourth-year students can attend, plus offering a number of clerkships. The coursemaster of the second-year Pathology course is Erika C. Crouch, Ph.D., M.D. Students can take clerkships in Autopsy Pathology, Surgical Pathology and Laboratory Medicine, or participate in the research activities of the faculty.

The Section of Immunology integrates immunology activities in the School. It is responsible for the teaching of immunology in the first year of the curriculum (Andrey S. Shaw, M.D., is the course-master), and in conducting basic research in immunology and in the immunological basis of disease.

Many faculty in the department are involved in graduate teaching and participate in the various programs offered by the Division of Biology and Biomedical Sciences. The department has strong participation in the Immunology Graduate Program, which is headed by Paul M. Allen, Ph.D.

Courses

First Year

M30 523 IMMUNOLOGY
Instructors: Andrey S. Shaw, M.D., 362-4614; Emil R. Unanue, M.D., 362-7440; John P. Atkinson, M.D., 362-8391; Robert D. Schreiber, Ph.D., 362-8748; Barry P. Sleckman, M.D., Ph.D., 747-8235; Herbert W. Virgin IV, M.D., Ph.D., 362-9223

This course consists of laboratories, laboratory exercises and small group discussions. It covers all aspects of the immune response—general properties of the immune system, effector molecules, cells and their function, cellular interactions, and immunological diseases. The Immunology course requires a strong background in biochemistry, genetics and cell biology. Some of the basic concepts from these fields should be reviewed during the course. There are two laboratory sessions. These will cover the
areas of blood typing/blood banking and allergy. In these laboratories, students will type their own blood and be tested for allergies. POPS (Patient Oriented Problem-Solving System in Immunology) will also be utilized; they contain a clinical problem that is analyzed and solved during the session. There are five hours of small group clinical discussion sessions. In these sessions, students meet with physicians to discuss the role of immunology and a particular human disease. The Immune System (second edition) by Peter Parham is used. For the small group clinical sessions, the latest edition of the textbook Case Studies in Immunology: A Clinical Companion (fourth edition) by Rosen and Geha will be used. There will be two formal exams (consisting of multiple choice and true and false questions) and one take-home exam (consisting of essay questions) on the topics described in the lectures and in the laboratory sessions. This course is restricted to medical students only.

**Second Year**

M60 665 PATHOLOGY
Instructor: Erika C. Crouch, Ph.D., M.D., 454-8462
This course provides a comprehensive survey of the biology and morphology of human disease through a combination of lectures and laboratory/case study sessions. The year begins with a review of basic disease mechanisms at the cellular and molecular level. Subsequently, the pathogenesis and characteristics of important diseases involving each organ system of the body are presented. Considerable emphasis is placed on learning the “language” of human disease. During the year, students become familiar with the methods of contemporary pathologic analysis. They also learn how the results of pathologic studies are used in the clinical setting to establish diagnoses, to assess prognosis and response to therapy, and to evaluate the quality of patient care.

**Third Year**

Conferences

Tumor Conference
One hour each week for 12 weeks during the Surgery and Obstetrics and Gynecology clerkships. Problem cases are presented for illustration and discussion of all aspects of neoplastic disease. Staff

**Fourth Year**

Electives

M60 805 AUTOPSY PATHOLOGY
Instructor(s): Jeffrey Saffitz, M.D., Ph.D., and staff, 362-7728
Location: West Building
Elective Contact: Jeffrey Saffitz, M.D., Ph.D., 362-7728
Other Information: Students should contact Dr. Saffitz prior to scheduling this elective. Enrollment limit per period: 2
Valid start weeks for 4-week blocks are: Weeks 13, 17, 21, 25, 29, 33, 37 and 41.

A full-time elective. Students will assist in performing autopsies and participate fully in Autopsy Service activities with the first-year house staff under the direction of senior pathology faculty. Students will be encouraged to learn as much gross pathology as possible, and will participate in brain cutting, specialty microscopic conferences and weekly autopsy case conferences.
Student time distribution: Autopsy Activities 75%, Conferences/Lectures 25%
Major teaching responsibility: Attendings and house staff
Patients seen/weekly: N/A
On call/weekend responsibility: None
M60 815  OB-GYN PATHOLOGY SUBINTERNSHIP
Instructor(s): Phyllis Huettner, M.D., 362-0118
Location: Barnes-Jewish Hospital, South Campus
Elective Contact: Phyllis Huettner, M.D., 362-0118
Other Information: Students report to Dr. Huettner's office, 300S Peters Building, Barnes-Jewish Hospital, South Campus, 9:00 a.m. first day of elective. Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

The elective stresses the principles of anatomic pathology when applied to operative material in obstetrics and gynecology. The subintern will examine gross and microscopic specimens in the Ob-Gyn Pathology Lab and review pertinent literature with a senior pathologist. Ample time will be available for attending regular conferences in ob-gyn and pathology.
Student time distribution: Inpatient 90%, Conferences/Lectures 10%; Subspecialty Care 100%
Major teaching responsibility: Attendings and residents
Patients seen/weekly: N/A
On call/weekend responsibility: None

M60 820  SURGICAL PATHOLOGY - BARNES-JEWISH HOSPITAL
Instructor(s): D. Ashley Hill, M.D., and staff, 454-8854
Location: Division of Surgical Pathology, 3rd Floor Peters Building, Barnes-Jewish Hospital South Campus
Elective Contact: D. Ashley Hill, M.D., 454-8854, (hill@path.wustl.edu)
Other Information: Please contact Dr. Hill prior to your elective for important introductory information and discussion. Enrollment limit per period: In order to permit maximum interaction with the surgical pathology staff and house staff, the elective is limited to two students for each of the first 3 four-week blocks between June 20, 2005 and September 11, 2005 and one student during each of the last 8 four-week blocks between September 12, 2005 and May 7, 2006. We may also be willing to accommodate MSTP students during the four-week period from May 23, 2005-June 17, 2005. Please contact the coursemaster to arrange.

This elective is designed to familiarize students with the discipline of surgical pathology and to encourage the development of basic skills in gross pathology and histopathological interpretation. The Laboratory of Surgical Pathology at Barnes-Jewish Hospital receives a broad range of medical biopsy material in addition to specimens derived from the busy surgical subspecialty practices. As a result, this elective is beneficial not only for students considering a career in pathology, but also for students planning careers in internal medicine, surgery, obstetrics-gynecology, pediatrics, radiology, radiation oncology and dermatology. Students on this elective will 1. Learn how patient specimens are received and processed, 2. Acquire skills in the gross examination and microscopic diagnosis of disease through active participation and 3. Learn the role of the pathologist in the preoperative, intraoperative, and postoperative care and management of patients. Students will function as junior housestaff managing their own cases with supervision from residents, fellows and attending pathologists. Students may also wish to participate in ongoing research projects within the Department as time, and interest, allows. The daily schedule for students begins at 8:00 a.m. with morning conference. In general, the student will be able to complete all gross examination and sign-out activities by 4:30 p.m. Students are welcome to stay beyond 4:30 p.m. to participate in any of the academic or other working activities of the Division.
Student time distribution: Clinical duties 85%, Conference/Lectures 15%
Major teaching responsibility: Attending staff, residents and fellows
Patients seen/weekly: N/A
On call/weekend responsibility: None

M60 825  INTRODUCTION TO NEUROPATHOLOGY
Instructor(s): Robert E. Schmidt, M.D., Ph.D., 362-7426
Location: West Building
Elective Contact: Robert E. Schmidt, M.D., Ph.D., 362-7426
Other Information: Students report to 3720 Neuropathology, West Building, 9:00 a.m. first day of
elective. Enrollment limit per period: 2

Valid start weeks for 4-week blocks are: Weeks 13, 17, 21, 29, 33, 37 and 41.

The course is structured to give the student a full-time immersion in the specialty of neuropathology. There are daily didactic sessions that cover the spectrum of neurological diseases, review neuro-anatomy, discuss approaches to the diagnosis of nervous system disease, and point out the interrelationships of research to clinical problems. Multiple clinical conferences and diagnostic working sessions complement the reading and project work. Time: 35 to 40 hours per week.

Student time distribution: Conferences/Lectures 100%; Subspecialty Care 100%
Major teaching responsibility: Attendings and fellows
Patients seen/weekly: N/A
On call/weekend responsibility: None

M60 860  CLINICAL LABORATORY MEDICINE - BARNES-JEWISH HOSPITAL
Instructor(s): Charles Eby, M.D., 362-3186
Location: Barnes-Jewish Hospital, South Campus
Elective Contact: Jenny Adams, 362-3110
Other Information: Students meet in chief resident’s office, 2nd Floor Barnes-Jewish Hospital, South Service Building, 8:30 a.m. first day of elective. Enrollment limit per period: 2

Valid start weeks for 4-week blocks are: 13, 17, 21, 29, 33, 37 and 41.

This elective is designed to teach the student how the vast array of clinical assays are used in the diagnosis of disease and how the tests are actually performed in the clinical laboratory. The four-week elective includes rotations through laboratories in clinical chemistry, clinical microbiology, hematology, coagulation, and blood bank. During the elective the student will have a carefully planned daily schedule, which includes regular didactic sessions with senior staff and house staff. Particularly useful clinical skills to be acquired include analysis of peripheral blood smears and coagulation tests, interpretation of cardiac enzyme and serum protein electrophoresis patterns, appropriate use of blood component therapy, and indications for therapeutic apheresis. Students will be given the opportunity to present and lead case discussions during this elective.

Student time distribution: Inpatient 25%, Conferences/Lectures 75%
Major teaching responsibility: Attendings and residents
Patients seen/weekly: Less than 1
On call/weekend responsibility: None

M25 883  TRANSFUSION MEDICINE
Instructor(s): Douglas Lublin, M.D., Ph.D., 362-8849
Location: Barnes-Jewish Hospital
Elective Contact: Jo Ann Mertz, 362-8849
Other Information: Students should preschedule their rotation with Dr. Lublin. Students should meet Dr. Lublin on the 2nd floor of Barnes Service Building, first day of elective. Enrollment limit per period: 2

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

This elective is designed to introduce the student to the clinical aspects of blood banking and interventional hematology. The four-week elective will consist of regular didactic sessions with senior staff, teaching conferences, participation in daily clinical rounds and exposure to developing programs. The student will develop clinical skills in areas related to transfusion practice, blood conservation and evaluation of transfusion reactions. Complex hematologic diseases such as the coagulopathies and diseases that require apheresis will serve to instruct in current clinical practice along with evolving applications of interventional hematology, such as photopheresis and peripheral stem cell harvest for marrow transplantation.

Student time distribution: For July, November and March: Inpatient 50%, Conferences/Lectures 50%; For remainder of year: Inpatient 100%; Subspecialty Care 100%
Major teaching responsibility: Attendings
Patients seen/weekly: 20-25
On call/weekend responsibility: Optional

In addition to the above, the department offers several advanced courses in the Division of Biology and Biomedical Sciences. These courses are listed below, but are described in the offerings of the Division of Biology and Biomedical Sciences.

L41 (Bio) 5051 FOUNDATIONS IN IMMUNOLOGY
L41 (Bio) 5171 MEDICAL IMMUNOLOGY
L41 (Bio) 5261 MOLECULAR MECHANISMS OF DISEASE
L41 (Bio) 5272 ADVANCED TOPICS IN MOLECULAR IMMUNOLOGY

Note — The number preceding the course title indicates that the course carries credit in the Graduate School of Arts and Sciences.

Research

(M60 900)

Paul M. Allen, Ph.D., 7th Floor Clinical Sciences Research Building, 362-8758. Research in immunology. The recognition of antigen by T cells. We are investigating how the T cell receptor functions developmentally, biochemically and structurally. We utilize in vivo models to study alloreactivity/graft rejection and the pathophysiological mechanisms involved in rheumatoid arthritis.


Erika C. Crouch, M.D., Ph.D., 454-8462. The structure and function of collagenous carbohydrate bindings’ proteins known as collectins. We are actively investigating the structure, function, synthesis, assembly and secretion of SP-D — a lung surfactant associated collectin that contributes to the innate pulmonary host defense against a wide variety of important bacterial, fungal, and viral pathogens. The laboratory is studying the human SP-D promoter and using site-directed mutagenesis to examine the structural requirements for assembly, secretion and biologic activity.


Michael McDaniel, Ph.D. 3709 West Building, 362-7435. The focus of this laboratory is to study the function and growth of pancreatic islets in Types 1 and 2 diabetes. Mammalian target of rapamycin (mTOR) is a protein kinase that integrates signals from growth factors and nutrients to regulate DNA and protein synthesis. G protein-coupled receptor agonists, such as GLP-1, have been shown to enhance proinsulin biosynthesis and secretion, and stimulate cellular growth and proliferation. Our objective is to further explore the mechanisms of action of GLP-1 to enhance DNA and protein synthesis via mTOR in rodent and human islets. These studies are of fundamental interest in optimizing mTOR to induce cellular growth and proliferation to: 1) enhance pre- and post- islet transplantation in type 1 diabetes and 2) prolong ?-cell compensation in response to insulin resistance in Type 2 diabetes. ?-cell failure in obesity-associated Type 2 diabetes is believed to correlate with the intracellular accumulation of lipids that contribute to defects in insulin secretion and maintenance of ?-cell mass. Our studies have identified lipoprotein lipase in ?-cells, a key enzyme for catalyzing the hydrolysis of lipoprotein-associated TAG, to produce free fatty acids (FFA) for local cellular uptake. We are also characterizing the effects of enhanced FFA uptake through fatty acid transporters and determining the regulation of lipid droplet synthesis and breakdown by lipid droplet associated proteins. Recent studies suggest that FFA up-regulate mitochondrial uncoupling proteins proposed to dissipate the proton gradient across the mitochondrial inner membrane. The objective of this study is to delineate the link between FFA and ?-cell mitochondrial dysfunction in type 2 diabetes.
Jeffrey D. Milbrandt, M.D., Ph.D., 101 Biotechnology Center, 362-4650. We have several ongoing projects in our laboratory. 1) The biological function of the GFL family of neurotrophic factors (GDNF, neurturin, persephin and artemin) that signal through a receptor complex containing the Ret tyrosine kinase. These factors promote survival of multiple neuronal populations including dopaminergic neurons, which degenerate in Parkinson’s disease, motor neurons, which are affected in Lou Gehrig’s disease and most neurons of the peripheral nervous system. 2) The biological roles of Egr2/Nab2 in regulating the Schwann cell myelination program and how abnormal function of these transcription factors result in peripheral neuropathies. 3) The development of prostate cancer, especially the role of Egr1 in regulating the PIN to invasive carcinoma transition and the role of the Nkx3.1 homeodomain protein in tumor initiation.

Curtis A. Parvin, Ph.D., 2435 Barnes-Jewish Hospital, North Campus, 454-8436. The application of biostatistical theory to data analysis issues in laboratory medicine, with particular emphasis on statistical approaches to characterizing the performance and quality of laboratory tests.

Jeffrey E. Saffitz, M.D., Ph.D., 4715 West Building, 362-7728. Experimental cardiovascular pathology research. Areas of research: cellular and molecular mechanisms of sudden cardiac death and the biology and pathobiology of intercellular communication in the heart.

Robert E. Schmidt, M.D., Ph.D., 3rd Floor West Building, 362-7429. Areas of research interest in this laboratory include: 1) the development and characterization of an experimental model of diabetic autonomic neuropathy in streptozotocin diabetic rats; 2) human sympathetic nervous system in aging and diabetes; 3) susceptibility of subpopulations of sympathetic neurons to experimental injury; 4) the role of oxidative stress in the pathogenesis of experimental diabetic autonomic and age-related neuropathy.


Barry Sleckman, M.D., Ph.D., 1747 West Building, 747-8235. Cellular immunology; molecular basis of T cell receptor assembly.

Carl H. Smith, M.D., St. Louis Children’s Hospital, 454-6029. Placental transport and surface membrane structure and function.

Steven Teitelbaum, M.D., Barnes-Jewish Hospital, 454-8463. Cellular and molecular mechanisms of bone remodeling with particular emphasis on osteoclast biology as relates to pathogenesis and prevention of diseases, such as osteoporosis. We focus on integrin and cytokine biology utilizing a variety of genetically-manipulated mice.

John Turk, M.D., Ph.D., 6609 Wohl, 362-8190. Studies focus on the role of phospholipase A2 (PLA2) enzymes in the regulation of insulin secretion from pancreatic islet beta cells. A novel PLA2 that does not require calcium ions has been cloned from rat and human islets that appears to participate in beta cell secretion and proliferation. Further studies of the role of this enzyme in these processes, it’s post translational modifications, and it’s interactions with other proteins involve molecular biologic manipulation of expression of the enzyme in cultured beta cells and intact mice. Mass Spectrometric characterization of complex lipids and proteins is an important tool in these studies.

Emil R. Unanue, M.D., 3701 West Building, 362-7440. Research in immunobiology/immunopathology. Examination of cellular interactions resulting in immune induction and cellular immunity. These cellular interactions are being studied in normal, in infectious processes, and in autoimmune diseases. The focus is to identify the proteins responsible for activation of lymphocytes in type I diabetes as well as
in infection with the intracellular pathogen Listeria monocytogenes.

Herbert Virgin, M.D., Ph.D., 1754 West Building, 362-9223. We work on issues at the interface of virology and immunology by analyzing aspects of viral immunity, viral pathogenesis, and viral genetics that contribute to virulence and disease. We focus on latency and pathogenesis of herpes viruses.

Mark A. Watson, M.D., Ph.D., Barnes-Jewish Hospital, Room 2316 Kingshighway Building, 454-7919. Our laboratory is interested in defining gene transcriptional programs associated with the early progression of human breast cancer. The experimental approach utilizes histopathological review and laser capture microdissection of tumor tissue from patient biopsies coupled with state-of-the-art quantitative RT-PCR, DNA expression microarray, and tissue microarray technologies. Using bioinformatics and statistical analysis of microarray data, we are defining gene expression profiles associated with breast tumor progression, from cellular atypia to invasive disease. Individual genes and signaling pathways identified will be used to better understand the biology of breast cancer, to identify novel diagnostic markers, and to develop strategies for new, targeted therapies. Similar approaches using DNA microarrays and bioinformatics are being applied to molecularly classify several other types of inherited and sporadic solid tumor neoplasms.

Faculty

EMIL RAPHAEL UNANUE, MD Mallinckrodt Professor of Pathology and Immunology, Head of the Department of Pathology and Immunology
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PETER A HUMPHREY, MD, PHD  Professor of Pathology and Immunology
JOHN M KISSANE, MD  Retiree - Professor of Pathology and Immunology
ROBYN SUE KLEIN, MD  Assistant Professor of Pathology and Immunology
FRIEDERIKE H. KREISEL, MD  Assistant Professor of Pathology and Immunology
MICHAEL KYRIAKOS, MD  Professor of Pathology and Immunology
JACK H LADENSON, PHD  Oree M Carroll and Lillian B Ladenson Professor of Clinical Chemistry in Pathology and Immunology
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RAKESH NAGARAJAN, MD, PHD, BA  Assistant Professor of Pathology and Immunology
CHRISTOPHER A NELSON, PHD  Research Instructor in Pathology and Immunology
JAN A. NOLTA, PHD  Associate Professor of Pathology and Immunology
DEBORAH J NOVACK, MD, PHD  Assistant Professor of Pathology and Immunology
JOHN WILLIAM OLNIEY, MD  Professor of Pathology and Immunology (Neuropathology)
CURTIS ALAN PARVIN, PHD  Clinical Research Associate Professor of Pathology and Immunology
ANDREW S. PEKOSZ, PHD  Assistant Professor of Pathology and Immunology
ARIE PERRY, MD  Associate Professor of Pathology and Immunology
ALAN PESTRONK, MD  Professor of Pathology and Immunology
JOHN DAVID PFEIFER, MD, PHD  Associate Professor of Pathology and Immunology
CHRISTINE T PHAM, MD  Assistant Professor of Pathology and Immunology
ZHENG PU  Research Instructor in Pathology and Immunology
JON H RITTER, MD  Associate Professor of Pathology and Immunology
FREDERICK P ROSS, PHD  Research Professor of Pathology and Immunology
ROBERT EDWARD SCHMIDT, MD, PHD  Professor of Pathology and Immunology
ROBERT D SCHREIBER, PHD  Alumni Professor of Pathology and Immunology
MITCHELL G SCOTT, PHD  Professor of Pathology and Immunology
ANDREY S SHAW, MD  Professor of Pathology and Immunology
KATHLEEN C SHEEHAN, PHD  Research Assistant Professor of Pathology and Immunology
BARRY SLECKMAN, MD, PHD  Associate Professor of Pathology and Immunology
CARL HUGH SMITH, MD  Professor of Pathology and Immunology
MORTON EDWARD SMITH, MD  Lecturer in Pathology and Immunology
THADDEUS STAPPENBECK, MD, PHD  Assistant Professor of Pathology and Immunology
ANISH SURI, PHD  Research Instructor in Pathology and Immunology
WOJCIECH A. SWAT, PHD  Assistant Professor of Pathology and Immunology
STEVEN L TEITELBAUM, MD  Messing Professor of Pathology and Immunology
DOUGLAS M TOLLEFSEN, MD, PHD  Professor of Pathology and Immunology
PANG-HSIEN TU, MD, PHD  Instructor in Pathology and Immunology
JOHN W TURK, MD, PHD  Professor of Pathology and Immunology
HERBERT W VIRGIN, IV, MD, PHD  Professor of Pathology and Immunology
DAVID WANG, PHD  Assistant Professor of Pathology and Immunology
HANLIN WANG, MD, PHD  Assistant Professor of Pathology and Immunology
XIAOLI WANG, MD, PHD  Research Instructor in Pathology and Immunology
MARK A WATSON, MD, PHD  Associate Professor of Pathology and Immunology
KATHERINE N WEILBAECHER, MD  Assistant Professor of Pathology and Immunology
FRANCES V WHITE, MD  Assistant Professor of Pathology and Immunology
TERRY A WOODFORD-THOMAS, PHD  Adjunct Research Assistant Professor of Pathology and Immunology
LOURDES YLAGAN, MD  Assistant Professor of Pathology and Immunology
WAYNE M YOKOYAMA, MD  Professor of Pathology and Immunology
YIK YEUNG LAWRE YU, PHD  Research Instructor in Pathology and Immunology
BARBARA ANN ZEHNBAUER, PHD  Professor of Pathology and Immunology
JING ZHAI, MD, PHD  Instructor in Pathology and Immunology
LIJUAN ZHANG, PHD  Assistant Professor of Pathology and Immunology

Department's Website

http://www.pathology.wustl.edu/

Department of Pediatrics

The primary aim of the teaching program of the Department of Pediatrics is to stimulate interest in developmental biology, especially human growth and development, and to provide the student with a foundation sufficiently comprehensive so that he or she will have an appreciation of clinical pediatric problems regardless of his or her future career choice in medicine.

The major clinical and research facilities are in St. Louis Children’s Hospital and the newborn services are at Barnes-Jewish Hospital. St. Louis Children’s Hospital is a facility with 235 beds that accepts patients through 21 years of age with all types of medical and surgical problems. Hospital admissions average 11,000 annually. Pediatric medical ambulatory activity, including subspecialty and emergency visits, averages about 90,000 visits a year. Nearly 5,000 infants are born annually in the Medical Center.

Courses

First Year
M30 511 MEDICAL GENETICS
Instructors: Jeffrey I. Gordon, M.D., 362-7243; Alison J. Whelan, M.D., 362-7800
The course is divided into halves. The first half focuses on the mechanisms of regulation of gene expression in eukaryotes. This includes discussions of the structure of DNA and its means of replication, the organization and packaging of eukaryotic genomes, chromatin structure and the nucleosome, the organization of polymerase II class genes, the processing of their primary transcripts, and the molecular basis for transcriptional and translational regulation including the use of transgenic mice to study cell-specific gene regulation. The second half focuses on how these concepts can be applied to an understanding of medical genetics. Topics covered include principles of Mendelian genetics, the molecular basis for various inborn errors of metabolism, their diagnosis and prenatal screening, the genetics of cancer, and finally, current strategies for mapping and characterizing the human genome. This course is referenced in Department of Genetics and is cross-listed with L41 (Bio) 550.

Selectives
M04 526 NEW DISEASES, NEW PATHOGENS
For full description, see Department of Molecular Microbiology.

Second Year
Students are introduced to pediatrics and to the faculty through a series of lectures and symposia designed to acquaint them with the concepts of human growth and development and the effects of age and maturity on reactions to injury and disease. The unique aspects of the physical examination of the infant and child are presented in the Introduction to Clinical Medicine course. Members of the faculty are active participants in the second-year Pathophysiology course.

Third Year
M65 760 PEDIATRIC CLERKSHIP
Instructors: Kathleen A. McGann, M.D.; Angela M. Sharkey, M.D. (both: 454-6299)
This six-week curriculum, which is a component of the 12-week Women’s and Children’s Health Clerkship, emphasizes pediatric pathophysiology and normal growth and development from birth through adolescence. Two weeks will be spent assessing newborns in the regular or special care nurseries at Barnes-Jewish or Missouri Baptist hospitals or spent seeing patients in the pediatric emergency department. Four weeks will be spent at St. Louis Children’s Hospital on an inpatient service. Emphasis is on performing a pediatric history and physical examination and developing an appropriate differential diagnosis. Daily rounds with house staff and attending physicians, as well as weekly case management conferences and grand rounds, further this emphasis. A weekly core lecture series also is offered during this 12-week combined clerkship (Women's and Children's Health) with Ob/Gyn.

Fourth Year
Electives
M65 801 GENERAL PEDIATRIC SUBINTERSHIP - ST. LOUIS CHILDREN’S HOSPITAL
Instructor(s): Kathleen McGann, M.D.; Angela Sharkey, M.D.; Alan Schwartz, M.D., Ph.D.; and Andrew White, M.D., 454-6299
Location: St. Louis Children’s Hospital
Elective Contact: Liz Karner, 4S30 St. Louis Children’s Hospital, 454-6299
Other Information: Students should call Liz Karner, 454-6299, one month before start date. Floor assignments will be determined by lottery from floor choices 7East, 9East and 12West. Students
should report to their designated floor on their first day at 8:00 a.m. Enrollment limit per period: 3

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

This is the general pediatric subinternship. There will be a lottery to determine if the student will be assigned to 7E, 9E or 12W. The student will be assigned patients on one of three inpatient pediatric floors (7East, 9East or 12West) for initial evaluation and continuing care. The student works as an extern and is expected to take call every fourth night. Students work directly under the supervision of the senior resident. Teaching rounds are conducted by the faculty. The elective will provide experience in the management of many pediatric medical conditions (variable depending on floor) including a wide variety of infectious diseases, failure to thrive, acute asthma, poisonings, immune deficiency diseases, along with pulmonary, gastrointestinal, renal and neurologic disorders.

Student time distribution: Inpatient 100%; Subspecialty Care/General Pediatrics 100%
Major teaching responsibility: Attendings and residents
Patients seen/weekly: 12
On call/weekend responsibility: Every fourth night

M65 808  PEDIATRIC ASTHMA AND ALLERGY
Instructor(s): Leonard B. Bacharier, M.D., and Robert C. Strunk, M.D., 454-2694
Location: 5S30 St. Louis Children’s Hospital
Elective Contact: Suzanne Cipponeri, 454-2694
Other Information: Students should call 454-2694 prior to the start of this elective for location and time. Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

In predominantly an outpatient setting, students will evaluate patients with a wide variety of allergic disorders including asthma, allergic rhinitis, anaphylaxis, food allergy, atopic dermatitis and urticaria/angioedema. Goals include: 1) the extension of history-taking skills to include environmental exposures, 2) the recognition of physical findings suggestive of allergic disease, 3) understanding the indications and interpretation of diagnostic testing including skin testing and assessment of pulmonary function, and 4) application of appropriate therapeutic strategies to these disorders. Weekly didactic conferences and inpatient consultations provide additional educational opportunities.

Student time distribution: Inpatient 20%, Outpatient 70%, Conferences/ Lectures 10%; Subspecialty Care 100%
Major teaching responsibility: Leonard B. Bacharier, M.D., and Robert C. Strunk, M.D.
Patients seen/weekly: 20
On call/weekend responsibility: None

M65 811  PEDIATRIC CRITICAL CARE MEDICINE
Instructor(s): Matthew Goldsmith, M.D., 454-2527
Location: 5S20 St. Louis Children’s Hospital
Elective Contact: Tracey Erdman, 454-2527
Other Information: Students report to the PICU, 7th Floor St. Louis Children’s Hospital, 8:00 a.m. first day of elective. Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

This elective is designed to familiarize the student with the diagnosis and treatment of critical illness in infants and children. To this end, each student is made responsible for a small number of assigned cases under the direct supervision of pediatric residents, pediatric critical care fellows, and faculty. The teaching activities emphasize the understanding of pathophysiological processes that lead to respiratory, cardiocirculatory, and central nervous system dysfunction and their therapy in the developing subject. Students are expected to participate in all the daily activities of the Pediatric Intensive Care Unit at St. Louis Children’s Hospital and be on occasional call after hours.

Student time distribution: Inpatient 100%; Subspecialty Care 100%
Major teaching responsibility: Attending, critical care fellows, and pediatric residents
Patients seen/weekly: 150
On call/weekend responsibility: Yes
M65 813 PEDIATRIC CARDIAC CATHETERIZATION
Instructor(s): David Balzer, M.D., and Susan Foerster, M.D., 454-6095
Location: St. Louis Children’s Hospital
Elective Contact: David Balzer, M.D., 454-6095
Other Information: Student reports to 5S30 St. Louis Children’s Hospital, 8:00 a.m. first day of elective. Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

Elective will focus on interpretation of hemodynamic and angiographic data acquired in the cardiac catheterization laboratory.
Student time distribution: Inpatient 50%, Outpatient 45%, Conferences/ Lectures 5%; Subspecialty Care 100%
Major teaching responsibility: Two attendings, supplemented by one fellow
Patients seen/weekly: 10
On call/weekend responsibility: None

M65 818 PEDIATRIC CARDIOLOGY-INPATIENT SERVICE
Instructor(s): Angela Sharkey, M.D.; Charles E. Canter, M.D.; Mark Grady, M.D.; Mark Johnson, M.D.; Dave Balzer, M.D.; Achi Ludomirsky, M.D.; and Guatam Singh, M.D., 454-6095
Location: St. Louis Children’s Hospital
Elective Contact: Angela Sharkey, M.D., 454-6095
Other Information: Students report to 5S30 St. Louis Children’s Hospital, Cardiology Division Office, 9:00 a.m. first day of elective. Enrollment limit per period: 2
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

The student works as a subintern and is assigned selected patients on the pediatric cardiology ward. Patients admitted to the cardiology service include those being evaluated for surgical intervention, patients with significant congestive heart failure, and those for cardiac catheterization/ intervention. The student has an opportunity to follow patients through these procedures.
Student time distribution: Inpatient 95%, Conferences/Lectures 5%; Subspecialty Care 100%
Major teaching responsibility: Single or two attendings, supplemented by one resident and one fellow
Patients seen/weekly: Up to 15
On call/weekend responsibility: As desired, none required

M65 819 PEDIATRIC CARDIOLOGY-OUTPATIENT SERVICE
Instructor(s): Angela Sharkey, M.D.; Charles E. Canter, M.D.; Mark Grady, M.D.; Mark Johnson, M.D.; Dave Balzer, M.D.; Edward Rhee, M.D.; Achi Ludomirsky, M.D.; and Guatam Singh, M.D., 454-6095
Location: St. Louis Children’s Hospital
Elective Contact: Angela Sharkey, M.D., 454-6095
Other Information: Students report to Heart Station, 2nd Floor St. Louis Children’s Hospital, Cardiology Division Office, 9:00 a.m. first day of elective. Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

Students will independently evaluate outpatients referred for evaluation of cardiac murmurs, chest pain, arrhythmia and report findings to the attending physician. Clinics are held at St. Louis Children’s Hospital, Missouri Baptist Hospital and many outreach sites. The student will review with the attending all EGGs, holter monitors, echocardiograms performed. Participation in weekly surgical conference and journal club is expected.
Student time distribution: Outpatient 95%, Conferences/Lectures 5%; Subspecialty Care 100%
Major teaching responsibility: Multiple attendings
Patients seen/weekly: 25
On call/weekend responsibility: None required
M65 825  CLINICAL GENETICS  
Instructor(s): Rick A. Martin, M.D., 454-6093  
Location: 4S30 St. Louis Children’s Hospital  
Elective Contact: Rick A. Martin, M.D., 454-6093  
Other Information: Students report to 4S30 St. Louis Children’s Hospital, 8:00 a.m. first day of elective. Enrollment limit per period: 1  
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

The goal of the Senior Medical Student elective in Clinical Genetics is to familiarize the student with the role of the Clinical Geneticist and Genetic Counselor in the diagnosis and management of birth defects and genetic disease. Attainment of this goal will be accomplished by a myriad of clinical experiences through established weekly genetics clinics in the Department of Pediatrics, Medicine and Neurology and on the pediatric genetics inpatient consultation service at St. Louis Children’s Hospital and Barnes-Jewish Hospital. The primary student role will be clinical evaluation of patients with various genetic diseases and syndromes under supervision of a clinical geneticist and/or a genetic counselor. Through this exposure the student will be expected to leave the elective not only with a more thorough understanding of basic genetic principles but also of the role of genetics in health care and the impact genetic disease has on the patient, their family and society.

Student time distribution: Inpatient 20%, Outpatient 70%, Conferences/ Lectures 10%; Subspecialty Care 100%  
Major teaching responsibility: Attendings  
Patients seen/weekly: 15  
On call/weekend responsibility: None

M65 827  SUBINTERNSHIP-PEDIATRIC HEMATOLOGY/ONCOLOGY  
Instructor(s): David Wilson, M.D., Ph.D., 454-2717  
Location: St. Louis Children’s Hospital, 9 West  
Elective Contact: Robert Hayashi, M.D., 454-4118  
Other Information: Students report to 9 South Nursing Station, 8:00 a.m. first day of elective. Enrollment limit per period: 1  
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

Students will assume the responsibilities of a pediatric resident on the inpatient Hematology/Oncology service at St. Louis Children’s Hospital.  
Student time distribution: Inpatient 90%, Conferences/Lectures 10%; Subspecialty Care 100%  
Major teaching responsibility: Single attending, first-year hem-onc fellow and junior resident  
Patients seen/weekly: 2-3 patients a day  
On call/weekend responsibility: Every 4 days with resident

M65 833  SPECIAL TOPICS IN REPRODUCTIVE HEALTH  
Instructor(s): F. Sessions Cole, M.D., 454-6148  
Location: 5S20 St. Louis Children’s Hospital  
Elective Contact: F. Sessions Cole, M.D., 454-6148  
Other Information: Students meet at 5S20 St. Louis Children’s Hospital, 8:00 a.m. first day of elective. Enrollment limit per period: 1  
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

Students will participate in clinical experiences in four clinical modules: contraception, sexually transmitted diseases, abortion and special topics (HIV infection and adolescence). Required reading will include relevant review articles. Clinical experiences will be primarily ambulatory.  
Student time distribution: Outpatient 90%, Conferences/Lectures 10%; Primary Care 30%, Subspecialty Care 70%  
Major teaching responsibility: Attendings  
Patients seen/weekly: 10
M65 835  PEDIATRIC IMMUNOLOGY AND RHEUMATOLOGY  
Instructor(s): Andrew White, M.D., 454-6124; Anthony French, M.D., Ph.D.; and Fei Shih, M.D., Ph.D.  
Location: St. Louis Children’s Hospital  
Elective Contact: Andrew White, M.D., 454-6124  
Other Information: Students report to Immunology/Rheumatology Clinic, Suite C, St. Louis Children’s Hospital, 8:30 a.m. first day of elective. Enrollment limit per period: 1  
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.  
Opportunities are available to care for children with a variety of immunologic and rheumatologic disorders. Students will see patients in outpatient clinics and inpatient consultations. An in-depth approach to evaluating disorders of the immunologic system will be provided. Students will participate in evaluation of new patients with a variety of rheumatologic diseases including JRA, SLE and scleroderma at both SLCH and Shriners Hospital clinics. Students may elect to participate in conferences and seminars.  
Student time distribution: Inpatient 20%, Outpatient 70%, Conferences/ Lectures 10%; Primary Care 30%, Subspecialty Care 70%  
Major teaching responsibility: Andrew White, M.D.  
Patients seen/weekly: 35-40  
On call/weekend responsibility: None

M65 840  PEDIATRIC INFECTIOUS DISEASES  
Instructor(s): Joseph W. St. Geme, M.D.; Greg Storch, M.D.; Kathleen McGann, M.D.; David Haslam, M.D.; Alexis Elward, M.D.; Galit Holzmann-Pazgal, M.D.; David Hunstad, M.D.; and Jeffrey McKinney, M.D., Ph.D., 454-6050  
Location: St. Louis Children’s Hospital  
Elective Contact: Joseph W. St. Geme, M.D., 454-6050  
Other Information: Student reports to 11W32 St. Louis Children’s Hospital, 9:00 a.m. first day of elective. Enrollment limit per period: 1  
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.  
This elective is designed to introduce students to the clinical aspects of infectious diseases in children. Students will consult on both inpatients and outpatients. Regular daily activities will include evaluation of new patients, work rounds on inpatient consults, microbiology teaching rounds in the bacteriology and virology labs, and teaching rounds with the infectious diseases attending. Formal teaching sessions include a weekly pediatric infectious disease case conference, a weekly joint clinical conference with the adult infectious diseases group, a weekly pediatric infectious diseases research conference, and a monthly journal club.  
Student time distribution: Inpatient 70%, Outpatient 20%, Conferences/ Lectures 10%; Subspecialty Care 100%  
Major teaching responsibility: One or two attendings, one or two fellows  
Patients seen/weekly: 5-10 new patients primarily, over 15-20 new patients with team  
On call/weekend responsibility: Saturdays optional

M65 841  CARE OF THE HIV-INFECTED PATIENT  
Instructor(s): Kathleen McGann, M.D., 454-6050, Gregory Storch, M.D., and staff  
Location: St. Louis Children’s Hospital, Barnes-Jewish Hospital, plus other ambulatory sites.  
Elective Contact: Kathleen McGann, M.D., 454-6050  
Other Information: Students should contact Dr. McGann one week prior to the start of rotation. Students report to 11W32 St. Louis Children’s Hospital, 9:00 a.m. first day of elective. Enrollment limit per period: 1  
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.  
This elective is designed to introduce students to the care of HIV-infected individuals (adults,
adolescents, and children) and of HIV-exposed infants. Care of the HIV-infected patient encompasses not only the medical aspects, but also the psychosocial aspects of care. The elective will involve rotation through several clinics including the maternal-HIV clinic, pediatric and adolescent HIV clinics, and several adult HIV clinics, along with participation in community-wide social service meetings, home visits, and exposure to the Retrovirus laboratory and the AIDS Clinical Trials unit. In addition, the student will spend part of his/her time rotating in the general ambulatory infectious diseases clinics (pediatric and adult ID).

Student time distribution: Outpatient 65%, Conferences/Lectures 15%, Other 20%; Subspecialty Care 100%
Major teaching responsibility: Attendings listed above as course instructors
Patients seen/weekly: 20
On call/weekend responsibility: None

M65 845 PEDIATRIC EMERGENCY MEDICINE
Instructor(s): David M. Jaffe, M.D., 454-2341
Location: St. Louis Children’s Hospital
Elective Contact: Carol Heller, 454-2341
Other Information: Students report to 4S50 St. Louis Children’s Hospital, 8:30 a.m. first day of elective. Enrollment limit per period: 2
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

The goal of this elective is to provide the senior medical student with a broad introductory clinical experience in pediatric emergency medicine. Functioning as a subintern in the Emergency Unit of St. Louis Children’s Hospital, the student will have the opportunity to evaluate and manage patients with a wide variety of emergent and urgent medical and surgical problems. Examples include: respiratory distress, abdominal pain, lacerations, bone injuries, rashes, fever, etc.

Students will work either a day shift (7:30 a.m.-3:00 p.m.) or an evening shift (3:00 p.m.-11:00 p.m.) in rotation. Daily teaching conferences are provided by the attending staff. A weekly meeting of the students and senior faculty will occur to review interesting cases. Also, attending staff and senior pediatric residents provide 24-hour on-site supervision. Each medical student will be asked to prepare a 20-minute presentation on a topic of his/her choosing.

Student time distribution: Outpatient 90%, Conferences/Lectures 10%; Subspecialty Care (Emergency Medicine) 100%
Major teaching responsibility: All EM attendings
Patients seen/weekly: ~30
On call/weekend responsibility: None (unless making up time)

M65 8501 PEDIATRIC ENDOCRINOLOGY AND DIABETES
Instructor(s): Louis Muglia, M.D., Ph.D.; Neil H. White, M.D.; Abby Hollander, M.D.; Bess Marshall, M.D.; Rebecca Green, M.D., Ph.D.; and Paul Hruz, M.D., Ph.D., 286-2761
Location: St. Louis Children’s Hospital
Elective Contact: Angie Hantak, 286-2761
Other Information: Student has the option to extend elective. Students report to Endocrinology/Metabolism Office, 11th Floor St. Louis Children’s Hospital, 8:30 a.m. first day of elective. Enrollment limit per period: 2
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

This elective is designed to include broad clinical experience in pediatric endocrinology and diabetes. The student will have an opportunity to evaluate both patients admitted to St. Louis Children’s Hospital and patients referred for consultation in our three outpatient clinics each week. In addition to a divisional conference to review referred patients, several joint conferences with the adult Endocrinology and Diabetes Division (clinical rounds, journal club/research seminar, case conference) are held weekly.

Student time distribution: Inpatient 40%, Outpatient 50%, Conferences/Lectures 10%; Subspecialty Care 100%
Major teaching responsibility: Attending physicians and fellows
Patients seen/weekly: 10-20 by student
On call/weekend responsibility: None

M65 851 CLINICAL PEDIATRIC GI ELECTIVE
Instructor(s): Robert Rothbaum, M.D., 454-6173
Location: Gastroenterology Clinical Offices, SLCH, Room 11E10
Elective Contact: Debbie Long, 454-6173, long_d@kids.wustl.edu
Other Information: Students should contact Debbie Long at least one week in advance of first day of elective for further information. Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

The rotation in Pediatric Gastroenterology, Hepatology, and Nutrition provides broad exposure to specialized and common pediatric problems. Gastroenterology patients are seen in both the outpatient suites and in the hospital. Students see outpatients with common pediatric complaints like chronic abdominal pain, constipation, and poor growth. Additionally, students experience the ongoing outpatient care of patients with chronic liver disease, inflammatory bowel disease, short-gut syndrome, celiac disease and other rare disorders. The inpatient service provides experience in caring for patients with acute illnesses such as gastrointestinal bleeding, malnutrition, liver failure, complications of inflammatory bowel disease, and pancreatitis. Students participate in diagnostic and therapeutic endoscopic procedures. At weekly divisional conferences, attendings, fellows and students review pathology slides from current cases and discuss difficult patient problems and topics of interest.

Student time distribution: The time spent in the outpatient clinic and on the inpatient service is individualized according to the student's interests. In general, the distribution is: Inpatient 50%, Outpatient 45%, Conferences/Lectures 5%; Subspecialty Care 100%

M65 852 CLINICAL PEDIATRIC PULMONARY MEDICINE
Instructor(s): Robert C. Strunk, M.D.; Leonard Bacharier, M.D.; Maite De La Morena, M.D.; Thomas Ferkol, Jr., M.D.; Pamela Schuler, M.D.; Stuart C. Sweet, M.D.; and Elizabeth Uong, M.D., 454-2694
Location: 5S30 St. Louis Children's Hospital
Elective Contact: Suzanne Cipponeri, 454-4088
Other Information: Students meet 10th Floor Spoehrer Tower, 9:00 a.m. first day of elective.
Enrollment limit per period: 2
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

This elective provides an opportunity for students to be exposed to the full scope of respiratory diseases in infants and children. Pediatric referrals will be seen in both an inpatient and outpatient setting. Goals include: 1) to learn the importance of the physical exam using inspection, percussion and auscultation; 2) indications and interpretation of diagnostic tests, such as CXR, chest CT, VQ scan, pulmonary function testing, and bronchoscopy with biopsy and lavage; 3) therapeutic interventions and the use of bronchodilators, anti-inflammatory agents, et al. Unique aspects of this rotation include a broad exposure to children with congenital lung defects, life-threatening asthma, cystic fibrosis and end-stage cardiopulmonary diseases referred for transplantation. Weekly didactic sessions as well as weekly divisional patient care sections are an opportunity to further learn and practice presentational skills.

Student time distribution: Inpatient varies, Outpatient varies, Conferences/Lectures 10%; Primary Care 10%, Subspecialty Care 90%

Major teaching responsibility: Attendings
Patients seen/weekly: 25
On call/weekend responsibility: None
M65 861  NEWBORN MEDICINE
Instructor(s): F. Sessions Cole, M.D., 454-6148
Location: St. Louis Children’s Hospital
Other Information: Students should report to Dr. Cole’s office by appointment the afternoon (or the Friday) prior to the beginning of the rotation for orientation. Enrollment limit per period: 3
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

The goal of this course is to provide students with responsibility for caring for newborn infants who range from normal to acutely ill to chronically ill and for their families. The physiology of the transition from fetal to extrauterine existence, the pathophysiology of specific diseases, and primary accountability of the student for patient management decisions and procedures will be emphasized. In addition, collaboration with nursing staff and other health care providers in decision-making (especially concerning the viability of individual infants) and family management will be regularly required.

