2002

Washington University School of Medicine bulletin, 2002-2003

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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 and 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

The information that appears in this Bulletin was compiled in the spring of 2002. It is current as of April 1, 2002.
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CALENDAR 2002-2003

2002

JUNE

14 Friday Clinic orientation for new third-year students.
17 Monday Academic year begins for the third- and fourth-year classes.
21 Friday Deadline for registration and initial payment of tuition for the third- and fourth-year classes.

NOVEMBER

28 Thursday Thanksgiving Day observance.
29 Friday Holiday for first- and second-year classes.

DECEMBER

21 Saturday Winter recess begins at 1 p.m. for all classes.

JULY

4 Thursday Independence Day observance.

AUGUST

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

2003

JANUARY

6 Monday Winter recess ends at 8 a.m. for all classes.
10 Friday Deadline for payment of the balance of tuition for all classes.
20 Monday Martin Luther King, Jr. Day observance.

SEPTEMBER

2 Monday Labor Day observance.
19 Thursday Danforth Symposium; no classes beyond noon for first- or second-year students.

MARCH

30 Sunday Spring recess begins for the first- and second-year classes.
**APRIL**

4  **Friday** Spring recess begins at 8 a.m. for the third- and fourth-year classes.

7  **Monday** Classes resume for all classes.

**MAY**

2, 3  **Friday and Saturday** Distinguished Student Scholarship/Distinguished Alumni Scholarship activities.

4  **Sunday** Academic year ends at 5 p.m. for the graduating students.

16  **Friday** Commencement.

**Friday** Academic year ends at 5 p.m. for the second-year class.

26  **Monday** Memorial Day observance.

30  **Friday** Clinical clerkships end at 5 p.m. for the third-year class.

**Friday** Doctoring Retreat begins for third-year class.

**Friday** Academic year ends at 5 p.m. for the first-year class.

**JUNE**

5  **Thursday** Doctoring Retreat ends at 5 p.m. for the third-year class.

**Thursday** Academic year ends at 5 p.m. for the third-year class.

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**SCHEDULE OF CLERKSHIP AND ELECTIVE INTERVALS**

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Final examinations for clinical clerkships are administered at the end of each clerkship. Exact date, time and location are announced by the coursemaster.
THE STUDY OF MEDICINE AT WASHINGTON UNIVERSITY

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 correlates, 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.
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 gave 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 hospital. 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, 11 current faculty members have been elected to the National Academy of Sciences. Seventeen Nobel laureates have been associated with the School of Medicine.

During Fiscal Year 2001, 101 members of the faculty held individual or career development awards: 57 from the National Institutes of Health; one from the American College of Rheumatology; one from the American College of Surgeons; one from the American Diabetes Association; one from the American Digestive Health Foundation; nine from the American Heart Association; one from the American Lung Association; one from the American Society of Clinical Oncology; 11 from Burroughs Wellcome Fund; one from the Foundation for Anesthesia Research and Education; one from Hunter's Hope Foundation; one from the Juvenile Diabetes Research Foundation International; one from the W.M. Keck Foundation; three from the Esther A. and Joseph Klingenstein Fund, Inc.; one from The Klingenstein Third Generation Foundation; one from the Leukemia Society of America, Inc.; one from the Edward Mallinckrodt, Jr. Foundation; one from the National Hemophilia Foundation; one from the Open Society Institute; one from the Parker B. Francis Foundation; two from the Radiological Society of North America, Inc.; Research and Education Fund; and three from Research to Prevent Blindness, Inc.

The School of Medicine has 18 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 2001-2002, the School employed 1,319 full-time, salaried faculty members in its 21 preclinical and clinical departments. The clinical departments are further strengthened by 1,180 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 2001 Entering Class of 120 students was selected from a pool of 4,010 applicants. The School is a national institution with 46 states and 30 countries represented in the current enrollment.

In 2002, the School conferred the M.D. degree upon 89 individuals. In addition, four students received the M.A./M.D. degrees and 15 students graduated with the M.D. and the Ph.D. degrees. Graduating students who participated in the 2002 National Residency Matching Program matched in programs recognized for high quality and selectivity. Beginning on page 233, 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 535 medical students. Programs also are conducted for 419 students who are pursuing graduate degrees in clinical investigation, health administration, occupational therapy, physical therapy or psychiatric epidemiology. The Division of Biology and Biomedical Sciences has extensive graduate training programs for 569 students seeking the Doctor of Philosophy degree in areas of Bioorganic Chemistry, Computational Biology, Developmental Biology, Evolutionary and Population Biology, Immunology, Molecular Biophysics, Molecular Cell Biology, Biochemistry, Molecular Genetics, Molecular Microbiology and Microbial Pathogenesis, Neurosciences and Plant Biology.

TEACHING FACILITIES

The 230-acre Washington University Medical Center, spread over portions of 12 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. An integral unit of the Medical Center is the world-famous Mallinckrodt Institute of Radiology and the Institute for Biomedical Computing.

The Medical Center generates an annual financial impact of more than $2.3 billion on the St. Louis area, including employment, taxes, purchasing, construction projects and the reverberation of that activity through the community. With more than 15,000 employees, the Medical Center is the second largest place of employment 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 $270 million has been expended on renovation and new construction. Capital improvements have added 560,000 square feet of space to the medical school during this same period. A final stage calls for 60,000 additional square feet of space to be created. In the most recent fiscal year, more than $70 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 Bernard Becker Medical Library; the Mallinckrodt Institute of Radiology Imaging Research Facility; East Building; the 4480 Clayton Avenue Building; the McDonnell Pediatric Research Building; and the Center for Advanced Medicine.

The 45,160-gross-square-foot Eric P. Newman Education Center, completed in December 1995, accommodates non-degree professional education for the Medical Center. The new education center provides auditoriums, classrooms, meeting space and lecture halls to support and enhance a comprehensive education program. The new 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. The completion of the medical school library in the fall of 1989, a $14 million structure consisting of 113,000 gross square feet, has enabled the expansion of its programs, as well as long-term growth of its collections. Even more importantly, the structure provides state-of-the-art information management.

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 Imaging Research Facility, East Building, provided space for the creation of an Imaging Center that houses four major MRI (Magnetic Resonance Imaging) units. The 4480 Clayton Avenue Building houses administration offices for the School of Medicine and the Department of Surgery. The 494,500-gross-square-foot, 1,500-car parking garage, built on the northeast corner of Taylor and Clayton avenues, is a reinforced, seven-story structure that provides much-needed additional parking. 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, 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.

In addition, major renovations to existing buildings continue, with emphasis on research facilities. Renovations totalling $44 million have recently been completed. Major improvements and renovations have been made to MRI’s East Imaging Facility in 1998. The Department of Biochemistry has undertaken a significant renovation of the first floor of the South Building for new laboratories and offices. The Department of Genetics has expanded its operations, during 1999 in the Genome Sequencing Center located at 4444 Forest Park Ave. through a major, multi-year grant from the NIH to accelerate the Human Genome Project, and in 2002 through renovations on the seventh and eighth floors of McDonnell Sciences Research Building. Ongoing improvements to the campus infrastructure are being made through the Public Realm Project, which is focused on landscape and streetscape enhancements. The 96,650-gross-square-foot, five-story Biotechnology Center has been renovated to accommodate the Departments of Psychiatry and Cell Biology and Physiology. This renovation includes space on the ground, first and second floors for laboratories and department support, space on the fourth floor for Protein Chemistry Laboratory. Research and space on the third floor to accommodate human genome studies and research. The 46,400-gross-square-foot McMillan Building renovation project includes five complete floors of general labs, offices, corridors and central mechanical and electrical system improvements. The renovation provided new offices and research labs for Neurology, Neurological Surgery and Ophthalmology. The 294,302-gross-square-foot 4444 Forest Park Ave. renovation project includes various office and research facility renovations. The 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.

The School of Medicine is divided into two segments. Clinical departments are 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 1.6 million gross square feet devoted to these activities. In the aggregate, the medical school occupies more than 4 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.

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.

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:

- **McMillan Hospital**: McMillan houses offices and research laboratories for the Departments of Neurology and Neurological Surgery, Ophthalmology and Visual Sciences, and Otolaryngology.
- **The Edward Mallinckrodt Institute of Radiology**: An internationally recognized center of excellence in teaching, research and clinical services in Radiology, the Institute is housed in a 13-story building with satellite units in the West Pavilion of Barnes-Jewish Hospital, the East Building and St. Louis Children's Hospital. MIR's facilities include three functioning cyclotrons and 11 magnetic resonance imaging scanners.
- **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 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 (10 floors)**: 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 clinics are administered by Barnes-Jewish Hospital. Many of the clinics located on the first five floors moved to the newly constructed Center for Advanced Medicine, with the vacated space available for research needs. The lower five floors contain clinical space and space for translational research. The first floor is home for the Chromalloy Kidney Dialysis Center. The upper five floors are devoted to research facilities for several departments of the School of Medicine.
- **Bernard Becker Medical Library**: Founded in 1911, the Washington University Medical School library is one of the oldest and most comprehensive libraries in the western United States. Located in the Edward Mallinckrodt Institute of Radiology, the library serves as an information hub for all Medical Center departments of the School of Medicine and the Barnes-Jewish Hospital. Many of the clinics located on the first five floors have moved to the newly constructed Center for Advanced Medicine, with the vacated space available for research needs. The lower five floors contain clinical space and space for translational research. The first floor is home for the Chromalloy Kidney Dialysis Center. The upper five floors are devoted to research facilities for several departments of the School of Medicine.

Bernard Becker Medical Library serves as an information hub for the Medical Center and extends its services and resources to the global health science community.

The facility, completed in 1989, integrates two components: the Health Sciences Collections, and the Medical School Computing and Networking Services. The eight-level, 114,000-square-foot structure has a capacity for more than 300,000 volumes. The Health Sciences Collection includes more than 200,000 volumes and over 2,000 current journal subscriptions.

Information Services, as part of Communication and Outreach, 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.

- **E-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, 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 more than 2,000 audiovisual titles and computer programs, a network of advanced personal computer workstations, and a large computer education classroom. The staff supports student computing. ITLS pioneered the use of high-capacity networks and digital imaging technology in the medical curriculum. ITLS also supports peripheral computer laboratories at other educational sites within the Medical Center.

The Medical School Computing and Networking Services provides 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. The division also ensures that network-based information resources available from the library are disseminated effectively to all Medical Center collaborators.

The library's Archives and Rare Book 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, 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, Evans Graham and Carl Cori.

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

Library hours and telephone numbers are:

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.

Circulation (314) 747-0023
Reference (314) 362-7085
Interlibrary Loan (314) 362-2780
Instructional Technologies and Library Systems (314) 362-2793
Archives & Rare Books (314) 362-4226
Help Desk (314) 362-7798

Barnes-Jewish Hospital, a 1,389-bed teaching and research facility, is the largest hospital in Missouri, with 270,000 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, cardiovascular surgery, endocrinology, gastroenterology, geriatrics, gynecology, infectious diseases, neurology, neurosurgery, ophthalmology, orthopedic surgery, otolaryngology, pulmonary disease, rheumatology, transplantation and urology.

St. Louis Children’s Hospital is one of the top pediatric hospitals in the country. It provides a full range of health services for children and their families throughout its 300-mile service area and beyond. The hospital’s broad spectrum of pediatric specialty services includes newborn medicine and the world’s largest pediatric lung transplant program.

St. Louis Children’s Hospital also provides an extensive complement of community outreach services, including specialized home care services, pediatric mobile intensive care units, clinical affiliations with regional hospitals and physicians, patient and parent support groups, education programs for parents and children, and a free parent information phone line and physician referral service staffed by registered nurses.

Barnes-Jewish and St. Louis Children’s hospitals are members of BJC HealthCare, a regional health care system that provides community-based and academic health care services at more than 100 inpatient and ambulatory care sites throughout Missouri and southern Illinois. BJC, in partnership with its physicians, provides a full continuum of health care services, including wellness and health promotion; primary, acute and ambulatory care; skilled nursing; long-term care; home health care; and hospice care.

Barnard Free Skin and Cancer Hospital houses the Washington University General Clinical Research Center (GCRC). Through a collaboration among Barnard, 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.

Central Institute for the Deaf was founded in 1914 as a place where teachers, parents and professionals work together to help children with hearing loss. Central Institute for the Deaf is an internationally recognized center for oral education, scientific research and the education of professionals in audiology, deaf education and speech and hearing sciences. CID helps hearing-impaired children learn listening, language, speech and academic skills, prepares graduate students for careers in speech and hearing, provides clinical services and conducts cutting-edge basic and applied research in hearing and deafness. CID’s acoustically enhanced “quiet school” features the Joanne Parrish Knight Family School, serving children and their families from birth to age 3. The new Harold W. Siebens Hearing Research Center houses state-of-the-art hearing laboratories.

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 holds nearly $90 million in extramural funding for cancer research and is organized into eight research programs (cancer genetics, cancer and developmental biology, tumor immunology, stem cell biology, cellular proliferation, oncologic imaging, prevention and control, clinical and translational research). The Siteman Cancer Center also provides 12 shared resource facilities to its more than 250 research members. Shared resource facilities include: bioinformatics core, biostatistics core, clinical trials core, embryonic stem cell core, health behavior research core, hereditary cancer core, high-speed cell sorter core, molecular core laboratory, multiplexed gene analysis core, pharmacology core, small animal cancer imaging core and tissue procurement core.
The following hospitals also are associated with the School of Medicine, and various members of their staffs hold University appointments:

- Christian Hospitals Northeast and Northwest: 517 beds
- Metropolitan St. Louis Psychiatric Center: 125 beds
- Missouri Baptist Medical Center: 358 beds
- Veterans Administration Medical Center: 104 beds
- Shriners Hospital for Children: 80 beds

**RESEARCH ACTIVITIES**

Grants and contracts totaling more than $363 million supported faculty research efforts at the School of Medicine in fiscal year 2001. Substantial additional support was provided directly to faculty investigators by the Howard Hughes Medical Institute and by the Barnes-Jewish Hospital Foundation. Gifts and grants from private sources, including alumni, individuals, foundations, corporations and other organizations, totaled $49.9 million from 6,261 entities.

The School of Medicine received $289.5 million from the National Institutes of Health in grants in fiscal year 2001, making it the fourth-largest recipient of NIH dollars among the 125 U.S. medical schools.

That money came in 655 separate grants, 588 of which were designated as research grants. Funds supporting training came in 35 additional grants, 31 grants were for fellowships and one grant was for construction. NIH research grants supported the investigations of at least 672 full-time faculty members.

The Johns Hopkins University $334,145,551
University of Pennsylvania $326,986,194
University of California, San Francisco $320,794,924
**Washington University** $289,518,114
University of Washington $234,509,358

The many medical firsts at the School of Medicine include:

- With international teams, announced the first working draft of the human genome and sequenced the first plant genome.
- Obtained cells that, when injected into the spinal cord, reinnulate nerve axons and allow some improvement in neurological function in animals.
- Developed genetically altered mice that do not become obese or develop diabetes when fed a high-fat diet.
- 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.
- Developed a new strategy for creating vaccines and antibiotics against bacteria such as those that infect the bladder.
- Uncovered key players in programmed cell death, which rids the body of surplus or abnormal cells, and discovered how cancer cells avoid the self-destruct signal.
- Created the first PET scanner, a device that images the brain at work.
- Among the first to give patients insulin for diabetes.
- Proposed the now-common practice of taking aspirin to help prevent heart attacks.
- Pioneered research into excitotoxicity and brain injury.
- Developed a blood test for early diagnosis of prostate cancer.
- Developed a surgical procedure to remove damaged portions of emphysema patients’ lungs, dramatically improving function.
- Developed a cure for hepatitis B in cases diagnosed early.
- Created a surgical cure for the abnormal heart rhythm called atrial fibrillation.
- Developed a blood test that quickly and safely identifies whether a heart attack patient will require invasive treatment.

**Ongoing research includes:**

- Identifying a link between AIDS drugs and diseases such as osteoporosis and diabetes; developing better methods of treating HIV-positive patients.
- Imaging language areas of the brain during recovery from stroke to observe the brain's natural rehabilitation pattern, leading to a better understanding of normal language processes and helping to optimize stroke therapy.
- Leading an international research team in the identification and isolation of a genetic risk factor for Alzheimer's disease.
- Developing a method to block the ability of the malaria parasite to spread in the bloodstream.
- Studying unsafe sleep practices and their relation to the risk of infant death.
- Developing drug therapies for histoplasmosis and other disease-causing fungi, as well as malaria and other major tropical diseases.
- Investigating nerve transplants, including the world's first nerve transplant using nerve tissue from a cadaver donor.
- Identifying clinical signs of early Alzheimer's and studying events that trigger the disease.
- Imaging brains of healthy children and those with perinatal stroke to understand how the brain develops and recovers from injury.
- Researching the role of the immune system in tumor formation.
- Developing and using new imaging tools to study how brain cells for their connections.
• Developing a new model of asthma that addresses the role of antiviral response.
• Developing and using new minimally invasive surgery techniques, including robotics.
• Improving diagnostic tools for cancer.
• Imaging people with schizophrenia to identify anatomical markers of the disease.
• Identifying the role of ethnicity in response to drugs such as chemotherapy.
• Developing a more complete understanding of hemoglobin, the oxygen-carrying protein in red blood cells.
• Identifying new rehabilitation methods that improve function in old and new spinal cord injury and stroke patients.
• Studying the underlying cause of recurrent urinary tract infections.
• Using antibiotics to treat abdominal aortic aneurysms.

CURRICULUM

The curriculum is the 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. It is planned to provide students who enter medical school with diverse backgrounds and interests and who will undertake a wide variety of careers with 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 will introduce students to the broad panorama 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. As there is not enough time for all students to be introduced to each of today's areas of specialization, 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 2002-2003

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

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Title</th>
<th>Coursemasters</th>
</tr>
</thead>
<tbody>
<tr>
<td>M75 503</td>
<td>Cell and Organ Systems Biology</td>
<td>Paul C. Bridgman, Ph.D. 362-3449</td>
</tr>
<tr>
<td>M05 501A</td>
<td>Human Anatomy and Development</td>
<td>Glenn C. Conroy, Ph.D. 362-3397</td>
</tr>
<tr>
<td>M30 523</td>
<td>Immunology</td>
<td>Andrey S. Shaw, M.D. 362-4614</td>
</tr>
<tr>
<td>M30 511</td>
<td>Medical Genetics</td>
<td>Alison J. Wibelman, M.D. 362-7800</td>
</tr>
<tr>
<td>M30 526</td>
<td>Microbes and Pathogenesis</td>
<td>Henry V. Huang, Ph.D. 362-2755</td>
</tr>
<tr>
<td>M15 502</td>
<td>Molecular Foundations of Medicine</td>
<td>Linda J. Pike, Ph.D. 362-9502</td>
</tr>
<tr>
<td>M35 554</td>
<td>Neural Sciences</td>
<td>David C. Van Essen, Ph.D. 362-7043</td>
</tr>
<tr>
<td>M25 507</td>
<td>Practice of Medicine I</td>
<td>Robert J. Robbaut, M.D. 454-6173</td>
</tr>
<tr>
<td></td>
<td>• Clinical Skills</td>
<td>Yoon Kang, M.D. 362-8050</td>
</tr>
<tr>
<td></td>
<td>• Ethics and Health Policy</td>
<td>Rebecca Dresser, J.D. 454-7116</td>
</tr>
<tr>
<td></td>
<td>• Health Promotion/Disease Prevention</td>
<td>Bradley Exneroff, M.D., M.P.H. 286-2546</td>
</tr>
<tr>
<td></td>
<td>• Interpreting Illness</td>
<td>Stephen S. Lefrak, M.D. 454-7116</td>
</tr>
<tr>
<td></td>
<td>• Medicine Patient Sessions</td>
<td>Katherine E. Henderson, M.D. 362-8050</td>
</tr>
<tr>
<td></td>
<td>• Patient-Physician Communication</td>
<td>Kellie L. Flood, M.D. 286-2713</td>
</tr>
<tr>
<td></td>
<td>• Scientific Method of Clinical Medicine and Research</td>
<td>Jay F. Piccirillo, M.D. 362-7394</td>
</tr>
</tbody>
</table>

Selectives

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>M04</td>
<td>General Selectives</td>
</tr>
<tr>
<td>M04</td>
<td>Medical Humanities</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>M04 501</td>
<td>Anatomy Through the Eyes of the Radiologist</td>
</tr>
<tr>
<td>M04 514</td>
<td>Cardiovascular Biophysics</td>
</tr>
<tr>
<td>Course No.</td>
<td>Course Title</td>
</tr>
<tr>
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</tr>
<tr>
<td>M04 519</td>
<td>Case Problems in Biochemistry and Cell Biology</td>
</tr>
<tr>
<td>M04 526</td>
<td>New Diseases, New Pathogens</td>
</tr>
<tr>
<td>M04 533</td>
<td>Tropical Medicine</td>
</tr>
<tr>
<td>M04 534A</td>
<td>Progression of Kidney Disease</td>
</tr>
<tr>
<td>M04 536</td>
<td>Autonomic Mechanisms in Diseased States</td>
</tr>
<tr>
<td>M04 537</td>
<td>Cardiovascular Control Mechanism</td>
</tr>
<tr>
<td>M04 552</td>
<td>Genetics and Molecular Biology of Ion Channels</td>
</tr>
<tr>
<td>M04 561</td>
<td>Brain Blood Vessels</td>
</tr>
<tr>
<td>M04 567</td>
<td>Microcirculation</td>
</tr>
<tr>
<td>M04 582</td>
<td>Alzheimer's Disease</td>
</tr>
<tr>
<td>M04 584</td>
<td>Medical Aspects of Domestic Violence</td>
</tr>
<tr>
<td>M04 587A</td>
<td>Physician as Health Protector and Patient Advocate</td>
</tr>
<tr>
<td>M04 589</td>
<td>Topics in Viral Pathogenesis</td>
</tr>
<tr>
<td>M04 596</td>
<td>Ion Channels and Disease</td>
</tr>
</tbody>
</table>

**SECOND YEAR**

Second-year courses are taught during the 36-week academic year.

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>M25 611B</td>
<td>Cardiovascular Disease Dana R. Abendschein, Ph.D. 362-8925</td>
</tr>
<tr>
<td>M25 614</td>
<td>Dermatology Lynn A. Cornelius, M.D. 362-8187 Jeffery E. Petersen, M.D. 996-8810</td>
</tr>
<tr>
<td>M35 632</td>
<td>Diseases of the Nervous System Allyson Zazulia, M.D. 362-6378</td>
</tr>
<tr>
<td>M55 660A</td>
<td>Clinical Topics in Otolaryngology Joel A. Goebel, M.D. 747-0553 James M. Hartman, M.D. 367-7346</td>
</tr>
<tr>
<td>M25 615A</td>
<td>Endocrinology and Metabolism William E. Clutter, M.D. 362-8094</td>
</tr>
<tr>
<td>M25 620A</td>
<td>Gastrointestinal and Liver Diseases/Nutrition Deborah C. Rubin, M.D. 362-8940</td>
</tr>
<tr>
<td>M25 625A</td>
<td>Hematology and Oncology Scot G. Hickman, M.D. 289-6308</td>
</tr>
<tr>
<td>M25 605A</td>
<td>Infectious Diseases Nigar Kirmani, M.D. 454-8214</td>
</tr>
<tr>
<td>M45 635B</td>
<td>Obstetrics/Gynecology Andrea P. Stephens, M.D. 362-1016 362-3126</td>
</tr>
<tr>
<td>M60 665</td>
<td>Pathology Erika C. Croub, M.D. 454-8462</td>
</tr>
<tr>
<td>M65 640</td>
<td>Pediatrics Leonard B. Bacharier, M.D. 454-6299</td>
</tr>
<tr>
<td>M25 607</td>
<td>Practice of Medicine II Yoon Kang, M.D. 362-8050</td>
</tr>
<tr>
<td></td>
<td>• Clinical Skills Yoon Kang, M.D. 362-8050</td>
</tr>
<tr>
<td></td>
<td>• Ethics and Health Policy Rebecca S. Dresser, J.D. 454-7116</td>
</tr>
<tr>
<td></td>
<td>• Health Promotion/Disease Prevention Bradley E. Eisen, M.D., M.P.H. 286-2546</td>
</tr>
<tr>
<td></td>
<td>• Interpreting Illness Stephen S. Lefkoe, M.D. 454-7116</td>
</tr>
<tr>
<td></td>
<td>• Medicine Patient Sessions Katherine E. Henderson, M.D. 362-8050</td>
</tr>
<tr>
<td></td>
<td>• Neurology Patient Sessions Allyson Zazulia, M.D. 362-6378</td>
</tr>
<tr>
<td></td>
<td>• Ophthalmology Morton E. Smith, M.D. 362-5722</td>
</tr>
<tr>
<td></td>
<td>• Patient-Physician Communication Kellie L. Flood, M.D. 286-2713</td>
</tr>
<tr>
<td></td>
<td>• Radiology Harvey S. Glaser, M.D. 362-2927</td>
</tr>
<tr>
<td></td>
<td>• Scientific Method of Clinical Medicine and Research Jay E. Pickett, M.D. 362-7394</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>M70 670A</td>
<td>Principles of Pharmacology Douglas F. Corey, Ph.D. 362-1726</td>
</tr>
<tr>
<td>M85 676A</td>
<td>Diseases of the Nervous System: Psychiatry Laura J. Bierut, M.D. 362-3492</td>
</tr>
<tr>
<td>M25 612B</td>
<td>Pulmonary Diseases Michael B. Lippmann, M.D. 289-6306</td>
</tr>
<tr>
<td>M25 613B</td>
<td>Renal and Genitourinary Diseases Stanley Misler, Ph.D., M.D. 454-7966 David Windus, M.D. 362-7211</td>
</tr>
<tr>
<td>M25 606A</td>
<td>Rheumatology Leslie E. Kabl, M.D. 454-7299</td>
</tr>
</tbody>
</table>

**THIRD YEAR**

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

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>M25 715</td>
<td>Urgent Care Clerkship Mark Levine, M.D. 362-6743 Sandy Sing, M.D. 362-7959</td>
</tr>
<tr>
<td>M26 712</td>
<td>Family Practice Clerkship Walton Summer II, M.D. 454-8164</td>
</tr>
<tr>
<td>M85 775</td>
<td>Consultation/Liaison Psychiatry Clerkship Kevin J. Black, M.D. 747-2013</td>
</tr>
<tr>
<td>M95 790</td>
<td>Integrated Surgical Disciplines Clerkship Eric Chat, M.D. 362-8029</td>
</tr>
<tr>
<td>M25 710</td>
<td>Medicine Clerkship Thomas M. De Fer, M.D. 362-8050</td>
</tr>
<tr>
<td>M35 720</td>
<td>Neurology Clerkship Mark P. Goldberg, M.D. 362-3258</td>
</tr>
<tr>
<td>M85 770</td>
<td>Psychiatry Clerkship Kevin J. Black, M.D. 747-2013</td>
</tr>
</tbody>
</table>
Women's and Children's Health Clerkships

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

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 students, friends 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.


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 Lectureship. Established in 1982 by S. E. Freund in memory of his wife to provide a visiting lectureship in clinical oncology.

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.

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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.


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.


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-founder 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 patients, friends, colleagues and former students in honor of Dr. McCarroll.


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 medicine 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.

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.
other physicians and the St. Louis community to expand the understanding and practice of occupational medicine.

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

Robert J. Terry Lectureship (1939) and Visiting Professorship (1982). Established by alumni and friends of Dr. Terry, his son, respectively, "for the purpose of fostering greater appreciation of the study of anatomy."

Donald L. Thurston Memorial Lectureship. Established in 1985 by his wife, Dr. Jean Holowach Thurston, and his colleagues and friends, the lectureship 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.

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 to a small group of four faculty members, representing four disciplines: anatomy, physiology, biochemistry, and clinical medicine. The group is coordinated by Ms. Kelly Noll in the Curriculum Evaluation Office (362-3404). The clinical advisers meet early in the fall term to begin the process.

2. Academic Advisers: Students are assigned a faculty member who is available to advise them on academic matters, such as course selection, study programs, academic policies, and requirements within the School of Medicine. This is an ongoing relationship, and students are assigned a new advisor each year.
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**

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.

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 must be arranged with an academic adviser and is subject to the approval of the Associate Dean for Student Affairs.

**Master of Arts and Doctor of Medicine**

Medical students interested in an intensive biomedical research experience may apply for admission to the M.A./M.D. program. Program participants spend 12 months working in the lab of a faculty member. Application to the program consists of a brief research proposal written by the student (due March 1). In order to receive the M.A. degree, students must write and orally defend a publication-quality manuscript at the end of the research year. Program participants receive a stipend of at least $16,000, full tuition remission, and health coverage. Prospective participants should apply for a Howard Hughes Medical Student Fellowship (due December 1); those who do not receive a Hughes Fellowship will receive support from the Dean. Additional information on the program can be obtained by contacting: M.A./M.D. Program, (314) 747-6787.

**Doctor of Philosophy**

The Division of Biology and Biomedical Sciences offers predoctoral programs in Biochemistry, Bioorganic Chemistry, Computational Biology, Developmental Biology, Evolutionary and Population Biology, Immunology, Molecular Biophysics, Molecular Cell Biology, Molecular Genetics, Molecular Microbiology and Microbial Pathogenesis, Neurosciences and Plant Biology. 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 and Sciences. All degrees are awarded through the Washington University Graduate School of Arts and 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
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 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 $20,500 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 begins when the student begins the program, either in June or at the beginning of the medical school year. Students are encouraged to begin the program in June. For these students, the first week is spent visiting faculty in various departments and choosing a laboratory in which to carry out a short research project before beginning the medical school year.

MSTP students complete medical and graduate school courses in the first two years. They are expected to do a summer research project between the first and second years of medical school. The laboratories selected for summer research need not be those chosen for the Ph.D. portion of the program.

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.

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 28th 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
- Bioorganic Chemistry
- Computational Biology
- Developmental Biology
- Evolutionary and Population Biology
- Immunology
- Molecular Biophysics
- Molecular Cell Biology
Study of Medicine

Molecular Genetics
Molecular Microbiology and Microbial Pathogenesis
Neurosciences

Students may conduct research under any of the faculty affiliated with these programs and with 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.

Finally, 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 ivwtv.dbbs.wiistl.edu/mstp/. 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.dbbs.wustl.edu/mstp/

APPLYING FOR ADMISSION

For updated information, check our Admissions home page at http://medschool.wustl.edu/admissions.

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 integral calculus; and to have a background in chemistry, including one year of general or inorganic chemistry and one year of organic chemistry. 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.

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
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 write 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 wumsoa@msnotes.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. Washington University School of Medicine operates on a rolling admissions schedule: beginning October 15, and applicants are notified as soon as a final decision has been made on their application. By April 15, every applicant should have a final decision: accepted, 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 may have their acceptance into the class rescinded.

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 25 years. Over this time, the School of Medicine increased the number of merit scholarships with the establishment of the Distinguished Minority Student Scholarship Program 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, two additional "named" scholarships were made available through the generosity of individuals. 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.

**Distinguished Student Scholarships**

Up to five full-tuition scholarships may be awarded annually to members of the entering first-year class. In early fall 2002, selected applicants for admission to the School's 2003 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 2003-2004 scholarship recipients will be made during the week following the on-campus interviews on Saturday, May 3, 2003.

**Distinguished Minority Student Scholarships**

Up to five scholarships may be awarded to eligible minority students in the entering first-year class. A Scholarship Selection Committee identifies those to be considered for scholarship, and award notifications follow within two weeks.

**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:

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 G. Drews, M.D.
Ronald G. Evans, M.D.
I.J. Flance, M.D.
Mark E. Frisse, M.D.
Bernard T. Garfinkel, M.D.
David Goldring, M.D.
Samuel B. Guze, M.D.
Paul O. Hagemann, M.D.
Alexis F. Hartmann, M.D.
John C. Herweg, M.D.
Robert S. Karsh, M.D.
John M. Kissane, M.D.
Ira J. Kooler, M.D.
Allan E. Korker, M.D.
Stuart A. Kornfeld, M.D.

The 2002-2003 Distinguished Alumni Scholarships honor:
Deborah J. Gersell, M.D.
Alan P. Eyss, M.D.
Paul A. Mennes, M.D.
Frederick D. Peterson, M.D.

**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 2003 third-year class are available on October 1, 2002. The deadline for submission of applications is March 31, 2003. 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, 2003. 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
For the first-year class matriculant, tuition and housing rates for the 2002-2003 academic year are listed below. Students who enter in 2002 will benefit from a tuition stabilization plan, which provides that their annual tuition of $35,780 will be constant over four 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 $45,253. Allowances for entertainment, travel, clothing and other miscellaneous items must be added to this estimate.

- Tuition (includes Student Health Service and Microscope Lending Plan): $35,780
- Books, supplies and instruments: 1,493
- Housing and food: 7,980

Student Health Service
The Student Health Service provides comprehensive health care, including hospitalization, for all students in the School of Medicine. Health insurance coverage for dependents of students can be arranged for an additional charge.

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 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 is the date of withdrawal for purposes of the Registrar's Office. This is the date of record which is used to determine the amount of tuition and fees that the student is responsible for. The Office of Financial Aid may calculate the student's refund based on the date of the student's last attendance, as determined by the Registrar's Office.

Financial Information
The annual cost of education at Washington University includes tuition, fees, and room and board. Students are expected to pay for all expenses associated with their education, including but not limited to tuition, fees, room, and board. The Office of Financial Aid provides financial assistance to students in the form of grants, loans, and work-study programs. 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 is the date of withdrawal for purposes of the Registrar's Office. This is the date of record which is used to determine the amount of tuition and fees that the student is responsible for. The Office of Financial Aid may calculate the student's refund based on the date of the student's last attendance, as determined by the Registrar's Office.
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 #624820, as a recipient. Medical school financial aid application documents and detailed instructions will be made available after January 1, 2003.

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 section “Assessing Academic Achievement” on page 31.

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 compliance with the policy.

Scholarship Funds

**Helen M. Aff-Drum Scholarship Fund.** Established in 1998 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.

**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.

The **Barnes Hospital Society Scholarships.** Established in 1989 by the attending staff physicians of what was formerly Barnes Hospital, one scholarship is awarded to a first-year student based on financial need, an additional four book scholarships are awarded to first-year students based on need and an additional four book scholarships are awarded to second-year students who demonstrated distinguished academic achievement in the first-year curriculum.

**Barnes-Jewish Hospital Medical Staff Association Scholarship Fund.** Established in 1998 by the Barnes-Jewish Hospital Medical Staff Association to provide a two-year full tuition scholarship supported by the fund. The two-year full tuition scholarship supported by the fund.

**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 in 1992 by a generous gift in 1982, the fund provides scholarship assistance for deserving students in the School of Medicine.

**Isabel Valle Brookings Scholarships.** Established in 1987 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.

**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 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.

Grace Strong Coburn Scholarship Fund. Created in 1962 through the bequest of Mrs. Grace Strong Coburn for scholarships in the School of 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 F. Cornwall, 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 Caspo, M.D. Memorial Scholarship Fund. Established in 1982 by Elise Caspo 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 55th 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.

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.

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. Gutman 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.

Hartville-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.

Dr. Grace Huse Memorial Fund. Provides scholarship awards for deserving 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.

**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. Lehnmann 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 fields 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 postgraduate 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.

**The Monsanto Scholars Program.** Established in 1990 with generous support from the Monsanto Fund. The Monsanto-Washington University Minority Medical Scientist Scholarship Program provides a monthly stipend and full tuition support for outstanding minority students who are committed to becoming academic physicians. Participants pursue both the M.D. and Ph.D. degrees in the six-year Medical Scientist Training Program (MSTP).

**John and Ruth Musselman Medical Scholarship Fund.** 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. 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.

**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 Reeller Scholarship.** To be given to medical students in the name of the parents of Louise Reeller.

**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 research in the medical sciences.

**Ruckelshaus, William and Josephine Prez.** Established in 1987 to provide financial assistance to medical students enrolled in research programs in the biological sciences.

**1949 Lionberger Scholarship Fund.** Established in 1949 by Dr. George M. Lionberger in memory of his mother, Mary Lionberger, an alumnus of the University of Washington in Seattle.

**Washington University School of Medicine Scholarship Fund.** Established in 1953 by the University School of Medicine to provide financial assistance to students in the School of Medicine.

**E.A. Marquard Memorial Student Scholarship.** Established in 1993 by Mrs. Ellen Richardson to provide scholarship support to medical students.

**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.

**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.

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**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 research in the medical sciences.
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 Gutman, 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.

Tubolske-Jonas-Tubolske 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.

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 Eise 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. Gooden 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 interest 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.

Homcrest Foundation — School of Medicine Loan Fund. In 1982, the trustees of the Homcrest Foundation approved a proposal on behalf of the School of Medicine to match up to a generous annual cap for five years 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 Loan Memorial Fund. Established in 1959 by The Merck Company Foundation, the original purpose of the loan was modified in 1983 to provide loans 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.


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.
ASSESSING ACADEMIC ACHIEVEMENT

Committee on Academic Evaluation of Students

Responsibility of the Committee

Overall evaluation of academic performance by students at the 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; and
4. Deciding upon matters of academic disciplinary action.

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 M.D. degree;
2. Students in a five-year M.A./M.D. degree program taking the pre-clinical or clinical portion of their M.D. education;
3. Students in the Medical Scientist Training Program (MSTP) taking the preclinical and clinical portion of their M.D. education; and
4. Those selected students with a prior medically relevant Ph.D. who have been approved by the Medical Science Training Placement Curriculum Committee (MSTPCC) and are enrolled in the M.D. portion of their education.

Membership of CAES

A) Appointed & 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- or 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 coursemaster 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 coursemaster will send a designated representative. In the event that a coursemaster 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 reexaminations (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 reexamination. 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 coursemaster. Such occasions will be promptly reported to the Registrar. In the event of inability to attend a scheduled examination due to illness, unless extenuating circumstances exist, the student is required to inform the coursemaster prior to the examination and to be evaluated by the Student Health Service. In the event that the student cannot reach the relevant coursemaster, the student should contact the Associate Dean for Student Affairs.

B) In order to continue their studies at the Washington University School of Medicine, students must demonstrate sound judgment, 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. Breaches of these principles 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
- T* = 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% or more) must be reported by the coursemaster to the Associate Dean for Student Affairs. In the event of a failure of a single exam within the course, the coursemaster may allow one attempt at remediation of this examination. The scheduling of a remedial examination will be agreed upon by the coursemaster 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 coursemaster 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 coursemaster, 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
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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 will also appear on the student's official educational record. Incomplete (I) indicates that, because of a delay excused by the coursemaster, the student has not completed the requirements to pass a course.

Grade Reporting
Final grades will be submitted to the Registrar by coursemasters within ten (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 ten (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.

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.

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 coursemaster 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.

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 The Individual Study Program (ISP) section 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
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, section C (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. 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 may also 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, according to the schedule listed under the next section, labelled "B":
1) a student for whom a Fail or Incomplete grade in any single course in the second year curriculum, OR
2) a student for whom a Fail or Incomplete grade has been recorded in a single complete year-long course in the second year curriculum, OR
3) 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 will generally 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 will be generally offered at a time determined by the coursemaster 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 year-long courses OR
2) three or more block-long courses OR
3) one complete year-long 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 (section C 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 interacademic 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 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 may also 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 coursemaster 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 for a course of action.

D) The Associate Dean for Student Affairs may also 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 coursemasters 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 coursemaster 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 will generally 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.

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.
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 a second year 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 (5) 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.

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 coursemasters 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 coursework. 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, 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.

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 coursemasters 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.

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**Tutorial Assistance Program**

Students experiencing difficulty in any course may request tutorial assistance. Such requests should initially be directed towards the coursemasters and thereafter to the Associate Dean for Student Affairs. Students who are repeating courses will be offered the opportunity for tutorial assistance. CAES may also 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).
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.D./M.A.
Student status is maintained while in the research phase of the M.D./M.A. program. Students are registered in the graduate school during the research year. Both student health and disability coverage are provided by the Division of Biology and Biomedical Sciences.

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
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 must also 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 (5) members.

Within twenty (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. 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 twenty (20) days of the date of an 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 M.D. 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.

For further information, refer to the policy's website: 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. 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. In such matters, the following rules apply:

A) The individual(s) raising the questions of possible misconduct shall present them in writing to the Associate Dean for Student Affairs and shall be reminded of their confidentiality.

B) 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.

C) If further inquiry is deemed necessary, the Associate Dean for Student Affairs and one of the Associate Deans listed under section B will discuss the complaint with the student.

D) If the Associate Dean for Student Affairs considers the matter sufficiently serious, a recommendation will be made to the Dean to convene a Disciplinary Committee.

E) Appointment to a Disciplinary Committee will be made by the Dean and will include four faculty members and one academic representative from the Office of Student Affairs. Appointees will declare if assurances of their impartiality in the matter are not evident. Members of the Committee will elect 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 (3 out of 5 votes), except when the motion is for recommending to the Dean dismissal from enrollment in the School, where 4 out of 5 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.

F) If the Disciplinary Committee is convened, the Associate Dean for Student Affairs will forward all information concerning the matter to the Committee.

G) 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.

H) 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.

I) The following guidelines will be applied to the conduct of a 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.

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

United States Medical Licensing Exam (USMLE)

The USMLE has replaced the National Board of Medical Examiners (NBME) exam and the Federation Licensing Exam (FLEX). The USMLE is designed to "assess the examinees' understanding of and ability to apply concepts and principles that are important in health and disease." 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 three separate examinations: USMLE Step 1, generally taken following the second-year curriculum, tests knowledge in the basic sciences; USMLE Step 2, generally taken prior to graduation, tests proficiency in clinical sciences; and USMLE Step 3, taken during internship.

Further information can be obtained from the Bulletin of Information published by the National Board of Medical Examiners, and is available, along with application forms, at: www.nbme.org.

STUDENT LIFE

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.
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 $80,000 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 evident in 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 among the finest opera companies in the United States. The company has produced over 50 operas and has won numerous awards. St. Louis is also home to the St. Louis Symphony Orchestra, which performs at Powell Hall. The orchestra has won numerous awards and has performed with many of the world's leading artists.

The St. Louis Art Museum is one of the finest art institutions in the United States. The museum houses an extensive collection of art and provides a venue for temporary exhibitions. The museum is located in elegant historic buildings and is open to the public.

The Missouri Botanical Garden is one of the largest and most beautiful gardens in the world. The garden features over 20,000 species of plants, including many that are endangered or threatened. The garden also serves as a research facility and is home to many educational programs.

Recreation

St. Louisans can enjoy a variety of recreational activities in the metropolitan area. For those who enjoy outdoor activities, there are Many trails and parks throughout the area. The Missouri Botanical Garden is one of the largest and most beautiful gardens in the world. The garden features over 20,000 species of plants, including many that are endangered or threatened. The garden also serves as a research facility and is home to many educational programs.

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 training facilities, and a number of on-campus recreational activities. The complex is located on the campus and is accessible to all students.
rooms, racquetball courts, a complete outdoor tennis complex and a track complex. Built on the site of the 1994 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, Boeing and May Department Stores. 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, Monsanto supports fellowships for M.D./Ph.D. students and a scholarship for minority medical students at the School of Medicine, and contracts with Washington University for biomedical research.

The John M. Olin School of Business at Washington University enjoys a special relationship with the business community. As a laboratory for student study, internship opportunities, practicums through the Management Center and permanent employment of business graduates, St. Louis plays an integral role in the education of undergraduate and graduate business students. Faculty and student consultants work with corporations to explore new opportunities for growth and development of their firms. The local business and professional communities also have been very supportive of a new graduate internship program, making part-time jobs available to advanced graduate students in the humanities and social sciences divisions of the Graduate School of Arts and Sciences.

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 and Applied Science. Engineering faculty members regularly undertake collaborative research and consulting projects with area firms such as Boeing, Monsanto and Emerson.

The cooperative education program gives undergraduate engineering students an opportunity to apply what they learn in the classroom in alternating periods of employment, both in St. Louis and nationwide. Through the engineering school’s continuing education division that reaches out to St. Louis’ technical community, area residents can pursue an engineering education outside of regular working hours. A new program, offered in conjunction with the University of Missouri-St. Louis, is designed specifically for nontraditional engineering students from St. Louis.

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 STATS, Students Teaching AIDS to Students, 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.

**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 2002-2003 are:

- **School Year: Mid August-Mid May (Nine Months)**
  - Single Room: $2,880
  - Large Single: $3,450
  - Solo Suite: $3,980
  - Double Room: $1,930
  - Double Suite: $2,880

- **Summer 2002 (May 25th - August 4th)**
  - Single Room: $860
  - Large Single: $1,060
  - Solo Suite: $1,220
  - Double Room: $590
  - Double Suite: $860

*Price per student*

**Security**

Security at the School of Medicine is the responsibility of Protective Services. Uniformed Protective Services Response 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 and unarmed Protective Services personnel 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 supplement the in-house staff.

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' radio dispatcher, 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/~jmd/. Information may be found on the web page under "For Our Students" or "For Our Staff." A daily crime log, information on crime prevention tips and the many services and programs provided by Protective Services also appear on the web page. Individual printouts of the information presented on the web page may be obtained by writing to Washington University School of Medicine, Protective Services Department, Campus Box 8207, 660 S. Euclid Ave., St. Louis, MO 63110, or by calling (314) 362-2698.

**Parking**

Parking is available on various surface lots and garages 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. Shuttle service is available for transportation from one site to another in accordance with specific shuttle schedules. If additional information is needed, please contact Transportation Services at (314) 362-0824. If you are interested in carpooling, vanpooling, or Bi-State Transit passes please contact our Rideshare Office at (314) 747-0706.

**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 second floor of McDonnell Sciences Building. 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.
St. Louis, MO 63110-1093

Student Health Service

The Student Health Service is located in the East Building, 4525 Scott Ave., Suite 3420. Office hours are 8 a.m. to 4 p.m., Monday through Friday. Telephone numbers:

Information/Appointments 362-3523
Billing 362-2346

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 362-2346 for more information.

Life Insurance

All students are covered by a $10,000 life insurance benefit. Call 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.

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.

**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 both the national and state levels.

**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.

**Christian Medical and Dental Society**

The Christian Medical and Dental Society (CMDS) fellowship is a nondenominational group that meets on the medical school campus. Part of a national organization founded in 1931, it exists as a source of encouragement, understanding, and support for Christian students, as well as a resource for the entire medical community through information and discussion of such topics as spirituality in patient care, Christian perspectives in medical ethics, and medical missions in the United States and abroad.

Weekly meetings, open to anyone, consist of times of prayer, sharing and Bible study. Additionally, seminars are conducted dealing with special topics that future physicians will encounter. All are invited to attend weekly meetings held at 7 p.m. in Reber Library.

**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. The group has established a biweekly lecture series, a community service project with BJC Refugee Health Services, and a website (medicine.wusm.edu/~fihtm) of international contact and funding opportunities. In addition, the group has worked closely with administration in the design of a formalized international health elective program and funding structure.

**MedSTUBS**

The Medical Student Used Book Store (MedSTUBS) is a student-run, nonprofit used bookstore that allows students to buy and sell used books. Opened just a few years ago, this bookstore fulfills the need for cheaper textbooks and allows the cycling of books to those who will need most of them. Students often find that when they have finished with a course there is no point in keeping the book because they want a new edition or they know they'll never use it again. Although books are needed for specific third-year rotations, some students find that they don't need the texts after the rotation is over — especially if they are not planning to specialize in that area. MedSTUBS is an opportunity for students to bring in their used texts and set their own prices. Then, when the book sells, MedSTUBS will mail the student a check, minus 5 percent. Students can drop by and browse the growing collection of textbooks, pretests, atlases, manuals, etc., or drop off their used books in 312 of Olin Dorm. Cash and checks are accepted.

**Operation Smile**

A private, non-profit volunteer medical services organization, Operation Smile provides reconstructive surgery and related health care to indigent children and young adults in developing countries and the United States. The local student association raises awareness of the program and promotes domestic involvement through fundraising, sponsorship of a lecture series, and participation in Operation Smile missions.

**Pediatric Care Organization**

The Pediatric Care Organization is a student group working to serve the St. Louis pediatric community. Through this organization, students have the opportunity to work with chronically ill children, provide support for these children's families, and learn about disease in a community-based pediatrics setting. The Pediatric Care Organization consists of two separate projects: the Pediatric Outreach Project (POP), and a Liver Support Group.
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)
A student/faculty clinic organized by students to service the indigent.

Washington University Medical Center Housestaff Auxiliary (WUMCHA)
WUMCHA is an organization comprised of female medical students, residents, fellows, attending physicians, and female spouses 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 Guide to St. Louis, as well as a directory of members. Annual dues are $20 and information about membership and applications can be obtained by calling Denise Kerlan at (314) 721-4604.

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. One of the newer programs is the Reproductive Health Project, which provides sex education to middle school students. The Students Teaching AIDS to Students (STATS) Program allows trained medical students to provide

Physicians for Social Responsibility
The Washington University SPSR chapter provides a forum for students interested in environmental health, nuclear disarmament, gun violence prevention, and other areas in which physician activism may have a positive impact on society. The chapter is affiliated with the national PSR organization and International Physicians for the Prevention of Nuclear War (winners of the 1985 Nobel Peace Prize). Current SPSR projects include medical waste reduction and awareness, youth violence prevention, state and federal-level legislative action, and a series of lunchtime multimedia presentations. In addition to these local projects, Washington University SPSR participates in national PSR programs such as the recent “First Monday Campaign to End Gun Violence.”
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 Dr. Leslie Kahl, 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, Dr. Koong-Nah Chung, Box 8107.

**Alpha Omega Alpha (AOA)**

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 acknowledg-
edges 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 2002 recipient: Margaret Rosanna Gray-Swain.

Morris Alex, M.D. Prize. Awarded each year to that medical student who is outstanding among his or her peers in the second-year Clinical Medicine course. The 2002 recipient: Brent A. Ragar.

Alpha Omega Alpha Book Prize. Awarded to a member of the graduating class who has performed outstandingly for the entire medical course. The 2002 recipient: Edward Christian Miner.

American College of Physicians William E. Clutter, 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 2002 recipient: Shan Li Cheng.

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 2002 recipient: Li Ern Chen.

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 clerkships. The 2002 recipient: Hannah Wunsch.

American Medical Women's Association Janet M. Glasgow Memorial Achievement Citations. Presented to women medical students graduating in the top 10 percent of their class. The 2002 recipients: Eva Ann Hurst, Marissa Morningstar Jaggers, Alison Sue Klenk, Christina Marie Ward, Monica K. Cheong, Phoebe Elizabeth Freer, Anat Gal-or and Margaret Rosanna Gray-Swain.

American Medical Women's Association Janet M. Glasgow Memorial Award. Presented to a woman graduating first in her class.

Association for Academic Surgery Student Research Award. Recognizes outstanding research efforts by a graduating medical student interested in a surgical career. The 2002 recipient: Mueed Ahmad.

The Ruth Behermeyer Award. Established in 2001 by the WUMCAA executive council to honor Ruth Behermeyer 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 2002 recipient: John A. Martini.

Alexander Berg Prize. Awarded to the student presenting the best results in research in molecular microbiology.

Jacques F. Bronfenbrenner Prize. 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, in the judgment of the Chairman of the Department of Medicine, has done the most outstanding work in infectious diseases or related fields. The 2002 recipient: Andrew Charles Glatz.


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 2002 recipient: Dortha Tao-Yi Chu.

Kebhar S. Chouke - George Gill Prize in Anatomy. Awarded annually to a first-year medical student who has demonstrated superior scholarship in anatomy. The 2002 recipient: Jason W. Stephenson.

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 2002 recipient: Adit A. Ginde.

Carl F. and Gerty T. Cori Prize in Biochemistry. Awarded at the end of the first year to the member of the class who has demonstrated superior scholarship in biochemistry. The 2002 recipient: Ryan M. Tierney.

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 2002 recipients: Nico U. Dosenbach and Jason W. Stephenson.

Antoinette Frances Dames Award in Cell Biology and Physiology. Awarded annually to a member of the first-year class who has demonstrated superior scholarship in these fields. The 2002 recipients: Ian S. Hagemann and Kristen J. Homes.

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 2002 recipient: Kabuiya Ruth Kimani.

Distinguished Minority Medical Student Scholarship Prize. 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 2002 recipients: Nefertari Daaga and Delma Y. Jarrett.

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 volunteering. The 2002 recipient: Anat Gal-or.

Dr. William Ellis Award. Established in 1990 by Dr. Ellis and awarded to a senior student in recognition of meritorious research in ophthalmology.

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 2002 recipient: Jennifer Margaret Klein.

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 2002 recipient: Sara Anne Fleming.

George F. Gill Prize in Pediatrics. Awarded to a member of the graduating class who has demonstrated superior scholarship in pediatrics. The 2002 recipient: Andrew Charles Glatz.

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 2002 recipient: Jessica Ward Miller.

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 2002 recipient: Anat Gal-or.


Dr. John Esben Kirk Scholastic Award. Established in 1975 and awarded to a graduating student of high scholastic standing. The 2002 recipient: Anat Gal-or.

Louis and Dorothy Koetzl 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 2002 recipient: Kacy Alvarez Phillips.

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 2002 recipient: Tanya Marya Wilkes.

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. The 2002 recipient: Michelle Anne Burack.


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 2002 recipient: Robert Morris Blanton Jr.

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 2002 recipient: Amir M. Islami-Manuchehry.


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 2002 recipient: Anat Gal-or.

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 2002 recipients: Edward Christian Miner and James Michael Johnston Jr.


Missouri State Medical Association Award. Presented annually to honor graduates of the senior class. The 2002 recipients: Felix Yichung Peng, Adam Fredrick Ghiz and Cindy Lien.

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 2002 recipient: Kabuiya R. Kimani.

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. The 2002 recipient: Charles Andrew Harris.
James L. O'Leary Neuroscience Prize. Awarded annually to students who demonstrate the best accomplishments in the neuroscience course. The 2002 recipient: Jason W. Stephenson.

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 2002 recipient: Kara E. Sternhell.

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 2002 recipient: Elise Lindsay Krejci.

St. Louis Pediatric Society Senior Prize. Presented to the senior student showing the greatest promise in clinical pediatrics. The 2002 recipient: Kristen Lynn Vogt.

David F. Silbert Outstanding Teaching Assistant Award. Established in memory of Dr. David Silbert. Awarded to a teaching assistant in a medical school course in recognition of his/her commitment to teaching.

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 2002 recipient: Tanya Maya Wildes.

Dr. Margaret G. Smith Award. Given to a woman medical student for outstanding achievement in the first two years of medical school. The 2002 recipient: Yue Yu.

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. The 2002 recipient: Jennifer Stuart Lee.

Samuel D. Soulé 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 2002 recipient: Margaret Rosanna Gray-Swain.

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 2002 recipient: Margaret Rosanna Gray-Swain.

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 2002 recipient: Jeffrey Parker Henderson.

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 2002 recipient: Cara L. O’Brien.

Samson F. Wernerman Prize in Surgery. Donated by his wife, Zelda E. Wernerman, and awarded annually to the fourth-year student who has demonstrated promise in the field of surgery. The 2002 recipient: Marissa Morningstar Jaggers.

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 2002 recipient: Christina Marie Ward.

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 2002 recipient: Shao-Pow Lin.

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 2002 recipient: Benjamin Daniel Unger.

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 2002 recipients: Margaret Wing Yan Mann and Abena Obenewa Olori.

THE WASHINGTON UNIVERSITY GRADUATE 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 website (medicine.wustl.edu/~residenc) 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 (2002) are identified in the Register of Students beginning on page 233.

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 Haues 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.

*Stephen J. Hawes 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 Fund.* 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 the following:

- 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 health care delivery.
- Integrate clinical outcome measures for delivery of quality patient care into the educational process.
• Assist physician’s adaptation to changing health care delivery environments.
• Support faculty development as postgraduate medical educators and leaders.

Each year more than 40 symposia and more than 120 recurring academic rounds and conferences as well as videos and monographs are provided with CME credit by this office. About 5,000 registrants attend these courses annually and receive more than 90,000 hours of instruction. 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.

**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 Alumni Association assists students in a variety of ways. The Association makes a substantial financial commitment each year to support 16 Distinguished Alumni Scholars. 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. The academic societies also benefit from support by WUMCAA. These provide opportunities for faculty and student interaction in a collegial environment.

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.

Many students and residents meet alumni informally during the admissions process. The Office of Medical Alumni and Development Programs 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 classes who return at five-year intervals, beginning with the class observing its 10th year following graduation and continuing through the class celebrating its 60th 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 to alumni. 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 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 allied health programs. Each year alumni and friends are solicited for 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.

Developing additional sources of student financial aid is a priority for the Alumni Association, whose members have established the Distinguished Alumni Scholarship program to provide full-tuition, four-year scholarships to promising medical students in honor of great teachers and mentors who were also alumni of the School of Medicine.

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. Eight such chairs have been created thus far.
STANDARDS, POLICIES, STUDENT CONSTITUTION AND BYLAWS

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 asserted 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; or

(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.

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(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.

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 advances. 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

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

Hearing procedures are set out in the University Judicial Code, found in Hearings 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.
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

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.

Washington University School of Medicine Policy Against Abusive Conduct

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 Human Resources.

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.

V. PROCEDURES

Possible steps in investigating such complaints include:

In most cases, the complaint is referred to Human Resources.
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.

Washington University School of Medicine Guidelines for Professional Conduct in Teacher/Learner Relationships

I. GOALS OF POLICY
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 with the appropriate person, 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 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 on the medical school web page: www.medicine.wustl.edu).
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 MSTREATED
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 Medicine or the Assistant Dean for Student Affairs. If you feel it is necessary, you may also contact the Vice President for Academic Affairs.