Students during each rotation will have the option to rotate through the Neonatal Intensive Care Unit at St. Louis Children’s Hospital and/or the labor and delivery services at Barnes-Jewish Hospital. Students assigned to the Neonatal Intensive Care Unit at St. Louis Children’s Hospital also will have the opportunity to become involved in the transport of acutely ill infants, while those on the Labor and Delivery Service will routinely be involved in normal newborn care and delivery room management. The student will be expected to rotate patient responsibilities every fourth night.

Student time distribution: Inpatient 90%, Outpatient 5%, Conferences/ Lectures 5%; Subspecialty Care 100%
Major teaching responsibility: Attending, fellow and residents
Patients seen/weekly: 30
On call/weekend responsibility: Every fourth night

M65 875  PEDIATRIC RENAL DISEASE
Instructor(s): Keith A. Hruska, M.D.; Anne M. Beck, M.D.; and S. Paul Hmiel, M.D., Ph.D., 454-6043
Location: St. Louis Children’s Hospital
Other Information: Students report to Lynne Strain, 454-2261, 11W32, St. Louis Children’s Hospital, 9:00 a.m. first day of elective. Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

This course is designed to provide the student with a wide exposure to all aspects of pediatric renal disease and an opportunity to explore a desired aspect of the field in-depth. The student will be an integral part of the Renal Team and as such will see both inpatients and outpatients. Students will have an opportunity to follow the courses of patients with acute renal disease as well as those with more chronic problems and will help to plan the evaluation and therapeutic management of these patients. Discussions and rounds with the attending staff and fellows emphasize the relationship between clinical problems and the pathophysiology of the underlying disease. These informal teaching sessions are supplemented by more formal sessions. These include renal attending rounds, renal research rounds and grand rounds, which are conducted weekly in conjunction with the Renal Division of Barnes-Jewish Hospital. Renal biopsy material is reviewed with the renal pathologists. Attendance at the weekly pediatric grand rounds and pediatric case conferences is encouraged. Opportunities in clinical and translational research projects will be discussed with interested students.

Student time distribution:  Inpatient 30%, Outpatient 60%, Conferences/ Lectures 10%; Subspecialty Care 100%
Major teaching responsibility: Attendings
Patients seen/weekly: 12-15
On call/weekend responsibility: None

M65 876  PEDIATRIC LUNG TRANSPLANTATION
Instructor(s): Stuart C. Sweet, M.D., and Maite de la Morena, M.D., 454-2694
Location: Allergy/Pulmonary Medicine Office, 5S30 St. Louis Children’s Hospital
Elective Contact: Suzanne Cipponeri, 454-4088
Other Information: Students meet in the Allergy/Pulmonary Office, 9:00 a.m. first day of elective.
Enrollment limit per period: 2
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

St. Louis Children’s Hospital has the largest pediatric lung transplant program in North America. This unique clinical rotation will enable students to be exposed to the process of transplantation from referral and listing to the actual surgery and post-operative care. Both inpatient and twice weekly outpatient clinics will be available for participation and learning. The use of diagnostic tests, such as flexible fiberoptic bronchoscopy with biopsies, the histopathology of infection and graft rejection, and the complexities of immunosuppression will all be explored. Weekly transplant meetings with our multidisciplinary team, as well as didactic/psychosocial and ethical and divisional care meetings will all be available. Our patient referral base is worldwide, and the primary cardiopulmonary disease states include: cystic fibrosis, pulmonary hypertension, complex congenital heart defects and alveolar proteinosis.

Student time distribution: Inpatient 50%, Outpatient 40%, Conferences/Lectures 10%; Subspecialty Care 100%
Major teaching responsibility: Attendings
Patients seen/weekly: 20-30
On call/weekend responsibility: None

M65 878  CLERKSHIP IN RURAL PRIMARY CARE PEDIATRICS
Instructor(s): Angela Sharkey, M.D., Kathleen McGann, M.D. --
Site Instructors: Kevin Blanton, M.D., in Sikeston and Claudia Preuschoff, M.D., in Poplar Bluff
Location: Sikeston or Poplar Bluff, MO
Elective Contact: Liz Karner, 4S30 St. Louis Children’s Hospital, 454-6299
Other Information: Students should call Liz Karner, 454-6299, at beginning of school year to indicate which rotation (Sikeston or Poplar Bluff) they have chosen, complete additional paperwork, and make housing reservations. Students should then report to their chosen site on their first day at 7:30 a.m.
Enrollment limit per period: 1 per site
Valid start weeks for 2-week blocks are: Weeks 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, and 43.
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

The clerkship in rural primary care pediatrics is designed to provide the student with first-hand experience in general pediatric practice in a rural community setting. Students will have the opportunity to see patients in a private office, participate in delivery room resuscitation, evaluate patients in the emergency department and provide pediatric consultation to family practitioners, obstetricians and surgeons. The objective of this elective is to provide the student with the experience of serving as a general pediatrician providing comprehensive health services in a rural community. Students assume responsibility for ongoing care of patients and have opportunities to perform procedures. Housing is available through SEMA ADHEC/Southeast Missouri Health Network at no cost to the student, however, reservations must be made early. Two-week or four-week blocks are available.

Student time distribution: Inpatient 10%, Outpatient 90%; Primary Care 100%
Major teaching responsibility: Single attending
Patients seen/weekly: 25-50
On call/weekend responsibility: Call with instructor, not in-house call

M25 831  PEDIATRIC DERMATOLOGY
Instructor(s): Susan Mallory, M.D., 454-2714
Location: 3N48 Children’s Hospital
Elective Contact: Rosemarie Brannan, 454-8622
Other Information: Call 454-2714 prior to first day of elective. Reporting time is 7:45 a.m. first day of elective. Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.
This clinical rotation will be available to students interested in dermatology, pediatrics or both. Students will follow the dermatology rotation (M25 830) with an emphasis on pediatric dermatology by attending pediatric dermatology clinics, seeing consults, etc. Enthusiastic students will have an opportunity to write up a case report if they wish, but need to notify Dr. Mallory before the course. Students can take either this elective or M25 830 - not both. Student time distribution: Inpatient 1%, Outpatient 74%, Conferences/Lectures 25%; Subspecialty Care 100% Major teaching responsibility: Single attending Patients seen/weekly: 50-100 On call/weekend responsibility: None

M80 870  CLERKSHIP IN PRIMARY CARE IN GENERAL PEDIATRICS
Instructor(s): Paul Simons, M.D., and Jay Epstein, M.D., 535-7855
Location: Forest Park Pediatrics, 4488 Forest Park Blvd.
Elective Contact: Paul Simons, M.D., 535-7855
Other Information: Students should contact coursemaster prior to the first day of the elective. Reporting time is 9:00 a.m. Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

The Clerkship in Primary Care in General Pediatrics is designed to provide the student with first-hand experience in general pediatric practice in a model ambulatory care setting at the Forest Park Pediatrics office on the medical campus. The major component of the clerkship is direct patient care under the supervision of the senior physicians who are members of the group. Students will join individual pediatricians as colleagues caring for pediatric patients under supervision. The broad spectrum of general ambulatory pediatrics including behavioral pediatrics, developmental pediatrics, preventive medicine and acute care aspects of pediatric practice will be emphasized. The objective of this elective is to provide the student with the actual experience of serving as a general pediatrician providing comprehensive health services to the families of a typical broadly based population receiving care through different insurance systems. Student time distribution: Outpatient 95%, Conferences/Lectures 5%; Primary Care 80%, Subspecialty Care (Developmental Pediatrics) 20%
Major teaching responsibility: Attendings Patients seen/weekly: 50+
On call/weekend responsibility: None

Research

(M65 900)

Charles E. Canter, M.D., 5S30 St. Louis Children’s Hospital, 454-6095. Clinical studies on cardiac transplantation in infants and children.

F. Sessions Cole, M.D., 5S20 St. Louis Children’s Hospital, 454-6148. Using population-based data bases, investigation priorities include: 1) impact of surfactant replacement therapy on racial disparities in infant mortality; and 2) understanding molecular epidemiology of surfactant protein B deficiency.

Michael R. DeBaun, M.D., M.P.H., 454-4177. Dr. DeBaun’s research interests include: 1) clinical investigation of the natural history of stroke in sickle cell disease; and 2) genotype/phenotype analysis in pediatric syndromes associated with cancer.

Thomas G. Diacovo, M.D., 4th Floor McDonnell Pediatric Research Building, 286-2852. Vascular biology and immunology. Investigative efforts are aimed at dissecting the adhesive interactions responsible for recruiting platelets and leukocytes to sites of inflammation and vascular trauma. Our laboratory is using molecular and biochemical approaches to modify the expression of cell surface adhesion
receptors (selectins and integrins). Several animal models are available to study the role of adhesion receptors using intravital microscopy.

Brian Hackett, M.D., Ph.D., 1146 St. Louis Children’s Hospital, 286-2833. Molecular biology of lung development. Research will focus on the molecular regulation of pulmonary epithelial differentiation. Areas of interest include the use of molecular markers for all lineage analysis and the role of Forkhead transcription factors in pulmonary epithelial differentiation.

David B. Haslam, M.D., Room 6107 McDonnell Pediatric Research Building, 286-2888. Mechanisms of disease caused by bacterial toxins. Research focuses on the binding and intracellular transport of shiga toxins within human cells. An area of particular interest is the genetic and evolutionary basis for human susceptibility to shiga toxins. In addition, research is examining the ability of shiga toxins to gain access to the cytoplasm by exploiting normal quality control mechanisms in the endoplasmic reticulum.

Robert J. Hayashi, M.D., 9S St. Louis Children’s Hospital, 454-4118. Clinical research interests include stem cell transplantation and its complications including Post Transplant Lymphoproliferative Disease and long-term side effects of therapy.

Keith A. Hruska, M.D., 5th Floor McDonnell Pediatric Research Building, 286-2772. The research in the laboratory focuses on new therapies for chronic kidney disease, osteoarthritis and their complications. The mechanisms of action of these therapies for nephropathy, vascular calcification and renal bone disease are being analyzed, as are mechanisms enabling cartilage transplantation.

Paul Hruz, M.D., Ph.D., 3rd Floor McDonnell Pediatric Research Building, 454-6051. Research interests include structure/function relationships in facilitative glucose transporters, congenital and acquired lipodystrophy syndromes, and insulin resistance associated with HIV protease inhibitor therapy.

David M. Jaffe, M.D., 4S50 St. Louis Children’s Hospital, 454-2341. Clinical research interests are: 1) occult bacteremia — identification, clinical decision making; 2) trauma — injury prevention, head and cervical spine injuries; 3) health care delivery system — role of the pediatric emergency department; and 4) pain management.

Lori Luchtman-Jones, M.D., 9S St. Louis Children’s Hospital, 454-6018. Investigative efforts are focused on clinical coagulation and sickle cell disease.

Jeffrey S. McKinney, M.D., Ph.D., 6105 McDonnell Pediatric Research Building, 286-2912. The molecular pathogenesis of E. coli and Salmonella infections. We employ novel RNA-based techniques of bacterial gene regulation to dissect host-pathogen interactions, using E. coli and Salmonella as model systems. We also study the diverse capabilities and functions of RNA in vitro and in vivo and are designing new RNA molecules amenable to in vitro evolution and to studies of RNA biology in bacteria, and to development of new antimicrobial agents.

Virginia L. Miller, Ph.D., 6103 McDonnell Pediatric Research Building, 286-2891. Molecular basis of the pathogenesis of the enteric pathogens Yersinia enterocolitica and Salmonella typhimurium, the bioterror pathogen Yersinia pestis, and the respiratory pathogen Klebsiella pneumoniae.

Louis Muglia, M.D., Ph.D., 4108 McDonnell Pediatric Research Building, 286-2847. Studies in our laboratory seek to determine: 1) the mechanism determining the timing of parturition; and 2) the role and regulation of hypothalamic neuropeptides involved in the stress response and reproduction, utilizing transgenic and gene knockout mice.

Scott Saunders, M.D., Ph.D., 4105 McDonnell Pediatric Research Building, 286-2850. Investigative efforts are aimed at understanding the molecular basis of development through cell and molecular biological approaches, including transgenic and knockout mouse technology. Specific areas of interests are: 1) understanding the role of cell surface heparan sulfate proteoglycans in morphogenesis; and 2) the biology of neuron migration in development of the central nervous system.
Alan L. Schwartz, M.D., Ph.D., 3S36 St. Louis Children’s Hospital, 454-6005. Investigative efforts are aimed at understanding: 1) the biology of cell surface receptors including biochemical and molecular dissection of the mechanisms responsible for receptor-mediated endocytosis of blood coagulation proteins; and 2) the regulation of intracellular protein turnover.

Shalini Shenoy, M.D., 9S St. Louis Children’s Hospital, 454-6018. Investigation of immunologic basis of graft versus host disease.

Carl H. Smith, M.D., 2N68 St. Louis Children’s Hospital, 454-6029. We investigate the cellular process underlying the maternal/fetal transport of amino acids and other nutrients by the human placental syncytiotrophoblast. This goal is approached through isolation and individual study of the maternal- and fetal-facing plasma membranes of the syncytiotrophoblast and through culture of cells derived from placental trophoblast. Cloned transporters are used when appropriate to understand transporter structure, function and interrelationships. Current investigations include: 1) the cloning of cDNAs for placental membrane transporters; 2) their expression in model systems for comparison with transport in membrane isolated directly from placenta; and 3) investigations of the effects of hypoxia on trophoblast amino acid transport.

Joseph W. St. Geme, M.D., 6110 McDonnell Pediatric Research Building, 286-2887. The molecular basis of Haemophilus influenzae pathogenicity. Haemophilus influenzae is a common cause of localized respiratory tract infections, such as otitis media, sinusitis and pneumonia. In addition, this organism is an important cause of meningitis and septicemia. We are employing methods of molecular and cell biology to characterize the bacterial and the host cell factors involved in the pathogenesis of disease due to this model mucosal pathogen.

Gregory A. Storch, M.D., Max Q. Arens, Ph.D., Richard S. Buller, Ph.D., and staff, 2N52 St. Louis Children’s Hospital, 454-6079. Rapid diagnosis of viral and other unconventional infections. The Diagnostic Virology Laboratory is studying the use of the polymerase chain reaction and oligonucleotide sequencing for the diagnosis of infections caused by viruses and other unconventional pathogens, and the detection of resistance to antimicrobial agents. Current projects include: 1) the detection of herpes viruses and BK Virus in blood or organ transplant recipients; 2) the detection of respiratory pathogens; and 3) the molecular detection and epidemiology of antibiotic resistance. Future projects will explore other infections caused by other unconventional pathogens that are not easily diagnosed using existing methods, and the application of PCR for quantitation of infectious agents and the detection of resistance to antiviral agents.

Robert C. Strunk, M.D., 11th Floor McDonnell Pediatric Research Building, 4905 Children’s Place, 454-2694. Clinical studies of patients with asthma aimed at understanding the mechanisms of death due to asthma in children.


David B. Wilson, M.D., Ph.D., 3102 McDonnell Pediatric Research Building, 286-2834. Research is focused on the molecular switches that regulate control genes during early embryonic development and differentiation.

Faculty

ALAN L SCHWARTZ, MD, PHD Harriet B Spoehr Professor of Pediatrics, Head of the Department of Pediatrics

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JANIS B ROBINSON, MD Assistant Professor of Clinical Pediatrics
VERNON J RODEN, MD Instructor in Clinical Pediatrics
JAMES R ROHRBAUGH, MD Associate Professor of Clinical Pediatrics
JOAN LEE ROSENBAUM, MD Associate Professor of Pediatrics
ISABEL L ROSENBLoom, MD Assistant Professor of Clinical Pediatrics
DANIEL B ROSENBLUTH, MD Associate Professor of Pediatrics
KELLY ROSS, MD Instructor in Pediatrics
WILLIAM J ROSS, MD Associate Professor of Clinical Pediatrics
ROBERT J ROTHBAUM, MD Professor of Pediatrics
STEVEN MARK ROTHMAN, MD Professor of Pediatrics
ELLA ROZIN Instructor in Clinical Pediatrics
JOSHUA BENNETT RUBIN, MD, PHD Assistant Professor of Pediatrics
CHRISTINA M RUBY, MD Instructor in Clinical Pediatrics
MARTIN D RUDLOFF, MD Assistant Professor of Clinical Pediatrics
DAVID RUDNICK, MD, PHD Assistant Professor of Pediatrics
YORAM RUDY Professor of Pediatrics
DIANE MARY RUP, MD Instructor in Clinical Pediatrics
DIANA M SATER-ROUKOZ Instructor in Clinical Pediatrics
GEORGE SATO, MD Professor of Clinical Pediatrics
RICHARD WILLIAM SATO, MD Assistant Professor of Clinical Pediatrics
SCOTT SAUNDERS, MD, PHD Assistant Professor of Pediatrics
BRIAN J. SAVILLE, MD Instructor in Pediatrics
MIA C WALLACE  Research Scientist of Pediatrics
MICHAEL S WATSON, PHD  Adjunct Professor of Pediatrics
ROGER J WAXELMAN, MD  Instructor in Clinical Pediatrics
MARC E WEBER, MD, JD  Assistant Professor of Clinical Pediatrics
SCOTT J WEINER, MD, PHD  Instructor in Clinical Pediatrics
DON WEISS, MD  Instructor in Clinical Pediatrics
ALISON J WHELAN, MD  Associate Professor of Pediatrics
ANDREW J WHITE, MD  Assistant Professor of Pediatrics
NEIL HARRIS WHITE, MD  Professor of Pediatrics
KAREN WHITE  Instructor in Clinical Pediatrics
MICHAEL PETER WHYTE, MD  Professor of Pediatrics
KAREN MORI WICKLINE, MD  Associate Professor of Pediatrics
DENISE WILFLEY  Professor of Pediatrics
GEORGE T WILKINS, JR, MD  Assistant Professor of Clinical Pediatrics
KRISTINE G WILLIAMS, MD  Instructor in Pediatrics
DAVID B WILSON, MD, PHD  Associate Professor of Pediatrics
PATRICIA ANN WOLFF, MD  Associate Professor of Clinical Pediatrics
KIMBERLY WOLLMUTH, MD  Instructor in Clinical Pediatrics
SORAYA WOLVERSON, MBBS, MS, BS  Professor of Clinical Pediatrics
MICHAEL WONG, MD, PHD  Assistant Professor of Pediatrics
GERALD WOOL, MD  Associate Professor of Clinical Pediatrics
JEFFREY M WRIGHT, MD  Assistant Professor of Clinical Pediatrics
RALPH A WUEBKER, JR, MD  Instructor in Pediatrics
KATHIE R WUELLNER, MD  Assistant Professor of Clinical Pediatrics
HAYLEY WURZEL  Instructor in Clinical Pediatrics
CHRISTINA YADAO  Instructor in Clinical Pediatrics
KELVIN A YAMADA, MD  Associate Professor of Pediatrics
MONA YASSIN, MD  Instructor in Clinical Pediatrics
JULIA CATHERINE YOUNG  Instructor in Clinical Pediatrics
CECILIA H YU, MD  Instructor in Clinical Pediatrics
BARBARA ANN ZEHNBAUER, PHD  Professor of Pediatrics

Department's Website
Department of Psychiatry

Instruction in psychiatry is given during the second, third and fourth years of the medical curriculum. Emphasis is on the teaching of psychiatry as a medical discipline, including the biological, social and psychological mechanisms and manifestations of psychiatric illness, as well as psychological reactions to other illnesses. Psychiatric disorders are common and disabling illnesses. An explosion of knowledge resulting from research in neuroscience, genetics and epidemiology is leading to exciting advances in understanding and treating these disorders. Our department is heavily involved in this research and our didactic curriculum integrates current clinical information with research advances in order to help students develop the knowledge, skills and attitudes to recognize these illnesses and understand the basic principles of treatment.

William Greenleaf Eliot Division of Child Psychiatry

The Division of Child Psychiatry offers a varied teaching program for medical students, residents in psychiatry and fellows at St. Louis Children’s Hospital and the Child Psychiatry Center. The center provides outpatient services to a varied and broad population of children with mental disorders. Trainees are assigned to these various services, where they participate in diagnostic evaluations and see patients in treatment, under supervision of a fellow and attending physician.

Courses

Second Year

M85 676A DISEASES OF THE NERVOUS SYSTEM: PSYCHIATRY
Instructor: Melissa A. Swallow M.D., 362-2440
This course emphasizes the diagnosis of major psychiatric illnesses in adults and children. Psychiatric diseases are described in terms of epidemiology, clinical presentation, natural history, genetics, differential diagnosis and clinical management. Interviewing techniques and performance of the mental status exam will be demonstrated by patient interviews.

Third Year

M85 770 PSYCHIATRY CLERKSHIP
Instructor: Kevin J. Black, M.D., 362-2469
Up to 11 students spend four weeks on the inpatient psychiatry service of either Barnes-Jewish Hospital or Metropolitan St. Louis Psychiatric Center. At either site, students evaluate and treat patients under the supervision of house staff and an attending physician, attend teaching conferences, including small group sessions with a psychiatrist that cover the psychiatric interview, and complete other assigned learning experiences. See www.psychiatry.wustl.edu/c/Education/MedicalStudent.aspx for current details or to review the goals of the clerkship.

M85 771 AMBULATORY CLERKSHIP: PSYCHIATRY FOR GENERALISTS
Instructor: Kevin J. Black, M.D., 362-2469
Up to six students may elect to pursue their ambulatory medicine selective through the Department of Psychiatry. Students submit a written review of a relevant clinical topic of their choice, and participate in clinical duties. Students will be assigned to one of the following clinical options: Barnes-Jewish Hospital adult psychiatry clinic and community psychiatry, psychiatry consultation service, Metropolitan St. Louis Psychiatric Center emergency room, BJC Behavioral Health or child psychiatry
Fourth Year

Electives

M85 805  PSYCHIATRY CONSULT SERVICE
Instructor(s): Carol North, M.D., 747-2013
Location: 17301A West Pavilion, Barnes-Jewish Hospital, South Campus
Elective Contact: Carol North, M.D., 747-2013
Other Information: Students should contact the consult team by voice mail at 848-2402, 8:00 a.m.
first day of elective. Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

The fourth-year student will work closely with the consult resident and consult team that also includes
the attending and advanced practice nurse in the evaluation and treatment of patients referred to the
psychiatry consult service. Students will attend weekly consult/liaison teaching conferences during the
summer, and Grand Rounds and Research Rounds in non-summer months.
Student time distribution: Inpatient 90%, Conferences/Lectures 10%; Subspecialty Care 100%
Major teaching responsibility: Attendings and residents and advanced practice nurses
Patients seen/weekly: 3 workups per week expected; follow up to 10 or more
On call/weekend responsibility: None

M85 810  OUTPATIENT COMMUNITY PSYCHIATRY
Instructor(s): Keith Garcia, M.D., 362-1222
Location: Wohl Clinic and community sites
Elective Contact: Keith Garcia, M.D., 362-1222
Other Information: Location of first meeting will be specified in a mailing. Enrollment limit per period:
minimum 2; maximum 3.
Valid start weeks for 4-week blocks are: Weeks 13 and 17.

This is a flexible clerkship where effort is made to tailor the activities to the students' interests. Students
will assist in diagnosis and treatment of adult psychiatric clinic and ER patients. The patients
present with a wide variety of psychological and interpersonal problems, as encountered in an
everyday office practice of an internist or general practice specialist. In this setting, the student will
have the opportunity to learn a variety of treatment techniques under supervision. Students
completing the clerkship have indicated their enjoyment of the opportunity for independent patient
management.
Student time distribution: Outpatient/ER 80%, Conferences/Lectures 20%; Subspecialty Care 100%
Major teaching responsibility: Attendings and residents
Patients seen/weekly: 20
On call/weekend responsibility: None

M85 831  ELECTROCONVULSIVE THERAPY (ECT)
Instructor(s): Keith Isenberg, M.D., and ECT staff, 362-1819
Location: Barnes-Jewish Hospital, South Campus
Elective Contact: Keith Isenberg, M.D., 362-1819
Other Information: Students should call Dr. Isenberg prior to scheduling the elective. Enrollment limit
per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

The student will be involved in the neuropsychiatric assessment of patients referred for ECT. In
addition, the student will receive training in the application of ECT and in the clinical management of
patients receiving ECT. The student will be encouraged to review appropriate literature and make clinically relevant case-oriented presentations.

Student time distribution: Inpatient 80%, Outpatient 15%, Conferences/ Lectures 5%; Subspecialty Care 100%

Major teaching responsibility: Keith Isenberg, M.D.

Patients seen/weekly: 40

On call/weekend responsibility: None

M85 836  CLINICAL PSYCHIATRY - INPATIENT PSYCHIATRIC SERVICE
Instructor(s): Eugene Rubin, M.D., Ph.D., 362-2462
Location: Renard Hospital

Elective Contact: Eugene Rubin, M.D., Ph.D., 362-2462
Other Information: Students report to Dr. Rubin’s office, 4409 Renard, 8:30 a.m. first day of elective.
Enrollment limit per period: 3

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

This is a senior rotation that provides the students with an opportunity to expand their knowledge of inpatient clinical psychiatry by functioning as externs. Students attend all staffing and teaching conferences given to first-year psychiatry residents, take patients in rotation, and share night call with other first-year residents approximately every fifth night.

Immediate supervision is provided by the inpatient attending, and additional supervision can be arranged as desired. Teaching emphasis is directed toward psychiatric diagnosis, appropriate use of psychopharmacologic agents, psychotherapeutic intervention, use of community resources and pursuit of the psychiatric scientific literature.

Student time distribution: Inpatient 85%, Conferences/Lectures 15%; Subspecialty Care 100%

Major teaching responsibility: Single clinical attending, teaching attendings and single resident

Patients seen/weekly: 5-7

On call/weekend responsibility: Every fifth night

M85 840  CHILD PSYCHIATRY
Instructor(s): Gary Boxer, M.D., 286-1740
Location: Montclair Building, 24 S. Kingshighway, Outpatient Psychiatry Clinic

Elective Contact: Gary Boxer, M.D., 286-1740
Other Information: Interested students should contact Dr. Gary Boxer at 286-1740 in the Department of Psychiatry. Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 9, 13, 17, 21, 25, 29, 33, 37 and 41.

This elective in child psychiatry utilizes the Child Psychiatry Outpatient Clinic at St. Louis Children’s Hospital. It provides experience in age-appropriate diagnostic and treatment methods in children and adolescents. Experience is also provided on the Consultation Service of St. Louis Children’s Hospital. A paper on topic of student’s choosing is required.

Student time distribution: Outpatient 75%, Conferences/Lectures 25%; Subspecialty Care 100%

Major teaching responsibility: Attendings and fellows

Patients seen/weekly: 12

On call/weekend responsibility: None

Research

(M85 900)

Andrey Anokhin, Ph.D., Suite 2T, Montclair Building, 18 S. Kingshighway, 286-2201. E-mail: anokhin@matlock.wustl.edu. Genetics of brain function and behavior in relation to substance abuse. This research elective is intended for students interested in biological psychology, psychophysiology, psychopharmacology of drugs of abuse, and behavior genetics. Dr. Anokhin is conducting experimental
studies with human volunteers, including twins, in order to better understand biobehavioral mechanisms underlying nicotine and alcohol addiction, as well as possible mediators of risk such as behavioral disinhibition and negative affect. One of the studies explores genetic influences on brain activity and autonomic measures related to inhibitory control of behavior and processing of emotional information. Identical and fraternal twins are assessed using quantitative electroencephalogram (EEG) and event-related potentials (ERPs) recorded during a variety of behavioral tasks and administered neuropsychological tests and personality questionnaires. Another study investigates the effects of cigarette smoking and nicotine deprivation on cognitive and emotional functioning. Another study looks at the effects of moderate dose of alcohol on brain function and performance. Interested students will be able to learn a variety of methods used in these studies including digital EEG and ERPs; startle response measures; emotion induction using affective pictures, self-report measures and questionnaires, and collection of blood samples for DNA analysis. Format of this research elective will include 1) directed reading; 2) participation in laboratory experiments with human subjects; 3) analysis of existing data from alcohol and smoking challenge experiments. Qualifications: Reliability and responsibility, ability to commit specified amount of time per week and work on schedule (can be negotiated on an individual basis), PC experience, and willingness to obtain short training and certification in ethical issues related to human studies.

Laura Jean Bierut, M.D., Wohl Clinic, 362-3492. This research elective will focus on analyzing data from a high-risk study of addiction. Cocaine dependent individuals were recruited from chemical dependency treatment centers and their relatives were interviewed. Students will have the opportunity to examine family and environmental factors that place some at risk for developing alcohol and other substance dependence.

Kevin J. Black, M.D., 2210 Renard, 362-2469. Students will participate in ongoing neuroimaging studies of movement disorders or neuropsychiatric illnesses. Degree of participation will relate to the student’s available research time, skills and interest. See www.nil.wustl.edu/labs/kevin for examples of past research.

Robert J. Cormier, Ph.D., G016, Biotechnology Building, 362-8658. Neuron-Astrocyte-Microvasculature Interaction in Brain Function. Neuronal activity resulting from normal and pathophysiological brain function is known to influence astrocyte and blood vessel physiology. Electrical activity in neurons causes calcium elevations in nearby astrocytes that travel to adjacent astrocytes and ultimately to the endothelial cells of the microvasculature. The results of these calcium elevations include regulation of the availability of energy substrates for neurons, nitric oxide generation, and alterations in cerebral blood flow. I am studying the mechanisms of communication among neurons, astrocytes, and microvasculature, the role of this communication in normal and abnormal physiology, and how this communication can be modulated. I use a number of tools and techniques in my research; including, electrophysiology, calcium imaging, immunohistochemistry, cell cultures, and brain slices.

Linda B. Cottler, Ph.D., Parc Frontenac Building, 286-2252. Our grants focus on public health psychiatry and include: 1) Community-based HIV prevention efforts with injectors and crack cocaine users, 2) Interventions to reduce drug use and sexual risks, 3) NIH Pre- and Post-doctoral training for psychiatric epidemiology, drug abuse comorbidity and biostatistics, 4) Applicability, reliability and validity of abuse and dependence concepts specifically for club drugs and other illicit drugs in Sydney, U.S. and Taiwan, 5) Collaboration between WUSM and NIMHANS in Bangalore, India on epidemiology, genetics, addiction and other mental disorders, 6) the link between biological data and self-reported behavioral risk factors.

John G. Csernansky, M.D., 6612 Renard Hospital, 747-2160. Neurobiology of schizophrenia. Students may participate in the conduct of clinical or preclinical studies of schizophrenia and related topics. Involvement in clinical studies can include training and experience in interviewing psychiatric patients, or gaining experience in the techniques of brain imaging. Involvement in preclinical studies can involve training and experience in receptor binding, microdialysis, immunohistochemistry, and animal behavior.

Renee M. Cunningham-Williams, Ph.D., M.P.E., 40 N. Kingshighway, Suite 4, 286-2264. Problem and Pathological Gambling: Epidemiology, Nosology, and Comorbidity. Students choosing this research
elective may learn research skills by being involved in data analysis, report and manuscript writing, data editing, verification, management, writing of diagnostic computer scoring algorithms and other activities as they relate to problem and pathological gambling behavior: (1) GAM Development Study: data available for analysis of 10 transcribed focus groups and 108 gambling SOGS screening tests and pretests of the GAM assessment instrument; (2) GAMCO Study (NIDA K01 DA 04030) – recently collected reliability and validity data among 300 gamblers, on the computerized GAM, as well as supplementary substance abuse, psychiatric information, treatment information and collateral informant data for approximately half of these subjects; (3) CPH-100-0600 (industry-funded) multi-site clinical medication trial data available for analysis on the effects of a investigational drug to treat severe gambling disorders. Screening and randomization data available for analyses; (4) GAM Ancillary Study (unfunded) - multi-site validity data available comparing the GAM-IV-12 (structured, non-clinician) to clinician ratings and self-administered measures of gambling behavior among those screened in the CPH-100-0600 study; (5) GAPP Study (NIDA R01 DA015032). Recently collected data on 150 gamblers using personal interviews of gambling behavior as well as a comprehensive SCID personality assessment conducted by clinicians among 150 gamblers interviewed in the GAMCO study. Data from two additional lay-administered interviews are also available for analysis.

Gabriel A. de Erausquin, M.D., Ph.D., G02 Biotechnology Building, 362-5186. Molecular mechanism of ethanol-induced suppression of adult neurogenesis in mice. Students may participate and carry out experiments in an animal model of chronic alcoholism using transgenic mice with null mutations in a variety of cell death and neuroprotective proteins. Experiments include labeling, identification, characterization and counting of newly generated neurons in the adult hippocampus. They may also participate in the preparation of cell cultures of neuronal precursors isolated from adult mouse brain of transgenic mice, and in the execution of experiments on alcohol toxicity in cultured differentiated and undifferentiated neural precursors.

Alison Goate, D.Phil., G04A Biotechnology Building, 362-8691. Genetic studies of Alzheimer’s disease. Studies can involve laboratory-based projects on the genetics or cell biology of Alzheimer’s disease or clinical studies involving the collection of data through telephone or personal interview of individuals with a family history of dementia.

Dan Haupt, M.D., 4405 Renard Building, 362-2592. Metabolic disturbances associated with mental illness and treatment. Students will design a customized learning experience in order to address their clinical and/or research interests. Possible activities include supervised literature reviews and participation in the process of designing, completing, and securing funding for ongoing NIH-funded clinical studies of metabolic effects of psychoactive medications.

John W. Newcomer, M.D., 4412 Renard Building, 362-5939. Clinical memory research; research concerning the control of weight and glucose and lipid metabolism. This elective offers the student a broad exposure to clinical protocols related to the neurochemical regulation of memory performance and glucose metabolism, including protocols in patients with schizophrenia. Students will have an opportunity to focus on a particular project of interest.

Carol North, M.D., 2210 Renard, 747-2013. The student will work closely with Dr. North in various aspects of ongoing research projects in psychiatric epidemiology and clinical studies or topics of the student’s choice. Ongoing studies include drug abuse and the homeless population, research on populations affected by disasters and terrorism, electroconvulsive therapy, psycho-education for serious mental illness, psychiatric aspects of gastrointestinal disease, and somatoform disorders. Potential activities include subject interviews, editing, data entry, data analysis, literature reviews and writing papers for publication.

Rumi Kato Price, Ph.D., M.P.E., 4560 Clayton Rd., 286-2282. The student will work closely with Dr. Price on ongoing research projects in substance abuse and psychiatric epidemiology. The current projects include: a longitudinal study of the impact of drug abuse and war trauma; a focused study on protective factors mitigating suicidal risk; an international epidemiologic study of developmental psychopathology; a large scale international human-genome epidemiology study focusing on gene-environment interactions involving substance abuse; epidemiologic applications of highly-flexible computational techniques.
Yvette Sheline, M.D., Renard 1115, East Building 2109, 362-8422. Two-month minimum. Opportunity for students with computer programming skills to work closely with Dr. Sheline in a neuroimaging project; 1) investigating brain activation in the limbic system in response to emotional stimuli. Students will be involved in acquiring and analyzing fMRI data, interviewing patients and writing up results or 2) measuring brain structures affected in major depression and correlating these findings with neuropsychological performance.

NOTE TO STUDENTS: There are always a number of research projects in the Department of Psychiatry. For additional information contact Dr. Rubin, 362-2462.

Faculty

CHARLES F ZORUMSKI, MD  Samuel B. Guze Professor of Psychiatry, Head of the Department of Psychiatry
AQEEB AHMAD     Instructor in Clinical Psychiatry
DALE J ANDERSON, MD  Instructor in Clinical Psychiatry
RICHARD H ANDERSON, MD, PHD  Instructor in Clinical Psychiatry
ANDREY P ANOKHIN, PHD  Research Assistant Professor of Psychiatry
E. JAMES ANTHONY, MD, PHD  Professor Emeritus of Psychiatry (Child Psychiatry)
SCOTT J ARBAUGH, MD  Instructor in Clinical Psychiatry
AHMAD BEHESHTI ARDEKANI, MD  Assistant Professor of Clinical Psychiatry
MICHAEL ROMAN BANTON, MD  Instructor in Clinical Psychiatry (Child Psychiatry)
DEANNA BARCH, PHD  Assistant Professor of Psychology in Psychiatry
RONALD BEACH, MD  Instructor in Clinical Psychiatry
SAVITA BHAT, MS  Instructor in Clinical Psychiatry
LAURA J BIERUT, MD  Associate Professor of Psychiatry
KEVIN J BLACK, MD  Associate Professor of Psychiatry
KELLY N BOTTERON, MD  Associate Professor of Psychiatry (Child Psychiatry)
GARY BOXER, MD  Associate Professor of Psychiatry (Child Psychiatry)
SUSAN KATHLEEN BOYER, MD  Instructor in Clinical Psychiatry
ALLYSON BOYLE, MD  Instructor in Clinical Psychiatry
ROBERT HARRY BRADY, MD  Instructor in Clinical Psychiatry (Child Psychiatry), Adjunct Instructor in Psychiatry (Child Psychiatry)
KATHLEEN K BUCHOLZ, PHD, MS  Research Professor of Psychiatry
JAMES BYRD, MD  Instructor in Clinical Psychiatry (Child Psychiatry)
ROBERT MICHAEL CARNEY, PHD  Professor of Psychiatry
LI-SHIUN CHEN  Instructor in Clinical Psychiatry
ZHOUFENG CHEN, PHD  Assistant Professor of Psychiatry
THEODORE J. CICERO, PHD  Professor of Neuropsychopharmacology in Psychiatry
THEODORE J. CICERO, PHD  Vice Chairman for Research, Department of Psychiatry
WILLIAM W. CLENDENIN, MD  Assistant Professor of Clinical Psychiatry
C. ROBERT CLONINGER, MD  Wallace Renard Professor of Psychiatry
DAVID M. CONNER, MD  Instructor in Clinical Psychiatry
JOHN NICHOLAS CONSTANTINO, MD  Associate Professor of Psychiatry (Child Psychiatry)
ROBERT J. CORMIER, PHD  Research Instructor in Psychiatry
JUAN C. CORVALAN, MD  Assistant Professor Emeritus of Clinical Psychiatry
LINDA B. COTTLER, PHD  Professor of Epidemiology in Psychiatry
JACK L. CROUGHAN, MD  Associate Professor of Clinical Psychiatry, Adjunct Associate Professor of Psychiatry
JOHN G. CSERNANSKY, MD  Gregory B. Couch Professor of Psychiatry
ALEJANDRO M. DATUIN, MD, AA  Assistant Professor of Clinical Psychiatry (On Staff at Malcolm Bliss Mental Health Center)
MARY A. DAVIS, MD  Assistant Professor of Clinical Psychiatry
GABRIEL A. DE ERAUSQUIN, MD, PHD  Assistant Professor of Psychiatry
JON TODD DEAN, MD  Instructor in Clinical Psychiatry
PAUL DEWALD, MD  Assistant Professor of Clinical Psychiatry
PLARIDEL C. DEZA, MD  Assistant Professor of Clinical Psychiatry (On Staff at Malcolm Bliss Mental Health Center)
DANIELLE MARIE DICK, PHD  Research Assistant Professor of Psychiatry
MEHMET E. DOKUCU, MD, PHD  Assistant Professor of Psychiatry (Pending Executive Faculty Approval)
HONGXIN DONG, PHD  Research Instructor in Psychiatry
JAMES EARL EDWARDS, MD  Assistant Professor of Clinical Psychiatry (Child Psychiatry)
SETH A. EISEN, MD  Professor of Psychiatry
NURI BRADFORD FARBER, MD  Assistant Professor of Psychiatry
CYNTHIA FLORIN, MD  Instructor in Clinical Psychiatry
KENNETH E. FREEDLAND, PHD  Professor of Psychiatry
DARRIN FRIESEN, MD  Instructor in Clinical Psychiatry
TERRY A. FULLER, MD  Assistant Professor of Clinical Psychiatry
AMELIA GALLITANO-MENDEL, MD, PHD  Instructor in Psychiatry
KEITH S. GARCIA, MD, PHD  Assistant Professor of Psychiatry
NICK S. GARG  Instructor in Clinical Psychiatry (Child Psychiatry)
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BARBARA GELLER, MD  Professor of Psychiatry (Child Psychiatry)
LUIS GIUFFRA, MD, PHD  Assistant Professor of Clinical Psychiatry
ANNE L GLOWINSKI, MD  Assistant Professor of Psychiatry (Child Psychiatry)
ALISON GOATE, PHD  Professor of Genetics in Psychiatry
DAVID GOLDEMEIER, MD  Instructor in Clinical Psychiatry
JULIA D. GRANT, PHD  Research Instructor in Psychiatry
RICHARD GRUCZA  Research Assistant Professor of Psychiatry
DEBRA A. GUSNARD, MD  Assistant Professor of Psychiatry
ANNA E HARTNETT, MD  Assistant Professor of Clinical Psychiatry
THOMAS D HARTNETT, MD  Assistant Professor of Clinical Psychiatry
STEVEN ARTHUR HARVEY, MD  Instructor in Clinical Psychiatry
DAN W. HAUPT, MD  Assistant Professor of Psychiatry
ANDREW C HEATH, PHD  Spencer T. Olin Professor of Psychology in Psychiatry
TAMARA G HERSHEY, PHD  Assistant Professor of Psychiatry
GITRY HEYDEBRAND, PHD  Instructor in Psychiatry
FREDERICK G HICKS, MD  Assistant Professor of Clinical Psychiatry
ROBERT S HICKS, MD  Associate Professor of Clinical Psychiatry
ANTHONY L HINRICHS, PHD  Research Instructor in Psychiatry
LEE HOFFER, PHD  Research Instructor in Psychiatry
SHELDON G HOLSTAD, PHD, PHS  Assistant Professor of Clinical Pharmacy in Psychiatry (On Staff at Jewish Hospital and St Louis College of Pharmacy)
BARRY ALLEN HONG, PHD  Professor of Psychiatry, Vice Chairman for Clinical Affairs, Department of Psychiatry
LINDA S HORNE, MD  Instructor in Clinical Psychiatry
RICHARD W HUDGENS, MD  Professor of Psychiatry
KEITH E ISENBERG, MD  Vice Chairman for Clinical Affairs, Department of Psychiatry, Professor of Psychiatry
YUKITOSHI IZUMI, MD, PHD  Research Associate Professor of Psychiatry
ALEKSANDAR JANCA, MD  Adjunct Professor of Psychiatry
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EDWARD H. KOWERT  Associate Professor Emeritus of Clinical Psychiatry
SUZANNE NICOLE L'ECUYER  Instructor in Clinical Psychiatry (Child Psychiatry)
WANDA M LAMB, MD  Assistant Professor of Clinical Psychiatry
F. TIMOTHY LEONBERGER, PHD  Instructor in Clinical Medical Psychology in Psychiatry (On Staff at Malcolm Bliss Mental Health Center)
KIT SANG LEUNG, PHD  Research Instructor in Psychiatry
COLLINS E LEWIS, MD  Associate Professor Emeritus of Psychiatry
ERVIN LIPSCHITZ, MD  Assistant Professor of Clinical Psychiatry
JAY L LISS, MD  Associate Professor of Clinical Psychiatry
ELIZABETH A LOBOS, PHD  Research Instructor in Psychiatry
JOAN L LUBY, MD  Associate Professor of Psychiatry (Child Psychiatry)
PATRICK JOSEPH LUSTMAN, PHD  Professor of Psychiatry
MICHAEL T. LYNSEY, PHD  Research Assistant Professor of Psychiatry
COLIN MACKENZIE  Instructor in Clinical Psychiatry
PAMELA A MADDEN, PHD  Assistant Professor of Psychology in Psychiatry
VIRGIL LEE MALMBERG, MD  Instructor in Clinical Psychiatry
JOSE MATHEWS  Instructor in Psychiatry
GREGORY WARREN MATTINGLY, MD  Assistant Professor of Clinical Psychiatry
MARcia JUNE MccABE, PHD  Instructor in Psychiatry
KIMBERLI MccALLUM, MD  Assistant Professor of Clinical Psychiatry (Child Psychiatry)
SCOTT MCCORMICK, III, MD  Assistant Professor of Clinical Psychiatry
DOUGLAS E MccOY, MD  Instructor in Clinical Psychiatry
JOSEPH K MccINNEY, MD  Associate Professor Emeritus of Clinical Psychiatry
STEVEN JAMES MccNERICK, PHD  Assistant Professor of Psychiatry
JAY L MEYER, MD  Associate Professor of Clinical Psychiatry
JAMES R MccOLAJCZAK, MD  Assistant Professor of Clinical Psychiatry
JULE P. MllER, JR  Instructor in Clinical Psychiatry
SUSAN MINChIN, MD, PHD  Instructor in Clinical Psychiatry
MARK A MINTUN, MD  Professor of Psychiatry
DAVID M MONTANI, MD  Instructor in Clinical Psychiatry
MARY ANN MONTGOMERY, MD  Associate Professor of Clinical Psychiatry
BLAKE WILLIAM MOORE, PHD  Professor Emeritus of Biochemistry in Psychiatry
KRISTA L MouldER, PHD  Research Assistant Professor of Psychiatry
RANDI H MOZENTER, PHD  Instructor in Clinical Medical Psychology in Psychiatry
GEORGE E MURPHY, MD  Professor Emeritus of Psychiatry
RASHMI R NAKRA  Associate Professor of Clinical Psychiatry
ELLIOt C NELSON, MD  Associate Professor of Psychiatry
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<tr>
<th>Name</th>
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<tr>
<td>ROSALIND J NEUMAN, PHD</td>
<td>Research Associate Professor of Mathematics in Psychiatry</td>
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<tr>
<td>JOHN W NEWCOMER, MD</td>
<td>Associate Professor of Psychiatry</td>
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<tr>
<td>BRUCE L NOCK, PHD</td>
<td>Associate Professor of Neurobiology in Psychiatry</td>
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<tr>
<td>KAREN E. NORBERG</td>
<td>Visiting Instructor in Psychiatry</td>
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<td>Assistant Professor of Clinical Psychiatry</td>
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<td>ERIC J NUETZEL, MD</td>
<td>Assistant Professor of Clinical Psychiatry</td>
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<tr>
<td>PATRICIA L O'NEAL, MD</td>
<td>Professor Emerita of Clinical Psychiatry</td>
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<td>JOHN WILLIAM OLNEY, MD</td>
<td>John P Feighner Professor of Psychiatry</td>
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<td>THOMAS FREDERIC OLTMANNS, PHD</td>
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<td>PAUL M PACKMAN, MD</td>
<td>Associate Professor of Clinical Psychiatry</td>
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<td>MICHELE L. PERGADIA</td>
<td>Research Instructor in Psychiatry</td>
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<td>DAVID E. POLLIO, PHD</td>
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<td>ELIZABETH F PRIBOR, MD</td>
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<td>MADELON T PRICE, PHD</td>
<td>Research Professor Emerita of Neurobiology in Psychiatry</td>
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<td>RUMI KATO PRICE, PHD</td>
<td>Research Associate Professor of Psychiatry</td>
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<td>THOMAS R PRZYBECK, PHD</td>
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<td>DANIEL D PUGH, MD</td>
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<td>JOHN S RABUN, MD</td>
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<td>DIANE RANKIN, MD</td>
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<td>DABEERU C RAO, PHD</td>
<td>Professor of Biostatistics in Psychiatry</td>
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<td>DEVNANDINI RASTOGI-CRUZ, MD</td>
<td>Assistant Professor of Psychiatry</td>
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<td>SYED A Raza, MD</td>
<td>Assistant Professor of Clinical Psychiatry (Child Psychiatry)</td>
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<td>GWENDOLYN G REICH, PHD</td>
<td>Research Professor of Psychiatry (Child Psychiatry)</td>
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<td>JOHN P RICE, PHD</td>
<td>Professor of Mathematics in Psychiatry</td>
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<td>CHERYL RICHARDS, PHD</td>
<td>Instructor in Psychiatry</td>
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<td>THOMAS F RICHARDSON, MD</td>
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<td>WILLIAM M RIEDESEL, II, MD</td>
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<td>STEPHEN L RISTVEDT, PHD</td>
<td>Assistant Professor of Medical Psychology in Psychiatry</td>
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<td>LEE NELKEN ROBINS, PHD</td>
<td>Professor Emerita of Sociology in Psychiatry</td>
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<td>JOHN DENO ROGAKOS, MD</td>
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<td>JOHN W ROHRBAUGH, PHD</td>
<td>Associate Professor of Psychiatry</td>
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<td>EUGENE HAROLD RUBIN, MD, PHD</td>
<td>Professor of Psychiatry, Vice Chairman for Education, Department of</td>
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<td>JAMES RUTHERFORD, MD</td>
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<td>BERETTE A SALAZAR, MD</td>
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<td>LAWRENCE M. SCHEIER</td>
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<td>JEFFREY FRANK SCHERRR, PHD</td>
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<td>JEFFREY I SCHULMAN, MD</td>
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<td>EARL R SCHULTZ, MD, BS</td>
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<td>ADELITA SEGOVIA LANGLEY</td>
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<td>LORETTA CASSELESE, PHD</td>
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<td>PEARL FISHER SEROTA, MD</td>
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<td>YVETTE I SHELINE, MD</td>
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<td>BARBARA SUE SILVERSTEIN, PHD</td>
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<td>NATHAN M SIMON, MD</td>
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<td>ERIK J SIREVAAG, PHD</td>
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<td>JUDITH ANN SKALA</td>
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<td>STACEY L SMITH, MD</td>
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<td>WAYNE A STILLINGS, MD</td>
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<td>CATHERINE STRILEY</td>
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<tr>
<td>VINOD SURI</td>
<td>Instructor in Clinical Psychiatry (Child Psychiatry) (Full-Time at Hawthorn Children's Psychiatric Hospital)</td>
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<td>DRAGAN M SVRAKIC, MD, PHD</td>
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<tr>
<td>TIFFANY L. TIBBS, PHD</td>
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<td>RICHARD D TODD, MD, PHD</td>
<td>Director of the Division of Child Psychiatry in Psychiatry, Blanche Ittleson Professor of Psychiatry (Child Psychiatry)</td>
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ALEXANDRE TODOROV, PHD  Research Associate Professor of Psychiatry
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CHRISTOPHER WUERTZ, MD  Assistant Professor of Clinical Psychiatry
LUIS H ZAYAS, PHD, MS  Professor of Psychiatry

Department's Website

http://www.psychiatry.wustl.edu/

Department of Radiation Oncology

The Department of Radiation Oncology was created on July 1, 2001. The department has a broad program that focuses on excellence in patient care, innovative research and creative didactic activities for medical students, residents in radiation oncology and other specialties as well as allied health personnel. The department is one of the largest, most academically balanced and best equipped in the country, which is responsible for all radiation therapy procedures at Washington University Medical Center.

Our faculty has gained international recognition for innovative technological advances in physics and treatment planning, biological research, computer applications and clinical investigation.

Milestones
  • demonstration of a hypoxic subpopulation in tumors in vivo
  • demonstrated the importance of the cell cycle in the sensitivity to ionizing radiation
  • customized (Cerrobind) shielding system to protect normal tissues during irradiation
  • in collaboration with Biomedical Computer Laboratory, design and construction of first small dedicated computer for radiation therapy treatment planning
  • in collaboration with Varian Associates and NCI, design and construction of the first generation of high-energy, dual-modality, multiple-energies linear accelerator (Clinac 35)
  • development of three-dimensional radiation therapy treatment planning and delivery systems
  • clinical applications of 3-D conformal and intensity-modulated radiation therapy
  • use of imaging modalities in treatment planning in radiation therapy, including PET scanning
The Department of Radiation Oncology currently occupies a large, attractive and convenient clinical facility on the ground floor of the Center for Advanced Medicine. The clinical facilities include nine linear accelerator rooms, four 3-D and conventional simulator rooms, and a high dose rate brachytherapy suite with two treatment rooms. Furthermore, the facility houses a Gamma Knife unit, which is operated in collaboration with HealthSouth Corporation. We have advanced treatment planning computer systems for 3-D conformal and intensity-modulated radiation therapy. The plan is to develop three linear accelerators that have on-board CT imaging capability. The modern brachytherapy suite includes capability for high dose rate remote afterloading and for image-guided permanent prostate seed implants. Interstitial and external hyperthermia treatments are also available.

The Physics faculty have research laboratories and offices on the fourth floor of the Clinical Sciences Research Building plus designated areas adjacent to the clinical facility in the CAM building. The Radiation Biology laboratory and faculty offices are housed at the 4511 Forest Park Building, where there is significant expansion of biology research space. A new Center for Molecular Targeted Radiotherapy is in progress.

Courses

**Third Year**

M90 740  Radiation Oncology Clerkship  
Instructor: Joseph R. Simpson, M.D., Ph.D., 362-8567  
The four-week clerkship in radiation oncology will provide students with the opportunity to participate in the evaluation and management of a broad range of patients referred for consideration of radiation therapy. Clerkship activities will take place entirely within the Barnes-Jewish Hospital/Siteman Cancer Center complex. Students will conduct patient evaluations under the supervision of radiation oncology department residents and faculty. Students will also attend and participate in regularly scheduled departmental conferences, which occur on a daily basis. Students will also have the opportunity to attend the appropriate multidisciplinary clinics, follow-up clinics and multidisciplinary conferences (such as pediatric neuro-oncology, cardiothoracic oncology, lymphoma, GYN tumor conferences) pertaining to their rotation schedule.

Instructional materials are available for students on the rotation (students are NOT expected to purchase any curricular materials for the clerkship). Student performance will be evaluated by both resident and faculty members who supervise the student over the course of the four-week clerkship.

**Fourth Year**

**Elective**

M90 840  CLINICAL RADIATION ONCOLOGY  
Instructor(s): Joseph Simpson, M.D., 362-8567 and Simon N. Powell, M.D., 362-8542  
Location: Center for Advanced Medicine, Lower Level  
Elective Contact: Joseph Simpson, M.D., 362-8567  
Other Information: Students should meet the Chief Resident in the Siteman Cancer Center Conference Room on the lower level of the CAM Building. Enrollment limit per period: 3  
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

The clinical division offers an elective with emphasis on the evaluation, planning of and administration of radiation therapy in patients with malignant tumors. The students have the opportunity to enhance their knowledge on the natural history, pathological, and biological features of cancer and to sharpen their clinical skills participating in the management of these patients.  
Student time distribution: Inpatient 7%, Outpatient 78%, Conferences/ Lectures 15%; Subspecialty
Care 100%
Major teaching responsibility: Attendings, residents and staff
Patients seen/weekly: 20-35 per physician
On call/weekend responsibility: None

Research

(M90 900)
Jeff Michalski, M.D., Radiation Oncology and Cancer Biology, 362-8566. Broad range of opportunities for investigation in: 1) prognostic factors and therapy outcome in a variety of patients with cancer; 2) three-dimensional treatment conformal and intensity-modulated radiation therapy in the treatment of patients with head and neck, lung, pancreas, rectal or prostate cancer; 3) biological studies exploring mechanisms involved in cellular DNA damages and repair by irradiation, heat and/or cytologic agents; 4) computer applications in data analysis and information systems; and 5) clinical outcome analysis projects.

Faculty

SIMON N. POWELL, MD, PHD  Professor of Radiation Oncology, Head of the Department of Radiation Oncology
KATHY BAGLAN  Instructor in Clinical Radiation Oncology
WALTER R BOSCH, PHS  Research Assistant Professor of Radiation Oncology
JEFFREY D BRADLEY, MD  Assistant Professor of Radiation Oncology
JOSEPH O. DEASY, PHD  Associate Professor of Radiation Oncology
VENKATA RAO DEVIRENII, MD  Associate Professor of Clinical Radiation Oncology
ROBERT E DRZYMALA, PHD  Associate Professor of Radiation Oncology
ISSAM M EL NAQA, PHD  Research Instructor in Radiation Oncology
JACQUELINE ESTHAPPAN, PHD  Instructor in Radiation Oncology
SREEKRISHNA M GODDU, PHD  Assistant Professor of Radiation Oncology
PERRY W GRIGSBY, MD, MS  Professor of Radiation Oncology
RYUJI HIGASHIKUBO, PHD  Research Associate Professor of Radiation Oncology
NOBUO HORIKOSHI, PHD  Assistant Professor of Radiation Oncology
ERIC E KLEIN  Associate Professor of Radiation Oncology
ANDREI LASZLO, PHD  Associate Professor of Radiation Oncology
HUI LI, PHD  Instructor in Radiation Oncology
HSIU-SAN LIN, MD, PHD  Retiree - Professor of Radiation Oncology
DANIEL ABRAHAM LOW, PHD  Associate Professor of Radiation Oncology
MUHAMMAD SALEEM MAHMOOD, MD  Instructor in Clinical Radiation Oncology
DAVID B MANSUR, MD  Assistant Professor of Radiation Oncology
JOHN W MATTHEWS, D SC  Research Assistant Professor of Radiation Oncology
JEFF MICHAEL MICHALSKI, MD  Associate Professor of Radiation Oncology
DANIEL F MULLEN, DDENT  Instructor in Radiation Oncology
SASA MUTIC  Associate Professor of Radiation Oncology
ROBERT J MYERSON, MD, PHD  Professor of Radiation Oncology
OSCAR D. NORTON, MD  Instructor in Clinical Radiation Oncology
GILBERT H NUSSBAUM, PHD  Associate Professor Emeritus of Radiation Oncology
TEJ K PANDITA, PHD  Associate Professor of Radiation Oncology
CARLOS A PEREZ, MD  Professor Emeritus of Radiation Oncology
JAMES VERNON PIEPHOFF, MD  Instructor in Clinical Radiation Oncology
JAMES A PURDY, PHD  Adjunct Professor of Radiation Oncology
GARY A RATKIN, MD  Instructor in Clinical Radiation Oncology
KEITH M RICH, MD  Associate Professor of Radiation Oncology
BUCK ROGERS, PHD  Assistant Professor of Radiation Oncology
JOSEPH L ROTI ROTI, PHD  Professor of Radiation Oncology
TAPAN ROY  Instructor in Clinical Radiation Oncology
LAKSHMI SANTANAM, PHD  Instructor in Radiation Oncology
SHAUN PATRICK SCOTT, PHD, BS  Instructor in Radiation Oncology
JOSEPH ROGERS SIMPSON, MD, PHD  Associate Professor of Radiation Oncology
WILLIAM L STRAUBE  Research Assistant Professor of Radiation Oncology
MARIE E TAYLOR, MD  Assistant Professor of Radiation Oncology
WADE L THORSTAD, MD  Instructor in Radiation Oncology
MILOS VICIC, PHD  Instructor in Radiation Oncology
TERESA JANE VIETTI, MD  Professor Emeritus of Radiology
BRUCE J WALZ, MD  Associate Professor of Clinical Radiation Oncology
TODD H WASSERMAN, MD  Professor
ROY C WOOD, PHD, BS  Instructor in Radiation Oncology
MAI XU, MD, PHD  Research Instructor in Radiation Oncology
QIN YANG  Assistant Professor of Radiation Oncology (Pending Executive Faculty Approval)
IMRAN ZOBERI, MD  Instructor in Radiation Oncology

Department's Website
Department of Radiology

The Mallinckrodt Institute of Radiology (MIR) serves as the Department of Radiology for Washington University School of Medicine, helping to guide the consulting physician in the discovery, treatment and, ultimately, the healing of disease. Established in 1930, MIR is one of the largest and most scientifically sophisticated radiology centers worldwide.

Internationally recognized for its groundbreaking research, the Institute continues to pioneer new radiological techniques for better patient care.

Milestones
- development of the first diagnostic test for gallbladder disease
- design and construction of the first cross-sectional X-ray laminagraph
- collaboration on design and installation of the first cyclotron located in a U.S. medical center
- development of positron emission tomography (PET)
- installation of one of the world’s first computed tomography (CT) and magnetic resonance (MR) scanners
- interfacing of a minicomputer with a gamma camera, improving accuracy and efficiency of nuclear medicine procedures
- establishment of the first mobile mammography van west of the Mississippi River
- integration of CT and MR scans with three-dimensional technology
- application of organic chemistry to the preparation of radiopharmaceuticals used in medical imaging
- measurement of cerebral blood flow and metabolism
- establishment of the St. Louis region’s most comprehensive interventional radiology center
- application of PET for measuring metabolic activity in relation to cardiac blood flow

The Institute occupies more than 400,000 total square feet, comprising its own 13-story building with satellite facilities in Barnes-Jewish, St. Louis Children’s and Wohl hospitals; the Clinical Sciences Research and East buildings; the Scott Avenue Imaging Center; the Center for Advanced Medicine; and the Knight Emergency and Trauma Center. The department provides diagnostic radiology, nuclear medicine and radiation physics for all hospitals in the Washington University Medical Center, Barnes-Jewish West County Hospital and Barnes-Jewish St. Peters Hospital.

MIR clinical facilities are on the second floor of the Institute (chest radiology, body computed tomography, operating room imaging, computed radiography); third floor (neuroradiology, MRI, angiography); fourth floor (gastrointestinal and genitourinary radiology, and ultrasonography); and the fifth floor (MRI). PET clinical and research facilities are available on the seventh floor. A comprehensive interventional radiology center occupies the eighth floor. Nuclear medicine is on the ninth floor of the Barnes-Jewish Hospital West Pavilion. Orthopedic imaging is on the sixth floor of the Center for Advanced Medicine. The Breast Health Center, on the fifth floor of the Center for Advanced Medicine, is a multidisciplinary facility that provides a full range of breast imaging services and interventional procedures. In the north wing of St. Louis Children’s Hospital is a complete pediatric radiology facility, offering ultrasound, nuclear medicine, CT and MRI. The diagnostic facilities at Barnes-Jewish Hospital north offer state-of-the art equipment and a staff of talented specialists in abdominal and chest radiology, MRI, nuclear medicine and interventional radiology. Musculoskeletal radiology services are available on the sixth floor of the Center for Advanced Medicine.

The Institute has 102 examination rooms for diagnostic radiology, one PET/CT scanner, nine CT scanners (all with spiral CT capability and two with multidetector arrays), six PET scanners, 11 MR scanners (five devoted to research), 16 ultrasound machines, and six mammography units. In addition, as part of the department’s community outreach effort, the Institute cosponsors with Barnes-Jewish Hospital a mobile mammography van that provides screening services at corporate and public sites in the St. Louis metropolitan area.

MIR research facilities are in the Clinical Sciences Research Building (radiological sciences), in the East Building (electronic radiology) and in the Scott Avenue Imaging Center (neurological PET,
molecular pharmacology, MR imaging, optical imaging and cardiovascular imaging).

Administrative, teaching and support functions occupy the sixth floor and the ninth through the 12th floors of the Institute.

The Mallinckrodt Institute of Radiology at Washington University Imaging Center is an extension of the medical school campus East Building. Opened in November 1994, the Imaging Center’s 70,000 square feet of space is dedicated to PET, MR and related sciences research. One of the best-equipped multidisciplinary facilities worldwide, the Imaging Center provides centralized resources for the scientific evaluation of imaging technology and for the development and application of advanced imaging systems. Researchers have access to advanced PET systems; powerful magnetic resonance scanners; three medical cyclotrons; in vivo MR spectroscopy; laboratories; animal care facilities; a neuropsychology laboratory; electrical engineering laboratories for image reconstruction; and high-end graphics workstations. The Imaging Center also houses sophisticated computer facilities that are used for clinical, research and teaching applications.

In 2003, Washington University and the School of Medicine launched BioMed 21, a strategic plan for developing a multidisciplinary approach to basic and clinical research. Mallinckrodt Institute’s nearly 75 years of imaging experience will be evident in BioMed 21’s Center for Biological Imaging, where biological imaging will progress from focusing on gross anatomy to the delicate molecular interactions that underlie cellular and general processes. Also in the planning stages is an imaging facility dedicated to transferring imaging concepts from the laboratory to clinical use.

Courses

Second Year

Twelve hours of lecture are devoted to an introduction to radiology. The majority of the course is devoted to diagnostic radiology, including computed tomography, ultrasound, nuclear medicine and magnetic resonance. Radiation biology also is introduced. The course also includes review of individual teaching file cases at small group sessions. Sanjeev Bhalla, M.D.

Fourth Year

Electives

M90 808 BODY CT
Instructor(s): Fernando R. Gutierrez, M.D., and Sanjeev Bhalla, M.D., 362-2927
Location: Mallinckrodt Institute of Radiology
Elective Contact: Fernando R. Gutierrez, M.D., Sanjeev Bhalla, M.D., 362-2927
Other Information: Students should contact Drs. Gutierrez or Bhalla to discuss meeting location and time for first day of elective. Enrollment limit per period: 2
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

Students will work with two attendings and four residents and participate in all aspects of the Body CT service including interview of patients, protocling examinations, review and interpretation of diagnostic CT examination and consultation with referring physicians. Approximately 400 CTs are performed each week including chest, abdominal and pelvic examinations and biopsy procedures. Students will attend the daily CT teaching conference and have the opportunity to attend other lectures and conferences. Special interests can be accommodated.
Student time distribution: Inpatient 30%, Outpatient 50%, Conferences/ Lectures 20%; Primary Care 50%, Subspecialty care 50%
Major teaching responsibility: Attending physician and residents
Patients seen/weekly: N/A
On call/weekend responsibility: None
M90 815  EMERGENCY RADIOLOGIC IMAGING  
Instructor(s): Sanjeev Bhalla, M.D., 362-2927  
Location: Emergency Department,  
Southwest Tower  
Elective Contact: Sanjeev Bhalla, M.D., 362-2927  
Other Information: Students should  
contact Dr. Bhalla to discuss meeting  
location and time for first day of  
elective and to obtain reading list. Enrollment limit per period: 1  
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.  

A four-week elective emphasizing the interactions between radiologists and emergency department  
physicians. Students will have extensive exposure to evaluation of both medical and surgical  
emergencies in the adult patient. They will learn appropriate utilization of radiologic resources, and will  
also learn the basics of film reading (chest, bone and joint, and body CT) at the viewing console.  
Students will serve as a liaison with the clinical physicians and support staff. This active elective will  
include attendance at the daily radiologic emergency department conference.  
Student time distribution: Inpatient (ER) 80%, Conferences/Lectures 20%  
Major teaching responsibility: Attendings and residents on the ER radiology service  
Patients seen/weekly: 250 chest radiographs, 100 bone and joint, 40 CT exams  
On call/weekend responsibility: None

M90 820  CLINICAL NUCLEAR MEDICINE  
Instructor(s): Tom R. Miller, M.D., Ph.D., 362-2809  
Location: 956 West Pavilion  
Elective Contact: Tom R. Miller, M.D., Ph.D., 362-2809  
Other Information: Students report to 956 West Pavilion, 8:30 a.m. first day of elective. Enrollment  
limit per period: 1  
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.  

The student will be exposed to the full range of clinical nuclear medicine. In conjunction with the staff,  
the student will be responsible for planning and interpreting imaging studies in patients referred to the  
Department. Opportunity exists to learn instrumentation techniques, including computer applications.  
There are daily conferences and scan interpretation sessions.  
Student time distribution: Inpatient 30%, Outpatient 50%, Conferences/ Lectures 20%; Primary Care  
50%, Subspecialty Care 50%  
Major teaching responsibility: Multiple attendings and fellows  
Patients seen/weekly: 200  
On call/weekend responsibility: None

M90 830  INTERVENTIONAL RADIOLOGY  
Instructor(s): Jennifer Gould, M.D., 362-2900  
Location: Mallinckrodt Institute of Radiology  
Elective Contact: Jennifer Gould, M.D., 362-2900  
Other Information: Students should contact Dr. Gould to discuss meeting location and time for first  
day of elective. Enrollment limit per period: 2  
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.  

Students will be exposed to all clinical and procedural aspects of interventional radiology including:  
patient evaluation and consultation, preparation of patients for procedures, performance of a wide  
range of vascular and non-vascular procedures, post-procedure patient management, and longitudinal  
patient follow-up. Students will actively participate in interventional procedures. Students will attend  
the departmental noon conference (daily) and section conferences including didactic lectures,  
morbidity and mortality conference, and case conferences (3-4 times per week).
Student time distribution: Inpatient 80%, Outpatient 10%, Conferences 10%
Major teaching responsibility: Attending Interventional radiology physicians will provide the majority of teaching. Fellows and residents will provide additional teaching.
Patients seen/weekly: Approximately 150 patients per week are seen in consultation or for procedures in the south campus Interventional facility.
On call/weekend responsibility: None

M90 842 THORACIC IMAGING - MIR
Instructor(s): Harvey Glazer, M.D., 362-2927
Location: Mallinckrodt Institute of Radiology
Elective Contact: Harvey Glazer, 362-2927
Other Information: Students meet instructor at 7:00 a.m. in the chest reading room, 2nd Floor, Mallinckrodt Institute of Radiology. Enrollment limit per period: 3
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

A four-week elective emphasizing the interactions between chest radiologists and the various clinical services, to include thoracic surgery, thoracic oncology, and pulmonary medicine. Learn to read chest radiographs at the viewing console while providing liaison with the clinical teams. This active elective will include the daily chest teaching conference and participation in weekly autopsy, thoracic surgery, thoracic oncology conferences, as well as the imaging aspects of the clinico-pathological medicine conference. Learn to identify subtle pneumothorax and pneumonia. Learn the limitations of portable chest radiographs.
Student time distribution: Inpatient 40%, Outpatient 35%, Conferences/ Lectures 25%
Major teaching responsibility: Attendings and residents on chest radiology service
Patients seen/weekly: 500 CXRs seen weekly
On call/weekend responsibility: None

M90 843 CLIN MUSCULOSKELETAL RADIOLOGY IMAGING
Instructor(s): Michael Gelbart, M.D., 362-2916
Location: 10th Fl Mallinckrodt and 6th Fl Center for Advanced Medicine
Elective Contact: Michael Gelbart, M.D., 362-2916
Other Information: Students report to Musculoskeletal conference room, 10th Fl Mallinckrodt, 8:00 a.m. first day of elective for conference. Enrollment limit per period: 2
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

Students will be exposed to all modalities of musculoskeletal radiology, including plain radiography, MRI, CT, and spine/joint interventional procedures. They will work directly with musculoskeletal attendings, fellows, and radiology residents. Topics to be covered include sports medicine/orthopedics, rheumatology, and pain management. Student objectives include increased comfort with the interpretation of plain radiographs of bones and joints as well as increased understanding of the indications for ordering commonly performed musculoskeletal studies. Students will attend the 8 a.m. morning conferences led by a staff radiologist and the noon conference in Scarpellino Auditorium daily as well as other scheduled section conferences.
Student time distribution: Inpatient 30%, Outpatient 50%, Conferences/ Lectures 20%; Primary Care 20%, Subspecialty Care 80%
Major teaching responsibility: Multiple attendings and fellows
Patients seen/weekly: 1000 plain radiographs, 40 CT/MRI, and 25 interventional procedures seen weekly
On call/weekend responsibility: None

M90 880 NEURORADIOLOGY CLINICAL ELECTIVE
Instructor(s): Greg Jamroz, M.D., 362-5949, and Franz J. Wippold, II, M.D.
Location: Neuroradiology section, Queeny Tower, 16th Floor
Elective Contact: Greg Jamroz, M.D., Franz J. Wippold, II, M.D., and Pam Jearls, 362-5949
Other Information: All students interested in this elective must contact Dr. Jamroz prior to beginning
Neuroradiology is the subspecialty of radiology that concerns the diagnosis and endovascular/percutaneous treatment of brain, spine, and extracranial head and neck diseases. The diagnostic division of Neuroradiology focuses on the use of plain films, computed tomography (CT), magnetic resonance (MR) imaging, myelography, and angiography in diagnosing central nervous system disease. The therapeutic division uses primarily angiographic and percutaneous techniques in treating appropriate lesions. The medical student participating in this elective will experience all facets of neuroradiology by rotating through all segments of the service and by contributing to the decision matrix for patients seen during the rotation.

Student time distribution: Diagnostic neuroradiology 60%, Conferences/lectures 20%, Interventional neuroradiology 10%, Case Preparation 10%

Major teaching responsibility: Preparation of case presentations for the neuroradiology teaching file

Patients seen/weekly: 100 Neuro CT, 100 Neuro MRI, 5 Myelograms, 5 Neuroangiograms

On call/weekend responsibility: None

Research

(M90 900)

Interested students should contact the appropriate individual in each division regarding the types of research projects available.

Kyongtacke Ty Bae, M.D., Ph.D., Room 3350 East Building, 747-1733. Quantitative Imaging Analysis. My research interests are quantitative and physiologic imaging and computer applications in diagnostic imaging. Radiology is a fast growing medical specialty. Rapid developments in computer and technology have provided an opportunity to explore for new radiology and clinical application and to use imaging as a quantification tool. Ongoing research projects include image segmentation and processing, computer-aided diagnosis, contrast medium pharmacokinetics, and functional and physiologic CT and MRI imaging.

Tom Conturo, M.D., Ph.D., 2nd Floor East Building, Rm 2120, 362-8421. Magnetic resonance (MR) imaging is a noninvasive means of providing images of the human body at high spatial resolution and contrast sensitivity. The contrast can be manipulated to depend on different properties of tissue water, enabling the study of a variety of biological processes. In some cases, endogenous or exogenous paramagnetic MR contrast agents are used to alter the MRI contrast by perturbing the tissue water environment. Recently, new MRI hardware has also enabled techniques having high temporal resolution. Using the unique contrast properties of MRI and the higher spatial/temporal resolution, non-invasive techniques can be devised to study neuronal activity, tissue perfusion, water mobility (diffusion), and neuronal fiber pathways in the human brain. The goals of Dr. Conturo's research lab are to develop and apply MR imaging techniques for quantitative imaging of cerebral perfusion, brain function, water diffusion, and neuronal fiber pathways. These techniques utilize the MR signal effects of exogenous bolus-injected contrast agents, endogenous hemoglobin, and microscopic water diffusion. Long-term goals are to apply these methodologies toward imaging and understanding human brain structure, function, and physiology in normal and abnormal conditions. The approaches that are used in this laboratory cover a broad range of areas, including MRI physics, MRI pulse sequence development, theoretical derivations, computer simulations, image-processing, computer graphics, custom contrast agents, phantom studies, animal models, human studies, clinical patient studies, and comparison with other imaging modalities.

Farrokh Dehdashti, M.D., Nuclear Medicine PET Facility, 7th Floor Mallinckrodt Institute of Radiology, 362-1474. Positron emission tomography (PET) is an imaging technique that produces images reflective of biochemical processes of normal and abnormal tissues. PET is complementary to anatomic imaging modalities such as computed tomography (CT) and magnetic resonance imaging (MRI). The ability of PET to quantify fundamental processes, such as blood flow, oxygen metabolism, glucose metabolism, and receptor density, makes this technique very desirable to both investigators and
clinicians. Dr. Dehdashti’s research utilizes the conventional PET radiopharmaceutical, F-18 fluorodeoxyglucose (FDG), as well as a variety of unique PET radiopharmaceuticals such as 16alpha[18F]-fluoro-17beta-estradiol (FES), an estrogen receptor based imaging tracer, Cu-60-diacetyl-bis[N4-methylthiosemicarbazone (Cu-60 ATSM), a hypoxic imaging tracer, and 94mTc-sestamibi to assess the functional capacity of multidrug drug resistance. Below is a partial list of the research projects relating to PET: 1) PET assessment of response to hormone therapy in advanced hormone-sensitive breast cancer (the major goal of this project is to predict response to hormone therapy in breast cancer based on PET assessment of flare reaction); 2) Imaging MDR1 P-glycoprotein transport activity in vivo with 94mTc-sestamibi PET to predict response to chemotherapy (the major goal of this project is to assess whether 94mTc-sestamibi PET will provide a functional assessment of MDR1 Pgp in advanced lung cancer and whether tumor uptake of 94mTc-sestamibi prior to chemotherapy will predict treatment failure in these patients); 3) To determine if quantitative measures of the change in tumor FDG uptake after 24 hours after starting estradiol therapy is a surrogate biomarker of the efficacy in patients with hormone-sensitive metastatic breast cancer. In an exploratory analysis, the effect of the two doses of estradiol on tumor glucose metabolism will be compared; 4) PET assessment of tumor hypoxia using Cu-ATSM in patients with breast cancer (the major goal of this project is to predict prognosis and response to neoadjuvant chemotherapy); 5) Functional assessment of P-glycoprotein with conventional nuclear medicine imaging and 99mTc-sestamibi in patients with advanced breast cancer; 6) PET assessment of prostate cancer using C-11 acetate; 7) To investigate the effects of letrozole therapy on tumor FES uptake in patients with hormone-sensitive breast cancer (to determine whether the up regulation of ER expression as a result of estrogen deprivation caused by letrozole therapy can be detected by FES-PET.

Rob J. Gropler, M.D., Room 1307 East Building, 747-3878. Cardiovascular Imaging Research. The research in the Cardiovascular Imaging Laboratory is designed to better understand the relationship between myocardial perfusion, intermediary metabolism and mechanical function in both normal and abnormal cardiac states. The research involves the integration of several imaging techniques with diverse strengths such as PET, MRI, CT and echocardiography. The success of the research requires several paths of investigation to be pursued in parallel. For example, in order to image the biologic processes of interest requires continued technical developments for each of the imaging methods listed above. There are ongoing efforts to permit more accurate PET measurements of myocardial substrate metabolism. They include the development of novel tracers of extracted substrates, the development of acquisition schemes to assess endogenous substrate metabolism, and the validation of mathematical approaches to correlate the tracer kinetics with the underlying metabolic processes. These studies are being pursued in small and large animal models and then in humans. Another example includes the current efforts to develop approaches to image the coronary arteries non-invasively by MRI using novel contrast agents and acquisition schemes. In addition, techniques are being developed to permit MR guided interventions on the coronary arteries. This undertaking includes the development of novel guide-wire tracking and catheter tracking schemes using both passive and active approaches. Finally, to permit assessments of myocardial oxygenation and thus, perfusion, techniques are being developed to permit BOLD imaging the myocardium. Another path of the research is to determine how this perfusional-metabolic-functional relation is altered by normal life changes and then determine how disease states alter the relationship. For example, both PET and echocardiography are being used to characterize the age and gender related changes on myocardial perfusion, substrate metabolism and function. To study the relationship in disease states, similar studies are being performed in patients with diabetes and obesity. A third path to determine the mechanisms responsible for these changes in this metabolic-functional relation and identify potential interventions that may reverse or ameliorate them. In this regard, similar imaging studies are being performed to determine the importance of nitric oxide and the PPARa system in defining this metabolic-functional relation.

Charles Hildebolt, D.D.S., Ph.D., 3rd Floor East Building, 362-8410. The assessment of oral bone by digital radiographic imaging, including new assessment methods based on photostimulable phosphor radiography. Assessments are focused on the use of radiographic imaging of oral bone to determine osteoporosis risk and the association between oral bone mass and dietary intake of calcium and vitamin D.
Tom R. Miller, M.D., Ph.D., 9th Floor West Pavilion, 362-2809. Research projects are available in positron emission tomography (PET) in the following areas: 1) Use of PET in radiation therapy treatment planning in patients with cervical cancer; 2) Evaluation of prognosis in cervical cancer by quantitative measures of tumor size, uptake and heterogeneity; 3) Evaluation of new radiopharmaceuticals in prostate cancer.

Mark A. Mintun, M.D., Suite 3354 East Building, 362-3316/362-6965. Positron Emission Tomography (PET). We use positron emission tomography (PET) in human subjects as a tool in the investigation of two distinct areas: The first area of research involves the study of the metabolic needs of the brain during neural work. While cerebral blood flow (CBF) augmentation is considered to be a hallmark of intensified neural activity, recent data from our laboratory have shown that in healthy human subjects the CBF response to physiological stimulation is not altered by stepped hypoglycemia or hypoxia and is driven by factors other than local requirements in glucose or oxygen. Theoretical modeling of oxygen delivery to human brain and actual measurements in healthy humans showed that adequate tissue levels of oxygen could be maintained without the need for increased CBF or oxygen delivery. Brain oxygen utilization increases during continuous physiological stimulation. The time course and magnitude of these changes suggest that the energy demands of neuronal activation are initially met predominantly by increased glycolysis whereas continued neuronal activation eventually requires increased oxidative metabolism. We suggest that the redox potential of the neural cells (NADH/NAD+ or lactate/pyruvate ratio) is an important sensor of blood flow need. This hypothesis was supported by the data obtained in animals and humans with CBF activation studies with lactate and pyruvate injections.

A second area of our research involves the use of PET to study the biology of depression treatment as well as other related neuropsychiatric diseases. The current interest in the laboratory is the use of serotonergic measures to probe the changes in brain receptor function during treatment of depression with different antidepressant drugs. We have previously shown with PET that the serotonin system in untreated depressed patients has decreased responsiveness to pharmacological challenge. Recently we have shown that, using the highly selective radioligand [18F]-altanserin to image serotonin-2A receptors in vivo, depressed patients have substantially decreased serotonin-2A receptors in the hippocampus compared to normal control subjects. The effect of antidepressant treatment on receptor density is being studied in order to study the responsiveness and down-regulation of this system. Other ongoing research has focused on the biology of addiction and involves the imaging of dopamine receptors in the basal ganglia, measuring the release of dopamine after pharmacologic challenges, and the measure of GABA-A receptors in different patient populations.

Stephen M. Moerlein, Ph.D., Radiological Sciences, 362-8466. Research interests lie in the general area of labeled tracer development for nuclear medicine imaging, especially positron-emission tomography (PET). Developmental effort begins with synthesis of target structures, preclinical screening that involves in vitro biochemistry and pharmacological testing, and ex vivo biodistribution studies in small animals. Promising tracers are then examined by in vivo imaging of animal subjects and tracer kinetic modeling. The final step in the transition of a radiochemical into a labeled drug takes into account radiation dosimetry, pharmaceutical quality, and the development of automated production to streamline delivery to human subjects. Each of these aspects are researched, with a primary interest in novel agents for examination of neurological processes by PET.

David Piwnica-Worms, M.D., Ph.D., 3rd Floor East Building, 362-9356. Research projects in molecular imaging are available. Molecular imaging is broadly defined as the characterization and measurement of biological processes in living animals, model systems and humans at the molecular and cellular level using remote imaging detectors such as PET, SPECT, MRI, bioluminescence, and near-infrared fluorescence. Our goal is to advance the understanding of normal biology and pathophysiology through noninvasive investigation of molecular and cellular events in vivo. Projects focus on validation and use of PET reporter genes and PET reporter probes as well as luciferase and bioluminescence imaging to investigate protein-protein interactions, gene expression patterns in cancer and infectious disease, development of peptide conjugates for membrane transduction of PET, SPECT and optical contrast agents, and investigations of the transport functions of the multidrug resistance (MDR1) P-glycoprotein family of membrane transporters.
William J. Powers, M.D., 2nd Floor East Building, 362-2957. Research opportunities are available using positron emission tomography to measure cerebral blood flow and metabolism in human subjects to investigate how the blood borne supply of oxygen and glucose is regulated to energy demand in physiological and pathological conditions. Ongoing projects include studies of cerebrovascular disease, head trauma, Huntington’s disease and Parkinson’s disease.

Marc Raichle, M.D., 2nd Floor East Building, 362-6907. We use functional imaging techniques, both positron emission tomography and functional magnetic resonance imaging, to study the normal organization of the human brain and the effect of selected diseases. The research focuses on both the methodology (imaging and experimental) and specific questions in cognitive neuroscience.

Michael J. Welch, Ph.D., 4th Floor Clinical Sciences Research Building, 362-8435. Short-lived positron emitting radionuclides such as carbon-11 and fluorine-18 can be used to trace physiologic and pharmacologic processes in humans. Tracers are being developed to probe brain receptors, tumor receptors and enzyme systems.

Bruce R. Whiting, Ph.D., Room 3352, East Building, 362-6965. Quantitative Computed Tomography (CT). By developing accurate models of the physics of CT image acquisition and incorporating these models into image reconstruction algorithms, improved quantitative information can be obtained from clinical CT images. Applications include 3D localization of cochlear implants, protocols to minimize CT radiation dose, brachytherapy dose planning, and alveolar bone structure. There are opportunities for computer programming and algorithm development, experimental data collection, conducting observer studies and analyzing clinical patient data.

Faculty

R. GILBERT JOST, MD  Elizabeth E Mallinckrodt Professor of Radiology, Head of The Department of Radiology, Director of The Edward Mallinckrodt Institute of Radiology
SAMUEL I. ACHILEFU, PHD  Associate Professor of Radiology
JOSEPH J. H. ACKERMAN, PHD  Professor of Radiology
ERBIL AKBUDAK, PHD  Research Assistant Professor of Radiology
MARYELLEN AMATO, MD  Instructor in Clinical Radiology
CAROLYN J ANDERSON, PHD  Associate Professor of Radiology
DEE CLAIRE ANDERSON, MD  Professor of Radiology
KYONGTAE T BAE, MD, PHD, MS  Associate Professor of Radiology
DENNIS M BALFE, MD  Professor of Radiology
DEANNA BARCH, PHD  Associate Professor of Radiology
PREMSRI TANG BARTON, MD  Associate Professor of Radiology
SANJEEV BHALLA, MD  Assistant Professor of Radiology
JOELLE BIERNACKI, MD  Instructor in Radiology
ARTHUR F BISHOP, MD  Instructor in Clinical Radiology
KEVIN J BLACK, MD  Associate Professor of Radiology
G. JAMES BLAINE, D SC  Retiree - Professor of Radiology
CHARLES F GARVIN, MD  Instructor in Clinical Radiology
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MICHAEL S GELBART, MD  Assistant Professor of Radiology
EDWARD M GELTMAN, MD  Assistant Professor of Radiology
DAVID S GIERADA, MD  Associate Professor of Radiology
LOUIS ARNOLD GILULA, MD  Professor of Radiology
CRAIG GLAIBERMAN, MD  Instructor in Radiology
HARVEY S GLAZER, MD  Professor of Radiology
JENNIFER E GOULD, MD  Instructor in Radiology
BRETT GRATZ, MD  Instructor in Radiology
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PERRY W GRIGSBY, MD, MS  Professor of Radiology
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ROBERT L GRUBB, JR, MD  Professor of Radiology
DEBRA A. GUSNARD, MD  Assistant Professor of Radiology
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DENISE P. HEAD, PHD  Research Assistant Professor of Radiology
JAY PAUL HEIKEN, MD  Professor of Radiology
THOMAS EUGENE HERMAN, MD  Associate Professor of Radiology
PILAR HERRERO, MS  Research Associate Professor of Radiology
TAMARA G HERSHEY, PHD  Assistant Professor of Radiology
ALBERT E HESKER, MD  Assistant Professor of Clinical Radiology
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WILLIAM P JAMES, MD  Assistant Professor of Radiology
CYLENE JAVIDAN-NEJAD, MD  Instructor in Radiology
JAMES A JUNKER, MD  Instructor in Clinical Radiology
KEITH A KASTELIC, MD  Instructor in Radiology
ANIL KHOGLA Instructor in Radiology
SOOAH KIM, MD  Visiting Instructor in Radiology
SAULO KLAHR, MD  Professor of Radiology
LAWRENCE M KOTNER, MD  Associate Professor of Radiology
RICHARD A KRAUS, MD  Assistant Professor of Radiology
KEITH ALAN KRONEMER, MD  Assistant Professor of Radiology
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RICHARD LAFOREST, PHD  Assistant Professor of Radiology
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MARK P. MCAVOY, PHD  Research Instructor in Radiology
KATHLEEN BLYTH MCDERMOTT, PHD  Research Assistant Professor of Radiology
ELIZABETH G MCFARLAND, MD  Adjunct Assistant Professor of Radiology
ROBERT CAROLIN MCKINSTRY, III, MD, PHD  Associate Professor of Radiology
ROBERT C MCKNIGHT, MD  Instructor in Radiology
CHRISTINE ONSY MENIAS, MD, BS  Assistant Professor of Radiology
MARY ANN MIDDLETON, MD  Assistant Professor of Radiology
WILLIAM D MIDDLETON, MD  Professor of Radiology
TOM RICHARD MILLER, MD, PHD  Professor of Radiology
MARK A MINTUN, MD  Professor of Radiology
STEPHEN M MOERLEIN, PHD  Associate Professor of Radiology
BARBARA S MONSEES, MD  Professor of Radiology
STEPHEN M MOORE, BS  Research Assistant Professor of Radiology
CHRISTOPHER J MORAN, MD  Professor of Radiology
KEITH L MULLENGER, MD  Instructor in Radiology
VAMSIDHAR R NARRA, MD  Assistant Professor of Radiology
JEFFREY J NEIL, MD, PHD  Professor of Radiology
JOHN HART NIEMEYER, MD  Instructor in Clinical Radiology
AMY SULLIVAN NORDMANN, MD  Instructor in Radiology
JOSEPH A. O'SULLIVAN, PHD  Associate Professor of Radiology
JASON OLIPHANT, MD  Instructor in Radiology
GARY H OMELL, MD  Assistant Professor of Clinical Radiology
MICHAEL K PASQUE, MD  Professor of Radiology
MICHAEL W PENNEY, MD  Instructor in Radiology
JOEL S PERLMUTTER, MD  Professor of Radiology
STEVEN E PETERSEN, PHD  Professor of Radiology
ANDREA PICHLER WALLACE, PHD  Research Instructor in Radiology
DANIEL D PICUS, MD, BS  Professor of Radiology
THOMAS KURT PILGRAM, PHD  Instructor in Radiology
DAVID R PIWNICA-WORMS, MD, PHD  Professor of Radiology
DAVID GERARD POLITTE, D SC  Research Instructor in Radiology
WILLIAM JOHN POWERS, MD  Professor of Radiology
FRED W PRIOR, PHD, MA  Research Associate Professor of Radiology
EDWARD FLOYD RAGSDALE, MD  Instructor in Clinical Radiology
MARCUS E RAICHLE, MD  Professor of Radiology
DAVID E REICHERT, PHD  Assistant Professor of Radiology
BUCK ROGERS, PHD  Assistant Professor of Radiology
DOUGLAS J ROWLAND, JR, PHD  Research Instructor in Radiology
HENRY D ROYAL, MD  Professor of Radiology
BRIAN G RUBIN, MD  Associate Professor of Radiology
DAVID A RUBIN, MD  Associate Professor of Radiology
YORAM RUDY  Research Professor of Radiology
STUART STEVEN SAGEL, MD  Professor of Radiology
ROBERT F SCHEIBLE, MD  Assistant Professor of Clinical Radiology
BRADLEY L SCHLAGGAR, MD, PHD  Assistant Professor of Radiology
DANIEL PHILLIP SCHUSTER, MD  Professor of Radiology
SALLY J SCHWARZ  Research Associate Professor of Radiology
JANICE SEMENKOVICH, MD  Associate Professor of Radiology
GARY D SHACKELFORD, MD  Professor Emeritus of Radiology
VIJAY SHARMA, PHD  Assistant Professor of Radiology
YVETTE I SHELINE, MD  Associate Professor of Radiology
JOSHUA S SHIMONY, MD, PHD  Assistant Professor of Radiology
GREGORIO A SICARD, MD  Professor of Radiology
BARRY ALAN SIEGEL, MD  Professor of Radiology
CARY LYNN SIEGEL, MD  Associate Professor of Radiology
The Department of Surgery includes the Divisions of General Surgery, Cardiothoracic Surgery, Pediatric Surgery, Plastic Surgery and Urologic Surgery. The formal instruction begins in the third year. For the duration of the 12-week rotation in Surgery, students are assigned clinical rotations, both within the Department of Surgery and in other departments at the School of Medicine, in which they have the opportunity to participate in the care of surgical patients. Students attend daily patient rounds and outpatient clinics as well as scheduled and emergency surgical procedures. Seminars and teaching conferences are scheduled on a regular basis. In the fourth year, students may select a subinternship elective offered through the various services within the Division of General Surgery. In addition, within the Department of Surgery, electives are available in pediatric surgery, transplant surgery, vascular surgery, cardiovascular and thoracic surgery, urologic surgery, and plastic and reconstructive surgery.