VI. OF THE STUDENT
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 with the appropriate person, 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 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.
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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 Medicine or the Assistant Dean for Student Affairs. If you feel it is necessary, you may also contact the Vice President for Academic Affairs.
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 not settled at the coursemaster level. (Complaints brought to 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 all records of complaints, responses and investigations, to the extent permitted by law. Please refer to the University's policy on sexual harassment, posted on the School’s web page at medicine.wustl.edu/students/policies.htm for details regarding confidentiality.

VI. PROCEDURE FOR HANDLING COMPLAINTS OF STUDENT ABUSE

The associate dean for medical student education will be responsible for handling 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.

Washington University School of Medicine Policy for Students with Disabilities

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 encourages and gives full consideration to all applicants for admission. 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.

Student Constitution and Bylaws of the Washington University School of Medicine Medical Student Government

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. Officers: 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 monies 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 monies 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, and GPC. 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: 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/herself 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 two weeks of the completion of the sixth week of 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. 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. 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. 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.

7. 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 vacant office, that officer must vacate the post he/she occupies.

8. 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 have the same duties and responsibilities as a Class President and MER and shall be elected by the M.D./Ph.D. students who are in the Ph.D. phase of their training. The election shall be held within eight weeks of the finish of the University's academic calendar under the conditions of Article II, Section C. The term shall be one year.

Article III:
The Medical Student Government
A. Membership: The Student Government shall consist of the President and the Representative to the Committee on Medical Education from each of the four classes, the Representative of M.D./Ph.D. Students, the Representative to the Graduate Professional Council, and the Representative to the Organization of Student Representatives of the Association of American Medical Colleges from each of the four classes. 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:
Study of Medicine

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
Peter Gabriel

Medical Education Representative (MER)
Jennifer Langsdorf

Representative to the Organization of Student Representatives (OSR Rep)
Paid Berry

Representative to the Graduate Professional Council (GPC Rep)
Carrie Daymont
Third-Year Class Officers

President
Jason Stephenson

Medical Education Representative (MER)
Kate Carlson

Representative to the Organization of Student Representatives (OSR Rep)
Nefertari Daaga

Representative to the Graduate Professional Council (GPC Rep)
Walter Chan

Second-Year Class Officers

President
Ian Dorward

Medical Education Representative (MER)
Franklin Huang

Representative to the Organization of Student Representatives (OSR Rep)
Kristina Toncray

Representative to the Graduate Professional Council (GPC Rep)
Archit Patel

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) 935-9990. Applicant who are qualified and who have special needs are considered individually in the selection process. The School of Medicine is committed to recruiting, enrolling, and educating an increased number of students from racial minority and educationally deprived groups.

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. 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 will be available at various sites on campus, prior to the next national election on November 5, 2002. Sites on the Medical Campus include the Student Affairs Office, Room 100, McDonnell Medical 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
600 W. Main and 208 State Capitol
P.O. Box 778
Jefferson City, MO 65102
(573) 751-2301 or (800) 669-8683
mos.sos.state.mo.us
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.

FIRST YEAR

M35 554 NEURAL SCIENCES
Instructors: Jeffrey W. Lichtman, M.D., Ph.D., 362-2504; W. Thomas Thach Jr., M.D., 362-3538; David C. Van Essen, Ph.D., 362-7043

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. Limited space is available for non-medical students with instructor's permission. Non-medical students should register under the cross-listed number L41 (Bio) 554 (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. The laboratories consist of the study of prepared slides and electron micrographs. A microscope will be provided for each student. 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) 5404 MOLECULAR NEUROBIOLOGY
L41 (Bio) 5562 PRINCIPLES OF NEURAL DEVELOPMENT
L41 (Bio) 5571 CELLULAR NEUROBIOLOGY
L41 (Bio) 5641 COMPUTATIONAL NEURO-SCIENCE
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
Instructors: Staff, 362-3397
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. Valid start weeks for 4-week blocks are: Weeks 29, 33, 37 and 41.

M05 820 TEACHING ASSISTANT IN HUMAN ANATOMY
Instructor: Glenn C. Conroy, Ph.D., 362-3397
Offers the student the opportunity to review human anatomy by assisting the Anatomy faculty in teaching first-year medical students in the Anatomy laboratory. Valid start weeks for 4-week blocks are: Weeks 13, 17 and 21.

Research (M05 900)
Cross-listed with L41 (Bio) 590
Charles H. Anderson, Ph.D., 362-1799
Computational models of neural systems.
Dora Angelaki, Ph.D., 747-5529
Computational and neural substrates of three-dimensional eye and head movement control.
Nancy L. Baenziger, Ph.D., 362-2817
Abnormal regulation of receptor signal transduction and neuronal connectivity in cellular models of Alzheimer’s disease.
E. Richard Bischoff, Ph.D., 362-3548
Development and regeneration of skeletal muscle.
Paul C. Bridgman, Ph.D., 362-3449
Cell biology of the developing nervous system.
Andreas H. Burkhalter, Ph.D., 362-4068
Development and synaptic organization of cortical circuits.
Harold Burton, Ph.D., 362-3556
Functional organization of somatic sensory cortex.
James M. Cheverud, Ph.D., 362-4188
Evolutionary quantitative genetics, genetics of growth and morphology, gene mapping in mice.
Glenn C. Conroy, Ph.D., 362-3397
Comparative primate anatomy and human evolution.
Ann Marie Craig, Ph.D., 362-0660
Molecular and cellular mechanisms of central neuron synapse formation.
Gregory C. DeAngelis, Ph.D., 747-2253
Neural circuits underlying three-dimensional vision and object representation.
David I. Gottlieb, Ph.D., 362-2758
Embryonic stem cell models of neural development and disease.
Timothy E. Holy, Ph.D., 362-0086
Neural mechanisms of the detection and recognition of pheromones.
Jeffery W. Lichtman, M.D., Ph.D., 362-2504
The mechanisms underlying the formation, maintenance and elimination of synaptic connections.
Arthur D. Loewy, Ph.D., 362-3930
Central circuits controlling arousal and autonomic functions.
Michael L. Nonet, Ph.D., 747-1176
Molecular genetic analysis of synaptic development and function in the nematode C. elegans.
Karen L. O’Malley, Ph.D., 362-7087
Molecular biology of dopaminergic systems. Mechanisms underlying the specification, regulation and neurodegeneration of dopaminergic systems.

Jane Phillips-Conroy, Ph.D., 362-3396
Behavior, morphology and biology of living primate populations.

Joseph L. Price, Ph.D., 362-3587
Structure and organization of the prefrontal cortex and limbic forebrain, and the neuropathology of Alzheimer’s disease.

Yi Rao, Ph.D., 362-9388
Molecular mechanism of vertebrate neural development.

Lawrence B. Salkoff, Ph.D., 362-3644
Genetics and molecular biology of ion channels.

Joshua R. Sanes, Ph.D., 362-2507
Molecular basis of synapse formation.

Stephen M. Highstein, M.D., University of Maryland, 1965; Ph.D., University of Tokyo, 1976. (See Department of Otolaryngology.)

Jeffrey W. Lichtman, M.D., Ph.D., Washington University, 1980.

Christopher J. Lingle, Ph.D., University of Oregon, 1979. (See Department of Anesthesiology.)

Arthur D. Loewy, Ph.D., University of Wisconsin, 1969.

Karen L. O’Malley, Ph.D., University of Texas, Austin, 1980.

Tae Sung Park, M.D., Yonsei University, 1971. (See Departments of Neurology and Neurosurgery and Department of Pediatrics.)

Steven E. Petersen, Ph.D., California Institute of Technology, 1981. (Neuropsychology. See Departments of Neurology and Neurosurgery and Department of Radiology.)

Jane Phillips-Conroy, Ph.D., New York University, 1978. (Also Faculty of Arts and Sciences)

Joseph L. Price, Ph.D., Oxford University, 1969.

Marcus E. Raichle, M.D., University of Washington, 1964. (See Department of Neurology and Department of Radiology.)

Lawrence H. Snyder, M.D., Ph.D., 747-3530
Computational and cognitive issues in cortical control of eye and arm movement.

Paul H. Taghert, Ph.D., 362-3461
Circadian clock regulation of behavior; development of transmitter properties.

W. Thomas Thach Jr., M.D., 362-3538
Neural control of posture, movement and motor learning; cognitive functions of the cerebellum.

David C. Van Essen, Ph.D., 362-7043
Organization and function of visual cortex in primates.

Mark B. Willard, Ph.D., 362-3462
The transport of macromolecules and viruses in neurons.

Rachel O. L. Wong, Ph.D., 362-4941
Development of neuronal connectivity in the central nervous system.

Faculty

EDISON PROFESSOR OF NEUROBIOLOGY AND HEAD OF DEPARTMENT
David C. Van Essen, Ph.D., Harvard University, 1971.

Professor Emeritus and Lecturer
Roy R. Peterson, Ph.D., University of Kansas, 1952.

Professors
Harold Burton, Ph.D., University of Wisconsin, 1968. (See Department of Cell Biology and Physiology and Department of Radiology.)

James M. Cheverud, Ph.D., University of Wisconsin, 1979. (See Department of Genetics. Also Faculty of Arts and Sciences)

Theodore J. Cicero, Ph.D., Purdue University, 1968. (See Department of Psychiatry.)

Glenn C. Conroy, Ph.D., Yale University, 1974. (Also Faculty of Arts and Sciences)

David I. Gottlieb, Ph.D., Washington University, 1971. (See Department of Biochemistry and Molecular Biophysics.)

Steven M. Rothman, M.D., State University of New York, Upstate, 1973. (See Departments of Neurology and Neurosurgery and Department of Pediatrics.)

Lawrence B. Salkoff, Ph.D., University of California, Berkeley, 1979. (See Department of Genetics.)

Alumni Endowed Professor of Neurobiology
Joshua R. Sanes, Ph.D., Harvard University, 1976.

Joseph H. Steinbach, Ph.D., University of California, San Diego, 1973. (See Department of Anesthesiology.)

Paul H. Taghert, Ph.D., University of Washington, 1981.

W. Thomas Thach Jr., M.D., Harvard University, 1964. (See Departments of Neurology and Program in Physical Therapy.)

Robert H. Waterston, M.D., Ph.D., The University of Chicago, 1972. (See Department of Genetics.)

Mark B. Willard, Ph.D., University of Wisconsin, 1971. (See Department of Biochemistry and Molecular Biophysics.)
Research Professor
Charles H. Anderson, Ph.D.,
Harvard University, 1962.

Associate Professor Emeritus and Lecturer
David N. Menton, Ph.D.,
Brown University, 1966.

Associate Professors
Dora Angelaki, Ph.D.,
University of Minnesota, 1991.
E. Richard Bischoff, Ph.D.,
Washington University, 1966.
Paul C. Bridgman, Ph.D.,
Purdue University, 1980.
Randy Lee Buckner, Ph.D.,
Washington University, 1995.
(Also Faculty of Arts and Sciences)
Andreas H. Burkhalter, Ph.D.,
University of Zurich, 1977. (See Departments of Neurology and Neurological Surgery.)
Maurizio Corbetta, M.D.,
University of Pavia, Italy, 1985. (See Department of Neurology and Department of Radiology.)
Ann Marie Craig, Ph.D.,
University of Western Ontario, Canada, 1989.
John G. Csernansky, M.D.,
New York University, 1979. (See Department of Psychiatry.)
Mark P. Goldberg, M.D.,
Columbia University, 1984. (See Departments of Neurology and Neurological Surgery.)
Ursula W. Goodenough, Ph.D.,
Harvard University, 1969.
(Also Faculty of Arts and Sciences)
M. Rosario Hernandez, D.D.S.,
University of Chile, 1973. (See Department of Ophthalmology and Visual Sciences.)

Research Associate Professors
Nancy L. Baenziger, Ph.D.,
Washington University, 1971.
Richard A. Baird, Ph.D.,
University of California, Berkeley, 1981. (See Department of Otolaryngology.) (Also Central Institute for the Deaf and Faculty of Arts and Sciences)
J. David Dickman, Ph.D.,
University of Wyoming, 1985. (Also Central Institute for the Deaf and Faculty of Arts and Sciences)
Dwayne D. Simmons, Ph.D.,
Harvard University, 1986. (See Department of Otolaryngology.) (Also Central Institute for the Deaf and Faculty of Arts and Sciences)

Assistant Professors
Gregory C. DeAngelis, Ph.D.,
University of California, Berkeley, 1992.

Laura L. Dugan, M.D.,
Ohio State University, 1987. (See Department of Medicine and Departments of Neurology and Neurological Surgery.)
Timothy E. Holy, Ph.D.,
Princeton University, 1997.
Steven J. Mennerick, Ph.D.,
Washington University, 1995. (See Department of Psychiatry.)
Daniel W. Moran, Ph.D.,
Arizona State University, 1994. (See Department of Biomedical Engineering.)
Jeffrey J. Neil, M.D., Ph.D.,
Washington University, 1984. (See Departments of Neurology and Neurological Surgery and Department of Pediatrics.)
Jeffrey G. Ojemann, M.D.,
Washington University, 1992. (See Department of Neurological Surgery and Department of Pediatrics.) (Also Psychology)
Carmelo Romano, Ph.D.,
Stanford University, 1981. (See Department of Ophthalmology and Visual Sciences.)
Lawrence H. Snyder, M.D.,
Ph.D., University of Rochester, 1992.
Ralf Wessel, Ph.D.,
University of Cambridge, 1992. (Also Faculty of Arts and Sciences)
Ling-Gang Wu, Ph.D.,
Baylor College of Medicine, 1994. (See Department of Anesthesiology.)

Research Assistant Professors
Jose-Angel Conchello, Ph.D.,
Dartmouth University, 1990.
Mark E. Warhol, Ph.D.,
Northwestern University, 1989. (See Department of Otolaryngology.) (Also Central Institute for the Deaf and Faculty of Arts and Sciences)

Assistant Professor (Adjunct)
Susan M. Fitzpatrick, Ph.D.,
Cornell University, 1984.
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 anesthesiology 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 vasodilatory 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.; G. Michael Crowder, M.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.; Ling-Gang Wu, Ph.D.; or Min Zhuo, Ph.D.
FOURTH YEAR
Electives

M10 805 ANESTHESIOLOGY
Instructor: Joseph Kras, M.D., D.D.S., 747-0300
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. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M10 811 CARDIOTHORACIC ANESTHESIOLOGY
Instructor: Charles W. Hogue Jr., M.D., 362-6584
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 intravascular 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. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M10 812 PEDIATRIC ANESTHESIA
Instructors: Gary E. Hirshberg, M.D.; David Moore, M.D.; David J. Murray, M.D., 454-6215
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 anesthesics (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 anesthesiology, 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. Valid start weeks for 4-week blocks are: Weeks 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M10 820 CRITICAL CARE
Instructors: Walter A. Boyle III, M.D., 747-3581; Timothy G. Buchman, Ph.D., M.D., 362-9347; J. Perren Cobb, M.D., 362-9347; Craig M. Coopersmith, M.D., 362-9347; Alex S. Evers, M.D., 454-8701; Eric Jacobsobn, M.B.Ch.B., 362-1196; Laureen L. Hill, M.D., 362-1196; Richard S. Hotchkiss, M.D., 362-8552
This clinical elective is designed 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

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including septic shock, management of fluids and electrolytes, and nutrition. **Valid start weeks for 4-week blocks are:** Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

**M10 821 PAIN MANAGEMENT**
Instructor: Robert A. Swarm, M.D., 747-0101
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. **Valid start weeks for 4-week blocks are:** Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

**M10 822 ANESTHESIA FOR NEUROSURGERY**
Instructors: René Tempelhoff, M.D.; Mary Ann Cheng, M.D., 362-2350
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. **Valid start weeks for 4-week blocks are:** Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

**M10 823 OBSTETRICAL ANESTHESIA**
Instructor: Laila Bottros, M.D., 362-1374
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 are actively involved in the participant's management, i.e., starting an IV, placement of spinal, epidural or CSE (combined spinal epidural) and intubations. They will also attend the weekly OB anesthesia conferences and round on postpartum patients and interviewing patients in Labor (with an OB anesthesia attending). **Valid start weeks for 4-week blocks are:** Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.
Charles W. Hogue Jr., M.D., University of Illinois, 1986.
Barbel Holtmann, M.D., University of Missouri, 1968.
Richard S. Hotchkiss, M.D., University of Virginia, 1976. (See Department of Medicine and Department of Surgery.)
Eric Jacobsohn, M.B.Ch.B., University of Cape Town Medical School, Cape Town, South Africa, 1984. (See Department of Surgery.)
James J. Jenkins, M.D., University of Missouri, 1981.
Sackler School of Medicine, 1979.
James M. Shear, M.D., University of Washington, 1983.
John D. McAllister, M.D., University of Manitoba, 1980. (See Department of Pediatrics.)
Carl H. Nielsen, M.D., Copenhagen Medical School, 1979.
Julian Yepes, M.D., University of Santo Tomas College of Medicine, Manila, 1986.
Ling-Gang Wu, Ph.D., Beijing Medical College, Beijing, China, 1992.
Edmund B. Mangahas, M.D., University of Santo Tomas College of Medicine, Manila, 1986.
John M. Niehoff, M.D., University of Missouri, Kansas City, 1982.
Debra D. Pulley, M.D., St. Louis University, 1987.
Raghu TerKonda, M.D., University of Missouri, 1991.
Frederick E. Youngblood, M.D., Medical College of Georgia, 1968.

Assistant Professors

Sirajuddin Agha, M.D., Liaquat Medical College, Jamshoro, SIND, Pakistan, 1969.
Sharma Anshuman, M.D., All India Institute of Medical Sciences, New Delhi, India, 1990.
Frederick E. Youngblood, M.D., Medical College of Georgia, 1968.
Instructors

Gustav Akk, Ph.D.,
State University of New York at Buffalo, 1997.

Inaki Azpiazu, Ph.D.,
Royal Free Hospital School of Medicine, University of London, United Kingdom, 1993.

Brad Bernstein, M.D.,
St. Louis University, 1984.

Catherine K. Uiune, M.D.,
Washington University, 1990; Ph.D., Washington University, 1990.

Selma E.H.O. Ishag, M.D.,

Nand Kodwani, M.D.,
Sind Medical College, University of Karachi, Pakistan, 1992.

Chris Chengfu Li, M.D., Ph.D.,
Hubei Medical University, Hubei, China, 1985; Ph.D., Beijing University, Beijing, 1991.

Qianjin Liu, M.D., Ph.D.,
Nanjing Medical University, 1983; Ph.D., St. Louis University, 1997.

Krishna Mantravadi, M.D.,
All India Institute of Medical Sciences, New Delhi, India, 1989.

Anthony J. Margherita, M.D.,
Georgetown University School of Medicine, 1985.

David Moore, M.D.,
University of Louisville, 1992.

Jebadurai Ratnaraj, M.D.,
Medical Association of North Rhine Dusseldorf, West Germany, 1985.

Ata Siddiqui, M.D.,
Sind Medical College, University of Karachi, Pakistan, 1988.

Xiaoming Xia, Ph.D.,
Oregon Health Science University, Portland, Oregon, 1998.

Alexander H. Young, M.D.,
University of Arkansas, 1990.
DEPARTMENT OF BIOCHEMISTRY AND MOLECULAR BIOPHYSICS

The department participates in medical school teaching in the first year, as well as offering several 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.

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 of cellular organelles in biological processes, including energy production, protein degradation and protein trafficking. Special topics workshops presented by physicians serve to link the basic science to the clinic. 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 NUCLIE 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

Gary K. Ackers, Ph.D., 362-0260
Biophysical chemistry of regulatory interactions in proteins and nucleic acids.

Wayne M. Barnes, Ph.D., 362-3351
Plant and DNA polymerase genetic engineering.

Peter M. Burgers, Ph.D., 362-3872
Molecular biology of yeast chromosomal DNA replication and DNA repair.

David P. Cistola, M.D., Ph.D., 362-4382
Structural biology of lipid- and drug-binding proteins.

Enrico Di Cera, M.D., 362-4185
Molecular recognition. Structure and function of serine proteases.

Elliot L. Elson, Ph.D., 362-3346
Cellular mechanics and cytoskeletal structure and function.

William A. Frazier III, Ph.D., 362-3548
The role of the extracellular matrix protein thrombospondin in vascular biology.

Carl Frieden, Ph.D., 362-3344
Protein folding. Role of chaperones: Protein-protein interactions. Relationship of enzyme structure to function.

Kathleen B. Hall, Ph.D., 362-4196

Jo Holt, Ph.D., 362-4406
Allosteric control mechanisms in human hemoglobin: Kinetics and thermodynamics.

Linda C. Kurz, Ph.D., 362-3401
Direct observation of enzymatic catalytic strategies.
Timothy M. Lohman, Ph.D., 362-4393

John E. Majors, Ph.D., 362-1135
Control of eukaryotic gene expression.

Garland R. Marshall, Ph.D., 362-1567
Molecular recognition, computer-aided drug design, peptidomimetics, protein structure prediction, signal transduction-GPCRs.

E. Scott Mathews, Ph.D., 362-1080
X-ray crystallographic studies of proteins and enzymes.

Linda J. Pike, Ph.D., 362-9502
Phosphoinositides and the role of caveolae/DIGs in signal transduction.

Jay W. Ponder, Ph.D., 362-4195
Computational modeling of protein structure and energetics. Protein engineering.

Gabriel Waksman, Ph.D., 362-4562
X-ray crystallographic studies of proteins involved in signal transduction, DNA replication and bacterial pathogenesis.

William R. Wilkoff, Ph.D., 362-0727
Virus structure, assembly, and maturation studied by X-ray crystallography and related biophysical techniques.

Faculty

RAYMOND H. WITTCOFF
PROFESSOR OF BIOCHEMISTRY AND MOLECULAR BIOPHYSICS AND HEAD OF DEPARTMENT

Carl Frieden, Ph.D., University of Wisconsin, 1955.

Professors Emeriti

Barbara I. Brown, Ph.D., Yale University, 1950.

David H. Brown, Ph.D., California Institute of Technology, 1948.

George R. Drysdale, Ph.D., University of Wisconsin, 1952.

Professors


Peter M.J. Burgers, Ph.D., State University of Leiden, 1977.

Enrico Di Cera, M.D., Università Cattolica, 1985.

Sarah C.R. Elgin, Ph.D., California Institute of Technology, 1971. (Also Department of Biology)

Alumni Endowed Professor of Biochemistry and Molecular Biophysics

Elliot L. Elson, Ph.D., Stanford University, 1966.

William A. Frazier III, Ph.D., Washington University, 1973. (See Department of Cell Biology and Physiology.)

Oscar P. Chilson, Ph.D., Florida State University, 1965. (See Department of Cell Biology and Physiology.)

David P. Cistola, M.D., Ph.D., Boston University, 1985.

Gregory I. Goldberg, Ph.D., Weizmann Institute of Science, 1977. (See Department of Medicine and Department of Molecular Microbiology.)

David L. Gottlieb, M.D., Washington University, 1971. (See Department of Anatomy and Neurobiology.)

Kathleen B. Hall, Ph.D., University of California, Berkeley, 1984.

Ellen Li, M.D., Ph.D., Washington University, 1980. (See Department of Medicine.)

John E. Majors, Ph.D., Harvard University, 1977.

Stephen M. Moerlein, Ph.D., Washington University, 1982. (See Department of Radiology.)

Linda J. Pike, Ph.D., Duke University, 1980.

Jay W. Ponder, Ph.D., Harvard University, 1984.

Mark B. Willard, Ph.D., University of Wisconsin, 1971. (See Department of Anatomy and Neurobiology.)

Research Associate Professor

**Assistant Professors**

**Usha P. Andley**, Ph.D., Jawaharlal Nehru University, 1977. (See Department of Ophthalmology and Visual Sciences.)

**Lucian V. Del Priore**, M.D., University of Rochester, 1982; Ph.D., Cornell University, 1984. (See Department of Ophthalmology and Visual Sciences.)

**David H. Fremont**, Ph.D., University of California, 1993. (See Department of Pathology and Immunology.)

**Katherine Parker Ponder**, M.D., Washington University, 1983. (See Department of Medicine.)

**Douglas M. Tollefsen**, M.D., Ph.D., Washington University, 1977. (See Department of Medicine.)

**William R. Wikoff**, Ph.D., Purdue University, 1998.

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**Research Assistant Professors**

**Jo Holt**, Ph.D., Colorado State University, 1982.


**Changguo Tang**, Ph.D., Massachusetts Institute of Technology, 1990.

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**Research Instructors**


**Alexander Kozlov**, Ph.D., Moscow University, 1994.
DEPARTMENT OF
CELL BIOLOGY AND
PHYSIOLOGY

The department offers instruction to medical and graduate students. A Cell and Organ Systems Physiology course in the first year is designed to provide students with a foundation for their further study of clinical and applied physiology. 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 following research interests are represented in the department at the present time: the biology of extracellular-matrix and cell-matrix interactions, the mechanism of action of polypeptide hormones, transport across cell membranes, membrane channels and G proteins, molecular biology of epithelial transport, reconstitution of intracellular transport including secretion and endocytosis, yeast cell biology, the cytoskeleton and the mechanisms of signal transduction across biological membranes, renal physiology, neurophysiology, contractile activation of muscle, biology of prion diseases, peripheral circulation, respiration and the application of computer techniques to biological problems. Electron microscopy of nerve and muscle is used to relate structure and function in these tissues.

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 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
Diabetes and hypertension are the leading initiating events that cause renal disease. Other immunologic and non-immunologic factors precipitate nephron loss. Once started, however, there is an inexorable deterioration of kidney function that culminates in renal replacement therapies. Dialysis and transplantation are expensive programs that also impact the quality of life of the patient. In this selective, we will compare and contrast molecular and cellular events in the progression of renal fibrosis to the pathophysiology of arteriosclerosis and stromal fibrosis that occurs in tumor formation within other organs. Pharmacologic interventions have been shown that only slow the progression of renal disease; however, newer treatments with growth factors show promise to blunt and possibly reverse fibrosis. Histologic examination and molecular/cell biology approaches will be highlighted. For those students interested, visits to a dialysis clinic with an attending physician may be arranged.

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
Instructors: Thomas A. Woolsey, M.D., 362-3600
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.
The homeostatic functions of the microcirculation include the active regulation of metabolic substrate delivery and waste product removal, and a multifaceted response to injury and disease. This elective is an introduction to 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, autoimmune disease, as well as the adaptive cardiovascular responses to exercise or high altitude. This selective is cross-listed in Department of Cell Biology and Physiology.

**Fourth Year Electives**

Descriptions of the following courses may be found under the 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 INTERACTION

**Research (M75 900)**

Cross-listed with L41 (Bio) 590

Dana R. Abendroth, Ph.D., 362-8925

Responses of arteries to acute injury and coagulation mediators of arterial remodeling after injury.

Kendall J. Blumer, Ph.D., 362-1668

Hormone and neurotransmitter signaling by G proteins.

John A. Cooper, M.D., Ph.D., 362-3964

The roles of actin and microtubules in cell motility and the cell cycle.

Phyllis L. Hanson, M.D., Ph.D., 747-4233

Study of protein-protein and protein-membrane interactions involved in neuronal and synaptotrophic membrane trafficking using biochemical, biophysical, and cell biological techniques.

David A. Harris, M.D., Ph.D., 362-4690

Cell biology and biochemistry of prion diseases and Alzheimer's disease.

John E. Heuser, M.D., 362-7900

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.

James E. Huettner, Ph.D., 362-6628

Excitatory amino acid receptors and synaptic transmission in the central nervous system.

Maurine Lindner, Ph.D., 362-6040

G-protein mediated signal transduction; protein palmitoylation in signal transduction and protein trafficking.

Robert P. Meehan, Ph.D., 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.
Robert W. Mercer, Ph.D., 362-6924

Michael M. Mueckler, Ph.D., 362-4160

Colin G. Nichols, Ph.D., 362-6630
The molecular mechanisms of potassium channel regulation and how potassium channels link metabolism to excitability in different physiological and disease states.

Alan L. Pearlman, M.D., 362-6947
Early development of the mammalian cerebral cortex, with emphasis on the molecular and cellular mechanisms that guide migrating neurons and axonal growth cones to their proper location.

Kendall J. Blumer, Ph.D.,
Duke University, 1986.

George J. Broze Jr., M.D.,
University of Washington, 1972.
(See Department of Medicine.)

Harold Burton, Ph.D.,
University of Wisconsin, 1968.
(See Department of Anatomy and Neurobiology and Department of Radiology.)

Roberto Civitelli, M.D.,
University of Sienna, Italy, 1980.
(See Department of Medicine.)

F. Sessions Cole, M.D.,
Yale University, 1973.
(See Department of Pediatrics and Clinical Investigation Program.)

John A. Cooper, M.D.,
The Johns Hopkins University,
1982; Ph.D., 1983.

Douglas C. Dean, Ph.D.,
University of Kansas, 1983.
(See Department of Medicine and Alvin J. Siteman Cancer Center.)

Susan K. Dutcher, Ph.D.,
University of Washington, 1980.
(See Department of Genetics.)

Helen M. Piwnica-Worms, Ph.D., 362-6812
Cell cycle- and checkpoint-control in normal and cancer cells.

Paul A. Schlesinger, M.D., Ph.D., 362-2223
Molecular mechanisms and regulation of intracellular channels for acidification of intracellular vesicles and the molecular pores formed in apoptosis.

Philip D. Stahl, Ph.D., 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.

Robert S. Wilkinson, Ph.D., 362-2300
Cellular physiology and nerve-muscle synapses, especially the regulation of synaptic strength and the role of innervation in determining cell properties.

Faculty
EDWARD MALLINCKRODT, JR.
PROFESSOR AND HEAD OF DEPARTMENT

Philip D. Stahl, Ph.D.,
West Virginia University, 1967.

Professors Emeriti
Carlton C. Hunt, M.D.,
Cornell University, 1942.
(See Departments of Neurology and Neurological Surgery.)

Albert Roos, M.D.,
University of Groningen, Netherlands, 1940.

Carl M. Rovainen, Ph.D.,
Harvard University, 1967.

Professors
Jacques U. Baenziger, M.D., Ph.D.,
Washington University, 1975.
(See Department of Pathology and Immunology.)

David C. Beebe, Ph.D.,
University of Virginia, 1974.
(See Department of Ophthalmology and Visual Sciences.)

William A. Frazier III, Ph.D.,
(See Department of Biochemistry and Molecular Biophysics.)

Marc R. Hammerman, M.D.,
Washington University, 1972.
(See Department of Medicine.)

David A. Harris,
University of Virginia, 1983.
(See Department of Medicine.)

John E. Heuser,
Harvard University, 1969.

Michael J. Holtzman,
Northwestern University, 1975.
(See Department of Medicine.)

Keith A. Hruska,
Creigh ton University, 1969.
(See Department of Medicine.)

F. Scott Mathews,
University of Minnesota, 1950.
(See Department of Biochemistry and Molecular Biophysics.)

Alumni Endowed Professor of Cell Biology and Physiology
Robert P. Mecham, Ph.D.,
Boston University, 1976.
(See Department of Medicine, Department of Pediatrics and Department of Biomedical Engineering.)
Robert W. Mercer, Ph.D., Syracuse University, 1980.
Michael M. Mueckler, Ph.D., University of Wisconsin, Madison, 1982.
Colin G. Nichols, Ph.D., University of Leeds, 1985. (See Department of Medicine.)
William C. Parks, Ph.D., Medical College of Wisconsin, 1982. (See Departments of Neurology and Neurological Surgery.)
M. Alan Permutt, M.D., Washington University, 1965. (See Department of Medicine.)
Helen M. Piwnica-Worms, Ph.D., Duke University, 1984. (See Alvin J. Siteman Cancer Center.)
Kenneth S. Polonsky, M.D., University of The Witwatersrand, Johannesburg, South Africa, 1973. (See Department of Medicine.)
Joseph L. Roti Roti, Ph.D., University of Rochester, 1972. (See Department of Biochemistry and Molecular Biophysics and Department of Radiation Oncology.)
Shirley A. Sahrmann, Ph.D., Washington University, 1973. (See Program in Physical Therapy.)
Linda J. Sandell, Ph.D., Northwestern University, 1980. (See Department of Orthopaedic Surgery.)
Clay F. Semenkovich, M.D., Washington University, 1981. (See Department of Medicine.)
Robert M. Senior, M.D., George Washington University, 1981. (See Department of Medicine.)
Robert W. Thompson, M.D., University of Michigan, 1983. (See Department of Surgery.)
Robert S. Wilkinson, Ph.D., University of Texas, Austin, 1974.
Thomas A. Woolsey, M.D., The Johns Hopkins University, 1969. (See Department of Anatomy and Neurobiology and Departments of Neurology and Neurological Surgery.)

Associate Professors
Dana R. Abendschein, Ph.D., Purdue University, 1978. (See Department of Medicine and Clinical Investigation Program.)
Guojun Bu, Ph.D., Virginia Polytechnic Institute, 1990. (See Department of Pediatrics.)
Thomas W. Ferkol Jr., M.D., Ohio State University, 1985. (See Department of Pediatrics.)
J. William Harbour, M.D., The Johns Hopkins University, 1990. (See Department of Ophthalmology and Visual Sciences.)
Sándor J. Kovács, Ph.D., California Institute of Technology, 1977, M.D., University of Miami, 1979. (See Department of Medicine and Department of Biomedical Engineering.) (Also Department of Physics)
Maurine Linder, Ph.D., University of Texas, Dallas, 1987.
Gregory D. Longmore, M.D., McGill University, 1983. (See Department of Medicine.)
Stanley Misler, Ph.D., New York University, 1977; M.D., 1978. (See Department of Medicine.)
Anthony J. Muslin, M.D., Harvard University, 1984. (See Department of Medicine.)
Yoel Sadovsky, M.D., Hebrew University, 1985. (See Department of Obstetrics and Gynecology.)
Thomas H. Steinberg, M.D., New York University, 1978. (See Department of Medicine.)
Steven M. Sirasberg, M.D., University of Toronto, 1963. (See Department of Surgery.)
Kevin E. Yarasheski, Ph.D., Kent State University, 1986. (See Department of Medicine.)

Research Associate Professor
Richard A. Pierce, Ph.D., Rutgers University, 1990. (See Department of Medicine.)

Assistant Professors
Yousef Abu-Amer, Ph.D., The Hebrew University, Jerusalem, 1993. (See Department of Orthopaedic Surgery.)
Steven Bassnett, Ph.D., University of East Anglia, England, 1987. (See Department of Ophthalmology and Visual Sciences.)
Perry E. Bickel, M.D., University of Texas, Southwestern, 1988. (See Department of Medicine.)
Janice E. Brunstrom, M.D., Medical College of Virginia, 1987. (See Departments of Neurology and Neurological Surgery.)
Jeffrey M. Gidday, Ph.D., University of Virginia, 1986. (See Department of Neurological Surgery and Department of Ophthalmology and Visual Sciences.)
Phyllis I. Hansson, M.D., Ph.D., Stanford University, 1993.
Hyunjung Jade Lim, Ph.D., University of Kansas, 1998. (See Department of Obstetrics and Gynecology.)
Beth Marshall, M.D., Vanderbilt University, 1986. (See Department of Pediatrics.)
Jeffrey H. Miner, Ph.D., California Institute of Technology, 1991. (See Department of Anatomy and Neurobiology.)
Kelle H. Moley, M.D., Yale University, 1988. (See Department of Obstetrics and Gynecology.)
Jeremiah J. Morrissey, Ph.D., St. Louis University, 1974. (See Department of Medicine.)
James M. Shiple, Ph.D., St. Louis University School of Medicine, 1992. (See Department of Medicine.)
Jason Weber, Ph.D.,
St. Louis University, 1997. (See Department of Medicine.)

Steven J. Weintraub, M.D.,
Medical College of Virginia, 1985. (See Department of Medicine.)

Research Assistant Professors

M. Alejandro Barbieri, Ph.D.,
Univ. Nacional de San Luis,

Richard Heil-Chapdelaine,
Ph.D., Purdue University, 1995.

Richard C. Hresko, Ph.D.,
University of Virginia, 1986.

Joseph C. Koster, Ph.D.,
Washington University, 1996.

Fernando Segade, Ph.D.,
University of Santiago, 1990.

Ling Wei, M.D.,
Beijing Capital Institute of Medicine, 1977. (See Department of Neurology.)

Instructors

Koong-Nah Chung, Ph.D.,
Washington University, 1986.

Decha Enkvetchakul, M.D.,
University of Columbia, 1993. (See Department of Medicine.)

Assistant Research Scientist

Haibing Teng, Ph.D.,
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 that cause inherited disease or susceptibility to 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, and particularly to the impact of new genetic technologies on the practice of medicine. 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, immunogenetics, human genetics, and population and evolutionary genetics. In addition to human genetics, research opportunities with experimental organisms include genetic studies with the mouse, fruit flies, nematodes, yeast, bacteria, chlamydomonas and zebrafish.

Advanced courses and seminars are offered that focus on such subjects as the genetics of inherited diseases, gene expression, genetic mapping, molecular genetics, developmental genetics, microbial genetics, immunogenetics, 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.

**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.

<table>
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<th>Course Code</th>
<th>Course Title</th>
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<tr>
<td>L41 (Bio) 5491</td>
<td>ADVANCED GENETICS</td>
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<tr>
<td>L41 (Bio) 5495</td>
<td>COMPUTATIONAL MOLECULAR BIOLOGY</td>
</tr>
<tr>
<td>L41 (Bio) 5911</td>
<td>CLASSICAL EXPERIMENTS IN MOLECULAR GENETICS</td>
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</tbody>
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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 M. Boucoch, Ph.D.**, 747-3261
  Molecular genetics of human diseases and cancer.

- **Janet M. Connolly, Ph.D.**, 362-3958
  Research in immunology. Thymic development and antigen specificity of T lymphocytes using transgenic mouse model systems.

- **Susan K. Dutcher, Ph.D.**, 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 R. Eddy, Ph.D.**, 362-7666
  Computational biology: RNA and protein structure prediction; genome analysis.

- **Daniela S. Gerhard, Ph.D.**, 362-2736

- **Warren R. Gish, Ph.D.**, 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.

- **Ted H. Hansen, Ph.D.**, 362-2716
  Molecular immunology of antigen presentation. Intracellular antigen processing, peptide binding to MHC molecules and presentation to immune T cells.

- **Stephen L. Johnson, Ph.D.**, 362-0362
  Growth control and morphogenesis in vertebrate development. Focus on genes and mechanisms affecting proportionate fin growth, fin regeneration and pigment stripe patterning in zebrafish.
H. Mark Johnston, Ph.D., 362-2735
Transcriptional control mechanisms in eukaryotic cells, diabetes in yeast and mechanisms of signal transduction.

Michael Lovett, Ph.D., 747-3261
The molecular basis of human genetic diseases, and the development of positional cloning technologies.

Elaine Mardis, Ph.D., 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.

John D. McPherson, Ph.D., 286-1848
Genome mapping and analysis; development of novel technology for large-scale physical mapping and analysis of genomes including human, mouse and A. thaliana.

Tim B. Schell, Ph.D., 362-0162
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 B. Skeath, Ph.D., 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.

Gary D. Stormo, Ph.D., 747-5534

Robert H. Waterston, M.D., Ph.D., 286-1805
Muscle development and function in the nematode Caenorhabditis elegans. Genome analysis and large-scale DNA sequencing.

Richard K. Wilson, Ph.D., 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., 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

JAMES S. MCDONNELL
PROFESSOR OF GENETICS
AND HEAD OF DEPARTMENT

Robert H. Waterston, M.D., Ph.D., The University of Chicago, 1972. (See Department of Anatomy and Neurobiology.)

Professors

Douglas E. Berg, Ph.D., University of Washington, 1969. (See Department of Molecular Microbiology.)

Anne M. Bowcock, Ph.D., University of The Witwatersrand, Johannesburg, South Africa, 1984. (See Department of Medicine, Department of Pediatrics and Clinical Investigation Program.)

James M. Cheverud, Ph.D., University of Wisconsin, 1979. (See Department of Anatomy and Neurobiology.)

C. Robert Cloninger, M.D., Washington University, 1970; M.D. (hon.), Umea University, 1983. (See Department of Psychiatry.)

Susan K. DUTcher, Ph.D., University of Washington, 1980.

Alison M. Goate, D.Phil., University of Oxford, 1983. (See Department of Psychiatry.)

Ted H. Hansen, Ph.D., University of Michigan, 1975.

George B. Johnson, Ph.D., Stanford University, 1972. (Also Faculty of Arts and Sciences)

H. Mark Johnston, Ph.D., University of California, Berkeley, 1980.

Timothy J. Ley, M.D., University of California, Berkeley, 1980. (See Department of Medicine and Alvin J. Siteman Cancer Center.)

Michael Lovett, Ph.D., University of London, 1981. (See Department of Pediatrics.)

J. Mark Petrash, Ph.D., University of Texas, Galveston, 1981. (See Department of Ophthalmology and Visual Sciences.)

Dabeeru C. Rao, Ph.D., Indian Statistical Institute, 1971. (See Division of Biostatistics.)

Theodore Reich, M.D., McGill University, 1963. (See Department of Psychiatry.)

John P. Rice, Ph.D., Washington University, 1975. (See Department of Psychiatry.)

Lawrence B. Salkoff, Ph.D., University of California, Berkeley, 1979. (See Department of Anatomy and Neurobiology.)

Stanley Sawyer, Ph.D., California Institute of Technology, 1964. (See Division of Biostatistics.) (Also Faculty of Arts and Sciences)

Barbara A. Schaal, Ph.D., Yale University, 1974. (Also Faculty of Arts and Sciences)
Gary D. Stormo, Ph.D.,
University of Colorado, Boulder,
1981. (See Department of Biomedical Engineering.)

Alan R. Templeton, Ph.D.,
University of Michigan, 1972. 
(Also Faculty of Arts and Sciences)

Richard D. Todd, Ph.D.,
University of Texas, Dallas, 1977; M.D., University of Texas, San Antonio, 1981. (See Department of Psychiatry.)

Michael P. Whyte, M.D.,
State University of New York, Downstate, 1972. (See Department of Medicine.)

Associate Professors

Michael R. Brent, Ph.D.,
Massachusetts Institute of Technology, 1991. (Also Faculty of Engineering and Applied Science)

James P. Crane, M.D.,
Indiana University, 1970. 
(See Department of Obstetrics and Gynecology and Department of Radiology.)

Ian W. Duncan, Ph.D.,
(Also Faculty of Arts and Sciences)

Alvin Goldfarb Distinguished Professor of Computational Biology

Sean R. Eddy, Ph.D.,

Paul J. Goodfellow, Ph.D.,
Queens University, 1985. 
(See Department of Surgery.)

David H. Gutmann, Ph.D.,
The University of Michigan, 1984; M.D., 1986. (See Department of Neurology.)

Andrew C. Heath, Ph.D.,
(See Department of Psychiatry.)

Pui-Yan Kwok, Ph.D.,
The University of Chicago, 1985; M.D., 1987. (See Department of Medicine.)

Howard L. McLeod, Pharm. D.,
Philadelphia College of Pharmacy and Science, 1990. (See Department of Medicine and Alvin J. Siteman Cancer Center.)

John D. McPherson, Ph.D.,
Queen's University, Kingston, 1989.

Janet S. Rader, M.D.,
University of Missouri, 1983. 
(See Department of Obstetrics and Gynecology.)

Mark S. Sands, Ph.D.,
State University of New York, Stony Brook, 1990. (See Department of Medicine.)

Tim B. Schedl, Ph.D.,
University of Wisconsin, 1984.

Brian K. Suarez, Ph.D.,
University of California, Los Angeles, 1974. (See Department of Psychiatry.)

Richard K. Wilson, Ph.D.,
University of Oklahoma, 1986. 
(See Clinical Investigation Program.)

Research Associate Professors

Ingrid B. Borecki, Ph.D.,
University of Hawaii, 1981. 
(See Division of Biostatistics.)

Janet M. Connolly, Ph.D.,

Research Instructors

Sandra W. Clifton, Ph.D.,
University of Oklahoma, 1993.

Pamela E. Hoppe, Ph.D.,
Princeton University, 1989.

Elena Rivas, Ph.D.,
University of Zaragoza, Spain, 1990.

Michael C. Wendl, D.Sc.,
Washington University, 1994.
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 Clinical Immunology Diseases,
H. James Wedner, M.D., acting chief
Bone and Mineral Diseases,
Dwight A. Towler, M.D., Ph.D.
Cardiovascular Diseases,
Michael E. Cain, M.D.
Center for Health Behavior Research,
Edwin B. Fisher, Ph.D.
Dermatology,
Lynn A. Cornelius, M.D.
Endocrinology, Diabetes and Metabolism,
Philip E. Cryer, M.D.
Gastroenterology,
Nicholas O. Davidson, M.B.B.S.
General Medical Sciences,
Bradley A. Evanoff, M.D., M.P.H.
Geriatrics and Gerontology,
John O. Holloszy, M.D.
Hematology,
Stuart A. Kornfeld, M.D., Ph.D.
Infectious Diseases,
William G. Powderly, M.B., B.Ch., B.A.O., Gregory L. Goldberg, Ph.D.
Lipid Research,
Gustav Schonfeld, M.D.
Medical Education,
Daniel M. Goodenberger, M.D.
Oncology,
John F. DiPersio, M.D., Ph.D.
Pulmonary and Critical Care Medicine,
Michael J. Holtzman, M.D.
Renal Diseases,
Marc R. Hammerman, M.D.
Rheumatology,
Wayne M. Yokoyama, M.D.

Instruction in Medicine is provided during all four years of the medical curriculum, beginning with Clinical 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.

FIRST YEAR

M25 507 THE PRACTICE OF MEDICINE I
Instructor: Thomas H. Gallagher, M.D., 454-8350

The practice of medicine requires that physicians integrate a diverse array of knowledge. Clinicians must interview and examine a patient, understand that patient’s experience of illness, develop an evidence-based differential diagnosis, and engage patients in their treatment plan, all the while attending to the ethical dimensions of clinical medicine. Physicians must understand how to promote the health of populations as well as that of individual patients. Physicians must also master skills for lifelong learning to remain competent professionals.

The Practice of Medicine I (TPM I) is the first part of a three-year course about the interfaces between patient, doctor and society. The course is organized around the six Content Areas described below. In addition, regular Integrative Case Sessions will highlight the interrelationships of the TPM Content Areas. Primary Care Preceptor sessions will provide each student with an introductory experience in outpatient medicine.

Content Areas:

THE EXPERIENCE OF ILLNESS
Content Area Leader: Stephen S. Lefrak, M.D., 454-7116

The practice of medicine reflects the tension between the unique story of individual patients and the generalized scientific understanding of disease. Physicians must learn to understand and resolve this tension as much as possible. The “Experience of Illness” is intended to help the student become aware of those areas that determine this unique response to biological processes. In addition to readings and small group discussions, students will write a patient-centered narrative following a home visit to a patient.

HEALTH PROMOTION/DISEASE PREVENTION
Content Area Leader: Bradley A. Evanoff, M.D., M.P.H., 454-8638

This overview of public health and preventive medicine will combine theory and application to allow students to interpret the scientific literature, to approach clinical medicine with an emphasis on prevention, and to understand aspects of the social, economic, and political environments that affect health and health care. The course will focus on methods of primary and secondary prevention, and on nutritional, environmental, and behavioral factors that impact health. Discussions of specific topics will include immunization, screening for chronic diseases and effects of toxic exposures.
SCIENTIFIC METHOD OF CLINICAL MEDICINE AND RESEARCH

Content Area Leader: Jay F. Piccirillo, M.D., 362-7504

From this content area students will learn the central role of clinical epidemiology and medical statistics in the care of patients, the critical review of the published literature, and the conduct of clinical research. Students also will learn the techniques of evidence-based medicine and how to use computerized databases to identify articles to answer important clinical questions.

CLINICAL SKILLS

Content Area Leader: Yoon Kang, M.D., 362-8050

The Clinical Skills content area serves as an introduction to the history and physical examination. Students will be able to perform a complete general history and physical exam (excluding breast, pelvic, and male genitalia exams). Additionally, students will be familiar with the basic format for summarizing findings in a written form, both in the context of a complete history and physical note as well as a daily progress note (i.e., SOAP note).

DOCTOR-PATIENT COMMUNICATION

Content Area Leader: Elliot E. Abbey, M.D., 362-2724

This section seeks to begin development of physician-patient communication skills through several mechanisms. Students will observe their small group instructors taking medical histories from hospitalized patients. Subsequently, the instructors will observe student-patient interaction in the same setting. Lectures regarding the standard components of the history will coincide with the instructor role modeling segment. Finally, videotapes illustrating examples of positive and negative aspects of communication will be utilized.

ETHICS AND HEALTH POLICY

Content Area Leader: Rebecca Dresser, J.D., 454-7116

This content area introduces students to ethical, social and legal issues arising in the practice of medicine. Topics to be covered include: the responsibilities of medical students and professionals; the doctor-patient relationship; and the organization and financing of health care. Issues in resource allocation, clinical research and disclosure of errors also will be addressed.

Selectives

M04 514 CARDIOVASCULAR BIOPHYSICS

Instructor: Sándor J. Kovács, Ph.D., M.D., 454-8097

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 (2002-2003).

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, the “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 elective 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 elective 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, hematological, 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: Yoon Kang, M.D., 362-8050
Content Area Leaders: Stephen S. Lefrak, M.D.; Bradley A. Evanoff, M.D., M.P.H.; Jay F. Piccirillo, M.D.; Yoon Kang, M.D.; Elliot E. Abbey, M.D.; Rebecca Dresser, J.D.

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 socioeconomic 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. Kabi, M.D., 362-7481

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., 362-8900

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 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., 362-7201

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. Debner, M.D., and pathology staff.

FOURTH YEAR
Electives

M25 801 HONORS MEDICINE — GENERAL MEDICINE
Instructor: Thomas M. De Fer, M.D., 362-8050
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. Valid start weeks for 4-week blocks are:
- Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M25 807 HONORS MEDICINE — ST. LOUIS VETERANS ADMINISTRATION MEDICAL CENTER
Instructor: Lewis R. Obste, M.D., 289-7030
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. Valid start weeks for 4-week blocks are:
- Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M25 805 RHEUMATOLOGY
Instructor: Richard D. Brasington, M.D., 454-7279
Students will be involved in the diagnostic work-up and management of patients with rheumatic illnesses.
including autoimmune diseases such as systemic lupus erythematosus and rheumatoid arthritis, inflammatory disorders such as vasculitis (polyarteritis, Wegener’s, temporal arteritis), spondyloarthopathies (ankylosing spondylitis, Reiter’s syndrome), common afflictions such as osteoarthritis, gout and regional musculoskeletal problems, and synovial fluid analysis. 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. Students attend a rheumatology conference held weekly. An extensive collection of self-study materials, including reprints, textbooks, slides and CD-ROM discs is available. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M25 809 HYPERBARIC MEDICINE AND PROBLEM WOUND MANAGEMENT
Instructor: John D. Davidson, M.D., and staff. 205-6818
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 specialties 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 John D. Davidson, M.D., for more information. 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.

M25 810 GERIATRIC MEDICINE
Instructor: David B. Carr, M.D., 286-2700
Students will participate in care in the skilled nursing facility, the inpatient geriatric consultation service, the outpatient geriatric assessment center, podiatry and the osteoporosis clinic. Attendance at scheduled research and clinical conferences in geriatric medicine, rehabilitation, geropsychiatry and hospice is required. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M25 811 CLINICAL INTERNAL MEDICINE — HOSPITALIST
Instructor: Mark Tboelke, M.D., 747-1499
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. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M25 814 CLINICAL EMERGENCY MEDICINE — BARNES-JEWISH HOSPITAL
Instructors: Mark Levine, M.D., 362-6743; Sanford Sineff, M.D., 362-7959
This rotation offers practical experience in the evaluation and management of acutely sick and injured patients. Students will function as subintens 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 have 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 Lawrence M. Lewis, M.D., Chief of Emergency Medicine, must take this WUMS IV Emergency Medicine rotation. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M25 821 IN-PATIENT CARDIOLOGY
Instructors: Mark S. Weinfield, M.D., 362-1291; Craig K. Reiss, M.D.; Benito Barzilat, M.D.; Michael A. Beardslee, M.D.; Alan C. Braverman, M.D.; Charles C. Carey, M.D.; Keith Mankowitz, M.D.; Sribari Thambiraj, M.D.; Suma A. Thomas, M.D.
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. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.
M25 822 HONORS MEDICINE — CARDIOLOGY
Instructor: Thomas M. De Fer, M.D., 362-8050
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. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M25 823 CLINICAL CARDIOLOGY — VETERANS ADMINISTRATION MEDICAL CENTER
Instructor: Wade H. Martin III, M.D., 289-6329
The major purpose of this elective in clinical cardiology at the John Cochran Veterans Administration Medical Center 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. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M25 825 CARDIAC ARRHYTHMIAS AND ELECTROPHYSIOLOGY
Instructor: Bruce D. Lindsay, M.D., 454-7834
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 hospitalized patients and outpatients 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. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M25 827 HEART FAILURE/CARDIAC TRANSPLANTATION
Instructor: Joseph G. Rogers, M.D., 454-7009
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. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M25 830 DERMATOLOGY
Instructor: Dermatology staff, 362-8180
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. Stress 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 Barnes-Jewish Hospital and affiliated clinics. Students will attend all clinical teaching rounds and conferences in addition to the basic.
The course is designed to acquaint the student with various procedures, especially blood and bone marrow morphology and in interpretation of coagulation tests. Weekly student rounds with a faculty member who rounds with them every day. 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. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33 and 37.

M25 844 HEMATOLOGY AND HEMOSTASIS
Instructors: Philip W. Majerus, M.D.; Morey A. Blinder, M.D.; Stuart A. Kornfeld, M.D., 362-8801
Activities planned include work-up of patients at Barnes-Jewish Hospital under the supervision of the hematologist fellow and his staff consultant; attendance at clinical rounds three to five hours weekly; participation in outpatient 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. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M25 847 BONE AND MINERAL DISEASES
Instructors: Roberto Ciccotti, M.D.; Michael P. Whyte, M.D.; Roberto Pacifici, M.D.; Reina Villareal, M.D.; Kathryn M. Diemer, M.D.; Dwight A. Towler, M.D., 454-8108
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 noninvasive 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. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.
M25 864 MULTIDISCIPLINARY INTENSIVE CARE MEDICINE
Instructor: Stephen S. Lefrak, M.D., and staff, 454-7116
This elective in intensive care is offered in the Intensive Care Unit at Barnes-Jewish Hospital north. This unit has 10 intensive care beds providing intensive nursing care and life-support technology. The patients represent a mixture of postoperative surgical cases and those patients with primarily medical problems. Patient care responsibility includes night call. In addition to patient responsibility, there are regularly scheduled conferences and attending rounds. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M25 867 MEDICAL INTENSIVE CARE
Instructor: Marin H. Kollef, M.D., 454-8764
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 include 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. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M25 870 ENDOCRINOLOGY, DIABETES AND METABOLISM
Instructor: Phillip E. Cryer, M.D., and staff, 362-7617
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. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M25 872 ONCOLOGY I — BARNES-JEWISH HOSPITAL
Instructor: Matthew A. Arquette, M.D., 362-5268
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. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M25 875 EXERCISE IN HEALTH MAINTENANCE AND TREATMENT OF CAD & DIABETES
Instructors: John O. Holloszy, M.D.; Ali A. Ehsani, M.D.; Linda Peterson, M.D., 362-3506
Exercise testing, including exercise electrocardiography, exercise echocardiography, measurement of $O_2$ uptake capacity, noninvasive cardiac output measurement, radionuclide studies during exercise, body composition determination and evaluation of the degree of physical frailty in the elderly. Exercise training to reverse physical frailty in old people in danger of losing their independence and in the treatment of hypertension, obesity, osteoporosis and diabetes. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M25 876 EXERCISE PHYSIOLOGY
Instructor: Ali A. Ehsani, M.D., 362-2395
Includes performing and interpretation of exercise testing, measurement of oxygen uptake and cardiac output. Students will participate in the management of patients undergoing exercise training. Valid start dates for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M25 880 PULMONARY MEDICINE — BARNES-JEWISH HOSPITAL
Instructor: Dan Schuller, M.D., and staff, 454-8762
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 the outpatient Lung Center and attend regular pulmonary and critical care medicine conferences. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M25 882 PULMONARY MEDICINE — VETERANS ADMINISTRATION MEDICAL CENTER
Instructor: Carlos C. Daughaday, M.D., 289-6306
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. 
Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M25 883 TRANSFUSION MEDICINE
Instructor: Lawrence T. Goodnough, M.D., 362-1546
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. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M25 884 BONE MARROW TRANSPLANTATION AND STEM CELL BIOLOGY
Instructor: John F DiPersio, M.D., Ph.D., 362-9339
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. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M25 885 OCCUPATIONAL/ENVIRONMENTAL MEDICINE
Instructor: Bradley A. Evanoff, M.D., M.P.H., 454-8638
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 Bradley A. Evanoff, M.D., M.P.H., if they wish to participate in research projects concerning the epidemiology of work-related diseases. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M25 887 CLINICAL CARDIOVASCULAR MEDICINE
Instructor: Thomas F. Martin, M.D., (573) 308-1301
Clinical cardiology with some internal medicine in a rural setting. Room and board provided. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 25, 29, 33 and 37.