Courses

Third Year

M95 790 INTEGRATED SURGICAL DISCIPLINES CLERKSHIP
During the 12-week surgery clerkship, students are assigned to three separate rotations. Each student is assigned to a required general surgery rotation at Barnes-Jewish Hospital, Christian Northeast Hospital, or the Veterans Administration Medical Center. In addition, each student selects elective rotations in other general surgical fields, surgical subspecialties and related disciplines of critical care. The student is an active participant in the daily care of patients on each service and attends the service teaching conferences and rounds. For the duration of the 12-week rotation, there are weekly small-group tutorial sessions with faculty members and a biweekly lecture series.

Fourth Year

There is ample opportunity for fourth-year students to participate in elective rotations within each Division of the Department of Surgery. Many of the fourth-year surgery electives are structured to allow the student to participate as a “sub-intern,” facilitating experiences in preoperative,
intraoperative and postoperative patient management. Generally, the minimum duration of a fourth-year elective rotation in the Department of Surgery is four weeks. Research electives are also available.

**Electives**

**M95 863  ACTING INTERNSHIP, SURGICAL ONCOLOGY AND ENDOCRINE SURGERY**
Instructor(s): Timothy Eberlein, M.D.; Jeffrey Moley, M.D.; Rebecca Aft, M.D.; Bruce Hall, M.D.; L. Michael Brunt, M.D.; Jill Dietz, M.D.; and Terry Lairmore, M.D.
Location: 3rd Floor Kingshighway Bldg.

Elective Contact: Jackie Fleming, 362-8029
Other Information: This is NOT a “preceptor” elective. However, students may elect to make prior arrangements to work more closely with a specific attending (based on availability). Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

This subinternship elective is designed to give students in-depth experience in the clinical management of patients on the Endocrine and Surgical Oncology Service (Unit I Service). Students will serve as clerks and will be responsible for patient management with housestaff under the guidance of the chief resident and attending surgeons. Clinical exposure is focused on thyroid, parathyroid and adrenal surgery, as well as breast oncology, GI oncology, melanoma and soft-tissue sarcomas. The course will offer opportunities for students to gain experience in preoperative, intraoperative, and postoperative patient management. There will be opportunity for students to evaluate patients, decide on a diagnostic and management strategy and provide care under housestaff and faculty guidance, as well as ample opportunity to attend and participate in conferences. Note: If a student desires to work more closely with a “specific attending”, he/she must make special arrangements with the faculty member prior to beginning this elective. If you have any questions regarding this notice, please call Jackie Fleming in the Surgical Education Office (362-8029).

Student time distribution: Inpatient 75%, Outpatient 15%, Conferences/ Lectures 10%; Primary Care 100%
Major teaching responsibility: Attending, chief resident, and junior residents
Patients seen/weekly: 20-40 (varies)
On call/weekend responsibility: Every third or fourth night with a resident who will directly supervise

**M95 879  ACTING INTERNSHIP, HEPATOBILIARY PANCREATIC SURGERY**
Instructor(s): Steven Strasberg, M.D. and David Linehan, M.D., 362-7147
Location: 17308 West Pavilion
Elective Contact: Jackie Fleming, 362-8029
Other Information: This is NOT a “preceptor” elective. However, students may elect to make prior arrangements to work more closely with a specific attending on this service (based on availability). Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

This subinternship elective is designed to give students in-depth experience in the clinical management of patients on the Hepatobiliary/Pancreatic (Unit II) Service. The Unit II Service is a busy upper gastrointestinal service with a focus on hepatobiliary and pancreatic diseases and their treatment. The course will offer opportunities for students to gain experience in preoperative, intraoperative and postoperative, patient management. Students will serve as clerks and will be responsible for patient management with housestaff under the guidance of the chief resident and attending surgeons. There will be opportunity for students to evaluate patients, decide on a diagnostic and management strategy and provide care under housestaff and faculty guidance, as well as ample opportunity to attend and participate in conferences. Note: If a student desires to work more closely with a “specific attending”, he/she must make special arrangements with the faculty member prior to beginning this elective. If you have any questions regarding this notice, please call Jackie Fleming in the Surgical Education Office (362-8029).

Student time distribution: Inpatient 75%, Outpatient 15%, Conferences/ Lectures 10%; Primary Care 100%
Major teaching responsibility: Attending, chief resident, and junior residents
Patients seen/weekly: Varies
On call/weekend responsibility: Every third or fourth night with a resident who will directly supervise

M95 814  ACTING INTERNSHIP, TRAUMA SERVICE
Instructor(s): Timothy G. Buchman, Ph.D., M.D.; Bradley Freeman, M.D.; Douglas Schuerer, M.D.; and Robb Whinney, O.D.
Location: 6104 Queeny Tower
Elective Contact: Vicki Amelung, 362-9347
Other Information: This is NOT a “preceptor” elective. However, students may elect to make prior arrangements to work more closely with particular attendings on this service (based on availability).
Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

The student on this elective will function as a subintern on the Trauma and Emergency Service within the Section of Burns, Trauma, and Surgical Critical Care. Student involvement in all aspects of clinical surgery is accomplished by student attendance in the outpatient office, preoperative patient evaluation, in-hospital patient management and postoperative outpatient follow-up after discharge. Practical experience will focus on the initial evaluation and resuscitation of traumatized patients and other emergency care patients. The student will also participate in regular rounds, conferences, and in-house call. Note: If a student desires to work more closely with a “specific attending”, he/she must make special arrangements with the faculty member prior to beginning this elective. If you have any questions regarding this notice, please call Jackie Fleming in the Surgical Education Office (362-8029).

Student time distribution: Inpatient 80%, Outpatient 10%, Conferences/ Lectures 10%; Primary Care 20%, Subspecialty Care 80%
Major teaching responsibility: Attendings, residents and fellows
Patients seen/weekly: 30
On call/weekend responsibility: Yes

M95 893  ACTING INTERNSHIP, MINIMALLY INVASIVE SURGERY
Instructor(s): L. Michael Brunt, M.D., and Brent Matthews, M.D., 454-7194
Location: Room 3503 Kingshighway Building, Barnes-Jewish Hospital, North Campus
Elective Contact: Student should contact Dr. Brunt at 454-7194 prior to the first day of the elective
Other Information: This is NOT a “preceptor” elective. However, students may elect to make prior arrangements to work more closely with Dr. Brunt on this elective (based on availability). Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

This subinternship elective in minimally invasive surgery is offered by L. Michael Brunt, M.D., a member of the Endocrine and Oncologic Surgery Section of the General Surgery Division. Surgeons in the Minimally Invasive Surgery group regularly perform the following procedures laparoscopically: cholecystectomy, splenectomy, adrenalectomy, gastric fundoplication, inguinal hernia repair, and gastric bypass for morbid obesity. The medical student electing this rotation will participate in the outpatient office and direct patient care, assist and observe in a wide range of laparoscopic procedures and participate in teaching rounds and conferences. During this rotation, the student may also have the opportunity to observe and participate in minimally invasive surgical procedures performed by various surgeons within the Division of General Surgery. Additionally, the student may also elect to participate in the laboratory of the Washington University Institute for Minimally Invasive Surgery one or two days per week. Notice: If a student desires to work more closely with a “specific attending”, he/she must make special arrangements with the faculty member prior to beginning this elective. If you have any questions regarding this notice, please call Jackie Fleming in the Surgical Education Office (362-8029).

Student time distribution: Inpatient 60%, Outpatient 30%, Conferences/ Lectures 10%; Subspecialty Care 100%
Major teaching responsibility: Attending and residents
Patients seen/weekly: ~25 (varies)
On call/weekend responsibility: None

M95 871  ACTING INTERNSHIP, VASCULAR SURGERY
Instructor(s): Gregorio Sicard, M.D.; Brian Rubin, M.D.; M. Wayne Flye, M.D.; Eric Choi, M.D.; Patrick Geraghty, M.D.; and Luis Sanchez, M.D., 362-7841
Location: 5103 Queeny Tower
Elective Contact: Students should contact Debbie Swap in Dr. Sicard's office prior to the start of this rotation at 362-7841
Other Information: This is NOT a “preceptor” elective. However, students may elect to make prior arrangements to work more closely with Dr. Sicard (362-7841) or other attendings on this service (based on availability). Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

This subinternship elective is designed to give students in-depth experience in the clinical management of patients on the Vascular Surgery Service. The elective will offer opportunities for students to gain experience in preoperative, intraoperative and postoperative, management of patients with surgically treated vascular diseases/conditions. Students will serve as clerks and will be responsible for patient management with housestaff under the guidance of the chief resident and attending surgeons. There will be opportunity for students to evaluate patients, decide on a diagnostic and management strategy and provide care under housestaff and faculty guidance, as well as ample opportunity to attend and participate in conferences. Notice: If a student desires to work more closely with a “specific attending”, he/she must make special arrangements with the faculty member prior to beginning this elective. If you have any questions regarding this notice, please call Jackie Fleming in the Surgical Education Office (362-8029).
Student time distribution: Inpatient 70%, Outpatient 20%, Conferences/ Lectures 10%; Primary Care 10%, Subspecialty Care 90%
Major teaching responsibility: Attending, fellows, chief resident, and junior residents
Patients seen/weekly: 100+ (varies)
On call/weekend responsibility: Student’s option

M95 862  ACTING INTERNSHIP, COLON AND RECTAL SURGERY
Instructor(s): James W. Fleshman, M.D.; Elisa Birnbaum, M.D.; David Dietz, M.D.; Matthew Mutch, M.D.; and Jennifer Lowney, M.D.
Location: 14102 Queeny Tower, South Campus
Elective Contact: Liz Nordike, 454-7183
Other Information: This is NOT a “preceptor” elective. However, students may elect to make prior arrangements to work more closely with a specific attending on this elective (based on availability). Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

This subinternship elective is designed to give students in-depth experience in the clinical management of patients on the Colorectal Surgery Service. Students work closely with the attendings within the Section of Colon and Rectal Surgery, and clinical exposure is focused on a wide range of benign and malignant colorectal diseases. There is exposure to radiation oncology and the specialized areas of nursing related to care of patients with colorectal cancer and inflammatory bowel disease. The course will offer opportunities for students to gain experience in preoperative, intraoperative and postoperative, patient management under housestaff and faculty guidance, as well as ample opportunity to attend and participate in conferences. Notice: If a student desires to work more closely with a “specific attending”, he/she must make special arrangements with the Colorectal Surgery Office prior to beginning this elective.
Student time distribution: Inpatient 75%, Outpatient 20%, Conferences/ Lectures 5%; Subspecialty Care 100%
Major teaching responsibility: James W. Fleshman, M.D., David Dietz, M.D., and colorectal fellows
Patients seen/weekly: 25-50
On call/weekend responsibility: Every fifth night or negotiable

M95 891 ORGAN TRANSPLANTATION
Instructor(s): Surendra Shenoy, M.D., Ph.D.; Martin Jendrisak, M.D., 362-5701; William Chapman, M.D. 362-7792; Niraj Desai, M.D., 747-1393; and Jeffrey Lowell, M.D., 362-2820
Location: Barnes-Jewish Hospital
Elective Contact: Dr. Shenoy's secretary (362-4338)
Other Information: Student should contact instructor if interested in scheduling elective. Enrollment limit per period: 2
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

The care of transplant patients requires the integration of multiple diverse medical and surgical disciplines. This elective clerkship in organ transplantation encompasses the preoperative evaluation and management of adult and pediatric recipients of liver, kidney and pancreas. Students participate in procurement of allografts from cadaveric or living donors, organ preservation and transplantation. Emphasis is also placed on postoperative care, multimodality immunosuppression and management of allograft rejection. Basic hepatic and renal physiology, fluid and electrolyte balance, and transplantation immunology are stressed. Rotation provides an elaborate exposure to different facets of management of end stage renal and liver disease. Management of the complications of diabetes, hypertension, portal hypertension and infectious problems are an integral part of pre and post transplant care. This course is designed to offer the student an overview of the field of organ transplantation. The student functions as a member of the transplant team and assumes appropriate responsibilities under supervision.

Student time distribution: Inpatient 80%, Outpatient 10%, Conferences/ Lectures 10%; Subspecialty Care 100%
Major teaching responsibility: Full attending and resident staff
Patients seen/weekly: 40
On call/weekend responsibility: Yes

M95 820 CARDIOTHORACIC SURGERY
Location: 3106 Queeny Tower
Elective Contact: Jennifer Lawton, M.D. (Secretary, Beverly Wolff, 362-2821)
Other Information: Students should contact Beverly Wolff at 362-2821 prior to the first day of elective. Students should report to 3106 Queeny Tower, 8:30 a.m. first day of elective. Enrollment limit per period: 3
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

The senior elective in cardiothoracic surgery is a four-week clinical rotation with two week blocks divided between adult cardiac, pediatric cardiac, and general thoracic surgery according to the student’s preference. Students will participate in morning work rounds, attend the operative procedures of their choice, and attend weekly conferences and teaching rounds. Students will be introduced not only to the surgical procedures but also to the postoperative care of the surgical patients.

On the pediatric and adult cardiac services, students will be introduced to the principles of cardiopulmonary bypass, ventricular assist devices, cardiac transplantation, coronary artery bypass surgery (on and off pump), valve repair and replacement, complex aortic surgery, the MAZE procedures and others.

On the adult cardiac surgery service, students will function as subinterns under the direct supervision of a faculty member.

On the thoracic surgical rotation students will have the opportunity of performing bronchoscopy, esophagoscopy, gastroscopy, and participate in surgical resections of lung cancer and esophageal cancer, as well as surgery for emphysema and for benign esophageal conditions. Students will also
participate in lung transplantation surgery.
Student time distribution: Inpatient 80%, Outpatient 10%, Conferences/ Lectures 10%; Subspecialty Care 100%
Major teaching responsibility: Attendings and residents
Patients seen/weekly: 20
On call/weekend responsibility: One in three, no weekend call

M95 830 PLASTIC RECONSTRUCTIVE SURGERY
Instructor(s): Thomas Tung, M.D., 362-4588
Location: 5401 Kingshighway Bldg.
Elective Contact: Thomas Tung, M.D., 362-4588
Other Information: Students should meet in 5401 Kingshighway Bldg., 8:30 a.m. first day of elective.
Enrollment limit per period: 2
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

The period on plastic surgery may either be spent as a clinical clerkship or conducting a basic laboratory project. The purpose of the clinical clerkship is to familiarize the student with the basic principles of tissue repair and reconstruction. The student will have successive assignments to each of the attending staff and the ward resident during the four weeks. This will expose the student to the breadth and depth of plastic surgery. Alternatively, if the student has identified a focus of interest, the student may participate on those services of special interest, such as hand or pediatric plastic surgery. The student will assume an active role on the plastic surgery service and will participate in the total management of a wide variety of surgical problems including congenital anomalies, microvascular surgery, surgery of the upper extremity, peripheral nerve surgery, cosmetic surgery and general reconstructive plastic surgery.
Student time distribution: Inpatient 70%, Outpatient 20%, Conferences/ Lectures 10%; Subspecialty Care 100%
Major teaching responsibility: Attendings and residents
Patients seen/weekly: 12
On call/weekend responsibility: Recommended

M95 831 PLASTIC SURGERY AMBULATORY CARE
Instructor(s): Thomas Tung, M.D., 362-4588
Location: 5401 Kingshighway Bldg.
Elective Contact: Thomas Tung, M.D., 362-4588
Other Information: Students should meet in 5401 Kingshighway Bldg., 8:30 a.m. first day of elective.
Enrollment limit per period: 1
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

The period on plastic surgery ambulatory care will focus on outpatient management of hand fractures, nerve injuries, facial traumas, wound healing/repair, pediatric injury, skin lesions and general outpatient plastic surgery. This rotation will focus on teaching basic suturing, radiology related duties, casting and splinting.
Student time distribution: Outpatient 90%, Conferences/Lectures 10%; Subspecialty Care 100%
Major teaching responsibility: Attendings and residents
Patients seen/weekly: 150
On call/weekend responsibility: Recommended

M95 850 UROLOGY
Instructor(s): Gerald Andriole, M.D., 362-8212
Location: Wohl Hospital
Elective Contact: Sally Wahlbrink, 362-8212
Other Information: Students should contact Dr. Andriole’s office at 362-8212 prior to first day for room assignment. Enrollment limit per period: Minimum 2
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

A four-week clinical clerkship in pediatric and/or adult urology will offer the interested student experience with a spectrum of problems in clinical urology. The student will learn the basic diagnostic procedures and management of surgical and non-surgical aspects of patient care on the private and ward services under the supervision of the attending staff and house staff. Clinical conferences are held four days per week.

Student time distribution: Inpatient 80%, Outpatient 10%, Conferences/ Lectures 10%; Subspecialty Care 100%

Major teaching responsibility: Several attendings, chief resident and resident staff

Patients seen/weekly: >20

On call/weekend responsibility: None

M95 880  PEDIATRIC SURGERY
Instructor(s): Robert Foglia, M.D., 454-6022
Location: SS60 St. Louis Children’s Hospital
Elective Contact: Linda Brockman, 454-6022
Other Information: Students should report at 8:30 a.m. on the first day of the rotation. Call Dr. Foglia’s office for location. Enrollment limit per period: 1

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

The student will fully participate as a subintern in all aspects of pediatric surgical patient care, including preoperative evaluation, surgery and postoperative care. Twice-daily rounds are made with the resident staff and daily rounds with the attending staff. Participation in general surgery pediatric clinic and emergency room care. Conferences include mortality and morbidity, radiology, pathology, trauma, case presentations and basic science, as well as daily contact with pediatric radiology, are expected. Students are encouraged to undertake clinical investigations if they have an interest.

Student time distribution: Inpatient 60%, Outpatient 30%, Conferences/ Lectures 10%; Subspecialty Care 100%

Major teaching responsibility: Attendings

Patients seen/weekly: 35

On call/weekend responsibility: Optional

M95 807  SURGERY CLERKSHIP, GENERAL SURGERY - KEOKUK AREA HOSPITAL (Rural Practice)
Instructor(s): Philip Caropreso, M.D., (319) 526-6365
Location: Keokuk Area Hospital
Elective Contact: Philip Caropreso, M.D., (319) 526-6365
Other Information: Students report to Dr. Caropreso’s office, Surgical Specialists of Keokuk, 1425 Morgan St., Keokuk, Iowa, 9:00 a.m. first day of elective. Enrollment limit per period: 2

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

Students work under the supervision of two general surgeons involved in a rural practice at the Keokuk Area Hospital, Keokuk, Iowa. Students function under a preceptorship arrangement and are involved in the diagnosis and management of a large variety of patients with general surgery conditions. Patients are followed from their initial office visit through outpatient diagnostic procedures and on to hospital admission for operation. Students assist or participate in surgery as first assistants, perform some minor surgeries under supervision, and have frequent opportunities to gain experience in a variety of endoscopic procedures. Students are an integral part of the practice of the two general surgeons. Housing is provided across the street from the hospital and food maintenance covered by the hospital. Keokuk is located approximately 3.5 hours north of St. Louis and is accessible by car.

Student time distribution: Inpatient 50%, Outpatient 50%; Subspecialty Care (General Surgery) 100%

Major teaching responsibility: Attending surgeons in general surgical partnership

Patients seen/weekly: 30-40

On call/weekend responsibility: On call weekdays/weekend optional
M10 820 CRITICAL CARE
Instructor(s): Timothy G. Buchman, Ph.D., M.D., 362-9347; Walter Boyle, M.D.; J. Perren Cobb, M.D.; Craig Coopersmith, M.D.; Alex Evers, M.D.; Eric Jacobsohn, M.D.; Laureen Hill, M.D.; Richard Hotchkiss, M.D.; George Tseng, M.D.; Omokhaye Higo, M.D.; John Mazuski, M.D.; and Doug Schuerer, M.D.

Location: Barnes-Jewish Hospital, South Campus
Elective Contact: Vicki Amelung, 362-9347
Other Information: Students should meet in Surgical Intensive Care Unit, 7:00 a.m. first day of elective. Enrollment limit per period: 4
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37, and 41.

This clinical elective is designated to familiarize the student with the management of the critically ill patient. The setting is the 8400 Surgical Intensive Care Unit at Barnes-Jewish Hospital. The student will receive individualized training in critical care management including stabilization of the critically ill or injured patient, cardiovascular assessment and invasive hemodynamic monitoring, management of the airway and mechanical ventilator support, and other aggressive support as needed. The student will function as an integral member of the surgical intensive care unit team, which consists of physicians with specialty training in critical care, critical care fellows, house staff from surgery, anesthesiology, and other specialties, pharmacists, and nutrition experts. The student will actively participate in daily rounds with members of the team and will be actively involved in the management of critically ill patients from all the surgical specialties except cardiothoracic and neurosurgery. Practical experience will be gained in placement and interpretation of invasive and non-invasive cardiovascular monitors, the recognition and treatment of shock syndromes including trauma and burns, airway management and the use of mechanical ventilation, the diagnosis and treatment of renal insufficiency, management and treatment of infectious problems including septic shock, management of fluids and electrolytes, and nutrition.

Student time distribution: Inpatient 80%, Conferences/Lectures 20%; Subspecialty Care 100%
Major teaching responsibility: Attendings
Patients seen/weekly: 50
On call/weekend responsibility: Variable

Research

(M95 900)

L. Michael Brunt, M.D., Room 3503 Kingshighway Building, Barnes-Jewish Hospital, North Campus, 454-7194. Minimally invasive surgery, including endocrine applications. Minimum rotation length: four weeks. Under the auspices of the Washington University Institute for Minimally Invasive Surgery (WUIMIS), a number of surgeons are investigating the physiologic consequences of laparoscopic surgery and new applications for procedures and technologies. Dr. Brunt is currently investigating clinical outcomes of various laparoscopic surgical procedures evaluating new biomechanical tissue prosthesies for use in laparoscopic hiatal hernia surgery.

David W. Dietz, M.D., 14th Floor Queeny Tower, Barnes-Jewish Hospital, 454-7179. Clinical research in colorectal cancer and inflammatory bowel disease. Minimum rotation length: one month. Ongoing projects are focused on predictors of response to neoadjuvant therapy in rectal cancer. Currently, 60Cu-ATSM PET scanning is being evaluated as a measure of tumor hypoxia and response to neoadjuvant chemoradiation. Potential also exists for the evaluation of molecular and genetic markers in this context through collaboration with the laboratory of Howard McLeod, PharmD. A number of clinical projects are also available utilizing the colorectal cancer and Crohn’s disease databases maintained in the section. The student will work under the direct supervision of Dr. David Dietz and other members of the Section of Colon and Rectal Surgery.

Susan E. Mackinnon, M.D., 660 S. Euclid, Box 8238, 362-4586. Peripheral nerve surgical research. Our laboratory investigates nerve injury and regeneration including nerve transplantation. The student will be encouraged to design and complete his/her own research study during the elective.
Minimum rotation length: six weeks. The research rotation can be conducted in the plastic surgery laboratories under the direction of Drs. Kane, Lowe, Tung, Hussussian, or Mackinnon. A project will be designed with the student prior to his/her rotation on plastic surgery so that all the materials and methods will be available at the beginning of the rotation. Ongoing projects include: 1) nerve repair and regeneration; 2) the effects of growth factors on wound healing; 3) in vivo tissue generation and tissue differentiation; 4) the mechanical, structural and biochemical effects of stress on scar tissue maturation; 5) in vivo anatomy of craniofacial deformities; and 6) outcome analysis of methods of cleft lip and palate management.

Faculty

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Alvin J. Siteman Cancer Center

Introduction

The Alvin J. Siteman Cancer Center at Barnes-Jewish Hospital and Washington University School of Medicine is designated by the National Cancer Institute as a Comprehensive Cancer Center, the only such center in Missouri and for a 240-mile radius. Siteman is world renowned for its basic science, translational, and prevention and control research. Siteman enhances and promotes interactions among the cancer research efforts throughout the campus and has provided an organizational focus and stimulus for researchers to continue to produce high quality institutional research. The Center holds more than $125 million in extramural funding for cancer research and is organized into eight research programs (Cancer Genetics, Cancer and Developmental Biology, Tumor Immunology, Hematopoietic Development and Malignancy, Cellular Proliferation, Oncologic Imaging, Prevention and Control, and Translational and Clinical Research). Siteman also provides 14 shared resource facilities to its more than 240 research members. Shared resource facilities include: Bioinformatics Core, Biostatistics Core, Clinical Trials Core, Embryonic Stem Cell Core, Hereditary Cancer Core, High Speed Cell Sorter Core, Molecular Core Laboratory, Multiplexed Gene Analysis Core, Pharmacology Core, Proteomics Core, Small Animal Cancer Imaging Core, Health Behavior and Outreach Core, Good Manufacturing Practice Facility, and Tissue Procurement Core.

Siteman’s Program for the Elimination of Cancer Disparities (PECaD) partners with the St. Louis community and collaborators from across the country, utilizing education and screening strategies to reduce differences in access to cancer diagnosis, care, and prevention based on race, ethnicity, socioeconomic, or other status.

The Siteman Cancer Center provides numerous opportunities in cancer research education and training through seminars, conferences, courses and research opportunities. Individuals are encouraged to contact Siteman at (800) 600-3606 or via the web site www.siteman.wustl.edu for more information. A few educational opportunities are listed below.

Siteman Basic Science Seminar Series

Siteman sponsors a campus-wide seminar series for basic cancer biology topics on the first Thursday of each month at 3 p.m. at the Eric P. Newman Education Center. Speaker information can be found on the Siteman web site at www.siteman.wustl.edu. Attendance is open.

Research Program Specific Activities

All of the Siteman Cancer Center research programs have regular internal seminars or work-in-progress discussion groups, and these frequently involve students and postdocs.

- The Cancer Genetics Program has a seminar on the second Tuesday of each month; a new discussion group around new gene discovery is planned. Contact Paul J. Goodfellow, Ph.D., for more information.
- The Cancer and Developmental Biology Program runs a biweekly laboratory research presentation seminar, which meets at 9 a.m. on Tuesdays. Contact David M. Ornitz, M.D., Ph.D., for more information.
- The Tumor Immunology Program utilizes the long-standing Immunology Seminar Series sponsored by the Department of Pathology and Immunology at 4 p.m. on Mondays in the Eric P. Newman Education Center. There are also dedicated sessions allotted to the topics of Tumor Immunology. Contact Robert D. Schreiber, Ph.D., for more information.
- The Hematopoietic Development and Malignancy Program convenes a weekly journal club to review primary and published data. About three-fourths of the presentations are in a journal club format, with the remainder from participating laboratories. Current literature regarding hematopoiesis and current trials in gene therapy are presented and critically reviewed. Contact Timothy J. Ley, M.D., for more information.
- The Cellular Proliferation Program sponsors a weekly seminar series entitled “Signaling/Cell Cycle.”
Each academic year, up to six speakers from outside the medical school are invited to present their current work. On weeks alternating with invited speakers, graduate students and postdoctoral research fellows working in the laboratories of our members present their research. Contact Helen M. Piwnica-Worms, Ph.D., for more information.

- The Marilyn Fixman Clinical Cancer Conference is held on the third Wednesday of each month in the Steinberg Amphitheater on the Barnes-Jewish Hospital north campus. Speakers at this conference present a disease-based clinical topic at each session. Contact the Siteman administration office at (314) 454-8439 for the schedule.
- The Prevention and Control Program has multiple regular research group meetings in nicotine dependence and smoking cessation, early detection, cancer communication and intervention research and psychosocial factors. Contact Edwin B. Fisher, Ph.D., for more information.
- There are more than 15 weekly/biweekly disease-based clinical conferences, and these can be found on the Siteman web site.

**Cancer Biology Special Emphasis Pathway**

The Siteman Cancer Center launched a special emphasis pathway as part of the Division of Biology and Biomedical Sciences graduate program in 2002. Siteman sponsors 12 total (new and continuing) students per year to participate in the program, which focuses on multi-disciplinary cancer biology research. The pathway includes participation in a cancer biology course each spring (two different courses alternating each year), the Siteman basic science seminar series, work-in-progress inter-lab meetings, and journal clubs with at least one of the five Siteman basic research programs. For more information on this new program contact Lee Ratner, M.D., Ph.D.

**Link to Website**

http://www.siteman.wustl.edu/

**Faculty**

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Stuart S Sagel, Professor of Radiology, Division of Diagnostic Radiology, Washington University School of Medicine

Linda J Sandell, Professor and Director of Research, Department of Orthopaedic Surgery, Washington University School of Medicine

Mark S Sands, Associate Professor of Medicine, Division of Oncology, Washington University School of Medicine

Scott Saunders, Assistant Professor of Pediatrics and Molecular Biology & Pharmacology, Washington University School of Medicine

Kenneth B Schechtman, Associate Professor of Biostatistics, Washington University School of Medicine

Tim B Schedl, Associate Professor of Genetics, Washington University School of Medicine

Maria E Schmidt, Assistant Professor of Radiology, Division of Diagnostic Radiology, Section of Breast Imaging, Washington University School of Medicine

Steven B Scholnick, Associate Professor of Otolaryngology, Division of Head and Neck Surgical Oncology, Washington University School of Medicine

Mario Schootman, Assistant Professor of Medicine, Division of Health Behavior Research, Washington University School of Medicine

Alan L Schwartz, Harriet B. Spoehrer Professor and Chairman of Pediatric, Washington University School of Medicine

Robert D Sengelmann, Assistant Professor of Medicine, Division of Dermatology, Washington University School of Medicine, Director, Cutaneous (Mohs’) Surgery, Barnes Jewish Hospital

Robert M Senior, Dorothy R. and Hubert C. Moog Professor in Pulmonary Medicine, Division of Pulmonary and Critical Care Medicine, Washington University School of Medicine

Donald G Sessions

William D Shannon, Assistant Professor of Biostatistics, Department of Medicine, Division of General Medical Sciences, Washington University School of Medicine, Assistant Professor, Division of Biostatistics, Washington University School of Medicine

Andrey S Shaw, Professor of Pathology and Immunology, Center for Immunology, Washington University School of Medicine

Shalini Shenoy, Assistant Professor of Pediatrics, Division Hematology/Oncology, Washington University School of Medicine

Cary L Siegel, Assistant Professor of Radiology, Director, Genitourinary Radiology, Mallinckrodt Institute of Radiology, Washington University School of Medicine

Marilyn J Siegel, Professor of Pediatrics and Professor of Radiology, Division of Diagnostic Radiology, Washington University School of Medicine

Theodore C Simon, Assistant Professor of Pediatrics and Assistant Professor of Molecular Biology and Pharmacology, Washington University School of Medicine

Joseph R Simpson, Associate Professor of Radiation Oncology, Washington University School of Medicine

Erik J Sirevaag, Instructor of Psychology in Psychiatry, Washington University School of Medicine
James B Skeath  Assistant Professor of Genetics, Washington University School of Medicine
Barry P Sleckman  Assistant Professor of Pathology and Immunology, Washington University School of Medicine
Sheng-Kwei "Victor" Song
J. Gershon Spector  Professor of Otolaryngology, Division of Head and Neck Surgical Oncology, Washington University School of Medicine
Philip D Stahl  Edward C. Mallinckrodt Jr. Professor and Head of Cell Biology & Physiology, Washington University Medical School
Thaddeus S. Stappenbeck  Assistant Professor of Pathology and Immunology, Division of Immunology and Molecular Pathology, Washington University School of Medicine
William F Stenson  Professor of Medicine, Division of Gastroenterology, Washington University School of Medicine
Sheila A Stewart  Assistant Professor of Cell Biology and Physiology, Washington University School of Medicine
Steven M Strasberg  Pruett Professor of Surgery, Division of General Surgery, Section of Hepatobiliary, Pancreatic and Gastrointestinal Surgery, Washington University School of Medicine, Head, Section of Hepatobiliary, Pancreatic and Gastrointestinal Surgery, Washington University School of Medicine
Brian K Suarez  Professor of Psychiatry, Washington University School of Medicine
Walton Sumner II  Associate Professor of Medicine, Division of General Medical Sciences, Washington University School of Medicine
John B Sunwoo  Assistant Professor of Otolaryngology, Washington University School of Medicine
Rama Suresh  Instructor of Medicine, Division of Oncology, Section of Medical Oncology, Washington University School of Medicine
Robert A Swarm  Associate Professor of Anesthesiology and Chief of the Division of Pain Management, Washington University School of Medicine, Director, Pain Management Center, Barnes-Jewish Hospital, Washington University School of Medicine
Wojciech A Swat  Assistant Professor of Pathology and Immunology, Washington University School of Medicine
Susan C Sylvia  Instructor of Psychology, St. Louis Children's Hospital
Paul H Taghert  Professor of Anatomy and Neurobiology, Washington University School of Medicine
Benjamin R Tan  Assistant Professor of Medicine, Division of Oncology, Washington University School of Medicine
John-Stephen A Taylor  Professor of Chemistry, Washington University School of Medicine
Marie E Taylor  Instructor in Radiation Oncology, Washington University School of Medicine
Sharlene A Teefey  Associate Professor of Radiology, Washington University School of Medicine, Attending Staff, Department of Radiology Barnes-Jewish Hospital, Consulting Staff, Department of Radiology, St. Louis Children's Hospital
Steven L Teitelbaum  Wilma and Roswell Messing Professor of Pathology, Division of Anatomic Pathology, Washington University School of Medicine
Wade L Thorstad  Instructor in Radiation Oncology, Mallinckrodt Institute of Radiology, Washington University School of Medicine
Alexandre A Todorov  Research Assistant Professor of Psychiatry, Washington University School of Medicine
Michael H Tomasson  Assistant Professor of Medicine, Division of Oncology, Washington University School of Medicine
Sergey M Troyanovsky  Associate Professor of Medicine, Division of Dermatology, Washington University School of Medicine
Thomas H Tung  Assistant Professor of Surgery, Division of Plastic and Reconstructive Surgery, Washington University School of Medicine

Peter G Tuteur  Associate Professor of Medicine, Division of Pulmonary & Critical Care Medicine, Washington University School of Medicine

Emil R Unanue  Mallinckrodt Professor and Chairman of Pathology and Immunology, Washington University School of Medicine, Pathologist-in-Chief, Barnes-Jewish Hospital and Allied Hospitals

Ravindra Uppaluri  Assistant Professor of Otolaryngology, Washington University School of Medicine

Suresh Vedantham

Teresa J Vietti  Professor Emeritus of Pediatrics, Division of Hematology and Oncology, Washington University School of Medicine

Ravi Vij  Assistant Professor of Medicine, Division of Oncology, Washington University School of Medicine

Haris G. Vikis  Research Assistant Professor of Surgery, Division of General Surgery, Washington University School of Medicine

Herbert W Virgin  Professor of Pathology and Immunology, Center of Immunology, Washington University School of Medicine

Mark S Walker  Instructor of Medicine, Division of Health Behavior Research, Washington University School of Medicine

David Wang  Assistant Professor of Molecular Microbiology and of Pathology and Immunology, Washington University School of Medicine

Hanlin L Wang  Assistant Professor of Pathology and Immunology, Division of Anatomic Pathology, Washington University School of Medicine

Yian Wang  Associate Professor of Surgery, Division of General Surgery, Washington University School of Medicine

Jason D Weber  Assistant Professor of Medicine, Division of Oncology, Washington University School of Medicine

Katherine N Weilbaecher  Assistant Professor of Medicine, Division of Oncology, Washington University School of Medicine

Steven J Weintraub  Assistant Professor of Surgery, Division of Urologic Surgery, Washington University School of Medicine

Bruce R Whiting

Samuel A Wickline  Professor of Medicine, Division of Cardiovascular Diseases, Washington University School of Medicine

Kimberly N Wiele  Assistant Professor of Radiology, Division of Diagnostic Radiology, Section of Breast Imaging, Washington University School of Medicine

David B Wilson  Associate Professor of Pediatrics and Chief of the Division of Pediatric Hematology/Oncology, Washington University School of Medicine

Richard K Wilson  Associate Professor of Genetics, Washington University School of Medicine

Franz J Wippold  Associate Professor of Radiology, Mallinckrodt Institute of Radiology, Washington University School of Medicine

Karen L Wooley  Professor of Chemistry, Washington University School of Medicine

Ricardo J Wray  Assistant Professor of Community Health, School of Public Health, Saint Louis University, St.
Louis, MO

Mai Xu  Instructor of Radiology, Division of Radiation Oncology, Washington University School of Medicine

Lourdes R Ylagan  Instructor in Pathology and Immunology, Division of Surgical Pathology, Washington University School of Medicine

Wayne M Yokoyama  Professor of Medicine and Chief of the Division of Rheumatology, Washington University School of Medicine

Ming You  Professor of Surgery, Division of General Surgery, Washington University School of Medicine

Steven Zheng  Assistant Professor of Pathology and Immunology, Division Experimental Pathology Research, Washington University School of Medicine

Imran Zoberi  Instructor in Radiation Oncology, Washington University School of Medicine
Teaching and Research Divisions and Programs

Division of Biostatistics

The Division of Biostatistics is a medical school-wide facility that engages in research, biostatistical consultation, and training activities. Interested students may pursue intensive studies through courses offered by the division. In addition to the core research program of the division, its research activities include collaborative projects with various departments of the medical school. Biostatistical consultation represents an important activity of the division, providing expertise in both theoretical and applied areas. At the initiative of other departments, the division also offers additional short courses in biostatistics. The division participates actively in both pre-doctoral and post-doctoral training.

Research activities of the division span a wide range of topics dealing with a number of disorders of considerable public health importance, and provide research opportunities at both theoretical and applied levels. Several research projects involve close interaction and collaboration with a number of research groups at the Medical Center. The present core research program of the division deals with genetic epidemiology, especially as it relates to cardiovascular disease. A number of theoretical and applied problems are addressed, including: nature-nurture resolution and identification of the genetic basis of risk factor domains such as lipids, obesity, blood pressure and hypertension, and insulin resistance and diabetes; exploration of temporal trends in the degree of genetic and environmental effects; and multivariate associations among multiple risk factors. Timely theoretical issues also are addressed, such as the sampling of families through patients and statistical properties of methods of data analysis. Most recent research also emphasizes gene-gene and gene-environment interactions.

Present collaborative research projects include: a coordinating center for a multicenter family and genetic study of heart disease (FHS); a coordinating center for a multicenter study to assess the genetic basis of coronary artery calcification (SCAN); a coordinating center for a multicenter study to assess the genetic basis of response to exercise training (HERITAGE); a coordinating center for a multicenter NETWORK study on the genetics of hypertension (HyperGEN) and the Family Blood Pressure Program (FBPP); coordinating centers for two multicenter studies to assess the genetic basis of intervention through incorporation of gene-environment interactions (GOLDN and GenSalt); a coordinating center for the Consortium for Radiologic Imaging Studies for Polycystic Kidney Disease (CRISP) to determine the effectiveness of new and innovative imaging methods for monitoring and assessing the progress of PKD; a coordinating center for the Polycystic Kidney Disease Treatment Network (PKD-TN) to evaluate hypertensive medications that may be effective in slowing progression of PKD in individuals suffering from the disease; a coordinating center for a trial in ocular hypertensives (OHTS); important collaborative studies of Alzheimer's disease and cancer through support roles as the ADRC biostatistics core and the Alvin J. Siteman Cancer Center biostatistics core; studies on ischemic heart disease; several epidemiological research projects developing methods for increasing public awareness and utilization of measures that are known to decrease the likelihood of developing heart disease and for encouraging behaviors that will improve prognosis following a heart attack.

The division provides consultation in a wide range of areas including the statistical design of experiments and clinical trials, protocol development, database management, analysis of data and interpretation of results. Some of the areas of special strength and expertise include cardiovascular biostatistics, computing and statistical packages. The division is well-equipped to provide assistance at the stage of preparing grant applications, including careful discussions of study design, sample size calculations, randomization schemes, computer resources and data analysis.

The Division of Biostatistics specializes in Genetic Epidemiology and promotes pre-doctoral and
post-doctoral training in this discipline. Genetic Epidemiology is the scientific discipline that deals with an analysis of the familial distribution of traits, with a view to understanding any possible genetic basis. However, one cannot study genes except as they are expressed in people living in certain environments, and one cannot study environmental factors except as they affect people who have certain genotypes. Genetic Epidemiology is a unique interdisciplinary field that seeks to understand both the genetic and environmental factors and how they interact to produce various diseases and traits in humans. These studies are carried out in relatively large samples of participants in relevant populations, thus, the population history and dynamics often come into play. Population dynamics alter the frequency and distribution of both genetic and environmental factors, and thus, their net effect on the phenotype of interest. Some population characteristics also can be exploited for the purposes of gene discovery and mapping because the history has affected the genomic structure in a way that specific genotypes associated with disease can be identified.

Human diseases have been the focal point of genetic epidemiologic studies and recent efforts are directed toward complex disorders such as coronary heart disease, hypertension, diabetes, obesity, cancer, atopy and allergies, and neurological and psychiatric disorders, to name a few. It is commonly thought that an understanding of the genetic underpinnings of such disorders will revolutionize medicine in the 21st century enabling better preventive measures, diagnosis, prognosis, and novel treatments. Given progress in the Human Genome Project, in computing power, and in the creation of powerful statistical methods of analysis, we are poised to shepherd this revolution. It is an exciting time in science, and opportunities for careers in genetic epidemiology abound.

The Division of Biostatistics sponsors (with Departments of Genetics and Psychiatry as co-sponsors) graduate study leading to a Master of Science (M.S.) degree and to the Certificate in Genetic Epidemiology. The Division also co-sponsors with the Division of Biology and Biomedical Sciences a new Ph.D. program in Quantitative Human and Statistical Genetics, which offers an interdisciplinary approach to preparing future scientists with analytical/statistical, computational, and human genetic methods for the study of human disease. For further information on the Ph.D. program, see dbbs.wustl.edu.

Genetic Epidemiology Masters of Science (GEMS) Program (M21)
The Genetic Epidemiology Masters of Science (GEMS) training program provides an interdisciplinary educational opportunity for people who want to work at the dynamic nexus of genetics and medicine. There are growing needs for scientists with this training both in academia and industry. With the wealth of data from the Human Genome Project and the availability of powerful new computational approaches, abundant opportunities are now available to explore and characterize the interplay between genes and the environment that affect the biological processes that underlie disease.

Master of Science (M.S.) Degree
The core faculty for this multidisciplinary program come from 11 departments/divisions in the School of Medicine. The GEMS degree program is sponsored by the Division of Biostatistics and co-sponsored by the departments of Genetics and Psychiatry, and includes world-renowned scientific leaders in their respective areas. D.C. Rao, Ph.D., director of the Division of Biostatistics and the GEMS program director, is one of the founding fathers of the field. The full-time, summer-to-summer (14 month), 32 credit hour GEMS program is designed to prepare students to work at the interface of genetics, biostatistics, epidemiology and computing.