M25 890 CLINICAL NEPHROLOGY
Instructor: Daniel W. Coyne, M.D., 362-7211
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 two half-days per week in the outpatient center rotating to the General Renal Clinics, the Renal Stere Clinic and the Transplant Clinic. Throughout the rotation, students work closely with two attending and two renal fellows. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M25 893 ADULT ALLERGY AND CLINICAL IMMUNOLOGY
Instructor: H.James Wedner, M.D., 454-7937
Students will participate in the allergy consult service at Barnes-Jewish Hospital, north and south campuses. 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 Asthma 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. Valid start dates for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M25 896 INTERDISCIPLINARY MUSCULO-SKELETAL MEDICINE
Instructor: Leslie E. K Kabl, M.D., 454-7257
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. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.
The Jacqueline Maritz 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.

Valid start weeks for 4-week blocks are: Weeks 17, 21, 25, 29, 33, 37 and 41.

Research (M25 900)
Dana R. Abendschein, Ph.D., 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 E. Atkinson, M.D., 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., 747-3032
Delineation of mechanisms responsible for clinical arthritides, improved identification of patients at risk for developing sudden cardiac death, evaluation of new antiarrhythmic agents, evaluation of new antichydaral pacing devices, signal-averaged ECGs and catheter ablation of arrhythmias.

David D. Chaplin, M.D., Ph.D., 362-9047
Developmental regulation of peripheral lymphoid organ structure and function, definition of the natural functions of acute proinflammatory cytokines in vivo, and T cells and cytokines in asthma.

Roberto Civitelli, M.D., 454-8408
The biology of cell-cell interactions and communication in bone via gap junctions and cell adhesion molecules. Function of connexins in transcriptional control of osteoblast differentiation, osteoclastogenesis and mechanotransduction. Modulation of mesenchymal lineage allocation and osteogenic differentiation by cadherins and β-catenin signaling.

Phillip E. Cryer, M.D., 362-7617
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., 362-2027
Fatty liver disease in patients with hepatitis C. Our laboratory is interested in the molecular mechanisms of hepatic steatosis, particularly in patients with hepatitis C. We work with cultured cell lines that express the viral polyprotein and with various 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 HCV mediated steatosis. These studies could range from experiments examining the expression of candidate genes in liver samples from patients with HCV and steatosis to studies in cell lines and in experimental animals in which elements of hepatic lipid biosynthesis and secretion are examined more closely, using molecular and biochemical techniques.

Arthurl Z. Eisen, M.D., 362-8180
Proteolytic degradation of the extracellular matrix. Behavior of fibroblasts in a collagen lattice (skin equivalent).

Bradley A. 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 Bradley A. Evanoff, M.D., M.P.H., to discuss this research.

Gregory I. Goldberg, Ph.D., 362-8172
Role of secreted extracellular matrix metalloproteases in tissue remodeling. Structure and function of the metalloproteases.
Richard W. Gross, M.D., Ph.D., 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., 362-8235
Studies characterizing the regulation of renal growth during development and in the settings of acute and chronic renal failure.

Jay W. Heinecke, M.D., 362-6923
The overall goal of our research is to understand the role of oxidative reactions executed by phagocytes in the pathogenesis of vascular disease. Novel lipid, nucleic acid, and protein oxidation products generated by phagocytes in vitro have been isolated and their structures determined using NMR and mass spectrometry. To establish the physiological relevance of such reactions, we have used mass spectrometry to demonstrate that these products are present in human atherosclerotic lesions.

John O. Holloszy, M.D., 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., 286-2772
The research in the laboratory focuses on new therapies for chronic kidney disease and its complications. The mechanisms of action of these therapies for nephropathy, vascular calcification and renal bone disease are being analyzed.

Saulo Klabs, M.D., 454-7107
Mechanisms involved in the progression of renal disease. This section will provide the student with an understanding of the methodology used to assess renal function and different maneuvers utilized to prevent the progression of renal disease in experimental animal models. Research projects include: 1) effects of urinary tract obstruction on renal function and metabolism, 2) factors that are responsible for the progression of renal disease in experimental animals, and 3) how does obstruction of the urinary tract lead to progressive renal disease.

Stuart A. Komfeld, M.D., 362-8803
Synthesis, processing and sorting of glycoproteins, including lysosomal enzymes. Intracellular protein trafficking.

Sándor J. Kovács, Ph.D., M.D., 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.

Anthony Kuczyk Jr., M.D., 362-9042 and 454-7306
Dietary antigens in infant colic, milk-induced colitis and “autoimmune” diseases. Allergens that cause chronic hives. NOD mice, which spontaneously develop Type I diabetes, infants with colic, nursing mothers with colicky infants, and chronic urticaria patients are being challenged with suspected antigens to identify etiologic substances and study mechanisms involved.

Pui-Yan Kwok, M.D., Ph.D., 362-8236
Automated genetic mapping. Projects are directed toward automation in the many areas of molecular genetics. Specifically, we are developing ways to detect DNA sequence variations efficiently, generating genetic markers that can be typed rapidly, and studying large populations with these markers using automated methods. Opportunities to apply these methods to human diseases are available.

Jack H. 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., 362-8933, 362-8935
Students will be members of a collaborative research team headed by Marc S. Levin, M.D., and Deborah C. Rubin, M.D. (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., 362-1362
Emergency medicine research elective. This elective offers an opportunity to investigate a wide variety of clinical questions relevant to emergency medicine, such as prevention of injury and trauma, toxicology, outcomes and cost-containment research, and public policy issues as well as the prehospital care of sick or injured patients. A preceptor would assist the student with literature review, study design and data analysis. Students with original research ideas would be encouraged to complete their work to the point of abstract presentation or manuscript preparation. Interested students should contact the Emergency Medicine Division (362-1362).
Biochemistry of platelets, regulation of lipid metabolism in tissue culture; mechanism of platelet thrombus formation.

Jeffrey D. Milbrandt, M.D., Ph.D., 362-4650
We have several ongoing projects in our laboratory. 1) The biological function of the GFL family of neutrophil 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., 454-7719
Stimulus-secretion coupling in endocrine cells (β-islet cells and adrenal chromaffin cells) examined using single-cell assays of secretion (capacitance measurements, amperometry).

Audrey R. Morrison, M.D., 362-2597
Regulation at a transcriptional and translational level of the cyclo-oxygenase gene(s) by the lymphokines IL-1 and TNF. Interactions of cyclooxygenase products with nitric oxide system in renal cells.

Jerome J. Morrissey, Ph.D., 454-7464, e-mail: morrisse@imgate.wustl.edu
During fibrotic kidney disease and during the subtle fibrosis of the kidney with age there is the activation and inhibition of genes traditionally associated with tumor initiation and metastatic growth. In order to gain more global information concerning gene expression during renal disease progression and treatment, gene array analysis will be employed. Results will be integrated with known information in the progression and treatment of atherosclerotic disease and fibrotic disease of other organ systems.

Richard E. Ostlund Jr., M.D., 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.

Roberto Pacifiel, M.D., 454-7765
Bone cell differentiation, growth and metabolism in tissue culture; cell-cell communication in bone via intercellular junctions and soluble factors, with emphasis on cytokines and their regulation by hormones and local factors.

Curtis A. Parvin, Ph.D., 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., 362-9600
Studies of genetic susceptibility to diabetes in man 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. Collaborative genetic studies are under way in the U.S., Israel and Japan. 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. A new Islet B-cell Functional Genomics Center is being established in the lab to study global gene expression profiles in health and disease.

Samuel A. Santoro, M.D., Ph.D., 362-3110
Research is aimed at defining the molecular mechanisms of cell-cell and cell-substrate adhesion. Investigations are centered on the structure, function and regulation of adhesion receptor molecules in platelet function, development and malignancy.

Gustav Schonfeld, M.D., 362-7038
Molecular genetics and pathophysiology of low LDL syndromes. Studies employ human families, genome scans, positional cloning, genetically altered cells and mice.

Daniel P. Schuster, M.D., 362-3776
Positron emission tomographic studies of acute lung injury. Students will be introduced to large-animal models of acute lung injury and techniques involving positron emission tomography, nuclear medicine, mathematical modeling and pulmonary physiology. Specific projects involving questions relevant to pulmonary edema, lung metabolism, pulmonary hypertension or pulmonary gene 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.

Clay F. Semenkovich, M.D., 362-4454
Eduardo Slatopolsky, M.D., 362-8242

Samuel L. Stanley, Jr., M.D., 362-1071
This lab studies the protozoan parasite Entamoeba histolytica, the cause of amebic dysentery and amebic liver abscess. Work in the laboratory has focused on developing models to better understand the immunopathogenesis of amebic infection, and the design and evaluation of recombinant-antigen based vaccines to stimulate mucosal and parenteral immune responses against the parasite.

Thomas H. Steinberg, M.D., 362-9218
We study cell-cell communication between macrophages and other cells macrophages talk to. In addition, we study the rapidly expanding class of receptors for extracellular ATP and their role in macrophage function. Methods include fluorescence video microscopy.

Douglas M. Tollefsen, M.D., Ph.D., 362-8830
Biochemical 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. Minimum of 12 weeks required.

John W. Turk, M.D., Ph.D., 362-8190
Phospholipid signaling mechanisms in pancreatic islets. Experience in mass spectrometric analysis of complex lipids is available.

Herbert W. Virgin IV, M.D., Ph.D., 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.

H. James Wedner, M.D., 454-7937
Psychosocial aspects of asthma. 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. James Wedner, M.D., 454-7937
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 biochemical 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 hysterophorus, a newly recognized allergen.

Samuel A. Wickline, M.D., 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 (Samuel A. Wickline, M.D., Director of Cardiovascular Magnetic Resonance Laboratory, 454-7459); 2) ultrasonic/physical acoustics (Samuel A. Wickline, Co-Director of Cardiovascular Division and Director of Medical Ultrasonics Laboratory, 454-8655); and 3) cardiovascular biophysics (Sandor J. Kovacs, Ph.D., M.D., 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

ADOLPHUS BUSCH
PROFESSOR AND CHAIRMAN OF DEPARTMENT

Kenneth S. Polonsky, M.D., University of The Witwatersrand, Johannesburg, South Africa, 1973. (See Department of Cell Biology and Physiology and Clinical Investigation Program.)

Elmer B. Brown, M.D., Washington University, 1950.

Hugh Chaplin Jr., M.D., Columbia University, 1947. (See Department of Pathology and Immunology.)

ADOLPHUS BUSCH
(See Department of Cell Biology and Physiology and Clinical Investigation Program.)

PROFESSOR AND CHAIRMAN

of the

ADOLPHUS BUSCH

Department of Medicine

M.D.

Department of Cell Biology and Physiology and Clinical Investigation Program.

William H. Daughaday, M.D., Harvard University, 1943.

M. Kenton King, M.D., Vanderbilt University, 1951. (Also formerly Danforth Professor of Preventive Medicine and Public Health)

George S. Kobayashi, Ph.D., Tulane University, 1963. (Microbiology)

J. Russell Little Jr., M.D., University of Rochester, 1956. (See Department of Molecular Microbiology.)

Charles W. Parker, M.D., Washington University, 1953. (See Department of Molecular Microbiology.)

B. Mitchell Perry Jr., M.D., Washington University, 1946.

John A. Pierce, M.D., University of Arkansas, 1948.

Mabel L. Purkerson, M.D., Medical College of South Carolina, 1956. (See Department of Pediatrics.)

John P. Boineau, M.D., Duke University, 1959. (See Department of Surgery.)

Anne M. Bowcock, Ph.D., University of Witwatersrand, 1984. (See Department of Genetics, Department of Pediatrics and Clinical Investigation Program.)


Timothy G. Buchman, Ph.D., The University of Chicago, 1978; M.D., University of Chicago, 1980. (See Department of Anesthesiology and Department of Surgery.)

Tobias and Hortense Lewin
Professor of Cardiovascular Diseases

Michael E. Cain, M.D., George Washington University, 1975.

Lewis R. Chase, M.D., Harvard University, 1964. (Chief, Washington University Medical Services, Veterans Administration Medical Center)

Ray E. Clouse, M.D., Indiana University, 1976. (See Department of Psychiatry.)

Irene E. and Michael M. Karl
Professor of Endocrinology and Metabolism

Philip E. Cryer, M.D., Northwestern University, 1965. (Clinical Research Center) (See Clinical Investigation Program.)

William H. Danforth, M.D., Harvard University, 1951. (See Administration.)

Nicholas O. Davidson, M.B.B.S., University of London, 1974. (See Department of Molecular Biology and Pharmacology.)

Douglas C. Dean, Ph.D., University of Kansas, 1983. (See Department of Cell Biology and Physiology.)


Lewis T. and Rosalind B. Apple
Professor of Medicine

John F. DiPersio, M.D., Ph.D., University of Rochester, 1980. (See Department of Pathology and Immunology, Department of Pediatrics and Alvin J. Siteman Cancer Center.)

Rebecca Susan Dresser, M.S., Indiana University, 1975.

William Michael Dunne Jr., Ph.D., Medical College of Wisconsin, 1981. (See Department of Molecular Microbiology and Department of Pathology and Immunology.)


The Winfred A. and Emma R. Showman Professor of Dermatology

Arthur Z. Eisen, M.D., University of Pennsylvania, 1957. (Dermatology)

Seth A. Eisen, M.D., Washington University, 1966.

Alex S. Evers, M.D., New York University, 1978. (See Department of Anesthesiology and Department of Molecular Biology and Pharmacology.)

Edward M. Geltman, M.D., New York University, 1971. (See Department of Radiology.)

Daniel E. Goldberg, M.D., Ph.D., Washington University, 1985. (Howard Hughes Medical Institute Assistant Investigator) (See Department of Molecular Microbiology.)

Gregory I. Goldberg, Ph.D., Weizmann Institute of Science, 1977. (Dermatology) (See Department of Biochemistry and Molecular Biophysics.)

Daniel M. Goodenberger, M.D., Duke University, 1974.

Lawrence T. Goodnough, M.D., University of Pennsylvania, 1975. (See Department of Pathology and Immunology.)

Jeffrey I. Gordon, M.D., The University of Chicago, 1973. (See Department of Molecular Biology and Pharmacology.)
Gregory A. Grant, Ph.D., University of Wisconsin, 1975. (Dermatology) (See Department of Molecular Biology and Pharmacology.)

Michael L. Gross, Ph.D., University of Minnesota, 1966. (See Department of Pathology and Immunology.) (Also Department of Chemistry)

Richard W. Gross, M.D., New York University, 1976; Ph.D., Washington University, 1982. (See Department of Molecular Biology and Pharmacology.) (Also Department of Chemistry)

Chromalloy Professor of Renal Diseases in Medicine
Marc R. Hammerman, M.D., Washington University, 1972. (See Department of Cell Biology and Physiology.)

Jay W. Heinecke, M.D., Washington University, 1981.


John O. Holloszy, M.D., Washington University, 1957.

Selma and Herman Seldin Professor of Medicine
Michael J. Holtzman, M.D., Northwestern University, 1975. (See Department of Cell Biology and Physiology.)

Ira M. Lang Professor of Nephrology
Keith A. Hruska, M.D., Creighton University, 1969. (See Department of Cell Biology and Physiology.)

Daniel P. Kelly, M.D., University of Illinois, 1982. (See Department of Molecular Biology and Pharmacology and Department of Pediatrics.)

Distinguished University Professor of Medicine
David M. Kipnis, M.D., University of Maryland, 1951. (See Department of Molecular Biology and Pharmacology.)

John E. and Adalice Simon Professor of Medicine
Saule Klahr, M.D., Universidad Nacional de Colombia, 1959.


Senior Adviser to the Chairman
Gerald Medoff, M.D., Washington University, 1962. (See Department of Molecular Biology and Pharmacology.)

Jeffrey D. Milbrandt, M.D., Washington University, 1978; Ph.D., University of Virginia, 1983. (See Department of Pathology and Immunology.)


James G. Miller, Ph.D., Washington University, 1969. (Also Faculty of Arts and Sciences)

Thalachaillour Mohananumar, Ph.D., Duke University, 1974. (See Department of Pathology and Immunology and Department of Surgery.)

Aubrey R. Morrison, M.B.B.S., University of London, 1970. (See Department of Molecular Biology and Pharmacology.)


Richard E. Ostlund Jr., M.D., University of Utah, 1970.

Roberto Paciifici, M.D., Perugia University, 1981. (See Department of Radiology.)

Alan A. and Edith L. Wolff Professor in Medicine
Timothy J. Ley, M.D., Washington University, 1978. (See Department of Genetics, Clinical Investigation Program and Alvin J. Siteman Cancer Center.)

Ellen Li, M.D., Ph.D., Washington University, 1980. (See Department of Biochemistry and Molecular Biophysics.)

Philip A. Ludbrook, M.B.B.S., University of Adelaide, 1963. (See Department of Radiology and Clinical Investigation Program.)


Philip W. Majerus, M.D., Washington University, 1961. (See Department of Biochemistry and Molecular Biophysics.)

Susan B. Mallory, M.D., University of Texas, Galveston, 1974. (Dermatology) (See Department of Pediatrics.)

Robert P. Mecham, Ph.D., Boston University, 1976. (See Department of Cell Biology and Physiology, Department of Pediatrics and Department of Biomedical Engineering.)

Danforth Professor of Medicine and Nutritional Science
Samuel Klein, M.D., Temple University, 1979. (See Clinical Investigation Program.)

David C. and Betty Farrell Distinguished Professor of Medicine
Stuart A. Kornfeld, M.D., Washington University, 1962. (See Department of Biochemistry and Molecular Biophysics.)


Jack H. Ladenson, Ph.D., University of Maryland, 1971. (Clinical Chemistry) (See Department of Pathology and Immunology.)

Stephen S. Lefrank, M.D., State University of New York, Downstate, 1965. (See Administration.)

Alan A. and Edith L. Wolff Distinguished Professor
William A. Peck, M.D., University of Rochester, 1960. (See Administration.)


M. Alan Permutt, M.D., Washington University, 1965. (See Department of Cell Biology and Physiology.)


Lee Ratner, M.D., Ph.D., Yale University, 1979. (See Department of Molecular Microbiology.)

J. Evan Sadler, Ph.D., Duke University, 1978; M.D., 1979. (Howard Hughes Medical Institute Associate Investigator in Medicine) (See Department of Biochemistry and Molecular Biophysics.)
Jeffrey E. Saffitz, Ph.D., Case Western Reserve University, 1977; M.D., 1978. (See Department of Pathology and Immunology.)

Samuel A. Santoro, M.D., Ph.D., Vanderbilt University, 1979. (See Department of Pathology and Immunology.)

Samuel E. Schechter, M.D., Ph.D., Samuel A. Santoro, M.D., Ph.D., of Pathology and Immunology.)

Vanderbilt University, 1979. (See Clinical Investigation Program.)

Moog Professor in Pulmonary Medicine

Gustav Schonfeld, M.D., Washington University, 1960.

Daniel P. Schuster, M.D., Yale University, 1976. (See Clinical Investigation Program.)

Clay F. Semenkovich, M.D., Washington University, 1981. (See Department of Cell Biology and Physiology.)

Dorothy R. and Hubert C. Moog Professor in Pulmonary Medicine


Barry A. Siegel, M.D., Washington University, 1969. (See Department of Radiology. Alvin J. Siteman Cancer Center and Clinical Investigation Program.)

Joseph Friedman Professor of Renal Diseases in Medicine

Eduardo Slatopolsky, M.D., University of Buenos Aires, 1959.

Samuel L. Stanley Jr., M.D., Harvard University, 1980. (See Department of Molecular Microbiology.)


Gregory A. Storch, M.D., New York University, 1973. (See Department of Molecular Microbiology and Department of Pediatrics.)

Douglas M. Tollefsen, M.D., Ph.D., Washington University, 1977. (See Department of Biochemistry and Molecular Biophysics.)

Rosemary and I.J. Flance Professor in Pulmonary Medicine


John W. Turk, M.D., Ph.D., Washington University, 1976. (See Department of Pathology and Immunology.)

H. James Wedner, M.D., Cornell University, 1957.

Gary J. Weil, M.D., Harvard University, 1975. (See Department of Molecular Microbiology.)

Alan N. Weiss, M.D., Ohio State University, 1966.


Samuel A. Wickline, M.D., University of Hawaii, 1980. (Also Department of Physics)

Frank Chi-Pong Yin, Ph.D., University of California, San Diego, 1970; M.D., 1973. (See Department of Biomedical Engineering.)

Sam J. Levin and Audrey Loew Levin Professor of Research in Arthritis

Wayne M. Yokoyama, M.D., University of Hawaii, 1978. (Howard Hughes Medical Institute Investigator) (See Department of Pathology and Immunology.)

Joseph J.H. Ackerman, Ph.D., Colorado State University, 1977. (Chemistry)

Thomas G. Cole, M.D., University of Missouri, 1974; Ph.D., 1980. (See Department of Biochemistry and Molecular Biophysics.)

Edwin B. Fisher, Ph.D., State University of New York, 1972. (Psychology) (See Alvin J. Siteman Cancer Center and Clinical Investigation Program.) (Also Department of Psychology)

Pong Fu Hsu, Ph.D., University of Utah, 1986.

Irene E. Karl, Ph.D., University of Wisconsin, 1940.

Jeremiah J. Morrissey, Ph.D., St. Louis University, 1974.

Professors Emeriti (Clinical)

Ralph V. Gieselman, M.D., Washington University, 1947.

Neville Grant, M.D., Columbia University, 1954.

Harold J. Joseph, M.D., University of Texas, 1950.

Norman P. Knowlton, M.D., Harvard University, 1945.

Virgil Loeb, M.D., Washington University, 1944.

Morris D. Marcus, M.D., Washington University, 1934. (Dermatology)


Ernest T. Rouse Jr., M.D., Washington University, 1943.

Llewellyn Sale Jr., M.D., Washington University, 1940.

Professors (Clinical)

Elliot E. Abbey, M.D., New York University, 1975. (Clinical Academic)

Benjamin A. Borowsky, M.D., Washington University, 1958.

John D. Davidson, M.D., Washington University, 1952.

IJ. Flance, M.D., Washington University, 1945.


James N. Heins, M.D., University of Louisville, 1961.

Michael M. Karl, M.D., University of Louisville, 1938.


Charles Kilo, M.D., Washington University, 1959.

Phillip E. Korenblat, M.D., University of Arkansas, 1960.

Marvin E. Levin, M.D., Washington University, 1951.


Samuel Nussbaum, M.D., Mt. Sinai School of Medicine, 1973.

G. Charles Oliver, M.D., Harvard University, 1957.


Robert Paine, M.D., Harvard University, 1944.

Lester T. Reese, M.D., Tulane University, 1966. (Dermatology)

Shabbir H. Safdar, M.D., Nishtar Medical College, 1961.

Benjamin Schwartz, M.D., Ph.D., Albert Einstein College of Medicine, 1972.

Burton A. Shatz, M.D., Washington University, 1943.
Howard L. McLeod, Pharm.D., Philadelphia College of Pharmacy and Science, 1990. (See Molecular Biology and Pharmacology and Alvin J. Siteman Cancer Center.)

Steven B. Miller, M.D., University of Nebraska, 1988. (See Molecular Biology, and Pharmacology.)

Stanley Misler, M.D., Ph.D., New York University, 1977. (See Department of Cell Biology and Physiology.)

Anthony J. Muslin, M.D., Harvard University, 1984. (See Department of Cell Biology and Pharmacology.)

William C. Parks, Ph.D., Medical College of Wisconsin, 1982. (See Department of Pediatrics.)

Curtis A. Parvin, Ph.D., University of Minnesota, 1980. (Clinical, Computer Science) (See Department of Pathology and Immunology and Division of Biostatistics.)

Jay F. Piccirillo, M.D., University of Vermont, 1985. (See Department of Otolaryngology and Program in Occupational Therapy.)

Joel Picus, M.D., Harvard University, 1984.

Katherine Parker Ponder, M.D., Washington University, 1983. (See Department of Biochemistry and Molecular Biophysics.)

Craig K. Reiss, M.D., University of Minnesota, 1983. (See Department of Biochemistry and Molecular Biophysics.)

Jay F. Piccirillo, M.D., University of Vermont, 1985. (See Department of Otolaryngology and Program in Occupational Therapy.)


Robert D. Rifkin, M.D., New York University, 1972.

Joseph G. Rogers, M.D., University of Nebraska, 1988.

Daniel Rosenbluth, M.D., Mt. Sinai School of Medicine, 1985.

Marcos Rothstein, M.D., University of Zulia, 1974.

Deborah C. Rubin, M.D., Albert Einstein College of Medicine, 1981.

Brent Ruoff, M.D., St. Louis University, 1981.

Mark S. Sands, Ph.D., State University of New York, 1990.

Dan Schuller, M.D., University Nacional Autonoma de Medicine, Mexico, 1985.

Thomas H. Steinberg, M.D., New York University, 1978. (See Department of Cell Biology and Physiology.)

Walton Summerlin, M.D., University of Texas, Southwestern, 1985.

Alan J. Tiefenbrunn, M.D., Washington University, 1974. (See Department of Radiology.)

Dwight A. Towler, M.D., Ph.D., Washington University, 1989. (See Department of Molecular Biology and Pharmacology.)

Sergy M. Troyanovski, Ph.D., All-Union Cancer Research Centre, 1981. (Dermatology) (See Department of Molecular Biology and Pharmacology.)

Peter G. Tuteur, M.D., University of Illinois, 1966.

Alison J. Whelan, M.D., Harvard University, 1986. (See Department of Pediatrics and Alvin J. Siteman Cancer Center.)

Lynn K. White, M.D., Harvard University, 1984.

David Windus, M.D., Creighton University, 1978.


Kevin E. Yarasheski, Ph.D., Kent State University, 1987. (See Clinical Investigation Program.)


Research Associate Professors Emeriti

Janina M. Bratnburg, Ph.D., University of Lodz, 1968.

Norma Fletcher, Ph.D., University of Copenhagen, 1965.

Research Associate Professors

Alex J. Brown, Ph.D., University of Tennessee, 1982.

Adriana Dusso, Ph.D., University of Rosari, 1985.

Denis E. Hourcade, Ph.D., Harvard University, 1978.


Osmi Kanagawa, M.D., Okayama University, 1974; Ph.D., 1978. (See Department of Pathology and Immunology.)

Bruce W. Patterson, Ph.D., University of Illinois, 1980. (See Clinical Investigation Program.)

Richard A. Pierce, Ph.D., Rutgers University, 1990. (Dermatology)

Kenneth B. Schechtman, Ph.D., Washington University, 1978. (See Division of Biostatistics and Clinical Investigation Program.)

Kathryn A. Yamada, Ph.D., Georgetown University, 1982.

Associate Professors Emeriti (Clinical)

Gail G. Ahumada, M.D., Stanford University, 1972.


David M. Lieberman, M.D., Vanderbilt University, 1949.

Mary L. Parker, M.D., Washington University, 1953.

James C. Sisk, M.D., Washington University, 1946. (Dermatology)

Ross B. Sommer, M.D., Cornell University, 1949.

Associate Professors (Clinical)

Jack Barrow, M.D., Washington University, 1946.


Robert M. Bruce, M.D., University of Minnesota, 1968.


Patricia L. Cole, M.D., Harvard University, 1981.

Stephen R. Crespin, M.D., Harvard University, 1965.

John S. Daniels, M.D., University of Arkansas, 1974.

Rand E. Dankner, M.D., Baylor College of Medicine, 1978.


Lewis C. Fischbein, M.D., Washington University, 1974.
Arthur H. Gale, M.D., University of Missouri, 1959.
Siddhesh Gowda, M.B.B.S., Medical College Bellary Mysore, 1970.
Owen S. Kantor, M.D., University of Missouri, 1968.
John J. Kelly, M.D., St. Louis University, 1963.
Micki Klearman, M.D., Washington University, 1981.
Harvey Lieblin, M.D., New York University, 1957.
Herbert Lubowitz, M.D., Washington University, 1958.
Alan P. Lyss, M.D., Washington University, 1976.
Deborah L. Parks, M.D., University of Louisville, 1982.
MaryBeth Pereira, M.D., University of California, 1980.
(See Department of Radiology.)
Scott R. Sale, M.D., St. Louis University, 1976.
Robert B. Shuman, M.D., University of Missouri, 1981.
Donald A. Skor, M.D., Rush University, 1978.
Paul M. Stein, M.D., St. Louis University, 1971.
Kongsak Tanphachitt, M.D., Siriraj Hospital Medical School, 1970.
J. Allen Thiel, M.D., St. Louis University, 1960.
Jeffrey Tillinghast, M.D., Washington University, 1980.

Stanley M. Wald, M.D., Washington University, 1946.
Leonard B. Weinstock, M.D., University of Rochester, 1981.

Associate Professors (Adjunct)
Elaine S. Krul, Ph.D., McGill University, 1982.
(See Clinical Investigation Program.)

Assistant Professor Emeritus
Allen P. Klippel, M.D., St. Louis University, 1946.

Assistant Professors
Douglas R. Adkins, M.D., Wright State University, 1986.
Robert Arch, Ph.D., University of Wurzburg, Germany, 1994.
(See Pathology and Immunology.)
Thomas J. Baranski, M.D., Ph.D., Washington University, 1992.
(See Department of Molecular Biology and Pharmacology.)
Michael A. Beardslee, M.D., St. Louis University, 1991.
Monica Bessler, M.D., Ph.D., University of London, 1994.
Perry E. Bickel, M.D., University of Texas, Southwestern, 1988.
(See Department of Cell Biology and Physiology.)
Ellen F. Binder, M.D., Washington University, 1981.
(See Program in Occupational Therapy.)
Thomas M. Birkenmeier, M.D., Washington University, 1982.
(See Department of Pathology and Immunology.)
Steven Brody, M.D., University of Michigan, 1980.
Lawrence Brown, M.D., Washington University, 1990.

John S. Burr, M.D., University of Pennsylvania, 1989
Mario Castro, M.D., University of Missouri, Kansas City, 1988.
(See Clinical Investigation Program.)
Lilibeth M. Cayabyab-Loe, M.D., University of Missouri, 1990.
Jane Chen, M.D., Washington University School of Medicine, 1993.
Zhouji Chen, Ph.D., Michigan State University, 1994.
(See Department of Pathology and Immunology.)
Lynn A. Cornelius, M.D., University of Missouri, 1980.
(Dermatology)
Thomas M. De Fer, M.D., University of Missouri, 1989.
Teresa Deshields, Ph.D., University of Georgia, 1987.
(See Clinical Investigation Program)
Robert H. Deusinger, Ph.D., University of Iowa, 1981.
(See Department of Biomedical Engineering and Program in Physical Therapy.)
University of Missouri, 1988.
(See Department of Neurology.)
Gregory A. Ewald, M.D., Northwestern University, 1989.
Mitchell N. Faddis, M.D., Ph.D., Washington University, 1993.
Larry E. Fields, M.D., Harvard University, 1980.
(See Department of Pathology and Immunology.)
Karen F. Forsman, M.D., Rush Medical College, 1981.
(Dermatology)
Brian F. Gage, M.D., University of California, 1984.
(See Clinical Investigation Program.)
Thomas H. Gallagher, M.D., Harvard University, 1990.
Gary L. Gambill, M.D., University of Oregon, 1974.
Timothy A. Graubert, M.D., Harvard University, 1988. (See Department of Pathology and Immunology.)
Jonathan M. Green, M.D., Wayne State University, 1986. (See Department of Pathology and Immunology.)
Jonathan B. Hall, M.D., St. Louis University, 1991.
Austen Arthur Halle III, M.D., University of Tennessee, 1982.
Xianlin Han, Ph.D., Washington University, 1990.
Michael P. Heffernan, M.D., University of Michigan, 1993.
Elizabeth Hilliker, M.D., Washington University, 1970.
Ian Kerst Hornstra, M.D., University of Missouri, 1986; Ph.D., University of Florida, Gainesville, 1993.
Courtney Houchen, Ph.D., Temple University, 1990.
Randall Howell, D.O., Kansas City College of Osteopathic Medicine, 1978.
Sreeni Jonnalagadda, M.D., University of Bombay, India, 1988.
Amy Joseph, M.D., Vanderbilt University, 1986.
Andrew M. Kates, M.D., Tufts University, 1994.
Hanna J. Khoury, M.D., Universite Catholique de Louvain, Brussels, Belgium, 1992.
Joshua Korzenik, M.D., Albert Einstein College of Medicine, 1987.
Attila Kovacs, M.D., Semmelweis University, Budapest, Hungary, 1985.
Gregory M. Lanza, M.D., Ph.D., University of Georgia, 1981. (See Department of Biomedical Engineering.)
Gerald P. Linette, Ph.D., M.D., Georgetown University, 1990.
Daniel C. Link, M.D., University of Wisconsin, 1985. (See Department of Pathology and Immunology.)
Robinna G. Lorenz, M.D., Ph.D., Washington University, 1990. (See Department of Pathology and Immunology.)
Caroline Mann, M.D., Indiana University, 1993.
Ann Martin, M.D., Case Western Reserve University, 1981. (Dermatology)
Thomas F. Martin, M.D., St. Louis University, 1965.
Timothy J. Martin, M.D., St. Louis University, 1991.
Brent W. Miller, M.D., Washington University, 1990.
Scott D. Minor, Ph.D., University of Iowa, 1987.
Hector D. Molina-Vicency, M.D., University of Puerto Rico, 1985. (See Department of Pathology and Immunology.)
Michael E. Mullins, M.D., Hahnemann University, 1987.
Michael J. Naughton, M.D., SUNY at Buffalo, 1993.
Rodney Newberry, M.D., Washington University, 1980.
Daniel S. Ory, M.D., Harvard University, 1986. (See Clinical Investigation Program.)
Jeffrey Peterson, M.D., University of Indiana, 1995.
Linda Peterson, M.D., Washington University, 1990.
Christine Pham, M.D., University of Florida, 1985. (See Department of Pathology and Immunology.)
Louis Polish, M.D., University of Vermont, 1981.
Chandra Prakash, M.D., University of Calicut, South India, 1990.
Joseph Primrose, M.D., University of Illinois, 1968.
Michael I. Rauchman, M.D., McGill University, 1984.
Lisa R. Ross, M.D., University of Michigan, 1983.
Raj Satyanarayana, M.D., University of Madras, India, 1982.
Jean E. Schaffer, M.D., Harvard University, 1986. (See Department of Molecular Biology and Pharmacology.)
Mario Schootman, Ph.D., University of Iowa, 1993. (See Clinical Investigation Program.)
Helena W. Schotland, M.D., Albert Einstein College of Medicine, 1988.
William D. Shannon, Ph.D., University of Pittsburgh, 1995. (See Alvin J. Siteman Cancer Center, Division of Biostatistics and Clinical Investigation Program.)
James M. Shipley, Ph.D., St. Louis University, 1992.
David R. Sinacore, Ph.D., West Virginia University, 1992.
Bradley Stoner, M.D., Ph.D., Indiana University, 1987.
Benjamin R. Tan, M.D., University of Philippines, 1990.
Pablo Tebas, M.D., Universidad Autonoma, Madrid, Spain, 1985.
Michael Tomasson, M.D., Stanford University, 1992.
Anitha Vijayan, M.D., University of West Indies, Jamaica, 1990.
Dennis T. Villareal, M.D., Cebu Institute of Medicine, Philippines, 1982.
Reina Villareal, M.D., Cebu Institute of Medicine, Philippines, 1980.
Oksana Volshteyn, M.D., Minsk State Medical Institute, 1976. (See Department of Neurology.)
Michael J. Walter, M.D., St. Louis University, 1990.
Jason Weber, Ph.D., St. Louis University, 1997.
Katherine N. Wellbaccher, M.D., Stanford University, 1992. (See Department of Pathology and Immunology.)
Mark S. Weinfield, M.D., Harvard University, 1991.
Steven J. Weintraub, M.D., Medical College of Virginia, 1985. (See Department of Cell Biology and Physiology.)
Cynthia Wichelman, M.D., Stanford University School of Medicine, 1988.
Karen Winters, M.D., Southern Illinois University, 1983.
Roger D. Yusen, M.D., University of Illinois, 1990.

Research Assistant Professors Emeritus
Greta Camel, M.D., University of Wisconsin, 1949.
Ida K. Mariz, A.B., Washington University, 1940.

Research Assistant Professors
Shrikant Anant, Ph.D., University of Illinois, 1993.
Grigori A. Bannikov, Ph.D., All-Union Cancer Research Centre, 1973. (Dermatology)
Kenneth R. Boschert, D.V.M., Mississippi State University, 1984. (Comparative Medicine)
Su-Li Cheng, Ph.D., University of Louisville, 1978.
Ivan E. Collier, Ph.D., Florida State University, 1980. (Dermatology)
Xiaoyun Fu, Ph.D., Zhejiang University, P.R. China, 1988.
Dong Ho Han, Ph.D., Brigham Young University, 1994.
Margarzata Krych, Ph.D., Polish Academy of Sciences, 1982.
Ben Wen Li, M.D., Zhejiang Medical University, 1975.
Steven Mummm, Ph.D., St. Louis University, 1992.
Elizabeth Newberry, Ph.D., Washington University, 1995.
Lorraine Nolte, Ph.D., Karolinska Institute, Stockholm, Sweden, 1995.
Sasanka Ramanadham, Ph.D., Texas Tech University, 1985.
Mitchell G. Scott, Ph.D., Washington University, 1982. (Clinical) (See Department of Pathology and Immunology.)
Phyllis K. Stein, Ph.D., University of Virginia, 1990.
Alan D. Waggoner, M.H.S., Washington University, 1996.
Consuelo Wilkins, M.D., Howard University, 1992.

Research Assistant Professors (Adjunct)
Grace S. Lo, Ph.D., University of Texas, Austin, 1976.

Assistant Professors Emeriti (Clinical)
Morris Alex, M.D., Washington University, 1943.
Benje Boonshaft, M.D., Washington University, 1961.
Duane E. Cozart, M.D., Medical College of Virginia, 1959.
William K. Hall, M.D., Washington University, 1942. (Dermatology)
Robert C. Kingsland, M.D., Washington University, 1937.
Warren Lonergan, M.D., Vanderbilt University, 1941.
J. Roger Nelson, M.D., Washington University, 1953.
Harold K. Roberts, M.D., Ohio State University, 1939.
Samuel Schechter, M.D., Washington University, 1941.

Assistant Professors (Clinical)
Charles C. Abel, M.D., Washington University, 1956.
Ingrid R. Albert, M.D., Albert Einstein College of Medicine, 1971. (Dermatology)
Jerome M. Aronberg, M.D., Washington University, 1971. (Dermatology)
Howard J. Aylward Jr., M.D., Vanderbilt University, 1970.
Om P. Bahl, M.B.B.S., Punjabi University, 1957.
Frederick D. Bauschard, M.D., University of Pittsburgh, 1968. (Dermatology)
Susan S. Berdy, M.D., St. Louis University, 1984.
Michael A. Berk, M.D., Indiana University, 1979.
Aaron M. Bernstein, M.D., Chicago Medical School, 1952.
Aaron Birenbaum, M.D., Washington University, 1948.
Clifford A. Birge, M.D., Washington University, 1961.
Matthew S. Bosner, M.D., University of Texas, 1983.
Philip Comens, M.D., Washington University, 1951.
Ralph Copp Jr., M.D., Washington University, 1952.
Vincent R. DeMello, M.D., Bombay University, 1969.
John T. Ellena, M.D., Southern Illinois University, 1983.
James Ettzsorn, M.D., St. Louis University, 1973.
Arnold M. Goldman, M.D., Washington University, 1959.
Benjamin M. Goldstein, M.D., Washington University, 1964.
David A. Goran, M.D., Washington University, 1976.
Charlene Gottlieb, M.D., Washington University, 1972.
Guner B. Gulmen, M.D., Hacettepe University, 1969.
Paul F. Hintze, M.D., University of Utah, 1978.
Bruce J. Hookerman, M.D., University of Illinois, 1967.
Morris Joftus, M.D., Wayne State University, 1971.
Jay M. Marion, M.D., Washington University, 1956.
Ralph F. Kuhlman, M.D., Harvard University, 1971.
Erik P. Thyssen, M.D., University of Copenhagen, 1984.
Alan R. Spivack, M.D., St. Louis University, 1964.
John H. Kissel, M.D., Harvard University, 1971.
Donald K. King, M.D., The Johns Hopkins University, 1970.
Michael P. Williams, Ph.D., University of California, 1996.
Gerald S. Shatz, M.D., Washington University, 1974.
Sherry E. Shuman, M.D., Wayne State University, 1982.
Gary Singer, M.D., University of Toronto, 1987.
Robert L. Kaufman, M.D., Harvard University, 1971.
Hadley J. Hookerman, M.D., St. Louis University, 1968.
(Dermatology)
Donald K. King, M.D., The Johns Hopkins University, 1970.
John H. Kissel, M.D., Harvard University, 1971.
Ralph F. Kuhlman, M.D., University of Illinois, 1964.
(Graduate Research)
Steven A. Lauter, M.D., Wayne State University, 1971.
Douglas R. Lilly, M.D., Washington University, 1956.
Carl A. Lyss, M.D., Washington University, 1956.
Jay D. Marion, M.D., Vanderbilt University, 1977.
Charles Miller, M.D., Washington University, 1972.
(Dermatology)
(Dermatology)
(Dermatology)
Simon Prager, M.D., University of California, 1991.
Leon R. Robison, M.D., Case Western Reserve University, 1968.
Gerald S. Shatz, M.D., Washington University, 1974.
Sherry E. Shuman, M.D., Wayne State University, 1982.
Gary Singer, M.D., University of Toronto, 1987.
Alan R. Spivack, M.D., St. Louis University, 1964.
(Dermatology)
James W. Walsh, M.D., Washington University, 1954.
George A. Williams III, M.D., Medical College of Wisconsin, 1972.
Michelle Woodley, M.D., SUNY, Stony Brook, 1986.
(See Department of Pediatrics.)
(Dermatology)
Herbert B. Zimmerman, M.D., Washington University, 1951.

Assistant Professors

(Associate Professor)

Thomas Burroughs, Ph.D., Washington University, 1997.
Frederik Lindberg, M.D., Umea University, 1987.
Michael P. Williams, Ph.D., University of Chicago, 1995.

Research Scientist

Mary Kathryn Liszewski, B.A., University of Missouri, St. Louis, 1971.

Instructors

Salma Ahmad, M.D., FJ. Medical College, Pakistan, 1970.
Matthew A. Arquette, M.D., Washington University, 1986.
Chandra Aubin, M.D., University of Missouri, 1983.
Vorachart Aueuaekiat, M.D., Ramathibodi Medical School, Mahidol University, Bangkok, Thailand, 1983.
(See Department of Pediatrics and Clinical Investigation Program.)
Laura A. Bayer, Ph.D., Virginia Commonwealth University, 1997. (See Clinical Investigation Program.)
Ernesto Bernal-Mizrachi, M.D., Universidad del Valle Medical School, 1989.
Melvin S. Blanchard, M.D., University of Tennessee, 1994.
Jaeman Byun, Ph.D., Washington University, 1996.
Marcia Chantler, M.D., University of Iowa, 1996.
Geoffrey Cislo, M.D., University of Michigan Medical School, 1996.
Philip T. Cohen, Ph.D., Brandeis University, 1967; M.D., University of California, 1975.
David Crane, M.D., University of Missouri, 1995.
Sharon Cresci, M.D., New York University, 1986.
Decha Enkvetchakul, M.D., University of Columbia, 1993.
Marc A. Fallah, M.D., Tufts University, 1994.
Edward Ferguson, M.D., University of Missouri, 1993.
Sean Fitzmaurice, M.D., St. Louis University, 1995.
Kellie L. Flood, M.D., University of Texas, Southwestern, 1996.
Jane M. Garbutt, M.B., Ch.B.,
Joseph H. Gatewood, M.D.,
The University of Chicago, 1970.
(See Department of Surgery.)
Mitchell H. Grayson, M.D.,
The University of Chicago, 1993.
(See Clinical Investigation Program.)
Richard Groger, Ph.D.,
Case Western Reserve University, 1990; M.D., 1992.
Gabrielle Highstein, Ph.D.,
University of Rhode Island, 1995.
Michael George Jakoby IV, M.D.,
Washington University, 1995.
Irmantus Juknevicius, M.D.,
Kauna Medical Institute, Lithuania, 1989.
Yoon Kang, M.D.,
Washington University, 1995.
Eric Katz, M.D.,
James G. Laing, Ph.D.,
Michigan State University, 1992.
Michael E. Lazarus, M.B.B.Ch.,
Witwatersrand University, 1993.
Kimberly Lederman, M.D.,
Tufts University, 1993.
L. Veronica Lee, M.D.,
Columbia University, 1990.
Mark Levine, M.D.,
New York University, 1993.
Tammy Lin, M.D.,
University of Michigan, 1997.
Anne C. Lind, M.D.,
Creighton University, 1989. (See Department of Pathology and Immunology.)
Mauricio Lisker-Melman, M.D.,
Universidad Nacional Autonoma, Mexico, 1980.
Margaret S. Lohre, M.D.,
University of Louisville, 1978.
Esther H. Lum, M.D.,
Robert John Mahoney, M.D.,
Washington University, 1997.
Raymond D. Miller, Ph.D.,
University of California, Davis, 1977. (Dermatology)
Natasha Muckova, M.D.,
University of Rochester School of Medicine, 1995.
William L. Nowatzke, Ph.D.,
Indiana University, Bloomington, 1996.
Vu Dinh Nguyen, M.D.,
Wayne State University, 1998.
Subramanian Pennathur, M.B.B.S.,
 Tirunelveli Medical College, India, 1991.
Prabha Ranganathan, M.B.B.S.,
University of Madras, India, 1990.
Christopher Richter, M.D.,
St. Louis University, 1997.
Jason Rothschild, M.D.,
University of North Carolina, Chapel Hill, 1998.
Myra Rubio, M.D.,
University of Arkansas, 1997.
Mai Sharaf, M.D.,
University of Arkansas, 1997.
David M. Sheinbein, M.D.,
St. Louis University, 1995.
Labras Sidossis, Ph.D.,
University of Texas Medical Branch, 1994.
Sanford Sineff, M.D.,
Brown University, 1996.
Shanthi Srinivasan, M.D.,
Wayne State University, 1992.
Richard Starlin, M.D.,
University of Nebraska Medical Center, 1996.
Christian D. Stone, M.D.,
University of California, Irvine, 1995.
Javier Szwarcberg, M.D.,
University of Buenos Aires, 1993.
Robert M. Taxman, M.D.,
Washington University, 1964.
Srihari Thanigaraj, M.D.,
University of Madras, India, 1993.
Mark Thoelke, M.D., Ph.D.,
University of Illinois, Urbana, 1990.
Suma A. Thomas, M.D.,
University of Iowa, 1993.
Girdhar Vedala, M.D.,
Thomas Jefferson University, 1993.
Mark Walker, Ph.D.,
University of Memphis, 1998. (See Clinical Investigation Program.)
David Warren, M.D.,
University of Pittsburgh, 1994.
Bo Yuan, M.D.,
Tulane Medical School, 1991.

Research Instructors
May Mei Chen, B.S.,
Baker University, 1963.
Lloyd Coleman, Ph.D.,
Iowa State University, 1984.
Michael K. Klebert, M.S.N.,
University of Texas, 1987.

David M. Kurtz, D.V.M.,
University of Tennessee, 1989; Ph.D., University of Alabama, Birmingham, 1998.
David John Mancuso, Ph.D.,
University of Pittsburgh, 1982.
Daniel R. Martin, M.S.,
University of Missouri, St. Louis, 1985.
Bettina Mittendorfer, Ph.D.,
University of Texas, 1999.
Fatihia Nassir, Ph.D.,
University Blaise Pascal Clermont-France, 1994.
Wade Pearson, Ph.D.,
University of Chicago, 1995.
Susan B. Racette, Ph.D.,
University of Chicago, 1994.
Terrence E. Richl, Ph.D.,
Ohio University, 1980.
Sharon A. Rogers, M.S.,
Nobuhiro Sakata, Ph.D.,
Toho University, Tokyo, Japan, 1991.
Elzbieta Anna Swietlicki, Ph.D.,
Medical Academy, Lodz, Poland, 1981.
Nathavat Tanphaichitr, M.D.,
Teresa A. Tessner, Ph.D.,
Ravi Vij, M.B.B.S.,
Candace Wang, M.D.,
Boston University School of Medicine, 1995.
Carla J. Weinheimer, B.S.,
University of Illinois, 1984.
Mervyn N. Weitzman, Ph.D.,
Monita Elaine Wilson, Ph.D.,
Brandeis University, 1992.
Hong Xian, Ph.D.,
Washington University, 1994.
Shaosang Zhang, M.D., Ph.D.,
Harbin Medical University, China, 1982.

Instructors Emeriti
(J Clinical)
David Feldman, M.D.,
Washington University, 1943.
Axel R. Gronau, M.D.,
University of Naples, 1935.
Jitendra K. Gupta, M.B.B.S.,
King George Medical College, 1981.
J. Ted Jean, M.D.,
Washington University, 1928.
Richard W. Maxwell, M.D.,
The University of Chicago, 1937.
Lamar H. Ochs, M.D.,
Washington University, 1944.
Robert F. Owen, M.D.,
Yale University, 1952.
Hugh R. Waters, M.D.,
Washington University, 1945.
Herbert C. Wieand, M.D.,
Washington University, 1943.

Instructors (Clinical)

Barry K. Abramson, M.D.,
University of Miami, 1989.
Susan R. Adams, M.D.,
University of Missouri, 1985.
Ann C. Anew, M.D.,
University of Missouri, 1989.
Jesus M. Alegre, M.D.,
San Marcos University, 1965.
Muhammad Ali, M.D.,
Dow Medical School, 1985.
Ana M. Alvarez-Jacinto, M.D.,
Santiago de Compostela, Spain, 1981.
Frank K. Anderson, M.D.,
Northwestern University, 1980.
(dermatology)
Scott J. Anderson, Ph.D.,
Milton F. Austin, M.D.,
Yale University, 1980.
James G. Avery, M.D.,
University of Tennessee, 1990.
Fred J. Balis, M.D.,
Washington University, 1989.
David Ban, M.D.,
University of Oregon, 1980.
Abraham Barake, M.D.,
Universidad del Valle, 1983.
Daniel B. Bawens, M.D.,
Washington University, 1975.
Michael Bavlsik, M.D.,
Sridhar Beeraam, M.B.B.S.,
Osmania Medical College, 1994.
C. Elliott Bell Jr., M.D.,
Tulane University, 1964.
Richard C. Bell, M.D.,
(dermatology)
William W. Benedict, M.D.,
Washington University, 1975.
Laurence A. Berarducci, M.D.,
Wayne State University, 1985.
Keith A. Bernstein, M.D.,
University of Missouri, Kansas City, 1987.
Marc Bernstein, M.D.,
Washington University, 1992.
Douglas R. Berson, M.D.,
Medical College of Pennsylvania, 1983.
Mythili C. Bharadwaj, M.B.B.S.,
Madras University, India, 1988.
Stanley L. Biel, M.D.,
William D. Birkenmeier, M.D.,
Gail L. Birkenmeier, M.D.,
Susan A. Blattel, M.D.,
St. Louis University, 1992.
Richard Bligh, M.D.,
Ross University, 1993.
Joyce F. Boehmer, M.D.,
University of Missouri, 1979.
Michael Bolger, M.D.,
Washington University, 1981.
Jonathan D. Bortz, M.D.,
University of Witwatersrand, South Africa, 1979.
Dec C. Boswell, M.D.,
University of Illinois, 1963.
Scott A. Brodarick, M.D.,
University of Illinois, 1975.
Jeffrey S. Brooks, D.P.M.,
New York College of Podiatric Medicine, 1974.
(Podiatry)
Kathleen S. Brunts, M.D.,
St. Louis University, 1981.
Stanley Buck, M.D.,
Washington University, 1977.
Donald Busiek, M.D.,
University of Missouri, 1983.
Melvin J. Butler, M.D.,
University of Missouri, 1992.
Galileu Cabral, M.D.,
University of Juiz de Flora, Brazil, 1964.
Stephen Carey, Ph.D.,
Harvard University, 1983; M.D.,
University of Southern California, 1987.
John M. Cary, M.D.,
St. Louis University, 1958.
Rebecca Chandler, M.D.,
Emory University, 1998.
Kae Pyng Chang, M.D.,
University of Missouri, 1995.
May Chatilla, M.D.,
American University of Beirut, 1983.

Philip Chu-Pak-Yu, M.D.,
University of Southern California,
Los Angeles, 1992.
Duck Sung Chun, M.D.,
Seoul National University, 1969.
Kathleen M. Cizek, M.D.,
The University of Chicago, 1990.
James Close, M.D.,
Washington University, 1984.
Frank Cohen, M.D.,
University of Toronto, 1939.
Shari Cohen, M.D.,
University of Missouri, 1987.
Brent K. Cole, M.D.,
Cornell University, 1997.
Danita L. Cole, M.D.,
University of Missouri, Kansas City, 1991.
John Costello, M.D.,
St. Louis University, 1977.
Johnnetta M. Craig, M.D.,
University of Iowa, 1986.
Charles Crecelius, Ph.D., M.D.,
St. Louis University, 1984.
Mary K. Cullen, M.D.,
Steven W. Cummings, M.D.,
St. Louis University, 1988.
Robert B. Cusworth, M.D.,
University of Rochester, 1974.
Erik D. Daniels, M.D.,
Howard University, 1989.
Laksham Darsi, M.D.,
L. Virgil Das, M.D.,
Southern Illinois University, 1989.
Wilson L. Davis Jr., M.D.,
University of Iowa, 1978.
Jennifer Delaney, M.D.,
Washington University, 1997.
Sunny Desai, M.B., B.S.,
South Gujarat University, India, 1991.
Thomas A. Dew, M.D.,
University of Arkansas, 1967.
Dellice Marie Dickhaus, M.D.,
Tulane Medical School, 1992.
James A. Diestelhorst, M.D.,
University of Missouri, Columbia, 1967.
Jacquelyn M. Dilworth, M.D.,
Howard University, 1985.
(Dermatology)
Marilyn Disch, M.D.,
University of Kansas, 1988.
Richard M. DiValerio, M.D.,
Irl J. Don, M.D., Washington University, 1972.
Mary Beth Donica, M.D., University of Missouri, Kansas City, 1986.
James W. Donnelly, M.D., Washington University, 1986. (Dermatology)

Maria C. Dumadag-Sabio, M.D., University of Missouri, 1988.
Royal J. Eaton, M.D., University of Missouri, 1964.

Connie F. Gibstine, M.D., Washington University, 1958.
Kenneth W. Gentsch, M.D., University of Iowa, 1989.
William M. Gee, M.D., University of South Carolina, 1986.

M.D.,
Mary Jo Gorman, M.D., Southern Illinois University, 1984.
C. Bruce Graves, M.D., Washington University, 1988.
Aaron Greenspan, M.D., University of Pittsburgh, 1991.
Mark H. Gregory, M.D., University of Vermont, 1986.
Peter Gregory, M.D., University of Vermont, 1986.

M.D.,


V. Rahan Gunasingham, M.D., Christian Medical College, India, 1982.

Maria Gurrieri, M.D., Catholic University, Rome, 1989.
Pushpa Gursahani, M.D., Government Medical College, Nagpur, India, 1959. (See Department of Pediatrics.)

Thomas E. Hakes, M.D., University of Iowa, 1978.

Rod Harizel, M.D., Northwestern University, 1985.

Kristina L. Henderson, M.D., St. Louis University, 1991.

Mary Jo Gorman, M.D., Southern Illinois University, 1984.

William E. Hinkley, M.D., Harvard University, 1969.

Sandra S. Hoffman, M.D., University of Kansas, 1976.

Barbra A. Horn, M.D., Washington University, 1982.

Raymond Hu, M.D., University of Missouri, 1982.

John W. Hubert, M.D., Washington University, 1975.

Mark Albert Hurt, M.D., University of Missouri, Columbia, 1982.

Richard G. Ilnat, M.D., Yale University, 1991.

Daryl L. Jacobs, M.D., Washington University, 1983.

Myron H. Jacobs, M.D., Louisiana State University, 1969.

Steven Jacobson, M.D., St. Louis University, 1985.

Poonam Jain, M.D., University of Iowa, 1988.

Daniel R. Jasper, M.D., St. Louis University, 1994.


Bhagavan V. Josyula, M.D., Universidad del Noreste, Mexico, 1986.

Renee J. Kanan, M.D., Washington University, 1986.

Madhavi Kandula, M.D., Northeastern Ohio University, 1987. (Dermatology)

David A. Katzman, M.D., St. Louis University, 1991.

Andrew Kazdan, M.D., Queens University, Kingston, Canada, 1993.

David Kelley, M.D., Howard University, 1980.

Charlotte J. Kennedy, M.D., Ph.D., Washington University, 1992.

Keith E. Kentch, M.D., University of Missouri, Kansas City, 1991.

Thomas Kernan-Kuciejczyk, M.D., St. Louis University, 1986.


Mary Kiehl, M.D., University of California, San Diego, 1990.


Rosa Anne Kincaid, M.D., Temple University, 1984.

Tinna P. King, M.D., University of Missouri, Kansas City, 1988.

Julia Klesney, Ph.D., M.D., University of Texas, Southwestern, 1998.

Linda M. Klutho, M.D., University of Missouri, 1998.

Mary E. Koly, M.D., University of Missouri, Kansas City, 1995.

Kevin L. Konzen, M.D., University of Illinois, 1984.

Alex H. Kosloff, M.D., St. Louis University, 1980.

Mark S. Krasnoff, M.D., Johns Hopkins University, 1991.

Roop Lal, M.D., Osmania Medical College, 1974.
EDWARD MALLINCKRODT DEPARTMENT OF MOLECULAR BIOLOGY AND PHARMACOLOGY

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 metabolism, 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 weekly discussions of recent papers in the literature as well as their own work and that of their colleagues.

SECOND YEAR

M70 670 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.

FOURTH YEAR

Research (M70 900)
Cross-listed with L41 (Bio) 590

Irving Boime, Ph.D., 362-2556
Regulated expression of human placental and pituitary glycoprotein hormone genes.

Ross L. Cagan, Ph.D., 362-7796
Cell fate specification, including initiation and programmed cell death, in the developing Drosophila retina.

Douglas F. Covey, Ph.D., 362-1726
Medicinal chemistry of steroids.

George W. Gokel, Ph.D., 362-9297
Novel synthetic organic compounds for use as model systems for biological processes.

Jeffrey I. Gordon, M.D., 362-7243
Gut development; host-microbial interactions in the mouse gastrointestinal ecosystem; protein N-myristoylation and aging in yeast.

Gregory A. Grant, Ph.D., 362-3367
Mechanism of allosteric regulation in enzymes.

Eugene M. Johnson Jr., Ph.D., 362-3926
Biology of neurotrophic factors and mechanisms of neuronal programmed cell death.

Kerry Kornfeld, M.D., Ph.D., 747-1480
Signal transduction during development. Aging.

Jeanne M. Nerbonne, Ph.D., 362-2564
Regulation of membrane excitability; structure, function and regulation of voltage-dependent ion channels.

David M. Ornitz, M.D., Ph.D., 362-3908
Regulation of organogenesis in the mouse by members of the fibroblast growth factor family. Genes involved in the development of the vestibular system.

John H. Russell, Ph.D., 362-2558
Faculty

Dr. Robert J. Glaser
Distinguished University Professor and
Head of Department

Jeffrey I. Gordon, M.D.,
(See Department of Medicine.)

Distinguished University Professor

David M. Kipnis, M.D.,
University of Maryland, 1951.
(See Department of Medicine.)

Professor Emeritus

F. Edmund Hunter Jr., Ph.D.,
University of Rochester, 1941.

Professors

Irving Boime, Ph.D.,
Washington University, 1970.
(See Department of Obstetrics and Gynecology.)

Richard A. Chole, M.D.,
University of Southern California, 1969; Ph.D., University of Minnesota, 1977.

Nicholas O. Davidson, M.B.B.S.,
University of London, 1974.
(See Department of Medicine.)

Alex S. Evers, M.D.,
New York University, 1978. (See Department of Anesthesiology.)

Gregory A. Grant, Ph.D.,
University of Wisconsin, 1975.
(See Department of Medicine.)

Eugene M. Johnson Jr., Ph.D.,
University of Maryland, 1970. (See Department of Neurology.)

Daniel P. Kelly, M.D.,
University of Illinois, 1982. (See Department of Medicine and Department of Pediatrics.)

Aubrey R. Morrison, M.B.B.S.,
(Burroughs Wellcome Clinical Pharmacology Scholar) (See Department of Medicine.)

Jeanne M. Nerbonne, Ph.D.,
Georgetown University, 1978.

David M. Ornitz, Ph.D.,
University of Washington, 1987; M.D., 1988. (See Alvin J. Siteman Cancer Center.)

John H. Russell, Ph.D.,
Washington University, 1974.

Alan L. Schwartz, Ph.D.,
Case Western Reserve, 1974; M.D., 1976. (See Department of Pediatrics.)

Professor (Adjunct)

Philip Needleman, Ph.D.,
University of Maryland, 1964.

Research Professor

Arthur H. Neufeld, Ph.D.,
New York University, 1970. (See Department of Ophthalmology and Visual Sciences.)

Associate Professors

Ross L. Cagan, Ph.D.,
Princeton University, 1989.

David M. Holtzman, M.D.,
Northwestern University, 1985.
(See Department of Neurology.)

Richard S. Hotchkiss, M.D.,
University of Virginia, Charlottesville, 1976. (See Department of Anesthesiology.)

Raphael Kopan, Ph.D.,
The University of Chicago, 1989.
(See Department of Medicine.)

Mark E. Lowe, Ph.D.,
(See Department of Pediatrics.)

Louis J. Muglia, Ph.D.,
The University of Chicago, 1986; M.D., 1988. (See Department of Pediatrics and Clinical Investigation Program.)

Dwight A. Towler, M.D., Ph.D.,
Washington University, 1989.
(See Department of Medicine.)

Sergey M. Troyanovsky, Ph.D.,
Academy of Medical Sciences, Moscow, 1981. (See Department of Medicine.)

David B. Wilson, M.D., Ph.D.,
Washington University, 1986.
(See Department of Pediatrics and Clinical Investigation Program.)

Jane Y. Wu, M.B.,
Shanghai Medical University, 1986; Ph.D., Stanford University, 1991.
(See Department of Pediatrics.)

Associate Professor (Adjunct)

Per Falk, M.D.,
University of Gothenburg, 1986; Ph.D., 1991.

Assistant Professors

Thomas J. Baranski, M.D., Ph.D.,
Washington University, 1992. (See Department of Medicine.)

Monica Bessler, M.D.,
University of Basel, Switzerland, 1984; Ph.D., University of London, 1994. (See Department of Medicine.)

Walter A. Boyle III, M.D.,
University of California, San Francisco, 1977. (See Department of Anesthesiology.)

Zhong-feng Chen, Ph.D.,
University of Texas, 1994. (See Department of Anesthesiology and Department of Psychiatry.)

C. Michael Crowder, M.D., Ph.D.,
Washington University, 1989. (See Department of Anesthesiology and Department of Medicine.)

Aaron DiAntonio, Ph.D., M.D.,
Stanford University, 1995.

Robert O. Heuckeroth, M.D., Ph.D.,
Washington University, 1990. (See Department of Pediatrics.)

Shin-ichi Imai, M.D., Ph.D.,
Keio University School of Medicine, Tokyo, Japan, 1995
(See Department of Medicine.)

Kerry Kornfeld, M.D., Ph.D.,
Stanford University, 1991.

Kristen Kroll, Ph.D.,
University of California, Berkeley, 1994.

Scott Saunders, M.D., Ph.D.,
Stanford University, 1990. (See Department of Pediatrics and Clinical Investigation Program.)

Jean E. Schaffer, M.D.,
Harvard University, 1986. (See Department of Medicine.)
(Cardiovascular Division)

Theodore C. Simon, Ph.D.,
George Washington University, 1990. (See Department of Pediatrics.)

Russell N. Van Gelder, M.D.,
Ph.D., Stanford University, 1994. (See Department of Ophthalmology and Visual Sciences.)
Research Instructor
Shiming Chen, Ph.D.,
SUNY Health Science Center,
Syracuse, 1992. (See Department of Ophthalmology and Visual Sciences.)

Division of Bioorganic Chemistry
Professor and Head
George W. Gokel, Ph.D.,
University of Southern California, 1971.

Professors
Douglas F. Covey, Ph.D.,
Richard W. Gross, M.D.,
New York University, 1976; Ph.D.,
Washington University, 1982.
(See Department of Medicine.)
(Also Department of Chemistry)
Jay W. Heinecke, M.D.,
Washington University, 1981.
(See Department of Medicine.)
David R. Piwnica-Worms, M.D.,
(See Department of Radiology.)

Michael J. Welch, Ph.D.,
(See Department of Biomedical Engineering, Department of Radiology and Alvin J. Siteman Cancer Center.)

Associate Professors
Carolyn J. Anderson, Ph.D.,
Florida State University, 1990.
(See Department of Radiology.)
Howard L. McLeod, Pharm.D.,
Philadelphia College of Pharmacy, 1990. (See Alvin J. Siteman Cancer Center and Department of Genetics.)
DEPARTMENT OF
MOLECULAR
MICROBIOLOGY

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.

FIRST YEAR

M30 526 MICROBES AND PATHOGENESIS
Instructor: Scott J. Hultgren, Ph.D., 362-6772

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
Instructors: Gregory A. Storch, M.D., 454-6079; Penelope G. Shackelford, M.D., 454-6050; Joseph W. St. Geme, M.D., 454-6050; William E. Goldman, Ph.D., 362-2742; David A. Leib, Ph.D., 362-2689; L. David Sibley, Ph.D., 362-8873; Virginia L. Miller, Ph.D., 286-2891

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., 362-1511

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. The elective 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.

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 in Division of Biology and Biomedical Sciences.

L41 (Bio) 5217 SPECIAL TOPICS IN MICROBIAL PATHOGENESIS

L41 (Bio) 5392 MOLECULAR MICROBIOLOGY AND PATHOGENESIS

Research (M30 900)

Cross-listed with L41 (Bio) 590

John P. Atkinson, M.D., 362-8391

Binding and signaling by microbes (measles virus, pathogenic Neisseria and Streptococcus) that interact with complement receptors and regulatory proteins.

Douglas E. Berg, Ph.D., 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., 747-2630

Molecular genetics of protozoan parasites; genomics, virulence and drug resistance.
Molecular genetics and pathogenicity of the streptococci and other pathogenic gram positive bacteria.

Josephine E. Clark-Curtiss, Ph.D., 935-6869

Genetics and molecular studies on the pathogenesis of Mycobacterium leprae, Mycobacterium tuberculosis and Mycobacterium avium.

Michael S. Diamond, M.D., Ph.D., 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. A new 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., 747-5597

Biology of the opportunistic fungal pathogen Cryptococcus neoformans.

M. Wayne Efe, M.D., Ph.D., 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.

Daniel E. Goldberg, M.D., Ph.D., 362-1514

Biochemistry of malaria.

William E. Goldman, Ph.D., 362-2742

Molecular basis of pathogenicity of Histoplasma capsulatum and Bordetella pertussis. In vitro models of respiratory tract infections and toxin effects. Biochemical analysis and genetic manipulation of virulence-related phenotypes.

Eduardo A. Grosman, Ph.D., 362-3692


David B. Haston, M.D., 454-6050

Glycolipids serve as the host-cell receptor for many pathogenic microbes and toxins. Our laboratory is examining the role of glycolipids in host-microbial interactions and eucaryotic cellular biology.

Henry V. Huang, Ph.D., 362-2755


Scott J. Hultgren, Ph.D., 362-6772

Molecular basis of microbial pathogenesis and cross-talk at the host-pathogen interface. Organelle biogenesis in pathogens. Structure-function of chaperones, usher and adhesins. Vaccine development and drug design.

Anthony Kulczycki Jr., M.D., 454-7360

Our interest is in the antigens and the mechanisms that are involved in various immunologic disorders such as infant colic, Type 1 diabetes and chronic urticaria.

David A. Leib, Ph.D., 362-2689

Molecular biology and latency of herpes simplex virus.

Hsiu-san Lin, M.D., Ph.D., 362-8566

Differentiation and function of mononuclear phagocytes.

Virginia L. Miller, Ph.D., 286-2891

Molecular basis of pathogenicity of the enteric pathogens Yersinia enterocolitica and Salmonella typhimurium.

Andrew S. Pekosz, Ph.D., 747-2132

Virology: molecular biology and pathogenesis of influenza virus infection.

Lee Ratner, M.D., Ph.D., 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.

Robert D. Schreiber, Ph.D., 362-8747

Biochemistry and biology of cytokines and their receptors. Elucidation of the signal transduction mechanisms used by interferon-gamma and tumor necrosis factor. Definition of the physiologic roles of cytokines in vivo especially with respect to host responses to tumors, and microbial pathogens.

L. David Sibley, Ph.D., 362-8873

Cell and molecular biology of invasion and intracellular survival by the protozoan Toxoplasma gondii.

Samuel L. Stanley Jr., M.D., 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 design and evaluation of recombinant antigen-based vaccines to stimulate mucosal and parenteral immune responses against the parasite.

Joseph W. St. Geme, M.D., 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 respiratory tract colonization, an essential 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.

Gregory A. Storch, M.D., 454-6079
The student in this elective will participate in a research project involving the application of techniques of molecular biology, especially the polymerase chain reaction, to the diagnosis of the infectious diseases. Infectious agents currently under investigation include human cytomegalovirus, Epstein-Barr virus, VZV, HSV, human parvovirus B19, JC virus, Ehrlichia and toxoplasma.

Patrick M. Stuart, Ph.D., 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 Reiter's syndrome.

Herbert W. Virgin IV, M.D., Ph.D., 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., 454-7782
Legionella pneumophila, the causative agent of Legionnaires' pneumonia, replicates inside alveolar macrophages by preventing phagosome-lysosome fusion.

Gary J. Weill, M.D., 454-7782
Filarial nematodes cause the tropical diseases of river blindness and elephantiasis. We are working to develop improved diagnostic methods and vaccines for control and prevention of these diseases.
Penelope G. Shackelford, M.D.,
Washington University, 1968.
(See Department of Pediatrics.)
L. David Sibley, Ph.D.,
Louisiana State University, 1985.
Joseph W. St. Geme, M.D.,
Harvard University, 1984.
(See Department of Pediatrics.)
Samuel L. Stanley Jr., M.D.,
Harvard University, 1980.
(See Department of Medicine.)
Herbert W. Virgin IV, M.D., Ph.D.,
Harvard University, 1985. (See Department of Pathology and Immunology.)
Gary J. Weil, M.D.,
Harvard University, 1975.
(See Department of Medicine.)
Richard K. Wilson, Ph.D.,
University of Oklahoma, 1986.
(See Department of Genetics.)

Research Associate Professors
Josephine E. Clark-Curtiss,
Ph.D., Medical College of Georgia, 1974.
Deborah E. Dobson, Ph.D.,
University of California, Berkeley, 1981.

Assistant Professors
Abderr Azzaq Belaaouaj, Ph.D.,
(See Department of Medicine.)
Michael S. Diamond, M.D.,
Ph.D., Harvard University, 1994.
(See Department of Medicine.)
Tamara L. Doering, M.D., Ph.D.,
The Johns Hopkins University, 1991.
David B. Haslam, M.D.,
University of Calgary, 1987.
(See Department of Pediatrics.)
Andrew S. Pekosz, Ph.D.,
University of Pennsylvania, 1996.
(See Department of Pathology and Immunology.)

Joseph P. Vogel, Ph.D.,
Princeton University, 1993.
William R. Wikoff, Ph.D.,
Purdue University, 1998.
(See Department of Biochemistry and Molecular Biophysics.)

Research Assistant Professor
Patrick M. Stuart, Ph.D.,
Northwestern University, 1985.
(See Department of Ophthalmology and Visual Sciences.)

Instructor
Linda G. Eissenberg, Ph.D.,
University of North Carolina, 1982.

Research Instructor
Wandy Beatty, Ph.D.,
University of Wisconsin, 1989.
DEPARTMENTS OF NEUROLOGY AND NEUROLOGICAL SURGERY

Neurology and Neurosurgery concern themselves 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 course in neural sciences directed by the Department of Anatomy and Neurobiology, with participation of faculty from Neurology and Neurosurgical. In the second year, the Departments of Neurology and Neurosurgical Surgery present the course in Diseases of the Nervous System in conjunction with the Departments of 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. The departments also participate in the Clinical 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.

Several divisions exist within Neurology and Neurosurgical Surgery:

- James L. O'Leary Division of Experimental Neurology and Neurosurgical Surgery: Thomas A. Woolsey, M.D. (Director)
- Division of Neuropsychology: Steven E. Petersen, Ph.D. (Division Chief), Maurizio Corbetta, M.D., Francis Miezis, M.S., Gordon L. Shulman, Ph.D.
- Division of Pediatric Neurology: Steven M. Rothman, M.D. (Division Chief), Susan T. Arnold, M.D., Janice E. Brunstrom, M.D., Anne M. Connolly, M.D., Philip R. Dodge, M.D., W. Edwin Dodson, M.D., Jennifer Kwon, M.D., Jeffrey J. Neil, M.D., Michael J. Noetzel, M.D., Jean H. Thurston, M.D., Edwin Treadwell III, M.D., Kelvin A. Yamada, M.D.
- Division of Pediatric Neurosurgery: Jeffrey G. Ojemann, M.D., Tae Sung Park, M.D.

In addition, several groups of faculty members are established for specialized research and teaching purposes. They include:

- Alzheimer's Disease Research Center: Virginia D. Buckles, Ph.D. (Executive Director), Eugene M. Johnson Jr., Ph.D., John C. Morris, M.D. (Co-Directors), M. Carolyn Baum, Ph.D., Mary A. Coats, B.S.N., Alexander W. Dromerick, M.D., Laura L. Dugan, M.D., Dorothy F. Edwards, Ph.D., James E. Galvin, M.D., David M. Holtzman, M.D., Terri L. Hosto, M.S.W., Thomas M. Meuser, Ph.D., B. Joy Snider, M.D., Ph.D., Martha Stormart, Ph.D.
- Center for the Study of Nervous System Injury: Dennis W. Choi, M.D., Ph.D. (Director), C. Robert Ahlu, Ph.D., Anne H. Cross, M.D., Ralph G. Dacey Jr., M.D., Gabriel A. de Erausquin, M.D., Ph.D., Rui DeMattos, Ph.D., Michael N. Dringer, M.D., Laura L. Dugan, M.D., Anne Fagan-Niven, Ph.D., Jeffrey M. Giddiday, Ph.D., Mark P. Goldberg, M.D., David I. Gottlieb, Ph.D., David H. Gutmann, M.D., Ph.D., David M. Holtzman, M.D., Chuang Y. Hsu, M.D., Ph.D., Mark F. Jacquin, Ph.D., Eugene M. Johnson Jr., Ph.D., Jin-Moo Lee, M.D., Ph.D., John W. McDonald, M.D., Ph.D., Jeffrey J. Neel, M.D., Ph.D., Tae Sung Park, M.D., Alexander Pasadaran, Ph.D., William J. Powers, M.D., Predy Rettiglia, M.D., Steven M. Rothman, M.D., Christian Sheline, Ph.D., B. Joy Snider, M.D., Ph.D., Ling Wei, M.D., Jin-Xu Ph.D., Kelvin A. Yamada, M.D., Shan Ping Yu, M.D., Ph.D.
- Cerebrovascular Disease Section: Chuang Y. Hsu, M.D., Ph.D. (Section Head), William J. Powers, M.D. (Section Head), Mark P. Goldberg, M.D., Ph.D. (Co-Head), Janice E. Brunstrom, M.D., Dennis W. Choi, M.D., Ph.D., Maurizio Corbetta, M.D., Ellen M. Delbert, M.D., Michael N. Dringer, M.D., Alexander W. Dromerick, M.D., Laura L. Dugan, M.D., Dorothy F. Edwards, Ph.D., Robert Faucetola, Ph.D., David M. Holtzman, M.D., William M. Landau, M.D., Jin-Moo Lee, M.D., Ph.D., Abdullah Nissief, M.D., Jeffrey J. Neel, M.D., Ph.D., Michael J. Noetzel, M.D., Marcus F. Ratcliffe, M.D., Steven M. Rothman, M.D., Bradley L. Schlagger, M.D., Ph.D., Ling Wei, M.D., Kelvin A. Yamada, M.D., Alyxson Zazulia, M.D.
- Clinical Neurophysiology Section: Edwin Treadwell III, M.D., Muhammad T. Al-Lozzi, M.D. (Section Co-Heads)
- EEG: Sleep and Evoked Potentials: Susan T. Arnold, M.D., Hrayr Alatarian, M.D., Stephen P. Dunle, M.D., Luu-Linh Thio, M.D., Ph.D., Edwin Treadwell III, M.D., Kelvin A. Yamada, M.D.
- EMG: Muhammad T. Al-Lozzi, M.D., Anne M. Connolly, M.D., Glenn Lopez, M.D.
- Epilepsy and Sleep Section: Frank G. Gilliam, M.D., Edwin Treadwell III, M.D. (Section Co-Heads), Susan T. Arnold, M.D., Hrayr Alatarian, M.D., W. Edwin Dodson, M.D., Stephen P. Dunle, M.D., Steven M. Rothman, M.D., Jean H. Thurston, M.D., Kelvin A. Yamada, M.D.
- Neuroimaging Section: William J. Powers, M.D. (Section Head), Juanita Carvajal, M.D., Maurizio Corbetta, M.D., Ellen M. Delbert, M.D., Francis Miezis, M.S., Joel S. Perlmuter, M.D., Steven E. Petersen, Ph.D., Gordon L. Shulman, Ph.D., Tom O. Videen, Ph.D., Alyxson Zazulia, M.D.
- Movement Disorders Section: Joel S. Perlmuter, M.D. (Director), Kevin J. Black, M.D., William M. Landau, M.D., Brad A. Racette, M.D., W. Thomas Thach Jr., M.D.
Neurology and Neurological Surgery

Neurodevelopment Section: Alan L. Pearlman, M.D. (Section Head), Jantice E. Brunstrom, M.D., David H. Gutmann, M.D., Ph.D., David M. Holtzman, M.D., Mark F. Jaccquin, Ph.D., Eugene M. Johnson Jr., Ph.D., Michael J. Noetzel, M.D., Steven M. Rothman, M.D., Thomas A. Woolsey, M.D.

Neuroimmunology Section: Anne H. Cross, M.D.

Neurological Critical Care Section: Michael N. Dangere, M.D. (Section Head/Director—NNICU), Venkatapuray Sivaguru, M.B.B.S., D.M., Ellen M. Delbert, M.D., Edgar García-Morales, M.D.

Neuromuscular Diseases Section: Alan Pestronk, M.D. (Director), Muhammad T. Al-Lozi, M.D., Anne M. Connolly, M.D., Julaine M. Florence, P.T., Jennifer Kwon, M.D., Glenn Lopate, M.D.

Areas of Neurosurgical specialization include:
- Epilepsy Surgery: Joshua L. Dowling, M.D., Jeffrey G. Ojemann, M.D.
- Cranial Base Surgery: Michael R. Chicoine, M.D., Robert L. Grubb Jr., M.D.
- Pituitary Surgery: Ralph G. Dacey Jr., M.D.
- Neuro-oncology: Michael R. Chicoine, M.D., Ralph G. Dacey Jr., M.D., Keith M. Rich, M.D.
- Pediatric Neurosurgery: Jeffrey G. Ojemann, M.D., Tae Sung Park, M.D.
- Cerebrovascular Surgery: Ralph G. Dacey Jr., M.D., Robert L. Grubb Jr., M.D., Keith M. Rich, M.D.
- Spinal Neurosurgery: Carl Lauryssen, M.D., C.B., Neil M. Wright, M.D.
- Stereotactic Radiosurgery: Michael R. Chicoine, M.D., Ralph G. Dacey Jr., M.D., Keith M. Rich, M.D.

FIRST YEAR

Selectives

Neurological Surgery

M04 5667 MICRO CIRCULATION
Instructor: Jeffrey M. Gidday, Ph.D., 286-2795

The homeostatic functions of the microcirculation include the active regulation of metabolic substrate delivery and waste product removal, and a multifaceted response to injury and disease. This elective is an introduction to 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 and autoimmune disease, as well as the adaptive cardiovascular responses to exercise or high altitude. (This selective is cross-listed in Department of Cell Biology and Physiology.)

SECOND YEAR

Neurology

M25 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

Neurology

M35 720 NEUROLOGY CLERKSHIP
Instructor: Mark P Goldberg, M.D., 362-3296

A full-time, four-week clerkship is provided on the 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.

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.

Neurological Surgery

M40 730 NEUROLOGICAL SURGERY CLERKSHIP
Instructor: Robert L. Grubb Jr., M.D., 362-3567

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.
FORTH YEAR
Electives
Neurology

M35 815 CONSULT NEUROLOGY
Instructor: Mark P. Goldberg, M.D., 362-3296
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 will also attend weekly clinical conferences, including Neurology/Neurosurgery Grand Rounds. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M35 840 NEUROREHABILITATION
Instructor: Alexander W. Dromerick, M.D., 454-7756
This is a clinical elective which will lead to greater knowledge and understanding in the principals of rehabilitation. The student will participate in the clinical care of patients with strokes, traumatic brain injury, and spinal cord injury. Students will make rounds with the clinical care team, attend outpatient clinics in stroke and traumatic brain injury rehabilitation, and participate in didactic teaching conferences within the PM&R residency. This rotation is particularly useful for people considering careers in rehabilitation, neurology, geriatrics, and neurosurgery. The goals of this rotation are to gain greater understanding of neurological disease and its treatment and to gain introduction to the basic principles of rehabilitation. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M35 851 CLINICAL ASPECTS OF AGING AND DEMENTIA
Instructors: John C. Morris, M.D.; David B. Carr, M.D.; James E. Galvin, M.D., 296-2683
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. Valid start weeks for 4-week blocks are: Weeks 9, 13, 33 and 37.

M35 860 PEDIATRIC NEUROLOGY
Instructor: Steven M. Rothman, M.D., 454-6042
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 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 repeat patients in a tutorial type of setting since patients are immediately reviewed with senior faculty. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M35 861 NEUROLOGY — NEUROSURGERY ICU
Instructor: Michael N. Diringer, M.D., 362-2999
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. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M35 870 EPILEPTOLOGY
Instructor: Hrayr Attarian, M.D., 362-3888
Students will be involved, mainly as observers, in diagnosing and managing both surgical and medical patients with epileptic disorders. The patients are in both inpatient and outpatient settings. Students are also required to do one patient write-up each and one talk on a topic relevant to epilepsy. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M40 805 NEUROSURGERY
Instructor: Ralph G. Dacey Jr., M.D., 362-3571
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, and 9 weekly clinics, Saturday morning lectures for third-year class, and weekly combined Neurology, Neurosurgery and Neuropathology conferences. Valid start
weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

**Research (M35 900)**

**Neurology**

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., 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., 362-3293

Understanding interactions of the immune system with the central nervous system as it relates to multiple sclerosis and other neuroinmunological 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., 362-3258

Cellular mechanisms of hypoxic and traumatic neuronal injury. Focus on disturbances of calcium homeostasis using conventional and confocal videomicroscopy.

David H. Gutmann, M.D., Ph.D., 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.

John W. McDonald, M.D., Ph.D., 747-4374, 454-7825

Spinal cord injury regeneration. Mechanisms of spinal cord injury and regeneration with emphasis on embryonic stem cell transplantation and remyelination.

Steven E. Petersen, Ph.D., 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., 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.

Kelvin A. Yamada, M.D., 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.

**Research (M40 900)**

**Neurological Surgery**

Michael R. Chicoine, M.D., 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., 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., 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.

Carl Lauriussen, M.D., 362-3580
Major research interests include the pathophysiology and functional outcomes in patients with cervical spondylotic myelopathy, the role of embolization in spinal surgery, the use of electrical stimulation in augmenting bone fusion, contemporary management of spinal cord injuries, the use of magnetic resonance imaging to assess spinal cord blood flow, and the use of bone morphogenic protein in spinal fusion and reconstruction. Stem cell research for spinal cord injury and, as a separate area, bone regeneration.

Jeffrey G. Ojemann, M.D., 454-4454
Research focuses on functional imaging and cognition, especially as it relates to patients undergoing surgical treatment of intractable epilepsy. Functional MRI of memory encoding before and after temporal lobectomy will be correlated with patient's memory performance and outcome. Preoperative language mapping is compared to intraoperative stimulation findings in patients who require awake craniotomies, e.g., for cerebral tumors.

Tae Sung Park, M.D., 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.

Keith M. Rich, M.D., 362-3566
Research on neuronal and glioma cellular apoptosis after treatment with DNA-damaging agents. Techniques include growing human brain tumor cells in culture, biassay for apoptosis with fluorescent staining, protein immunoblotting and PCR.

Thomas A. Woolsey, M.D., 362-3600
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 station 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.
Faculty

Neurology

SEAY PROFESSOR OF CLINICAL NEUROPHARMACOLOGY IN NEUROLOGY AND HEAD OF DEPARTMENT
David B. Clifford, M.D., Washington University, 1975.

Professors Emeriti
Margaret H. Clare, M.A., Washington University, 1951.
(See Department of Neurophysiology)
Philip R. Dodge, M.D., University of Rochester, 1948.
(Senior Lecturer)
A. Edward Dodson, M.D., Duke University, 1967.
(Senior Lecturer)
Sven G. Eliasson, Ph.D., University of Lund, 1952.
(Professor of Neurophysiology)
David A. Balota, Ph.D., University of South Carolina, 1981.
(Also Department of Psychology)
(See Department of Psychiatry)

Professors
Harvey A. and Dorismae Hacker Friedman Professor of Neurology
John C. Morris, M.D., University of Rochester, 1974.
(See Department of Pathology and Immunology)
(See Department of Cell Biology and Physiology)
Joel S. Perlmutter, M.D., University of Missouri, 1979.
(See Department of Anatomy and Neurobiology and Department of Radiology)
(See Department of Neurology and Radiology)
Edward F. Vastola, M.D., Columbia University, 1947.

Research Professor
Mark F. Jacquin, Ph.D., City University of New York, 1980.

Professors (Clinical)
(See Department of Psychiatry)
Stuart Weiss, M.D., Washington University, 1954.

Professor (Adjunct)
John L. Burns, Ph.D., Columbia University, 1950.

Associate Professor Emeritus
Lawrence A. Cohen, M.D., Case Western Reserve University, 1954.

Associate Professors
C. Robert Almli, Ph.D., Michigan State University, 1970.
(See Program in Occupational Therapy)
M. Carolyn Baum, Ph.D., Washington University, 1993.
(See Program in Occupational Therapy)
Anne M. Connolly, M.D., Indiana University, 1984.
(See Department of Pediatrics)
Maurizio Corbetta, M.D.,
University of Pavia, 1985. (See Department of Anatomy and Neurobiology and Department of Radiology.)

Anne H. Cross, M.D.,
University of Alabama, 1980.

Susan S. Deusinger, Ph.D.,
Washington University, 1987. (See Program in Physical Therapy.)

Michael N. Diringer, M.D.,
University of Kentucky, 1982. (See Department of Anesthesiology, Department of Neurological Surgery and Program in Occupational Therapy.)

Alexander W. Dromerick, M.D.,
University of Maryland, 1986. (See Program in Occupational Therapy.)

Frank G. Gilliam, M.D.,
University of Louisville, 1987. (See Department of Neurological Surgery.)

Mark P. Goldberg, M.D.,
Columbia University, 1984. (See Department of Anatomy and Neurobiology.)

Donald O. Schnuck Family Chair in Neurology for Neurofibromatosis Research

David H. Gutmann, M.D., Ph.D.,
University of Michigan, 1986. (See Department of Genetics and Department of Pediatrics.)

Charlotte and Paul Hagemann Professor of Neurology

David M. Holtzman, M.D.,
Northwestern University, 1985. (See Department of Molecular Biology and Pharmacology.)

Jeffrey J. Neil, M.D., Ph.D.,
Washington University, 1984. (See Department of Anatomy and Neurobiology, Department of Pediatrics, Department of Radiology and Clinical Investigation Program.)

Michael J. Noetzel, M.D.,
University of Virginia, 1977. (See Department of Pediatrics.)

Shirley A. Sahrman, Ph.D.,
Washington University, 1973. (Neurophysiology) (See Department of Cell Biology and Physiology and Program in Physical Therapy.)

Yvette I. Sheline, M.D.,
Boston University, 1979. (See Department of Psychiatry and Department of Radiology.)

Richard S. Sohn, M.D.,
The University of Chicago, 1968:

Edwin Trevathan III, M.D.,
Emory University, 1982. (See Department of Pediatrics.)

Oksana Volshteyn, M.D.,
Minsk State Medical Institute, 1976. (See Department of Medicine.)

Kelvin A. Yamada, M.D.,
Baylor College of Medicine, 1983. (See Department of Pediatrics.)

Research Associate Professors

Tom O. Videen, Ph.D.,
University of Washington, 1981. (Neurophysiology) (See Department of Radiology.)

Shan Ping Yu, M.D., Ph.D.,
Capital Institute of Medicine, 1979.

Associate Professor Emeritus (Clinical)

Joseph M. Dooley Jr., M.D.,
St. Louis University, 1958.

Associate Professors (Clinical)

Denis I. Altman, M.B., B.Ch.,
University of The Witwatersrand, 1975. (See Department of Pediatrics.)

Garrett C. Burris, M.D.,
University of Southwestern Louisiana, 1968. (See Department of Pediatrics.)

J. Michael Hatlelid, M.D.,
Washington University, 1977.

Walter Lemann, M.D.,
Tulane University, 1979.

John F. Mantovani, M.D.,
University of Missouri, 1974. (See Department of Pediatrics.)

James R. Rohrbaugh, M.D.,
Ohio State University, 1974. (See Department of Pediatrics.)

Associate Professor (Adjunct)

Warren E. Lux, M.D.,
New York University, 1970.

Assistant Professors

Venkatesh Aiyagari, M.B.B.S.,
Calcutta University, India, 1986. D.M., National Institute of Mental Health and Neurosciences, Bangalore, India, 1992. (See Department of Neurological Surgery.)

Muhammad T. Al-Lozi, M.D.,
King Edward Medical College, 1980.

Susan T. Arnold, M.D.,
Cornell University, 1988. (See Department of Pediatrics.)

Ilhray Attarian, M.D.,
American University of Beirut, 1972.

Janet DuChek Balota, Ph.D.,
University of South Carolina, 1982. (See Program in Occupational Therapy.)

Kevin J. Black, M.D.,
Duke University, 1990. (See Department of Psychiatry.)

Janice E. Brunstrom, M.D.,
Medical College of Virginia, 1987. (See Department of Cell Biology and Physiology and Department of Pediatrics.)

Gabriel A. de Erausquin, M.D.,
Ph.D., Universidad de Buenos Aires, 1986. (See Department of Psychiatry.)

Ellen M. Deibert, M.D.,
Temple University School of Medicine, 1993. (See Department of Neurological Surgery.)

Laura L. Dugan, M.D.,
Ohio State University, 1987. (See Department of Medicine.)

Stephen P. Duntley, M.D.,

Dorothy F. Edwards, Ph.D.,
Washington University, 1980. (See Program in Occupational Therapy.)

James P. Fessler III, M.D.,
Vanderbilt University, 1995.

Robert P. Fucetola, M.D.,
Washington University, 1997.

James E. Galvin, M.D.,
UMDNJ—New Jersey Medical School, 1992.

Jennifer Kwon, M.D.,
University of Michigan, 1989. (See Department of Psychiatry.)

Glenn Lopate, M.D.,
Ohio State University, 1987.
Assistant Professors (Clinical)

Sylvia Awadalla, M.D., Ohio State University, 1985.
Lynn B. Blackburn, Ph.D., Indiana University, 1972.
David J. Callahan, M.D., Washington University, 1986.
Royal G. Grueneich, Ph.D., University of Minnesota, 1978.
Joseph Hanaway, M.D., McGill University, 1960.
Robert P. Margolis, M.D., St. Louis University, 1975.
Howard I. Weiss, M.D., Tulane University, 1972.

Instructor Emerita

In-Sook Sunwoo, M.D., Woo Sok University, 1992.

Instructors

Ron DeMattos, Ph.D., SUNY at Stony Brook, 1998.
Jin-Moo Lee, M.D., Ph.D., Cornell University, 1993.
Jeri A. Lyons, Ph.D., Medical College of Wisconsin, 1997.
Abdullah Nassief, M.D., King Saud University, Riyadh, Saudi Arabia, 1990.
Fredy Revilla, M.D., Universidad Peruana-Cayetano, Heredia, Peru, 1993.
Rimma Ruvinskaya, M.D., Leningrad Institute, USSR, 1985.
B. Joy Snider, M.D., Ph.D., University of Texas, Southwestern, 1986.

Michael Wong, M.D., Ph.D., University of Texas, Southwestern, 1995.

Research Instructors

Angela L. Berry, M.S.N., University of Missouri, Kansas City, 1992.
Maria B. Carroll, M.S.N., St. Louis University, 1994.
Mary A. Coats, B.S.N., Southern Illinois University, 1980.
Terry L. Hosto, M.S.W., University of Michigan, 1986.
Krzyztof Hyrc, Ph.D., Jagiellonian University, Poland, 1987.
Pamela E. Millsap, M.S.N., University of Texas, Arlington, 1989. (Gerontology)
Sally J. Muich, M.S.N., St. Louis University, 1995.
Yannan Ouyang, Ph.D., University of California, San Diego, 1995.
Janice L. Palmer, M.S.N., University of Missouri, St. Louis, 1994. (Gerontology)
Kimberly K. Powlishta, Ph.D., Stanford University, 1989.
Stacy Stiening, M.S.N., St. Louis University, 2000.

Instructors (Clinical)

Lizette Alvarez-Montero, M.D., Ponce School of Medicine, Puerto Rico, 1991.
Max Benzaquen, M.D., Ph.D., San Marcos University, 1978.
James S. Bonner, M.D., University of Missouri, 1980. (See Department of Pediatrics)
Russell Cantrell, M.D., University of Tennessee, 1989.
Juan Escandon, M.D., Colombian School of Medicine, Bogota, Colombia, 1989.
Bennett D. Frank, M.D., Ph.D., Baylor College of Medicine, 1988.
Ashok Kumar, M.D., Dow Medical College, University of Karachi, Pakistan, 1985.
Sandra L. Tate, M.D., Southern Illinois University, 1987.

Instructors (Fellows)
Aninda B. Acharya, M.D., University of Kansas, 1996.
Abdulrahman Alreshaid, M.D., King Saud University, Riyadh, Saudi Arabia, 1994.
Jagannadh Avasarala, M.D., Ph.D., Kakatiya Medical College, India, 2000.
Kelly Brown, M.D., Hahnemann University, 1996.
Lin Cui, M.D., Jilin University Medical School, China, 1993.
Lawrence N. Eisenman, M.D., Northwestern University, 1997.
Kevin C. Ess, M.D., University of Cincinnati, 1998.
Francisco Gondim, M.D., Universidade Federal do Ceara, Fortaleza, Brazil, 1997.
Irina Rammeantu, M.D., University of Medicine and Pharmacy (Carol Davila), Bucharest, Romania, 1997.
Waqar Waheed, M.D., King Edward Medical College, Lahore, Pakistan, 1993.

John F. Zurasky, M.D., Indiana University School of Medicine, 1998.

Research Instructors (Fellows)
Ebru Erbayat-Altay, M.D., Ankara University Medical School, Turkey, 1991.
Hrvoje Hecimovic, M.D., Ph.D., University of Zagreb Medical School, 1989.
Chul-Sang Lee, Ph.D., Seoul University, 1996.
Cesar Minelli, Ph.D., Faculdade de Medicina do Triangulo Mineiro, Brazil, 1992.
Jennifer L. Stark, Ph.D., Ohio State University, 2001.

Research Scientists
Francis Miezin, M.S., University of Wisconsin, 1972.
(Neuropsychology) (See Department of Neurological Surgery.)
(Also Department of Psychology)
Abraham Z. Snyder, Ph.D., Rockefeller University, 1977; M.D., State University of New York, Buffalo, 1981. (See Department of Radiology.)

Neurological Surgery

EDITH R. AND HENRY G. SCHWARTZ PROFESSOR AND CHAIRMAN OF DEPARTMENT
Ralph G. Dacey Jr., M.D., University of Virginia, 1974.

Professors Emeriti
Sidney Goldring, M.D., Washington University, 1947.

Professors
Mokhtar Gado, M.D., Cairo University, 1960. (See Department of Radiology.)

Herbert Lourie Professor of Neurological Surgery
Robert L. Grubb Jr., M.D., University of North Carolina, 1988. (See Department of Radiology)
Shi H. Huang Professor of Neurological Surgery
Tae Sung Park, M.D., Yonsei University, 1971. (See Department of Anatomy and Neurobiology and Department of Pediatrics)
William J. Powers, M.D., Cornell University, 1975. (See Department of Neurology, Department of Radiology and Clinical Investigation Program)
René Tempelhoff, M.D., University of Lyon, 1984. (See Department of Anesthesiology)
Richard D. Wetzel, Ph.D., St. Louis University, 1974. (See Department of Neurology and Department of Psychiatry)
Thomas A. Woolsey, M.D., The Johns Hopkins University, 1969. (George H. and Ethel E. Bishop Scholar in Neuroscience) (See Department of Anatomy and Neurobiology, Department of Neuroscience and Department of Neurological Surgery)

Associate Professors
Andreas H. Burkhalter, Ph.D., University of Zurich, 1977. (See Department of Anatomy and Neurobiology)
Robert E. Drzymala, Ph.D., University of Oklahoma, 1977. (See Department of Radiation Oncology)
Jeffrey M. Gidday, Ph.D., University of Virginia, 1986. (See Department of Cell Biology and Physiology and Department of Ophthalmology and Visual Sciences)
Frank G. Gillian, M.D., University of Louisville, 1987. (See Department of Neurobiology)
Carl Larsson, M.B., Ch.B., University of Cape Town, 1981. (See Department of Anatomy and Neurobiology, Department of Neurology and Department of Radiology)
Keith M. Rich, M.D.,
Indiana University, 1977.
(See Department of Anatomy and
Neurobiology and Department of
Radiation Oncology.)

Research Associate
Professor
Jack R. Engsberg, Ph.D.,
University of Iowa, 1985. (See
Program in Occupational Therapy
and Department of Biomedical
Engineering.)

Assistant Professors
Venkatesh Aiyagari, M.B.B.S.,
Calcutta University, India, 1986;
M.M., National Institute of Mental
Health and Neurosciences,
Bangalore, India, 1992. (See
Department of Neurological
Surgery.)

Michael R. Chicoine, M.D.,
University of California,
Los Angeles, 1990.
Ellen M. Deibert, M.D.,
Temple University, 1993. (See
Department of Neurology.)
Michael N. Diringer, M.D.,
University of Kentucky, 1982.
(See Department of Neurology
and Program in Occupational
Therapy.)
Joshua L. Dowling, M.D.,
Tulane University, 1989.
John W. McDonald III, M.D.,
Ph.D., University of Michigan,
1992. (See Department of
Neurology.)
Jeffrey G. Ojemann, M.D.,
Washington University, 1992. (See
Department of Anatomy and
Neurobiology and Department of
Pediatrics.) (Also Psychology)
Neil M. Wright, M.D.,
University of California, Los
Angeles, 1993.

Research Assistant
Professors
Hans H. Dietrich, Ph.D.,
Max Planck Institute, Germany,
1986.
Bradley Miller, Ph.D.,
Cornell University, 1991.

Assistant Professors
(Adjunct)
Matthew A. Howard, M.D.,
University of Cincinnati, 1984.
John Perl II, M.D.,

Research Scientists
Gary W. Harding, M.S.E.,
University of Washington, 1983.
(See Department of
Otolaryngology.)
Gordon L. Shulman, Ph.D.,
University of Oregon, 1979.
(Neurophysiology) (See Department
of Neurology.) (Also Department
of Psychology)
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:

James R. Schreiber, 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.
- Research: D. Michael Nelson, M.D., Ph.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.

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 pediatrics 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: Andrea L.P. Stephens, M.D., 362-4211

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. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.
M45 810 OB/GYN ENDOCRINOLOGY — INFERTILITY SUBINTERNSHIP
Instructor: Randall R. Odem, M.D., 286-2400
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. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M45 825 GYNECOLOGY ACROSS A WOMAN’S LIFE SPAN
Instructor: Diane E. Merritt, M.D., 362-1016
This clinical experience is designed to acquaint the student with outpatient gynecology as it impacts the patient at various times in her life span (infancy, adolescence, reproductive years, peri- and post-menopause). Sexuality and sexual dysfunction, congenital anomalies of the reproductive tract, contraception, hormone replacement 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 the instructor. The student will also attend departmental conferences and be responsible for independent reading assignments in outpatient gynecology. Valid start weeks for 4-week blocks are: Weeks 1, 13, 17, 21, 29, 33 and 41. (Individual student must discuss with the instructor if Weeks 5 or 9 are desired.)

M45 830 GYNO ONCOLOGY SUBINTERNSHIP
Instructor: David G. Mutch, M.D., 362-3181
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, provide consultations and attend OB-GYN conferences. Opportunities for clinical or basic research project in gynecologic malignancy are also available. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M45 840 MATERNAL-FETAL MEDICINE SUBINTERNSHIP
Instructor: Gilad A. Gross, M.D., 747-0739
Subinterns 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 maternity-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. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M45 856 OB/GYN ULTRASOUND GENETICS
Instructor: Jeffrey M. Dicke, M.D., 454-8135
The student will learn the principles and techniques of noninvasive 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 observe specimen preparation in the cytogenetics laboratory and gain experience in pedigree analysis and familial risk factor assessment working with genetic counselors. Opportunities for participation in clinical research are also available. 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.

M65 833 SPECIAL TOPICS IN REPRODUCTIVE HEALTH
Instructor: E. Sessions Cole, M.D., 454-6148
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. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

Research (M45 900)
Irving Boime, Ph.D., 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., 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.

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 web site at www.obgyn.wustl.edu/moleylab/index.asp.

Yoel Sadowsky, M.D., 747-0937
In our laboratory we focus on reproductive development and function. 1) Gonadal development: We are investigating the molecular mechanisms of gene activation by Steroidogenic Factor 1 (SF-1), an "orphan" nuclear receptor that is essential for development of both female and male gonads, as well as the adrenal gland. We utilize molecular as well as genetic approaches to dissect the transcriptional regulatory functions of SF-1 and their modulation by co-regulators. 2) Placental Differentiation: In collaboration with D. Michael Nelson, M.D., Ph.D., we dissect the mechanisms that determine placental differentiation during human pregnancy. This process may be disrupted by diverse insults such as hypoxia and malnutrition, which leads to fetal growth restriction. Focusing on genes that modulate trophoblast differentiation and function, we utilize primary human trophoblasts to correlate phenotypic changes with alterations in gene expression. We use DNA micro-arrays (gene-chip) to examine gene expression in normal and abnormal trophoblasts.

Faculty

ELAINE AND MITCHELL
YANOW PROFESSOR AND
HEAD OF DEPARTMENT
James R. Schreiber, M.D.,
The Johns Hopkins University, 1972.

Professors Emeriti

H. Marvin Camel, M.D.,
Creighton University, 1950.
Ernst R. Friedrich, M.D.,
University of Heidelberg, 1954.
James C. Warren, M.D.,
University of Kansas, 1954; Ph.D.,
University of Nebraska, 1961.
(Walter G. Wiest, Ph.D.,
University of Wisconsin, 1952.

Professors

Irving Boime, Ph.D.,
Washington University, 1970.
(See Department of Molecular Biology and Pharmacology.)
James P. Crane, M.D.,
Indiana University, 1970.
(See Department of Genetics and Department of Radiology.)
Paul J. Goodfellow, Ph.D.,
Queen's University, 1985.
(See Department of Surgery and Alvin J. Siteman Cancer Center.)
Diane F. Merritt, M.D.,
New York University, 1975.
Ira C. and Judith Gall
Professor in Obstetrics and Gynecology
David G. Mutch, M.D.,
Washington University, 1980.

Professors Emeriti (Clinical)

Robert Burststein, M.D.,
Washington University, 1948.
S. Michael Freiman, M.D.,
Washington University, 1955.
Marvin Rennard, M.D.,
Washington University, 1952.

Professors (Clinical)

Andrew E. Galakatos, M.D.,
University of Missouri, 1965.
Ira C. Gall, M.D.,
University of Cincinnati, 1951.

Virginia S. Lang Professor in Obstetrics and Gynecology
D. Michael Nelson, M.D., Ph.D.,
Washington University, 1977.
Frederick Sweet, Ph.D.,
University of Alberta, 1908.
Professor (Adjunct)
Frederick T. Kraus, M.D., Washington University School of Medicine, 1955.

Associate Professor (Emeritus)
Asko I. Kivikoski, M.D., University of Turku, 1958; D.Sc., 1967.

Associate Professors
Rita Basuray, Ph.D., University of Illinois, 1983.
Ronald J. Chod, M.D., University of Texas, 1983.
Jeffrey M. Dicke, M.D., University of Missouri, 1985. (See Department of Radiology.)
Thomas J. Herzog, M.D., University of Cincinnati, 1986.
Phyllis C. Huettner, M.D., University of Illinois, 1981. (See Department of Pathology and Immunology.)
Rebecca P. McAlister, M.D., University of Kentucky, 1979.
Randall R. Odem, M.D., University of Iowa, 1981.
Michael J. Paul, M.D., Northwestern University, 1980.
Janet S. Rader, M.D., University of Missouri, 1983.
Youl Sadovski, M.D., Hebrew University, 1985. (See Department of Cell Biology and Physiology.)
Daniel B. Williams, M.D., University of Missouri, 1985.

Associate Professors Emeriti (Clinical)
Godofredo M. Herzog, M.D., Washington University, 1957.
J. Barlow Martin, M.D., Washington University, 1955.

Associate Professors (Clinical)
Joe E. Belew, M.D., St. Louis University, 1957.
Shih-Chung Chang, M.D., Chung-Shan Medical College, 1968.

Jacob Klein, M.D., Jefferson Medical College, 1968.
Lee A. Rigg, M.D., Washington University, 1971.
Chotchai Srisuro, M.D., Siriraj Faculty of Medical Sciences, 1967.
Klaus J. Staitsch, M.D., Free University of Berlin, 1966.
David L. Weinstein, M.D., St. Louis University, 1985.

Assistant Professor (Adjunct)
Jeffrey D. Bloss, M.D., Jefferson Medical College, 1982.

Assistant Professors
Lisa M. Bernhard, M.D., Louisiana State University, 1985.
Randall K. Gibb, M.D., Loyola University, 1991.
Ann M. Gronowski, Ph.D., University of Wisconsin, Madison, 1992. (See Department of Pathology and Immunology.)
Glad A. Gross, M.D., St. Louis University, 1992.
M. Katherine Jahnige, M.D., Harvard University, 1994.
Hun jung Jade Lim, Ph.D., University of Kansas, 1998. (See Department of Cell Biology and Physiology.)
Sara J. Marder, M.D., Medical College of Pennsylvania, 1991.
Kimberly A. Martin, M.D., University of Western Ontario, Canada, 1990.
Kelle H. Moley, M.D., Yale University, 1988. (See Department of Cell Biology and Physiology.)
Louis J. Muglia, Ph.D., The University of Chicago, 1986; M.D., 1988. (See Department of Molecular Biology and Pharmacology and Department of Pediatrics.)
John D. Pfeifer, M.D., Ph.D., University of California, San Diego, 1988. (See Department of Pathology and Immunology.)


Assistant Professors Emeriti (Clinical)
J. Leslie Walker, M.D., University of Tennessee, 1960.
Jerome D. Sachar, M.D., University of Missouri, 1979.
M. Bryant Thompson, M.D., University of California, 1961.
Albro C. Tobey, M.D., University of Dublin, 1972.
Gary M. Wasserman, M.D., University of Missouri, Kansas City, 1980.

Instructors
Sarah L. Keller, M.D., Southern Illinois University, 1989.
Kay LeChien, M.S., University of Pittsburgh School of Public Health, 1992.
Mitul B. Shah, M.D., University of Illinois, Chicago, 1996.

Instructors Emeriti (Clinical)
Parker H. Word, M.D., Howard University, 1944.

Instructors (Clinical)
Scott W. Biester, M.D., University of Missouri, Kansas City, 1989.
Lawrence V. Boveri, M.D., University of Missouri, Kansas City, 1988.
Igor Brondz, M.D., Vinniisa Medical Institute, Russia, 1978.
Christine M. Cernik, M.D., Rush University, 1983.
Michelle R. de Vera, M.D., Washington University, 1989.
Russell B. Dieterich, M.D., University of Illinois, 1970.
Lakshmi V. Dundoo, M.D., Deccan College of Medical Sciences, 1993.
Kevin O. Easley, M.D., University of North Carolina, 1983.
Josiah O. Ekunno, M.D., University of Ibadan, Nigeria, 1971.
Marsha N. Fisher, M.D., University of Missouri, 1992.
Gordon M. Goldman, M.D., St. Louis University, 1966.
Hoosna Haque, M.D., Baylor College of Medicine, 1996.
Joseph Hazan, M.D., Ege University, 1971.
Kathleen M. Hogan, M.D., University of Missouri, 1989.
William E. Houck, M.D., University of Cincinnati, 1981.
Laura R. Hulbert, M.D., Washington University, 1981.
Michael K. Johnson, M.D., St. Louis University, 1975.
Vernon L. Johnson, M.D., St. Louis University, 1985.
J. Hoon Kim, M.D., University of Missouri, Kansas City, 1990.
Lauri Klabi, M.D., University of Missouri, 1991.
Claudia C. Krasnoff, M.D., University of Maryland, 1994.
Christine M. Ladd, M.D., University of Missouri, 1990.
Tony C. Lam, M.D., Albert Einstein College of Medicine, 1983.
FaneC. Lekkas, M.D., St. Louis University, 1991.
Gerard J. Malnar, M.D., St. Louis University, 1987.
Mary E. Mani, M.D., St. Louis University, 1990.
Daniel S. McDonald, M.D., University of Missouri, 1989.
Denise A. Meckler, M.D., Ohio State University, 1992.
Tempton S. Mistry, M.D., Grant Medical College, 1968.
Alvaro Mora, M.D., Antioquia University, 1975.
Helen I. Mussemann, M.D., Baylor College of Medicine, 1996.
Meera R. Patel, M.D., University of Missouri, Kansas City, 1996.
Anthony C. Pearlstone, M.D., Washington University, 1983.
Timothy C. Philpott, M.D., Washington University, 1994.
Aaron J. Pile, M.D., Eastern Virginia Medical School, 1983.
Amy J. Ravin, M.D., The University of Chicago, 1996.
Ann Marie S. Rockamann, M.D., St. Louis University, 1991.
Sudha R. Saha, M.D., Calcutta University, 1962.
Kevin B. Schaberg, M.D., Washington University, 1966.
Daniel J. Semenoff, M.D., St. Louis University, 1963.
D. Elan Simckes, M.D., Hebrew University, 1989.
John A. Stopple, M.D., University of Wisconsin, 1969.
Jean A. Thomas, M.D., Faculte de Medecine et de Pharmacie d’Haiti, 1972.
Jeffrey B. Thompson, M.D., University of Missouri, 1993.
Daniel G. Wagner, M.D., St. Louis University, 1989.
Mark S. Wasserman, M.D., University of Missouri, Kansas City, 1984.
Anna C. Wolaniuk, M.D., Medical Academy of Lodz, 1975.
Haifaa T. Younis, M.D., Baghdad Medical School, 1984.
Instructors (Adjunct)
Patricia Lazaroff, C.N.M.,
St. Louis University, 1974.
Clayton D. Skaggs, D.C.,
Logan College of Chiropractic,
1987.
DEPARTMENT OF
OPHTHALMOLOGY
AND VISUAL
SCIENCES

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.

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.; Carla J. Siegfried, 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

M50 740 OPHTHALMOLOGY CLERKSHIP

Instructor: Morton E. Smith, M.D., 747-5559; Carla J. Siegfried, M.D.

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.

FOURTH YEAR

Electives

M50 801 OPHTHALMOLOGY

Instructor: Carla J. Siegfried, M.D.; Morton E. Smith, M.D., 362-5722

This elective is for senior students who plan to apply for a residency in ophthalmology. The elective is offered to four students each interval. The student rotates through one or more specific clinics including the general eye clinic at Barnes-Jewish Hospital and/or the subspecialty clinics of 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 Carla J. Siegfried, M.D., or Russell N. Van Gelder, Ph.D., M.D., (director of the residency program) or Morton E. Smith, M.D., (coursemaster). 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 Smith. The students must attend all conferences as well as Grand Rounds and Wednesday Night Seminar for residents, and must spend one night a week (until 9 p.m.) with the ophthalmology residents 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 Smith in March prior to scheduling at PIT. 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. The final grade is also determined by the oral presentations to Siegfried, Van Gelder or Smith, plus the oral quiz on the “Case Studies” book. The grades at Washington University are Honors, High Pass, Pass, Fail. Valid start weeks for 4-week blocks are: Weeks 1, 9, 13.
Research (M50 900)

Usha P. Andley, Ph.D., 362-7167
2. Ocular gene therapy.

Steven Bassnett, Ph.D., 362-1604
1. Lens cell biology.
2. Ocular gene therapy.

David C. Beebe, Ph.D., 362-1099
1. Molecular and cellular biology of anterior segment development and aging.

Shenting Chen, Ph.D., 747-4350
Molecular basis of retinal specific gene expression and hereditary retinal degeneration.

Thomas A. Ferguson, Ph.D., 362-3745
Cellular and molecular regulation of the ocular immune response.

Mae Etsuko Gordon, Ph.D., 362-3716
1. Multicenter randomized clinical trial to determine if medical treatment of ocular hypertension prevents or delays glaucomatous optic nerve damage.

J. William Harbour, M.D., 747-1738
Tumorigenesis and regulation of cell growth, treatment of ocular tumors.

M Rosario Hernandez, D.D.S., 747-1448
Molecular and cellular mechanisms underlying glaucomatous optic neuropathy in humans.

Peter D. Lukasiewicz, Ph.D., 362-4284
Roles of receptors for inhibitory and excitatory amino acids in retina. Neurobiology of the vertebrate retina.

Arthur H. Neufeld, Ph.D., 747-1487
Pharmacologic neuroprotection of the optic nerve in glaucoma.

J. Mark Petrasb, Ph.D., 362-1172
1. Molecular biology and genetics of cataracts.
2. Development of enzyme inhibitors for prevention of diabetic cataracts and retinopathy.

V. Nathan Ravi, M.D., Ph.D., 747-4458
Development of biomaterials for ophthalmic applications.

Carmelo Romano, Ph.D., 362-2676
Role of receptors for excitatory amino acids (EAAs) in the vertebrate retina.

Alan Shiels, Ph.D., 362-1637
Genetics of cataract and refractive disorders.

Patrick M. Stuart, Ph.D., 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., 362-5356

Lawrence Tybansen, M.D., 454-6026
Pediatric Ophthalmology:
1. Development of the visual brain and eye alignment.
2. Visual cortex development, ocular alignment, strabismus.