Certificate in Genetic Epidemiology
We offer a Certificate in Genetic Epidemiology, which is earned after successful completion (with a minimum of a "B" average) of four core courses (11 credit hours) that are normally offered to Master's candidates in Genetic Epidemiology. Thee Courses may be taken over one or two summers:

M21-503 Statistical Computing with SAS
M21-505 Biostatistics for Research Workers (prerequisite M21-503)
M21-515 Fundamentals of Genetic Epidemiology
M21-550 Introduction to Bioinformatics (prerequisite M21-505)

Prospective Students
Since Genetic Epidemiology is an interdisciplinary field, we expect applicants to come from a variety of backgrounds, but primarily from the quantitative or the biological sciences, and possibly at different points in their careers: undergraduates with quantitative sciences (e.g., mathematics through calculus plus one semester of statistics) and/or biological sciences (at least through Principles of Biology II: Genetics or equivalent) background; people with terminal degrees in other (related) disciplines who seek to gain expertise in genetic epidemiology; current employees of pharmaceutical and biotechnology companies seeking additional training and formal credentials in the field. All prospective students must provide evidence of basic skills in computer programming through coursework, documented experience or by passing a proficiency exam. Promising candidates who do not meet all the prerequisites will work with the Program Director to take the appropriate courses or training to rectify weaknesses.

Location

The GEMS Program is located in the Division of Biostatistics, on the third floor of Shriners (706 S. Euclid), Rooms 3307-3312.

Further Information

See our website at www.biostat.wustl.edu/gems or contact the Program Administrator (362-1052 or pa@wubios.wustl.edu) or write to:
The GEMS Program
Division of Biostatistics
Campus Box 8067
660 S. Euclid Ave.
St. Louis, MO 63110-1093
Telephone: (314) 362-1052
Fax: (314) 362-2693
www.biostat.wustl.edu/gems

Registration Instructions

Students will register with the Program Administrator in Genetic Epidemiology. Before registering, current Washington University students must obtain appropriate consent from their division. Students outside the GEMS program enrolling in individual courses must have permission of the Course Master.

Academic Calendar

The GEMS program follows the calendar of the College of Arts and Sciences.

Link to Division of Biostatistics Web Site

http://www.biostat.wustl.edu/

Courses

M21-503 Statistical Computing with SAS
Instructor: Aldi Kraja, Ph.D., 362-2498. and colleagues.
Intensive hands-on summer training in SAS (Statistical Analysis System) during six full weekdays. Students will learn how to use SAS for handling, managing, and analyzing data. Instruction is provided in the use of SAS programming language, procedures, macros, and SAS SQL. The course will include exercises using existing programs written by SAS experts. Instruction manual and computer lab will be provided. This course meets the prerequisite for M21-505 Biostatistics for Research Workers. Students are strongly recommended to participate in the workshop on "Computing/UNIX" prior to this course.
M21 505 Biostatistics for Research Workers  
Instructors: Michael A. Province, Ph.D., 362-3616; Kenneth B. Schechtman, Ph.D., 362-2271. 
Intensive two-week summer course designed for those researchers who want to expand their knowledge of practical methods in statistics. Oriented toward statistical and epidemiological concepts, applications, practical hints and hands-on approach to data, rather than theory or derivation of formulas. Heavy use is made of SAS for in-class examples and homework problems. We will cover classical methods (e.g., t-test, chi-square, correlation), multivariate methods (regression, logistic models, ANOVA, survival analysis), study design, probability and maximum likelihood. Some selected topics are then covered in greater detail. Prerequisite: M21-503 Statistical Computing with SAS or student must have practical experience with SAS. Students are strongly recommended to participate in workshops on “Computing/UNIX” and “Statistics” prior to this course. Contact the Program Administrator for details (pa@wubios.wustl.edu or telephone 362-1052). Permission of the Course Master required (362-1952). Credit: 3 units.

M21 515 Fundamentals of Genetic Epidemiology  
Instructor: Treva K. Rice, Ph.D., 362-3662 and colleagues. 
Intensive two-week summer course. Causes of phenotypic variation, familial resemblance/aggregation, heritability (family, twin and adoption designs), biometrical genetics, Hardy-Weinberg Equilibrium, major gene, segregation analysis, ascertainment, study designs, basic concepts in linkage and association analysis. (Lab practice with SEGPATH, PAP, S.A.G.E.) Students are strongly recommended to participate in workshops on “Computing/UNIX” and “Statistics” prior to this course. Contact the Program Administrator for details (pa@wubios.wustl.edu or telephone 362-1052). Permission of the Course Master required (362-1952). Credit: 3 units.

M21 5483 Human Linkage and Association Analysis  
Instructor: John P. Rice, Ph.D., 286-2572  
Meiosis, inheritance, Hardy-Weinberg Equilibrium, Linkage, segregation analysis, linkage analysis: definition, crossing over, map functions, phase, LOD scores, LINKAGE, genetic heterogeneity, penetrance, phenocopies, and liability classes, multi-point analysis, non-parametric analysis (sibpairs and pedigrees), quantitative trait analysis, determination of power for mendelian and complex trait analysis, linkage disequilibrium analyses, allelic association (case control designs and family bases studies), practical aspects of data management of genetic data, quantitative trait analysis using measured genotypes and variance components. Hands-on computer exercises will be emphasized. There will be student presentations. Prerequisite: M21-515 Fundamentals of Genetic Epidemiology. Cross-listed as L41-5483 (Genetics). Credit: 3 units.

M21 550 Introduction to Bioinformatics  
Instructors: C. Charles Gu, Ph.D., 362-3642; Gary D. Stormo, Ph.D., 747-5534  
Provide a broad exposure to the basic concepts, methodology and application of bioinformatics to solve biological problems. Specifically, the students will learn the basics of online genomic/protein databases and database mining tools, and acquire understanding of mathematical algorithms in genome sequence analysis (alignment analysis, gene finding/predicting), and of the impact of recent developments in the DNA chip technology. Prerequisite: M21 505 Biostatistics for Research Workers. Permission of the Course Master required. Credit: 3 units.

M21 599 Directed Independent Study  
Instructors: D.C. Rao, Ph.D., 362-3608; Michael Lovett, Ph.D., 747-3265  
A faculty member will work with the student in specific areas related to the student’s primary needs. Permission of the Course Master required. Credit: variable, maximum 6 units.
M21 610 Independent Research
Instructors: D.C. Rao, Ph.D., 362-3608; Michael Lovett, Ph.D., 747-3265
Student selects a faculty mentor in consultation with the instructors to undertake a supervised research project in the mentor's lab. The goal is to acquire independent research skills and to develop excellent writing and presentation abilities. A report based on the research must be written in the format of an actual scientific publication and presented to a select audience. Permission of the Course Master required. Credit: maximum 6 units.

M21 616 Epidemiology, Clinical Trials, Study Design and Management
Instructor: J. Philip Miller, A.B., 362-3617
Learn critical concepts and methods in epidemiology, including attributable risk, cohort studies, and case control studies. Learn about the design, conduct, and types of clinical trials, including methods for analysis of clinical trials. Learn study design issues, power analysis, study management issues (protocols, data entry, data flow, database management, QC), special considerations for multicenter studies, human studies, principles and issues in designing linkage and association studies, and ethical, legal, and social issues concerning human studies. Prereq: M21-505 Biostatistics for Research Workers and M21-515 Fundamentals of Genetic Epidemiology. Permission of the Course Master required (362-1052). Credit: 3 units.

M21 621 Computational Statistical Genetics
Instructors: Michael A. Province, Ph.D.,362-3616; Howard L. McLeod, Ph.D., 747-5183
This course is designed to give the students computational experience with the latest statistical genetics methods and concepts, so that they will be able to computationally implement the method(s)/model(s) developed as part of their thesis. Concentrating on the applications of genomics and SAS computing, it deals with creating efficient new bioinformatic tools to interface with some of the latest, most important genetic epidemiological analysis software, as well as how to derive, design and implement new statistical genetics models. The course also includes didactic instruction on haplotype estimation and modeling of relationship to phenotype, LD mapping, DNA pooling analysis methods, analysis approaches in pharmacogenomics (with an emphasis on possible genomic role in drug response heterogeneity), and epistasis (GxG) and GxE interactions; data mining methods, including clustering, recursive partitioning, boosting, and random forests; and fundamentals of meta-analysis, importance sampling, permutation tests and empirical p-values, as well as the design of monte-carlo simulation experiments. Prerequisite: M21-515 Fundamentals of Genetic Epidemiology. Permission of the Course Master required (362-1052). Credit: 3 units.

Link to Genetic Epidemiology Masters of Science

Faculty

DABEERU C RAO, PHD Professor of Biostatistics, Director of the Division of Biostatistics
INGRID B BORECKI, PHD Associate Professor of Biostatistics
ROBERT CULVERHOUSE, PHD Assistant Professor of Biostatistics
MICHAEL R DEBAUN, MD, MS Associate Professor of Biostatistics
SHENG FENG, PHD Research Assistant Professor of Biostatistics
Program in Medical Humanities

The Humanities Program in Medicine is a University-wide program dedicated to providing students with a broadened exposure to areas other than the biological sciences during their medical education. These areas include clinical ethics, jurisprudence, history, economics, literature and health policy. The program is directed from the dean’s office at the medical school and utilizes faculty located at the Hilltop Campus, medical school and law school, as well as extramural faculty.

The mission of the program is to generate an appreciation of the relationship of human experience, culture, institutions and values to medicine and thereby help to educate professionals who will apply that understanding to their activities as practicing physicians, biomedical researchers and/or medical administrators. This program is an enhancement of an already strong curriculum in order to prepare medical students to pursue their professional careers more effectively. It takes a major role in the Practice of Medicine course integrated over the first two years of medical school. In addition, several electives are offered during the fourth year.

Link to Website

http://pohim.wustl.edu/

Courses

M80 541 TOPICS IN MEDICINE/MEDICAL HUMANITIES
Instructors: Rebecca Dresser, J.D.; Stephen S. Lefrak, M.D., 454-7116
This is a required course given in the spring semester of the first year of medical school. This interdepartmental course is highly coordinated with Medical Humanities. Students select topics of interest for in-depth study initiated by discussions in a small-group, seminar format. Development of topics includes input from a broad range of disciplines, including sociology, philosophy, ethics, history, communications and economics, as well as the biological and medical sciences. It is offered as a menu of mini-courses, each limited to approximately 20 students. Each section consists of six two-hour sessions with a faculty member(s) devoted to an individual subject. Each student must select one course from the menu.

Other Courses

M04 582-01 ALZHEIMER’S DISEASE IN THE CLINIC AND THE LAB
Instructors: John C. Morris, M.D.; Thomas M. Meuser, Ph.D.; James E. Galvin, M.D.; Nigel J. Cairns, PhD, MRCPath; Alison M. Goate, D.Phil.; Randy Lee Buckner, Ph.D.; Eugene M. Johnson, PhD; and others. For information, contact Dr. Meuser at 286-2882 or meusert@abraxas.wustl.edu.

Alzheimer’s disease (AD) affects more than 4 million Americans today and this number will increase substantially as our population ages. The cost of caring for AD patients has been estimated at over $100 billion annually. The human toll on patients and family members can be devastating. Patients and families turn to primary care and specialist physicians (e.g., neurologists, psychiatrists, geriatricians) for answers to their plight. The good news for physicians is that research on AD is moving at a rapid pace. Exciting advances in our understanding of AD etiology, early diagnosis, and treatment are changing the landscape of dementia care.

Students in this course will be treated to a dynamic overview of the most exciting areas of AD clinical and basic science research from one of the top Alzheimer Disease Research Centers in the world. Find out how amyloid plaques and other AD-related abnormalities form in the brain and new discoveries about their possible reversal! The course includes lecture and student presentation components, as well as opportunities to observe patients and families in an active Neurology memory disorders clinic, participate in neuropathology evaluations of demented individuals, and interact with investigators from the fields of molecular genetics, cell biology and neuropathology.

M80 856 HEALTH ADMINISTRATION 1
Instructor(s): Dennis Lambert, Ph.D., 362-3266
Location: Health Administration, 4547 Clayton Ave.
Elective Contact: Dennis Lambert, Ph.D., 362-3266, lambert@wubios.wustl.edu
Other Information: Elective length can extend through several four-week periods if the student chooses to attend one of the classes offered by the Health Administration Program. Students should contact Dr. Lambert prior to the start of the elective regarding when and where to report on first day of elective

Enrollment limit per period: 10
Valid start weeks for 4-week blocks are: Weeks 13, 17, 21, 25, 29, 33, 37 and 41. Valid Start weeks for longer blocks are: Weeks 13, 17, and 29.

The U.S. health care system continues to experience dynamic changes. Socioeconomic and policy changes have resulted in a continuing evolution of new forms of health care delivery. The goal of this elective is to expose the senior medical student to the organization of the health care delivery system in the U.S. and discuss changes which have impacted the financing, organization, and delivery of health care. Students will also be exposed to the various methods insurers use for payment, and will become familiar with current organizations and operations of selected inpatient and outpatient provider organizations. The course will be conducted by faculty using a seminar approach drawing upon background textbooks, monographs, timely topical articles and current research publications to focus the weekly discussions.

By prior arrangement with the instructor, the medical student may elect to audit Health Administration
Program classes of their choice in finance, human resource management, health law, health policy, and management information systems. This will be arranged according to individual interests and schedules.
Student time distribution: Conferences/Lectures 100%
Major teaching responsibility: Faculty
Patients seen/weekly: N/A
On call/weekend responsibility: None
Graduate Programs

Division of Biology and Biomedical Sciences

The Division of Biology and Biomedical Sciences, organized in 1973, is a consortium of university departments that together provide interdisciplinary training for full-time Ph.D. students. This unique organization was formed because of the realization that research and training in modern biology transcend the limits of departmental structure. The faculty consists of members of seven preclinical departments in the School of Medicine — Anatomy and Neurobiology, Biochemistry and Molecular Biophysics, Cell Biology and Physiology, Genetics, Molecular Microbiology, Pathology and Immunology, and Molecular Biology and Pharmacology; 10 clinical departments — Anesthesiology, Medicine, Neurology and Neurological Surgery, Obstetrics and Gynecology, Ophthalmology and Visual Sciences, Otolaryngology, Pediatrics, Psychiatry, Radiology and Surgery; the Department of Biology; the Department of Chemistry and Psychology in the School of Arts and Sciences; and the Department of Computer Science and Biomedical Engineering in the School of Engineering. More than 300 faculty are affiliated with one or more of 12 broad training programs: Biochemistry, Chemical Biology, Computational Biology, Developmental Biology, Evolution Ecology and Population Biology, Immunology, Molecular Biophysics, Molecular Cell Biology, Molecular Genetics, Molecular Microbiology and Microbial Pathogenesis, Neurosciences, Plant Biology, and Quantitative Human and Statistical Genetics. Faculty in these programs take responsibility for all divisional activities, including recruiting, admissions, advising and research training. In addition, many divisional courses and seminars are offered by the participating faculty.

Currently, more than 500 graduate students are enrolled in the Division, including 150 students pursuing both the Ph.D. and the M.D. through the Medical Scientist Training Program (see Degree Programs area of Admissions and Educational Programs section.) Requirements for the Ph.D. include a series of courses tailored to a student’s background and interests, qualifying examinations, execution of laboratory research and defense of a dissertation generated through original scientific investigation. Although students enter the Division through an affiliation with one of the 12 programs, it is possible for a student to transfer to another program as interests evolve. During the first year, advisers are appointed to assist students in selecting courses and seminars, as well as to help them in choosing three laboratory rotations in which they will spend several months becoming acquainted with a particular area of scientific research. Most students choose a research adviser by the end of the first year.

Applications for admission to the Ph.D. programs of the Division are due December 1 for matriculation the following fall. Admission is based on demonstrated ability, future promise and the number of positions currently available. Applicants should have completed rigorous undergraduate training in biology, chemistry, physics, psychology, computer science, engineering or related fields at a high level of scholastic achievement. It is required that each applicant take the aptitude test of the Graduate Record Examination (GRE). The advanced GRE subject test is highly recommended. Additional information and application for admission to the Ph.D. programs may be obtained from our web site at dbbs.wustl.edu or by writing to the Director of Admissions, Washington University School of Medicine, Campus Box 8226, 660 S. Euclid Ave., St. Louis, Missouri 63110-1093 (e-mail: admissions@dbbs.wustl.edu). Students who wish to pursue both the Ph.D. and M.D. degrees must apply to the Medical Scientist Training Program (see Degree Programs area of Admissions and Educational Programs section.)

Students admitted to the graduate programs are guaranteed full stipend and tuition support contingent upon satisfactory performance. The stipend for the 2005-2006 academic year will be $22,500 annually. Tuition remission is provided to all students, and life, disability and health care also is provided by the Medical Center Student Health Service. The Division provides support for its Ph.D.
students from several sources, including federally funded training grants provided by the National Institutes of Health.

Link to Website

http://dbbs.wustl.edu

Courses

The following graduate courses are offered by the Division of Biology and Biomedical Sciences, and they are available both to Ph.D. and M.D. students who meet the prerequisites for the appropriate course. Those courses particularly relevant to a given department are cross-listed under the department in this Bulletin. Faculty members in charge of courses and their departmental affiliations are shown at the end of each course description.

L41 (Bio) 501 Human Anatomy and Development
For full description, see Department of Anatomy and Neurobiology’s M05 501A Human Anatomy and Development.

L41 (Bio) 5011 Ethics and Research Science
Instructor: Staff, Division of Biology and Biomedical Sciences, 362-3365
Exploration of ethical issues which research scientists encounter in their professional activities. Topics will include, but are not limited to: student-mentor relationships, allegations of fraud, collaborators’ rights and responsibilities, conflicts of interest, confidentiality, and publications. Case study and scenario presentations will provide focus for discussions. Prerequisite: open to graduate students engaged in research. Six 90-minute sessions. Credit: 1 unit.

L41 (Bio) 502 General Physiology
Instructor: Robert S. Wilkinson, Ph.D., 362-2300
This course applies the fundamental physiological mechanisms of cell biology to the functions of the major organ systems of the body, namely, the cardiovascular, renal, respiratory, gastrointestinal and endocrine systems. The course is intended primarily for first-year medical students. The Physiology and Microscopic Anatomy courses are closely coordinated within the same schedule. Course continues into the spring semester with a different schedule. Prerequisites: Bio 5061 or the equivalent and permission of course director. Credit: 6 units.

L41 (Bio) 5051 Foundations in Immunology
Instructor: Kenneth M. Murphy, M.D., Ph.D., 362-2009
Designed for graduate students as an in-depth introduction to immunology. Topics: antibody structure and genetics, B cell recognition, T cell receptor, major histocompatibility complex, T cell recognition, regulation of the immune response, immune mediators, humoral and cellular effector mechanisms. Discussion group will meet once a week on Thursdays from 10:00 a.m. – 12:00 p.m. Prerequisite: Introductory Biochemistry and/or Genetics helpful. Permission of instructor. This course is referenced in the Department of Pathology and Immunology. Credit: 4 units.

L41 (Bio) 5062 Central Questions in Cell Biology
Instructor: Guojun Bu, Ph.D., 286-2860
This course explores areas of cell biology under active investigation. Topics include receptor biology, protein trafficking, signal transduction pathways. Special emphasis will be on the neuronal aspects of cell biology, with examples of pathogenesis of neurological diseases. For each section, introductory lectures are accompanied by discussions of experimental techniques and evaluations of the strategies employed in recent original papers. Prerequisites: L41 (Bio) 5068, or permission of instructor. Two hours each week alternating between lectures and discussions. This is referenced in the Department of Cell Biology and Physiology. Credit: 2 units.
L41 (Bio) 5065 Cell Biology of the Stress Response
Instructor: Joseph L. Roti Roti, Ph.D., 362-9770
Both prokaryotic and eukaryotic cells have evolved strategies to cope with potentially lethal stresses. Current knowledge of these stress responses will be discussed, including the repair of damaged DNA, cell-cycle check-point pathways, scavenging free radicals, alteration of gene expression to resist further exposure to stress and the basis for genomic instability. Prerequisite: Protein Chemistry, Nucleic Acid Chemistry. Two hours lecture and one hour journal club per week, with students presenting assigned paper(s). Credit: 2 units.

L41 (Bio) 5066 Biostatistics for Research Workers
For full description, see Division of Biostatistics, M21 505.

L41 (Bio) 5067 Intro to Bioinformatics
Instructors: C. Charles Gu, Ph.D., 362-3642; Gary D. Stormo, Ph.D., 747-5534
Provide a broad exposure to the basic concepts, methodology and application of bioinformatics to solve biological problems. Specifically, the students will learn the basics of online genomic/protein databases and database mining tools, and will acquire understanding of mathematical algorithms in genome sequence analysis (alignment analysis, gene finding/predicting), gene expression microarray (genechip) analysis, and of the impact of recent developments in the protein microarray technology. Prerequisite: M21 505 Biostatistics for Research Workers. Credit: 3 units. Same as M21 GEMS 550.

L41 (Bio) 5068 Fundamentals of Molecular Cell Biology
Instructor: John A. Cooper, M.D., Ph.D., 362-3964
The goal of the course is for incoming PhD graduate students in Cell and Molecular Biology programs to learn about research and experimental strategies used to dissect molecular mechanisms that underlie cell structure and function. The course includes an emphasis on techniques of protein biochemistry. Therefore, enrolling students need to have strong backgrounds in cell biology and biochemistry. The format is two lectures and one small group discussion section per week. Each discussion section focuses on original research articles, for which the students prepare written critiques and then discuss. Three exams are given, taken home over weekends. Enrollment is restricted to graduate students in the PhD programs of the Division of Biology and Biomedical Sciences. If space permits, graduate students in other programs, medical students, and undergraduate students may enroll with explicit permission from the instructor. Prereqs: Courses in cell biology and biochemistry, comparable to L41 Biol 334 and L41 Biol 4501. Same as M15 5068 and M04 5068. Credit 4 units. Same as E62 BME 5068.

L41 (Bio) 5073 Bioorganic Chemistry Journal Club
Instructor: George W. Gokel Ph.D., 362-9297
Discussion of recent literature and research topics in Bioorganic Chemistry. Credit: 1 unit.

L41 (Bio) 5092 Molecular and Developmental Biology Journal Club
Instructors: Aaron DiAntonio, M.D., Ph.D., 362-9925; Kristen L. Kroll, Ph.D., 362-7045
This course will teach the fundamentals of organization and oral presentation of scientific information. Presentations will be of recent articles from the literature relating to modern molecular and developmental biology, as well as original research by the students. Students will be evaluated on clarity and effectiveness of presentations. Credit: 1 unit.

L41 (Bio) 5102 ISSUES OF DISABILITY IN SOCIETY
Instructor: David B. Gray, Ph.D., 286-1658
The emergence of disability as a public health concern in the United States has implications for all aspects of society. This course allows the student to explore global disability issues with an emphasis on the more personal aspects of living with a disability, including policy issues, community integration, housing, assistive technology, transportation, employment self-care, recreation, communication and health care. The course has a multidisciplinary focus and is designed for students pursuing professional careers where issues of disability must be considered and for students who want to become informed of the impact of disability on the individual and society. Credit: 3 units. Same as
L41 (Bio) 5123 Experimental Hematopoiesis Journal Club
Instructor: Daniel C. Link, M.D., 362-8771
Journal club in which papers that describe significant advances in the field of experimental hematopoiesis are discussed. Students are expected to present one paper per semester and attend the weekly (1 hour) session. No prerequisites. Credit: 1 unit.

L41 (Bio) 5125 Student-Run Cell Biology Journal Club
Instructor: Robert W. Mercer, Ph.D., 362-6924
Participants (students) present summaries of current research published in various journals in the field of cell biology. A large component of this journal club includes coaching in oral presentation. Students receive one credit for regular participation and for making one presentation. Credit: 1 unit.

L41 (Bio) 5128 Cell Biology of Extracellular Matrix Journal Club
Instructor: J. Michael Shipley, Ph.D., 454-7990
This journal club covers a broad range of topics related to extracellular matrix, including the fields of biochemistry, molecular biology, cell biology and developmental biology. Speakers give a brief background to introduce the topic and then focus on one or two papers from the current literature. Presentations are given by faculty, students and postdoctorates. Students receive one credit for regular participation and for making one presentation. Credit: 1 unit.

L41 (Bio) 5132 Cytoskeleton Discussion Group
Instructor: John A. Cooper, M.D., Ph.D., 362-3964
Weekly presentations of recent literature and research, with each participant presenting once per semester. Opportunity for students to discuss the context, implications and future directions for research. Prerequisite: L41 (Bio) 5068 or undergraduate course in cell biology. This is referenced in the Department of Cell Biology and Physiology. Credit: 1 unit.

L41 (Bio) 5137 Ion Channels Journal Club
Instructor: Colin G. Nichols, Ph.D., 362-6630
Student will attend journal club every week and participate in group discussion of recent paper. Once per semester student will choose a paper and present it to the group. Credit: 1 unit.

L41 (Bio) 5138 Journal Club for the Molecular Mechanism of Aging
Instructor: Shin-ichiro Imai, M.D., Ph.D., 362-7228
Why do we age? What causes aging? How is our life span determined? This journal club will address such fundamental but challenging questions of aging and longevity. Recent studies on aging and longevity are now unveiling regulatory mechanisms of the complex biological phenomenon. We'll cover the latest progress in this exciting field and stimulate discussions on a variety of topics including aging-related diseases. One hour of paper presentation and discussion per every two weeks. Prerequisite: Basic knowledge of molecular biology and genetics of model organisms, such as yeast, C. elegans, Drosophila and mouse. Credit: 1 unit.

L41 (Bio) 5142 Cell and Molecular Biology of Bone
Instructor: Keith A. Hruska, M.D., 286-2855
The course is designed around a core of general lectures, each supplemented by two to four student presentations, from the recent literature. Topics include, but are not limited to, bone cell ontogeny, integrin/cadherin-based signal transduction, hormonal regulation, and cell:cell communication. Prerequisite: L41 (Bio) 5068 or consent of coursemaster. Credit: 2 units.

L41 (Bio) 5171 Medical Immunology
Instructor: Andrey S. Shaw, M.D., 362-4614
An introduction to basic concepts in immunology and immunopathology. Lectures focus on antigen-antibody interactions, immunoglobulin structure and genetics, the cellular basis of the immune response and immune regulation, T cell effector mechanisms, the inflammatory response, complement, the positive and negative roles of hypersensitivity, and immune deficiency. Prerequisite: some background in biochemistry and genetics helpful. Restricted to medical students only except in
unusual circumstances, with permission of coursemaster. Offered during the first half of the second medical semester. Three-four lecture hours a week, two 2-hour lab periods, four 1-hour clinical discussion groups. Credit: variable, maximum 3 units.

L41 (Bio) 5191 Pathobiology of Human Disease States  
Instructors: Daniel C. Link, M.D., 362-8771; Hector D. Molina, M.D., 747-0339  
Three human disease states will be discussed in detail. Topics will include background clinical and epidemiological information, followed by a detailed examination of the molecular and cellular events that underlie the disease state. Examples of pertinent topics include Alzheimer's disease, AIDS, leukemia, cystic fibrosis, sickle cell anemia, diabetes, etc. Prerequisite: must be a Markey Pathway student and have HIPAA training. Credit: 2 units.

L41 (Bio) 5192 Cancer Biology Journal Club  
Instructors: Jason D. Weber, Ph.D., 747-3896  
This journal club covers current papers in molecular oncology, cancer genetics and contemporary molecular biology. Presentations will be given by students, post-docs and faculty, then discussed. Credit: 1 unit.

L41 (Bio) 5215 THURSDAY DEVELOPMENT RAVE  
Instructor: Kristen Kroll, Ph.D., 362-7045; Ross L. Cagan, Ph.D., 362-7796  
Travel the Medical School to gain hands-on experience with new techniques and approaches to developmental biology. We will emphasize a different approach in which doing goes hand-in-hand with asking. Developmental biology can be fun ... so ... no note-taking allowed; we'll give you the notes. Bring your curiosity. Food, beverages and music are all part of the mix. You will learn! Due to the nature of the class, size will be limited. Prerequisite: Graduate standing and coursemaster approval required. Credit: 2 units.

L41 (Bio) 5217 Special Topics in Microbial Pathogenesis  
Instructors: L. David Sibley, Ph.D., 362-8873; Henry V. Huang, Ph.D., 362-2755  
Primarily for graduate and MSTP students, this course involves discussion and oral presentation of current research on pathogenic micro-organisms (bacteria, viruses, parasites, and fungi) and their virulence determinants. Additionally, students will gain practice in how to design and defend research proposals. Emphasis on model systems that demonstrate the cellular and molecular basis of host-pathogen interactions. Prereq: advanced elective course "Molecular Microbiology and Pathogenesis" or permission of instructor. Class meets twice per week for 1.5 hours each. Credit 3 units.

L41 (Bio) 5235 Genetics Journal Club  
Instructors: Susan K. Dutcher, Ph.D., 362-2765; Mark Johnston, Ph.D., 362-2735  
This journal club will be focused on the Genetics Department seminar series. Students will present one or a few recent papers by the seminar speaker scheduled for that week. Students will provide a brief written evaluation (on a form that will be provided) of their peers' presentations and the faculty advisors will meet with each student after the presentation to provide feedback. Credit: 1 unit.

L41 (Bio) 5255 Experimental Skeletal Biology Journal Club  
Instructor: Steven Teitelbaum, M.D., 454-8463  
The journal club, which meets weekly, focuses on cellular and molecular biology of the skeleton. Emphasis is placed on gaining insights into normal skeletal homeostasis as well as systemic disorders of bone. Papers presented for review are selected from the most competitive journals. Participants are encouraged to "think outside of the box" and discuss novel molecular discoveries that may impact bone cell function. Credit: 1 unit.

L41 (Bio) 5261 Molecular Mechanisms of Immunological Diseases  
Instructor: Christine T.N. Pham, M.D., 362-9043  
Advanced immunology students will be exposed to human diseases that appear to have an immunological basis. In addition to lectures and evaluation of recent clinical and relevant basic immunology literature, an emphasis will be placed on direct encounters with patients and pathologic material when feasible, providing students with a human aspect to discussions of immune
pathogenesis. Diseases covered will include those with known causes such as AIDS and autoimmune disorders such as systemic lupus erythematosus and rheumatoid arthritis for which a molecular basis is not fully understood. Other areas may include asthma and tissue transplantation where effector mechanisms are better characterized. Since most of these disorders have no cure or are imperfect clinical entities, the class will discuss research areas that may be fruitful and lead to improved diagnosis and treatment. Prerequisite: Foundations of Immunology or permission of instructor and HIPAA training. Credit: 2 units.

L41 (Bio) 5262 HUMAN IMMUNOBIOLOGY
Instructor: Wayne M. Yokoyama, M.D., 362-9075
Advanced immunology students will be exposed to clinical manifestations of human diseases that have an immunological base, such as rheumatoid arthritis, systemic lupus erythematosus, juvenile rheumatoid arthritis, allergy and asthma, by interacting with physicians seeing these patients in the outpatient clinic. One credit, pass/fail. Prerequisite: Molecular Mechanisms of Immunological Diseases or consent of instructor and HIPAA training. Spring semester; schedule to be arranged. Credit: 1 unit.

L41 (Bio) 5272 Advanced Topics in Immunology
Instructors: Barry P. Sleckman, M.D., Ph.D., 747-8235; Wojciech A. Swat, Ph.D., 747-8889
This course uses a journal club format to discuss contemporary issues in the cell and molecular biology of the immune system. Discussions focus on the use of current approaches to analyze the cellular and molecular basis of immunity. Topics include mechanisms of antigenic specificity, diversity, cell communication, differentiation, activation and effector activity. Prerequisite: L41 (Bio) 5051 and permission of instructor. Credit: 2 units. This is referenced in the Department of Pathology and Immunology.

L41 (Bio) 5282 Chromatin Structure and Gene Expression
Instructor: Sarah C. R. Elgin, Ph.D., 935-5348
A special topics course covering nucleosome structure, histone modification and chromatin remodeling in gene activation, and epigenetic regulation in yeast, Drosophila, mammals and plants. One-hour review of the topic followed by a one-hour discussion of assigned current literature; emphasis on experimental design. Prerequisite: L41 (Bio) 548 Nucleic Acids and Protein Biosynthesis. Credit 2 units.

L41 (Bio) 5284 Current Research in Chromatin, Epigenetics and Nuclear Organization
Instructors: Sarah C.R. Elgin, Ph.D., 935-5348; Douglas L. Chalker, Ph.D., 935-8838
This journal club considers papers from the current literature on chromatin structure and function, with an emphasis on regulation of transcription, epigenetics and genomics. Presentations are given by students, postdocs and faculty, with discussion by all. Students enrolled for credit are expected to attend regularly, and to present a minimum of one paper during the term, with consultation and critique from the faculty. Credit 1 unit.

L41 (Bio) 5288 Special Topics in Molecular Genetics: Molecular Basis of Cancer
Instructor: Lee Ratner, M.D., Ph.D., 362-8836
A special topics course with lectures and discussion on the molecular basis of cancer with special focus on 1) cell cycle regulation and tumor suppressor proteins, 2) viral oncology including retroviruses, herpes viruses, papilloma virus, and hepatitis viruses, and 3) breast cancer including gene expression studies, hormone regulation, and metastases. Credit 2 units.

L41 (Bio) 5312 Macromolecular Interactions
Instructor: Timothy M. Lohman, Ph.D., 362-4393
This course will cover equilibria, kinetics and mechanisms of macromolecular interactions from a quantitative perspective. Thermodynamics, multiple binding equilibria (binding polynomials), linkage phenomena, cooperativity, allostery, macromolecular assembly, enzyme catalysis and mechanism, steady-state and pre-steady state kinetics, and isotope effects. Modern methods of computer analysis using non-linear least squares-fitting and simulation to analyze binding isotherms and full kinetic time courses is emphasized. Prerequisite: Physical Chemistry, Biochemistry, Calculus and Organic Chemistry. Three class hours per week. Credit: 3 units.
L41 (Bio) 5314 Molecular Biophysics Graduate Seminar
Instructor: Kathleen B. Hall, Ph.D., 362-4196
Student presentation of molecular biophysics topic. Second-year students present from literature; senior students give formal research seminar. Attendance required for all molecular biophysics students. Credit: 1 unit.

L41 (Bio) 5316 Intro to Biomolecular Statistical Thermodynamics
Instructor: Rohit V. Pappu, Ph.D., 362-2057
This course is intended to introduce concepts of statistical thermodynamics to students working or interested in areas of Molecular Biophysics, Biochemistry, Chemical and Biomolecular Engineering and Biotechnology. No prior knowledge will be assumed, although a reasonable foundation in basic calculus and statistics will be useful. The functions of biomolecular machines are intricately determined by the three-dimensional shapes that prevail in an aqueous physiological milieu. How do these shapes come about and how are these shapes used in biological function? A detailed introduction will be provided to the only appropriate framework to study biomolecular folding and binding. Topics to be covered include: an introduction to concepts in equilibrium statistical physics, concepts of polymer physics and polymer solutions that are applicable to macromolecules, and the physics and engineering principles of folding and self-assembly. A combination of statistical mechanics theory and overview of experimental data will be used to illustrate each of the above mentioned concepts. Prerequisites: L41 (Bio) 2960 or equivalent. Credit 3 units. Same as home course E72 BME 531.

L41 (Bio) 5319 Molecular Foundations of Medicine
Instructor: Linda J. Pike, Ph.D., 362-9502
This course is designed primarily for medical students and will cover fundamental aspects of biochemistry and cell biology. The course begins with a treatment of protein structure and the function of proteins in the cytoskeleton and cell motility. The principles of enzyme kinetics and regulation are then discussed and basic pathways for the synthesis and metabolism of carbohydrates and lipids are introduced. This leads into a discussion of membrane structure and the function of cellular organelles in biological processes including energy production, protein degradation and protein trafficking. Prerequisite: Coursemaster approval is required. This course is cross-listed in the Department of Biochemistry and Molecular Biophysics as M15 502 (Molecular Foundations of Medicine). Credit: 3 units.

L41 (Bio) 5325 Protein Structure and Function
Instructor: Jay W. Ponder, Ph.D., 362-4195
The first half of the course covers descriptive amino acid, peptide and protein structure; protein folding, engineering and design; and introductions to enzyme kinetics and thermodynamics protein-ligand interactions. The second half of the course focuses on biophysical methods for the determination and analysis of protein structure and function. These include sections on visible spectroscopy, nuclear magnetic resonance and crystallography. This course is required for the Programs in Biochemistry and in Molecular Biophysics. Prerequisite: undergraduate course in physical chemistry. Credit: 3 units.

L41 (Bio) 5327 Optical Spectroscopy: Theory and Applications
Instructor: Kathleen B. Hall, Ph.D., 362-4196
Spectroscopic methods to be covered include fluorescence, both ensemble and single molecule, and absorption (circular dichroism); fluorescence correlation spectroscopy will also be discussed. The quantum chemistry /physics behind these methods will be reviewed. Prereq: Consent of instructor. Credit 2 units.

L41 (Bio) 5329 Mathematical Methods for Biophysics and Biochemistry
Instructor: Nathan A. Baker, Ph.D., 362-2040
The purpose of this course is to introduce the basic concepts of mathematical physics to students in the context of problems they are likely to encounter in their coursework and research. Specifically, the course will introduce analytical and numerical mathematical methods relevant to the fields of biophysics and biochemistry. By the end of the course, the students should have a good grasp of these basic techniques, their application to biological problems, and related software and computational resources. Credit 3 units. Same as E62 BME 5329.
L41 (Bio) 5352 Developmental Biology
Instructor: Kerry Kornfeld, M.D., Ph.D., 747-1480
Analysis of a selected set of key processes in development, such as pattern formation, cell-cell signaling and morphogenesis. The focus is on molecular approaches applied to important model systems, but framed in classical concepts. Prerequisite: L41 (Bio) 5068 Fundamentals of Molecular Cell Biology and L41 (Bio) 548 Nucleic Acids and Protein Biosynthesis. Credit: 3 units.

L41 (Bio) 5384 Advanced Cell Biology
Instructors: Jean E. Schaffer, M.D., 362-8717; Daniel S. Ory, M.D., 362-8737
A lecture/discussion course for graduate and MSTP students that emphasizes current research directions in fundamental processes of cellular biology. Topics will be covered in depth over two-week blocks and will include glyobiology, membranes, extracellular proteolysis, cell communications and contacts, and receptor-mediated endocytosis. Prerequisite: L41 (Bio) 5068 or permission of coursemasters. Credit: 3 units.

L41 (Bio) 5392 Molecular Microbiology and Pathogenesis
Instructor: Michael Caparon, Ph.D., 362-1485
First half focuses on microbial physiology and genetics, with special attention to recent discoveries in gene regulation and protein processing. Second half devoted to microorganisms that cause disease, with emphasis on the molecular interactions between pathogen and host. Prerequisite: first-semester core curriculum for programs in Cell and Molecular Biology. Credit: 3 units. This is referenced in the Department of Molecular Microbiology.

L41 (Bio) 5393 Molecular Virology Journal Club
Instructors: David A. Leib, Ph.D., 362-2689; Andrew S. Pekosz, Ph.D., 747-2132
Journal club covering a broad range of topics in virology with an emphasis on pathogenesis or molecular biology of medically important viruses. A minimum of one student presentation with faculty critique. Prerequisite: permission of instructor. Credit: 1 unit.

L41 (Bio) 5412 Tropical and Molecular Parasitology
Instructor: L. David Sibley, Ph.D., 362-8873
Graduate level seminar course focusing on current scientific literature in molecular parasitology. The journal club will meet biweekly during the Fall and Spring semesters. Students will attend both semesters in order to receive one credit. The seminar series will run jointly with a research conference in Tropical and Molecular Parasitology. Outside speakers will be invited for the seminar series to emphasize important developments in tropical medicine and molecular parasitology. In advance of the invited speakers, topics will focus on their previous research publications. Prereqs, L41 (Bio) 5392 Molecular Microbiology & Pathogenesis. Credit 0.5 unit.

L41 (Bio) 5416 Molecular Microbiology and Pathogenesis Journal Club
Instructor: Joseph Vogel, Ph.D., 747-1029
Presentations by students, postdoctoral fellows and faculty on a broad range of topics of current interest, including the fields of molecular mechanisms of pathogenesis, biochemistry, molecular biology, cell biology, developmental biology and immunology. Speakers usually give a brief background to introduce the topic and then focus on one or two papers from the current literature. Credit requires attendance at all sessions and one or two presentations during the year. Credit: 1 unit.

L41 (Bio) 5417 Hematology/Oncology Journal Club
Instructors: Stuart A. Kornfeld, M.D., 362-8803; Philip W. Majerus, M.D., 362-8801
This journal club, founded in 1966, covers a broad range of topics of current interest, including the fields of biochemistry, molecular biology, cell biology, developmental biology and immunology. Speakers usually give a brief background to introduce the topic and then focus on one or two papers from the current literature. Presentations are given by graduate students, postdoctorate fellows and the faculty. Each attendee presents two to three times per year. Participants are expected to attend all the sessions. Credit: 1 unit.
L41 (Bio) 5419 Seminars in Microbiology AND Infectious Diseases
Instructor: Joseph Vogel, Ph.D., 747-1029  
Work-in-progress seminars by graduate students and postdoctoral fellows. Prerequisite: L41 (Bio) 5392 Molecular Microbiology and Pathogenesis. Credit: 1 unit.

L41 (Bio) 5424 Cellular and Molecular Mechanisms of Infectious Disease
Instructors: David A. Leib, Ph.D., 362-2689; Virginia L. Miller, Ph.D., 286-2891  
A series of discussions led by faculty members and visiting faculty, covering topics that range from basic research on microbiology to clinical aspects of infectious diseases. Required for participants in the Infectious Diseases Scholars program at Washington University. Prereqs: L41 (Bio) 5392 or permission of instructor. Credit 1 unit.

L41 (Bio) 5443 Nucleic Acids and Nucleic Acid Protein Interactions Journal Club
Instructor: Kathleen B. Hall, Ph.D., 362-4196  
The biochemistry of nucleic acids and nucleic acid-protein interactions. Focus is on the functional and structural properties of these molecules, addressed through basic biochemical and quantitative approaches. Credit: 1 unit.

L41 (Bio) 5466 Current Topics in Biochemistry
Instructor: Kathleen B. Hall, Ph.D., 362-4196  
Student presentations of thesis research. Formal presentations require powerpoint. Required of all Biochemistry graduate students; first and second year students get credit. Credit 2 units.

L41 (Bio) 5467 Optical Bioelectric Imaging
Instructor: Dennis L. Barbour, 935-7548  
Traditional methods of studying electrical activity in biological tissue involve measurements with electronics. Recent advances in optics and microscopy have led to an expansion of options for indirectly measuring neural and cardiac bioelectric activity with light. Course topics include the basic physics underlying vital light microscopy, use of voltage-sensitive and calcium-sensitive fluorescent probes, multiphoton and confocal imaging of living tissue and photoactivation of caged compounds. Prereqs: college calculus and physics, any biology course. Credit 3 units. Same as home course E72 BME 504.

L41 (Bio) 5468 Cardiovascular Biophysics Journal Club
Instructor: Sándor J. Kovács, Ph.D., M.D., 454-7660  
This journal club is intended for beginning MSTP or graduate students with a background in the quantitative sciences (engineering, physics, math, chemistry, etc.). The subjects covered are inherently multidisciplinary. We will review landmark and recent publications in quantitative cardiovascular physiology, mathematical modeling of physiologic systems and related topics such as chaos theory and nonlinear dynamics of biological systems. Familiarity with calculus, differential equations, and basic engineering/thermodynamic principles is assumed. Knowledge of anatomy/physiology is not required, but is helpful. Prerequisite: Calculus, physiology/anatomy is optional. Same as E72 BME 5911. Credit: 1 unit.

L41 (Bio) 5472 CARDIOVASCULAR MRI — FROM PHYSICS TO CLINICAL APPLICATION  
Instructor: Samuel A. Wickline, M.D., 454-5539  
This graduate course (seniors welcome) will cover the basic physics involved in creating an image by magnetic resonance technology. The use of this technology, specifically as it applies to the unique challenges of cardiovascular applications, will be examined. This will include topics such as motion compensation techniques, real-time imaging, exogenous contrast enhancement, and quantitative flow measurements, for example. As much as one-third of the class will involve actual case studies and the discussion of clinical use for cardiovascular MRI. Students will demonstrate competence in the subject through a combination of homework, a final examination, and a small semester project. Prerequisite: Calculus, introductory human physiology/anatomy/biology course. Same as E62 BME 502. Credit: 3 units.
L41 (Bio) 5474 Algorithms for Computational Biology
Instructor: Michael R. Brent, Ph.D., 935-6621
This course will focus on how to sequence and analyze a genome, emphasizing computational and
algorithmic issues. After taking this course, you should be able to parachute into a genome informatics
group, understand what’s going on, and do something useful on your first day. Topics covered include:
the essential biology, the essential probability theory, base calling and quality clipping, genome
assembly (including aspects of sequence alignment), repeat masking, predicting protein-coding genes
(including Hidden Markov Models and comparative genomics approaches), predicting gene function by
comparing to proteins of known function, basic RNA gene finding, and advanced topics in sequence
alignment. This course will include a combination of paper-and-pencil homework assignments and
programming labs. Prerequisite: CS 241 or CS 514N or L41 (Bio) 5495. Same as E81 CSE 587A.
Credit: 3 units.