Russell N. Van Gelder, M.D., Ph.D., 362-4286
1. Molecular biology of circadian photoreception.
2. Uveitis and ocular inflammation.
3. Polymerase chain reaction diagnosis and discovery of uveitis pathogens.

Martin B. Wax, M.D., 362-3305
1. Role of autoimmunity in glaucomatous optic neuropathy and normal pressure glaucoma.

Faculty

CHAIR OF DEPARTMENT

Professors Emeriti
Bernard Becker, M.D., Harvard University, 1944.
Morton E. Smith, M.D., University of Maryland, 1960.

Professors
Janet and Bernard Becker Professor
David C. Beebe, Ph.D., University of Virginia, 1974.

PhD. Custer, M.D., Vanderbilt University, 1978.
Mae Etsuko Gordon, Ph.D., University of Wisconsin, 1978.
(See Division of Biostatistics.)
Bernard Becker Professor
J. Mark Petrash, Ph.D., University of Texas, Galveston, 1981. (See Department of Genetics.)
Lawrence Tychsen, M.D., Georgetown University, 1979. (See Department of Anatomy and Neurobiology and Department of Pediatrics.)
Martin B. Wax, M.D., University of Southern California, 1978.

Professors Emeriti (Clinical)
Benjamin Milder, M.D., Washington University, 1939.
James E. Miller, M.D., Medical College of Alabama, 1949. (See Department of Pediatrics.)
Edward Okun, M.D., University of Vermont, 1956.

Professors (Clinical)
George M. Bohigian, M.D., St. Louis University, 1965.
Isaac Boniuk, M.D., Dalhousie University, Nova Scotia, 1962.
M. Gilbert Grand, M.D., Yale University, 1968.
Jack Hartstein, M.D., University of Cincinnati, 1955.
Jack Kayes, M.D., Washington University, 1957.
Allan E. Kolker, M.D., Washington University, 1957.
Jay S. Pepose, Ph.D., University of California, Los Angeles, 1980; M.D., 1982.
Stephen R. Waltman, M.D., Yale University, 1964.

Associate Professors
Usha P. Andley, Ph.D., Jawaharlal Nehru University, 1977. (See Department of Biochemistry and Molecular Biophysics.)
Steven Bassnett, Ph.D., University of East Anglia, 1987. (See Department of Medicine.)
Thomas A. Ferguson, Ph.D., University of Cincinnati, 1982. (See Department of Pathology and Immunology.)
J. William Harbour, M.D., The Johns Hopkins University, 1990. (See Department of Cell Biology and Physiology and Department of Medicine, Molecular Oncology.)
Cynthia Z. Kenneally, M.D., University of Missouri, 1982.
David A. Leib, Ph.D., The University of Liverpool, 1986. (See Department of Molecular Microbiology.)
Gregg T. Lueder, M.D., University of Iowa, 1985. (See Department of Pediatrics.)
Peter D. Lukasiewicz, Ph.D., University of Michigan, 1984. (See Department of Anatomy and Neurobiology.)
Carmelo Romano, Ph.D., Stanford University, 1981. (See Department of Anatomy and Neurobiology.)
Mitchel L. Wolf, M.D., Albert Einstein College of Medicine, 1968.

Associate Professors Emeriti (Clinical)
Neva P. Arribas, M.D., Manila Central University, 1954.
Glen P. Johnston, M.D., Washington University, 1956.

Associate Professors (Clinical)
Dean B. Burgess, M.D., University of California, 1967.
Harry L. Knopf, M.D., Harvard Medical School, 1967.
Matthew A. Thomas, M.D., Harvard University, 1981.

Assistant Professors
Edward M. Barnett, M.D., Ph.D., University of Iowa, 1995.
Shiming Chen, Ph.D., SUNY Health Science Center, 1992. (See Department of Molecular Biology and Pharmacology.)
Jeffrey M. Gidday, Ph.D., University of Virginia, 1986. (See Department of Neurological Surgery.)
P. Kumar Rao, M.D., University of Southern California, 1995.
Alan Shiels, Ph.D., University of London, 1983.
Carla J. Siegfried, M.D., University of Missouri, Kansas City, 1989.
Russell N. Van Gelder, Ph.D., M.D., Stanford University, 1994. (See Department of Molecular Biology and Pharmacology.)

Research Assistant Professors
Valery I. Shestopalov, Ph.D., Lomonosov Moscow State University, 1993.
Patrick M. Stuart, Ph.D., Northwestern University, 1985. (See Department of Molecular Microbiology.)
Gulgun Tezel, M.D., Hacettepe University of Medicine Turkey, 1983.

Assistant Professors Emeriti (Clinical)
James M. Gordon, M.D., University of Minnesota, 1966.
Arthur W. Stickle Jr., M.D., University of Oklahoma, 1943.
Instructors


Tammie Lee Keadle, Ph.D., Louisiana State University, 1992.

Mary Mignecco, O.D., University of Missouri, 1991.

Mark S. Rallo, O.D., University of Missouri, 1990.


Instructors (Clinical)


Gregg J. Berdy, M.D., St. Louis University, 1983.

Andrew N. Blatt, M.D., St. Louis University, 1988.

Rebekah A. Braslow, M.D., Yale University, 1992.

Nicholas N. Colosi, M.D., St. Louis University, 1990.

Bruce S. Frank, M.D., Washington University, 1976.


Sanjay P. Malhotra, M.D., University of Missouri, Kansas City, 1995.

Robert F. Munsch, M.D., St. Louis University, 1977.

Paul F. Nichols, M.D., University of California, 1982.

Mark A. Rothstein, M.D., University of Utah, 1991.

Steven M. Shields, M.D., Washington University, 1986.

Howard N. Short, M.D., St. Louis University, 1978.

Mark H. Spurrier, M.D., Washington University, 1980.


Shilpa A. Thornton, M.D., University of Missouri, Kansas City, 1994.

Linda M. Tsai, M.D., Northwestern University, 1995.

Instructors (Adjunct)


Paul M. Bernier, O.D., University of Missouri, St. Louis, 1987.

Frank J. Bier, O.D., University of Missouri, 1984.

Mark G. Birkmann, O.D., University of Missouri, 1992.


Paul J. Botelho, O.D., Boston University, 1992.


Earl S. Changar, O.D., Southern College of Optometry, 1958.


David L. Davidson, O.D., Southern College of Optometry, 1964.


Lawrence V. Ernst, O.D., University of Missouri, 1990.

Raymond F. Fada Jr., O.D., University of Missouri, 1989.


N. Rex Ghormley, O.D.,
Southern California College of Optometry, 1964.

Steven J. Grondalski, O.D.,

Alexander D. Harris, O.D.,
University of Missouri, 1986.

William L. Herbold, O.D.,
Southern College of Optometry, 1967.

Douglas L. Huff, O.D.,
Southern California College of Optometry, 1981.

Jeffrey H. Jacob, O.D.,
Southern California College of Optometry, 1980.

Deborah L. Kerber, O.D.,
University of Missouri, 1992.

William F. Kiefer Jr., O.D.,
Illinois College of Optometry, 1975.

Mark A. Kleindorfer, O.D.,
Indiana University, 1979.

Vivian M. Kloke, O.D.,
University of Missouri, 1990.

Ronald J. Knox, O.D.,
Southern College of Optometry, 1956.

Thomas E. Kraemer, O.D.,
Indiana University School of Optometry, 1972.

Paul A. LaPoint, O.D.,
Southern College of Optometry, 1963.

Scott W. Lewis, O.D.,
Southern California College of Optometry, 1977.

James W. Lieber, O.D.,
Illinois College of Optometry, 1981.

Lisa M. Mackey, O.D.,
University of Missouri, 1993.

Eugene J. Mobley, O.D.,
Northern Illinois College of Optometry, 1950.

Robert L. Mobley, O.D.,
Illinois College of Optometry, 1958.

Raymond I. Myers, O.D.,
Indiana University School of Optometry, 1970.

Michael D. Rohde, O.D.,
University of Missouri, 1987.

Frederick W. Schwager, O.D.,

Christopher G. Seep, O.D.,
University of Missouri, 1984.

David B. Seibel, O.D.,
University of Missouri, 1987.

Charles D. Signorelli, O.D.,
Southern College of Optometry, 1957.

Claud R. Snowden, O.D.,

Craig H. Sorce, O.D.,
University of Missouri, 1992.

James F. Streiter, O.D.,
Chicago College of Optometry, 1954.

Brian P. Sumner, O.D.,

Gary L. Vogel, O.D.,
Ohio State University, 1977.

James J. Wachter, O.D.,

Donald E. Walter Jr., O.D.,
University of Houston, 1972.

Michael L. Wolf, O.D.,
University of Missouri, 1987.
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, Barnes-Jewish St. Peters Hospital and the Veterans Administration Medical Center. Students have the opportunity to gain experience on the following services: Hand; Shoulder and Elbow; Spine; Sports Medicine; Trauma; Foot and Ankle; and Pediatric Orthopaedic Surgery. It is anticipated that students will assist in the care of patients in the surgical wards, scrub in 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.

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., and Scott J. Luhmann, 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., and Orthopaedic Surgery at Barnes-Jewish Hospital north campus with Rick W. Wright, M.D. Students also may participate in an all-clinical rotation on this service. In addition to operative and clinical experience, students participate in weekly tutorials on orthopaedic physical examination with faculty members.

FOURTH YEAR

Electives

M95 840 ORTHOPAEDIC SURGERY — FOOT/ANKLE
Instructor: Jeffrey E. Johnson, M.D., 747-2543
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 clerkship will serve as an active and integral part of the orthopaedic team. **Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.**

M95 842A ORTHOPAEDIC SHOULDER/ELBOW SURGERY
Instructor: Ken Yamaguchi, M.D., 747-2543
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. **Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.**

M95 842B ORTHOPAEDIC SHOULDER/ELBOW SURGERY
Instructor: Leesa Galatz, M.D., 747-2543
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. **Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.**

M95 845A ORTHOPAEDIC HAND AND UPPER EXTREMITY SURGERY
Instructors: Martin I. Boyer, M.D.; Richard H. Gelberman, M.D., 747-2543
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. **Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.**

M95 845B ORTHOPAEDIC HAND AND UPPER EXTREMITY SURGERY
Instructor: Paul R. Manske, M.D., 747-2543
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 the instructor's service will also participate in the instruction of students choosing this elective. **Valid start weeks for 4-week blocks are:** Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

**M95 846 ORTHOPAEDIC TRAUMA**
Instructors: Joseph Borrelli Jr., M.D., 747-2543; William Ricci, M.D., 747-2543
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. **Valid start weeks for 4-week blocks are:** Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

**M95 847 ORTHOPAEDIC SPINE SURGERY**
Instructor: Keith H. Bridwell, M.D., 747-2543
This clinical elective is available for four weeks, during which time the student will work with attending surgeon 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 pediatric 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. **Valid start weeks for 4-week blocks are:** Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

**M95 848 ORTHOPAEDIC PEDIATRIC SURGERY**
Instructor: J. Eric Gordon, M.D., 747-2543
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 is required. **Valid start weeks for 4-week blocks are:** Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

**M95 853 ORTHOPAEDIC SURGERY — SPORTS**
Instructor: George A. Paletta Jr., M.D., 747-2543
This clinical elective is available for four weeks, during which time the student will participate in orthopaedic conferences, outpatient clinics, surgical cases and patient rounds. The medical students electing this clerkship will serve as an active and integral part of the orthopaedic team. **Valid start weeks for 4-week blocks are:** Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

**M95 854 ORTHOPAEDIC SPINE SURGERY WITH EMPHASIS ON CERVICAL SPINE**
Instructor: Kiehyun Daniel Riew, M.D., 747-2543
Clinical elective available for four weeks, during which time the student will work with attending surgeons primarily at Barnes-Jewish and St. Louis Children's Hospital observing and assisting in outpatient and inpatient care. To be included in the OR and outpatient clinics. Attendance at and participation in the weekly orthopaedic and spine conference activities is suggested. **Valid start weeks for 4-week blocks are:** Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

**M95 8991 ORTHOPAEDIC SURGERY EXTERNSHIP (VISITING STUDENTS ONLY)**
Instructor: Martin I. Boyer, M.D.
Students rotate on Orthopaedic Services for two- or four-week blocks. Students may choose from hand, sports medicine, trauma, cervical spine, shoulder/elbow, foot/ankle, pediatric and research rotations depending upon availability. Please contact Donna DePond in the Orthopaedic Education Office for further information. E-mail address: depondo@msnotes.wustl.edu. **Valid start weeks for 4-week blocks are:** Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

Please contact the Orthopaedic Surgery Education Office at 747-2543 for further information.

**Research (M95 900)**
Various Orthopaedic Surgery research opportunities are available with the following faculty attending. If interested, please contact the Education Office at 747-2543 or contact the physician directly.

Yousef Abu-Amer, Ph.D.
Joseph Borrelli Jr., M.D.
Martin I. Boyer, M.D.
John G. Clohisy, M.D.
Leesa Galatz, M.D.
Richard H. Gelberman, M.D.
J. Eric Gordon, M.D.
Jeffrey E. Johnson, M.D.
Lawrence G. Lenke, M.D.
Scott J. Luhmann, M.D.
Matthew J. Matava, M.D.
George A. Paletta Jr., M.D.
William M. Ricci, M.D.
Kiehyun Daniel Riew, M.D.
Timothy M. Ritty, Ph.D.
Linda J. Sandell, Ph.D.
Matthew J. Silva, Ph.D.
Rick W. Wright, M.D.
Ken Yamaguchi, M.D.

Faculty

FRED C. REYNOLDS
PROFESSOR OF
ORTHOPAEDIC SURGERY AND
HEAD OF DEPARTMENT
Richard H. Gelberman, M.D.,
University of Tennessee, 1969.

Professors Emeriti
Lee T. Ford, M.D.,
University of Tennessee, 1940.
Jerome J. Gilden, M.D.,
Washington University, 1952.

Professors
Dr. Asa C. and Dorothy Jones
Professor of Orthopaedic Surgery
Keith H. Bridwell, M.D.,
Washington University, 1977.
Jerome J. Gilden, M.D.,
Endowed Professor
Lawrence G. Lenke, M.D.,
Northwestern University, 1986.
Charles F. and Joanne Knight
Distinguished Professor in
Orthopaedic Surgery
William J. Maloney III, M.D.,
Columbia University, 1983.
Paul R. Manske, M.D.,
Washington University, 1964.
Douglas J. McDonald, M.D.,
University of Minnesota,
Minneapolis, 1982.
Linda J. Sandell, Ph.D.,
Northwestern University, 1980.
(See Department of Medicine.)
Perry L. Schoenecker, M.D.,
University of Wisconsin, 1968.

Associate Professors
Jeffrey E. Johnson, M.D.,
Georgetown University, 1980.

Gary A. Miller, M.D.,

Associate Professors Emeriti (Clinical)
Marshall B. Conrad, M.D.,
Washington University, 1945.
Robert E. Kuhlmann, M.D.,
Washington University School of
Medicine, 1956.
Harry C. Morgan, M.D.,
Harvard University, 1953.

Assistant Professor Emeritus
J. Otto Lottes, M.D.,
University of Louisville, 1937.

Assistant Professors
Yousef Abu-Amer, Ph.D.,
The Hebrew University, 1993.
Joseph Borrelli Jr., M.D.,
University of South Florida, 1988.
Martin I. Boyer, M.D.,
University of Toronto, 1988.
John C. Clohisy, M.D.,
Northwestern University, 1989.
Matthew B. Dobbs, M.D.,
University of Iowa, 1995.
J. Eric Gordon, M.D.,
University of California, 1988.
Matthew J. Matava, M.D.,
University of Missouri,
George A. Paletta Jr., M.D.,
The Johns Hopkins University,
Heidi Prather, D.O.,
University of Health Sciences
College of Osteopathic Medicine,
William M. Ricci, M.D.,

Kiehyun Daniel Riew, M.D.,
Case Western Reserve University, 1984.
Robert A. Shively, M.D.,
University of Illinois, 1969.
Matthew J. Silva, Ph.D.,
Massachusetts Institute of
Technology, 1996. (See Department
of Biomedical Engineering.)
Rick W. Wright, M.D.,
University of Missouri, 1988.
Ken Yamaguchi, M.D.,

Research Assistant Professor
Jueren Lou, M.D., Ph.D.,
Kiangi Medical College, 1983.

Instructors
Leesa Galatz, M.D.,
George Washington University, 1993.
Scott J. Luhmann, M.D.,
University of Minnesota, 1991.
John P. Metzler, M.D.,
University of Texas, Medical
Branch, Galveston, 1995.
Brett A. Taylor, M.D.,
Harvard University Medical

Research Instructor
Timothy M. Ritty, Ph.D.,
University of Texas, Houston, 1997.

Instructor Emeritus
( Clinical)
W. Edward Lansche, M.D.,
Washington University, 1952.
DEPARTMENT OF OTOLARYNGOLOGY

Otolaryngology is presented to students in the second-, third- and fourth-year classes. Clinically oriented lectures and a physical diagnosis workshop are presented to second-year students. In the third year of the medical curriculum, two-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 four- to six-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, Otolaryngology 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 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 pediatrics endoscopy; and allergy and endoscopic nasal sinus surgery.

SECOND YEAR

M55 660B OTOLARYNGOLOGY AND PHYSICAL DIAGNOSIS
Lecturer: Joel A. Goebel, M.D., 747-0553
Clinically oriented lectures in otolaryngology are given to the entire class. Subjects include ear disease; vertigo; nose, sinus and larynx problems and head and neck cancer.

THIRD YEAR

M55 750 OTOLARYNGOLOGY CLERKSHIP
Instructor: Joel A. Goebel, M.D., 747-0553
A two-week exposure to otolaryngology outpatient and inpatient management. Emphasis will be on ambulatory care evaluation and decision-making skills.

FOURTH YEAR

Electives

M55 801 OTOLARYNGOLOGY
Instructor: Joel A. Goebel, M.D., 747-0553
Four-week rotation includes evaluation of ENT problems presented to specialist for diagnosis and treatment. The student participates in the clinic, hospital and operating room. This also includes time on the Pediatric ENT Service, Audiology Voice Laboratory and Vestibular Evaluation Laboratory. Option of rotation on the ENT Service at the Veterans Administration Medical Center is available. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M55 802 GENERAL OTOLARYNGOLOGY
Instructor: Joel A. Goebel, M.D., 747-0553
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 the Veterans Administration Medical Center (VAMC). At Barnes-Jewish Hospital, participation in clinic, hospital inpatient and operating room settings would expose student to a broad spectrum of patients. At the VAMC the emphasis would be on head and neck tumors.

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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. Valid start weeks for 2-week blocks are: Weeks 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41 and 43.

M55 803 PEDIATRIC OTOLARYNGOLOGY
Instructor: David W. Moller, M.D., 454-6162
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 subspecialty/multidisciplinary clinics such as the Down’s clinic or 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. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M55 820 PRACTICUM IN ADULT CLINICAL AUDIOLOGY
Instructor: Michael Valente, Ph.D., 362-7489
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. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M55 831 NEUROOTOLOGY
Instructor: Joel A. Goebel, M.D., 747-0553
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. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M55 832 OTOLARYNGOLOGY/NEUROTOLOGY/BASE SKULL SURGERY
Instructor: J. Gtali Neely, M.D., 362-7344
The students will be active participants in the clinical office and in surgery with Dr. Neely, concentrating on medicine and surgery of the ear and skull base in adults and children. They will also have access to and be expected to dissect in the temporal bone surgical dissection laboratory. The hospitals used are Barnes-Jewish, St. Louis Children’s, and Veterans Administration. The days begin at 7:00 a.m. and end at 6:00 p.m. The purpose of this elective is to use the milieu of a surgical practice to learn to efficiently identify dangerous and/or correctable lesions affecting the hearing, balance and facial nerve function and to develop experiences and concepts of applied basic and clinical science to the practice of medicine in order to stimulate scientific physicians. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M55 833 AMBULATORY OTOLARYNGOLOGY FOR THE PRIMARY CARE PHYSICIAN
Instructor: Joel A. Goebel, M.D., 747-0553
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. Valid start weeks for 4-week blocks are: Weeks 9, 13, 17, 21, 25, 29, 33, 37 and 41.

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. Bobne, Ph.D.; Gary W. Harding, M.S.E., 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 endolympathic 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 that 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.

Joel A. Goebel, M.D., 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., 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 database and a study of outcomes of treatment for recurrent head and neck cancer.

J. Gail Neely, M.D., 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., 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., 362-7549
scholnick@misnotes.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 that 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.

Faculty

LINDBURG PROFESSOR AND HEAD OF DEPARTMENT
Richard A. Chole, M.D., University of Southern California, 1969; Ph.D., University of Minnesota, 1977.

Professors Emeriti
Colin Painter, Ph.D., University of London, 1969.
Donald G. Sessions, M.D., Washington University, 1962.
S. Richard Silverman, Ph.D., Washington University, 1942.
(Audiology) (Also Central Institute for the Deaf and Faculty of Arts and Sciences)

Ruediger Thalmann, M.D., University of Vienna, 1954.
Professors
Barbara A. Bohne, Ph.D., Washington University, 1971.
Joel A. Goebel, M.D., Washington University, 1980.
Stephen M. Hightstein, M.D., University of Maryland, 1965; Ph.D., University of Tokyo Faculty of Medicine, 1976. (See Department of Anatomy and Neurobiology.)
Rodney P. Lusk, M.D., University of Missouri, 1977. (See Department of Pediatrics.)
J. Gail Neely, M.D., University of Oklahoma, 1965.
Dec N. Salt, Ph.D., University of Birmingham, 1977.
Margaret W. Skinner, Ph.D., Washington University, 1976.
Michael Valente, Ph.D., University of Illinois, 1975. (Audiology)

Research Professor Emeritus and Lecturer
Donald H. Eldredge, M.D., Harvard University, 1946. (Also Central Institute for the Deaf and Faculty of Arts and Sciences)

Research Professors
Ira J. Hirsh, Ph.D., Harvard University, 1948. (Audiology) (Also Central Institute for the Deaf and Faculty of Arts and Sciences)
James D. Miller, Ph.D., Indiana University, 1957. (Also Central Institute for the Deaf)
Isolde Thalmann, Ph.D., California Western University, 1982.

Professor Emeritus (Clinical)
Benard C. Adler, M.D., Washington University, 1937.

Professors (Clinical)
Susan E. Mackinnon, M.D., Queen's University, Kingston, Ontario, 1975. (See Department of Surgery and Program in Occupational Therapy.)

Associate Professors
Randall A. Clary, M.D., University of Illinois, 1984. (See Department of Pediatrics.)
Jay F. Piccirillo, M.D., University of Vermont, 1985. (See Department of Medicine and Program in Occupational Therapy.)
Steven B. Scholnick, Ph.D., Cornell University, 1982.
Stanley E. Thawley, M.D., University of Texas Medical Branch, 1967.

Research Associate Professors
Richard A. Baird, Ph.D., University of California, Berkeley, 1981.
J. David Dickman, Ph.D., University of Wyoming, 1985.
Dwayne D. Simmons, Ph.D., Harvard University, 1986.

Research Associate Professor (Adjunct)
Roanne G. Karzon, Ph.D., Washington University, 1982. (Audiology)

Assistant Professors
James M. Hartman, M.D., University of Missouri, Kansas City, 1988.
Brock D. Ridenour, M.D., Tulane University, 1985.
Ravindra Uppaluri, M.D., Ph.D., University of Minnesota, 1995.

Assistant Professors Emeriti (Clinical)
Louis S. Altshuler, D.D.S., Ohio State University, 1945.
Donald R. Ingram, M.D., University of Illinois, 1956.
Herbert M. Smit, M.D., St. Louis University, 1933.
George Robert Kletzker, M.D., University of Missouri, 1984.
Claire Matthews, Ph.D., University of Kansas, 1980. (Speech Pathology)
Supote Phipatanakul, M.D., Chulalongkorn Hospital Medical School, 1965.
Albert F. Ruehl, M.D., St. Louis University, 1973.
Peter G. Smith, Ph.D., Purdue University, 1972; M.D., Medical University of South Carolina, 1976.
Lloyd Thompson, M.D., Howard University, 1964.

Assistant Professor (Clinical) (Adjunct)
Margaret G. Peak, Ph.D., Columbia University, 1975. (Audiology)

Research Assistants
Brian T. Faddis, Ph.D., University of California, Davis, 1994.
Mark E. Warchol, Ph.D., Northwestern University, 1989.

Research Scientists
Gary W. Harding, M.S.E., University of Washington, 1983. (See Department of Neurological Surgery.)
Timothy A. Holden, B.S.E., University of Iowa, 1984.

Instructors
Carl F. Ehrlich, M.D., University of Missouri, 1965.

Instructors (Clinical)
Scan B. Bailey, M.D., Tulane University, 1987.
Phadung Chadaratan, M.D., Mahidol University, 1964.
J. Michael Conover, M.D., Vanderbilt University, 1975.
John David Dahm, M.D., University of Texas Health Sciences Center, San Antonio, 1990.
Tamara K. Ehlers, M.D., University of Wisconsin, 1983.
James A. Fernandez, M.D., St. Louis University, 1981.
James D. Gould, M.D., Medical College of Virginia, 1993.
Jason M. Hanson, M.D., Northwestern University, 1992.
Richard Maack, M.D., University of Maryland, 1985.

Kamlesh Makwana, D.D.S., Marquette University School of Dentistry, 1996.
John W. McKinney, M.D., University of Missouri, 1979.
Herman Turner, D.D.S., Georgetown University, 1951.
Calvin H. Weiss, D.D.S., St. Louis University, 1946.
Alan P.K. Wild, M.D., Tulane University, 1983.

Research Instructor
Pablo Blazquez, Ph.D., University of Seville, 1992.
DEPARTMENT OF PATHOLOGY 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 cytopathological 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 Samuel A. Santoro, M.D., 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, experimental 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. (see Saffitz for guidance on these.)

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 coursemaster), 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 Robert D. Schreiber, Ph.D.

FIRST YEAR

M60 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. Steckman, M.D., Ph.D., 747-8223; Herbert W. Virgin, 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, immunologic effector mechanisms and the role of immunology in disease. 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 exercises that consist of POPS (Patient Oriented Problem-Solving System in Immunology). The POPS consist of workbooks that contain a clinical problem that is analyzed and solved during the session. There are five hours of small group discussions. In these sessions, students meet with physicians to discuss the role of immunology and a particular human disease. Basic Immunology: Functions and Disorders of the Immune System, by Abbas and Lichtman is used. For the small group discussion, the textbook Case Studies in Immunology: A Clinical Companion (third edition) by Rosen and Geha will be used. There will be two exams consisting of multiple choice and true and false 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 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. During the year, students will become familiar with the methods of contemporary pathologic analysis. They also will 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

Clinical Pathological Conference

The clinical history and treatment of patients who have died are discussed before the class by the physicians and surgeons of the departments concerned. These conferences afford students an opportunity to interpret the clinical observations in light of the postmortem findings. One hour per week during the year. Staff

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
Instructors: Jeffrey E. Saffitz, M.D., Ph.D., and staff, 362-7728
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. **Valid start weeks for 4-week blocks are:** Weeks 1, 13, 17, 21, 25, 29, 33, 37 and 41.

M60 815 OB-GYN PATHOLOGY SUBINTERNSHIP
Instructor: Phyllis C. Huettner, M.D., 362-0118
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. **Valid start weeks for 4-week blocks are:** Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M60 820 SURGICAL PATHOLOGY — BARNES-JEWISH HOSPITAL
Instructors: Louis P. Dehner, M.D., and surgical pathology staff, 362-0150
Surgical Pathology offers an elective for a four-week period under Surgical Pathology I. Students participate fully in activities of the Division of Surgical Pathology, and they are responsible for dissection and description of gross specimens and microscopic diagnosis under supervision of the senior staff of the division. Students attend morning conferences with the faculty, surgical and medical grand rounds, and a variety of subspecialty conferences in which the division participates. In addition, Surgical Pathology II includes rotations through selected subspecialties: neuropathology, hematopathology, dermatopathology, ENT pathology, and gynecologic pathology. **Valid start weeks for 4-week blocks are:** Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M60 825 INTRODUCTION TO NEUROPATHOLOGY
Instructor: Robert E. Schmidt, M.D., Ph.D., 362-7426
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 neuroanatomy, discuss approaches to the diagnosis of nervous system disease, and point out the interactions 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. **Valid start weeks for 4-week blocks are:** Weeks 13, 17, 21, 29, 33, 37 and 41.

M60 841 PEDIATRIC PATHOLOGY
Instructor: Frances V. White, M.D., 362-0101
This four-week elective offers an experience in pediatric pathology involving material from both the Pediatric Autopsy Service and the Division of Surgical Pathology. The elective is designed to teach the student how to develop basic skills in histopathological interpretation. This elective will be offered only to one student per period in order to permit maximum interaction with the surgical pathology staff and house staff. During the course of the elective, the student will be taught to function as junior house staff. The student will participate in the examination and dissection of gross specimens, observe frozen section diagnosis, and formulate histopathological diagnoses, all in conjunction with residents and members of the senior staff. Since the Laboratory of Surgical Pathology at Barnes-Jewish Hospital processes a broad range of material as well as specimens derived from busy surgical subspecialty practice, the elective is considered desirable for students who plan careers in internal medicine, surgery and radiology as well as those who intend to enter the field of pathology. **Valid start weeks for 4-week blocks are:** Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M60 850 SURGICAL PATHOLOGY — BARNES-JEWISH HOSPITAL
Instructors: Jon R. Ritter, M.D., and staff, 362-0104
This elective is designed to acquaint the student with the discipline of surgical pathology and to permit them to develop basic skills in histopathological interpretation. This elective will be offered only to one student per period in order to permit maximum interaction with the surgical pathology staff and house staff. During the course of the elective, the student will be taught to function as junior house staff. The student will participate in the examination and dissection of gross specimens, observe frozen section diagnosis, and formulate histopathological diagnoses, all in conjunction with residents and members of the senior staff. Since the Laboratory of Surgical Pathology at Barnes-Jewish Hospital processes a broad range of medical biopsy material as well as specimens derived from busy surgical subspecialty practice, the elective is considered desirable for students who plan careers in internal medicine, surgery and radiology as well as for those who intend to enter the field of pathology. **Valid start weeks for 4-week blocks are:** Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M60 860 CLINICAL LABORATORY MEDICINE — BARNES-JEWISH HOSPITAL
Instructor: Samuel A. Santoro, M.D., Ph.D., 362-3110
This elective is designed to teach the student how to use the vast array of clinical assays 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, DNA-based
diagnostics, hematology, coagulation, clinical immunology, histocompatibility 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 and appropriate use of blood component therapy. Students will be given the opportunity to present and lead case discussions during this elective. Valid start weeks for 4-week blocks are: 13, 17, 21, 29 and 33.

M25 883 TRANSFUSION MEDICINE

Instructor: Lawrence T. Goodnough, M.D., 362-1546

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 indications for application of interventional hematology, such as photopheresis and peripheral stem cell harvest for marrow transplantation. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

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.
defining their relationship to cerebrovascular amyloid and cytoskeletal components.

Current research focuses on developing silver stains and immunochemical probes to assist computer imaging and quantification of plaques, tangles and neurons. Projects include: 1) lesion quantification in brains of the very aged (over 80 years); 2) correlation of lesion severity with precise clinical measurements of cognitive deficits; 3) interactive and automated computer-assisted quantification of neuritic plaque subtypes; and 4) a multicenter study (CERAD) to validate pathologic criteria for diagnosing Alzheimer's disease.

Jeffrey D. Milbrandt, M.D., Ph.D., 362-7728
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 results 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., 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., 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.

Samuel A. Santoro, M.D., Ph.D., 362-8849
Research is aimed at defining the molecular mechanisms of cell-cell and cell-substrate adhesion. Investigations are centered on the structure, function and regulation of adhesion receptor molecules in platelet function, development and malignancy.

Robert E. Schmidt, M.D., Ph.D., 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 response of axoplasmic transport to experimental nerve injury, particularly the reversal of the polarity of axonal transport at the site of mechanical injury.

Robert D. Schreiber, Ph.D., 362-8747
Research on cytokine signal transduction and definition of the molecular roles of interferon-gamma, tumor necrosis factor and interleukin-10 in promoting host responses to tumors and microbial pathogens.

Andrey S. Shav, M.D., 362-6141
Signal transduction in lymphocytes. Genetic basis of renal disease.

Barry Slekman, M.D., Ph.D., 747-8235
Cellular immunology; molecular basis of T cell receptor assembly.

Carl H. Smith, M.D., 454-6029
Placental transport and surface membrane structure and function.

Steven L. Teitelbaum, M.D., 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 W. Turk, M.D., Ph.D., 362-8190
Studies focus on the role of phospholipase A (PLA) enzymes in the regulation of insulin secretion from pancreatic islet beta cells. A novel PLA, 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, its post translational modifications, and its interactions with other proteins involves 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., 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 W. Virgin IV, M.D., Ph.D., 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.
Tumor-associated nucleic acid, and gene expression of tumor tissue from patient biopsies, isolation of histo-pathological analysis and tissue microdissection breast cancer. Techniques employed will include the Student will participate in studies directed toward molecular pathology as it relates to cancer diagnosis and treatment will complement research activities.

**Faculty**

**EDWARD MALLINCKRODT**

**PROFESSOR AND HEAD OF DEPARTMENT**

Emil R. Unanue, M.D., University of Havana, 1960.

**Professors Emeriti**

Bagh Chaplin Jr., M.D., Columbia University, 1947. (See Department of Medicine.)

Paul E. Lacy, M.D., Ohio State University, 1948; Ph.D., University of Minnesota, 1955.

**Professors**

Robert L. Kroc Professor

Paul M. Allen, Ph.D., University of Michigan, 1981.

Jacques U. Baenziger, M.D., Ph.D., Washington University, 1975. (See Department of Cell Biology and Physiology.)

Marco Colonna, M.D., Parma University, 1983. (See Department of Medicine.)


Louis P. Dehner, M.D., Washington University, 1966. (See Department of Pediatrics.)

W. Michael Dunne, Ph.D., Medical College of Wisconsin, 1975. (See Department of Medicine and Department of Molecular Microbiology.)

Timothy J. Eberlin, M.D., University of Pittsburgh, 1977. (See Department of Surgery and Alvin J. Siteman Cancer Center.)

Jonathan D. Gitlin, M.D., University of Pittsburgh, 1978. (See Department of Pediatrics and Clinical Investigation Program.)

Lawrence T. Goodnough, M.D., University of Pennsylvania, 1975. (See Department of Medicine.)

Michael L. Gross, Ph.D., University of Minnesota, 1966. (See Department of Medicine.)

Peter A. Humphrey, M.D., Ph.D., University of Kansas, 1984. (See Department of Surgery.)

John M. Kissane, M.D., Washington University, 1952.

Michael Kyriakos, M.D., Albert Einstein College of Medicine, 1962.

Oree M. Carroll and Lillian B. Ladenson Professor of Clinical Chemistry

Jack H. Ladenson, Ph.D., University of Maryland, 1971. (See Department of Medicine.)

Michael L. McDaniel, Ph.D., St. Louis University, 1970.

Jeffrey D. Milbrandt, M.D., Ph.D., University of Virginia, 1983. (See Department of Medicine.)

Thalachalour Mohanakumar, Ph.D., Duke University, 1974. (See Department of Medicine and Department of Surgery.)

John C. Morris, M.D., University of Rochester, 1974. (See Department of Neurology.)

Kenneth M. Murphy, Ph.D., The Johns Hopkins University, 1982; M.D., 1984.

John W. Olney, M.D., University of Iowa, 1969. (See Department of Psychiatry.)

Mary M. Zutter, M.D., 362-0114

Division of Anatomic Pathology. We focus on the cellular and molecular analysis of the Alpha, Beta, integrin in normal epithelial and hematopoietic differentiation and in breast cancer biology. We use a number of in vitro and in vivo models of hematopoiesis and mammary gland morphogenesis.

Alan Pestronk, M.D., The Johns Hopkins University, 1970 (See Department of Neurology.)

Paul E. Lacy and Ellen Lacy Professor

Jeffrey E. Saffitz, Ph.D., Case Western Reserve University, 1977; M.D., 1978. (See Department of Medicine and Clinical Investigation Program.)

Conan Professor in Laboratory Medicine

Samuel A. Santoro, M.D., Ph.D., Vanderbilt University, 1979. (See Department of Medicine.)


Alumni Professor

Robert D. Schreiber, Ph.D., State University of New York, 1973. (See Department of Molecular Microbiology and Alvin J. Siteman Cancer Center.)

Andrey S. Shaw, M.D., Columbia University, 1984.

Carl H. Smith, M.D., Yale University, 1959. (See Department of Pediatrics.)

Wilma and Roswell Messing Professor

Steven L. Teitelbaum, M.D., Washington University, 1964.

John W. Turk, M.D., Ph.D., Washington University, 1976. (See Department of Medicine.)

Herbert W. Virgin IV, M.D., Ph.D., Harvard University, 1985. (See Department of Medicine and Department of Molecular Microbiology.)

Wayne M. Yokoyama, M.D., University of Hawaii, 1978. (See Department of Medicine.)
Mary M. Zutter, M.D., Tulane University, 1981. (See Clinical Investigation Program.)

Research Professor

Frederick P. Ross, Ph.D., University of Warwick, 1976.

Associate Professors

Andrew C. Chan, M.D., Ph.D., Washington University, 1986. (See Department of Medicine.)

Talal A. Chatilla, M.D., American University, 1984. (See Department of Pediatrics.)

Rosa Maria Davila, M.D., University of Puerto Rico, 1981.

George J. Despotis, M.D., St. Louis University, 1985. (See Department of Anesthesiology.)

John F. DiPersio, M.D., Ph.D., University of Rochester, 1980. (See Department of Medicine, Department of Pediatrics and Alvin J. Siteman Cancer Center.)

Charles S. Eby, M.D., Vanderbilt University, 1981. (See Department of Medicine.)

Samir K. El-Moffy, Ph.D., Temple University, 1975. (See Department of Otolaryngology.)

Thomas A. Ferguson, Ph.D., University of Cincinnati, 1982. (See Department of Ophthalmology and Visual Sciences.)

Phyllis C. Huettner, M.D., University of Pennsylvania, 1985; (See Department of Obstetrics and Gynecology.)

Osami Kanagawa, M.D., Okayama University, 1974; Ph.D., 1978. (See Department of Medicine.)

Helen Liapis, M.D., University of Athens, 1974.

Douglas M. Lublin, Ph.D., Stanford University, 1976; M.D., University of California, Los Angeles, 1982. (See Department of Medicine.)

Daniel W. McKeel Jr., M.D., University of Virginia, 1966.

Mitchell G. Scott, Ph.D., Washington University, 1982. (See Department of Medicine.)

Barbara A. Zehnbauer, Ph.D., The University of Chicago, 1979. (See Department of Pediatrics and Alvin J. Siteman Cancer Center.)

Research Associate Professor

Marina Cella, M.D., University of Genova, 1989.

Associate Professor (Clinical)

Steven L. Leary, D.V.M., Iowa State University, 1971. (Also Division of Comparative Medicine)

Research Associate Professor (Clinical)

Curtis A. Parvin, Ph.D., University of Minnesota, 1980. (See Department of Medicine and Division of Biostatistics.)

Assistant Professors

Robert Arch, Ph.D., University of Wurzburg, Germany, 1994. (See Department of Medicine.)

Morey A. Blinder, M.D., St. Louis University, 1981. (See Department of Medicine.)

Rainer K. Brachmann, M.D., Ludwig-Maximilians University, 1987. (See Department of Medicine.)

Alec M. Cheng, Ph.D., Washington University, 1993. (See Department of Medicine.)

Kyunghee Choi, Ph.D., University of Illinois, 1988.

Thomas G. Diacovo, M.D., McGill University, 1988. (See Department of Pediatrics.)

Larry E. Fields, M.D., Harvard University, 1980. (See Department of Medicine.)

Daved H. Fremont, Ph.D., University of California, San Diego, 1993. (See Department of Biochemistry and Molecular Biophysics.)

Timothy A. Graubert, M.D., Harvard University, 1988. (See Department of Medicine.)

Jonathan M. Green, M.D., Wayne State University, 1986. (See Department of Medicine.)

Ann M. Gronowski, Ph.D., University of Wisconsin, 1992. (See Department of Obstetrics and Gynecology.)

Anne C. Lind, M.D., Creighton University, 1989. (See Department of Medicine.)

Gerald P. Linette, M.D., Ph.D, Georgetown University, 1990. (See Department of Medicine.)

Daniel C. Link, M.D., University of Wisconsin, 1985. (See Department of Medicine.)

Danielle W. Lu, M.D., University of Medicine and Pharmacy, Romania, 1995.

Horacio M. Maluf, M.D., National University of Cordoba, Argentina, 1984.

Hector D. Molina-Vicenty, M.D., University of Puerto Rico, 1985. (See Department of Medicine.)

Andrew S. Pekosz, Ph.D., University of Pennsylvania, 1996. (See Department of Molecular Microbiology.)

Arie Perry, M.D., University of Texas, 1990.


Barry P. Sleckman, M.D., Ph.D., Harvard University, 1989.

Wojciech A. Swat, Ph.D., Polish Academy of Sciences, 1992.


Mark A. Watson, M.D., Ph.D., Washington University, 1992. (See Alvin J. Siteman Cancer Center and Clinical Investigation Program.)

Katherine N. Weilbaecher, M.D., Stanford University, 1992. (See Department of Medicine.)

Frances V. White, M.D., University of North Carolina, 1976.


Research Assistant Professors

Toshiyuki Araki, M.D., Osaka University, 1989; Ph.D., 1993.
Theresa L. Murphy, Ph.D.,
The Johns Hopkins University, 1983.
Kathleen C. Sheehan, Ph.D.,
St. Louis University, 1986.

Research Assistant
Professor (Adjunct)
Terry Woodford-Thomas, Ph.D.,
Virginia Polytech, 1982.

Instructors
W. Richard Burack, Ph.D.,
University of Virginia, 1994; M.D., 1995.
S. Kent Dickeson, Ph.D.,
University of Kansas, 1991.
Deborah J. Novack, M.D., Ph.D.,
Washington University, 1995.
Karen R. Pinto, M.D.,
GOA Medical College, India, 1986.
Saha Sadeghi, M.D.,
University of Chicago, 1995.
Lourdes R. Ylagan, M.D.,
Ohio State University, 1993.

Research Instructors
Dorothy J. Fiete, B.S.,
Marymount College, 1966.

Susan Gilfillan, Ph.D.,
Stanford University, 1990.
Guim Kwon, Ph.D.,
University of Michigan, 1992.
Yvonne Landt, M.S.,
University of Illinois, 1972.
Christopher A. Nelson, Ph.D.,
Washington University, 1995.

Lecturer
Morton E. Smith, M.D.,
University of Maryland, 1960.
(See Department of Ophthalmology
and Visual Sciences.)
EDWARD MALLINCKRODT 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.

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 Christian Northwest 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 PEDIATRICS SUBINTERNSHIP — ST. LOUIS CHILDREN'S HOSPITAL
Instructors: Kathleen A. McGann, M.D.; Angela M. Sharkey, M.D.; Alan L. Schwartz, M.D., Ph.D.; James P. Keating, M.D., 454-6299

This is the general pediatric subinternship. 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 intern and is expected to take call every fourth night. Students work directly under the supervision of the senior resident, and 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.
The teaching activities emphasize the understanding of the pathophysiology of disease in 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. **Valid start weeks for 4-week blocks are:** Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

**M6S 808 PEDIATRIC ASTHMA AND ALLERGY**

Instructor: Leonard B. Baccharier, M.D.; Robert C. Strauk, M.D., 454-2694

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. **Valid start weeks for 4-week blocks are:** Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

**M6S 810 PEDIATRIC CRITICAL CARE MEDICINE**

Instructor: Julio Pérez Fontán, M.D., 454-2527

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, cardiovascular 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. **Valid start weeks for 4-week blocks are:** Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

**M6S 813 PEDIATRIC CARDIAC CATHETERIZATION**

Instructors: David T. Balzer, M.D.; Russel Hirsch, M.D., 454-6095

Election will focus on interpretation of hemodynamic and angiographic data acquired in the cardiac catheterization laboratory. **Valid start weeks for 4-week blocks are:** Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

**M6S 818 PEDIATRIC CARDIOLOGY — INPATIENT SERVICE**


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. **Valid start weeks for 4-week blocks are:** Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

**M6S 819 PEDIATRIC CARDIOLOGY — OUTPATIENT SERVICE**


Students will independently evaluate outpatients referred for evaluation of cardiac murmurs, chest pain and 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 ECGs, Holter monitors and echocardiograms performed. Participation in weekly surgical conference and journal club is expected. **Valid start weeks for 4-week blocks are:** Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

**M6S 825 CLINICAL GENETICS**

Instructor: Rick A. Martin, M.D., 454-6093

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. **Valid start weeks for 4-week blocks are:** Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

**M6S 827 SUBINTERNSHIP IN PEDIATRIC HEMATOLOGY/ONCOLOGY**

Instructor: David B. Wilson, M.D., Ph.D., 454-2717

Students will assume the responsibilities of a pediatric resident on the inpatient Hematology/Oncology service at St. Louis Children’s Hospital. **Valid start weeks for 4-week blocks are:** Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.
M65 833 SPECIAL TOPICS IN REPRODUCTIVE HEALTH
Instructor: F. Sessions Cole, M.D. 454-6148
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. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M65 835 PEDIATRIC IMMUNOLOGY AND RHEUMATOLOGY
Instructors: Jonathan D. Gitlin, M.D.; Talal A. Chatlla, M.D.; Maite de la Morena, M.D.; Andrew J. White, M.D.; Calvin B. Williams, M.D., Ph.D.
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 St. Louis Children's Hospital and Shriners Hospital clinics. Students may elect to participate in conferences and seminars. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M65 840 PEDIATRIC INFECTIOUS DISEASES
Instructors: Joseph W. Storch, M.D.; Gregory A. Storch, M.D.; Kathleen A. McGann, M.D.; David B. Hastam, M.D.; Alexis M. Elward, M.D., 454-6050
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 lab, and teaching rounds with the infectious disease attending. Formal teaching sessions include a weekly pediatric infectious disease case conference, a weekly joint clinical conference with the adult infectious disease group, a weekly pediatric infectious disease research conference and a monthly journal club. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M65 841 CARE OF THE HIV-INFECTED PATIENT
Instructors: Kathleen A. McGann, M.D., 454-6050; Victoria Fraser, M.D.; Linda M. Mundy, M.D.; Gregory A. Storch, M.D.; Judith Aberg, M.D.; staff
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 of care, but also the psychosocial aspects. The elective will involve rotation through several clinics including the maternal-child 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, TB clinic and the STD clinic). Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M65 845 PEDIATRIC EMERGENCY MEDICINE
Instructor: David M. Jaffe, M.D., 454-2341
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, rash, 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. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M65 850 PEDIATRIC ENDOCRINOLOGY AND METABOLISM
Instructors: Neil H. White, M.D.; Abby J. Hollander, M.D.; Bess A. Marshall, M.D.; Louis J. Muglia, M.D., Ph.D.; Rebecca Green, M.D., Ph.D.; Paul Hruz, M.D., Ph.D.; Kathleen E. Betbin, M.D., Ph.D., 286-1157
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 Metabolism Division (clinical rounds, journal club/research seminar, case conference) are held weekly. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M65 851 CLINICAL PEDIATRIC GI ELECTIVE
Instructor: Mark E. Lowe, M.D., Ph.D., 286-2857
The rotation in pediatric gastroenterology, hepatology, and nutrition provides broad exposure to specialized and common pediatric problems.
Gastroenterology patients are seen both in the outpatient suites and in the hospital. Students will see outpatients with common pediatric complaints like chronic abdominal pain, constipation and poor growth, which are frequently encountered in a general pediatrics practice. Additionally, students will experience the ongoing outpatient care of patients with chronic liver disease, inflammatory bowel disease, short-gut syndrome, celiac disease and a variety of 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 can participate in diagnostic and therapeutic endoscopic procedures. Weekly divisional conferences review pathology slides from current cases and discuss difficult patient problems and topics of interest, presented by fellows and attendings. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M65 852 CLINICAL PEDIATRIC PULMONARY MEDICINE

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, etc. 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 presentation skills. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M65 861 NEWBORN MEDICINE
Instructor: F. Sessions Cole, M.D., 454-6148

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 extraterrestrial 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 be assigned to the Special Care Nursery at St. Louis Children’s Hospital and to the labor and delivery services at Barnes-Jewish Hospital. Students assigned to the St. Louis Children’s Hospital Special Care Nursery 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. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M65 875 PEDIATRIC RENAL DISEASE
Instructors: Keith A. Hruska, M.D.; Anne M. Beck, M.D.; S. Paul Hmiel, M.D., Ph.D., 454-6043

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. The student will be required to present one or two in-depth reviews of areas of interest. Opportunities in clinical and translational research projects will be discussed with interested students. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M65 876 PEDIATRIC LUNG TRANSPLANTATION
Instructors: Stuart C. Sweet, M.D.; Maite de la Morena, M.D., 454-2694

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. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M65 878 CLERKSHIP IN RURAL PRIMARY CARE PEDIATRICS
Instructors: Angela M. Sharkey, M.D.; Kathleen A. McGann, M.D.
The clerkship in rural primary care pediatrics is designed to provide the student with firsthand 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. Valid start weeks for 2-week blocks are: Weeks 1, 5, 9, 13, 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.

M25 831 PEDIATRIC DERMATOLOGY
Instructor: Susan B. Mallory, M.D., 454-2714
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 the instructor before the course. Students can take either this elective or M25 830 — not both. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33 and 37.

M80 870 CLERKSHIP IN PRIMARY CARE IN GENERAL PEDIATRICS
Instructors: Paul S. Simons, M.D.; Jay Epstein, M.D., 535-7855
The Clerkship in Primary Care in General Pediatrics is designed to provide the student with firsthand 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 behaviorally developmentally 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 typically broad-based population receiving care through different insurance systems. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

Research (M65 900)
Charles E. Canter, M.D., 454-6095
Clinical studies on cardiac transplantation in infants and children.

F. Sessions Cole, M.D., 454-6148
Using population-based databases, investigation of particular interest is the genetic and evolution of proteinosis. 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
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., 454-4118
Leveraged investigation is focused on the role of T lymphocytes in immune tolerance during viral and bacterial infection. Clinical research interests are in the area of BMT.

Paul Hruz, M.D., Ph.D., 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., 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., 454-6018
Investigative efforts are focused on clinical coagulation and sickle cell disease.

Virginia L. Miller, Ph.D., 286-2891
Molecular basis of the pathogenesis of the enteric pathogens Yersinia enterocolitica and Salmonella typhimurium.

Louis J. Mugiya, M.D., Ph.D., 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.

William C. Parks, Ph.D., 286-2862
Research is focused on regulation of matrix and proteinase production as well as biological functions of proteinases.

J. Julio Pérez Fontán, M.D., 454-2527
Airway nerves and inflammation. Biology of the airway intrinsic neuronal network and its role in airway neurogenic inflammation.

Scott Saunders, M.D., Ph.D., 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 interest 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., 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., 454-6018
Investigation of immunologic basis of graft versus host disease.

Carl H. Smith, M.D., 454-6018
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. Molecular techniques are used when appropriate to understand transporter structure, function and interrelationships. Current investigations include: 1) the characterization of cationic amino acid transport systems of the maternal- and fetal-facing membranes: investigation of function, and cellular localization; 2) the cloning of cDNAs for placental membrane transporters; and 3) their expression in model systems for comparison with transport in membrane isolated directly from placenta.

Joseph W. St. Geme, M.D., 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. Butler, Ph.D.; staff, 454-6079
Rapid diagnosis of viral and other unconventional infections. The Molecular Diagnostics Section of 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 antiviral agents. Current projects include: 1) the detection of herpes viruses and BK Virus in the blood of organ transplant recipients; 2) the development of new assays for the detection of central nervous system pathogens; 3) the detection of vector-borne agents in blood; and 4) the detection of respiratory pathogens. 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., 454-2694
Clinical studies of patients with asthma aimed at understanding the mechanisms of death due to asthma in children.

Stuart C. Sweet, M.D., Ph.D., 454-2694
Research involves using transgenic mouse models to investigate the mechanisms of acute rejection and chronic graft dysfunction in lung allografts.

Faculty

THE HARRIET B. SPOEHRER PROFESSOR AND HEAD OF DEPARTMENT

Alan L. Schwartz, Ph.D., Case Western Reserve University, 1974; M.D., 1976. (See Department of Molecular Biology and Pharmacology.)

Professors Emeriti

Alexis F. Hartmann Jr., M.D., Washington University, 1951.
John C. Herweg, M.D., Washington University, 1945.
Lawrence L. Kahn, M.D., Louisiana State University, 1945.
Penelope G. Shackelford, M.D., Washington University, 1968. (See Department of Molecular Microbiology.)
Jesse L. Ternberg, Ph.D., University of Texas, 1950; M.D., Washington University, 1953; Sc.D. (hon.), Grinnell College, 1972. (See Department of Surgery.)
Jean H. Thurston, M.D., University of Alberta, 1941. (See Departments of Neurology and Neurological Surgery.)
Teresa J. Vielli, M.D., Baylor University, 1953. (See Department of Radiology.)

Professor Emeritus and Lecturer

Philip R. Dodge, M.D., University of Rochester, 1948. (See Departments of Neurology and Neurological Surgery.)

Professors

Anne M. Bowcock, Ph.D., University of Witwatersrand, 1984. (See Department of Genetics, Department of Medicine and Clinical Investigation Program.)
Aharon J. Ciechanover, M.D., Hebrew W. Israel, 1973; Ph.D., Technion Faculty Medical, Israel, 1987.
Park J. White M.D. Professor of Pediatrics
F. Sessions Cole, M.D., Yale University, 1973. (See Department of Cell Biology and Physiology and Clinical Investigation Program.)
Louis P. Dehner, M.D., Washington University, 1966. (See Department of Pathology.)
W. Edwin Dodson, M.D., Duke University, 1967. (See Department of Neurology and Neurosurgical Surgery.)
Edwin B. Fisher, Ph.D., State University of New York, 1972. (See Department of Medicine, Alvin J. Siteman Cancer Center and Clinical Investigation Program.) (Also Department of Psychology)
Helene B. Roberson Professor of Pediatrics
Jonathan D. Gitlin, M.D., University of Pittsburgh, 1978. (See Department of Pathology and Immunology and Clinical Investigation Program.)
Aaron Hamvas, M.D., Washington University, 1981.
Keith A. Hruska, M.D., Creighton University, 1969. (See Department of Cell Biology and Physiology and Department of Medicine.)

Dana Brown/St. Louis Children's Hospital Professor of Pediatrics
W. McKim Marriott, M.D./St. Louis Children's Hospital Professor of Pediatrics
James P. Keating, M.D., Harvard University, 1963.
Daniel P. Kelly, M.D., University of Illinois, 1982. (See Department of Medicine and Department of Molecular Biology and Pharmacology.)
Michael L. Landt, Ph.D., University of Oregon, 1976. (Laboratory Medicine) (See Department of Pathology.)
Michael Lovett, Ph.D., University of London, 1982 (See Department of Genetics.)
Rodney P. Lusk, M.D., University of Missouri, 1977. (See Department of Otolaryngology.)
Susan B. Mallory, M.D., University of Texas, 1974. (See Department of Medicine.)
Appoline Blair/St. Louis Children's Hospital Professor of Surgery
Jeffrey L. Marsh, M.D., The Johns Hopkins University, 1970. (See Department of Surgery.)
William H. McAllister, M.D., Wayne State University, 1954. (See Department of Radiology.)
Robert P. Mecham, Ph.D., Boston University, 1976. (See Department of Cell Biology and Physiology, Department of Medicine and Department of Biomedical Engineering.)
Donald Strominger Professor of Pediatrics
Robert C. Strunk, M.D., Northwestern University, 1968. (See Clinical Investigation Program.)
Bradley T. Thach, M.D., Washington University, 1968.
Lawrence Tychsen, M.D., Georgetown University, 1979. (See Department of Anatomy and Neurobiology and Department of Ophthalmology and Visual Sciences.)
Neil H. White, M.D., Albert Einstein College of Medicine, 1975. (See Clinical Investigation Program.)
Michael P. Whyte, M.D., State University of New York, Downstate, 1972. (See Department of Medicine.)

Professors Emeriti (Clinical)
Maurice J. Lonsway, M.D., Washington University, 1950.
Helen E. Nash, M.D., Meharry Medical College, 1945.

Professors (Clinical)
Mohamad T. Amjad, M.D., University of Teheran, 1961.
C. Read Boles, M.D., Washington University, 1943.
James M. Corry, M.D., Washington University, 1974.
Elliot F. Gellman, M.D., University of Missouri, 1961.
Maurice J. Keller, M.D., Columbia University, 1940.
Kevin J. Murphy, M.D., St. Louis University, 1978.
Homer E. Nash Jr., M.D., Meharry Medical College, 1951.
Frederick D. Peterson, M.D., Washington University, 1957.
Steven J. Plax, M.D., University of Missouri, 1961.
George Sato, M.D., Washington University, 1947.
Warren G. Sherman, M.D., Tulane University, 1969.
Mary A.T. Tillman, M.D., Howard University, 1960.

Professor (Adjunct)
Steven D. Shapiro, M.D., The University of Chicago, 1983. (See Department of Cell Biology and Physiology, Department of Medicine and Clinical Investigation Program.)
Michael S. Watson, Ph.D., University of Alabama, 1981.

Associate Professor Emeritus
James K. Turner, M.D., Washington University, 1953.

Associate Professors
Guoju Bu, Ph.D., Virginia Polytechnic Institute, 1990. (See Department of Cell Biology and Physiology.)
Charles E. Canter, M.D., St. Louis University, 1979.
Talal A. Chatila, M.D., American University, 1984. (See Department of Pathology and Immunology.)
Randall A. Clary, M.D., University of Illinois, 1984. (See Department of Otolaryngology.)
Jeffrey G. Dawson, M.D., University of Louisville, 1982.
John F. DiPersio, M.D., Ph.D., University of Rochester, 1980. (See Department of Medicine, Department of Pathology and Immunology and Alvin J. Siteman Cancer Center.)
Anthony G. Durnowicz, M.D., University of Maryland, Baltimore, 1983.
Thomas W. Fer kol Jr., M.D., Ohio State University, 1985. (See Department of Cell Biology and Physiology.)
Robert P. Foglia, M.D., Georgetown University, 1974. (See Department of Surgery.)
Dorothy K. Grange, M.D., University of Florida, Gainesville, 1981.
David H. Gutmann, Ph.D., University of Michigan, 1984; M.D., 1986. (See Departments of Neurology and Neurological Surgery.)
Brian P. Hackett, Ph.D.,
Boston University, 1984; M.D., 1986. (See Clinical Investigation Program.)
Gary E. Hirschberg, M.D.,
Hahnemann Medical College, 1972. (See Department of Anesthesiology.)
Dee Hodge III, M.D.,
Abby L. Hollander, M.D.,
University of Cincinnati, 1986.
Robert M. Kennedy, M.D.,
Medical College of Georgia, 1980.
Benjamin C.P. Lee, M.B.B.S.,
University of London, 1966. (See Department of Radiology.)
Mark E. Lowe, M.D.,
University of Miami, 1984.
Jeffrey A. Lowell, M.D.,
Yale University, 1985. (See Department of Surgery.)
Mark J. Manary, M.D.,
Washington University, 1982.
Barry P. Markovitz, M.D.,
University of Pennsylvania, 1983. (See Department of Anesthesiology.)
R. Martin, M.D.,
John D. McAllister, M.D.,
University of Manitoba, 1980. (See Department of Anesthesiology.)
Kathleen A. McGann, M.D.,
Louis J. Mugiia, Ph.D.,
The University of Chicago, 1986; M.D., 1988. (See Department of Molecular Biology and Pharmacology and Clinical Investigation Program.)
Jeffrey J. Neil, M.D., Ph.D.,
Washington University, 1984. (See Department of Neurology and Clinical Investigation Program.)
Michael J. Noetzel, M.D.,
University of Virginia, 1977. (See Departments of Neurology and Neurological Surgery.)
Joan L. Rosenbaum, M.D.,
University of Texas, 1983.
Angela M. Sharkey, M.D.,
St. Louis University, 1986.
Karin Shepherd, M.B.B.S.,
University of Queensland, 1970.
Paul S. Simons, M.D.,
Washington University, 1967.
Edwin Trevathan III, M.D.,
Emory University, 1982. (See Department of Neurology.)
Alison J. Whelan, M.D.,
Washington University, 1986. (See Department of Medicine and Alvin J. Siteman Cancer Center.)
Lynn K. White, M.D.,
Harvard Medical School, 1984.
David B. Wilson, M.D., Ph.D.,
Washington University, 1986. (See Department of Molecular Biology and Pharmacology and Clinical Investigation Program.)
Jane Y. Wu, M.D.,
Shanghai Medical University, 1986; Ph.D., Stanford Medical College, 1991. (See Department of Molecular Biology and Pharmacology.)
Barbara A. Zehnbauer, Ph.D.,
The University of Chicago, 1979. (See Department of Pathology and Immunology and Alvin J. Siteman Cancer Center.)

Associate Professors Emeriti (Clinical)
Helen M. Aff-Drum, M.D.,
Washington University, 1934.
Stanley L. Harrison, M.D.,
Washington University, 1930.
Sol Londe, M.D.,
Washington University, 1927.
Frank S. Wissmath, M.D.,
Washington University, 1943.

Associate Professors (Clinical)
Walter F. Benoist, M.D.,
Washington University, 1972.
Garrett C. Burris, M.D.,
University of Virginia, 1968. (See Departments of Neurology and Neurological Surgery.)
Charles H. Dougherty, M.D.,
Jay S. Epstein, M.D.,
Emory University, 1983.
James A. Gerst, M.D.,
University of Missouri, 1972.
Marshall B. Greenman, M.D.,
University of Illinois, 1948.
Robert J. Hoffman, M.D.,
St. Louis University, 1976.
Nancy E. Holmes, M.D.,
University of Missouri, 1976.
Shirley M. Knight, M.D.,
Washington University, 1980.
Joel S. Koenig, M.D.,
Vanderbilt University, 1982.
Kenneth A. Koerner, M.D.,
Washington University, 1941.
Katherine L. Kreussler, M.D.,
Indiana University, 1978.
Norton S. Kronemer, M.D.,
University of Missouri, 1962.
Jack A. Land Jr., M.D.,
University of Mississippi, 1977.
Richard L. Lazaroff, M.D.,
St. Louis University, 1978.
John C. Martz, M.D.,
Washington University, 1942.
Thomas C. McKinney, M.D.,
Washington University, 1980.
Alison C. Nash, M.D.,
Baylor College of Medicine, 1981.
James R. Rohrbaugh, M.D.,
Ohio State University, 1970. (See Departments of Neurology and Neurological Surgery.)
William J. Ross, M.D.,
Washington University, 1972.
Blaine M. Sayre, M.D.,
Washington University, 1968.
Patricia B. Wolff, M.D.,
University of Minnesota, 1972.
Gerald Wool, M.D.,
Washington University, 1962.

Assistant Professors
Max Q. Arens, Ph.D.,
Virginia Polytechnic Institute, 1971.
Leonard B. Bacharier, M.D.,
Washington University, 1992. (See Department of Medicine and Clinical Investigation Program.)
David T. Balzer, M.D.,
St. Louis University, 1985.
Anne M. Beck, M.D.,
Douglas W. Carlson, M.D.,
Anne M. Connolly, M.D.,
Southern Illinois University, 1984.
Joan A. Hirt, M.D.,
University of Pennsylvania, 1980.
Jane E. Kwasnicki, M.D.,
University of Wisconsin, 1980.
Jain, M.D.,
La Patisserie, 1980.
Katherine L. Kreussen, M.D.,
University of Minnesota, 1976.
John N. Constantino, M.D.,
Washington University, 1988. (See Department of Psychiatry.)
Research Assistant Professor

Carol L. Wilson, Ph.D.,
Princeton University, 1992.

Assistant Professors Emeriti (Clinical)

Martin Calodney, M.D.,
New York University, 1936.
Samuel W. Golub, M.D.,
Washington University, 1941.
Alfred S. Schwartz, M.D.,
The Johns Hopkins University, 1936.

Assistant Professors (Clinical)

William S. Adams, M.D.,
University of Missouri, Columbia, 1989.
Denis I. Altman, M.B., B.Ch.,
University of The Witwatersrand, 1975. (See Departments of Neurology and Neurological Surgery.)
Patricia J. Amato, M.D.,
Medical College of Ohio, 1982.
Jill M. Baer, M.D.,
University of Kentucky, 1975.
Angela L. Bard, M.D.,
Indiana University, Indianapolis, 1981.
Edward T. Barker, M.D.,
Washington University, 1957.
Susan L. Baumer, M.D.,
Earl C. Becks Jr., M.D.,
University of Missouri, 1981.
Jean E. Birmingham, M.D.,
University of Missouri, 1988.
Huldah C. Blamovich, M.D.,
 Meharry Medical College, 1965.
Yolette V. Brown, M.D.,
Washington University, 1982.
Max H. Burgdorf, M.D.,
Washington University, 1974.
David J. Callahan, M.D.,
Washington University, 1986. (See Department of Neurology.)
Tattamangalam P. Chandrika,
Michael E. Danter, M.D.,
John C. Davis, M.D.,
University of Michigan, 1980.
Ray S. Davis, M.D.,
University of Louisville, 1978.
Tulay Dincer, M.D., Hacettepe University, 1977.
Elliott H. Farberman, M.D., St. Louis University, 1973.
Ira J. Friedman, M.D., University of Arkansas, 1960.
John P. Galgani Jr., M.D., St. Louis University, 1982.
Joseph K. Goldenberg, M.D., University of Missouri, 1980.
J. Larry Harwell, M.D., University of Missouri, 1977.
Barry Light, Ph.D., University of Missouri, 1980.
Joseph A. Kahn, M.D., University of Missouri, 1977.
Michele E. Kemp, M.D., Washington University, 1981.
Henry L. Knock, M.D., The Johns Hopkins University, 1953.
Barry Light, Ph.D., University of Missouri, 1977; M.D., 1980.
John F. Mantovani, M.D., University of Missouri, 1974.
M. Michael Maurer Jr., M.D., Washington University, 1972.
Ariane E. May, M.D., University of Medicine and Dentistry, New Jersey, 1987.
Susan Pittman, M.D., University of Missouri, 1963.
Juanita C. Pollio-Colvin, M.D., Northwestern University, 1979.
Isabel L. Rosenblom, M.D., University of Maryland, 1984.
Martin D. Rudloff, M.D., Washington University, 1981.
Margaret A. Schmandt, M.D., St. Louis University, 1987.
C. Jeffrey Sippel, Ph.D., St. Louis University, 1980; M.D., 1983.
Harold B. Sitrin, M.D., St. Louis University, 1971.
M. Anne Street, M.D., University of Illinois, 1976.
Marc E. Weber, M.D., University of Tennessee, 1974.
George T. Wilkins Jr., M.D., University of Illinois, 1957.
Kathie R. Wuegner, M.D., St. Louis University, 1978.

Instructors
Jae-Koo (Jack) An, M.D., University of Texas, Southwestern, Dallas, 1996.
Sanjay Aurora, M.B.B.S., Jawhalar Institute of Postgraduate Medical Education and Research, 1986.
Leigh Ann Berry, Ph.D., University of Virginia, 1993.
Kathleen E. Bethin, M.D., Ph.D., SUNY-Buffalo School of Medicine, 1995.
Janice E. Brunstrom, M.D., Medical College of Virginia, 1987.
David F. Crawford, M.D., Ph.D., University of Texas, Southwestern, 1994.
Elizabeth L. Durmowicz, M.D., University of Cincinnati, 1989.
Alexis M. Elward, M.D., University of Maryland, 1994.
Kathleen M. Fentzke, M.D., University of Chicago, Pritzker, 1997.
Rebecca Green, M.D., Ph.D., Washington University, 1993.
Michael R. Harris, Ph.D., St. Louis University, 1981; M.D., 1991.
Jacqueline Hoffman, M.D., Harvard University, 1979; Ph.D., Washington University, 1994.
Jackie Holder, D.O., Oklahoma State University College of Osteopathic Medicine, 1986.
Mark A. Hostetler, M.D., Northwestern University, 1988.
Paul Hruz, Ph.D., Medical College of Wisconsin, 1993; M.D., 1994.
(Dental Medicine) (See Department of Radiology.)
Christina L. Ingram, M.D., Harvard University, 1992.
Joseph Lesnik, M.D., University of Iowa, Iowa City, 1998.
Anna S. Lijowska, M.D., Jagiellonian University, Krakow, Poland, 1988.
Alicia Lynn, M.D., University of Missouri, Columbia, 1996.
Brian J. Kelly, M.B., Ch.B., University of Cape Town, 1972.
Kathryn L. Plosh, M.D., Washington University School of Medicine, 1999.
Deborah L. Lerner, M.D., Harvard University, 1992.
Joseph Lesnik, M.D., University of Iowa, Iowa City, 1998.
Anna S. Lijowska, M.D., Jagiellonian University, Krakow, Poland, 1988.
Alicia Lynn, M.D., University of Missouri, Columbia, 1996.
Michelle McManus, M.D., University of Texas, San Antonio, 1998.
Avinash Purohit, M.D., Dr. N.S. Medical College, Jodhpur, Rajasthan, 1979.
Mary E. Pylipow, M.D., Creighton University, 1984.
Robert J. Bradshaw, M.D., St. Louis University, 1980.
Seth J. Brownridge, M.D., Washington University, 1982.
John R. Carlile, M.D., University of Kansas, 1975.
Rubininda Casino, M.D., University of Santo Tomas, 1979.
Donald V. Dicshen, M.D., University of Nebraska, 1964.
Ala Dorfman, M.D., Chernovtsy State Medical School, 1986.
Diane M. Eschmann, M.D., University of Missouri, 1993.
Laura A. Esswein, M.D., University of Missouri, 1991.
Anna M. Fitz-James, M.D., George Washington University, 1981.
Edward B. Fliesher, M.D., St. Louis University, 1978.
Myrto Frangos, M.D., St. Louis University, 1985.
Maurice J. Gabriel, M.D., University of DeSevilla, Spain, 1970.
Alice B. Granoff, M.D., University of Texas, Southwestern, 1965.
Roman E. Hammes, M.D., University of Iowa, 1954.
Melanie G. Hampton, M.D., University of Kentucky, Louisville, 1981.
Ellinor F. Hancock, M.D., Meharry Medical College, Nashville, 1982.
Suzanne M. Hanson, M.D., Northwestern University, 1993.
Mary Ann Hollman, M.D., University of Alabama, Birmingham, 1988.
J. Joseph Horan, M.D., St. Louis University, 1971.
Denise K. Ihnat, M.D., Yale University, 1991.
Carl S. Ingber, M.D., Boston University, 1972.
Joyce D. Johnson, M.D., Case Western Reserve University, 1982.
Sheldon Kessler, M.D., St. Louis University, 1951.
Katherine L. Komendowski, M.D., Uniformed Services University, 1984.
Jennifer S. Ladage, M.D., St. Louis University, 1991.
Stacie S. Laff, M.D., Rush Medical College, 1993.
Leland M. Laycob, M.D., University of Missouri, 1968.
Robert D. Lins, M.D., University of Missouri, 1969.
Suzanne L. Miller, M.D., University of Illinois, 1978.
Mary R. Morgan, M.D., Washington University, 1990.
David A. Nile, M.D., St. Louis University, 1981.
Jerome H. O'Neil Jr., M.D., St. Louis University, 1981.
Eugenia M. Pierce, M.D., St. Louis University, 1958.
Daniel S. Plax, M.D., Washington University, 1993.
Emanuel Rashed, M.D., St. Louis University, 1962.
Sheryl S. Ream, M.D., St. Louis University, 1986.
Vernon J. Roden, M.D., St. Louis University, 1971.
Ella Rozin, M.D., Minsk State Medical School, 1980.
Christina M. Ruby, M.D., Northwestern University, 1994.
Diane M. Rup, M.D., Case Western Reserve University, 1986.
Joseph Schachter, M.D., Indiana University, 1979.
Howard J. Schlansky, M.D., University of Missouri, Kansas City, 1978.
Seymour M. Schlansky, M.D., Chicago Medical School, 1950.
Martin P. Schmidt, M.D., St. Louis University, 1986.

Jacquelyn C. Schnidman, M.D., St. Louis University, 1979.
Eleanor M. Shaw, M.D., University of Missouri, 1983.
Nareshkumar Solanki, B.M., B.S., University of Nairobi, 1975.
Robert D. Spewak, M.D., St. Louis University, 1979.
Craig A. Spiegel, M.D., Case Western Reserve University, 1982.
Norman P. Steele, M.D., Indiana University, 1972.

Sharon D. Vermont, M.D., University of Missouri, Kansas City, 1993.
Roger J. Waxelman, M.D., University of Missouri, 1969.
Don Weiss, M.D., University of Medicine and Dentistry of New Jersey, 1986.
Mona Yassin, M.D., Al-Azhan University Faculty of Medicine, 1979.
Cecilia H. Yu, M.D., University of Texas, Southwestern, 1992.

Sharon D. Vermont, M.D., University of Missouri, Kansas City, 1993.
Roger J. Waxelman, M.D., University of Missouri, 1969.
Don Weiss, M.D., University of Medicine and Dentistry of New Jersey, 1986.
Mona Yassin, M.D., Al-Azhan University Faculty of Medicine, 1979.
Cecilia H. Yu, M.D., University of Texas, Southwestern, 1992.
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.

SECOND YEAR

M85 676A DISEASES OF THE NERVOUS SYSTEM: PSYCHIATRY
Instructor: Laura J. Bierut, M.D., 362-3492
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., 747-2013
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/Education/Med%20student/wums3info.htm for current details or to review the goals of the clerkship.

M85 775 AMBULATORY CLERKSHIP: PSYCHIATRY FOR GENERALISTS
Instructor: Kevin J. Black, M.D., 747-2013
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, or child psychiatry clinic. As of this writing, there is no night call at any site. See www.nil.wustl.edu/labs/kevin/psy/options.htm for further details.

FOURTH YEAR

Electives

M85 805 PSYCHIATRY CONSULT SERVICE
Instructor: Carol S. North, M.D., 747-2013
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. The student will attend weekly consult/liaison teaching conferences, as well as Grand Rounds and Research Rounds. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M85 810 OUTPATIENT COMMUNITY PSYCHIATRY
Instructor: Theodore Reich, M.D., 362-2149
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, such as are 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. Valid start weeks for 4-week blocks are: Weeks 13 and 17.

M85 831 ELECTROCONVULSIVE THERAPY (ECT)
Instructors: Keith E. Isenberg, M.D.; ECT staff, 362-1819
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. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.
M85 836 CLINICAL PSYCHIATRY — INPATIENT PSYCHIATRIC SERVICE
Instructor: Eugene H. Rubin, M.D., Ph.D., 362-2462
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. **Valid start weeks for 4-week blocks are:** Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M85 840 CHILD PSYCHIATRY
Instructor: Gary Boxer, M.D., 286-1740
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. **Valid start weeks for 4-week blocks are:** Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M85 850 SUBSTANCE ABUSE
Instructor: Wilson M. Compton III, M.D., 286-2261, compton@epi.wustl.edu
The rotation gives the student the opportunity to learn about formal day or evening group treatment of alcohol and licit and illicit drug abuse. Students will be expected to become familiar with the theoretical basis of relapse prevention therapy, the conduct of therapy groups and the medical complications of substance abuse. Will not be scheduled at PIT at the coursemaster's request. Students must speak to instructor prior to scheduling this course. **Valid start weeks for 4-week blocks are:** (coursemaster approval required.)

Research (M85 900)

Andrey Anokhin, Ph.D., 286-2201, anokhin@matlock.wustl.edu
Neuropsychopharmacology of alcohol and tobacco: experimental studies in humans. This research elective is intended for students interested in biological psychology, psychophysiology, psychopharmacology of drugs of abuse and behavior genetics. Anokhin is conducting experimental studies with human volunteers in order to better understand biobehavioral mechanisms underlying nicotine and alcohol addiction. One of the studies 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. Another study investigates long-term effects of alcohol on brain function and cognitive performance using data from MZ twins differing in their experience with alcohol. Interested students will be able to learn a variety of methods used in these studies including quantitative imaging of brain activation and hemispheric asymmetry; event-related brain potentials (ERPs) elicited in cognitive tasks; 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 certain amount of time per week and work on schedule (can be negotiated on an individual basis), PC experience, willingness to obtain training and certification in informed consent procedures.

Laura J. Bierut, M.D., 362-3492
This research elective will focus on analyzing data from a high-risk study of alcoholism. Alcohol-dependent individuals were recruited from chemical dependency treatment centers and their first-degree 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 and depression. **Kevin J. Black, M.D., 747-2013**
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.wusd.edu/labs/kevin](http://www.nil.wusd.edu/labs/kevin) for examples of past research.

Robert J. Cormier, Ph.D., 362-8658
Neuron-Astrocyte Interaction. Astrocytes are integral components of brain function. In addition to their critical role in metabolic support for neurons, astrocytes play a critical role in the regulation of neuronal function. Astrocytes may participate in information processing through cytoplasmic Ca++ elevations, which are triggered by synaptic transmission, transport as waves across and among astrocytes, and may be transmitted by neurons. The student will be introduced to methods for studying the physiology and bi-directional communication between neurons and astrocytes. These methods include fluorescent imaging of Ca++ and electrophysiology.

Linda B. Cottler, Ph.D., 286-2252
There are several NIH-funded projects pertaining to many broad areas of research: 1) studies to prevent HIV high-risk behaviors in women who use drugs or...
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 S. North, M.D., 747-2013
The student will work closely with 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 somatiform disorders. Potential activities include subject interviews, editing, data entry, data analysis, literature reviews and writing papers for publication.

Rumi K. Price, Ph.D., 286-2282
The student will work closely with 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 study of gene-environment interaction using ethnic-specific substance sensitivity genes; application of computer-intensive but highly flexible techniques such as neural-network models, genetic algorithms to large-scale epidemiologic studies.

Yvette I. Sheline, M.D., 362-8422
Two-month minimum. Opportunity for students with computer programming skills to work closely with Sheline in a neuroimaging project 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.

NOTE TO STUDENTS: There are always a number of research projects in the Department of Psychiatry. For additional information contact Eugene H. Rubin, Ph.D., 362-2462.

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.
Faculty

Department of Psychiatry

SAMUEL B. GUZE PROFESSOR AND CHAIR OF DEPARTMENT
Charles F. Zurumski, M.D., St. Louis University, 1978. (See Department of Anatomy and Neurobiology.)

Professors Emeriti

Blake W. Moore, Ph.D., Northwestern University, 1952. (Biochemistry)

George E. Murphy, M.D., Washington University, 1952.

Lee N. Robins, Ph.D., Radcliffe College, 1951. (Sociology) (Also Faculty of Arts and Sciences)

Saul Rosenzweig, Ph.D., Harvard University, 1932. (Medical Psychology) (Also Department of Psychology)

William R. Sherman, Ph.D., University of Illinois, 1955. (Biochemistry)

Professors

Robert M. Carney, Ph.D., Washington University, 1978. (Medical Psychology) (Also Department of Psychology)

Theodore J. Cicero, Ph.D., Purdue University, 1968. (Neuropsychopharmacology) (See Administration and Department of Anatomy and Neurobiology.)

Wallace Renard Professor

C. Robert Cloninger, M.D., Washington University, 1970; M.D. (hon.), Umea University, Sweden, 1983. (See Department of Genetics.) (Also Department of Psychology)

Ray E. Clouse, M.D., Indiana University, 1976. (Medicine) (See Department of Medicine.)

Linda B. Cotter, Ph.D., Washington University, 1987. (Epidemiology) (See Health Administration.)

Gregory B. Couch Professor

John G. Csernansky, M.D., New York University, 1979. (See Department of Anatomy and Neurobiology.)

Kenneth E. Freedland, Ph.D., University of Hawaii, 1982. (Medical Psychology) (Also Department of Psychology)

Alison M. Goate, D.Phil., University of Oxford, 1983. (Genetics) (See Department of Genetics.)

Spencer T. Olin Professor

Andrew C. Heath, D.Phil., University of Oxford, 1983. (Psychology) (See Department of Genetics.) (Also Department of Psychology)

Barry Hong, Ph.D., St. Louis University, 1982. (Medical Psychology) (See Department of Medicine.) (Also Department of Psychology)

Richard W. Hudgens, M.D., Washington University, 1956.

Keith E. Isenberg, M.D., Indiana University, 1978.

Patrick J. Lustman, Ph.D., Michigan State University, 1980. (Medical Psychology) (Also Department of Psychology)

Carol S. North, M.D., Washington University, 1983.

John P. Feigheimer Professor of Neuropsychopharmacology

John W. Olney, M.D., Iowa University, 1963. (See Department of Pathology and Immunology.)

Dabeeru C. Rao, Ph.D., Indian Statistical Institute, 1971. (Biostatistics) (See Department of Genetics and Division of Biostatistics.)

Samuel and Mae S. Ludwig Professor

Theodore Reich, M.D., McGill University, 1963. (See Department of Genetics.)

John P. Rice, Ph.D., Washington University, 1975. (Mathematics) (See Department of Biostatistics and Clinical Investigation Program.)


Marcel T. Saghir, M.D., American University, 1963.

Brian K. Suarez, Ph.D., University of California, Los Angeles, 1974. (Genetics) (See Department of Genetics.)

Richard D. Wetzel, Ph.D., St. Louis University, 1974. (Medical Psychology) (See Departments of Neurology and Neurological Surgery.)

Research Professor Emerita


Research Professor

Kathleen K. Bucholz, Ph.D., Yale University, 1986.

Professors Emeriti (Clinical)

Sydney B. Maughs, M.D., Washington University, 1935.

Patricia L. O'Neal, M.D., Washington University, 1948.

Professor (Adjunct)

Norman Sartorius, M.D., University of Zagreb, 1958.

Associate Professor Emeritus

Collins E. Lewis, M.D., Harvard University, 1971.

Associate Professors


Mark A. Mintun, M.D., Washington University, 1981. (See Department of Biomedical Engineering and Department of Radiology.)

John W. Newcomer, M.D., Wayne State University, 1985. (Also Department of Psychology)

Bruce L. Nock, Ph.D., Rutgers University, 1980. (Neurobiology) (See Department of Anatomy and Neurobiology.)
Mary Ann Montgomery, M.D., Northwestern University, 1973.
Paul M. Packman, M.D., Washington University, 1963.
Elizabeth P. Pribram, M.D., St. Louis University, 1985.
E. Robert Schultz, M.D., Washington University, 1955. (See Department of Neurology.)
Daniel Silverman, M.D., Northwestern University, 1972.
Harold D. Wolff, M.D., State University of Iowa, 1955.

Associate Professors (Adjunct)

Jennifer Kwon, M.D., University of Michigan, 1989. (See Department of Neurology.)
Pamela Madden, Ph.D., University of Pittsburgh, 1992. (Psychology)
Steven J. Mennerick, Ph.D., Washington University, 1995. (Neurobiology) (See Department of Anatomy and Neurobiology.)
Devna Rastogi-Cruz, M.D., Washington University, 1991.
Stephen L. Ristvedt, Ph.D., University of Pennsylvania, 1989. (Medical Psychology)

Research Assistant Professors

Andrey Anokhin, Ph.D., Russian Academy of Sciences, 1987.
Renee M. Cunningham-Williams, Ph.D., Washington University, 1994.
Thomas Przybeck, Ph.D., Washington University, 1983.
Ty A. Ridenour, Ph.D., Ball State University, 1996.
Alexandre A. Todorov, Ph.D., Louisiana State University, 1992.

Assistant Professors (Clinical)

Ahmad Ardekani, M.D., Pahlavi University, 1974.
Juan C. Corvalan, M.D., University of Santo Tomas, 1965.
Alejandro M. Datuin, M.D., University of Santo Tomas, 1965. (Metropolitan St. Louis Psychiatric Center)
Mary Davis, M.D., Washington University, 1952.
Paul Dewald, M.D., University of Rochester, 1945.
Terry A. Fuller, M.D., Washington University, 1974.
Luis A. Giuffra, M.D., Universidad Peruana Cayetano Merced, Peru, 1986; Ph.D., Yale University, 1991.
Anna Hartnett, M.D.,
University of Ottawa, 1960.

Thomas Hartnett, M.D.,
University of Ottawa, 1959.

Frederick G. Hicks, M.D.,
University of Minnesota, 1981.

Sheldon G. Holstad, Pharm.D.,
University of Iowa, 1986.
(Pharmacy) (St. Louis College of Pharmacy)

Mark C. Johnson, M.D.,
University of Kentucky, 1980.

Saaid Khojasteh, M.D.,
Shiraz University, 1981.

Ervin Lipschitz, M.D.,
Washington University, 1949.

Scott McCormick, M.D.,
The University of Chicago, 1985.

James R. Mikolajczak, M.D.,
St. Louis University, 1972.

Jule Miller, M.D.,
Washington University, 1953.

Thomas Nowotny, M.D.,
Washington University, 1985.

Eric J. Nuetzel, M.D.,
St. Louis University, 1976.

Diane Rankin, M.D.,
University of Colorado, 1968.

James L. Rutherford, M.D.,
University of Iowa, 1980.

Jo-Ellyn M. Ryall, M.D.,
Washington University, 1975.

Berette Salazar, M.D.,
University of New Mexico, 1982.

Paul W. Sheffner, M.D.,
Washington University, 1974.

Nathan Simon, M.D.,
Washington University, 1955.

Reed E. Simpson, M.D.,
Washington University, 1976.

Wayne A. Stillings, M.D.,
Washington University, 1975.

Edwin D. Wolfran, M.D.,
State University of Iowa, 1959.

Christopher Wuertz, M.D.,
University of Illinois, 1984.

Instructors

Qiang Fu, M.D.,
The First Military Medical University,
Guangzhou, P.R. China, 1986;
Ph.D., The University of Alabama
at Birmingham School of Public Health, 1998.

Dan W. Haupt, M.D.,
University of Vermont, 1997.

Tamara Hershey, Ph.D.,
Washington University, 1996.
(Neuropsychology)

Girly Heydebrand, Ph.D.,
University of Missouri-St. Louis, 1994. (Psychology)

Loon-Tzian Lo, M.D.,
Fujian Medical College, 1984.

Instructors (Clinical)

Lachman K. Abichandani, M.D.,
Far Eastern University, 1974.

Aqeeb Ahmad, M.D.,
Liaquat Medical College, 1970.

Dale J. Anderson, M.D.,
Washington University, 1979.

Richard H. Anderson, Ph.D.,
Brigham Young University, 1986;
M.D., St. Louis University, 1989.

Scott J. Arbbaugh, M.D.,
St. Louis University, 1985.

Ronald Beach, M.D.,
St. Louis University, 1974.

Susan Boyer, M.D.,
University of Missouri, 1993.

Allyson Boyle, M.D.,
Columbia University, 1983.

David M. Conner, M.D.,
University of Oklahoma, 1983.

Jon Todd Dean, M.D.,
University of Texas, 1987.

Cynthia Florin, M.D.,
Columbia University, 1984.

Darrin S. Friesen, M.D.,
Washington University, 1994.

David J. Goldmeier, M.D.,
Washington University, 1982.

Miggie Greenberg, M.D.,
Case Western Reserve School of Medicine, 1990.

Steven Harvey, M.D.,
Washington University, 1992.

Linda S. Horne, M.D.,
Ohio State University, 1986.

LaRhonda Raeshell Jones, M.D.,
University of Missouri, Kansas City, 1994.

Colin MacKenzie, M.D.,
Case Western Reserve University, 1996.

Virgil I. Malmberg, M.D.,
University of Missouri, 1978.

Jose Mathews, M.D.,
University College of Medical Sciences, 1992.

Gregory Mattingly, M.D.,
Washington University, 1989.

Douglas McCoy, M.D.,
Southern Illinois University, 1990.

Susan A. Minchin, M.D., Ph.D.,
University of Iowa College of Medicine, 1991.

David M. Montani, M.D.,
Washington University, 1996.

Randi H. Mozer, Ph.D.,
Washington University, 1989.
(Medical Psychology)

John S. Rabun, M.D.,
University of Tennessee, 1987.

Stacey L. Smith, M.D.,
Northwestern University, 1991.

Michele M. Van Eerdewegh, M.D.,
Free University of Brussels, Belgium, 1970.

Division of Child Psychiatry

BLANCHE F. ITTLESON
PROFESSOR AND DIRECTOR
OF DIVISION

Richard D. Todd, Ph.D.,
University of Texas, 1977; M.D.,
1981. (Child Psychiatry) (See
Department of Genetics.)

Professor Emeritus

E. James Anthony, D.P.M.,
University of London, 1947;
M.D., 1949. (Child Psychiatry)

Professor

Barbara Geller, M.D.,
Albert Einstein College of Medicine, 1964. (Child Psychiatry)
Research Associate Professor
Gwendolyn G. Reich, Ph.D., Washington University, 1978. (Anthropology) (Child Psychiatry)

Associate Professors
Haruo Kusama, M.D., Washington University, 1965. (Child Psychiatry)
Zila Welner, M.D., Hebrew University, 1961. (Child Psychiatry) (See Department of Pediatrics.) (Hawthorn Children’s Psychiatric Hospital)

Assistant Professor Emeritus
Loretta K. Cass Seleski, Ph.D., Ohio State University, 1950. (Medical Psychology)

Assistant Professors
Kelly N. Botteron, M.D., University of Kansas, 1988. (Child Psychiatry) (See Department of Radiology.)
Gary Boxer, M.D., University of Colorado, 1980. (Child Psychiatry)
John N. Constantino, M.D., Washington University, 1988. (Child Psychiatry) (See Department of Pediatrics.)
Joan Luby, M.D., Wayne State University, 1985. (Child Psychiatry) (See Psychiatric Epidemiology.)

Assistant Professors (Clinical)
James E. Edwards, M.D., University of Tennessee, 1962. (Child Psychiatry)
Pakistan, 1960. (Child Psychiatry)
Barbara S. Silverstein, Ph.D., St. Louis University, 1994. (Social Work)
Jagdish Suri, M.D., King George Medical College, 1964. (Child Psychiatry)

Instructor
Anne L. Glowinski, M.D., Baylor College of Medicine, 1992.

Instructors (Clinical)
Michael R. Banton, M.D., St. Louis University, 1985. (Child Psychiatry)
Brad Z. Berger, M.D., Northwestern University, 1990.
Robert H. Brady, M.D., Tufts University School of Medicine, 1995.
Kimberli McCallum, M.D., Yale University, 1986. (Child Psychiatry)
Syed T. Rizvi, M.D., University of Karachi, 1995.
Jeffrey Schulman, M.D., University of Kentucky, 1974. (Child Psychiatry)
Vinod Suri, M.D., Punjab University, 1962. (Hawthorn Children’s Psychiatric Hospital)
DEPARTMENT OF RADIATION ONCOLOGY

The Department of Radiation Oncology was created on July 1, 2001, after being unanimously approved by the Executive Faculty on June 6, 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. The Department of Radiation Oncology 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 in vivo tumors
- experimentation on biological basis of pre-operative radiation
- customized (Cerrobend) 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 occupies a large, attractive and convenient clinical facility that was recently inaugurated on the ground floor of the Center for Advanced Medicine (about 50,000 square feet). 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 the gamma knife unit, which is operated in collaboration with HealthSouth Corporation. Initially, we will operate with seven state-of-the-art computer control medical linear accelerators with the latest accessories, including multi-leaf collimator. One of the accelerators is equipped to perform intensity-modulated radiation therapy using the Peacock system from NOMOS Corporation. We have advanced treatment planning computer systems for 3-D conformal and intensity-modulated radiation therapy. 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.

Gamma knife as well as Linac-based stereotactic irradiation (radiosurgery) programs are in operation. In addition, the Physics faculty have research laboratories and offices on the third and sixth floors of Barnard Hospital and on the fourth floor of the Clinical Sciences Research Building. We are in the process of formulating plans for an Innovative Technology Research Center to be housed in some of the space formerly occupied by the clinical service at the Mallinckrodt Institute of Radiology ground floor as well as in Barnard Hospital. The administrative offices of the department, as well as the Cancer and Radiation Biology laboratory and faculty offices and the Oncology Information computer systems are housed at the 4511 Forest Park Medical Building. The total amount of space occupied by the department is close to 100,000 square feet.

FIRST YEAR

Summer Oncology Clerkship for First-Year Students

An eight-week summer clerkship program is available for first-year medical students. The students participate in the clinical activities of the Radiation Oncology Center and are exposed to the fundamental concepts of cancer biology and radiation therapy in a series of lectures, seminars and case presentation conferences. They have the opportunity to conduct either laboratory research or clinical investigation under the direction of the staff members of the sections of clinical radiation oncology and cancer biology.

Joseph R. Simpson, Ph.D., M.D.; Joseph L. Roti Roti, Ph.D.

FOURTH YEAR

Electives

M90 840 CLINICAL RADIATION ONCOLOGY

Instructors: Joseph R. Simpson, M.D., 362-8567; Carlos A. Perez, M.D., 362-8500

The clinical section offers an elective with emphasis on the evaluation, planning and administration of radiation therapy in patients with malignant tumors. The students have the opportunity to enhance their knowledge of the natural history and pathological and biological features of cancer and to sharpen their clinical skills participating in the management of these patients. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.
Research (M90 900)

Carlos A. Perez, M.D., 362-3499

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.

Jacob E. Locke, M.D., 362-9786

Introduction to laboratory research. The student will have the opportunity to participate in bench and animal research in the discipline of radiobiology. Modern investigational techniques will be taught, including northerns, westerns, DNA binding analysis (gel shifts), and in vivo tumor measurement and imaging.

Faculty

CHAIR OF DEPARTMENT
Carlos A. Perez, M.D., Universidad de Antioquia, 1960.

Professors

Perry W. Grigsby, M.D., University of Kentucky, 1982.
Hsiu-san Lin, M.D., Taiwan University, 1960; Ph.D., The University of Chicago, 1968. (See Department of Molecular Microbiology.)
Robert J. Myerson, Ph.D., University of California, 1974; M.D., University of Miami, 1980.
James A. Purdy, Ph.D., University of Texas, 1971. (Radiation Physics)
Joseph L. Roti Roti, Ph.D., University of Rochester, 1972. (Radiation and Cancer Biology) (See Department of Biochemistry and Molecular Biophysics and Department of Cell Biology and Physiology.)
Todd H. Wasserman, M.D., University of Rochester School of Medicine and Dentistry, 1972.
Jeffrey F. Williamson, Ph.D., University of Minnesota, 1982. (Radiation Physics) (See Department of Biomedical Engineering.)

Associate Professors

Robert E. Drzymala, Ph.D., University of Oklahoma, 1977. (Radiation Physics) (See Department of Neurological Surgery.)
Eric E. Klein, M.S., University of Massachusetts, 1985. (Radiation Physics)
Andrei Laszlo, Ph.D., University of California, 1981. (Radiation and Cancer Biology)
Eduardo G. Moros, Ph.D., University of Arizona, Tucson, 1990. (Radiation Physics) (See Department of Biomedical Engineering.)
Keith M. Rich, M.D., Indiana University, 1977. (See Department of Anatomy and Neurobiology and Departments of Neurology and Neurological Surgery.)

Associate Professor Emeritus

Gilbert H. Nussbaum, Ph.D., Harvard University, 1967. (Radiation Physics)

Research Associate Professor

Ryuji Higashikubo, Ph.D., Bowling Green State University, 1978. (Radiation and Cancer Biology)
Clayton R. Hunt, Ph.D.,
The University of Chicago, 1979.
(Radiation and Cancer Biology)

John W. Matthews, D.Sc.,
Washington University, 1980.
(Radiation Physics)

William L. Straube, M.S.,
Washington University, 1992.
(Radiation Physics)

Assistant Professor
(Clinical)

MacDonald B. Logie, M.D.,
Northwestern University, 1967.

Instructors

Jeffrey D. Bradley, M.D.,
University of Arkansas, 1993.

Ming-shun Chen, Ph.D.,
Kansas State University, 1991.
(Radiation and Cancer Biology)

Seymour Fox, Ph.D.,
University of Oklahoma, 1977.
(Computer Sciences)

Jacob E. Locke, M.D.,
Boston University, 1995.

Daniel F. Mullen, D.D.S.,
University of Missouri, Kansas City, 1977. (Computer Science)

Marie E. Taylor, M.D.,
University of Washington, Seattle, 1982.

Wade L. Thorstad, M.D.,
University of Texas, Houston, 1991.

Imran Zoberi, M.D.,
Washington University, 1996.

Research Instructor

Mai Xu, M.D., Ph.D.,
China Medical University, 1992.
(Radiation and Cancer Biology)

Instructors (Clinical)

Muhammad S. Mahmood, M.D.,
Washington University, 1989.

James V. Piephoff, M.D.,
University of South Carolina, 1989.

Tapan Roy, M.D.,
Baroda Medical College at Baroda, India, 1974.
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, 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 laminograph
- 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 vascular and interventional radiology center
- application of PET for measuring metabolic activity in relation to cardiac blood flow

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 fifth floor (MRI). PET clinical and research facilities are available on the seventh floor. A comprehensive vascular and interventional radiology center occupies the eighth floor. Nuclear medicine is on the ninth floor of the Barnes-Jewish Hospital West Pavilion. The 10th floor of the West Pavilion houses ultrasonography and outpatient radiology. The Breast Health Center is currently located on the fifth floor of the Kingshighway Building on the north campus but is scheduled to move to the fifth floor of the Center for Advanced Medicine in mid-2002. This multidisciplinary facility provides a full range of breast imaging services and interventional procedures. In the north wing of St. Louis Children’s Hospital, the first floor houses 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 vascular 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, 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, image processing), and in the Scott Avenue Imaging Center (neurological PET, molecular radiopharmacology, MR imaging, optical 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, two 4.7 Tesla MR scanners;
Radiology

two Siemens 1.5 Tesla MR scanners with Echo Planar imaging capability; one 3 Tesla Siemens whole-body scanner; three medical cyclotrons; in vivo MR spectroscopy; radiopharmaceutical laboratories; animal care facilities; a neuropsychology laboratory; electrical engineering laboratories for image reconstruction; high-end graphics workstations; and a Siemens Somatom Plus Spiral CT Diagnostic Image Evaluation/Reconstruction console. The Imaging Center also houses sophisticated computer facilities that are utilized for clinical, research and teaching applications.

FIRST YEAR

During the first semester of the gross anatomy course, conferences are given by several members of the radiology staff in the following areas: neuro, chest, cardiac, musculoskeletal and abdominal radiology. These sessions are arranged to coincide with the particular area of the body being studied in the anatomical dissection classes. Conferences are conducted in small groups, giving students an opportunity to relate directly with the radiologists.

Selectives

M04 501 ANATOMY THROUGH THE EYES OF THE RADIOLOGIST
Coordinator: Pam Schaub, 362-2928
A five-week seminar that seeks to reinforce the first-semester anatomy experience by relating previously learned anatomical information to radiographic images. As a byproduct, this elective provides a link for the first-year anatomists to the real world of medicine. Students will be expected to work in small groups prior to the meeting of each seminar to review a set of radiographic images and/or review recommended reading. Groups assigned a case will be responsible for presenting their findings to the class. Radiologists from radiology subspecialties will moderate the conference and supply appropriate complementary cases as needed. Harvey S. Glazer, M.D.

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. Harvey S. Glazer, M.D.

FOURTH YEAR

Electives

M90 805 RADIOLOGY — MALLINCKRODT INSTITUTE OF RADIOLOGY
Instructor: Lawrence M. Kotner Jr., M.D., 454-7400
Lectures, seminars and innovative conferences emphasizing film interpretation and the role of radiology in the solution of clinical diagnostic problems are the "core" of this elective. The student will have an opportunity to be involved in the daily workload of subspecialty radiology and will be able to observe diagnostic and therapeutic examinations. Each student will spend one to two weeks on each of two or more of the following sessions of Radiology:
- Chest Radiology
- Cross-Sectional Imaging
- GI Radiology
- GU Radiology
- Interventional Radiology
- Neuroradiology
- Nuclear Medicine
- Pediatric Radiology
- Radiation Oncology
- Skeletal Radiology/ER

All efforts will be made to arrange these subspecialty assignments to meet the needs and interests of the individual student. The ACR teaching file and audiovisual materials, as well as an extensive library, will be available. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M90 808 BODY CT
Instructors: Fernando R. Gutierrez, M.D.; Sanjeev Bbilla, M.D., 362-3189 or 747-2726
Students will work with two attendings and four residents and participate in all aspects of the Body CT service, including interview of patients, protocelling examinations, review and interpretation of diagnostic CT examination and consultation with referring physicians. Approximately 300 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. Valid start weeks for 4-week blocks are: Weeks 9, 13, 17, 29, 33, 37 and 41.

M90 820 CLINICAL NUCLEAR MEDICINE
Instructor: Tom R. Miller, M.D., Ph.D., 362-2809
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 isotopic studies in patients referred to the department. Opportunity exists to learn

180
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 and thoracic oncology conferences, as well as the imaging aspects of the clinicopathological medicine conference. Learn to identify subtle pneumothorax and pneumonia. Learn the limitations of portable chest radiographs.

Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

Research (M90 900)

Interested students should contact the appropriate individual in each division regarding the types of research projects available.

James Blaine III, D.Sc., 362-6965
Active research projects at the Electronic Radiology Laboratory include digital image acquisition and display of radiology and non-radiology modalities, information management, telecommunications utilizing ATM high-speed local and wide-area technologies, medical video and image processing in support of clinical research in radiology.

Jeffrey J. Brown, M.D., 362-2967
My research is primarily concerned with MR imaging of anatomic areas outside the central nervous system. Specific areas of interest include evaluation of new MR pulse sequences and contrast agents for abdominal, cardiac and breast MRI.

Thomas E. Conturo, M.D., Ph.D., 362-8421
My research group's interests include magnetic resonance (MR) technique development and experimental studies involving cerebral perfusion and diffusion imaging, MR imaging of brain functional activation, and development of MR contrast agents.

Har old Debdasht, M.D., 362-7418
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 the fundamental processes, such as blood flow, oxygen metabolism, glucose metabolism, and receptor density, makes this technique very desirable to both investigators and clinicians. Research projects relating to positron emission tomography and general nuclear medicine are available in the following areas: 1) PET assessment of response to hormone therapy in advanced breast cancer [in this research protocol, researchers will assess the role of PET with two radiotracers, 1660[18F]fluoro-17β-estradiol (FES) (an estrogen analogue) and [18F]-2-[18F]-fluoro-2-deoxyglucose (FDG) (a glucose analogue), as a means to predict the response of the cancer to hormonal treatment of PET in breast cancer]; 2) PET assessment of somatostatin receptors in patients with neuroendocrine tumors using [11Cu]-labeled octreotide (a somatostatin analogue); 3) PET assessment of tumor hypoxia using a copper-labeled PET radiopharmaceutical; 4) conventional nuclear medicine imaging in folate receptors in gynecologic cancer tumors using vitamin folate attached to In-111-DPTA; 5) functional assessment of P-glycoprotein with conventional nuclear medicine and [18F]Te-sestamibi (a glucose analogue); 6) the use of FDG-PET in predicting relapse in patients with Hodgkin's and non-Hodgkin's lymphoma who have received salvage chemotherapy; 8) PET assessment of prostate cancer using FDG and C-11 acetate.

Rob J. Gropler, M.D., 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, imaging 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 noninvasively 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 of 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 MRI 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, hypertensive heart disease,
obesity and dilated cardiomyopathy. These studies
have relevance because these disease states all
increase with age and in general, are more common
in men. A third path is to determine the mechanisms
responsible for these changes in this metabolic-
functional relation and identify potential interven-
tions that may reverse or ameliorate them. In this
regard, similar imaging studies are being performed
to determine the importance of nitric oxide and the
PPARs system in defining this metabolic-functional
relation.

Charles F. Hildebolt, D.D.S., Ph.D., 362-8410
The assessment of alveolar bone loss by digital
radiographic imaging, including the determination of
whether or not there is an interrelationship between
alveolar and post-cranial bone loss after menopause
and the assessment of alveolar bone by phosphor
radiography.

Tom R. Miller, M.D., Ph.D., 362-2807
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 mea-
sures of tumor size, uptake and heterogeneity;
3) Evaluation of new radiopharmaceuticals in
prostate cancer and renal cell cancer.

Stephen M. Moerlein, Ph.D., 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 large animals and tracer kinetic model-
ing. The final step in the transition of a radiochemical
to a labeled drug takes into account radiation
dosimetry, pharmaceutical quality, and the develop-
ment of automated production to streamline delivery
to human subjects. Each of these aspects is
researched, with a primary interest in novel agents
for examination of neurological processes by PET.

David R. Piwnica-Worms, M.D., Ph.D., 362-9356
Research projects in molecular imaging are available.
Molecular imaging is broadly defined as the charac-
terization 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 and near-infrared
fluorescence. Our goal is to advance the understand-
ing of normal biology and pathophysiology through
noninvasive investigation of molecular and cellular
events in vitro. Projects focus on validation and use
of PET reporter genes and PET reporter probes to
investigate gene expression patterns in cancer;
development of peptide conjugates for membrane
transduction of PET, SPECT and MR contrast agents;
and investigations in vivo and in vitro of the
transport functions of the multidrug resistance (MDR)
P-glycoprotein family of membrane transporters.

William J. Powers, M.D., 362-7116
Research opportunities are available using positron
emission tomography to measure cerebral blood
flow and metabolism in human subjects to investi-
gate how the blood borne supply of oxygen and
glucose is regulated to energy demand in physiologi-
cal and pathological conditions. Ongoing projects
include studies of cerebrovascular disease,
Huntington’s disease and Parkinson’s disease.

Marcus E. Raichle, M.D., 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 method-
ology (imaging and experimental) and specific
questions in cognitive neuroscience.

Jerald W. Wallis, M.D., 362-2809
Recent research projects have included three
dimensional display of tomographic images,
development of software for analysis of (and
correction for) patient motion during tomographic
acquisition, development of new iterative tobomo-
graphic image reconstruction techniques and work
on use of the internet in nuclear medicine.

Michael J. Welch, Ph.D., 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.
Faculty

HEAD OF DEPARTMENT AND DIRECTOR OF THE MALLINCKRODT INSTITUTE OF RADIOLOGY

R. Gilbert Jost, M.D., Yale University, 1969. (Also Department of Computer Science)

Professor Emeritus and Lecturer

Fred J. Hodges III, M.D., University of Wisconsin, 1946.

Professors

Joseph J.H. Ackerman, Ph.D., Colorado State University, 1977. (See Department of Medicine.)
(Also Department of Chemistry)


Dennis M. Balfe, M.D., Medical College of Wisconsin, 1975.


Harold Burton, Ph.D., University of Wisconsin, 1968. (See Department of Anatomy and Neurobiology and Department of Cell Biology and Physiology.)

Ralph V. Clayman, M.D., University of California, 1973. (See Department of Surgery.)

Mark S. Conrad, Ph.D., Washington University, 1977. (Also Department of Physics)

James P. Crane, M.D., Indiana University, 1970. (See Department of Genetics and Department of Obstetrics and Gynecology.)

Michael D. Darcy, M.D., Ohio State University, 1979. (See Department of Surgery.)

Ronald G. Evans, M.D., Washington University, 1964. (Also Department of Economics)

M. Wayne Flye, M.D., University of North Carolina, 1967; Ph.D., Duke University, 1980. (See Department of Surgery and Department of Molecular Microbiology.)

Mokhtar Gado, M.D., Cairo University, 1960. (See Department of Neurological Surgery.)

Louis A. Gihula, M.D., University of Illinois, 1967. (See Department of Surgery.)

Harvey S. Glazer, M.D., Washington University, 1976.

Robert L. Grubb Jr., M.D., University of North Carolina, 1965. (See Departments of Neurology and Neurosurgical Surgery.)


Saulo Klahr, M.D., Universidad Nacional de Colombia, 1959. (See Department of Medicine.)

Philip A. Ludbrook, M.B.B.S., University of Adelaide, 1963. (See Department of Medicine and Clinical Investigation Program.)

Jeffrey L. Marsh, M.D., The Johns Hopkins University, 1970. (See Department of Surgery and Department of Pediatrics.)

William H. McAllister, M.D., Wayne State University, 1954. (See Department of Pediatrics.)


Tom R. Miller, Ph.D., Stanford University, 1971; M.D., University of Missouri, 1976. (Also Department of Electrical Engineering)

Mark A. Mintun, M.D., Washington University, 1981. (See Department of Biomedical Engineering, Department of Psychiatry and Clinical Investigation Program.)

Barbara S. Monsees, M.D., Washington University, 1975.

Roberto Pacifici, M.D., Perugia University, 1981. (See Department of Medicine.)

Michael K. Pasque, M.D., University of Oklahoma, 1978. (See Department of Biomedical Engineering and Department of Surgery.)

Joel S. Perlmuter, M.D., University of Missouri, 1979. (See Departments of Neurology and Neurological Surgery.)

Steven E. Petersen, Ph.D., California Institute of Technology, 1982. (See Departments of Neurology and Neurological Surgery.)

Daniel D. Picus, M.D., The University of Chicago, 1981. (See Department of Surgery.)

David R. Piwnica-Worms, M.D., Ph.D., Duke University, 1984. (See Department of Molecular Biology and Pharmacology.)

William J. Powers, M.D., Cornell University, 1975. (See Departments of Neurology and Neurosurgical Surgery and Clinical Investigation Program.)

Marcus E. Raichle, M.D., University of Washington, 1964. (See Department of Anatomy and Neurobiology, Department of Biomedical Engineering and Department of Neurology.)

Henry D. Royal, M.D., St. Louis University, 1974.

Stuart S. Sagel, M.D., Temple University, 1965.

Daniel P. Schuster, M.D., Yale University, 1976. (See Department of Medicine.)

Gary D. Shackelford, M.D., Washington University, 1968. (See Department of Pediatrics.)

Gregorio A. Sicard, M.D., University of Puerto Rico, 1972. (See Department of Surgery.)

Barry A. Siegel, M.D., Washington University, 1969. (See Department of Medicine, Alvin J. Siteman Cancer Center, and Clinical Investigation Program.)

Marilyn J. Siegel, M.D., State University of New York, 1969. (See Department of Pediatrics.)

Donald L. Snyder, Ph.D., Massachusetts Institute of Technology, 1966. (See Institute for Biomedical Computing.)
(Also Department of Electrical Engineering)

Robert W. Thompson, M.D., University of Michigan, 1983. (See Department of Surgery and Clinical Investigation Program.)

William G. Totty, M.D., University of Tennessee, 1975.

Michael J. Welch, Ph.D., University of London, 1965. (See Department of Molecular Biology and Pharmacology and Alvin J. Siteman Cancer Center.)
(Also Department of Chemistry)

Professor (Clinical)

Noah Susman, M.D., Washington University, 1952.
Associate Professors
Samuel Achilefu, Ph.D., University of Nancy I, France, 1991.
Carolyn J. Anderson, Ph.D., Florida State University, 1990. (See Department of Molecular Biology and Pharmacology.)
Premt T. Barton, M.D., Mahidol University, Thailand, 1973.
Jeffrey J. Brown, M.D., University of California, San Diego, 1983.
Thomas E. Conturo, M.D., Ph.D., Vanderbilt University, 1989. (Also Department of Physics)
DeWitte T. Cross III, M.D., University of Alabama, 1980.
Victor G. Dávila-Román, M.D., University of Puerto Rico, 1981.
Farrokh Dehdashti, M.D., Pahlavi University, Iran, 1977.
Colin P. Derdeyn, M.D., University of Virginia, 1988.
Diana L. Gray, M.D., University of Illinois, 1981. (See Department of Obstetrics and Gynecology.)
Robert J. Gropler, M.D., University of Cincinnati, 1981. (See Department of Medicine and Clinical Investigation Program.)
Fernando R. Gutierrez, M.D., University of Valladolid, 1974.
Thomas E. Herman, M.D., The Johns Hopkins University, 1975.
David M. Hovsepian, M.D., Columbia University, 1986. (See Department of Surgery.)
Lawrence M. Kotner, M.D., Washington University, 1968.
Robert G. Levitt, M.D., University of California, 1972.
Stephen M. Moerlein, Ph.D., Washington University, 1982. (See Department of Biochemistry and Molecular Biophysics.)
Christopher J. Moran, M.D., St. Louis University, 1974.
Jeffrey J. Neil, M.D., Ph.D., Washington University, 1984. (See Department of Neurology)
Joseph A. O’Sullivan, Ph.D., University of Notre Dame, 1986. (Also Department of Electrical Engineering)
Brian G. Rubin, M.D., University of Vermont, 1984. (See Department of Surgery and Clinical Investigation Program.)
Janice W. Semenovitch, M.D., Washington University, 1981.
Sharlene A. Teefey, M.D., University of Hawaii, 1990.
Thomas M. Vesely, M.D., Mayo Medical School, 1986. (See Department of Surgery)
Jeroald W. Wallis, M.D., Stanford University, 1981. (See Clinical Investigation Program.)
Franz J. Wippold II, M.D., St. Louis University, 1977.
Research Associate Professor
Tom O. Videen, Ph.D., University of Washington, 1981. (See Department of Neurology.)
Associate Professors
Sumner Holtz, M.D., St. Louis University, 1948.
Philip J. Weisman, M.D., Yale University, 1972.
Associate Professor (Clinical)
Shiying Zhao, Ph.D., University of South Carolina, 1991.
Assistant Professor Emeritus
Armand Díaz, R.N., R.T., Havana University, 1948.
Assistant Professors
Kyongtac T. Bae, Ph.D., University of Pennsylvania, 1988; M.D., University of Chicago, 1992.
Kevin J. Black, M.D., Duke University, 1990. (See Department of Psychiatry and Department of Neurology.)
Kelly N. Botteron, M.D., University of Kansas, 1988. (See Department of Psychiatry)
Daniel B. Brown, M.D., Hahnemann University, 1983.
Randall Lee Buckner, Ph.D., Washington University, 1995. (Also Department of Psychology)
Maurizio Corbetta, M.D., University of Pavia, Italy, 1985. (See Department of Anatomy and Neurobiology and Department of Neurology.)
Constance S. Courtosis, M.D., Medical University of South Carolina, 1985.
Steven Don, M.D., Vanderbilt University, 1985.
Dionc M. Farria, M.D., Harvard University, 1989.
Edward M. Geltman, M.D., New York University, 1971. (See Department of Medicine.)
Debra A. Gusnard, M.D., The University of Chicago, 1982. (See Department of Psychiatry.)
Richard LaForest, Ph.D., Laval University, Quebec, Canada, 1994.
Susan M. Langhorst, Ph.D., University of Missouri-Columbia, 1982.
Vadim A. Markel, M.D., New Mexico State University, 1995.
Robert C. McKinstry III, Ph.D., Massachusetts Institute of Technology, 1991; M.D., Harvard Medical School, 1992. (See Clinical Investigation Program.)
Mary A. Middleton, M.D., Medical College of Wisconsin, 1982.
Randall V. Olsen, M.D., University of Alberta, 1995. (See Department of Surgery.)
Maria E. Schmidt, M.D., Yale University, 1983.
Naris Rujanavech, M.D., Faculty of Medicine, Siriraj Hospital, 1972.
Chandrakant C. Tailor, M.B.B.S, Maharaja Sayajirao University of Baroda, 1972.