L41 (Bio) 5476 Modeling Biomolecular Systems I
Instructor: Jay W. Ponder, Ph.D., 362-4195
This course covers the applications of computer modeling and simulation to problems involving
biological macromolecules. Lectures will discuss the theory and algorithms underlying a variety of
simulation techniques. Laboratory exercises and a student project will provide experience with
software presently used in the field. Topics examined in detail include: computational tools,
molecular visualization, simulation methodology, force field methods, optimization, experimental
design, QSAR, scoring and screening of ligands, docking, structure databases, and refinement and
prediction of structures. Prereqs: basic background in biochemistry and physical chemistry; ability to
write simple computer programs in any language. Credit 3 units. Same as E62 BME 530.

L41 (Bio) 5477 Modeling Biomolecular Systems II
Instructor: David Sept, Ph.D., 935-8837
This course is a continuation of BME 530/BIO 5476 covering additional topics in computer modeling
and simulation. The lectures will cover the theory and underlying algorithms, while the laboratories
and term project will provide the students with hands-on experience in using various software
packages. Topics will include: statistical mechanics concepts in molecular simulations; algorithms for
molecular dynamics, stochastic dynamics and Monte Carlo simulations; free energy calculations;
electrostatics and continuum solvation methods; hybrid QM/MM calculations; multi-scale modeling.
Prereqs: A background in biochemistry and physical chemistry. Credit 3 units. Same as home course
E62 BME 540.

L41 (Bio) 548 Nucleic Acids and Protein Biosynthesis
Instructor: John E. Majors, Ph.D., 362-1135
Fundamental aspects of structure, biosynthesis and function of nucleic acids and the biosynthesis of
proteins. Emphasis on mechanisms involved in the biosynthetic processes and the regulation thereof.
Prerequisite: L41 (Bio) 337, 449, or equivalent or permission of instructor. This is referenced in the
Department of Biochemistry and Molecular Biophysics. Credit: 3 units.

L41 (Bio) 5481 Student-Run Molecular Genetics Journal Club
Instructor: John E. Majors, Ph.D., 362-1135
Students in the Molecular Genetics Program have organized this journal club, which meets weekly. The
speaker provides the faculty member in charge with a one-page outline of their presentation ahead of
the class time. Students provide written evaluations of the quality and content of each others’ talks.
The forms are given to each speaker by way of the faculty member in charge. All students receiving
credit are expected to give one presentation per semester and to attend regularly. This is referenced
in the Department of Biochemistry and Molecular Biophysics. Credit: 1 unit.

L41 (Bio) 5482A Human Linkage and Association Analysis
Instructor: Anne Bowcock, Ph.D., 747-3264; John P. Rice, Ph.D., 286-2572
Meiosis, inheritance, Hardy Weinberg Equilibrium, Linkage analysis: definition, crossing over, map
functions, phase, LOD scores, genetic heterogeneity, penetrance, phenocopies, liability classes and
multipoint analysis; non-parametric linkage analysis (sibpairs and pedigrees) and practical aspects of
preparing data; determination of power for mendelian and complex trait analysis; linkage
disequilibrium analyses, allelic association (case control designs and family bases studies);
quantitative trait analysis: measured genotypes, variance components methods, epistasis and GxE interaction. Forty-five hours of lectures and computer labs. Credit: 3 units. Same as M21 GEMS 5482A.

L41 (Bio) 5484 Genetics & Development of C. Elegans Journal Club
Instructor: Tim Schedl, Ph.D., 362-6162
Students will present a research paper (or present their current thesis research) and the appropriate background material. Credit: 1 unit.

L41 (Bio) 5486 Classic Experiments in Molecular Biology
Instructors: Susan K. Dutcher, Ph.D., 362-2765; Sean R. Eddy, Ph.D., 362-7666; Mark Johnston, Ph.D., 362-2735
A few key papers stand out as the historical foundations of molecular genetics. They illuminate the process of intuition, creative experimentation and insight that led to what we now accept as dogma in our field. This class, organized in the style of a journal club, will explore this history through presentations by students of these classic papers. Each student will be responsible for presenting one topic, consisting of two to three papers, placing them in their historical context through background reading from the contemporary literature, and in Judson’s “The Eighth Day of Creation” and Cairns, Stent, and Watson’s “Phage and the Origin of Molecular Biology.” Prerequisite: Graduate standing and L41 (Bio) 548 and L41 (Bio) 5491, or consent of instructors. Credit: 1 unit.

L41 (Bio) 5488 Genomics
Instructors: Tim Schedl, Ph.D., 362-6162; Barak A. Cohen, Ph.D., 362-3674
A hybrid of concepts and practical applications in genomics. Areas covered include how genomes are mapped and sequenced, computational methods for gene predictions, functional genomic techniques for ascribing function to DNA, RNA and protein sequence and how genomic techniques and resources can advance the study of human disease. Heavy emphasis will be placed on students acquiring basic skills needed to navigate and manipulate databases of DNA sequence, gene expression and other types of genome wide data. Prerequisites: L41 (Bio) 5068 Molecular Cell Biology, L41 (Bio) 548 Nucleic Acids or by permission of instructor. Lecture 3 units of credit, lab one additional unit, space limited. Credit: 3 or 4 units.

L41 (Bio) 5491 Advanced Genetics
Instructor: James B. Skeath, Ph.D., 362-0535
Fundamental aspects of organismal genetics with emphasis on experimental studies that have contributed to the molecular analysis of complex biological problems. Examples drawn from bacteria, yeast, nematodes, fruit flies and mammalian systems. Prerequisite: graduate standing or permission of instructor. This is cross-listed in the Department of Genetics. Credit: 3 units.

L41 (Bio) 5493 Subversive Genetics, Attacks on the Central Dogma
Instructor: Stephen L. Johnson, Ph.D., 362-0362
Exceptions to the central dogma of genetics and molecular biology are identified and examined. Particular care is paid to identifying strategies to resolve mechanistic bases of these phenomena. Prerequisite, L41 (Bio) 5491 Advanced Genetics. Credit 2 units.

L41 (Bio) 5495 Computational Molecular Biology
Instructor: Sean R. Eddy, Ph.D., 362-7666
A detailed survey of the mathematical and algorithmic basis for methods in computational molecular biology. Topics covered include sequence alignment algorithms, multiple sequence alignment, RNA structure prediction, motif and pattern searches, and phylogenetic inference. Two lectures per week, plus a discussion section each week in which students present a current paper in the field. Students will acquire a working knowledge of UNIX and the C programming language during the course. There are no formal prerequisites, but prior experience in computer programming and an aptitude for mathematics is almost essential. The course is generally too advanced for biologists simply seeking to learn how to use common bioinformatics tools. Same as E62 BME 537. Credit: 3 units.

L41 (Bio) 5496 Seminar in Computational Molecular Biology
Instructor: Jeremy Buhler, Ph.D., 935-6180; Gary D. Stormo, Ph.D., 747-5534
Students present current research papers and the appropriate background material in the field of computational biology. Same as E81 CSE 7803. Credit: 1 unit.

L41 (Bio) 5497 Special Topics in Computational Molecular Biology
Instructor: Gary D. Stormo, Ph.D., 747-5534
In-depth discussion of problems and methods in computational molecular biology. Each year, three topics will be covered, and those will change yearly. Prerequisite: L41 (Bio) 5495 Computational Molecular Biology or instructor’s consent. Same as E81 CSE 583A. Credit: 2 units.

L41 (Bio) 550 Medical Genetics
Instructor: Alison J. Whelan, M.D., 362-8050
Topics covered include population and quantitative genetics, clinical cytogenetics, biochemical genetics and metabolic defects. Lectures, clinics and small group discussions. Prerequisite: an introductory genetics course and permission of the instructor. This is cross-listed in the Department of Genetics as M30 511 Medical Genetics. Credit: 2 units.

L41 (Bio) 5506 Data Mining and Applications to Computational Biology
Instructor: Weixiong Zhang, Ph.D., 935-8788
Formerly CS 529A. Many scientific computing problems are, by nature, statistical. Such problems appear in many domains, such as text analysis, data mining on the web, computational biology and various medical applications. Another source of the statistical nature of such problems is the lack of sufficient information of the problem domains as well as the specific problems at hand. What is available for a typical application is usually a set of data from observation or experiments. The main objective of this course is to gain experience of dealing with statistical data analysis problems by studying various statistical methods that can be used to make sense out of data, by reading and reviewing literature as well as by working on a specific statistical problem in a selected application domain. Prereqs: CSE 241 and SSM 326A (or Math 320), or their equivalent, or permission of the instructor. Credit 3 units. Same as home course E81 CSE 514A.

L41 (Bio) 5511 Molekoolz
Instructors: Tanya Wolff, Ph.D., 362-1509; Jason D. Weber, Ph.D., 747-3896
Come join us as we explore the latest in a wide range of research areas. Invited speakers will discuss topics from RNA to proteins, signals to receptors, cells to tissues, and everything in between. All are welcome, but lectures will be aimed at advanced graduate students, post-docs and interested faculty. Weekly reading and writing (experimental design) exercises will be assigned. Credit 2 units.

L41 (Bio) 554 Neural Sciences
For full description, see the Department of Anatomy and Neurobiology, M35 554 Neural Sciences.

L41 (Bio) 5564 Topics in Neural Engineering: Sensorimotor Systems and Computations
Instructors: Dora E. Angelaki, Ph.D., 747-5529; Gregory C. Deangelis, Ph.D., 747-2253; Lawrence Hugh Snyder, M.D., Ph.D., 747-3530
Sensorimotor computations provide one of the best opportunities for understanding a fundamental question about brain function: how are sensory signals transformed into motor commands? This course will address the basic physiological organization and function of sensory and motor areas of the brain, with a strong emphasis on computational aspects of brain function and on quantitative/engineering approaches to their study. The course will consist of a set of lectures as well as interactive student-faculty discussions of current and classical literature. Special focus will be on eye movements, as well as the visual and vestibular systems. The course is mainly designed for graduate students in physical sciences and engineering (e.g., mainly Biomedical Engineering) or Systems Neuroscience. Prereqs: L41 (Bio) 5651 Neural Systems. Seniors with a good quantitative background are also welcome if they have taken EE379 and BME301 or with special permission from one of the instructors. A good handle of calculus and differential equations, as well as a background in Fourier analysis, signal processing and frequency domain representations are required. Class meets in 2nd floor conference room in E. McDonnell Bldg, Medical School campus. Credit 3 units. Same as home course E62 BME 573.

L41 (Bio) 5565 Oral Presentation of Scientific Data
Instructor: Staff, Anatomy and Neurobiology, 362-3363
Practical course on how to prepare and present scientific data to an audience, either as a seminar or as a course lecture. Prerequisite: first-year neuroscience program courses. Credit: 1 unit.

L41 (Bio) 5571 Cellular Neurobiology
Instructor: Jim Huettner, Ph.D., 362-6624
This course will present a fully integrated overview of nerve cell structure, function and development at the molecular and cellular level. Broad topics to be covered include gene structure and regulation in the nervous system, quantitative analysis of voltage- and chemically-gated ion channels, presynaptic and postsynaptic mechanisms of chemical neurotransmission, sensory transduction, neurogenesis and migration, axon guidance and synapse formation. Ten lectures plus four hours of discussion per week for six weeks. There will be two exams and a written research proposal, as well as homework problems and summaries of discussion papers. Prerequisite: graduate standing or permission of the instructor. Credit: 6 units.

L41 (Bio) 5581 Neural Basis of Acoustic Communications
Instructor: Nobuo Suga, Ph.D., 935-8530
Lectures and seminars in hearing and acoustic signals of animals, from invertebrates to humans. Structural and functional adaptation for processing the signals for communication and echolocation are considered. Prereq: Bio 3411 or Bio 3421, or a course comparable to Physiological Psychology. One two-hour class a week. Offered in the fall semester of odd numbered years. Credit 2 units.

L41 (Bio) 5619 Advanced Cognitive, Computational, and Systems Neuroscience
Instructor: Todd Braver, Ph.D., 935-5143
This course will develop critical thinking and analysis skills with regard to topics in Cognitive, Computational and Systems Neuroscience. Course format will be a series of modules composed of intensive, faculty-led case studies on interdisciplinary topics at the intersection of psychology, computation and neuroscience. The goal will be to highlight the benefits of integrative, interdisciplinary approaches, by delving into a small set of topics from a variety of perspectives, rather than providing a survey-level introduction to a broader set of topic areas. Modules will involve a combination of lectures and student-led discussion groups, with students further expected to complete a multi-disciplinary integrative final review paper. Case-study topics will vary somewhat from year to year, but are likely to include some of the following: temporal coding as a mechanism for information processing, coordinate transformations in sensory-motor integration, mechanisms of cognitive control, motor control strategies including application to neural prosthetics, and memory systems in health and disease. Credit 3 units. Same as L33 Psych 519.

L41 (Bio) 5622 Cognitive, Computational, and Systems Neuroscience Project Building
Instructor: Deanna Barch, Ph.D., 935-8729
The goal of this course is to help students in the CCSN Pathway develop the critical thinking skills necessary to develop and implement high quality, interdisciplinary research projects. Throughout the course of the semester, each student will develop a research plan in their chosen area of interest. The plan will be developed in consultation with at least two faculty members (from at least two different subdisciplines within the pathway) as well as the other students and faculty participating in the course. The culmination of this course will be for each student to produce an NIH-style grant proposal on the research project of their choosing. For most students, this will serve either as their thesis proposal or a solid precursor to the thesis proposal. The course will be designed to help facilitate the development of such a research plan through didactic work, class presentations, class discussion, and constructive feedback on written work. The course will begin with a review of written examples of outstanding research proposals, primarily in the form of grant submissions similar to those that the students are expected to develop (i.e., NRSA style proposals, R03 proposals). Review of these proposals will serve as a stimulus to promote discussion about the critical elements of good research proposals and designs in different areas. Each student will be expected to give three presentations throughout the semester that will provide opportunities to receive constructive feedback on the development and implementation of research aims. The first presentation (towards the beginning of the semester) will involve presentation of the student's general topic of interest and preliminary formulation of research questions. Feedback will emphasize ways to focus and develop the research hypotheses into well-formulated questions and experiments. The second presentation will involve a more detailed
presentation of specific research questions (along the lines of NIH-style Specific Aims) and an initial outline of research methods. The final presentation will involve a fuller presentation of research questions and proposed methods. Feedback, didactic work, and group discussion throughout the semester will include guidance on critical components of the development of a research plan, including how to perform literature searches, formulate testable hypotheses, write critical literature summaries, and design experiments and analyses. The course will meet once a week, with faculty members from different tracks within the Pathway present at each meeting. This will allow students to receive feedback from several perspectives. Prereq: Member of CCSN Pathway, permission of instructor. Credit 3 units. Same as L33 Psych 5191.

L41 (Bio) 5651 Neural Systems
Instructor: Gregory C. DeAngelis Ph.D., 747-2253
The course will consist of lectures and discussions of the sensory, motor and integrative systems of the brain and spinal cord, together with a weekly lab. The lectures will present aspects of most neural systems, and will be given by faculty members who have specific expertise on each topic. The discussions will include faculty-led group discussions and papers presented and discussed by students. The labs will include human brain dissections, examination of histological slides, physiological recordings, behavioral methods, computational modeling and functional neural imaging. Credit: 4 units.

L41 (Bio) 5657 Biological Neural Computation
Instructor: Kurt A. Thoroughman, Ph.D., 935-9094
This course will consider the computations performed by biological nervous systems. Readings and discussions will investigate the biophysical and physiological bases of computations made by ion channels, synapses, dendrites, neurons and neuronal networks. Computer laboratories and a semester long independent project will determine how simple mathematical models succeed or fail to represent observed biological function and organismal behavior. Readings will include classic and current primary research papers. Prerequisites: calculus, some experience with differential equations, and cell or systems biology. Same as E62  BME 572.

L41 (Bio) 5663 Neurobiology of Disease
Instructors: Bradley L. Schlaggar, Ph.D., 454-6120; Mark P. Goldberg, M.D., 362-3258
This is an advanced graduate seminar on the neuroscience of nervous system disorders. This course is intended to acquaint basic scientists with a spectrum of clinical diseases, and to consider how advanced neuroscience approaches may be applied to promoting recovery in the brain. The class will meet for 2 1/2 hours each week. Each session will be led by a faculty guest with expertise in a specific neurological or psychiatric disease. In the first hour, the speaker will discuss clinical manifestations and pathophysiology. Where possible, the clinical presentation will be supplemented with a patient demonstration or videotape. The second hour will follow a journal club format. Two or three students will review current papers assigned by the speaker or course director. This course is offered in alternate years. Credit 2 units.

L41 (Bio) 572 Seminar in Plant Biology
Instructor: Michael M. Neff, Ph.D., 935-7915
A weekly discussion of modern research in plant biology including topics in molecular genetics, development, biochemistry, physiology, population dynamics and plant-pathogen interactions. Research seminars by local and outside speakers will be intermixed with journal club presentations in alternating weeks. Credit will be contingent on one journal club presentation per semester, regular attendance and active participation in group discussions. Credit: 2 units.

L41 (Bio) 580 Seminar in Population Biology
Instructor: Justin Fay Ph.D., 747-1808
This weekly seminar, covering different topics each semester, should be taken by graduate students in the program. Prerequisite: graduate standing or permission of the instructors. Credit: variable, 2 or 3 units.

L41 (Bio) 582 Ethnobiology Journal Club
Instructor: Jan Salick, Ph.D., 577-5165; Gayle J. Fritz, Ph.D., 935-8588
Students in this journal club will meet weekly with ethnobotanists, ethnozoologists, and ecologists from various St. Louis institutions (including Washington University, UM-St. Louis, St. Louis University, and the Missouri Botanical Garden) to discuss recent publications and ongoing research. Enrolled students will attend the journal club every week, and once per semester, will choose a paper and lead the discussion. Credit 1 unit. Same as home course L48 Anthro 560.

L41 (Bio) 585 Seminar in Floristic Taxonomy
Instructor: P. Mick Richardson, Ph.D., 577-5176
A survey of angiosperm families, their morphology, cytology, anatomy, palynology, chemistry and evolution. Prerequisite: L41 (Bio) 4132 or equivalent. Credit: 1 unit.

L41 (Bio) 590 Research
Instructors: Staff, Division of Biology and Biomedical Sciences, 362-3365
Credit to be arranged. Research is listed as 900-level course in each department.

L41 (Bio) 5911 Seminar in Biology and Biomedical Sciences
Instructors: Staff, Division of Biology and Biomedical Sciences, 362-3365
These seminars cover the recent literature in various areas not included in other courses, or in more depth than other courses. Credit to be arranged.

L41 (Bio) 5915 Teaching Practice in Biology and Biomedical Sciences
Instructor: John H. Russell, Ph.D., 362-2558
Students serve as teaching assistants for undergraduate and graduate-level courses. Faculty-supervised activities include lecture preparation and presentation, leading discussion and problem-solving sessions and laboratory instruction. Prerequisite: restricted to graduate students in the Division of Biology and Biomedical Sciences. Credit: 1 unit.

L41 (Bio) 5999 Independent Work
Instructors: Staff, Division of Biology and Biomedical Sciences, 362-3365
This course is designed for individual students wishing to explore in-depth specialized areas of literature or technology with one or more faculty members. Credit will vary with the amount of work and discussion, but cannot be more than 3 credits. Credit: Variable, maximum 3 units.

Note — The number preceding the course title indicates that the course carries credit in the Graduate School of Arts and Sciences.

Biomedical Engineering

Biomedical engineering is the integration of engineering methods with biological science and medical practice. It strives to provide increased quantitative and analytical understanding of complex living organisms. Through this increased understanding, biomedical engineers can contribute to advances in biomedical research and to improvements in health care.

In many areas of medicine and biology, advances are being driven by technology. For example, modern computer technology is fundamental to the new fields of computational molecular biology, genome analysis and computational neuroanatomy. Systems approaches are increasingly important to advancing knowledge of many biological processes. Other facets of biomedical engineering will lead to improved diagnostic and therapeutic agents, improved prostheses, and new approaches to tissue and organ repair including the use of bio-resorbable materials, reconstituted tissue and regenerated cells. With the increased understanding that comes from scientific research and the tools of biomedical engineering, a bountiful era of increased understanding of disease, health care informatics, new biomaterials, and revolutionary medical devices can be realized.
Biomedical engineering has been a focus of activity for almost 40 years in both the School of Engineering and Applied Science and the School of Medicine at Washington University in St. Louis. Contributions of the university include advances in imaging technologies for biology and medicine; positron emission tomography, confocal optical microscopy, advanced ultrasound imaging, magnetic resonance imaging and X-ray tomography. The university has played a leading role in applying high-speed communications systems to transmit scientific and medical information. Furthermore, the university is recognized worldwide for its work in mapping and sequencing the human genome, in computational molecular biology, in mapping of the human brain, and in cardiovascular engineering.

Biomedical engineering is an extremely diverse field encompassing the activities of faculty at Washington University in departments at the medical school as well as the engineering school. Recognizing the strength and diversity of existing programs, the Department of Biomedical Engineering was established on July 1, 1997. Together with the newly established Institute of Biomedical and Medical Engineering, involving faculty from the School of Engineering and Applied Science, the School of Medicine and also from the College of Arts & Sciences, this network facilitates and promotes the graduate educational training of biomedical engineers at Washington University. The Executive Council of the Institute, with broad representations from both the School of Engineering and Applied Science and the School of Medicine, has the responsibility to facilitate and coordinate student access to these various research opportunities. A graduate committee composed of members of the full-time faculty and the Institute determines the guidelines for graduate students in biomedical engineering.

The goals of graduate education in Biomedical Engineering at Washington University are to continue the University’s innovative and nationally recognized research programs and to train a new generation of leaders who apply engineering science throughout biology and medicine in government, industry and academia. This is a broad vision of biomedical engineering as a field and defines a role for which Washington University is ideally suited.

**Link to Website**

http://biomed.wustl.edu/graduate/

**Courses**

BME 500 Independent Study  
BME 501 Graduate Seminar  
BME 502 Cardiovascular MRI—From Physics to Clinical Application  
BME 503A Cell and Organ Systems Biology  
BME 504 Special Topics: Optical Bioelectric Imaging  
BME 5068 Fundamentals of Molecular Cell Biology  
BME 523 Biomaterials Science  
BME 530 Modeling Biomolecular Systems I  
BME 531 Introduction to Biomolecular Statistical Thermodynamics  
BME 533 Biomedical Signal Processing  
BME 537 Computational Molecular Biology  
BME 537A Intensive Course in Computational Molecular Biology  
BME 540 Modelling Biomolecular Systems II  
BME 556 Special Topics: Experimental Methods in Biomechanics  
BME 557 Cellular and Subcellular Biomechanics  
BME 558 Biological Transport  
BME 559 Introduction to Biomechanics  
BME 560A Biomechanics  
BME 561 Special Topics: Proteins as Nanomachines  
BME 562 Mechanics of Growth and Development
BME 5641 Computational Neuroscience
BME 566 Cardiac Electrophysiology
BME 567 Cardiovascular Engineering II: Cardiac Mechanics
BME 568 Cardiovascular Dynamics
BME 573 Topics in Neural Engineering, Sensorimotor Systems and Computations
BME 590A Special Topics in Biomedical Engineering
BME 590B Special Topics: Medical Computer Vision
BME 590C Cardiovascular Magnetic Resonance Imaging
BME 590F Special Topics: Cell and Tissue Engineering
BME 590H Special Topics: Introduction to Biomaterials Science
BME 590K Nonlinear Elasticity in Biomechanics
BME 590L Special Topics: Engineering Aspects of Biotechnology
BME 590N Special Topics: Modeling Biomolecular Systems
BME 590P Polymer Principles in Protein Structure
BME 590Q Biological Neural Computation
BME 590R Introduction to Biomechanics
BME 590S Special Topics: Tissue Engineering
BME 590T Applied Neural Communication and Control
BME 590U Special Topics: Biotechnology Techniques for Engineers
BME 590X Special Topics: Design of Artificial Organs
BME 590Z Special Topics: Musculoskeletal Biomechanics
BME 5911 Cardiovascular Biophysics Journal Club
BME 599 Master’s Research
BME 600 Doctoral Research

For additional related courses, see the Bulletin of the School of Engineering and Applied Science.

Faculty

Professor and Chairman of Department

Frank Chi-Pong Yin, Ph.D.,

Professors Emeriti

Harold W. Shipton, C.Eng.,

Salvatore P. Sutera, Ph.D.,

Lewis J. Thomas Jr., M.D.,
Washington University 1957.

Professors

R. Martin Arthur, Ph.D.,
University of Pennsylvania, 1968.

Philip V. Bayly, Ph.D.,
Duke University, 1993.

G. James Blaine III, D.Sc.,
Washington University, 1974.
John P. Boineau, M.D.,
Duke University, 1959.

Harold Burton, Ph.D.,
University of Wisconsin, 1968.

Michael E. Cain, M.D.,
George Washington University, 1975.

Elliot L. Elson, Ph.D.,
Stanford University, 1966.

William A. Frazier III, Ph.D.,

Bijoy K. Ghosh, Ph.D.,
Harvard University, 1983.

Stephen M. Highstein, M.D.,
University of Maryland Medical School, 1965; Ph.D., University of Tokyo Faculty of Medicine, 1976.

Daniel A. Low, Ph.D.,
Indiana University, 1988.

Garland R. Marshall, Ph.D.,
Rockefeller University, 1966.

Robert P. Mecham, Ph.D.,
Boston University, 1976.

James G. Miller, Ph.D.,
Washington University, 1969.

Thomas R. Miller, M.D.,
University of Missouri, 1976.

Michael K. Pasque, M.D.,

Marcus E. Raichle, M.D.,
University of Washington, 1964.

Carl M. Rovainen, Ph.D.,
Harvard University, 1967.

Yoram Rudy, Ph.D.
Case Western Reserve University, 1978.

Joseph H. Steinbach, Ph.D.,

Gary D. Stormo, Ph.D.,
University of Colorado, 1981.

Barna A. Szabo, Ph.D.,
State University of New York, 1969.

Larry A. Taber, Ph.D.,
Stanford University, 1979.

Alan R. Templeton, Ph.D.,
University of Michigan, 1972.

W. Thomas Thach Jr., M.D.,
Harvard University, 1964.

David C. Van Essen, Ph.D.,
Harvard University, 1971.

Michael J. Welch, Ph.D.,

Thomas A. Woolsey, M.D.,
The Johns Hopkins University, 1969.

**Professor (Adjunct)**

Gary Brandenburger, D.Sc.,

**Research Professors**

Charles H. Anderson, Ph.D.,
Harvard University, 1962.

Julius Goldstein, Ph.D.,
University of Rochester, 1965.

**Associate Professors**

Amir Arsham Amini, D.Sc.,
University of Michigan, 1990.

Dora Angelaki, Ph.D.,
University of Minnesota, 1991.

Michael R. Brent, Ph.D.,

Paul C. Bridgman, Ph.D.,
Purdue University, 1980.

Andreas H. Burkhalter, Ph.D.,
University of Zurich, 1977.

Jianmin Cui, Ph.D.
State University of New York Stony Brook, 1992.

Igor R. Efimov, Ph.D.
Moscow Institute of Science and Technology, 1992.

Daniel R. Fuhrmann, Ph.D.,
Princeton University, 1984.

Robert J. Gropler, M.D.,
University of Cincinnati, 1981.
Sándor J. Kovács, Ph.D.,

Stanley Misler, Ph.D.,

Joseph A. O’Sullivan, Ph.D.,
University of Notre Dame, 1986.

Steven E. Petersen, Ph.D.,
California Institute of Technology, 1982.

William D. Richard, Ph.D.,
University of Missouri, Rolla, 1988.

Frederick U. Rosenberger, D.Sc.,
Washington University, 1969.

Jin-Yu Shao, Ph.D.,

Matthew J. Silva, Ph.D.,
Massachusetts Institute of Technology, 1996.

M. Victor Wickerhauser, Ph.D.,
Yale University, 1985.

Samuel A. Wickline, M.D.,
University of Hawaii, 1980.

Research Associate Professors

Jack R. Engsberg, Ph.D.,
University of Iowa, 1985.

Joseph W. Klaesner, Ph.D.,
Vanderbilt University, 1995.

Richard B. Schuessler, Ph.D.,
Clemson University, 1977.

Assistant Professors

Kyongtae T. Bae, Ph.D.,

Thomas E. Conturo, M.D., Ph.D.,
Vanderbilt University, 1989.

Nathan A. Baker, Ph.D.,

Dennis L. Barbour, M.D., Ph.D.,
The Johns Hopkins University, 2003.

P. Duffy Cutler, Ph.D.,
University of California, Los Angeles, 1992.
Gregory C. DeAngelis, Ph.D.,
University of California, Berkeley, 1992.

Robert H. Deusinger, Ph.D.,
University of Iowa, 1981.

Donald L. Elbert, Ph.D.,
University of Texas, Austin, 1997.

James E. Huettner, Ph.D.,
Harvard University, 1987.

Gregory M. Lanza, Ph.D.,
University of Georgia, 1981.

Timothy J. McCarthy, Ph.D.,
University of Liverpool, 1989.

Scott D. Minor, Ph.D.,
University of Iowa, 1987.

Daniel W. Moran, Ph.D.,
Arizona State University, 1994.

Michael J. Mueller, Ph.D.,
Washington University, 1992.

Ruth Okamoto, D.Sc.,
Washington University, 1997.

Rohit V. Pappu, Ph.D.,
Tufts University, 1996.

Jay W. Ponder, Ph.D.,
Harvard University, 1984.

Shelly E. Sakiyama-Elbert, Ph.D.,

David S. Sept, Ph.D.,
University of Alberta, 1997.

Kurt A. Thoroughman, Ph.D.,
The Johns Hopkins University, 1999.

Nikolaos V. Tsekos, Ph.D.,
University of Minnesota, 1995.

Jerold W. Wallis, M.D.,
Stanford University, 1981.

Research Assistant Professors

John M. Ollinger, D.Sc., Ph.D.,
Washington University, 1986.

DeQuan Zou, D.Sc.,
Genetic Epidemiology Masters of Science (GEMS)

The Genetic Epidemiology Masters of Science (GEMS) training program provides an interdisciplinary educational opportunity for people who want to work at the dynamic nexus of genetics and medicine. There are growing needs for scientists with this training both in academia and industry. With the wealth of data from the Human Genome Project and the availability of powerful new computational approaches, abundant opportunities are now available to explore and characterize the interplay between genes and the environment that affect the biological processes that underlie disease.

Master of Science (M.S.) Degree
The core faculty for this multidisciplinary program come from 11 departments/divisions in the School of Medicine. The GEMS degree program is sponsored by the Division of Biostatistics and co-sponsored by the departments of Genetics and Psychiatry, and includes world-renowned scientific leaders in their respective areas. D.C. Rao, Ph.D., director of the Division of Biostatistics and the GEMS program director, is one of the founding fathers of the field. The full-time, summer-to-summer (14 month), 32 credit hour GEMS program is designed to prepare students to work at the interface of genetics, biostatistics, epidemiology and computing.

Certificate in Genetic Epidemiology
We offer a Certificate in Genetic Epidemiology, which is earned after successful completion (with a minimum of a "B" average) of four core courses (11 credit hours) that are normally offered to Master’s candidates in Genetic Epidemiology. Thee Courses may be taken over one or two summers:

M21-503 Statistical Computing with SAS
M21-505 Biostatistics for Research Workers (prerequisite M21-503)
M21-515 Fundamentals of Genetic Epidemiology
M21-550 Introduction to Bioinformatics (prerequisite M21-505)

Prospective Students
Since Genetic Epidemiology is an interdisciplinary field, we expect applicants to come from a variety of backgrounds, but primarily from the quantitative or the biological sciences, and possibly at different points in their careers: undergraduates with quantitative sciences (e.g., mathematics through calculus plus one semester of statistics) and/or biological sciences (at least through Principles of Biology II: Genetics or equivalent) background; people with terminal degrees in other (related) disciplines who seek to gain expertise in genetic epidemiology; current employees of pharmaceutical and biotechnology companies seeking additional training and formal credentials in the field. All prospective students must provide evidence of basic skills in computer programming through coursework, documented experience or by passing a proficiency exam. Promising candidates who do not meet all the prerequisites will work with the Program Director to take the appropriate courses or training to rectify weaknesses.

Location
The GEMS Program is located in the Division of Biostatistics, on the third floor of Shriners (706 S. Euclid), Rooms 3307-3312.

Further Information
See our website at www.biostat.wustl.edu/gems or contact the Program Administrator (362-1052 or pa@wubios.wustl.edu) or write to:
The GEMS Program
Division of Biostatistics
Campus Box 8067
660 S. Euclid Ave.
St. Louis, MO 63110-1093
Registration Instructions
Students will register with the Program Administrator in Genetic Epidemiology. Before registering, current Washington University students must obtain appropriate consent from their division. Students outside the GEMS program enrolling in individual courses must have permission of the Course Master.

Academic Calendar
The GEMS program follows the calendar of the College of Arts and Sciences.

Link to Website
http://www.biostat.wustl.edu/gems/

Courses

M21-503 Statistical Computing with SAS
Instructor: Aldi Kraja, Ph.D., 362-2498. and colleagues.
Intensive hands-on summer training in SAS (Statistical Analysis System) during six full weekdays. Students will learn how to use SAS for handling, managing, and analyzing data. Instruction is provided in the use of SAS programming language, procedures, macros, and SAS SQL. The course will include exercises using existing programs written by SAS experts. Instruction manual and computer lab will be provided. This course meets the prerequisite for M21-505 Biostatistics for Research Workers. Students are strongly recommended to participate in the workshop on "Computing/UNIX" prior to this course. Contact the GEMS program Administrator for details (pa@wubios.wustl.edu or telephone 362-1052). Permission of the Course Master required (362-1952). Credit: 2 units.

M21 505 Biostatistics for Research Workers
Instructors: Michael A. Province, Ph.D., 362-3616; Kenneth B. Schechtman, Ph.D., 362-2271.
Intensive two-week summer course designed for those researchers who want to expand their knowledge of practical methods in statistics. Oriented toward statistical and epidemiological concepts, applications, practical hints and hands-on approach to data, rather than theory or derivation of formulas. Heavy use is made of SAS for in-class examples and homework problems. We will cover classical methods (e.g., t-test, chi-square, correlation), multivariate methods (regression, logistic models, ANOVA, survival analysis), study design, probability and maximum likelihood. Some selected topics are then covered in greater detail. Prerequisite: M21-503 Statistical Computing with SAS or student must have practical experience with SAS. Students are strongly recommended to participate in workshops on "Computing/UNIX" and "Statistics" prior to this course. Contact the Program Administrator for details (pa@wubios.wustl.edu or telephone 362-1052). Permission of the Course Master required (362-1952). Credit: 3 units.

M21 515 Fundamentals of Genetic Epidemiology
Instructor: Treva K. Rice, Ph.D., 362-3662 and colleagues.
Intensive two-week summer course. Causes of phenotypic variation, familial resemblance/aggregation, heritability (family, twin and adoption designs), biometrical genetics, Hardy-Weinberg Equilibrium, major gene, segregation analysis, ascertainment, study designs, basic concepts in linkage and association analysis. (Lab practice with SEGPATH, PAP, S.A.G.E.) Students are strongly recommended to participate in workshops on "Computing/UNIX" and "Statistics" and/or take M21-503 prior to this course. Contact the Program Administrator for details (pa@wubios.wustl.edu or telephone 362-1052). Permission of the Course Master required (362-1952). Credit: 3 units.
M21 5483 Human Linkage and Association Analysis
Instructor: John P. Rice, Ph.D., 286-2572
Meiosis, inheritance, Hardy-Weinberg Equilibrium, Linkage, segregation analysis, linkage analysis: definition, crossing over, map functions, phase, LOD scores, LINKAGE, genetic heterogeneity, penetrance, phenocopies, and liability classes, multi-point analysis, non-parametric analysis (sibpairs and pedigrees), quantitative trait analysis, determination of power for mendelian and complex trait analysis, linkage disequilibrium analyses, allelic association (case control designs and family bases studies), practical aspects of data management of genetic data, quantitative trait analysis using measured genotypes and variance components. Hands-on computer exercises will be emphasized. There will be student presentations. Prerequisite: M21-515 Fundamentals of Genetic Epidemiology. Cross-listed as L41-5483 (Genetics). Credit: 3 units.

M21 550 Introduction to Bioinformatics
Instructors: C. Charles Gu, Ph.D., 362-3642; Gary D. Stormo, Ph.D., 747-5534
Provide a broad exposure to the basic concepts, methodology and application of bioinformatics to solve biological problems. Specifically, the students will learn the basics of online genomic/protein databases and database mining tools, and acquire understanding of mathematical algorithms in genome sequence analysis (alignment analysis, gene finding/predicting), and of the impact of recent developments in the DNA chip technology. Prerequisite: M21 505 Biostatistics for Research Workers. Permission of the Course Master required. Credit: 3 units.

M21 599 Directed Independent Study
Instructors: D.C. Rao, Ph.D., 362-3608; Michael Lovett, Ph.D., 747-3265
A faculty member will work with the student in specific areas related to the student’s primary needs. Permission of the Course Master required. Credit: variable, maximum 6 units.

M21 610 Independent Research
Instructors: D.C. Rao, Ph.D., 362-3608; Michael Lovett, Ph.D., 747-3265
Student selects a faculty mentor in consultation with the instructors to undertake a supervised research project in the mentor’s lab. The goal is to acquire independent research skills and to develop excellent writing and presentation abilities. A report based on the research must be written in the format of an actual scientific publication and presented to a select audience. Permission of the Course Master required. Credit: maximum 6 units.

M21 616 Epidemiology, Clinical Trials, Study Design and Management
Instructor: J. Philip Miller, A.B., 362-3617
Learn critical concepts and methods in epidemiology, including attributable risk, cohort studies, and case control studies. Learn about the design, conduct, and types of clinical trials, including methods for analysis of clinical trials. Learn study design issues, power analysis, study management issues (protocols, data entry, data flow, database management, QC), special considerations for multicenter studies, human studies, principles and issues in designing linkage and association studies, and ethical, legal, and social issues concerning human studies. Prereq: M21-505 Biostatistics for Research Workers and M21-515 Fundamentals of Genetic Epidemiology. Permission of the Course Master required (362-1052). Credit: 3 units.

M21 621 Computational Statistical Genetics
Instructors: Michael A. Province, Ph.D.,362-3616; Howard L. McLeod, Ph.D., 747-5183
This course is designed to give the students computational experience with the latest statistical genetics methods and concepts, so that they will be able to computationally implement the method(s)/model(s) developed as part of their thesis. Concentrating on the applications of genomics and SAS computing, it deals with creating efficient new bioinfomatic tools to interface with some of the latest, most important genetic epidemiological analysis software, as well as how to derive, design and implement new statistical genetics models. The course also includes didactic instruction on haplotype estimation and modeling of relationship to phenotype, LD mapping, DNA pooling analysis methods,
analysis approaches in pharmacogenomics (with an emphasis on possible genomic role in drug response heterogeneity), and epistasis (GxG) and GxE interactions; data mining methods, including clustering, recursive partitioning, boosting, and random forests; and fundamentals of meta-analysis, importance sampling, permutation tests and empirical p-values, as well as the design of monte-carlo simulation experiments. Prerequisite: M21-515 Fundamentals of Genetic Epidemiology. Permission of the Course Master required (362-1052). Credit: 3 units.

Faculty

Health Administration

Philosophy

The faculty of the Health Administration Program of Washington University believes that administrative personnel in health organizations require not only a solid foundation in management, but also an understanding of those aspects of finance, regulation and strategic planning unique to the health care field. Since its inception in 1946, the Program has acted on the premise that health administration students would benefit from exposure to the environment in which they ultimately will work. To this end, the Program has maintained an organizational structure consisting of a core faculty located within the School of Medicine, augmented by faculty from other schools and departments within the university, as well as affiliated institutions and agencies. This multidisciplinary approach enables the student to acquire not only management knowledge and skills, but also an understanding of the many complexities unique to the health care sector.

Curriculum and Sequence of Study

Required courses constitute 70 percent of the course sequence for the Master of Health Administration degree, offering vital exposure to the generic knowledge in the health administration area. In addition to the elective courses available within the Health Administration Program (HAP), students may take up to 15 semester hours of graduate work in other units of Washington University. The HAP student’s faculty adviser must approve the selection of courses in the student’s individual curriculum.

As a means of furthering interdisciplinary study, up to 15 semester hours of HAP courses are open to interested graduate students from other areas of Washington University. There is also a dual M.H.A.-J.D. degree with the School of Law, a dual M.H.A.-M.B.A. degree with the School of Business, a dual M.H.A.-M.I.M. degree with the School of Engineering, and a dual M.H.A.-M.S.W. degree with George Warren Brown School of Social Work. A dual degree is also offered with the School of Arts and Sciences in Human Resource Management (M.H.A.-M.A.) through University College. Medical students interested in health administration can choose a fourth year elective offered by HAP.

The sequence of study requires two years, each consisting of a fall and spring semester. Upon completion of the four semesters, or a total of 60 units, the student will receive a master of health administration (M.H.A.) degree. The statute of limitations is five years from the date of matriculation to complete all requirements for the M.H.A. degree. Contingent upon graduation, the student has the option of pursuing a 12-24 month postgraduate administrative fellowship. A certificate will be awarded by Washington University School of Medicine and the affiliated fellowship organization upon its satisfactory completion.

Administrative Fellowship

The 12-24 month optional postgraduate administrative fellowship will be served in a hospital, health agency, health organization or health system that has been recommended and approved by the full-time faculty. This option is available only to those persons who have the M.H.A. degree conferred upon them by the Washington University Health Administration Program. The purpose of the fellowship is to provide the graduate with an opportunity to observe and practice those concepts and principles
learned during the didactic on-campus exposure. The administrative fellowship is strongly recommended, as this postgraduate practical exposure is deemed necessary for adequate professional career preparation. The fellowship is completed under the direction of a well-qualified and experienced health care executive.

The full-time faculty maintains a close liaison with the administrative fellow and the preceptor. An educational plan that outlines the fellow’s activities for the coming year must be filed by the fellow. The fellow reviews his/her learning progression at the end of the fellowship in a report to the HAP director. The preceptor sends two evaluation reports to the director of HAP and shares the responsibility for recommending the awarding of the certificate by Washington University School of Medicine and the fellowship site organization.

Admission Requirements

Washington University’s Health Administration Program is committed to nondiscriminatory practices in selection of applicants regarding race, sex, age, religion or national origin. The faculty and staff are affirmatively committed to recruiting, enrolling and educating students from minority groups who have the potential for graduate study.

A minimum of a bachelor’s degree from an accredited university or college acceptable to Washington University School of Medicine is required, as is completion of the Graduate Record Examination Aptitude Test (GRE) or the Graduate Management Aptitude Test (GMAT). International students are also required to take the TOEFL exam. No specific undergraduate major field of study is required for admission into the program; however, at least one semester of accounting is required and introductory courses in economics, statistics (or their equivalents) and mathematics through college algebra are very strongly recommended. An on-site interview is required.

Tuition per semester: $11,750

Books and supplies (per semester): $625

Application fee (nonrefundable): $30/U.S., $50/International

Link to Website

http://hap.wustl.edu/

Courses

Fourth Year

Medical Student Elective

M80 856 Health Administration I
This elective is described in the Teaching and Research Divisions, and Programs chapter.

Faculty

STUART B BOXERMAN, D SC  Director of the Health Administration Program, Associate Professor of Health
Health Care Services

The Health Care Services Program at Washington University responds to the growing need for interdisciplinary professionals with expertise in the planning, implementation and evaluation of health service programs. Sponsored jointly by Washington University’s School of Medicine, Department of Psychology and University College, this 30-unit graduate degree program draws on the broad expertise of university faculty and research personnel. The curriculum examines organizational influences important to the development of innovative programs for individuals and families, stressing health education and the application of current research findings.

Admission to the Health Care Services Program is open on a selective basis to qualified applicants with a bachelor’s degree in a science or health-related field from an accredited institution. Applicants should have completed training in one of the several professions involved in the health care environment. Others may be admitted whose training and goals are congruent with the purposes of the program and acceptable to the admissions committee. The Master of Health Science degree can be pursued on a part-time basis with most courses held during the late afternoon or evening hours to accommodate the working professional. Students may select electives from various departments and divisions of the university (health administration, social work, psychology, human resources management).

Link to Website

http://www.artsci.wustl.edu/~ucollege/graduate_healthca.html

Faculty

Director

Edwin B. Fisher, Ph.D.
State University of New York, Stony Brook, 1972. (Professor of Psychology, Medicine, and Pediatrics and Director, Division of Health Behavior Research.)

Associate Director

Kelly M. Everard, Ph.D.
University of Kentucky, 1995. (Research Associate, Division of Health Behavior Research, Department of Medicine)
Instructors

Patricia Cavazos, Ph.D.
State University of New York, Buffalo (Postdoctoral Fellow)

Teresa Deshields, Ph.D.
University of Georgia, 1985. (Assistant Professor, Division of Health Behavior Research, Department of Medicine, Director of Psychosocial Services, Siteman Cancer Center)

Patricia E. Freed, R.N., M.S.N., Ed.D.
Southern Illinois University-Edwardsville, 1995. (Associate Professor, Jewish Hospital College of Nursing and Allied Health)

Joan Heins, M.A.
Washington University, 1990. (Research Patient Coordinator, Division of Health Behavior Research, Department of Medicine)

Cheryl A. Houston, Ph.D.
St. Louis University, 2000. (Director of Dietetics, Program in Dietetics, Department of Environmental Sciences, Fontbonne University)

Donna B. Jeffe, Ph.D.
Washington University, 1993. (Research Assistant Professor, Division of Health Behavior Research, Department of Medicine)

Arthur Lucas, M.Div.
Duke University School of Divinity, 1973. (BJC Spiritual Care Services)

Donald Rickert, Ph.D.
St. Louis University, 1984. (Professor, St. Louis College of Pharmacy)

Mario Schootman, Ph.D.
University of Iowa, 1993. (Assistant Professor of Epidemiology and Medicine, Division of Health Behavior Research, Department of Medicine)

Leigh Tenkku, M.P.H.
St. Louis University, 1998. (Research Associate, Department of Community and Family Medicine, St. Louis University School of Medicine)

Mark Walker, Ph.D.
University of Memphis, 1998. (Instructor in Medicine, Division of Health Behavior Research, Department of Medicine)

Valerie Yancey, Ph.D.
St. Louis University, 1998. (Associate Professor, Jewish Hospital College of Nursing and Allied Health)

Occupational Therapy

The Program in Occupational Therapy prepares students for professional practice and through its research generates knowledge to address the issues facing individuals with disabilities, chronic diseases and developmental disabilities. Students are prepared as generalists but, in addition, can concentrate their studies for work in pediatrics, aging, work and industry or social participation. The curriculum focuses on the dynamic interaction of the biological and psychological, environmental and
occupational factors that enable persons to fulfill roles, and lead meaningful and productive lives. Students interact with leading physicians and scientists whose practice and science is contributing to better methods of treatment of persons with disabilities. In addition, students are linked with community agencies and leaders that are providing services to individuals with disabling conditions. Undergraduate students in pre-health, psychology, biology or anthropology will find that the Program offers a means of applying their knowledge in a professional field. Applicants must hold a bachelor’s degree or be a participant in an approved three-two program and have completed prerequisite courses from an accredited college or university. The OT Program is accredited by the Accreditation Council for Occupational Therapy Education of the American Occupational Therapy Association. Graduates of the Program will be eligible to sit for the national certification examination administered by the NBCOT. (Note: a felony conviction may affect a graduate’s ability to sit for NBCOT certification examination or attain state licensure.)

**Master of Science in Occupational Therapy Degree Program**

The professional Master of Science in Occupational Therapy degree requires courses that develop the knowledge and skills necessary to practice occupational therapy. Each candidate for a Master of Science in Occupational Therapy degree must complete a minimum of 67 hours of coursework, usually accomplished in five semesters of study (two academic years and the intervening summer.) Six months of supervised clinical fieldwork (12 credits) is required to be completed within 12 months of completion of coursework.

**Doctor of Occupational Therapy Degree Program**

The Doctor of Occupational Therapy (O.T.D.) is a degree providing students the opportunity to focus their occupational therapy studies in one of four areas of concentration: Productive Aging, Social Participation and the Environment, Work and Industry, and Pediatrics. The O.T.D. requires seven semesters of study and three clinical placements for students entering professional practice. Post professional students enrolled in the OTD have varying program lengths based on prior degree and experience.

A full description of degrees in Occupational Therapy is available from the office of the Program in Occupational Therapy, or at the web site [www.ot.wustl.edu](http://www.ot.wustl.edu).

Tuition and fieldwork fees (MSOT, full time) per semester: $10,258 for six semesters

Tuition and fieldwork fees (OTD, full-time): $10,258 per semester first four semesters

$12,717 per semester last four semesters

Part-time tuition: $835 per credit

**Link to Website**

http://ot.wustl.edu

**Faculty**

**M. CAROLYN BAUM, PHD** Professor of Occupational Therapy, Elias Michael Director of the Program in Occupational Therapy

**C. ROBERT ALMLI, PHD** Associate Professor of Occupational Therapy
Physical Therapy

Physical Therapy is the science of human movement applied to rehabilitation, injury, fitness, injury prevention and overall health. Practicing in a variety of settings, physical therapists diagnose and treat movement dysfunction in patients with skill, competence and compassion. The Program in Physical Therapy is committed to providing students with excellent scientific and clinical education, in an environment that strives to continually lead the industry in practice, research, innovation and
advocacy of movement health.

The Program in Physical Therapy at the School of Medicine offers three formal curricula that collectively foster opportunities for lifelong learning and comprehensive career development.

**The Professional Doctor of Physical Therapy**

The professional curriculum is an intensive three-year experience leading to the degree Doctor of Physical Therapy. The principle focus of this professional training is to develop scientific and clinical expertise in the diagnosis and treatment of movement-related conditions. By integrating biomedical and physical sciences and clinical education with behavioral and social sciences, this curriculum provides students with the scientific expertise, critical thinking skills and interpersonal communication necessary for effective clinical practice, comprehensive treatment design, patient advocacy, patient education and health promotion. Applicants for admission must have completed 1) a bachelor’s degree at an accredited institution, and 2) prerequisite courses in biology, chemistry, physics, mathematics, anatomy, physiology, English, psychology, social sciences, and humanities, and 3) the Graduate Record Examination.

**The Postprofessional Doctor of Physical Therapy**

The post-professional clinical doctorate curriculum offers practicing physical therapists an opportunity to enhance their roles as diagnosticians, evidence-based practitioners and educators for an advanced model of practice. Designed to refine the practicing physical therapist's scientific and clinical expertise, the post-professional program also leads to a Doctor of Physical Therapy. Applicants for admission must have 1) graduated from an accredited professional physical therapy program, 2) acquired acceptable grade point averages in previous academic endeavors, 3) achieved acceptable scores on the Graduate Record Examination, and 4) must be licensed to practice in the United States.

**Doctor of Philosophy in Movement Science**

The focus of the interdisciplinary doctoral program in Movement Science is to prepare future researchers and faculty members who can enhance the profession of physical therapy. Admission to this curriculum requires acceptable scores on the Graduate Record Examination, excellence in previous academic work and demonstrated beginning abilities in posing questions of importance to the study of movement.

The faculty members of the Program in Physical Therapy are committed to being leaders in discovering and transmitting new knowledge related to movement dysfunction, preparing clinicians to assume multiple roles in a complex health care environment and fulfilling the service mission to society through active participation in humanistic, scientifically-based patient care. Students in all curricula are expected to participate actively in an environment that values integrity, initiative, creativity and the strong belief that physical therapy intervention promotes health. In these ways, all individuals associated with the Program in Physical Therapy may achieve their highest professional and personal potential.

**Tuition:**
- Professional curriculum $13,207 per semester
- Post-professional curriculum: $450 per credit
- Doctoral curriculum: $14,850 per semester

Further information may be obtained by direct correspondence with the Program in Physical Therapy, Campus Box 8502, 4444 Forest Park Blvd., St. Louis, MO 63108-2212.

Phone: (314) 286-1400
Fax: (314) 286-1410
e-mail: ptprog@wustl.edu
Web site: pt.wustl.edu
Faculty

SUSAN DEUSINGER, PHD  Director of the Program in Physical Therapy, Professor of Physical Therapy
AMY J BASTIAN, PHD  Adjunct Assistant Professor of Physical Therapy
NANCY J BLOOM, DPT, BS  Instructor in Physical Therapy
MARYBETH BROWN, PHD  Adjunct Associate Professor of Physical Therapy
TAMARA LAVON BURLIS, DPT, BS  Instructor in Physical Therapy
WILLIAM TODD CADE, PHD  Instructor in Physical Therapy
CHERYL ANN CALDWELL, DPT  Instructor in Physical Therapy
BILLIE RUTH CLARK, PHD  Assistant Professor of Physical Therapy
SUZANNE MARIE CORNBLEET, DPT  Instructor in Physical Therapy, Associate Director for Clinical Education in Physical Therapy
BETH ELAINE CROWNER, MS  Instructor in Physical Therapy
DIANE L. DAMIANO, PHD  Research Associate Professor of Physical Therapy
ROBERT H DEUSINGER, PHD  Assistant Professor of Physical Therapy
KRIKOR T DIKRANIAN, MD, PHD  Instructor in Physical Therapy
KATHLEEN KOLLER DIXON  Instructor Emeritus in Physical Therapy
GAMMON MARIE EARHART, PHD  Instructor in Physical Therapy
JULAINE MARIE FLORENCE, DPT  Research Associate Professor of Physical Therapy
MARY KENT HASTINGS, DPT  Instructor in Physical Therapy
MARIE HARRIS HAYES, DPT  Instructor in Physical Therapy
ROBERT JEROME HICKOK  Assistant Professor Emeritus of Physical Therapy
STEPHEN M HIGHSTEIN, MD, PHD  Professor of Physical Therapy
GREGORY WILLIAM HOLTZMAN  Instructor in Physical Therapy
RENEE A IVENS  Instructor in Physical Therapy
JOSEPH W. KLAESNER, PHD, BS  Research Assistant Professor of Physical Therapy
CATHERINE ECKEL LANG, PHD  Instructor in Physical Therapy
MATTHEW J MATAVA, MD  Assistant Professor of Physical Therapy
DEBRA MCDONNELL, AS  Instructor in Physical Therapy
MARY KATE MCDONNELL, DPT  Instructor in Physical Therapy
**Master of Psychiatric Epidemiology Program (MPE)**

The MPE Program, offered by the Epidemiology and Prevention Research Group in the Department of Psychiatry at Washington University Medical School, was established in 1989 by Lee Robins, Ph.D., and is the first and only program of its kind in the world. This program offers fundamental epidemiological and research skills, with an emphasis on interdisciplinary studies within a medical school environment. The program is noted for its public health focus, as it encompasses prevention, treatment and intervention research. It also strongly emphasizes training in the responsible conduct of science.

Candidates develop practical research skills and learn basic epidemiological methods that can be applied to many disciplines. They study the history and development of the major national and international psychiatric epidemiology studies, and they become familiar with diagnostic instruments commonly used in the field. Students learn how to organize and manage population surveys, including design, data collection and data analysis. Instructors in the program are experienced research investigators, with productive research teams.

Students come from varied backgrounds such as public health, social work, engineering, nursing, mathematics, psychology and anthropology. The overall objective of the MPE Program is to prepare pre-doctoral students and post-doctoral fellows for a productive research career in epidemiology, with an emphasis on behavioral risk factors. Graduate students in other University programs are also encouraged to enroll in courses. Undergraduate students are welcome, with the instructor’s approval.
Degree in Psychiatric Epidemiology

A Master in Psychiatric Epidemiology degree is offered to candidates enrolled in the program. The degree may be earned after successful completion of 30 credits made up of 14 core courses (26 credit hours) that are required in the MPE Program and 4 credits of elective courses. Elective credits may include additional hours of Independent Study (beyond the required 6 hours). Required courses are: M08 500 Introduction to General Epidemiology, M08 502 Instruments of Psychiatric Diagnoses and Assessment, M08 544 Applied Statistics for Behavioral Scientists, M08 507 Epidemiology Seminar I, M08 508 Landmarks in Psychiatric Epidemiology, M08 532 Psychiatry Grand Rounds I, M08 533 Psychiatry Research Seminar I (all offered in Fall), M08 507A Epidemiology Seminar II, M08 507B Epidemiology Seminar III, M08 532A Psychiatry Grand Rounds II, M08 533A Psychiatry Research Seminar II, M08 538 Research Methods, M08 676 Psychiatric Disorders of the Nervous System (all offered in Spring), and M08 506 Independent Study (offered Fall and Spring). In addition, a program-approved manuscript is required for graduation.

Academic Calendar

In general, the MPE Program follows the calendar of the School of Medicine for beginning and ending dates of semesters; students should consult the web site given below for specific courses offered each semester.

Registration Information for Non-MPE Students

All courses are open to any student, with the instructor’s approval.

Registration Information for MPE Students

Registration is done through the Program Director’s office.

Further Information

For further information, view our web site at www.epi.wustl.edu (click on MPE) or contact Peg Greco, Administrative Coordinator (314) 286-2261 or grecop@epi.wustl.edu.

Location

The MPE Program Administration is located at 40 N. Kingshighway, Parc Frontenac Building, Suite 4. Courses are held in this building and in various locations of the medical school.

Director

The director of the MPE Program is Linda B. Cottler, Ph.D., Professor of Epidemiology in Psychiatry.

Link to Website

http://epi.wustl.edu/MPE/MPEhome.htm

Courses

M08 500 INTRODUCTION TO GENERAL EPIDEMIOLOGY
Instructor: Linda B. Cottler, Ph.D., 286-2252
Epidemiology is the study of health and disease in the population. This course, while introducing epidemiologic methods and classic medical studies, emphasizes the clinical importance of psychiatric
M08 502 INSTRUMENTS OF PSYCHIATRIC DIAGNOSES AND ASSESSMENT
Instructor: Kathleen K. Bucholz, Ph.D., 286-2284
Introduction to commonly used interviews, both structured and semi-structured, and questionnaire development since 1940 for the diagnosis of specific psychiatric disorders in children and adults. Credit: 1 unit.

M08 505A BIOSTATISTICS FOR RESEARCH WORKERS
Instructor: Michael A. Province, Ph.D., 362-3616
Designed for those researchers who want to expand their knowledge of practical methods in statistics. Oriented toward statistical and epidemiological concepts, applications, practical hints, and a hands-on approach to data. Heavy use of SAS/PC for in-class examples and homework problems. Credit: 3 units. Cross-listed as M21 505 (GEMS).

M08 506 INDEPENDENT STUDY
Instructor: Arranged mentor
Student arranges with a faculty member to:
1) participate in that person's ongoing research;
2) research literature on a specific topic; 3) carry out secondary data analysis with an existing data set;
4) design and/or carry out an original research project; and/or 5) prepare a grant proposal. The faculty member meets regularly with the student and guides the project. Credit: 1-3 units.

M08 507 EPIDEMIOLOGY SEMINAR I: Recent Trends in Epidemiology (Credit: 1 unit)
Instructor: Linda B. Cottler, Ph.D., 286-2252

M08 507A EPIDEMIOLOGY SEMINAR II: Recent Progress in Epidemiology (Credit: 1 unit)
Instructor: Renee Cunningham-Williams, Ph.D., 286-2252

M08 507B EPIDEMIOLOGY SEMINAR III: Post Doc Presentations (Credit: 1 unit)
Instructor: Anne Glowinski, M.D., 286-2217
This series offers introduction tutorials for newly developed analytic techniques or techniques developed in other fields for advanced applications to epidemiologic studies.

M08 508 LANDMARKS IN PSYCHIATRIC EPIDEMIOLOGY
Instructor: Kathleen K. Bucholz, Ph.D., 286-2284
A review of the major studies in psychiatric epidemiology, describing methods and results, from the 1920s to the present. Credit: 1 unit.

M08 532 PSYCHIATRY GRAND ROUNDS I (Credit: 1 unit)

M08 532A PSYCHIATRY GRAND ROUNDS II (Credit: 1 unit)
Instructor: Carol S. North, M.D., 747-2013
Clinical psychiatric issues are discussed and illustrated with presentations of patients. Students discuss the presentation after each lecture, focusing on content and style.

M08 533 PSYCHIATRY RESEARCH SEMINAR I (Credit: 1 unit)
Research studies in psychiatry covering a broad range of topics. Students meet to discuss the seminar after each lecture.
M08 533A  PSYCHIATRY RESEARCH SEMINAR II (Credit: 1 unit)
Instructor: Anne Glowinski, M.D., 286-2217
Research studies in psychiatry covering a broad range of topics. Students meet to discuss the seminar after each lecture.

M08 538 RESEARCH METHODS
Instructor: Linda B. Cottler, Ph.D., 286-2252
A hands-on approach to psychiatric and substance abuse research. Enrollees attend confidential project meetings, being exposed to the ins and outs of the project’s daily operations. Credit: 3 units.

M08 676 PSYCHIATRIC DISORDERS OF THE NERVOUS SYSTEM
Instructor: Laura J. Bierut, M.D., 362-3492
Emphasizes the diagnosis of major psychiatric illness. Psychiatric disease will be described in terms of epidemiology, clinical presentation, natural history, genetics, differential diagnosis and clinical management. Biological and psychological influences on these diseases will be presented. Interviewing techniques and performance of mental status exam will be demonstrated by patient interviews. Credit: 2 units.

M08 540 MINI COURSE–EPIDEMIOLOGY METHODS
Instructor: Kathleen K. Bucholz, Ph.D., 286-2284
Short course in epidemiologic methods. Credit: 1 unit.

M08 523 MINI COURSE–PSYCHOLOGICAL TESTING
Instructor: Richard D. Wetzel, Ph.D., 362-2440
Seminar format, topics vary. Credit: 1 unit.

M08 531 MINI COURSE–PERSONALITY DISORDERS
Instructor: C. Robert Cloninger, Ph.D., 362-7005
Seminar format, topics vary. Credit: 1 unit.

M08 541 MINI COURSE–SCHIZOPHRENIA
Instructor: Nuri B. Farber, M.D., 362-2459
Seminar format. Credit: 1 unit.

M08 542 MINI COURSE–BIPOLAR DISORDER
Instructor: Nuri B. Farber, M.D., 362-2459
Seminar format. Credit: 1 unit.

M08 537 INTRODUCTION TO CHILD PSYCHIATRY I (Credit: 3 units)
This course addresses normative development and developmental psychopathology as it relates to mental disorders occurring in children and adolescents.

M08 537A INTRODUCTION TO CHILD PSYCHIATRY II (Credit: 1 unit)
Instructor: Joan Luby, M.D., 286-2730
These courses addresses normative development and developmental psychopathology as it relates to mental disorders occurring in children and adolescents.

M08 544 APPLIED STATISTICS FOR BEHAVIORAL SCIENTISTS (Credit: 3 units)
Instructor: Ed Spitznagel, Ph.D.
Instruction designed for those behavioral researchers who want to expand their knowledge of practical methods in statistics, with an emphasis on statistical and epidemiological concepts, applications, practical hints, and a hands-on approach to data, and using SAS/PC for in-class examples and homework problems.

M08 599 PUBLISHING WORKSHOP (Credit: 1 unit)
Instructor: Karen Dodson (APS)
Workshop designed to instruct students and researchers in the areas of oral presentation, the publishing application process, manuscript preparation and grant writing. Anecdotes as well as tried and true ideas will be shared by experts.

M08 899 THESIS WORKSHOP (Credit: 0 units)
Instructor: Arranged mentor
As the final requirement to be degreed, and under the guidance of a mentor, the student, as first author, develops a publishable manuscript that meets journal requirements and results in submission for peer review. Enrollment is limited to the degree-seeking candidate registered for 0 to 8 hours of coursework whose thesis writing qualifies him/her for full-time status.

Faculty

Director and Professor

Linda B. Cottler, Ph.D.,
Washington University, 1987. (Epidemiology) (See Department of Psychiatry and Health Administration Program.)

Associate Director and Research Associate Professor

Renee M. Cunningham-Williams, Ph.D., M.P.E.,
Washington University, 1994. (Social Work) (See Department of Psychiatry.)

Professors

C. Robert Cloninger, M.D.,
Washington University, 1970. (See Department of Psychiatry and Department of Genetics.)

Carol S. North, M.D.,
Washington University, 1983; M.P.E., 1993. (See Department of Psychiatry.)

Michael A. Province, Ph.D.,
Washington University, 1987. (See Clinical Investigation Program.)

Edward L. Spitznagel Jr., Ph.D.,
The University of Chicago, 1965. (See Division of Biostatistics.) (Also Department of Mathematics)

Richard D. Wetzel, Ph.D.,
St. Louis University, 1974. (See Department of Neurological Surgery and Department of Neurology.)

Research Professor

Kathleen K. Bucholz, Ph.D.,
Yale University, 1986. (See Department of Psychiatry.)

Associate Professor

Laura J. Bierut, M.D.,

Assistant Professors

Nuri B. Farber, M.D.,
Washington University, 1989.

Joan Luby, M.D.,
Wayne State University, 1985. (See Department of Psychiatry.)

Program in Audiology and Communication Sciences

The Program in Audiology and Communication Sciences provides advanced training and graduate programs in the fields of clinical audiology, deaf education, and speech and hearing sciences. Established at Central Institute for the Deaf (CID) in 1914, the training programs are now a member of a consortium of programs known as "CID at Washington University School of Medicine," which also includes clinical services and research programs operated by the Department of Otolaryngology. PACS also maintains its close affiliation with the CID Oral School and Outreach Center.

Link to Website

http://pacs.wustl.edu

Courses

Doctor of Audiology (Au.D.)

The four-year graduate program in audiology trains students to become independent clinicians and leads to the Doctor of Audiology (Au.D.) degree. The program is designed to provide students with the knowledge and skills that reflect the latest advances in evaluation and treatment of hearing conditions. Students gradually progress from classroom-based instruction to clinical practice in audiology. The first three years provide students with the foundation for practice, with students gaining knowledge and skills in the basic and applied sciences, evaluation and diagnosis practices for adults and children, hearing disorders, professional issues and ethics, research methods, and clinical observation and practice. The fourth year is spent in a full-time clinical externship.

The audiology program is accredited by the American Speech-Language-Hearing Association (ASHA). Graduates are eligible for national certification by ASHA.

Master of Science in Deaf Education (M.S.D.E.)

The graduate program in deaf education offers one- and two-year programs that prepare students to become classroom teachers of hearing-impaired children. The program promotes the oral philosophy—that deaf and hearing-impaired children can learn to listen and talk—and prepares teachers to help children develop their spoken and written language skills. For very young children, language and speech concepts are conveyed in a variety of settings and generally involve working closely with parents, families, and other caregivers. For older children, language and speech are taught in a classroom setting in concert with conventional academic subjects normally taught in kindergarten through the elementary grades.

Students proceed from broadly based classroom instruction and observation to progressively more specialized coursework and practice teaching experiences. Introductory coursework provides the foundation for practice. Students gain knowledge in the basic and applied sciences, curriculum, and
instructional methods. Advanced coursework provides training in evaluation techniques, manual communication, intervention strategies, counseling techniques, research methods and practice teaching experiences. The CID Oral School and Outreach Center serves as the primary site for student teaching for students in the deaf education program, with additional practice teaching sites available, both locally and nationally.

The deaf education program is accredited by the State of Missouri’s Department of Elementary and Secondary Education (DESE) and the Council on Education of the Deaf (CED). Graduates of the program are eligible for teacher certification in the State of Missouri (Deaf/Hearing Impaired, K-12) and for national certification by CED.

**Doctor of Philosophy (Ph.D.) in Speech and Hearing Sciences**

The focus of the interdisciplinary programs in Speech and Hearing Sciences (M.A. and Ph.D.) is to prepare future researchers and academicians in the field of speech and hearing sciences. Four areas of emphasis are available – clinical audiology, deaf education, speech and language, and sensory neurosciences. Students generally work one-on-one with faculty researchers during their studies. Training builds upon the student’s basic knowledge of aspects of the fields that pertain to speech, language, and hearing and emphasizes research and teaching experience.

The Speech and Hearing Sciences Program is operated by the Program in Audiology and Communication Sciences (PACS), and administered through the Graduate School of Arts & Sciences.

**Calendar**

In general, PACS follows the academic calendar of the School of Arts & Sciences. Students should consult the PACS academic calendar for specific information.

**Contact Information**

Further information may be obtained by contacting:

Washington University School of Medicine  
Program in Audiology and Communication Sciences  
660 S. Euclid Avenue, Campus Box 8042  
St. Louis, MO  63110

Phone: (314) 747-0104  
Fax: (314) 747-0105  
E-mail: elliottb@msnotes.wustl.edu  
Web: pacs.wustl.edu

**Faculty**

**Program Director**

William W. Clark, Ph.D.,  
University of Michigan, 1975.

**Professors (Joint)**

Barbara A. Bohne, Ph.D.,  
Washington University, 1971.

Nancy Tye Murray, Ph.D., University of Iowa, 1984.


**Associate Professors (Joint)**

J. David Dickman, Ph.D., University of Wyoming, 1985.

Kevin K. Ohlemiller, Ph.D., Northwestern University, 1990.

Dwayne D. Simmons, Ph.D., Harvard University, 1986.

Mark E. Warchol, Ph.D., Northwestern University, 1989.

**Assistant Professors**

Brian T. Faddis, Ph.D., University of California-Davis, 1994.


Johanna G. Nicholas, Ph.D., Washington University, 1990.

Rosalie M. Uchanski, Ph.D., MIT, 1988

**Instructors**

Lynda C. Berkowitz, M.S., Washington University 1983.


Donald G. Brennan, Ph.D., CCC-SLP, University of Oklahoma, 1974.

Christine M. Clark, M.A., Maryville University, 1999.


James D. Miller, Ph.D., Indiana University, 1957.

E. Tracy Mishler, M.A., CCC-A, Northwestern University, 1981.


Brad A. Stach, Ph.D., CCC-A, Baylor College of Medicine, 1986.

Professors Emeritus

Donald H. Eldredge, M.D.

Ira J. Hirsh, Ph.D.,

David P. Pascoe, Ph.D., CCC-A

School of Medicine/St. Louis College of Pharmacy Student Research Training Program

A key academic institution in our biomedical and clinical health center environment is the St. Louis College of Pharmacy. It is one of the premier institutions in the country for the teaching and training of pharmacists. The College’s extensive pharmaceutical sciences curriculum has generated interest by a number of their students in laboratory biomedical research. Students beyond their fourth year at St. Louis College of Pharmacy who demonstrate interest in science and research, and are recommended by the College faculty, will have an opportunity to complete 10- to 14-week fellowships in any of the laboratories at the School of Medicine. Students can, with consent of their advisors at the College of Pharmacy and the laboratory principal investigator, extend their stay. This joint research collaboration should encourage those students in the program to pursue graduate degrees in the Division of Biomedical Sciences at the School of Medicine.
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http://facts.wustl.edu/board.htm

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Rebecca P. McAllister, M.D.
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Paul A. Schoening, M.S., M.B.A.  
Associate Dean for Academic Information Management and Director of the Bernard Becker Medical Library

Alison J. Whelan, M.D.  
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Michael J. Naughton
Wade L. Thorstad
Register of Students

Alphabetical List of Students

Note: This may not be a complete listing. Some students may have elected to withhold directory information.

Kirstin Lee Abel  Allentown, PA, BA, The Johns Hopkins University ’02, Program: Doctor of Medicine, Elective Year
Amelia Ann Adams Bloomington, IL, Program: Doctor of Medicine, First Year Medical Student
Sarah Renee Adams  Pittsburgh, PA, BS, Oakwood College ’03, Program: Doctor of Medicine, Clinical Clerkship Year
Adewale Oluwaseu Adeniran  Jacksonville, FL, Program: Doctor of Medicine, First Year Medical Student
Elaine Jean Ahillen  St. Louis, MO, BA, University of Kansas ’04, Program: Doctor of Medicine, Second Year Medical Student
Jacqueline Marie Ahillen  St. Louis, MO, BA, University of Kansas ’04, Program: Doctor of Medicine, Second Year Medical Student
Omar Rizwan Ahmad  Carbondale, IL, BS, The University of Chicago ’01, Program: Doctor of Medicine, 2005 Graduate, Transitional Year, Forest Park Hospital, St. Louis, MO, Ophthalmology, University of Michigan, Ann Arbor, MI
Saba Ahmad  Burr Ridge, IL, BS, Northwestern University ’02, Program: Doctor of Medicine, Elective Year
Christina Kim Ahn  Kinston, NC, BS, Stanford University ’03, Program: Doctor of Medicine, Second Year Medical Student
Shreeram Akilesh  Bangor, ME, BA, Dartmouth College ’00, Program: MSTP, Second Year Research
Jesse Aaron Alba  Marietta, GA, BS, Brigham Young University ’03, Program: Doctor of Medicine, Clinical Clerkship Year
Jennifer Marie Alexander  Columbus, NE, BS, University of Nebraska, Lincoln ’99, Program: MSTP, Fourth Year Research
Kevin Dennis Alford  O’Fallon, IL, BA, The Johns Hopkins University ’03, Program: Doctor of Medicine, Clinical Clerkship Year
Brian Frazer Scot Allen  Knoxville, TN, BA, Washington University ’02, Program: Doctor of Medicine, Elective Year
Benedict Joseph Alter  Dayton, OH, BS, Washington University ’03, Program: MSTP, First Year Research
Courtney Joseph Amor Glendora, CA, BS, University of California, Los Angeles ’03, Program: Doctor of Medicine, Clinical Clerkship Year
Karrie Tomiska Amor  Oakley, CA, BS, University of California, Los Angeles ’03, Program: Doctor of Medicine, Clinical Clerkship Year
Mallika Anand  Warren, CA, BA, Texas A & M University ’01, Program: Doctor of Medicine, Clinical Clerkship Year
Shuchi Anand  Shoreview, MN, BA, Carleton College ’02, Program: Doctor of Medicine, Elective Year
Lauren Anderson Bolingbrook, IL, Program: Doctor of Medicine, First Year Medical Student

Anthony John Apicelli Titusville, NJ, BA, Princeton University '99, Program: MSTP, Fourth Year Research

Alejandro Aquino Aurora, IL, BS, University of Notre Dame '02, Program: Doctor of Medicine, Elective Year

Kevin Lee Ard Maize, KS, BA, Washington University '02, Program: Doctor of Medicine, Clinical Clerkship Year

Juliet Tenilola Aregbesola Orlando, FL, BS, Xavier University of Louisiana '03, Program: Doctor of Medicine, Clinical Clerkship Year

Leonard Hart Armstrong Minot, ND, BS, Montana State University '02, Program: Doctor of Medicine, Elective Year

Theodore Nader Armstrong Minot, ND, BS, Montana State University '04, Program: Doctor of Medicine, Second Year Medical Student

Caroline Lyle Arthur Denver, CO, BS, Brown University '03, Program: Doctor of Medicine, Second Year Medical Student

Molly Katharine Arvin Nashville, TN, BA, Washington University '04, Program: Doctor of Medicine, Second Year Medical Student

Ellen Hunter Bailey Cincinnati, OH, Program: Doctor of Medicine, First Year Medical Student

Justin Taylor Baker Decatur, GA, BS, Brown University '97, Program: MSTP, Fifth Year Research

Sharmini Ash Balakrishnan Virginia Beach, VA, Program: Doctor of Medicine, First Year Medical Student

Sami Jihad Barmada Pittsburgh, PA, BS, University of Pittsburgh '98, Program: MSTP, Clinical Clerkship Year

Kara Michelle Barnett Livingston, NJ, BA, Washington University '01, Program: Doctor of Medicine, 2005 Graduate, Transitional Year, Albert Einstein Medical Center, Philadelphia, PA, Anesthesiology, Hospital of the University of Pennsylvania, Philadelphia, PA

Jason Michael Baron Sarasota, FL, BS, Massachusetts Institute of Technology '04, Program: Doctor of Medicine, Second Year Medical Student

Jacob Martin Basak Hoffman Estates, IL, Program: MSTP, First Year Medical Student

Lisa Bauman Mounds View, MN, BS, Washington University '04, Program: Doctor of Medicine, Second Year Medical Student

Rebecca Ann Bavolek Little Rock, AR, BS, University of Illinois, Urbana-Champaign '98, Program: Doctor of Medicine, Clinical Clerkship Year

Lauren Ashley Baylor Brecksville, OH, BS, Ohio State University '01, Program: Doctor of Medicine, Clinical Clerkship Year

Roger V Belizaire Midland, TX, MS, University of Texas Health Science Center '03, BA, Princeton University '00, Program: MSTP, First Year Research

Peter Scott Benjamin Somers, CT, BS, Brown University '00, Program: Doctor of Medicine, 2005 Graduate, Internal Medicine, Johns Hopkins Hospital, Baltimore, MD

Andrea Lynn Bennett Wayne, NJ, BS, Boston College '00, Program: Doctor of Medicine, 2005 Graduate, Pediatrics, Children's Hospital of Philadelphia, Philadelphia, PA

Anne Elizabeth Berenbom Kansas City, MO, BA, University of Pennsylvania '01, Program: Doctor of Medicine, 2005 Graduate, Transitional Year, Louis A. Weiss Memorial Hospital, Chicago, IL, Ophthalmology, New York Eye & Ear Infirmary, New York, NY

Patrick Finley Bergin Natchez, MS, BS, Mississippi State University '01, Program: Doctor of Medicine, 2005
Daniel William Bergner  Plainfield, IL, BS, University of Illinois, Urbana -Champaign ’01, Program: Doctor of Medicine, 2005 Graduate, Internal Medicine, Northwestern McGaw Medical Center, Chicago, IL

Cagri Giray Besirli  Bursa, Turkey, BS, University of Michigan, Ann Arbor ‘98, Program: MSTM, Clinical Clerkship Year

Neil Vikrant Bhand  Madison, WI, BS, Northwestern University ’04, Program: Doctor of Medicine, Second Year Medical Student

Ajay Kamal Bhatia  Timonium, MD, BA, The Johns Hopkins University ’97, BS, Oxford University ’99, Program: MSTM, Fifth Year Research

Kathryn J Bitter  Glenview, IL, BA, Baylor University ’04, Program: Doctor of Medicine, Second Year Medical Student

Guy Matthew Bizek  Aurora, MO, BA, St Louis University ’01, Program: Doctor of Medicine, Elective Year

Seth Michael Bloom  Corvalis, MT, BA, Washington University ’03, Program: MSTM, Second Year Medical Student

Jennifer Michelle Boland  Seneca, WI, BS, University of Wisconsin ’02, Program: Doctor of Medicine, Elective Year

Michael Rashad Booker  Aurora, CO, BS, Colorado School Of Mines ’98, Program: Doctor of Medicine, Elective Year

Michael Magdy Bottos  Chesterfield, MO, BA, Washington University ’02, Program: Doctor of Medicine, Elective Year

Andrew Wynn Bowman  Athens, GA, BS, Vanderbilt University ’97, BS, Vanderbilt University ’97, Program: MSTM, Clinical Clerkship Year

Ryan James Bowman  Bakersfield, CA, BA, University of California ’00, Program: Doctor of Medicine, Elective Year

Brian Adam Boyd  Caruthersville, MO, BS, University of Missouri, Columbia ’02, Program: Doctor of Medicine, Clinical Clerkship Year

Jason A Brant  Boulder, CO, BS, Washington University ’04, Program: Doctor of Medicine, Second Year Medical Student

Paul Andrew Brewer  Newburg, OR, BS, George Fox University ’00, Program: Doctor of Medicine, Elective Year

David Micah Brogan  San Antonio, TX, Program: Doctor of Medicine, First Year Medical Student

Justin Ryan Brooks  Chesapeake, VA, BA, University of Maryland, Baltimore ’04, Program: MSTM, Second Year Medical Student

Kristin Rebecca Brown  Denver, CO, BA, Northwestern University ’04, Program: Doctor of Medicine, Second Year Medical Student

Staci Bryson  Salt Lake City, UT, BS, Brigham Young University ’02, Program: Doctor of Medicine, Clinical Clerkship Year

Fang Bu  Marietta, GA, Program: Doctor of Medicine, First Year Medical Student

Oname Oro Burlingame  St. Louis, FL, BA, Claremont McKenna College ’96, Program: MSTM, Clinical Clerkship Year

Justin Michael Burton  Annapolis, MD, BS, University of Maryland, College Park ’01, Program: Doctor of Medicine, 2005 Graduate, Pediatrics, Children’s National Medical Center, Washington, DC

Patrick John Bushard  Random Lake, WI, BA, Northwestern University ’01, MS, Northwestern University ’01, Program: Doctor of Medicine, 2005 Graduate, Internal Medicine-Preliminary, Barnes-Jewish Hospital/Internal Medicine, St. Louis, MO, Neurology, Washington University, St. Louis, MO
Craig Alan Byersdorfer  Duluth, MN, BS, University of Minnesota, Duluth '95, BA, University of Minnesota, Duluth '95, Program: MSTP, Clinical Clerkship Year

Gregory Dee Byrd  Hillsboro, OR, BS, University of Oregon '00, Program: Master of Arts/ Doctor of Medicine, 2005 Graduate, Orthopaedic Surgery, Oregon Health & Science University, Portland, OR

Lawrence Disini Cabusora  Bay Shore, NY, Program: Doctor of Medicine, First Year Medical Student

Sheng Feng Cai  Cincinnati, OH, BS, Duke University '02, Program: MSTP, Second Year Research

John Allan Campbell  Peoria, IL, BS, University of Illinois, Urbana -Champaign '98, Program: Doctor of Medicine, 2005 Graduate, Family Practice, St. John's Mercy Medical Center, St. Louis, MO

Kenisha Natalie Campbell  Kingston, Jamaica, BA, Cornell University '00, Program: Doctor of Medicine, 2005 Graduate, Pediatrics, Golisano Children's Hospital at Strong, Rochester, NY

Dena Grace Caralis  Troy, MI, Program: Doctor of Medicine, First Year Medical Student

Tracy Michelle Carlson  Albuquerque, NM, BA, University of Tulsa '03, Program: MSTP, First Year Research

Timothy James Casper  Columbus, OH, Program: Doctor of Medicine, First Year Medical Student

Karen Ama-Serwa Chachu  New York City, NY, BA, Williams College '01, Program: MSTP, Third Year Research

Sara Marie Champlin  Program: Doctor of Medicine, First Year Medical Student

Elaine Soling Chan  Vancouver, British Columbia, BA, The University of Chicago '01, Program: Doctor of Medicine, Clinical Clerkship Year

Carolyn Jean-An Chang  Port Washington, NY, BS, Stanford University '02, Program: Doctor of Medicine, Elective Year

Jinny E Chang  Sunnyvale, CA, BA, Univ of California, Berkeley '01, Program: Doctor of Medicine, Elective Year

Qing Chang  Shanghai, Program: Doctor of Medicine, First Year Medical Student

Sherwin Shiu-Cheung Chan  Vancouver, British Columbia, Canada, BS, Queen's University at Kingston '00, BS, Queen's University at Kingston '00, Program: MSTP, Fourth Year Research

Melani Shaun Cheers  New Bethlehem, PA, Program: Doctor of Medicine, First Year Medical Student

David Yuan-Sou Chen  Troy, MI, BS, University of Michigan, Ann Arbor '03, Program: MSTP, First Year Research

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Clerkship Year

Matthew John Christopher  St. Louis, MO, BA, St. Louis University '93, Program: MSTP, Third Year Research

Jennifer Y. Chu  Plano, TX, MS, Stanford University '02, BS, Stanford University '02, Program: Doctor of Medicine, Clinical Clerkship Year

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Michael Cohen  Woburn, MA, BA, Harvard University '98, Program: Master of Arts/Doctor of Medicine, 2005 Graduate, Plastic Surgery, Georgetown University Hospital/Plastic Surg, Washington, DC

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Christopher Andrew Cox  Merced, CA, BA, University of The Pacific '03, Program: Doctor of Medicine, Elective Year

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Benjamin Jesse Davis  Highland Park, IL, BA, New York University '03, Program: Doctor of Medicine, Clinical Clerkship Year

Sarah Nicole Davis  Sweet Valley, PA, Program: MSTP, First Year Medical Student

Alex Martin De Shields  Easton, MA, BA, Swarthmore College '98, Program: Doctor of Medicine (5 Year), Elective Year

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Shadmehr Demehri  Vancouver, WA, BS, Washington State University '04, Program: MSTP, Second Year Medical Student

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Manuel Doblado  Houston, TX, BA, Washington University '04, Program: Doctor of Medicine, Second Year Medical Student

Michael Andrew Dobson  Allen, TX, Program: Doctor of Medicine, First Year Medical Student

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Charlene Ann Ellsworth  Ballston Spa, NY, BS, Tufts University '97, PH, Massachusetts Institute of Technology '04, Program: Doctor of Medicine, Second Year Medical Student

Mary Adel Elmasri  Laguna Niguel, CA, BA, University of California, Berkeley '02, Program: Doctor of Medicine, Clinical Clerkship Year

Rachel Marie Engen  Clear Lake, MN, BA, Northwestern University '04, Program: Doctor of Medicine, Second Year Medical Student

Edward Manuel Esparza  San Antonio, TX, BA, Princeton University '99, Program: MSTP, Fifth Year Research

Jeremy Robert Etzkorn  Springfield, IL, BS, University of Illinois, Urbana-Champaign '03, Program: Doctor of Medicine, Second Year Medical Student

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Erin Corinne Farlow  Indianapolis, IN, BA, Washington University '02, Program: Doctor of Medicine, Elective Year

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Oluwadamilola Motunrayo Fayanju  Basking Ridge, NJ, BA, Harvard University '01, MA, Harvard University '01, Program: Doctor of Medicine, Clinical Clerkship Year

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Margaret Ann Fitzpatrick  Milwaukee, WI, BS, University of Notre Dame '03, Program: Doctor of Medicine, Clinical Clerkship Year

Katherine Elizabeth Fleming  Memphis, TN, BS, University of Tennessee, Knoxville '03, Program: Doctor of Medicine, Clinical Clerkship Year

Saroj Andreena Fleming  Jamaica, NY, Program: Doctor of Medicine, First Year Medical Student

Denise Renea Flinn  Georgetown, TX, BA, Southwestern University '96, Program: Doctor of Medicine, 2005 Graduate, Internal Medicine, Barnes-Jewish Hospital, St. Louis, MO

Nicholas Christian Foeger  Portola Valley, CA, BA, Brown University '03, Program: MSTP, First Year Research

Elizabeth Ellen Foglia  Columbia, MD, BS, University of Notre Dame '01, Program: Master of Arts/ Doctor of Medicine, Elective Year
Mackenzie Anna Ford  Princeton, IN, BA, Indiana University, Bloomington '02, Program: Master of Arts/ Doctor of Medicine, Clinical Clerkship Year

Cara Marie Fosdick  Saline, MI, Program: Doctor of Medicine, First Year Medical Student

Anthony Frank Fotenos  San Francisco, CA, BS, Brown University '99, Program: MSTP, Fourth Year Research

Elizabeth A Fowler  Unionville, MO, AB, Washington University '04, Program: Doctor of Medicine, Second Year Medical Student

Michael David Fox  West Chester, OH, BS, Ohio State University '01, Program: MSTP, Third Year Research

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George Mark Freeman  Hickory, NC, Program: MSTP, First Year Medical Student

Adam Timothy Froemming  Alexandria, MN, BS, University of Minnesota, Twin Cities '01, Program: Doctor of Medicine, Elective Year

Antonina I. Frolova  Galveston, TX, Program: MSTP, First Year Medical Student

Margo Christiane Funk  West Lafayette, IN, BS, Indiana University, Bloomington '99, Program: Master of Arts/ Doctor of Medicine, Elective Year

Ryan Kevin Funk  Idaho Falls, ID, Program: Doctor of Medicine, First Year Medical Student

Lauren Elizabeth Galpin  Wilmington, DE, BS, Georgetown University '99, Program: Master of Arts/ Doctor of Medicine, Elective Year

Noopur Gangopadhyay  Beckley, WV, BS, University of Virginia '04, Program: Doctor of Medicine, Second Year Medical Student

John Michael Gansner  Campbell River, British Columbia, Canada, BA, Harvard University '02, Program: MSTP, Second Year Research

Eric Jonas Gapud  Atlanta, GA, BS, University Georgia '02, Program: MSTP, Second Year Medical Student

Jennifer Michelle Gardner  Leawood, KS, BS, Duke University '01, Program: Doctor of Medicine (5 Year), Elective Year

Anubhav Garg  Cleveland, OH, BS, Case Western Reserve University '02, Program: Doctor of Medicine, Elective Year

Eugenia Catarina Garvin  Stony Brook, NY, BS, Harvard University '03, Program: Doctor of Medicine, Clinical Clerkship Year

Albert Ooguen Gee  Urbana, IL, BS, University of Illinois, Urbana-Champaign '01, Program: Doctor of Medicine, 2005 Graduate, Orthopaedic Surgery, Hospital of the University of Pennsylvania, Philadelphia, PA

Elaine Yeming Gee  Staten Island, NY, BS, New York University '02, Program: Doctor of Medicine, Elective Year

Joel Charles Geerling  Saint Louis, MO, BA, Saint Louis University '01, Program: MSTP, Third Year Research

Bob Geng  Burlington, NJ, Program: Doctor of Medicine, First Year Medical Student

Michael John Geske  Okemos, MI, BS, University of Michigan, Ann Arbor '04, Program: Doctor of Medicine, Second Year Medical Student

Monica Ghei  Herndon, VA, BS, Duke University '03, Program: Doctor of Medicine, Clinical Clerkship Year

Zahra Ghiassi-Nejad  Tehran, Iran, BA, New York University '04, Program: MSTP, Second Year Medical Student
Nsangou Tambangre Ghogomu  Friendswood, TX, BS, University of Illinois, Urbana-Champaign '04, Program: Doctor of Medicine, Second Year Medical Student

Marios Giannakis  Athens, Greece, BS, University of Toronto '01, Program: MSTP, Second Year Research

Jill Elizabeth Gibson  Columbia, MO, BA, Northwestern University '01, Program: Doctor of Medicine, 2005 Graduate, Internal Medicine, Barnes-Jewish Hospital/Internal Medicine, St. Louis, MO

Corey Scott Gill  Woodstock, GA, BS, University of Georgia '01, Program: Master of Arts/ Doctor of Medicine, Elective Year