Assistant Professors (Adjunct)
David A. Feinberg, Ph.D., University of California, 1982; M.D., University of Miami, 1988.
Celette Sugg Skinner, Ph.D., University of North Carolina, Chapel Hill, 1991.

Research Scientists
Carmen S. Dence, M.S., Florida State University, 1972.
Pilar Herrero, M.S., Washington University, 1997.
Deborah W. McCarthy, Ph.D., Florida State University, 1993.
Sally Wagner Schwarz, M.S., University of Southern California, 1976.
Abraham Z. Snyder, Ph.D., Rockefeller University, 1977; M.D., SUNY, Buffalo, 1981.

Instructors
Joanna M. Costello, M.D., Medical College of Pennsylvania, 1985.
Michael G. Crowley, Ph.D., University of Florida, 1982.
Glenn Fletcher, Ph.D., Michigan State University, 1981.
William James, M.D., University of Missouri, 1993.
Anil Khosla, M.D., All India Institute of Medical Sciences, 1981.
Keith A. Kronemer, M.D., Tulane University, 1990.

Thomas K. Pilgram, Ph.D., University of California, Berkeley, 1982.
M. Brant Ruff, M.D., University of Tennessee, 1995.
Joshua S. Shimony, M.D., Ph.D., University of Illinois, Urbana-Champaign, 1995.
Katia D. Vo, M.D., Cornell University Medical College, 1991.

Research Instructors
Erbil Akbudak, Ph.D., Washington University, 1996.
Jason S. Lewis, Ph.D., University of Kent, United Kingdom, 1996.
Kathryn E. Luker, Ph.D., Washington University, 1994.
Jim Zheng Wang, Ph.D., Texas A&M University, 1997.

Instructors (Clinical)
Maryellen E. Amato, M.D., Case Western Reserve University, 1981.
Charles F. Garvin, M.D., University of Missouri, Kansas City, 1982.
James A. Junker, M.D., St. Louis University, 1979.
Jerry Tobler, Ph.D., California Institute of Technology, 1978; M.D., Yale University, 1983.
Mary Culver
Department of Surgery

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 or a preceptorship elective in the Division of General Surgery. In addition, within the Department of Surgery, electives are available in pediatric surgery, transplant surgery, vascular surgery, and thoracic surgery, urologic surgery, and plastic and reconstructive surgery.

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 are opportunities for fourth-year student rotations within each division in the Department of Surgery. The student is encouraged to consult with the Surgery course master in planning his or her fourth-year rotation so that resources and faculty expertise within the department can be maximally utilized during the rotation. Generally, the minimum duration of a fourth-year rotation in the Department of Surgery is four weeks.

Electives

M95 804 Advanced Surgery Clerkship (Acting Internship in Surgery)
Instructor: Timothy J. Eberlein, M.D., 362-8029
This course will give students an in-depth experience in clinical management of patients with surgical problems. It will provide students an opportunity to evaluate patients, decide on a diagnostic and management strategy, and provide care under housestaff and faculty guidance. Students will serve as clerks on a busy general surgical service and will be responsible for patient management with housestaff under the guidance of the chief resident and attending surgeons. The course will offer opportunities for students to gain experience in preoperative, and especially intraoperative and postoperative, patient management. There will be ample opportunity to attend and participate in conferences. Note: Due to the various preceptorship electives offered through the Division of General Surgery, space on some services through this elective may be limited. Students may request a particular service, but assignments will be made only to services with available space. It is recommended that students take this elective later in the academic year in order to increase the likelihood of receiving an assignment to a preferred service. If you have questions regarding this notice, please call Jackie Fleming at 362-8029. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M95 807 Surgical Clerkship, General Surgery — Keokuk Area Hospital (Rural Practice)
Instructor: Ronald Knizeder, M.D., (319) 524-5734
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. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.
The student will work closely with the four 
Colon and Rectal Surgery.
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. Clinical exposure is focused on a wide range of benign and malignant colorectal disease. 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 student is expected to attend and participate in all conferences. Specifics of the elective should be planned in advance with Elisa H. Birnbaum, M.D., or James W. Fleshman Jr., M.D. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M95 881 PRECEPTORSHIP/SUBINTERNSHIP
UNIT III/TRAUMA ELECTIVE WITH TIMOTHY G. BUCHMAN, PH.D., M.D.
Instructors: Timothy G. Buchman, Ph.D., M.D.; Bradley D. Freeman, M.D.; Bruce I. Hall, M.D.; Peter B. Angood, M.D., 362-9347
The student will work closely with Timothy G. Buchman, Ph.D., M.D., within the Section of Burns, Trauma and Surgical Critical Care, and will function as a resident on the Trauma and Emergency Service. 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 24-hour call. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M95 820 CARDIOTHORACIC SURGERY
The senior elective in cardiothoracic surgery is a four-week clinical rotation. Time on this rotation will be evenly divided between adult cardiac, pediatric cardiac and general thoracic surgery. While on the cardiothoracic surgery service, students will participate in morning work rounds with the cardiothoracic surgery house staff, attend the operative procedures of their choice, attend weekly cardiothoracic surgery conference, and attend teaching rounds and cardiac catheterization conference (combined cardiology and cardiothoracic surgery). The students will be introduced not only to the surgical techniques involved in cardiothoracic surgery, but emphasis will also be placed on postoperative care. In addition, the principles of cardiopulmonary bypass, left and right heart assist devices, intra-aortic balloon counterpulsation, cardiac transplantation, lung transplantation, cardiac arrhythmia surgery, coronary artery bypass surgery, valve repair and replacement, and benign and malignant pulmonary and esophageal disorders will be emphasized. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M95 830 PLASTIC RECONSTRUCTIVE SURGERY
Instructor: Thomas H.H. Tung, M.D., 362-4588
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. 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. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M95 831 PLASTIC SURGERY AMBULATORY CARE
Instructor: Thomas H.H. Tung, M.D., 362-4588
The period on plastic surgery ambulatory care will focus on outpatient management of hand fractures, nerve injuries, facial trauma, 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. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M95 850 UROLOGY
Instructor: Gerald L. Andriole Jr., M.D., 362-8212
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 nonsurgical 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. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.
M95 861 PRECEPTORSHIP/SUBINTERNSHIP, SURGICAL ONCOLOGY AND ENDOCRINE SURGERY
Instructors: Jeffrey F. Moley, M.D., or Gerard M. Doherty, M.D.
The student will work closely with Jeffrey F. Moley, M.D., or Gerard M. Doherty, M.D., within the Oncology and Endocrine Section of the Division of General Surgery. 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. Clinical exposure is focused on thyroid, parathyroid and adrenal surgery, as well as breast oncology, GI oncology, melanoma and soft-tissue sarcomas. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M95 850 PEDIATRIC SURGERY
Instructor: Robert P. Foglia, M.D., 454-6022
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, emergency room care, pediatric oncology conferences, weekly conferences including mortality and morbidity, radiology, pathology, and monthly trauma and medical surgical GI conferences, as well as daily contact with pediatric radiology, are expected. Students are encouraged to undertake clinical investigations if elective time permits. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M95 891 ORGAN TRANSPLANTATION
Instructors: Jeffrey A. Lowell, M.D., 362-2820; Surendra Shenoy, M.D., Ph.D.; Martin J. Endrisak, M.D., 362-5701
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 of adult and pediatric recipients of either kidney or liver transplants or organ grafts procured from cadaveric or living related donors, and participation in the operative management of these patients. Emphasis is also placed on postoperative care, multimodality immunosuppression, management of allograft rejection and organ retrieval and preservation. Basic hepatic and renal physiology, fluid and electrolyte balance, and transplantation immunology are stressed. Management of the complications of diabetes, portal hypertension and infectious diseases are a part of the complete management of these patients. This course is designed to offer the student an overview of the field of organ transplantation. The student functions as an integral part of the transplant team and assumes appropriate responsibilities under supervision. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M95 892 PRECEPTORSHIP/SUBINTERNSHIP, MINIMALLY INVASIVE SURGERY WITH NATHANIEL J. SOPER, M.D.
Instructor: Nathaniel J. Soper, M.D., 454-8877
An elective rotation in minimally invasive surgery is being offered by the Division of General Surgery. The coordinator for the rotation is Nathaniel J. Soper, M.D., a member of the Hepatobiliary Pancreatic (HPB) Section of the General Surgery Division. Surgeons in this section of the Division of General Surgery regularly perform the following procedures laparoscopically: cholecystectomy, common bile duct exploration, staging of intra-abdominal malignant disease, gastric fundoplication, inguinal hernia repair and gastroenterostomy. 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 the rotation, the student may also find opportunity to observe or participate in minimally invasive surgical procedures performed by surgeons in other specialty sections within the Division of General Surgery, including endocrine/oncology and colorectal surgery, as well as in the Division of Urologic Surgery. 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. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

M95 896-F PRECEPTORSHIP/SUBINTERNSHIP, VASCULAR SURGERY WITH GREGORIO A. SICARD, M.D.
Instructor: Gregorio A. Sicard, M.D., 362-7841
The student will work closely with Gregorio A. Sicard, M.D., within the Vascular Section in the Division of General Surgery. 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 operating room and postoperative outpatient follow-up after discharge. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.
MIO 820 CRITICAL CARE

Instructors: Timothy G. Buchman, Ph.D., M.D., 362-9347; Walter A. Boyle III, M.D., 747-3581; J. Perren Cobb M.D., 362-9347; Craig M. Coopersmith, M.D., 362-9342; Alec S. Evers, M.D., 454-8701; Eric Jacobsohn, M.D., 362-1196; Laureen L. Hill, M.D., 362-1190, 362-9347; Richard S. Hotchkiss, M.D., 362-8552

This clinical elective is designed 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. Valid start weeks for 4-week blocks are: Weeks 1, 5, 9, 13, 17, 21, 25, 29, 33, 37 and 41.

Research (M95 900)

James W. Fleshman Jr., M.D., 454-7177

Research in laparoscopy of colorectal disease. Minimum rotation length: three months. Ongoing projects in the laboratory are focused on defining the effects of laparoscopic techniques on tumor implantation. Other projects in which the student may participate include delineation of tumor cell dissection within the abdominal cavity after elective or acute disease, management of the instrumentation site incision to prevent tumor implantation. The student will work under the direct supervision of James W. Fleshman Jr., M.D., and Judith M. Connell, Ph.D. The student will have the opportunity to gain familiarity with radioimmunoassay techniques and histologic techniques, as well as to participate directly in small-animal surgical procedures.

Susan E. Mackinnon, M.D., 362-4587

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.

Susan E. Mackinnon, M.D., 362-4593

Plastic surgery research laboratories. Minimum rotation length: six weeks. The research rotation can be conducted in the plastic surgery laboratories under the direction of Judith M. Gurley, M.D., Alex A. Kane, M.D., James B. Lowe III, M.D., Thomas H.H. Tung, M.D., Christopher J. Hussussian, M.D., Susan E. Mackinnon, M.D., Jeffrey L. Marsh, M.D., or Robert A. Young, M.D. 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.

Nathaniel J. Soper, M.D., 454-8877

Minimally invasive surgery. Minimum rotation length: four weeks. Under the auspices of the Washington University Institute for Minimally Invasive Surgery (WUIIMS), a number of surgeons are investigating the physiologic consequences of laparoscopic surgery and new applications for procedures and technologies. The student may choose a specific staff member's research project or participate in several different projects. These investigators and their projects include: Nathaniel J. Soper, M.D., physiologist of Nissen fundoplication and ergonomics of laparoscopic surgery; James W. Fleshman Jr., M.D., influence of pneumoperitoneum on intraperitoneal spread of colorectal cancer; L. Michael Brunt, M.D., application of endoscopic surgery to the neck and axilla.

Robert W. Thompson, M.D., 362-4510

Pathophysiology of abdominal aortic aneurysms. Minimum rotation length: eight weeks. This laboratory research elective allows the student the opportunity to be exposed to, and participate in, active basic science investigations regarding the pathophysiology and treatment of abdominal aortic aneurysms. This laboratory utilizes both human clinical material and animal models of aneurysm disease, combined with molecular and cellular techniques such as Western and Northern blots, reverse transcriptase polymerase chain reactions, immunohistochemistry and in situ hybridization. The
student will have the opportunity to integrate these laboratory studies with clinical knowledge based on a busy clinical practice in vascular surgery and to interact frequently with faculty and staff in the Section of Vascular Surgery.

Faculty

**BIXBY PROFESSOR OF SURGERY AND CHAIR OF DEPARTMENT**

Timothy J. Eberlein, M.D., University of Pittsburgh, 1977. (See Department of Pathology and Immunology and Alvin J. Siteman Cancer Center.)

**BIXBY PROFESSOR OF SURGERY AND CHAIR OF DEPARTMENT**

Timothy J. Eberlein, M.D., University of Pittsburgh, 1977. (See Department of Pathology and Immunology and Alvin J. Siteman Cancer Center.)

**Division of Cardiothoracic Surgery**

Evarts A. Graham Professor of Surgery and Head of Division


**Professors Emeriti**

Thomas B. Ferguson Sr., M.D., Duke University, 1947.

Charles L. Roper, M.D., University of Colorado, 1953.

**Professors**

Hendrick B. Barner, M.D., University of Washington, 1957.


John Shoenberg Professor

Ralph J. Damiano Jr., M.D., Duke University, 1980.


Charles B. Huddleston, M.D., Vanderbilt University, 1978.

Jacqueline and William Maritz Professor

Thalachallour Mohanakumar, Ph.D., Duke University, 1974. (See Department of Medicine and Department of Pathology and Immunology.)

Michael K. Pasque, M.D., University of Oklahoma, 1978. (See Department of Radiology and Department of Biomedical Engineering.)

Joseph C. Bancroft Professor

Alec Patterson, M.D., Queen’s University, 1974.

**Associate Professors**

Eric Jacobsohn, M.B.Ch.B., University of Cape Town Medical School, Cape Town, South Africa, 1984. (See Department of Anesthesiology.)

Eric N. Mendeloff, M.D., University of California, Los Angeles, 1985.

Nabil A. Munfakh, M.D., University of Michigan, 1985.

**Research Associate Professor**

Richard B. Schuessler, Ph.D., Clemson University, 1977. (See Department of Biomedical Engineering.)

**Assistant Professors**

Michael S. Avidan, M.D., University of Witwatersrand, South Africa, 1991. (See Department of Anesthesiology.)

Richard J. Battafarano, M.D., Hahnemann University, 1988; Ph.D., University of Minnesota, 1997.


Charl J. de Wet, M.B.Ch.B., University of Pretoria, South Africa, 1990. (See Department of Anesthesiology.)

Laureen L. Hill, M.D., University of California, Davis, 1992. (See Department of Anesthesiology.)

Jennifer S. Lawton, M.D., Hahnemann University, 1992.


Nader Mozami, M.D., Columbia University, 1992.

Marc R. Moon, M.D., Wayne State University, 1988.

Instructor

Christina C. Pasque, M.D., University of California, Los Angeles, 1980.

**Division of General Surgery**

Head of Division and Professor

Gregorio A. Sicard, M.D., University of Puerto Rico, 1972. (See Department of Radiology and Clinical Investigation Program.)

**Professors Emeriti**

Charles B. Anderson, M.D., Yale University, 1962.


William W. Monafo Jr., M.D., Tufts University, 1957.


**Professors**

Peter B. Angood, M.D., University of Manitoba, Canada, 1981.

Harry Edison Professor of Surgery

Timothy G. Buchman, Ph.D., University of Chicago, 1978; M.D., 1980. (See Department of Anesthesiology and Department of Medicine.)


M. Wayne Flye, M.D., University of North Carolina, 1967; Ph.D., Duke University, 1980. (See Department of Molecular Microbiology and Department of Radiology.)

Paul J. Goodfellow, Ph.D., Queens University, 1985. (See Department of Obstetrics and Gynecology and Alvin J. Siteman Cancer Center.)
Associate Professors Emeriti (Clinical)

Richard V. Bradley, M.D.,
Washington University, 1952.

Leo A. Sachar, M.D.,
Washington University, 1940.

Richard G. Sisson, M.D.,
Yale University, 1946.

William B. Walker, M.D.,
Washington University, 1946.

Associate Professors (Clinical)

Kenneth J. Bennett, M.D.,
Tulane University, 1965.

Jerome F. Levy, M.D.,
Washington University, 1958.

William D. Schieber, M.D.,
Washington University, 1953.

Research Associate Professors

William G. Dilley, Ph.D.,
University of California, 1970.

Timothy P. Fleming, Ph.D.,
University of Missouri, Columbia,
1985. (See Department of Genetics.)

Assistant Professors

Rebecca L. Aff, Ph.D.,
University of Wisconsin, Madison,
1983; M.D., Washington University,
1992. (See Clinical Investigation Program.)

Daniel B. Brown, M.D.,
Hahnemann University, 1993. (See Department of Radiology.)

Eric Choi, M.D.,
The University of Chicago, 1990.

Craig M. Coopersmith, M.D.,
University of Pennsylvania, 1991. (See Department of Anesthesiology.)

James R. Duncan, M.D., Ph.D.,
Washington University, 1988. (See Department of Radiology.)

J. Christopher Eagon, M.D.,
Harvard University, 1988.

Bradley D. Freeman, M.D.,
Duke University, 1988. (See Clinical Investigation Program.)

Patrick J. Geraghty, M.D.,
Northwestern University, 1991.

Peter S. Goeddegbereurc, Ph.D.,
Erasmus University, Rotterdam,
Netherlands, 1989.

Bruce L. Hall, Ph.D.,

Mary E. Klingensmith, M.D.,

David Linchnan, M.D.,
University of Massachusetts, 1990.

Robert E. Schmiege Jr., M.D.,
The Johns Hopkins University, 1989.

Surendra Shenoy, M.D., Ph.D.,
Kasturba Medical College, 1975.

Suresh Vedantham, M.D.,
The University of Chicago, 1992.
(See Department of Radiology.)

Research Assistant Professors

Judith M. Connett, Ph.D.,
Washington University, 1979.

Andres Jaramillo, Ph.D.,
University of Louisville, 1991.

Nancy J. Poindexter, Ph.D.,
University of Minnesota, 1985.

Gundumi A. Upadhy, Ph.D.,
Bangalore University, India, 1984.

Assistant Professors (Clinical)

Kenneth J. Arnold, M.D.,
Washington University, 1968.

David W. Dietz, M.D.,
Jefferson Medical College of Thomas Jefferson University, 1993.

Jill Richardson Dietz, M.D.,
Jefferson Medical College of Thomas Jefferson University, 1993.

Ronald Kinheaded, M.D.,
University of Missouri, 1966.

Stanley L. London, M.D.,
Washington University, 1949.

Jerry R. Meyers, M.D.,
Washington University, 1966.

Shale M. Rifkin, M.D.,
Washington University, 1948.

Andrew D. Spencer, M.D.,
Indiana University, 1954.

Leonard B. Weinstock, M.D.,
University of Rochester, 1981.
Instructors
Martin D. Jendrisak, M.D.,
Ohio State University, 1978.
Laurence Yee, M.D.,
University of Pittsburgh, 1990.

Research Instructor
Yael G. Alevy, Ph.D.,
Albert Einstein College of Medicine, 1975.

Instructors (Clinical)
Jerry L. Beguelin, M.D.,
Washington University, 1962.
John B. Buettner, M.D.,
Washington University, 1967.
Ronald J. Gaskin, M.D.,
Washington University, 1970.
Jay W. Haines, M.D.,
Chicago Medical School, 1974.
Elizabeth Hilliker, M.D.,
Washington University, 1970.
Robert J. Kingsbury, M.D.,
University of Michigan, 1970.
David P. Krajcovic, M.D.,
Washington University, 1969.
G. Lynn Krause Jr., M.D.,
University of Pennsylvania, 1954.
Eric H. Lindenblad, M.D.,
University of Missouri, 1981.
Alan M. Londe, M.D.,
Washington University, 1961.
Mark A. Ludwig, M.D.,
The University of Chicago, 1976.
Hubert S. Mickel, M.D.,
Harvard University, 1962.
Julian C. Mosley Jr., M.D.,
Washington University, 1972.
George A. Oliver, M.D.,
Washington University, 1952.
Charles L. Parks, M.D.,
Washington University, 1969.
Jon Peterson, M.D.,
University of Southern California, 1978.
Frank O. Richards, M.D.,
Howard University, 1947.
Donald C. Sauser, M.D.,
Washington University, 1960.
Marlys E. Schuh, M.D.,
Washington University, 1979.
Erik P. Thysen, M.D.,
Michael Reese Hospital, 1990.

Division of Pediatric Surgery
Head of Division and Associate Professor
Robert P. Foglia, M.D.,
Georgetown University, 1974.

Professor Emeriti
Jessie L. Ternberg, Ph.D.,
University of Texas, 1950; M.D.,

Assistant Professors
Patrick A. Dillon, M.D.,
Georgetown University, 1988. (See Department of Pediatrics.)
Robert K. Minkes, M.D.,
Tulane University, 1992. (See Department of Pediatrics.)
George B. Mychaliska, M.D.,

Division of Plastic and Reconstructive Surgery
Sydney M. Shoenberg, Jr. and
Robert H. Shoenberg Professor of Plastic and Reconstructive Surgery and Head of Division
Susan E. Mackinnon, M.D.,
Queen's University, 1975. (See Department of Otolaryngology and Program in Occupational Therapy.)

Professors Emeriti
Minot P. Fryer, M.D.,
The Johns Hopkins University, 1940; D.S., Brown University, 1972.
Paul M. Weeks, M.D.,
University of North Carolina, 1958.

Professors
Donald V. Huebener, D.D.S.,
Washington University, 1969.
Appoline Blair St. Louis
Children's Hospital Professor of Surgery
Jeffrey L. Marsh, M.D.,
The Johns Hopkins University, 1970. (See Department of Pediatrics.)

William G. Hamm Professor of Plastic Surgery
V. Leroy Young, M.D.,
University of Kentucky, 1970.

Associate Professors
Keith E. Brandt, M.D.,
University of Texas, Houston, 1983.
Bruce A. Kraemer, M.D.,
Washington University, 1979.

Research Associate Professor
Christine B. Novak, M.S.,
University of Toronto, 1992. (See Program in Occupational Therapy.)

Assistant Professors
Judith M. Gurley, M.D.,
Christopher J. Hussussian, M.D.,
Yale University, 1990.
Alex A. Kane, M.D.,
Dartmouth University, 1991.
Thomas H.H. Tung, M.D.,
University of Maryland, 1990.

Assistant Professors (Clinical)
Mark E. Beehner, D.D.S.,
Loyola University, 1979; M.D.,
St. Louis University, 1990.
Joseph W. Eades, M.D.,
Washington University, 1960.
Andrew M. Kim, D.M.D.,
Washington University, 1984.
Richard J. Nissen, D.D.S.,
University of Iowa, 1988.
Homa Youn Sedighi, D.D.S.,
University of Iowa, 1988.

Instructors
Christine J. Cheng, M.D.,
University of Texas Health Science Center, San Antonio, 1993.
James B. Lowe III, M.D.,
Mary K. Seaton, B.S.,
University of Missouri, 1977.

Instructors (Clinical)
David A. Caplin, M.D.,
University of Cincinnati, 1975.
H. Groves Cooke, D.D.S.,
Washington University, 1971.
Surgery


Division of Urologic Surgery

Head of Division and Professor
Gerald L. Andriole Jr., M.D., Jefferson Medical College, 1978. (See Clinical Investigation Program.)

Professor Emeritus
Charles B. Manley Jr., M.D., University of Missouri, 1958. (See Department of Pediatrics.)

Professor
William J. Catalona, M.D., Yale University, 1968.

Professor Emeritus (Clinical)
Robert K. Royce, M.D., Washington University, 1942.

Associate Professors

Associate Professors Emeriti (Clinical)

Assistant Professors

Assistant Professors Emeriti (Clinical)

Assistant Professor (Clinical)
James G. Bucy, M.D., Northwestern University, 1962.

Instructor
Charles H. Nicolai, M.D., Washington University, 1946.

Instructors (Clinical)
ALVIN J. SITEMAN CANCER CENTER

The Alvin J. Siteman Cancer Center at Barnes-Jewish Hospital and Washington University School of Medicine is world renowned for its basic science and translational research. The Siteman Cancer Center (SCC) 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 $90 million in extramural funding for cancer research and is organized into eight research programs (cancer genetics, cancer and developmental biology, tumor immunology, stem cell biology, cellular proliferation, oncologic imaging, prevention and control, and clinical and translational research). The SCC also provides 12 shared resource facilities to its more than 250 research members. Shared resource facilities include: bioinformatics core, biostatistics core, clinical trials core, embryonic stem cell core, health behavior research core, hereditary cancer core, high speed cell sorter core, molecular core laboratory, multiplexed gene analysis core, pharmacology core, small animal cancer imaging core and tissue procurement core.

The SCC provides numerous opportunities in cancer research education and training through seminars, conferences, courses and research opportunities. Individuals are encouraged to contact the Siteman Cancer Center at (314) 454-8327 or via the web site www.siteman.wustl.edu for more information. A few educational opportunities are listed below.

SCC Basic Science Seminar Series
The SCC 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 SCC 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 Tumor Genetics 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, Ph.D., M.D., for more information.
- The Tumor Immunology Program utilizes the longstanding 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 Stem Cell Biology 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. Piwnicka-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 SGC 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 SCC web site.

Cancer Biology Special Emphasis Pathway
The SCC will launch a new special emphasis pathway as part of the Division of Biology and Biomedical Sciences graduate program in 2002. The SCC will sponsor up to 16 students to participate in the program, which will be focused on multidisciplinary cancer biology research. The pathway will include participation in a cancer biology course, the SCC basic science seminar series, work-in-progress inter-lab meetings and journal clubs with at least one of the five basic research programs within the SCC. For more information on this new program contact Douglas G. Dean, Ph.D.
Faculty

Spencer T. and Ann W. Olin Distinguished Professor and Director
Timothy J. Eberlein, M.D., University of Pittsburgh, 1977. (See Department of Pathology and Immunology and Department of Surgery.)

Deputy Director
John F. DiPersio, M.D., Ph.D., University of Rochester, 1980. (See Department of Medicine, Department of Pathology and Immunology, and Department of Pediatrics.)

Associate Director of Basic Research: Program Leader, Stem Cell Biology; Core Director, Embryonic Stem Cell
Timothy J. Ley, M.D., Washington University, 1978. (See Department of Genetics and Department of Medicine.)

Associate Director of Clinical Investigations; Program Leader, Clinical and Translational Research
Jeffrey F. Moley, M.D., Columbia University, 1980. (See Department of Surgery.)

Associate Director of Prevention and Control; Program Co-Leader, Prevention and Control; Core Director, Health Behavior Research
Edwin B. Fisher, Ph.D., State University of New York, 1972. (See Department of Medicine.) (Also Department of Psychology)

Education Program Leader
Douglas C. Dean, Ph.D., University of Kansas, 1983. (See Department of Cell Biology and Physiology and Department of Medicine.)

Program Leader, Cancer Genetics; Core Co-Director, Hereditary Cancer
Paul J. Goodfellow, Ph.D., Queens University, 1985. (See Department of Genetics, Department of Obstetrics and Gynecology and Department of Surgery.)

Program Leader, Cancer and Developmental Biology
David M. Ornitz, Ph.D., University of Washington, 1987; M.D., 1988. (See Department of Molecular Biology and Pharmacology.)

Program Leader, Tumor Immunology
Robert D. Schreibman, Ph.D., State University of New York, 1973. (See Department of Molecular Microbiology and Department of Pathology and Immunology.)

Program Leader, Cellular Proliferation
Helen M. Piwnica-Worms, Ph.D., Duke University, 1984. (See Department of Cell Biology and Physiology.)

Program Co-Leader, Prevention and Control
Ross C. Brownson, Ph.D., Colorado State University, 1985. (St. Louis University School of Public Health)

Program Leader, Oncologic Imaging; Core Co-Director, Small Animal Cancer Imaging
Michael J. Welch, Ph.D., University of London, 1965. (See Department of Molecular Biology and Pharmacology, Department of Radiology and Department of Biomedical Engineering.)

Program Leader, Developmental Therapeutics
Paula M. Fracasso, M.D., Ph.D., Yale University, 1984. (See Department of Medicine.)

Core Director, Clinical Trials
Jeff M. Michalski, M.D., Medical College of Wisconsin, 1986. (See Department of Radiation Oncology.)

Core Co-Director, Hereditary Cancer
Alison J. Whelan, M.D., Washington University, 1986. (See Department of Medicine and Department of Pediatrics.)

Core Director, High-Speed Cell Sorter
Timothy A. Graubert, M.D., Harvard University, 1988. (See Department of Medicine.)

Core Director, Molecular Core Laboratory
Barbara A. Zehnbauer, Ph.D., The University of Chicago, 1979. (See Department of Pathology and Immunology and Department of Pediatrics.)

Core Director, Multiplexed Gene Analysis; Core Director, Tissue Procurement
Mark A. Watson, M.D., Ph.D., Washington University, 1992. (See Department of Pathology and Immunology.)

Core Director, Pharmacology
Howard L. McLeod, Pharm.D., Philadelphia College of Pharmacy and Science, 1990. (See Department of Genetics and Department of Medicine.)

Core Co-Director, Small Animal Cancer Imaging
Joseph J.H. Ackerman, Ph.D., Colorado State University, 1977. (See Department of Chemistry.)

Co-Chair, Protocol Review and Monitoring Committee
Joel Picus, M.D., Harvard Medical School, 1984. (See Department of Medicine.)

Co-Chair, Protocol Review and Monitoring Committee
Barry A. Siegel, M.D., Washington University, 1969. (See Department of Medicine, Department of Radiology and Clinical Investigation Program.)
TEACHING AND RESEARCH DIVISIONS, AND PROGRAMS

DIVISION OF BIOSTATISTICS

The Division of Biostatistics is a medical school-wide facility that engages in teaching, research and biostatistical consultation activities. Interested students may pursue intensive studies through electives offered by the division. At the initiative of other departments, the division also offers additional short courses in biostatistics. The division participates actively in both predoctoral and postdoctoral training. 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 a major activity of the division, providing expertise in both theoretical and applied areas.

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 factors such as lipids, lipoproteins, apolipoproteins, obesity, blood pressure, sex hormones and glucose tolerance; 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.

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 response to exercise training (HERITAGE); a coordinating center for a multicenter NETWORK study on the genetics of hypertension (HyperGEN); a coordinating center for a trial in ocular hypertensives (OHTS); studies in psychiatric epidemiology; studies of the epidemiology of falls, hip fracture and osteoporosis; studies of Alzheimer’s disease; studies on ischemic heart disease; three 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; study of pre-ecampsia and genetic risk factors (including AGT); and epidemiological genetics and family studies of mental disorders including schizophrenia and alcoholism.

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. 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.

GENETIC EPIDEMIOLOGY MASTER OF SCIENCE (GEMS) PROGRAM (M21)
The Master of Science in Genetic Epidemiology (GEMS) 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.

The core facility 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 the departments of Genetics and Psychiatry, and includes world-renowned scientific leaders in their respective areas. Dabeeru 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, two-year, 44 credit hour GEMS program is designed to prepare students to work at the interface of genetics, statistics, epidemiology and computing.

CERTIFICATE IN GENETIC EPIDEMIOLOGY
We offer a Certificate in Genetic Epidemiology to Washington University faculty and staff, to degree candidates in other programs, and to professionals working in related fields. The Certificate may be earned after successful completion (with a minimum of a "B" average) of five core courses (15 credit hours) that are normally offered to Master’s students in Genetic Epidemiology. These courses are: M21 505 Biostatistics for Research Workers, M21 515 Fundamentals of Genetic Epidemiology, M21 500 Introduction to General Epidemiology (all offered in the fall semester), and M21 5482 Human Linkage and Association Analysis and M21 550 Introduction to Bioinformatics (both offered in the spring semester). Courses may be taken over a period of several years.
Prospective Students

Since Genetic Epidemiology is an interdisciplinary field, we expect applicants to come from a variety of backgrounds, but primarily from the biological or quantitative 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 Fundamentals of Biology II or equivalent) background; people with terminal degrees in other (related) disciplines who seek to gain expertise in genetic epidemiology; and current employes 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.

The GEMS Program is located in the Division of Biostatistics at 706 S. Euclid Ave. (Old Shriner’s Hospital).

Further information may be obtained by writing 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
Program Administrator: pa@wubios.wustl.edu
www.biostat.wustl.edu/gems/

M21 500 INTRODUCTION TO GENERAL EPIDEMIOLOGY
Instructor: Linda B. Cottier, Ph.D., 286-2252

Epidemiology is the study of health and disease in the population. This course will introduce you to epidemiologic methods and guidelines for assessment development. It also emphasizes the clinical importance and relevance of epidemiology to medicine. Credit: 3 units. Cross-listed as M08 500 (MPE).

M21 505 BIOSTATISTICS FOR RESEARCH WORKERS
Instructors: Michael A. Province, Ph.D., 362-3616; Kenneth B. Schechtman, Ph.D., 362-2271

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/PC 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 (e.g., reliability, factor analysis, survey and sampling, research design) are then covered in greater detail. Credit: 3 units. Cross-listed as M08 505A (MPE) and L41 5066 (Bio).

M21 515 FUNDAMENTALS OF GENETIC EPIDEMIOLOGY
Instructors: Treva K. Rice, Ph.D., 362-3662; Brian K. Suarez, Ph.D., 362-9433

Causes of phenotypic variation, familial resemblance/association, 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. (Laboratory practice with SEGPATH, PAP, S.A.G.E.) Credit: 3 units.

M21 535 POPULATION GENETICS
Instructor: Alan R. Templeton, Ph.D., 935-6868

An introduction to the basic principles of population and ecological genetics. Mechanisms of microevolutionary processes; integrated ecological and genetic approach to study the adaptive nature of the evolutionary process. Credit: 3 units.

M21 540 ADVANCED TOPICS IN GENETIC EPIDEMIOLOGY
Instructors: Ingrid B. Borecki, Ph.D., 362-3690; John P. Rice, Ph.D., 286-2572

Linkage analysis of quantitative traits, model-based and model-free linkage analysis, ascertainment, epistasis, GxE interaction, multilocus models, linkage disequilibrium, association analysis and scans, fine mapping and gene localization, haplotype analysis, mixed linkage/association models, current concepts in genetics of complex traits, cardiovascular disease, psychiatric disorders, cancer and the role of animal models. Credit: 3 units.

M21 5482 HUMAN LINKAGE AND ASSOCIATION ANALYSIS
Instructors: Anne M. Bowcock, Ph.D., 747-3264; John P. Rice, Ph.D., 286-2572

Meiosis, inheritance, Hardy-Weinberg Equilibrium, Linkage: definition, crossing over, map functions, phase, LOD scores, genetic heterogeneity, penetrance, phenocopies, and liability classes, multipoint 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). Credit: 3 units. Cross-listed as M08 5482 (Genetics).
M21 550 INTRODUCTION TO BIOINFORMATICS
Instructors: Chi 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. Credit: 3 units.

M21 599 DIRECTED INDEPENDENT STUDY
Instructors: Dabeeru 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. Requires the approval of the GEMS director. Credit: variable, maximum 6 units.

M21 601 INDEPENDENT STUDY/ROTATION
Instructors: Dabeeru C. Rao, Ph.D., 362-3608; Michael Lovett, Ph.D., 747-3265
Student selects a faculty mentor in consultation with the coursemasters and pursues independent study in the mentor’s lab. The general goal is to strengthen the overall learning portfolio for the student. If specific areas are not indicated for additional study, work could be initiated toward the Independent Research/Apprenticeship to be carried out in the spring. Credit: 2 units.

M21 610 INDEPENDENT RESEARCH/APPRENTICESHIP
Instructors: Dabeeru C. Rao, Ph.D., 362-3608; Michael Lovett, Ph.D., 747-3265
Student selects a faculty mentor in consultation with the coursemasters 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. Independent research will be supplemented as needed with apprenticeship at sponsoring institutions. Credit: 9 units.

M21 615 STUDY DESIGN AND MANAGEMENT
Instructors: John P. Rice, Ph.D., 362-3617; Chi Gu, Ph.D., 362-3642
Learn critical study design issues, optimal study designs, cost-benefit analysis, power analysis, study management issues (protocols, data entry, data flow, database management, QC), special considerations for multicenter studies, human studies, principals and issues in designing linkage and association studies, and ELSI issues. Credit: 3 units.

M21 625 TRENDS IN GENETIC EPIDEMIOLOGY
Instructors: Michael A. Province, Ph.D., 362-3616; Howard L. McLeod, Ph.D., 747-5183
This course covers timely special issues and therefore some topics may change from year to year. It will start with the following topics in the first year: Pharmacogenomics, Data Mining and Pattern Recognition, Heterogeneity, Meta-analysis, Sequential Analysis, and Identification of Functional Variants. Credit: 3 units.

M80 510 HUMAN GENETICS
Instructor: John P. Rice, Ph.D.
This is an integrated course of human genetics designed primarily for graduate students in human genetics. It provides an overview of current genetic knowledge and techniques and allows the student to pursue an individual study project. Credits: 3 units.

Faculty

PROFESSOR AND DIRECTOR
Dabeeru C. Rao, Ph.D., Indian Statistical Institute, 1971.
(See Department of Genetics.)

Professors
Mae Etsuko Gordon, Ph.D., University of Wisconsin, 1978.
(See Department of Ophthalmology and Visual Sciences.)

(See Alvin J. Siteman Cancer Center.)

(See Clinical Investigation Program.)

John P. Rice, Ph.D., Washington University, 1975.
(See Department of Psychiatry and Clinical Investigation Program.)

Stanley Sawyer, Ph.D., California Institute of Technology, 1964.
(Also Faculty of Arts and Sciences)

(Also Faculty of Arts and Sciences)

Associate Professor
(See Department of Medicine and Clinical Investigation Program.)

Research Associate Professors
Ingrid B. Borecki, Ph.D., University of Hawaii, 1981.
(See Department of Genetics.)

Curtis A. Parvin, Ph.D., University of Minnesota, 1980.
(See Department of Medicine and Department of Pathology and Immunology.)


Paul A. Thompson, Ph.D., University of North Carolina, 1983.

Assistant Professor Emerita
Barbara B. Hixon, B.S., University of Illinois, 1941.
Assistant Professors
Michael R. DeBaun, M.D.,
Sanford University, 1987. (See Department of Pediatrics.)
William D. Shannon, Ph.D.,
University of Pittsburgh, 1995. (See Department of Medicine and Clinical Investigation Program.)
Mary Feltsa, Ph.D.,
University of Sao Paulo, Brazil, 1990.

Research Assistant Professors
Ping An, M.D.,
Shanghai Medical University, Shanghai, China, 1987.
Chi Gu, Ph.D.,
Washington University, 1992.
Chengjie Xiong, Ph.D.,
Kansas State University, 1997.
Yan Yan, Ph.D.,
Johns Hopkins School of Hygiene and Public Health, 1998. (See Department of Surgery.)

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.

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.

M80 582 ALZHEIMER'S DISEASE
Alzheimer's disease (AD) affects more than 4 million Americans 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 heartbreaking. 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 diagnostic techniques have occurred and new treatments are in the FDA approval pipeline. 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 dementia clinic, participate in neuropathology evaluations of demented individuals, and access to Alzheimer investigators in molecular genetics, cell biology and neuroanatomy.

M80 856 HEALTH ADMINISTRATION I
Instructor: Dennis L. Lambert, Ph.D., 362-3266
During the 1990s, the U.S. health care system underwent dynamic change. Socioeconomic and policy changes 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 that have impacted the financing and delivery of health care. Currently, the continuing evolution of large health care systems as well as new types of provider organizations are of interest. The course will explore the impact of these organizations on health care delivery (e.g., managed
Teaching and Research Divisions, and Programs

care) and financing (e.g., provider payment systems and methods). The elective will be conducted by senior 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 coursemaster, 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. **Valid start weeks for 4-week or longer blocks are:** Weeks 13, 17, 21, 25, 29, 33, 37 and 41.
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; and the Department of Chemistry in the School of Arts and Sciences. More than 300 faculty are affiliated with one or more of 12 broad training programs: Biochemistry, Bioorganic Chemistry, Computational Biology, Developmental Biology, Evolutionary and Population Biology, Immunology, Molecular Biophysics, Molecular Cell Biology, Molecular Genetics, Molecular Microbiology and Microbial Pathogenesis, Neurosciences, and Plant Biology. 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 page 20). 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 January 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 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 page 20).

Students admitted to the graduate programs are guaranteed full stipend and tuition support contingent upon satisfactory performance. The stipend for the 2002-2003 academic year will be $20,500 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.

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
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 research scientists confront on a daily basis. Topics will include, but are not limited to: student-mentor relationships, allegations of fraud, collaborators’ rights and responsibilities, conflicts of interest and confidentiality. 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. Prerequisites: Bio 5061 or the equivalent and permission of course director. Credit: 6 units.

L41 (Bio) 5051 FOUNDATIONS IN IMMUNOLOGY
Instructor: Herbert W. Virgin IV, M.D., Ph.D., 362-9223
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 Thursday from 3-5 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: David A. Harris, M.D., Ph.D., 362-4690
This course explores areas of cell biology under active investigation. Topics include biogenesis of organelles, cytoskeleton, apoptosis, cell differentiation and cell physiology. 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., 362-9789
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 checkpoint pathways, scavenging free radicals and alteration of gene expression to resist further exposure to stress. 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) 5068 FUNDAMENTALS OF MOLECULAR CELL BIOLOGY
Instructor: John A. Cooper, M.D., Ph.D., 362-3964
This course is one of the two fall courses that comprise the core curriculum for the graduate programs in Cell and Molecular Biology. The goal of the course is for incoming graduate students to learn about research on molecular mechanisms that underlie cell structure and function. As such, the course emphasizes research and experimental strategies. The course includes a strong emphasis on how the techniques and approaches of protein biochemistry are used in cell biology research. Topics covered in the course include protein structure analysis, protein purification, membrane structure and function, protein and vesicular trafficking, enzyme kinetics, receptor-ligand binding, cell cycle, apoptosis, cell motility and extracellular matrix. The format is three lectures and one small group discussion section per week. Each discussion section focuses on one or more original research articles, which the students read, prepare written critiques, and discuss in the group, which is facilitated by a faculty member. Exams are open-book and taken home over a weekend. Enrollment is restricted to graduate students in the Ph.D. programs of the Division of Biology and Biomedical Sciences. If space permits, graduate students in other programs, medical students and undergraduate students may enroll, but only with explicit permission from the instructor. Same as M15 5068 and M04 5068. Same as E62 BME 5068. Credit: 4 units.

L41 (Bio) 5072 SYNTHESIS FOR BIOORGANIC CHEMISTS
Instructors: George W. Gokel, Ph.D., 362-9297; staff
The course will involve background discussion of the physical organic chemical principles that underlie synthetic tactics and strategies followed by a survey of modern methodology. Prerequisite: undergraduate courses in organic and physical chemistry. Three hours per week. Credit: 4 units.

L41 (Bio) 5073 BIOORGANIC CHEMISTRY JOURNAL CLUB
Instructor: George W. Gokel, Ph.D., 362-9297; staff
Discussion of recent literature and research topics in Bioorganic Chemistry. Credit: 1 unit.

L41 (Bio) 5074 RADIOPHARMACEUTICAL CHEMISTRY AND BIOLOGY
Instructor: Carolyn J. Anderson, Ph.D., 362-8427
This course will teach the fundamentals of radiopharmaceutical chemistry and biology for the diagnostic imaging of disease and therapy of cancer. Students will attend one weekly lecture, of which the first several weeks will focus on the basics of radionuclide production, radiochemistry and
biological applications of radiopharmaceuticals. The lectures later in the semester will focus on research topics in molecular nuclear medicine. One class hour per week and one laboratory (either demonstration or hands-on). Credit contingent on attendance and regular participation. Students will also be given papers and asked to write a critique. Credit: 1 unit.

L41 (Bio) 5092 MOLECULAR AND DEVELOPMENTAL BIOLOGY JOURNAL CLUB
Instructors: Aaron DiAntonio, M.D., Ph.D., 362-9925; Kristen I. 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. Same as M01 OT 426.

L41 (Bio) 5122 CELL-MATRIX INTERACTIONS
Instructors: Robert P. Mecham, Ph.D., 362-2254; William C. Parks, Ph.D., 286-2862
Current research in extracellular matrix biology with an emphasis on cell-matrix interactions. Specific topics include structure and composition of ECM, receptors for ECM and the role of cell-matrix interactions in development, inflammation and disease. Prerequisite: Basic Biochemistry/Cell Biology. This is referenced in the Department of Cell Biology and Physiology. Credit: 2 units.

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) 5124 CELL BIOLOGY JOURNAL CLUB
Instructor: Robert W. Mercer, Ph.D., 362-6924
Discussion of key papers on all aspects of cell biology. Emphasis on recent papers that have addressed fundamental questions relevant to cell biology. Credit: 1 unit, contingent upon regular attendance and one presentation.

L41 (Bio) 5125 STUDENT-RUN CELL BIOLOGY JOURNAL CLUB
Instructor: Phillip D. Stahl, Ph.D., 362-6950
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) 5126 DEVELOPMENTAL BIOLOGY JOURNAL CLUB
Instructor: Kathryn G. Miller, Ph.D., 935-7305
This journal club covers a broad range of topics in developmental biology. Participants (students, faculty and postdoctorates) present summaries of current research published in various journals in the field of developmental biology. Credit: 1 unit, contingent upon attendance and one presentation per semester.

L41 (Bio) 5128 CELL BIOLOGY OF EXTRACELLULAR MATRIX JOURNAL CLUB
Instructor: William C. Parks, Ph.D., 286-2862
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) 5129 GLYCOBIOLOGY DISCUSSION GROUP
Instructor: Jacques U. Baenziger, M.D., Ph.D., 362-8730
Recent papers that deal with glycobiology will be presented each week for discussion. Those wishing to take the course for credit (1 per semester) must attend and present once during a semester. Anyone wishing to be placed on the e-mail list announcing topics should contact Jacques U. Baenziger, M.D., Ph.D., at baenziger@pathology.wustl.edu. Credit: 1 unit.

L41 (Bio) 5132 CYTOSKELETON DISCUSSION GROUP
Instructor: Elliot L. Elson, Ph.D., 362-3346
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: Shintaro Inai, M.D., Ph.D., 362-7853
Why do we age? What causes aging? How is our lifespan determined? This new 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) 5144 SIGNAL TRANSDUCTION IN HUMAN BIOLOGY
Instructors: Kendall J. Blumer, Ph.D., 362-1668; Anthony J. Mustin, M.D., 747-3525
This course focuses on the human biology of signal transduction in normal and diseased states. It consists of lectures and student presentations. State-of-the-art experimental approaches and linkage between basic and clinical research will be highlighted, showing how multidisciplinary research leads to understanding of disease mechanisms, and improved diagnosis and treatment. Prerequisite: L41 (Bio) 5068 Fundamentals of Molecular Cell Biology. Credit: 2 units.

L41 (Bio) 5171 MEDICAL IMMUNOLOGY
Instructor: Andrew 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. 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 malaria, cystic fibrosis, sickle cell anemia, diabetes or lupus. Prerequisite: must be a Markey Pathway student. Credit: 2 units.

L41 (Bio) 5192 CANCER BIOLOGY JOURNAL CLUB
Instructors: Rainer K. Brachmann, M.D., 747-3764; 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: 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. Credit: 2 units.

L41 (Bio) 5217 SPECIAL TOPICS IN MICROBIAL PATHOGENESIS
Instructor: J. David Sibley, Ph.D., 362-8873
Primarily for graduate and MSTP students, this seminar course involves discussion of current research of pathogenic microorganisms and their virulence determinants. Emphasis on model systems that develop human infection, host-pathogen interactions, pathogenesis, epidemiology and antimicrobial strategies. Credit: varies by semester. Credit: 0-3 units.
that demonstrate the cellular and molecular basis of host-pathogen interactions. Prerequisite: advanced elective course Molecular Microbiology and Pathogenesis or permission of instructor. Two class hours a week. This is referenced in the Department of Molecular Microbiology. Credit: 2 units.

L41 (Bio) 5225 PROTEINS JOURNAL CLUB
Instructor: Linda C. Kurz, Ph.D., 362-3401
A weekly journal club of recent literature and research in the fields of protein structure and function. Presentations are given by graduate students, postdoctoral fellows and faculty. Presentation of controversial topics and results are encouraged. Credit: 1 unit, contingent upon regular attendance and one presentation. Prerequisite: graduate standing.

L41 (Bio) 5235 GENETICS JOURNAL CLUB
Instructors: Mark Johnston, Ph.D., 362-2755; Susan K. Dutcher, Ph.D., 362-2765
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’ 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: Wayne M. Yokoyama, M.D., 362-9075
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 effecter 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. Credit: 2 units.

L41 (Bio) 5262 HUMAN IMMUNOBILOGY
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. Prerequisite: Molecular Mechanisms of Immunological Diseases or consent of instructor. Credit: 1 unit.

L41 (Bio) 5272 ADVANCED TOPICS IN IMMUNOLOGY
Instructors: Barry P. Sleckman, M.D., Ph.D., 747-8235; Kenneth M. Murphy, M.D., Ph.D., 362-2009
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. 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.
historical overview, action of dominant and recessive oncogenes, chromosomal translocations, viral oncology, cell cycle dysregulation, intracellular signaling, apoptosis, and tumor immunology. Credit: 2 units.

L41 (Bio) 5312 MACROMOLECULAR INTERACTIONS
Instructor: Timothy M. Lobman, 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, allosteriy, 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. Prerequisites: Physical Chemistry, Biochemistry, Calculus and Organic Chemistry. Three class hours per week. Credit: 3 units.

L41 (Bio) 5313 OPTICAL SPECTROSCOPIC METHODS IN BIOPHYSICS
Instructor: John M. Jean, Ph.D., 362-4197
An introduction to molecular spectroscopy and photophysics with an emphasis on fluorescence methods for the study of biomolecular structure and dynamics. Topics include radiative and nonradiative transitions, time-resolved techniques, fluorescence microscopy, and single molecule methods. Prerequisite: Permission of instructor. Credit: 3 units.

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. Special topics workshops presented by physicians serve to link the basic science to the clinic. 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) 5342 MACROPHAGE BIOLOGY
Instructor: Thomas H. Steinberg, M.D., 362-9218
This special topics course will examine aspects of cell and molecular biology of the macrophage: endocytosis, phagocytosis, adhesion, motility, signal transduction, antigen processing, lysosomes and intracellular parasitism. Prerequisite: Fundamentals of Molecular Cell Biology L41 (Bio) 5068 or Foundations in Immunology L41 (Bio) 5051. Offered in alternate years. Two hours a week. Credit: 2 units.

L41 (Bio) 5352 DEVELOPMENTAL BIOLOGY
Instructor: David C. Beebe, Ph.D., 362-1621
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: Fundamentals of Molecular Cell Biology L41 (Bio) 5068 or Nucleic Acids (548). Credit: 3 units.

L41 (Bio) 5381 MECHANISMS OF PROTEIN TARGETING AND INTERCOMPARTMENTAL TRANSPORT
Instructor: Phillip D. Stahl, Ph.D., 362-6950
Recent advances regarding the molecular mechanisms responsible for targeting and intercompartmental transport of proteins to and between specific organelles, such as the endoplasmic reticulum, golgi apparatus, lysosomes, mitochondria and nucleus. Particular emphasis on the development and use of cell-free systems that faithfully recreate key protein targeting and transport events. Material consists primarily of original research articles presented by students. Prerequisite: Molecular Cell Biology (may not be taken concurrently). Credit: 1 unit.

L41 (Bio) 5384 ADVANCED CELL BIOLOGY
Instructors: Jean E. Schaffner, M.D., 362-8717; William C. Parks, Ph.D., 286-2862
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: glycobiology, membranes, extracellular proteolysis, cytoskeletal connections, and receptor-mediated endocytosis. Prerequisite: L41 (Bio) 5068 or permission of coursemasters. Credit: 3 units.

L41 (Bio) 5391 MOLECULAR VIROLOGY
Instructor: Henry V. Huang, Ph.D., 362-2755
Emphasis is on the basic molecular biology of virus replication, gene expression, host interactions and pathogenesis. The course will be a combination of lectures and student-led discussion sessions. Prerequisite: first-semester core curriculum for programs in Cell and Molecular Biology. Special topics course. Credit: 2 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. Adas, Ph.D., 747-2132
Journal club with a minimum of one student presentation with faculty critique. Prerequisite: permission of instructor. Credit: 1 unit.

L41 (Bio) 5395 SPECIAL TOPICS IN MICROBIOLOGY-CHEMISTRY-EARTH SCIENCE
Instructor: Jan P. Amend, Ph.D., 935-8651
A course with lectures, student presentations and discussions on topics in the interface of microbiology, biochemistry and geochemistry. The focus will be on the impact of microbial processes on their habitats in conjunction with the constraints of the natural system on microbial diversity, phylogeny and physiology. Credit: 2 units.

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 1965, 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) 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) 5456 ADVANCED CRYSTALLOGRAPHY
Instructor: Gabriel Waksman, Ph.D., 362-4562
The advanced course in protein crystallography will address all aspects of modern protein crystallography including fundamentals of crystallography, the derivation of the structure factor and electron density equation, symmetry and space groups, direct methods, isomorphous replacement, molecular replacement, data collection and crystal growing theory and techniques. Prerequisites: L41 (Bio) 5325 Protein Structure and Function. Two class hours per week. This is referenced in the Department of Biochemistry and Molecular Biophysics. Credit: 2 units.

L41 (Bio) 5461 MOLECULAR RECOGNITION
Instructor: Garland R. Marshall, Ph.D., 935-4678 (a.m.); Jay W. Ponder, Ph.D., 362-4195
The physical basis of recognition as exemplified in ligand binding to receptors is the focus with modeling of interactions between macromolecules of biological interest such as G-protein coupled receptors and ligands such as drugs and hormones. Approaches to structure-based design of novel ligands as well as development of active site hypotheses when the three-dimension structure of the receptor is unknown will be developed. Emphasis will be placed on pharmacophore determination, receptor site modeling, three-dimensional quantitative structure-activity relationships, neural networks and de novo design. Applications will be taken from biological systems of therapeutic interest such as...
inhibition of proteases (HIV protease, thrombin, collagenase), homology modeling of enzyme targets such as convertases and design of minor groove ligands for DNA. Each student should expect to complete a project applying one of the computational methods discussed. Two hours of lecture plus three hours of lab per week. Prerequisites: Physical Chemistry, basic Biological Chemistry. Minimum five students. This is referenced in the Department of Biochemistry and Molecular Biophysics. Credit: 3 units.

L41 (Bio) 5464 COMPUTATIONAL BIOCHEMISTRY
Instructor: Jay W. Ponder, Ph.D., 362-4195
This course will cover the application of computer modeling and simulation to problems involving biological macromolecules of interest such as enzymes, receptors, nucleic acids, etc. Lectures will discuss the theory and algorithms behind a variety of simulation techniques. Implementation of these approaches through computational chemistry and molecular modeling will be used to explore their applicability to experimental systems. Alternative paradigms and methods for handling problems at differing levels of structural resolution will be emphasized. Topics examined in detail include molecular mechanics force fields, optimization, dynamics-based simulation, protein folding, homology modeling, tertiary structure prediction, etc. Applications will be taken from well-defined biological systems with critical experimental data available for comparison and validation. Each student should expect to complete a project applying one of the computational methods discussed. Prerequisites: Calculus and Physical Chemistry. Minimum five students. This is referenced in the Department of Biochemistry and Molecular Biophysics. Credit: 3 units.

L41 (Bio) 5466 CURRENT TOPICS IN BIOCHEMISTRY
Instructors: David P. Cistola, M.D., Ph.D., 362-4382; Mark E. Lowe, M.D., Ph.D., 286-2857
Special topics course involving the discussion of research papers covering a broad range of topics in the field of biochemistry. Papers selected from the primary literature will be presented and discussed by students with guidance from the instructor. Emphasis will be placed on papers that illustrate the application of chemical approaches to important biological processes. Designed primarily for first- and second-year graduate students in the Biochemistry Ph.D. program. Prerequisite: Coursemaster permission. Credit: 1 unit.

L41 (Bio) 5468 CARDIOVASCULAR BIOPHYSICS JOURNAL CLUB
Instructor: Sándor J. Kovács, Ph.D., M.D., 454-7660
This journal club is intended for 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. Same as E72 BME 591L. Credit: 1 unit.

L41 (Bio) 5472 CARDIOVASCULAR MRI — FROM PHYSICS TO CLINICAL APPLICATION
Instructor: Sándor J. Kovács, Ph.D., M.D., 454-7660
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 seminar project. Prerequisites: Calculus, introductory human physiology/anatomy/biology course. Same as E62 BME 590M. 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. Prerequisites: CS 241 or CS 514N or L41 (Bio) 5495. Same as E61 CS 547T. Credit: 3 units.

L41 (Bio) 5478 BIOMOLECULAR NMR
Instructor: David P. Cistola, M.D., Ph.D., 362-4382
This advanced elective will cover some of the basic concepts and experiments used for characterizing biological macromolecules using multi-dimensional NMR spectroscopy. Topics will include fundamental concepts such as spin echoes, polarization transfer,
multiple-quantum NMR, as well as experimental and practical considerations in characterizing the structures and dynamics of macromolecules. Prerequisites: L41 (Bio) 5325 or permission of instructor. 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 speaker then gives them feedback, and students are responsible for giving one presentation per semester and to attend regularly. This is referenced in the Department of Biochemistry and Molecular Biophysics. Credit: 1 unit.