Timothy Justin Gillenwater  Glasgow, KY, BS, Vanderbilt University '03, Program: Doctor of Medicine, Clinical Clerkship Year

Jennifer Gibson Gill  Knoxville, TN, BS, University Georgia '03, Program: MSTP, First Year Research

Mary Ann Tan Gimenez  Greendale, WI, BS, University of Wisconsin '95, Program: MSTP, 2005 Graduate, Pathology/Laboratory Medicine, University of Louisville, Louisville, KY

Yekaterina Gincherman  St. Louis, MO, BA, University of Missouri, St Louis '03, Program: Doctor of Medicine, Clinical Clerkship Year

Leah R. Givens  Atlanta, GA, BS, University of Georgia '03, AB, University of Georgia '03, Program: Doctor of Medicine, Second Year Medical Student

Jeffrey Avins Glassberg  Manhattan, NY, BA, University of Rochester '01, Program: Master of Arts/ Doctor of Medicine, Elective Year

Patricia Ellen Goldhoff  Springfield, MO, AB, Harvard University '04, Program: Doctor of Medicine, Second Year Medical Student

Kathryn Ann Gold  Pittsburgh, PA, BS, Duke University '01, Program: Doctor of Medicine, 2005 Graduate, Internal Medicine, Hospital of the University of Pennsylvania, Philadelphia, PA

Guillermo Gonzalez  Tucson, AZ, Program: Doctor of Medicine, First Year Medical Student

Elizabeth Leigh Goodman  Santa Monica, CA, BA, Pomona College '00, Program: Doctor of Medicine, Second Year Medical Student

Anjali Gopalan  Las Cruces, NM, BA, Rice University '04, Program: Doctor of Medicine, Second Year Medical Student

Jegan Gopal  North Hollywood, CA, BS, University of California, Los Angeles '00, Program: Doctor of Medicine, Elective Year

Mollie Rebecca Gordon  Houston, TX, MA, University of London '01, BA, University of Pennsylvania '00, Program: Doctor of Medicine, 2005 Graduate, Psychiatry, Barnes-Jewish Hospital/Psychiatry, St. Louis, MO

Daniel Graesser  St. Louis, MO, BS, University of Illinois, Urbana-Champaign '04, AB, University of Illinois, Urbana-Champaign '04, Program: Doctor of Medicine, Second Year Medical Student

Anna Sorensen Graseck  Southington, CT, Program: Doctor of Medicine, First Year Medical Student

Cheryl Ann Gray  Middlesex, MA, AB, Harvard University '99, Program: Doctor of Medicine, Second Year Medical Student

Adam M Greenbaum  Houston, TX, Program: MSTP, First Year Medical Student

David Stanley Grenda  Las Vegas, NVMA, BA, Harvard University '94, MH, Weston Jesuit School of Theology '98, Program: MSTP, Fourth Year Research

Jaclyn Mikela Grentzer  Camarillo, CA, Program: Doctor of Medicine, First Year Medical Student

Nicole Renee Grieselhuber  Hamilton, OH, BS, Case Western Reserve University '03, Program: MSTP, First Year
Brent Griffith  Clarkston, MI, BS, University of Notre Dame ’04, Program: Doctor of Medicine, Second Year Medical Student

Jennifer Lynn Griffith  Indianapolis, IN, BS, Indiana University, Bloomington ’04, BA, Indiana University, Bloomington ’04, Program: MSTP, Second Year Medical Student

Andrew Alexander Grimm  Burnsville, MN, BS, Massachusetts Institute of Technology ’00, Program: MSTP, Fourth Year Research

Sarah Elizabeth Grosland  Elgin, IL, BS, Butler University ’02, Program: Doctor of Medicine, Elective Year

Monique Gupta  Macon, GA, Program: Doctor of Medicine, First Year Medical Student

Brandon Kenneth Hadland  Las Vegas, NV, BS, HARVEY MUDD COLLEGE ’98, Program: MSTP, Elective Year

Scott Evan Hadland  White Rock, BC, Canada, BS, McGill University ’03, Program: Doctor of Medicine, Second Year Medical Student

Tarik Hadzic  Storrs, CT, Program: MSTP, First Year Medical Student

Ian Sean Hagemann  Alexandria, VA, BA, Princeton University ’00, Program: MSTP, Fourth Year Research

Suzanna Su-Hiong Hahn  Program: Doctor of Medicine, First Year Medical Student

Luke Tyler Hall  Harrisburg, IL, BA, Greenville College ’03, Program: Doctor of Medicine, Clinical Clerkship Year

Caroline Patricia Halverstam  Tenafly, NJ, BA, Northwestern University ’02, Program: Doctor of Medicine (5 Year), Research (Here)

David Caleb Ham  Jacksonville, TX, Program: Doctor of Medicine, First Year Medical Student

Elizabeth Erica Hansen  Asheville, NC, BA, Washington University ’02, Program: MSTP, First Year Research

Joshua Thomas Hanson  Arlington, TX, BA, University of Texas, Austin ’01, Program: Doctor of Medicine (5 Year), Research (Away)

Andrew Thomas Harger  Portland, OR, Program: Doctor of Medicine, First Year Medical Student

James Michael Harper  Baltimore, MD, BM, Rice University ’00, Program: MSTP, Second Year Medical Student

Lorie Michelle Harper  Carrollton, TX, BS, University of Texas, Dallas ’01, BS, University of Texas, Dallas ’01, Program: Doctor of Medicine, 2005 Graduate, Obstetrics and Gynecology, Barnes-Jewish Hospital/OB-GYN, St. Louis, MO

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Cynthia Joan Herrick  The Woodlands, TX, BA, Princeton University '02, Program: Doctor of Medicine, Elective Year

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Jena Beth Hudson Valparaiso, IN, Program: Doctor of Medicine, First Year Medical Student

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John Christian Huetsch  Waterloo, IL, BA, Harvard University '03, Program: Doctor of Medicine, Clinical Clerkship Year
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Alisen Brie Huske  Elgin, IL, BA, Washington University ’01, Program: Doctor of Medicine, 2005 Graduate, Pediatrics, Medical College of Wisconsin/Pediatrics, Milwaukee, WI

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Ricky Raj Kalra  Plano, TX, Program: Doctor of Medicine, First Year Medical Student

Grace Kao  Montville, NJ, BA, Harvard University ’01, Program: MSTP, Second Year Research

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Narayanan Kazhuthu  Morris Plains, NJ, BA, Princeton University ’96, Program: MSTPCC, Clinical Clerkship Year
<table>
<thead>
<tr>
<th>Name</th>
<th>City</th>
<th>State</th>
<th>Program</th>
<th>Details</th>
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<tbody>
<tr>
<td>Rahul Kasukurthi</td>
<td>Portland, OR</td>
<td>OR</td>
<td>Program: Doctor of Medicine</td>
<td>First Year Medical Student</td>
</tr>
<tr>
<td>Bryson William Katona</td>
<td>Silver Spring, MD, BA</td>
<td>PA</td>
<td>University of Pennsylvania '02</td>
<td>MS, University of Pennsylvania '02, Program: MSTP, Second Year Research</td>
</tr>
<tr>
<td>Andrew Leon Kau</td>
<td>St. Louis, MO, BS, Emory</td>
<td>MO</td>
<td>University '98, Program: MSTP</td>
<td>Second Year Medical Student</td>
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<tr>
<td>Julia Anne Kauffman</td>
<td>Bellingham, WA, BS, University of California, San Diego '04, BA, University of California, San Diego '04, Program: Doctor of Medicine, Second Year Medical Student</td>
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<tr>
<td>Nada Mufid Kawar</td>
<td>Montrose, CA, BS, University of California, Los Angeles '98, Program: Doctor of Medicine, 2005 Graduate, Obstetrics and Gynecology, University of California, San Francisco, San Francisco, CA</td>
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<tr>
<td>James Edward Kelly</td>
<td>St. Louis, MO, BS, University of Notre Dame '99, Program: Master of Arts/ Doctor of Medicine, 2005 Graduate, Transitional Year, St. John's Mercy Medical Center/GME OfficeSt. Louis, MO, Diagnoic Radiology, Barnes-Jewish HospitalSt. Louis, MO</td>
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<tr>
<td>Alistair Juel Kent</td>
<td>Walnut Ridge, AR, BS</td>
<td>AR</td>
<td>Harding University '04, Program: Doctor of Medicine, Second Year Medical Student</td>
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<tr>
<td>Aparna Hemant Kesarwala</td>
<td>Belle Mead, NJ, BA</td>
<td>NJ</td>
<td>Princeton University '00, Program: MSTP, Fourth Year Research</td>
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<tr>
<td>Jason David Keune</td>
<td>St. Louis, MO, BA</td>
<td>MO</td>
<td>Washington University '97, Program: Doctor of Medicine, Elective Year</td>
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<tr>
<td>Bernard Khor</td>
<td>St. Louis, MO, BS</td>
<td>MO</td>
<td>Massachusetts Institute of Technology '98, Program: MSTP, Sixth Year Research</td>
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<tr>
<td>David Ashkan Kiamanesh</td>
<td>Dix Hills, NY</td>
<td>NY</td>
<td>Program: Doctor of Medicine, First Year Medical Student</td>
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<tr>
<td>Elizabeth Ann Kidd</td>
<td>San Mateo, CA, BA</td>
<td>CA</td>
<td>Pomona College '00, Program: Doctor of Medicine, 2005 Graduate, Internal Medicine-Preliminary, Barnes-Jewish Hospital/Internal Medicine, St. Louis, MO, Radiation Oncology, Barnes-Jewish Hospital, St. Louis, MO</td>
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<tr>
<td>Edy Yong Kim</td>
<td>Bloomfield Hills, MI</td>
<td>MI</td>
<td>BA, Harvard University '97, Program: MSTP, Clinical Clerkship Year</td>
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<tr>
<td>Elma Eunjung Kim</td>
<td>Korea, BA</td>
<td>KO</td>
<td>Emory University '00, Program: Master of Arts/ Doctor of Medicine, Elective Year</td>
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<tr>
<td>Lauren Marie Kim</td>
<td>Jasper, AL, BA</td>
<td>AL</td>
<td>Harvard University '99, Program: Master of Arts/ Doctor of Medicine, Clinical Clerkship Year</td>
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<tr>
<td>Andrew Marshall King</td>
<td>Glendale, AZ, BA</td>
<td>AZ</td>
<td>Northwestern University '04, Program: Doctor of Medicine, Second Year Medical Student</td>
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<tr>
<td>Erick N. Kinyungu</td>
<td>Limurn, Kenya, BS</td>
<td>KE</td>
<td>University of Nebraska, Lincoln '02, Program: Doctor of Medicine, Elective Year</td>
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<tr>
<td>Jeffery Michael Klco</td>
<td>Perry, OH, BS</td>
<td>OH</td>
<td>Boston College '98, Program: MSTP, Fourth Year Research</td>
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<tr>
<td>Michael Ryan Klein</td>
<td>Arlington, VA, BS</td>
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<td>University of Notre Dame '04, Program: Doctor of Medicine, Second Year Medical Student</td>
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<tr>
<td>Kristina Lynn Kluge</td>
<td>Watertown, MN</td>
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<tr>
<td>Eric Marshall Knoche</td>
<td>Mt. Vernon, IL, BS</td>
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<tr>
<td>Kaveh Kousari</td>
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<td>First Year Medical Student</td>
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<td>Sarah G Kovnar</td>
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<tr>
<td>Marie Alana Kozel</td>
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<tr>
<td>Benjamin Charles Kramer</td>
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</table>
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Clinical Clerkship Year

**Shantia Rahimian** Rancho Palos Verdes, CA, BA, University of California, Berkeley ’00, Program: Doctor of Medicine, Clinical Clerkship Year

**Saju Aby Rajan** Staten Island, NY, BS, Temple University ’03, Program: Master of Arts/ Doctor of Medicine, Master of Arts

**Brandon Aaron Ramo** Atlanta, GA, BS, University of Georgia ’01, Program: Doctor of Medicine, 2005 Graduate, Orthopaedic Surgery, Vanderbilt University Medical Center, Nashville, TN

**Lisette Marie Ramos** Bohemia, NY, BS, Duke University ’01, Program: Doctor of Medicine, 2005 Graduate, Anesthesiology, St. Louis University SOM/Anesthesiology, St. Louis, MO

**Vinod Rao** Monroeville, PA, BS, Massachusetts Institute of Technology ’02, Program: MSTP, Second Year Research

**Brian Michael Rapp** Edwardsville, IL, BS, Washington University ’02, Program: Master of Arts/ Doctor of Medicine, Clinical Clerkship Year

**Amanda Kate Raya** South Pasadena, CA, BA, Pomona College ’04, Program: Doctor of Medicine, Second Year Medical Student

**Ronald Luke Rebenitsch** Bismarck, ND, Program: Doctor of Medicine, First Year Medical Student

**Anjani T. Reddy** Ogden, UT, BA, Swarthmore College ’04, Program: Doctor of Medicine, Second Year Medical Student

**Laxminarsim Daram Reddy** Houston, TX, Program: Doctor of Medicine, First Year Medical Student

**Elizabeth Channing Reed** Greenbelt, MD, BS, University of Maryland, College Park ’02, Program: Master of Arts/ Doctor of Medicine, Master of Arts

**Jennifer Lynn Reeve** Farmington, MI, BS, Univ of Michigan-Ann Arbor ’04, Program: MSTP, Second Year Medical Student

**Kristoff Rewi Reid** Davis, CA, BS, United States Military Academy ’98, Program: Doctor of Medicine, Clinical Clerkship Year

**Andrew Rex Reinink** Tecumseh, MI, BS, Michigan State University ’04, Program: Doctor of Medicine, Second Year Medical Student

**Karen Elaine Reisiger** Vestal, NY, BS, University of Pittsburgh ’01, Program: Doctor of Medicine, 2005 Graduate, Surgery-Preliminary, Univ of Texas, Southwestern Medical School, Dallas, TX, Urology, University of Texas, Southwestern Medical School, Dallas, TX

**Kristina Joy Rene** Morristown, MN, BS, Concordia University of Wisconsin ’02, Program: Doctor of Medicine, Elective Year

**John Edward Reuter** Excelsior, MN, BS, Stanford University ’00, Program: Doctor of Medicine, Clinical Clerkship Year

**Joshua Arthur Reyes** Program: Doctor of Medicine, First Year Medical Student

**Nicholas Gallagher Rhodes** Eau Claire, WI, BS, University of Wisconsin, Madison ’03, Program: Doctor of Medicine, Clinical Clerkship Year

**Suzanne Michelle Rhodes** Safford, AZ, Program: Doctor of Medicine, First Year Medical Student

**Noor Riaz** St Louis, MO, BA, Northwestern University ’03, Program: Doctor of Medicine, Clinical Clerkship Year

**Charles Gerard Rickert** Peoria, IL, BA, New York University ’03, Program: Doctor of Medicine, Second Year Medical Student
Robert Vincent Ridenour, III. Eau Claire, WI, BS, University of Notre Dame '01, Program: Doctor of Medicine, 2005 Graduate, Pathology/Laboratory Medicine, Mayo Graduate School of Medicine/Pathology, Rochester, MN

Clare Haverty Ridley Atlanta, GA, BA, Columbia University '02, Program: Doctor of Medicine, Second Year Medical Student

Amy Elizabeth Riek Delafield, WI, BS, University of Wisconsin, Madison '01, Program: Doctor of Medicine, 2005 Graduate, Internal Medicine, Barnes-Jewish Hospital/Internal Medicine, St. Louis, MO

Richard Aaron Robison Sierra Madre, CA, BS, California Institute of Technology '02, Program: Doctor of Medicine (5 Year), Research (Away)

Brandon George Rocque Lilburn, GA, BS, University of Georgia '01, Program: Doctor of Medicine, 2005 Graduate, Surgery-Preliminary, U Wisconsin Hospital and Clinics, Madison, WI, Neurological Surgery, U Wisconsin Hospital and Clinics, Madison, WI

Randall John Rodrigues San Jose, CA, BS, University of Georgia '01, Program: MSTP, Third Year Research

Cynthia Elise Rogers Louisville, KY, BA, Harvard University '98, Program: Doctor of Medicine, 2005 Graduate, Psychiatry, Barnes-Jewish Hospital/Psychiatry, St. Louis, MO

Amanda Elaine Rohn Cleveland, OH, Program: Doctor of Medicine, First Year Medical Student

Jeffrey David Roizen Chicago, IL, BS, Williams College '00, Program: MSTP, Fourth Year Research

Natalya Romaniv Chicago, IL, BA, The University of Chicago '00, Program: Doctor of Medicine, 2005 Graduate

David Aaron Rosen Farmington Hills, MI, BA, University of Michigan, Ann Arbor '02, Program: MSTP, Second Year Research

Ilana Shaina Rosman Palo Alto, CA, BA, Brown University '01, Program: Doctor of Medicine, Second Year Medical Student

Shada Amelia Rouhani Clarksburg, MD, BS, McGill University '03, Program: Doctor of Medicine, Second Year Medical Student

Adam Gene Rouse Huxley, IA, BS, Washington University '04, Program: MSTP, Second Year Medical Student

Audrey Patricia Routt Spokane, WA, BS, Western Washington University '02, Program: Doctor of Medicine, Elective Year

Susan Jennifer Rovelstad Waynesboro, PA, BS, University of Illinois, Urbana-Champaign '98, Program: Master of Arts/ Doctor of Medicine, 2005 Graduate, Surgery-Preliminary, Boston University Medical Center, Boston, MA, Boston University Medical Center, Boston, MA

Anthony Jerrod Rowe Avon, NY, BS, University of Pittsburgh '04, Program: Doctor of Medicine, Second Year Medical Student

Stacey Leigh Rubin Elkins Park, PA, BA, Cornell University '99, Program: Doctor of Medicine, Elective Year

Wesley Alan Russell Franklin, TN, BS, Georgetown University '98, Program: Doctor of Medicine, Second Year Medical Student

Michelle Catherine Sabo Solon, OH, Program: MSTP, First Year Medical Student

Dana Lin Sacco Sebring, FL, BS, University Of Florida '00, AA, South Florida Community College '98, Program: Doctor of Medicine (5 Year), Research (Here)

Michael George Sacerdote Lexington, MA, BA, Harvard University '02, Program: Doctor of Medicine, Second Year Medical Student

Neil Sachanandani Program: Doctor of Medicine, First Year Medical Student
Justin Samuel Sadhu  Frankfort, IL, BS, University of Illinois, Chicago '03, Program: Doctor of Medicine, Clinical Clerkship Year

Jose Bernardo Saenz Miami, FL, BA, Cornell University '03, Program: MSTP, First Year Research

James Riley Sagar Arlington, VA, BA, University of Virginia '03, Program: Doctor of Medicine, Clinical Clerkship Year

Mohammed Khurram Saghir Overland Park, KS, BA, University of Pennsylvania '01, Program: Master of Arts/Doctor of Medicine, Elective Year

Paban Saha Tallahassee, FL, BA, The Johns Hopkins University '02, MA, The Johns Hopkins University '02, Program: Doctor of Medicine, Elective Year

Gurmukh Singh Sahota Branchburg, NJ, Program: MSTP, First Year Medical Student

John Lawrence Sanders New Haven, CT, Program: Doctor of Medicine, First Year Medical Student

Heidi Linda Sandige St. Louis, MO, BA, Northwestern University '91, MA, Yale University '93, Program: Master of Arts/Doctor of Medicine, 2005 Graduate, Pediatrics, Case Western/University Hospitals, Cleveland, OH

Shailaja Janaki Sathy Ft. Worth, TX, BA, University of Texas, Austin '01, Program: Doctor of Medicine, 2005 Graduate, Internal Medicine, Duke University Medical Center/Int Medicine, Durham, NC

Theodore Daniel Satterthwaite Wilmette, IL, BA, Williams College '00, Program: Master of Arts/Doctor of Medicine, Elective Year

Danielle Kaye Scheidenhelm Belvidere, IL, BA, Coe College '01, Program: MSTP, Third Year Research

Tara Marie Scherer Peoria, IL, Program: Doctor of Medicine, First Year Medical Student

Bruce Jeremy Schlomer Pueblo, CO, BS, University of Virginia '02, Program: Doctor of Medicine, Elective Year

Nicole Cherie Schmitt Las Vegas, NV, BS, University of Nevada, Las Vegas '01, Program: Doctor of Medicine, Elective Year

Katherine Elizabeth Schwetye Saint Louis, MO, BA, Washington University '01, Program: MSTP, First Year Research

Leon Robert Scott Fairfax, VA, BS, University of Virginia '03, Program: Doctor of Medicine, Clinical Clerkship Year

Ruth Barron Seabrook West Orange, NJ, BA, Amherst College '00, Program: Doctor of Medicine, 2005 Graduate, Pediatrics, Children's Hospital of Philadelphia, Philadelphia, PA

Midori Jane Seppa Penngrove, CA, BA, Lewis and Clark College '99, Program: MSTP, Third Year Research

Sunitha Sequeira Morrison, CO, BS, Washington University '03, Program: Doctor of Medicine, Second Year Medical Student

Venkat Seshadri Maywood, IL, BS, Northwestern University '01, Program: Doctor of Medicine, Elective Year

Ghazal Shafiei Orland Park, IL, Program: Doctor of Medicine, First Year Medical Student

Baiju Kirtikumar Shah Houston, TX, BA, University of Texas, Austin '00, Program: Doctor of Medicine, Clinical Clerkship Year

Nirav Rasik Shah Des Plaines, IL, BA, Northwestern University '01, Program: Doctor of Medicine, 2005 Graduate, Orthopaedic Surgery, Barnes-Jewish Hospital/Orthopaedic Surgery, St. Louis, MO

Samir Hemendra Shah Little Rock, AR, Program: Doctor of Medicine, First Year Medical Student

Ajay Bipin Shalwala Program: Doctor of Medicine, First Year Medical Student
Thomas Scott Shane  Greenfield, WI, BS, Emory University '02, Program: Doctor of Medicine, Elective Year

Noura Mohamed Sharabash  Champaign, IL, BS, University of Illinois, Urbana-Champaign '01, Program: Doctor of Medicine, 2005 Graduate, Internal Medicine, University of Chicago Hospital/Int Medicine, Chicago, IL

Efrat Shavit  Concord, MA, Program: Doctor of Medicine, Second Year Medical Student

Annemarie Noelle Sheets  West Lafayette, IN, BS, Massachusetts Institute of Technology '03, Program: Doctor of Medicine, Second Year Medical Student

Eugenia Shekhtman  Program: Doctor of Medicine, First Year Medical Student

Amy Lynn Sheldahl  Hull, IA, BS, Iowa State University '02, Program: Doctor of Medicine, Elective Year

John Paul Ying-Ching Shen  Saint Louis, MO, BS, Massachusetts Institute of Technology '02, Program: Doctor of Medicine (5 Year), Research (Away)

Tammy Ting-Yu Shen  Surrey BC, Canada, BS, Duke University '03, Program: Doctor of Medicine, Second Year Medical Student

Yeamie Marie Sheref  Willingboro, NJ, BS, University of Pennsylvania '04, Program: Doctor of Medicine, Second Year Medical Student

Yelizaveta Ilinichna Sher  San Francisco, CA, BA, University of California, Berkeley '01, Program: Doctor of Medicine, Clinical Clerkship Year

Arsham Sheybani  Baton Rouge, LA, BS, Louisiana State University '04, Program: Doctor of Medicine, Second Year Medical Student

Jennifer Shih  Garland, TX, BS, Massachusetts Institute of Technology '03, Program: Doctor of Medicine, Clinical Clerkship Year

Leonid Shmuylovich  Newton, MA, BS, Cornell University '03, Program: MSTP, First Year Research

Omar Khalid Siddiqi  East Greenwich, RI, BS, University of Rhode Island '03, Program: Doctor of Medicine, Clinical Clerkship Year

Smita Sihag  Carlisle, MA, Program: Doctor of Medicine, Clinical Clerkship Year

Jessica Lynn Silverman  Program: Doctor of Medicine, First Year Medical Student

Deepti Singh  Naperville, IL, BA, The University of Chicago '02, Program: Doctor of Medicine, Clinical Clerkship Year

Devon Snow  Edmonds, WA, BS, Tufts University '03, Program: Doctor of Medicine, Second Year Medical Student

Eric Lee Snyder  Painted Post, NY, BS, Pennsylvania State University '97, Program: MSTP, 2005 Graduate, Pathology/Laboratory Medicine, Brigham & Women's Hospital/Pathology, Boston, MA

Celaine May So  Fort Wayne, IN, BA, University of Southern California '02, Program: Doctor of Medicine, Elective Year

Isaac H. Solomon  Program: MSTP, First Year Medical Student

Steven Matthew Sperry  St. Simons Island, GA, BA, University of Virginia '03, Program: Doctor of Medicine, Second Year Medical Student

Jennifer Eryn Sprague  Nashville, IN, BS, Indiana University, Bloomington '00, Program: MSTP, Clinical Clerkship Year

Seth Thomas Stalcup  Flagstaff, AZ, BS, University of Arizona '03, Program: Doctor of Medicine, Clinical Clerkship Year

Ashley Lynn Steed  Roeford, NC, BS, Duke University '01, Program: MSTP, Third Year Research
Scott Jeffrey Steiger  Coffeyville, KS, BS, Duke University ’98, Program: Doctor of Medicine, 2005 Graduate, Internal Medicine, University of Washington/Internal Medicine, Seattle, WA

Kara Ellen Sternhell  St. Louis, MO, BA, Washington University ’99, Program: Master of Arts/ Doctor of Medicine, 2005 Graduate, Pediatrics-Preliminary, St. Louis Children’s HospitalSt. Louis, MO, Dermatology

Sabrina Jill Stone  Cedar Rapids, IA, BS, Iowa State University ’01, Program: Doctor of Medicine, 2005 Graduate, Internal Medicine, Duke University Medical Center/Int Medicine, Durham, NC

Thomas Paul Stricker  Bettendorf, IA, BS, University of Iowa ’97, Program: MSTP, 2005 Graduate, Pathology/Laboratory Medicine, University of Chicago Hospital/Pathology, Chicago, IL

Leroy Joseph Stromberg  Program: Doctor of Medicine, First Year Medical Student

Russell G Strom  Bismarck, ND, BA, Harvard University ’04, Program: Doctor of Medicine, Second Year Medical Student

David Wesley Strong  Southfield, MI, BA, The Johns Hopkins University ’03, Program: MSTP, First Year Research

Menachem M Stuart  Program: Doctor of Medicine, Clinical Clerkship Year

Katherine Anne Stumpf  Quincy, IL, BA, Washington University ’03, Program: Doctor of Medicine, Clinical Clerkship Year

Christopher Joseph Sumey  Fairmont, MN, BA, St Olaf College ’04, Program: Doctor of Medicine, Second Year Medical Student

Ian Richard Paul Sunderland  Manitoba, Canada, BS, University of Toronto ’01, Program: Doctor of Medicine, 2005 Graduate, Plastic Surgery, University of Washington/Plastic Surgery, Seattle, WA

Mythili Suntharalingam  Woodridge, IL, BA, Brandeis University ’98, MS, Brandeis University ’98, Program: MSTP, 2005 Graduate, Pediatrics, Children’s Hospital, Boston, MA

Neeraj K. Surana  Evansville, IN, BS, Indiana University, Bloomington ’98, BA, Indiana University, Bloomington ’98, BS, Indiana University, Bloomington ’98, Program: MSTP, Clinical Clerkship Year

Melanie Marie Sutter  Steeleville, IL, BS, Baylor University ’04, Program: Doctor of Medicine, Second Year Medical Student

Pooja Manjula Swamy  Decatur, AL, BS, Emory University ’01, Program: Doctor of Medicine, 2005 Graduate, Internal Medicine-Preliminary, St. Mary’s Health Center, St. Louis, MO, Dermatology, Barnes-Jewish Hospital, St. Louis, MO

Chad Michael Sylvester  Racine, WI, BS, University of Notre Dame ’01, Program: MSTP, Third Year Research

William Biggins Taft  Nashua, NH, BS, University of Wisconsin, Madison ’00, Program: Doctor of Medicine, 2005 Graduate, Pediatrics, Cincinnati Children's Hospital, Cincinnati, OH

Neda Tahmasebi  Program: Doctor of Medicine, First Year Medical Student

Junko Takeshita  Ann Arbor, MI, BA, Wellesley College ’98, Program: MSTP, Clinical Clerkship Year

Christopher Yasuyuki Tanaka  Columbia, MD, BA, University of California, Berkeley ’03, Program: Doctor of Medicine, Clinical Clerkship Year

Ting Yin Tao  Knoxville, TN, BA, Washington University ’00, Program: MSTP, Fourth Year Research

Shandiz Tehrani  Simi Valley, CA, BA, Occidental College ’00, Program: MSTP, Fourth Year Research

Anna Ruth Terry  Fort Smith, AR, BS, University of Arkansas ’01, BA, University of Arkansas ’01, Program: Doctor of Medicine, Clinical Clerkship Year

Jacob Antony Thomas  Program: Doctor of Medicine, First Year Medical Student
Jennifer Nicole Thompson  Peoria, IL, BS, Bradley University ’04, Program: Doctor of Medicine, Second Year Medical Student

Jeremy Ryan Thompson  Saint Charles, MO, BS, Harding University ’00, Program: Doctor of Medicine, 2005 Graduate, Psychiatry, Barnes-Jewish Hospital/Psychiatry, St. Louis, MO

Divya Tiwari  Carol Stream, IL, BS, University of Illinois, Chicago ’02, Program: Doctor of Medicine, Elective Year

Illya Tolokh  Program: MSTP, First Year Medical Student

Kristina Ai Toncray  Peoria, IL, BS, University of Illinois, Urbana-Champaign ’01, Program: Doctor of Medicine, 2005 Graduate, Pediatrics, University of Washington, Seattle, WA

Timothy Trung-Tin Tran  Program: Doctor of Medicine, First Year Medical Student

Amber Linnell Traugott  Menominee Falls, WI, BS, University of Georgia ’01, AA, Monterey Peninsula College ’96, AS, College of Lake County ’93, Program: Doctor of Medicine, Elective Year

Ilya V. Treskov  Saint Louis, MO, BS, Washington University ’01, Program: MSTP, Second Year Research

James Jay Tschudy  Belleville, IL, BS, Brigham Young University ’04, Program: Doctor of Medicine, Second Year Medical Student

Daniel Chen Tu  Edwardsville, IL, BA, Washington University ’00, Program: MSTP, Third Year Research

Diwakar Turaga  Chelmsford, MA, BS, University of Massachusetts ’04, Program: MSTP, Second Year Medical Student

Isaiah Richard Turnbull  Portland, OR, BS, University of Oregon ’98, Program: MSTP, Third Year Research

Alexander Joachim Ungewickell  St. Louis, MO, BA, Washington University ’98, Program: MSTP, Clinical Clerkship Year

Mwiza Ushe  West Springfield, MA, BS, University of Pittsburgh ’00, Program: Master of Arts/ Doctor of Medicine, Clinical Clerkship Year

Sanjeev Vaishnavi  Snellville, GA, BS, Georgia Institute of Technology ’02, Program: MSTP, First Year Research

Sara Ann Van Calcar  Program: Doctor of Medicine, First Year Medical Student

Katherine An Vandenheuvel  Program: Doctor of Medicine, First Year Medical Student

Kristin Anne Vanderploeg  Santa Paula, CA, BA, Colgate University ’03, Program: Doctor of Medicine, Second Year Medical Student

John Michael Vaszari  Program: Doctor of Medicine, First Year Medical Student

Luis Alberto Vega  Program: Doctor of Medicine, First Year Medical Student

Sunitha Vemula  Ada, OK, BA, Johns Hopkins University ’04, Program: Doctor of Medicine, Second Year Medical Student

John Wilson Verbsky  Milton, WI, BA, The University of Chicago ’92, MA, Washington University ’97, Program: MSTP, Clinical Clerkship Year

Vishal Verma  Charleston, WV, AB, Washington University ’02, Program: Doctor of Medicine, Clinical Clerkship Year

Matthew David Vesely  Tampa, FL, BA, Creighton University ’03, Program: MSTP, First Year Research

Victor Manuel Villalobos  El Paso, TX, BS, Baylor University ’99, Program: MSTP, Fifth Year Research

Natasha Monique Viquez  Northridge, CA, BS, University of Southern California ’99, BA, University of Southern California ’99, Program: MSTP, Fifth Year Research
Yamini Vikas Virkud Boca Raton, FL, BA, Harvard University '03, Program: Doctor of Medicine, Clinical Clerkship Year

Daniel Nam Hoang Vo Memphis, TN, BS, Vanderbilt University '01, Program: Doctor of Medicine, Elective Year

Alecia C Vogel Freeburg, IL, Program: MSTP, Second Year Medical Student

Matthew R Vogt Program: MSTP, First Year Medical Student

Luke John Voytas St. Louis, MO, BS, Duke University '01, Program: Doctor of Medicine, 2005 Graduate, Pediatrics, Childrens Hospital of Los Angeles, Los Angeles, CA

Hongha Thi Vu San Jose, CA, BA, University of California, Berkeley '01, Program: Doctor of Medicine, Clinical Clerkship Year

James Robert Wade Program: Doctor of Medicine, First Year Medical Student

Tracey Hope Wagner Chesterfield, MO, BS, University of Wisconsin-Madison '02, Program: Doctor of Medicine, Second Year Medical Student

Suzanne Elizabeth Wahrle Lakewood, CO, BS, Millsaps College '99, Program: MSTP, Fourth Year Research

Julie E Walcutt Gretna, NE, BA, Washington University '04, Program: Doctor of Medicine, Second Year Medical Student

Monica R Walker Orland Park, IL, BA, Northwestern University '04, Program: MSTP, Second Year Medical Student

Lindley Bevelle Wall Columbia, MO, BS, Duke University '02, Program: Doctor of Medicine, Elective Year

Karolyn Ann Wanat Wauwatosa, WI, BS, Florida Institute of Technology '00, Program: Doctor of Medicine, Second Year Medical Student

Gary Xiaoshi Wang Program: MSTP, First Year Medical Student

Michael Emmerson Ward Byron, MN, BS, Kenyon College '99, Program: MSTP, Clinical Clerkship Year

Stephen James Warner Program: MSTP, First Year Medical Student

Lukas Delbert Wartman Dyer, IN, BS, University of Wisconsin, Madison '99, Program: Doctor of Medicine (5 Year), 2005 Graduate, Internal Medicine, Barnes-Jewish Hospital/Internal Medicine, St. Louis, MO

Marie Rogers Waterhouse Washington, DC, BA, Columbia University '97, Program: Doctor of Medicine, 2005 Graduate, Pediatrics, Children's Hospital, Philadelphia, PA

Daniel Alexander Wattson Program: Doctor of Medicine, First Year Medical Student

Heather Webb Bremerton, WA, BS, Brigham Young University '02, Program: Doctor of Medicine, Elective Year

Daniel Wee Lake Forest, IL, BA, Northwestern University '02, Program: Doctor of Medicine, Elective Year

Iga Natalia Wegorzewska Program: MSTP, First Year Medical Student

Cindy Hsinyao Wei Princeton Junction, NJ, BA, Rutgers State University '00, Program: Doctor of Medicine (6 Year), Research (Away)

Bradley Charles Weinberger Philadelphia, PA, BA, Princeton University '01, Program: Doctor of Medicine, 2005 Graduate, Pediatrics, Case Western/University Hospitals, Cleveland, OH

Terrence Daniel Welch Toledo, OH, BS, University of Notre Dame '01, Program: Doctor of Medicine, 2005 Graduate, Internal Medicine, University of Michigan Hospitals, Ann Arbor, MI

Kristin Kay Wenger North Olmsted, OH, BA, Ohio Wesleyan University '97, Program: MSTP, Fifth Year Research

Ingrid Elizabeth Wertz Sacramento, CA, PhD, Univ of CA, Davis '04, BA, Univ of California, Berkeley '92,
Program: Doctor of Medicine, Elective Year

**Michael Brandon Westover** Temecula, CA, Program: MSTP, Clinical Clerkship Year

**Dawn Marie Wetzel** Toms River, NJ, BA, The Johns Hopkins University ‘98, Program: MSTP, 2005 Graduate, Pediatrics, New York Presbyterian Hospital, Columbia, New York, NY

**Brian Richard White** Cape Elizabeth, ME, BA, Harvard University ’04, Program: MSTP, Second Year Medical Student

**Robert Lazell White** Frederick, MD, BS, Washington University ’99, Program: MSTP, Clinical Clerkship Year

**Ryan Thomas Whitesell** Program: Doctor of Medicine, First Year Medical Student

**Elizabeth Whitlock** Program: Doctor of Medicine, First Year Medical Student

**Derek Edwin Williams** Lilburn, GA, BS, Vanderbilt University ’03, Program: Doctor of Medicine, Clinical Clerkship Year

**Jordan Williams** Program: MSTP, First Year Medical Student

**Kevin Frederick Wilson** Linden, UT, BS, Brigham Young University ’01, Program: Doctor of Medicine, 2005 Graduate, Surgery-Preliminary, University of Michigan, Ann Arbor, MI, Otolaryngology, University of Michigan, Ann Arbor, MI

**Erica Lauren Wise** Program: MSTP, First Year Medical Student

**Curtis Wilfrid Wittmann** Lincoln, NE, BA, Wesleyan University ’00, Program: Doctor of Medicine, 2005 Graduate, Psychiatry, Massachusetts General Hospital, Boston, MA

**Benjamin Douglas Womack** Utica, MS, BS, Mississippi State University ’00, Program: Doctor of Medicine, 2005 Graduate, Internal Medicine, D-3100 Vanderbilt Med Ctr North, Nashville, TN

**Ambrose Hon Wai Wong** Vancouver, British Columbia, Canada, BS, University of British Columbia ’04, Program: Doctor of Medicine, Second Year Medical Student

**Robert Daniel Wong** Syosset, NY, BS, Yale University ’03, Program: Doctor of Medicine, Second Year Medical Student

**Vincent Kwok Wai Wong** Arcadia, CA, BS, University of California, San Diego ’02, Program: Doctor of Medicine, Elective Year

**Anna Woodbury** Houston, TX, BA, Rice University ’04, Program: Doctor of Medicine, Second Year Medical Student

**Rosanna Lisa Wustrack** West Linn, OR, BA, Yale University ’99, Program: Doctor of Medicine, Elective Year

**John David Wylie** Worthington, OH, BS, Ohio State University ’00, Program: MSTP, Clinical Clerkship Year

**Lisa Yun Xu** Louisville, KY, BA, Washington University ’02, Program: Doctor of Medicine, Elective Year

**Nicole Keiko Yamada** Program: Doctor of Medicine, First Year Medical Student

**Dan Yang** Syracuse, NY, BA, Washington University ’03, Program: Doctor of Medicine, Clinical Clerkship Year

**Louise Yeuk Yan Yeung** Los Angeles, CA, BA, Case Western Reserve University ’03, Program: Doctor of Medicine, Clinical Clerkship Year

**Mae Ewing Young** Program: Doctor of Medicine, First Year Medical Student

**Margaret Ashley Young** Program: MSTP, First Year Medical Student

**Belinda Dorothea Yu** Alamo, CA, BA, Harvard University ’01, MA, Harvard University ’01, Program: Doctor of Medicine, Elective Year

**Camille Joy Yu** Sacramento, CA, BA, Stanford University ’01, Program: Doctor of Medicine, 2005 Graduate, Pediatrics, Children's Hospital, Los Angeles, CA
Yue Yu  Los Alamos, NM, BS, University of New Mexico ’99, Program: MSTP, Clinical Clerkship Year
David William Zeltser  Program: Doctor of Medicine, First Year Medical Student
Dongyang Zhang  Cape Girardeau, MO, BA, Washington University ’03, Program: MSTP, First Year Research
Victoria Nan Zheng  Program: Doctor of Medicine, First Year Medical Student
Kenneth Richard Ziegler  Los Angeles, CA, BA, University of California, Berkeley ’01, Program: Doctor of Medicine, Clinical Clerkship Year
Andrew Joseph Zimolzak  Jackson, MI, BS, Michigan State University ’02, Program: Doctor of Medicine, Clinical Clerkship Year
Daniel Christian Zurcher  Salt Lake City, UT, BS, Brigham Young University ’04, Program: Doctor of Medicine, Second Year Medical Student

Summary of Students in the School of Medicine

(2004-2005)

Doctor of Medicine and Doctor of Philosophy Degrees
Graduating Class: 18
Third-Year Class: 2
Seventh-Year Research: 1
Sixth-Year Research: 5
Fifth-Year Research: 15
Fourth-Year Research: 17
Third-Year Research: 26
Second-Year Research: 22
First-Year Research: 20
Second-Year Class: 27
First-Year Class: 21

Doctor of Medicine and Master of Arts Degrees
Graduating Class: 6
Trainees: 12

Doctor of Medicine Degree
Graduating Class: 90
Five-Year Research Program: 5
Third-Year Class: 99
Second-Year Class: 99
First-Year Class: 102

Doctor of Physical Therapy Degree
Graduating Class: 61
Second-Year Class: 59
First-Year Class: 67
Part-Time Students: 55

Doctor of Occupational Therapy Degree
Graduating Class: 4
Third-Year Class: 14
Second-Year Class: 17
First-Year Class: 6

**Doctor of Audiology**
Fourth-Year Class: 0
Third-Year Class: 6
Second-Year Class: 11
First-Year Class: 13

**Master of Health Administration Degree**
Graduating Class: 19
First-Year Class: 21

**Master of Science in Occupational Therapy Degree**
Graduating Class: 30
Second-Year Class: 25
First-Year Class: 25

**Master of Science in Psychiatric Epidemiology**
Graduating Class: 7
First-Year Class: 3

**Master of Science in Genetic Epidemiology**
Graduating Class: 7
First-Year Class: 3
Part-Time Students: 7
Certificate/SCND: 3

**Master of Science in Deaf Education**
Graduating Class: 5
First-Year Class: 11

Total: 1066
Map

Map

Map
For additional information, see the map at: http://visitor.wustl.edu/medicalmap.pdf
Schools of Washington University

All schools are located at One Brookings Drive, St. Louis, Missouri 63130 except Medicine (660 S. Euclid Ave., St. Louis, Missouri 63110). A University-sponsored shuttle bus travels between the Hilltop Campus and the Medical Center at regular intervals.

Arts & Sciences
- College of Arts and Sciences
- Graduate School of Arts and Sciences
- University College
School of Architecture
School of Art
Olin School of Business
School of Engineering and Applied Science
School of Law
School of Medicine
George Warren Brown School of Social Work
All Faculty

Alphabetical List of Faculty

NABIL ABBOUD, MD  Associate Professor of Anesthesiology, Anesthesiology, BA CHRISTIAN BROTHERS COLLEGE 63, MD ST. JOSEPH UNIVERSITY, BEIRUT 70

CHARLES C ABEL, MD  Assistant Professor of Clinical Medicine, Internal Medicine, BA WESTMINSTER COLLEGE 52, MD WASHINGTON UNIV IN ST. LOUIS 56

DANA RAY ABENDSCHEIN, PHD  Associate Professor of Cell Biology and Physiology, Cell Biology & Physiology, BS STATE UNIVERSITY OF NEW YORK 74, PHD PURDUE UNIVERSITY 78

DANA RAY ABENDSCHEIN, PHD  Associate Professor of Medicine, Internal Medicine, BS STATE UNIVERSITY OF NEW YORK 74, PHD PURDUE UNIVERSITY 78

MARC BRUCE ABRAMS, DDENT  Instructor in Clinical Otolaryngology, Otolaryngology, BA UNIVERSITY OF MO KANSAS CITY 68, DDENT UNIVERSITY OF MO KANSAS CITY 72

BARRY K ABRAMSON, MD  Instructor in Clinical Medicine, Internal Medicine, BA JOHNS HOPKINS UNIVERSITY 81, MD UNIVERSITY OF MIAMI 85

YOUSEF ABU-AMER, PHD  Associate Professor of Cell Biology and Physiology, Cell Biology & Physiology, BS HEBREW UNIVERSITY 85, MS HEBREW UNIVERSITY 87, PHD HEBREW UNIVERSITY 93

YOUSEF ABU-AMER, PHD  Associate Professor of Orthopaedic Surgery, Orthopaedic Surgery, BS HEBREW UNIVERSITY 85, MS HEBREW UNIVERSITY 87, PHD HEBREW UNIVERSITY 93

NADA A ABUMRAD, PHD  Professor of Medicine (Pending Executive Faculty Approval), Internal Medicine, BS AMERICAN UNIVERSITY OF BEIRUT 72, PHD STATE UNIVERSITY OF NEW YORK 78

ANINDA BHAT ACHARYA, MD  Instructor in Clinical Neurology, Neurology, BS UNIVERSITY OF KANSAS 92, MD UNIVERSITY OF KANSAS 96

SAMUEL I ACHILEFU, PHD  Associate Professor of Radiology, Radiology, PHD UNIVERSITY OF NANCY I 91

Joseph JH Ackerman  Siteman Cancer Center, Associate Professor of Radiology, Division of Radiological Sciences, Washington University School of Medicine, 1991-1993: Postdoctoral Research Fellow, Bioorganic/Inorganic Chemistry, Oxford University, Oxford, England, 1991: PhD, Chemistry, University of Nancy, France

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