L41 (Bio) 5482 HUMAN LINKAGE AND ASSOCIATION ANALYSIS
Instructor: Anne Bowcock, Ph.D., 747-3264
Twenty-four hours of lectures; six hours of student presentations. To be held in the Genetics Library (McDonnell Science Bldg., Room 823), one afternoon a week for two hours each session. Credit: 2 units.

L41 (Bio) 5484 GENETICS AND DEVELOPMENT OF C. ELEGANS JOURNAL CLUB
Instructor: Tim Scheid, 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., 362-2755
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. Prerequisite: Graduate standing and L41 (Bio) 548 and L41 (Bio) 5491, or consent of instructors. Credit: 1 unit.

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) 5494 QUANTITATIVE CARDIOVASCULAR PHYSIOLOGY
Instructor: Sándor J. Kovács, Ph.D., M.D., 454-7660
The course will cover the mechanical, thermodynamic, electrical and pump function role of the heart as well as tissue elasticity, viscosity of selected media, aspects of the microcirculation and wave propagation. Mathematical modeling of various physiologic functions will be stressed. The connection between model prediction and comparison to in vivo human physiologic data will be emphasized. The question of whether new physiology can be predicted from first principles will be considered. Same as E62 BME 5494. Credit: 3 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 landmark paper in the field. Students will acquire a working knowledge of UNIX and the Perl scripting language during the course. There are no formal prerequisites, but an aptitude for mathematics and computer programming is 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: Gary D. Stormo, Ph.D., 747-5534
Computational methods in molecular biology. Focus is on novel methods and recent contributions in computational genomics, proteomics and transcriptomics. Same as E61 CS 6802. 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 or instructor's consent. Same as E71 CS 543T. Credit: 2 units.

L41 (Bio) 5498 AN INTRODUCTION TO GENOMIC ANALYSIS: FUNCTIONAL GENOMICS
Instructor: Tim B. Schiedt, Ph.D., 362-6162
Formal lectures will serve to highlight the role that genomic analysis currently plays in all areas of genetics. A series of lectures and demonstrations will introduce the students to many of the techniques presently used in genomic analysis. Prerequisite: L41 (Bio) 548 nucleic acids or permission of course-master. One-hour lecture and one-hour laboratory demonstration/lecture each week. Credit: 2 units.

L41 (Bio) 550 MEDICAL GENETICS
Instructors: Alison J. Whelan, M.D., 362-8050; Jeffrey I. Gordon, M.D., 362-7243
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) 5511 MOLEKOOLZ
Instructors: Tanya Wolff, Ph.D., 362-1509; Rainer K. Brachmann, M.D., 747-3764
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 and post-docs. Students taking the course for credit will be expected to read one paper per topic. 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
Instructor: Dora E. Angelaki, Ph.D., 747-5529
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/neuroengineering 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 and limb movements, spatial orientation and visual perception. By the end of the course, students should be able to use the firing patterns of individual neurons to build working models of central nervous system circuitry. Prerequisite: graduate students and L41 (Bio) 5651 or special permission from instructor. Same as E62 BME 590G. Credit: 3 units.

L41 (Bio) 5565 ORAL PRESENTATION OF SCIENTIFIC DATA
Instructor: Jeff W. Lichtman, M.D., Ph.D., 362-2504
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 Huetter, 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. Prerequisites: 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 auditory signals of animals, from invertebrates to humans. Structural and functional adaptation for processing the signals for communication and echolocation are considered. Prerequisite: L41 (Bio) 3411 or L41 (Bio) 3421, or a course comparable to Psychological Psychology. One-half hour class per week. Offered in the fall semester of odd-numbered years. Credit: 2 units.

L41 (Bio) 5601 TOPICS IN COGNITIVE NEUROSCIENCE
Instructor: Randy L. Buckner, Ph.D., 935-5019
Recent theoretical and empirical explorations of a range of topics in cognitive neuroscience will be discussed including perception, attention, memory, language and emotion. Emphasis will be placed on how empirical studies using behavioral, neuroimaging and lesion methods are able to provide insight into the neurobiological basis of human development, perception, attention, memory, language and emotion. Credit: 1 unit.

L41 (Bio) 5651 ORAL PRESENTATION OF SCIENTIFIC DATA
Instructor: Jeff W. Lichtman, M.D., Ph.D., 362-2504
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) 5604 NEURAL SCIENCES
Instructor: Jeff W. Lichtman, M.D., Ph.D., 362-2504
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) 5601 TOPICS IN COGNITIVE NEUROSCIENCE
Instructor: Randy L. Buckner, Ph.D., 935-5019
Recent theoretical and empirical explorations of a range of topics in cognitive neuroscience will be discussed including perception, attention, memory, language and emotion. Emphasis will be placed on how empirical studies using behavioral, neuroimaging and lesion methods are able to provide insight into the neurobiological basis of human development, perception, attention, memory, language and emotion. Credit: 1 unit.
human cognition. The final assignment will involve developing, writing and defending a hypothetical grant proposal. Prerequisite: graduate standing or permission of instructor. Same as L33 (Psych) 4401. Credit: 3 units.

L41 (Bio) 5606 COGNITIVE NEUROSCIENCE OF HUMAN MEMORY
Instructor: Randy L. Buckner, Ph.D., 935-5019
A survey of issues related to the cognitive neuroscience of human memory will be discussed including working and long-term memory. Reading will consist of classic works by James, Fuster, Goldman-Rakic, Milner, and Squire as well as many contemporary articles that highlight hot issues and new techniques. Requirements will include readings, attendance, brief presentations, and active participation in classroom discussion. Prerequisite: graduate standing. Same as L33 (Psych) 5090.

L41 (Bio) 5641 COMPUTATIONAL NEUROSCIENCE
Instructor: Charles H. Anderson, Ph.D., 362-1799
This course provides a unified framework for understanding neurobiological systems based on principles of computation and information theory. Students learn how neuronal circuits function through the construction of computer simulations. The discussion begins with small insect systems and ends with sensory, motor, and high-level cortical circuits in primates. Two hours of lectures per week with homework assignments using Matlab. In addition, class projects are assigned in collaboration with experimental neuroscientists. Prerequisites: Calculus, Linear Systems and Programming Experience. Credit: 3 units.

L41 (Bio) 5651 NEURAL SYSTEMS
Instructor: Joseph L. Price, Ph.D., 362-3587
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) 5662 BIOLOGICAL APPLICATIONS OF OPTICAL MICROSCOPY
Instructor: Mark E. Goldberg, M.D., 362-3258
Introduction to the light microscope as a tool for innovative research in cell biology and neuroscience. Topics include optical microscope theory, electronic image acquisition and analysis, fluorescent probes for intracellular ions such as calcium and confocal microscopy. Seminar format with faculty and student participation. Prerequisites: graduate standing or permission of instructor. Audit only by prior arrangement with instructor. Two class hours per week. Credit: 2 units.

L41 (Bio) 5663 NEUROBIOLOGY OF DISEASE
Instructors: Mark P. Goldberg, M.D., 362-3258; Bradley L. Schlaggar, M.D., Ph.D., 454-6120
This is an advanced graduate seminar on the neuroscience of nervous system disorders. Each session is taught by a guest with expertise in a specific neurologic or psychiatric disease. The first hour is a lecture on clinical manifestations and pathophysiology. The second hour is a journal club format in which students present assigned papers. Prerequisite: Introductory neuroscience course at the graduate or medical school level. The course is open to upper-level graduate students in the neuroscience program. Others only by prior arrangement with the instructor. Web site: www.neuro.wustl.edu/bio5663/ Credit: 2 units.

L41 (Bio) 567 ADVANCED TUTORIALS IN NEURAL SCIENCES
Instructor: Joshua R. Sanes, Ph.D., 362-2507, staff
Directed readings and discussions for graduate students on selected topics in advanced neuroscience. Topics and specific instructors to be listed at registration. Each tutorial will last six weeks. Two class hours per week for six weeks, 1 unit. Offered in both fall and spring semesters. Open to all students interested in the neurosciences program. Prerequisite: consent of instructor for non-neurosciences students. Credit: 1-3 units, depending on how many sessions taken.

L41 (Bio) 572 SEMINAR IN PLANT BIOLOGY
Instructor: Eric J. Richards, Ph.D., 935-7196
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) 5721 STUDENT-RUN PLANT BIOLOGY JOURNAL CLUB
Instructors: Barbara N. Kunkel, Ph.D., 935-7284; Craig S. Pikaard, Ph.D., 935-7569; Eric J. Richards, Ph.D., 935-7196
Students of the Plant Biology Program are responsible for organizing this journal club which highlights new papers that significantly advance our understanding of plants. Students arranging to give presentations should consult with one of the faculty organizers at least one week in advance of their talk to gain
approval of their topic and the paper chosen. Students taking the journal club for credit are expected to attend regularly and to make one presentation per semester. Course meets on alternate Fridays. No prerequisites, open to all graduate students and to undergraduates who obtain permission from one of the faculty advisors. Credit: 1 unit.

L41 (Bio) 580 SEMINAR IN POPULATION BIOLOGY
Instructor: Allan Larson, Ph.D., 935-4656
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) 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) 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 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.

Note — The number preceding the course title indicates that the course carries credit in the Graduate School of Arts and Sciences.

DEPARTMENT OF BIOMEDICAL ENGINEERING

Biomedical engineering is the integration of engineering methods with biological science and medical practice. It is concerned with mathematical models, instruments, informatics, biomaterials and medical devices and strives to provide increased quantitative understanding of complex living organisms. Through this increased understanding, biomedical engineers can contribute to the conduct of biomedical research, to improvements in health care and to the utilization of natural rather than artificial processes in meeting society's goals.

In many areas of medicine and biology advances are being driven by information technology. For example, modern computer technology is fundamental to the new fields of computational molecular biology, genome analysis and computational neuroanatomy. 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 bioresorbable 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.

These discoveries will open new opportunities for M.S. and D.Sc. graduates that go beyond those presently available in academic research, teaching and health care. Growth of a new industrial sector concerned with biomaterials and medical devices will create many new jobs for biomedical engineering graduates in the next century.

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, from 15 departments at the School of Medicine and also from the College of Arts & Sciences, this network facilitates and promotes the graduate educational training of Washington University. These activities have been organized through the Institute into a number of specialized programs to provide research opportunities for graduate study. 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 capable of acting independently and directing novel applications of 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.

Biomedical Engineering course offerings:
- BME 500 Independent Study
- BME 501 Graduate Seminar
- BME 503A Cell and Organ Systems Biology
- BME 5068 Fundamentals of Molecular Cell Biology
- BME 537 Computational Molecular Biology
- BME 537A Intensive Course in Computational Molecular Biology
- BME 546 Algorithms for Computational Biology
- BME 5494 Quantitative Cardiovascular Physiology
- BME 557 Cellular and Subcellular Biomechanics
- BME 558 Biological Transport
- BME 559 Introduction to Biomechanics
- BME 560A Biomechanics
- 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 582A Instrumentation
- 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 590G Special Topics: Topics in Neural Engineering, Sensorimotor Systems and Computations
- BME 590H Special Topics: Introduction to Biomaterials Science
- BME 590K Nonlinear Elasticity in Biomechanics
- BME 590L Special Topics: Engineering Aspects of Biotechnology
- BME 590M Cardiovascular MRI—From Physics to Clinical Application
- 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 5911 Cardiovascular Biophysics Journal Club
- BME 599 Master's Research
- BME 600 Doctoral Research
- BME 614 Mechanics of Continua

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., University of California, San Diego, 1970; M.D., 1973. (See Department of Medicine.)

Professors Emeriti


Professors

John P. Boineau, M.D., Duke University, 1959. (See Department of Medicine and Department of Surgery.)

Harold Burton, Ph.D., University of Wisconsin, 1968. (See Department of Anatomy and Neurobiology and Department of Cell Biology and Physiology.)

Michael E. Cain, M.D., George Washington University, 1975. (See Department of Medicine.)

Scan R. Eddy, Ph.D., University of Colorado, 1991. (See Department of Genetics.)
Elliot L. Elson, Ph.D., Stanford University, 1966. (See Department of Biochemistry and Molecular Biophysics.)

William A. Frazier III, Ph.D., Washington University, 1973. (See Department of Biochemistry and Molecular Biophysics and Department of Cell Biology and Physiology.)

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. (See Department of Anatomy and Neurobiology and Department of Otolaryngology.)

Jeffrey W. Lichtman, M.D., Ph.D., Washington University, 1980. (See Department of Anatomy and Neurobiology.)

Garland R. Marshall, Ph.D., Rockefeller University, 1966. (See Department of Biochemistry and Molecular Biophysics and Department of Molecular Biology and Pharmacology.)

Robert P. Mecham, Ph.D., Boston University, 1976. (See Department of Cell Biology and Physiology, Department of Medicine and Department of Pediatrics.)

James G. Miller, Ph.D., Washington University, 1969. (See Department of Medicine.)

Thomas R. Miller, M.D., University of Missouri, 1976. (See Department of Radiology.)

Michael K. Pasque, M.D., University of Oklahoma, 1978. (See Department of Radiology and Department of Surgery.)

Marcus E. Raichle, M.D., University of Washington, 1964. (See Department of Anatomy and Neurobiology, Department of Neurology and Department of Radiology.)

Carl M. Rovainen, Ph.D., Harvard University, 1967.

Donald L. Snyder, Ph.D., Massachusetts Institute of Technology, 1966. (See Department of Radiology.)

Joseph H. Steinbach, Ph.D., University of California, San Diego, 1973. (See Department of Anatomy and Neurobiology and Department of Anesthesiology.)

Gary D. Stormo, Ph.D., University of Colorado, 1981. (See Department of Genetics.)

Salvatore P. Sutera, Ph.D., California Institute of Technology, 1960.

Barna A. Szabo, Ph.D., State University of New York, 1969.

Larry A. Tabor, Ph.D., Stanford University, 1979.

Tzyh-Jong Tarn, D.Sc., Washington University, 1968.

Alan R. Templeton, Ph.D., University of Michigan, 1972.

W. Thomas Thach Jr., M.D., Harvard University, 1964. (See Department of Anatomy and Neurobiology, Department of Biochemistry and Molecular Biophysics, Department of Neurology and Program in Physical Therapy.)

David C. Van Essen, Ph.D., Harvard University, 1971. (See Department of Anatomy and Neurobiology.)

Robert H. Waterston, M.D., Ph.D., The University of Chicago, 1972. (See Department of Anatomy and Neurobiology and Department of Genetics.)

Michael J. Welch, Ph.D., University of London, 1965. (See Department of Molecular Biology and Pharmacology, Department of Radiology and Alvin J. Siteman Cancer Center.)


**Professor (Adjunct)**


**Research Professors**

Charles H. Anderson, Ph.D., Harvard University, 1962. (See Department of Anatomy and Neurobiology.)

Julius Goldstein, Ph.D., University of Rochester, 1965.

**Associate Professors**


Dora Angelaki, Ph.D., University of Minnesota, 1991.

Paul C. Bridgman, Ph.D., Purdue University, 1980. (See Department of Anatomy and Neurobiology.)

Andreas H. Burkhalter, Ph.D., University of Zurich, 1977. (See Department of Anatomy and Neurobiology and Department of Neurological Surgery.)

Ron Cytron, Ph.D., University of Illinois, 1984.


Robert J. Gropler, M.D., University of Cincinnati, 1981.

Sándor J. Kovács, Ph.D., California Institute of Technology, 1977; M.D., University of Miami, 1979. (See Department of Medicine.)

Stanley Misler, Ph.D., New York University, 1976; M.D., 1978. (See Department of Cell Biology and Physiology and Department of Medicine.)

Joseph A. O'Sullivan, Ph.D., University of Notre Dame, 1986.

Steven E. Petersen, Ph.D., California Institute of Technology, 1982. (See Department of Anatomy and Neurobiology, Departments of Neurology and Neurosurgical Surgery and Department of Radiology.)


M. Victor Wickerhauser, Ph.D., Yale University, 1985.

Samuel A. Wickline, M.D., University of Hawaii, 1980. (See Department of Medicine.)

**Assistant Professors**

Kyoji Yamada, M.D., Ph.D., University of Illinois; M.D., 1999.

Philip Arand, D.Sc., Duke University.

Thomas A. Woolsey, M.D., Ph.D., University of Pennsylvania; P.D., Diploma in Radiology, University of London, 1977; M.D., University of Cambridge, 1980; D.P.M., Diploma in Medical Physics, 1981.

Georgia A. Ziegler, Ph.D., University of Michigan, 1997.

Robert B. Zablocki, Ph.D., Washington University; Department of Radiology.

**Graduate Programs**

The Graduate Program is intended for students with advanced degrees working toward a Ph.D. degree. The program is administered by the Department of Neurological Surgery and consists of a training program in neurosurgery and neuroanatomy. The program is designed to provide a solid foundation in the basic sciences and to prepare students for careers in academic medicine. Graduates of the program are expected to achieve high levels of competence in research and clinical medicine, and to be able to work independently in the field of neurosurgery.
Research Associate Professors

Jack R. Engsberg, Ph.D.,
University of Iowa, 1985. (See Department of Neurological Surgery and Program in Occupational Therapy.)

Joseph W. Klaesner, Ph.D.,
University of Iowa, 1981. (See Department of Surgery.)

Richard B. Schuessler, Ph.D.,
Clemson University, 1977. (See Department of Radiology.)

Michael L. Dustin, Ph.D.,
Harvard University, 1990.

Donald L. Elbert, Ph.D.,
University of Texas, Austin, 1997.

Warren R. Gish, Ph.D.,
University of California, Berkeley, 1988. (See Department of Genetics.)

James E. Huettner, Ph.D.,
Harvard University, 1987. (See Department of Cell Biology and Physiology.)

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.

Robert H. Deusinger, Ph.D.,
University of Iowa, 1981. (See Department of Medicine and Program in Physical Therapy.)

Jeremy C. Schotland, Ph.D.,

DeAngelis, Gregory C.
Ph.D.,
Duke University, 1990.

Shelly E. Sakiyama-Elbert, Ph.D.,

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. The student's previous academic work, employment experience and ultimate professional goals enter into the individual's personalized 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 between the Health Administration Program and the School of Law, a dual M.H.A.-M.B.A. degree between the Health Administration Program and the Graduate School of Business Administration and a dual M.H.A.-M.I.M. degree between the Health Administration Program and the
School of Engineering. A dual degree is also offered between the Health Administration Program and the School of Arts and Sciences in Human Resource Management (M.H.A.-M.A.) through University College. Medical students interested in attaining the M.H.A. degree can complete one semester of required HAP courses as part of their fourth-year electives. The remaining three semesters of HAP courses can then be completed after the student has attained his/her M.D. degree.

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's of health administration (M.H.A.) degree conferred by Washington University. 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 Washington University. 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 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, and the fellow reviews his/her learning progression at the end of the fellowship in a report to HAP's director. The preceptor sends two evaluation reports to the director of HAP and shares the responsibility for recommending 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) or the Graduate Management Aptitude Test. 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 $11,500
Books and supplies (per semester) 550
Application fee (nonrefundable) 30

FOURTH YEAR
Medical Student Elective
M80 856 HEALTH ADMINISTRATION I
This elective is described in the Teaching and Research Divisions and Programs chapters.

Faculty

ASSOCIATE PROFESSOR AND DIRECTOR

Assistant Professor
Ronald E. Gribbins, Ph.D., University of Wisconsin, 1975.

Assistant Professor of Health Administration
Mark A. Schnitzler, Ph.D., Washington University, 1997.

Instructor
HEALTH CARE SERVICES PROGRAM

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.

Faculty

ASSOCIATE DIRECTOR

Kelly M. Everard, Ph.D., University of Kentucky, 1995. (Research Associate, Division of Health Behavior Research, Department of Medicine)

Instructors

Laura A. Bayer, Ph.D., Virginia Commonwealth University, 1997. (Instructor in Medicine, Division of Health Behavior Research, Department of Medicine)

Teresa Deshilens, 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)

Robyn Housemann, Ph.D., St. Louis University, 2000. (Assistant Professor, St. Louis University School of Public Health)

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)


Barbara Michael, M.H.S., Washington University, 1999.

Anat Reschke, Ph.D., Washington University, 2000. (Instructor in Medicine, Division of Health Behavior Research, Department of Medicine)

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.

Mark Walker, Ph.D., University of Memphis, 1998. (Instructor in Medicine, Division of Health Behavior Research, Department of Medicine)

Valerie Yancy, Ph.D., St. Louis University, 1999. (Associate Professor, Jewish Hospital College of Nursing and Allied Health)

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).

PROGRAM IN 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 specialize 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 psychology, biology and 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 have equivalent training in a health-related discipline. Undergraduate and graduate students are eligible for financial assistance through scholarships, grants and graduate assistantships. These opportunities are open on a selective basis to qualified applicants.
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.

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 75 hours of coursework, usually accomplished in five semesters of study (two academic years and the intervening summer.) Six months of supervised clinical fieldwork 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 professional 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.

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.

Tuition (graduate, full time) per semester: $11,100
Fee, per three-month clinical fieldwork: $2,000

Faculty

ASSOCIATE PROFESSOR AND ELIAS MICHAEL DIRECTOR
M. Carolyn Baum, Ph.D., OTR/L, Washington University, 1993. (See Department of Neurology.)

Professors
Susan E. Mackinnon, M.D., Queen’s University, 1975. (See Department of Surgery and Department of Otolaryngology.)
J. Gail Neely, M.D., University of Oklahoma, 1965. (See Department of Otolaryngology.)

Associate Professors
C. Robert Almli, Ph.D., Michigan State University, 1970.
Michael N. Diringer, M.D., University of Kentucky, 1982. (See Departments of Neurology and Neurological Surgery.)
Alexander W. Dromerick, M.D., University of Maryland, 1986. (See Department of Neurology.)
Janet Duchek, Ph.D., University of South Carolina, 1982.

Dorothy F. Edwards, Ph.D., Washington University, 1980.
Jay F. Piccirillo, M.D., University of Vermont, 1985. (See Department of Medicine and Department of Otolaryngology.)

Assistant Professors
Ellen F. Binder, M.D., Washington University, 1981. (See Department of Medicine.)
Bradley A. Evanoff, M.D., M.P.H., Washington University, 1986. (See Department of Medicine and Clinical Investigation Program.)
Leonard N. Matheson, Ph.D., University of Southern California, 1979.

Research Assistant Professors
Jack R. Engsberg, Ph.D., University of Iowa, 1985. (See Department of Neurological Surgery and Department of Biomedical Engineering.)
Holly Hollingsworth, Ph.D., University of Illinois, Urbana, 1975.

Instructors
Christine Berg, Ph.D., OTR/L, Washington University, 1999.
David B. Gray, Ph.D., University of Minnesota, 1974.
Kathleen Kniepmann, M.P.H., OTR/L, Harvard University, 1981.
Patricia D. La Vesser, Ph.D., OTR/L, Washington University, 2000.
Monica Perlmutter, M.A., OTR/L, Washington University, 1989.
Patty Schneider, M.S., OTR/L, Washington University, 1996.
Mary K. Seaton, M.H.S., OTR/L, Washington University, 1996.
Susan Stark, Ph.D., OTR/L, University of Missouri, Columbia, 1998.

PROGRAM IN 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 profession 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 $11,900 per semester
Post-professional curriculum $420 per credit
Doctoral curriculum $13,450 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@msnotes.wustl.edu
physicaltherapy.wustl.edu

Faculty

DIRECTOR AND ASSOCIATE PROFESSOR
Susan S. Deusinger, Ph.D.,
(See Department of Neurology.)

Professors

Stephen M. Highstein, M.D.,
University of Maryland, 1965; Ph.D.,
University of Tokyo, 1976. (See Department of Otolaryngology.)
Shirley A. Sahrmann, Ph.D.,
Washington University, 1973. (See Department of Cell Biology and Physiology and Departments of Neurology and Neurological Surgery.)

Paul S.G. Stein, Ph.D.,
Stanford University, 1970. (Also Department of Biology)
Michael J. Strube, Ph.D.,
University of Utah, 1982. (Also Department of Psychology)
W. Thomas Thach Jr., M.D.,
Harvard University, 1964. (See Department of Anatomy and Neurobiology, Department of Neurology, and Department of Biomedical Engineering.)
Graduate Programs

**Associate Professor**


**Research Associate Professor**


**Assistant Professor Emeritus**

Robert J. Hickok, M.H.A., Washington University, 1971. (See Health Administration Program.)

**Assistant Professors**

Robert H. Deusinger, Ph.D., University of Iowa, 1981. (See Department of Medicine and Department of Biomedical Engineering.)

Matthew J. Matava, M.D., University of Missouri, Kansas City, 1987. (See Department of Orthopaedic Surgery.)

Scott D. Minor, Ph.D., University of Iowa, 1987.


Susan B. Racette, Ph.D., The University of Chicago, 1994. (See Department of Medicine.)

David R. Sinacore, Ph.D., University of West Virginia, 1992.


Linda Van Dillen, Ph.D., Washington University, 1994.

**Research Assistant Professors**

Joseph W. Klaesner, Ph.D., Vanderbilt University, 1995. (See Department of Biomedical Engineering.)

DeQuan Zou, D.Sc., Washington University, 1993. (See Department of Biomedical Engineering.)

**Instructor (Emeritus)**


**Instructors**


B. Ruth Clark, Ph.D., St. Louis University, 1988.


Catherine Crandell, M.S., Washington University, 1994.


**Instructors (Clinical)**

Diane Abels
Chris Ahr
Allison Allen
Steve Allen
Cindy Alvino
Kim Ammon
Rose Analitas
Kristy Azbell
Michelle Babcock
Chris Baechle
Dana Beggs
Kimberlyn Benge
Marlys Bennett
Mollie Beyers
Susan Barr Black
Amy Owens Blanford
Jocelyn Blaskey
Philip Boeckmann
Jill Boissonnault
Shawn Bonar
Leslie Boone
Misty Booth
Jo Bowers
Jean Bowman
Carl Brandow
Kathy Braun
Sharea Brehm
Tina Briggs
Heather Brooks
Alesia Brown
Laura Brown
Liesl Brown
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Bernita Caesar
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Beth Howard
Sharon Howard
Rick Huelsing
Dane Hupp
Carol Hyde
Bene James
Kristi Jansen
JoJ Janssen
Kara Jerzan
Dina Jones
Elaine Jones
Dexter Joyner
Dala Kalb
Lyn Kalkbrenner
Rachel Kath-Dvorak
Sally Katz
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Mike Sams
Bob Sanders
Molly Scanlan
Patty Scheets
Jennifer Schlageter
Kathly Schmidt
Heidi Schulte
Peg Schultz
Jenny Schulze
Alex Scialy
Heather Scott
Pam Scott
Tracy Seely
David Seagle
Landis Seger
Angela Sellers
Masters Program in Psychiatric Epidemiology (MPE)

This program prepares postdoctoral fellows and a select group of predoctoral students for an active research career in psychiatric epidemiology. Students develop research skills and learn basic epidemiological methods. They study the history and development of various psychiatric diagnostic systems and the history of psychiatric epidemiology, and they become familiar with the commonly used diagnostic interviews and questionnaires. They also become familiar with computer statistical packages and become competent in data analysis.

Advanced students may be given credit for similar courses taken elsewhere. Each student selects a mentor who is responsible for guiding him or her in research activities. Students present research findings at scholarly meetings and in journal articles and learn to write grant proposals. They serve as constructive critics of the published and submitted work of other researchers and become sensitive to ethical issues in cross-sectional and longitudinal epidemiological research. Students' time is divided between formal courses and research apprenticeships. Students participate in various stages of ongoing studies: instrument development, study design, interviewer training, sample selection, data collection and management, designing and carrying out data analysis and literature reviews.

There are two tracks for the MPE curriculum:
1) General Psychiatric Epidemiology and
2) Psychiatric Genetic Epidemiology. The degree of Master of Psychiatric Epidemiology (MPE) is typically earned in two years.

Faculty

DIRECTOR AND PROFESSOR
Linda B. Cottier, Ph.D., Washington University, 1987. (Epidemiology) (See Department of Psychiatry and Health Administration Program.)

ASSOCIATE DIRECTOR AND RESEARCH ASSISTANT 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.)

Andrew C. Heath, D.Phil., University of Oxford, 1983. (See Department of Psychiatry and Department of Genetics.) (Also Department of Psychology)

Carol S. North, M.D., Washington University, 1983; M.P.E., 1993. (See Department of Psychiatry.)
Theodore Reich, M.D., McGill University, 1963. (See Department of Genetics and Department of Psychiatry.)

John P. Rice, Ph.D., Washington University, 1975. (See Department of Genetics, Department of Psychiatry and Division of Biostatistics.)

Edward L. Spitznagel Jr., Ph.D., The University of Chicago, 1965. (See Division of Biostatistics.) (Also Department of Mathematics)

Arlene Stiffman, Ph.D., Washington University, 1980. (Also George Warren Brown School of Social Work)

Rumi K. Price, Ph.D., University of California, 1988. (See Department of Psychiatry.)

Gwendolyn G. Reich, Ph.D., Washington University, 1978. (See Department of Psychiatry.)

Research Professor
Kathleen K. Bucholz, Ph.D., Yale University, 1986. (See Department of Psychiatry.)

Research Associate Professors
Rosalind J. Neuman, Ph.D., Washington University, 1981. (See Department of Psychiatry.)

Joan Luby, M.D., Wayne State University, 1985. (See Department of Psychiatry.)

M17 500 CLINICAL RESEARCH STUDY DESIGN
Coursemasters: Samuel Klein, M.D., 362-8190; Bradley A. Evanoff, M.D., M.P.H., 454-3850
Introduction to basic principles in designing and implementing a clinical research study, including developing an appropriate research question, choosing the correct study design, obtaining approval for the experimental protocol, reporting the data, and submitting a grant proposal. Student evaluation based upon final written examination. Credit: 2 units.

M17 501 TECHNIQUES OF PATIENT-ORIENTED RESEARCH (I)
Coursemasters: William J. Powers, M.D., 362-2957; Jeffrey E. Saffitz, M.D., Ph.D., 362-7728
The theoretical basis and scientific application of contemporary methods in molecular and cellular biology will be considered in the context of patient-oriented research. Student evaluation will be based on a written, problem-solving take-home examination. Credit: 3 units.

M17 502 SCIENTIFIC FOUNDATIONS OF TRANSLATIONAL RESEARCH (I)
Coursemasters: E. Sessions Cole, M.D., Ph.D., 454-6148; Steven D. Shaprio, M.D., 454-2694
Review current theories of genetic, development, and environmental mechanisms for disease in three separate modules. Student evaluation based upon a final written examination. Credit: 3 units.

M17 505 BIOSTATISTICS FOR PATIENT-ORIENTED RESEARCH
Coursemasters: Kenneth B. Schectman, Ph.D., 362-2271; Michael A. Province, Ph.D., 362-2616
Designed to expand the knowledge of practical methods in statistics for investigators in patient-oriented research. Includes statistical concepts, applications, practical hints and a hands-on approach to data. Heavy use of SAS/PC for in-class
examples and homework problems. Student evaluations based upon final written examination. Credit: 3 units.

M17 550 RESEARCH PROPOSAL SEMINAR
Coursemasters: Samuel Klein, M.D., 362-8190; Bradley A. Evanoff, M.D., M.P.H., 454-3850; Kenneth B. Schechtman, Ph.D., 362-2271
Proposals for research projects are presented for critical review. The potential importance of the study, study design, experimental protocol, analytical methods and statistics will be discussed. Student evaluation will be based upon satisfactory submission of research proposal to the IRB. Prerequisite for this course is Clinical Research Study Design. Credit: 1 unit.

M17 551 TECHNIQUES OF PATIENT-ORIENTED RESEARCH (II)
Coursemasters: William J. Powers, M.D., 362-2957; Jeffrey E. Saffitz, M.D., Ph.D., 362-7728
The theoretical basis and scientific application of modern biological imaging modalities and analysis of whole body composition and systemic physiology will be considered in the context of patient-oriented research. Student evaluation will be based on a written, problem-solving take-home examination. Credit: 3 units.

M17 552 SCIENTIFIC FOUNDATIONS OF TRANSLATIONAL RESEARCH (II)
Coursemasters: F. Sessions Cole, M.D., Ph.D., 454-6148; Steven D. Sibert, M.D., 454-2694
Modern scientific principles relevant to patient-oriented research, presented as modules in the "bench-to-bedside" paradigm for specific diseases. Example modules include cardiovascular, cancer and inherited disease. Emphasis is placed on general biologic processes that translate to specific clinical manifestations. Student evaluation based upon a discussion paper of a disease not covered by course materials. Credit: 3 units.

M17 600 TOPICS IN CLINICAL RESEARCH
Coursemaster: Daniel P. Schuster, M.D., 362-3776
A weekly journal club of recent and key papers in the field of clinical research. Presentations are given by graduate students. Credit contingent upon regular attendance and one presentation. Credit: 1 unit.

M17 900 INDEPENDENT STUDY
Instructor: TBD (student’s mentor)
A clinical research project supervised by a mentor acceptable to the MSCIP. Requires a written grant proposal. Credit: 5 units.

Faculty

DIRECTOR, PROFESSOR AND ASSOCIATE DEAN FOR CLINICAL RESEARCH
Daniel P. Schuster, M.D., Yale University, 1976. (See Department of Medicine and Department of Radiology.)

Professors
Anne M. Bowcock, Ph.D., University of The Witswatersrand, 1984. (See Department of Genetics, Department of Medicine, and Department of Pediatrics.)
F. Sessions Cole, M.D., Ph.D., Yale University, 1973. (See Department of Cell Biology and Physiology and Department of Pediatrics.)
Philip E. Cryer, M.D., Northwestern University, 1965. (See Department of Medicine.)

Edwin B. Fisher, Ph.D., State University of New York, 1972. (See Department of Medicine and Alvin J. Siteman Cancer Center.) (Also Department of Psychology)
Jonathan D. Gitlin, M.D., University of Pittsburgh, 1978. (See Department of Pathology and Immunology and Department of Pediatrics.)
Mae Etsuko Gordon, Ph.D., University of Wisconsin, 1978. (See Department of Medicine, Department of Ophthalmology and Visual Sciences, and Division of Biostatistics.)
Virginia A. Herrmann, M.D., St. Louis University, 1974. (See Department of Surgery.)
Samuel Klein, M.D., Temple University, 1979. (See Department of Medicine.)
Michael Lovett, Ph.D., University of London, 1981. (See Department of Genetics and Department of Pediatrics.)

Philip A. Ludbrook, M.D., University of Adelaide, 1963. (See Department of Medicine and Department of Radiology.)
J. Philip Miller, A.B., Washington University, 1965. (See Division of Biostatistics, Psychiatric Epidemiology and Alvin J. Siteman Cancer Center.)
Thomas R. Miller, Ph.D., Stanford University, 1971; M.D., University of Missouri, 1976. (See Department of Radiology.) (Also Department of Electrical Engineering)
Mark A. Mintun, M.D., Washington University, 1981. (See Department of Psychiatry and Department of Radiology.)
Barbara S. Monseses, M.D., Washington University, 1975. (See Department of Radiology.)
Colin G. Nichols, Ph.D., University of Leeds, 1985. (See Department of Cell Biology and Physiology.)
Associate Professors

Dana R. Abendschein, Ph.D., Purdue University, 1978. (See Department of Cell Biology and Physiology and Department of Medicine.)

William E. Clutter, M.D., Ohio State University, 1975. (See Department of Medicine.)

Gerard M. Doherty, M.D., Yale University, 1986. (See Department of Surgery and Alvin J. Siteman Cancer Center.)

Robert J. Gropler, M.D., University of Cincinnati, 1981. (See Department of Medicine and Department of Radiology.)

Pui-Yan Kwok, M.D., Ph.D., The University of Chicago, 1987. (See Department of Medicine.) (Dermatology)

Janet B. McGill, M.D., Michigan State University, 1979. (See Department of Medicine and Department of Pediatrics.)

Joanne E. Mortimer, M.D., Loyola University, 1977. (See Department of Medicine.)

Robert F. Nease Jr., Ph.D., Stanford University, 1989. (See Department of Medicine.)

Jeffrey J. Neil, M.D., Ph.D., Washington University, 1984. (See Department of Neurology and Department of Pediatrics.)

Brian G. Rubin, M.D., University of Vermont, 1984. (See Department of Radiology and Department of Surgery.)

Kenneth B. Schechtman, Ph.D., Washington University, 1978. (See Department of Medicine and Division of Biostatistics.)

Robert W. Thompson, M.D., University of Michigan, 1983. (See Department of Radiology and Department of Surgery.)

Jerold W. Wallis, M.D., Stanford University, 1981. (See Department of Radiology.)

David B. Wilson, M.D., Ph.D., Washington University, 1986. (See Department of Molecular Biology and Pharmacology and Department of Pediatrics.)

Richard K. Wilson, Ph.D., University of Oklahoma, 1986. (See Department of Genetics.)

Kevin E. Yarasheski, Ph.D., Kent State University, 1986. (See Department of Medicine.)

Mary M. Zutter, M.D., Tulane University, 1981. (See Department of Pathology and Immunology.)

Research Associate Professors

Rosalind J. Neuman, Ph.D., Washington University, 1981. (Mathematics) (See Department of Psychiatry.)

Bruce W. Patterson, Ph.D., University of Illinois, 1980. (See Department of Medicine.)

Rumi K. Price, Ph.D., University of California, 1988. (See Department of Psychiatry and Psychiatric Epidemiology.)

Assistant Professors

Rebecca L. Afi, Ph.D., University of Wisconsin, Madison, 1983; M.D., Washington University, 1992. (See Department of Surgery.)

Philip M. Barger, M.D., Case Western Reserve University, 1989. (See Department of Medicine.)

Mario Castro, M.D., University of Missouri, Kansas City, 1988. (See Department of Medicine.)

Bradley A. Evanoff, M.D., M.P.H., Washington University, 1986. (See Department of Medicine and Program in Occupational Therapy.)

Bradley D. Freeman, M.D., Duke University, 1988. (See Department of Surgery.)

Brian F. Gage, M.D., University of California, 1988. (See Department of Medicine.)

Thomas H. Gallagher, M.D., Harvard University, 1990. (See Department of Medicine.)

Brian P. Hackett, Ph.D., Boston University, 1984; M.D., 1986. (See Department of Pediatrics.)

Mark C. Johnson, M.D., The Johns Hopkins University, 1982. (See Department of Pediatrics.)
Robert C. McKinstry III, Ph.D., Massachusetts Institute of Technology, 1991; M.D., Harvard University, 1992. (See Department of Radiology.)

Louis J. Muglia, Ph.D., The University of Chicago, 1986; M.D., 1988. (See Department of Molecular Biology and Pharmacology and Department of Pediatrics.)

Vamsidhar R. Narra, M.D., Osmania University, India, 1990. (See Department of Radiology.)

Daniel S. Ory, M.D., Harvard University, 1986. (See Department of Medicine.)

Scott Saunders, M.D., Ph.D., Stanford University, 1990. (See Department of Molecular Biology and Pharmacology and Department of Pediatrics.)

William D. Shannon, Ph.D., University of Pittsburgh, 1995. (See Department of Medicine, Alvin J. Siteman Cancer Center and Division of Biostatistics.)

Theodore C. Simon, Ph.D., George Washington University, 1990. (See Department of Pediatrics.)

Mark A. Watson, M.D., Ph.D, Washington University, 1992. (See Department of Pathology and Immunology and Alvin J. Siteman Cancer Center.)

Pamela K. Woodard, M.D., Duke University, 1990. (See Department of Radiology.)

Research Assistant Professors

Donna B. Jeffe, Ph.D., Washington University, 1993. (See Department of Medicine.)

Kathleen B. Sheehan, Ph.D., St. Louis University, 1986. (See Department of Pathology and Immunology.)

Instructors

Leonard B. Bacharier, M.D., Washington University, 1992. (See Department of Medicine and Department of Pediatrics.)

Laura A. Bayer, Ph.D., Virginia Commonwealth University, 1997. (See Department of Medicine.)

Teresa Deshields, Ph.D., University of Georgia, 1985. (See Department of Medicine.)

Mitchell H. Grayson, M.D., The University of Chicago, 1993. (See Department of Medicine.)

Jeffrey S. Greiwe, M.D., Southern Illinois University, Carbondale, 1996. (See Department of Medicine.)

Mario Schootman, Ph.D., University of Iowa, 1993. (See Department of Medicine.)

Mark Walker, Ph.D., University of Memphis, 1998. (See Department of Medicine.)
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Associate Vice Chancellor for Medical Public Affairs
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Associate Vice Chancellor for Clinical Affairs and Chief Executive Officer, Faculty Practice Plan
W. Edwin Dodson, M.D.
Associate Vice Chancellor for Continuing Medical Education and Associate Dean for Medical Student Admissions
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**Assistant Vice Chancellor for Clinical Affairs and Executive Director for Practice Plan Development, Faculty Practice Plan**

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**Assistant Vice Chancellor for Veterinary Affairs and Director of the Division of Comparative Medicine**

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**Assistant Vice Chancellor for Clinical Affairs and Executive Director for Clinical Operations, Faculty Practice Plan**

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**Assistant Vice Chancellor and Assistant Dean of Special Programs**

Leslie E. Kahl, M.D.  
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Philip A. Ludbrook, M.D.  
**Associate Dean for Human Studies**

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**Associate Dean for Graduate Medical Education**

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**Associate Dean and Director of the Office of Diversity**

Paul A. Schoening, M.B.S.  
**Associate Dean for Academic Information Management and Director of the Bernard Becker Medical Library**

Daniel P. Schuster, M.D.  
**Associate Dean for Clinical Research**

G. Michael Timpe, M.B.A.  
**Assistant Dean for Special Projects and Administrative Director of the Center for Clinical Studies**

Alison J. Whelan, M.D.  
**Associate Dean for Medical Student Education**

George E. Andersson, B.A.  
**Assistant Dean for Finance**

Koong-Nah Chung, Ph.D.  
**Assistant Dean for Admissions and Student Affairs**

Walter W. Davis Jr., M.B.A.  
**Assistant Dean for Facilities and Chief Facilities Officer**

Kathryn M. Diemer, M.D.  
**Assistant Dean for Career Counseling**

Stephen S. Lefrak, M.D.  
**Assistant Dean for the Humanities Program in Medicine**

Deborah A. Monolo, A.B.  
**Assistant Dean for Academic Affairs and Registrar**

John F. Walters, M.A.  
**Assistant Dean for Student Affairs and Director of Student Financial Aid**

Carol L. Kwasny, M.A.  
**Assistant Registrar**

Karen Winters, M.D.  
**Director of the Student and Employee Health Services — Medical Campus**

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**Chancellor**

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**Executive Vice Chancellor for Medical Affairs and Dean; President, Washington University Medical Center; Chairman, Executive Faculty**

Edward S. Macias  
**Executive Vice Chancellor and Dean of Arts and Sciences**

Stephen M. Beverley  
**J. William Campbell**

David B. Clifford  
**Associate Dean for Human Studies**

Richard A. Chole  
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Katherine Martin-Bredahl
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Lori McGee-Minnich
Janet B. McGill
LaTisha McKinney
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### Graduating Class
**May 10, 2002**

**Doctor of Medicine and Doctor of Philosophy Degrees**

<table>
<thead>
<tr>
<th>Name</th>
<th>State/Country</th>
<th>University/Institution, Location</th>
<th>Field of Study</th>
<th>Institution/Location</th>
<th>City, State/Province</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chu, Dortha Tao-Yi</td>
<td>Taiwan, Republic of China</td>
<td>B.A., University of California, Berkeley, '92</td>
<td>General Surgery</td>
<td>University of California, San Diego, San Diego, CA</td>
<td></td>
</tr>
<tr>
<td>Chuang, Hubert Hsing</td>
<td>Louisville, KY</td>
<td>B.S., Yale University, '92</td>
<td>Internal Medicine, Preliminary</td>
<td>Yale-New Haven Hospital, New Haven, CT</td>
<td></td>
</tr>
<tr>
<td>Colvin, Jennifer Susan</td>
<td>Towson, MD</td>
<td>A.B., Harvard University, '87</td>
<td>Psychiatry</td>
<td>Barnes-Jewish Hospital, St. Louis, MO</td>
<td></td>
</tr>
<tr>
<td>Dahiy, Anjali</td>
<td>Virginia Beach, VA</td>
<td>B.A., Princeton University, '95</td>
<td>Internal Medicine, Preliminary</td>
<td>Forest Park Hospital, St. Louis, MO</td>
<td></td>
</tr>
<tr>
<td>Efriki, Joseph Patrick</td>
<td>Oakland, MI</td>
<td>B.S., University of Michigan, Ann Arbor, '94</td>
<td>Internal Medicine, Preliminary</td>
<td>Virginia Mason Hospital, Seattle, WA</td>
<td></td>
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<tr>
<td>Farazi, Thalia Andrea</td>
<td>Nicosia, Cyprus</td>
<td>B.A., Brandeis University, '94</td>
<td>Pediatrics</td>
<td>Children's Hospital, Boston, MA</td>
<td></td>
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<tr>
<td>Harris, Charles Andrew</td>
<td>Stony Brook, NY</td>
<td>Sc.B., Brown University, '94</td>
<td>Internal Medicine</td>
<td>Barnes-Jewish Hospital, St. Louis, MO</td>
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<tr>
<td>Henderson, Jeffrey Parker</td>
<td>Olmsted, MN</td>
<td>B.S., University of Wisconsin, Madison, '94</td>
<td>Internal Medicine, Preliminary</td>
<td>Barnes-Jewish Hospital, St. Louis, MO</td>
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<tr>
<td>Klekotka, Paul Alan</td>
<td>Mesa, AZ</td>
<td>B.S., University of Arizona, '95</td>
<td>Internal Medicine, Preliminary</td>
<td>Barnes-Jewish Hospital, St. Louis, MO</td>
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<tr>
<td>Lin, Shao-Pow</td>
<td>Houston, TX</td>
<td>B.S., Stanford University, '93</td>
<td>Transitional</td>
<td>St. John's Mercy Medical Center, St. Louis, MO</td>
<td></td>
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<tr>
<td>Madden, John Crane</td>
<td>Middlesex, MA</td>
<td>B.S., Yale University, '94</td>
<td>Pediatrics</td>
<td>Barnes-Jewish Hospital, St. Louis, MO</td>
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<tr>
<td>Roy, Dolly Banerjee</td>
<td>Williamson, IL</td>
<td>B.S., Washington University, '94</td>
<td>Internal Medicine, Preliminary</td>
<td>San Francisco, CA</td>
<td></td>
</tr>
<tr>
<td>Shankaran, Vijay</td>
<td>Cuyahoga, OH</td>
<td>B.A., Dartmouth College, '94</td>
<td>Deferring Residency</td>
<td>Stanford University, Stanford, CA</td>
<td></td>
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<tr>
<td>Truong, Rosalie Minh</td>
<td>Los Angeles, CA</td>
<td>B.S., University of California, Davis, '90</td>
<td>Pediatrics, Preliminary</td>
<td>Barnes-Jewish Hospital, St. Louis, MO</td>
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<tr>
<td>Wei, Michael Ching-sun</td>
<td>Urbana, IL</td>
<td>B.S., University of Illinois, '95</td>
<td>Pediatrics</td>
<td>Children's Hospital, Boston, MA</td>
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<tr>
<td>Yu, Jennifer Tong-young</td>
<td>Ann Arbor, MI</td>
<td>B.S., University of Michigan, '95</td>
<td>Transitional</td>
<td>Forest Park Hospital, St. Louis, MO</td>
<td></td>
</tr>
<tr>
<td>Ahmad, Muced</td>
<td>Oklahoma City, OK</td>
<td>B.S., University of Oklahoma, '97</td>
<td>Otolaryngology</td>
<td>Washington University, St. Louis, MO</td>
<td></td>
</tr>
<tr>
<td>Blanton Jr., Robert Morris</td>
<td>Houston, TX</td>
<td>B.S., Stanford University, '97</td>
<td>Internal Medicine</td>
<td>Barnes-Jewish Hospital, St. Louis, MO</td>
<td></td>
</tr>
<tr>
<td>Lin, Aaron Chengtung</td>
<td>Sacramento, CA</td>
<td>B.S., Stanford University, '97</td>
<td>Surgery, Preliminary</td>
<td>Brigham &amp; Women's Hospital, Boston, MA</td>
<td></td>
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<tr>
<td>Phillips, Kacy Alvarez</td>
<td>Harvey, LA</td>
<td>B.S., Xavier University of Louisiana, '96</td>
<td>General Surgery</td>
<td>Wayne State University/Detroit Medical Center, Detroit, MI</td>
<td></td>
</tr>
<tr>
<td>Abedin, Sakena</td>
<td>El Paso, TX</td>
<td>B.A., Harvard University, '95; M.S., Stanford University, '96; M.A., '97</td>
<td>Pediatrics</td>
<td>Children's Hospital of Philadelphia, Philadelphia, PA</td>
<td></td>
</tr>
</tbody>
</table>

*Degree Conferred in August 2001*
<table>
<thead>
<tr>
<th>Name</th>
<th>Hospital/University</th>
<th>City, State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahmad, Saad</td>
<td>Bartlett, IL</td>
<td>B.S., Duke University, '98 Transitional Louis Weiss/University of Chicago Chicago, IL Ophthalmology Duke University Durham, NC</td>
</tr>
<tr>
<td>Bartlett, Allison Humes</td>
<td>Madison, WI</td>
<td>B.A., Princeton University, '98 Pediatrics Baylor College of Medicine Houston, TX</td>
</tr>
<tr>
<td>Brown, Ty David</td>
<td>Harrisburg, PA</td>
<td>B.A., University of Delaware, '98 Psychiatry University Hospital Cincinnati, OH</td>
</tr>
<tr>
<td>Burack, Michelle Anne</td>
<td>Benthoud, CO</td>
<td>B.S., Duke University, '90 Neurology Washington University St. Louis, MO</td>
</tr>
<tr>
<td>Button, Jeanne Helen</td>
<td>Portland, OR</td>
<td>B.S., Georgetown University, '98 Internal Medicine, Preliminary Baylor College of Medicine Houston, TX Physical Medicine and Rehab Baylor College of Medicine Houston, TX</td>
</tr>
<tr>
<td>Chandra, Ritik Satish</td>
<td>Louisville, KY</td>
<td>B.A., Washington University, '97 Emergency Medicine University of Louisville Louisville, KY</td>
</tr>
<tr>
<td>Chen, Judy Ling</td>
<td>St. Louis, MO</td>
<td>B.S., Stanford University, '98 Otolaryngology Stanford University Stanford, CA</td>
</tr>
<tr>
<td>Cheng, Shan Li</td>
<td>Dallas, TX</td>
<td>B.A., Brown University, '98 Internal Medicine Barnes-Jewish Hospital St. Louis, MO</td>
</tr>
<tr>
<td>Cheng, Tammy Peihsin</td>
<td>Los Angeles, CA</td>
<td>B.S., University of California, Los Angeles, '96 Internal Medicine Barnes-Jewish Hospital St. Louis, MO</td>
</tr>
<tr>
<td>Cheong, Monica K.</td>
<td>Irvine, CA</td>
<td>B.A., Harvard University, '97 Internal Medicine, Primary Boston University Medical Center Boston, MA</td>
</tr>
<tr>
<td>Chi, Tien-Hsin Cynthia</td>
<td>Irvine, CA</td>
<td>B.S., University of Notre Dame, '97; M.S., '99 Neurological Surgery Washington University St. Louis, MO</td>
</tr>
<tr>
<td>Cloran, Francis Joseph</td>
<td>Salem, OR</td>
<td>B.S., University of Notre Dame, '97; M.S., '99 Neurological Surgery Washington University St. Louis, MO</td>
</tr>
<tr>
<td>Denny, Matthew Richard</td>
<td>Seven Hills, OH</td>
<td>B.A., Brown University, '97 Transitional Albert Einstein Medical Center Philadelphia, PA Diagnostic Radiology Albert Einstein Medical Center Philadelphia, PA</td>
</tr>
<tr>
<td>Dorff, Jonathan David</td>
<td>Beverly Hills, CA</td>
<td>B.A., Brown University, '97 Transitional Albert Einstein Medical Center Philadelphia, PA Diagnostic Radiology Albert Einstein Medical Center Philadelphia, PA</td>
</tr>
<tr>
<td>Echols, Roderick Evans</td>
<td>Madison, WI</td>
<td>B.S., University of Texas, Houston, '90 Internal Medicine, Preliminary Roger Williams Hospital Providence, RI</td>
</tr>
<tr>
<td>Elseby, Susan</td>
<td>Downey, CA</td>
<td>B.S., University of California, Los Angeles, '98 Internal Medicine Cedars-Sinai Medical Center Los Angeles, CA</td>
</tr>
<tr>
<td>Feng, Felix Yichung</td>
<td>Palo Alto, CA</td>
<td>B.S., Stanford University, '98 Internal Medicine, Preliminary St. Joseph Mercy Hospital Ann Arbor, MI Diagnostic Radiology University of Michigan Hospitals Ann Arbor, MI</td>
</tr>
<tr>
<td>Fisher, Emily Jo</td>
<td>Edgewood, KY</td>
<td>B.A., University of Southern California, '96 Dermatology University Hospital Cincinnati, OH</td>
</tr>
<tr>
<td>Fleming, Sara Anne</td>
<td>Herndon, VA</td>
<td>B.S., Cornell University, '98 Family Practice Swedish Medical Center (Providence) Seattle, WA</td>
</tr>
<tr>
<td>Frasier, Michael Anthony</td>
<td>Nashville, TN</td>
<td>B.S., Hampton University, '98 Internal Medicine, Preliminary George Washington University Washington, DC Emergency Medicine George Washington University Washington, DC</td>
</tr>
<tr>
<td>Freer, Phoebe Elizabeth</td>
<td>St. Louis, MO</td>
<td>B.A., Amherst College, '96 Transitional Healtheon Alliance Denver, CO Diagnostic Radiology Barnes-Jewish Hospital St. Louis, MO</td>
</tr>
<tr>
<td>Gal-or, Anat</td>
<td>Pittsburgh, PA</td>
<td>B.S., B.A., Carnegie Mellon University, '97 Internal Medicine, Preliminary Case Western Reserve (Metro Health Program) Cleveland, OH Ophthalmology Cleveland Clinic Foundation Cleveland, OH</td>
</tr>
<tr>
<td>Garrett, Heather Vallhonrat</td>
<td>Haverford, PA</td>
<td>B.S., University of Virginia, '96 Internal Medicine, Preliminary St. Louis University St. Louis, MO Diagnostic Radiology Barnes-Jewish Hospital St. Louis, MO</td>
</tr>
</tbody>
</table>
Gelberman, Sara Courtney
S. Louis, MO
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Obstetrics-Gynecology
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Ghiz, Adam Fredrick
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Baltimore, MD

Kirksey, Duane Erron
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B.S., Xavier University, ‘98
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Birmingham, AL

Klein, Jennifer Margaret
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B.A., University of California, Berkeley, ‘97
Internal Medicine
Santa Clara Valley Medical Center
San Jose, CA

Klenk, Alison Sue
Indianapolis, IN
B.S., Duke University, ‘98
Internal Medicine, Preliminary
Barnes-Jewish Hospital
St. Louis, MO
Dermatology
Barnes-Jewish Hospital
St. Louis, MO

Köynen, Altug
Fargo, ND
B.S., Carnegie Mellon University, ‘98
Obstetrics-Gynecology
George Washington University
Washington, DC

Krejci, Elise Lindsay
Hickory Hills, IL
B.S., University of Illinois, Urbana, ‘98
Pathology
Barnes-Jewish Hospital
St. Louis, MO

Kumar, Varun
Potomic, MD
B.A., Cornell University, ‘98
Pediatrics
Rhode Island Hospital/Brown University
Providence, RI

Lee, Jennifer Stuart
Fairfax Station, VA
B.S., Yale University, ‘98
Deferring Residency

Lien, Cindy
San Jose, CA
B.S., Stanford University, ‘96
Internal Medicine
University of California, San Francisco
San Francisco, CA

Lin, Mary Uan-Sian
Willette, IL
B.S., Stanford University, ‘97
Radiation Oncology
University of Michigan Hospitals
Ann Arbor, MI

Liou, Aimee
Tulsa, OK
B.S., University of Oklahoma, Norman, ‘98
Pediatrics
St. Louis Children’s Hospital
St. Louis, MO

Luthy, Siu Ping
Singapore
B.S., Stanford University, ‘98
Family Practice
Cox Medical Center
Springfield, MO

Mann, Margaret Wing Yan
Huntington Beach, CA
B.S., B.A., Stanford University, ‘98
Transitional
St. John’s Mercy Medical Center
St. Louis, MO
Dermatology
Barnes-Jewish Hospital
St. Louis, MO
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<td>University of Chicago Hospital, Chicago, IL</td>
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<td>University of California, San Francisco</td>
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<td>B.A., Harvard University, '87; Ph.D., Stanford University, '95</td>
<td>Family Practice</td>
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<td>Internal Medicine</td>
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Tadikamalla, Raghu Ram
Pittsburgh, PA
B.A., Northwestern University, '98
Internal Medicine
Barnes-Jewish Hospital
St. Louis, MO

Tevarawer, Amye Juliet
Clayton, MO
B.S., Washington University, '98
Internal Medicine
Barnes-Jewish Hospital
St. Louis, MO

Unger, Benjamin Daniel
Glendale, OH
B.S., Harvard University, '94
Internal Medicine, Preliminary
Thomas Jefferson University
Philadelphia, PA

Vemulakonda, Gurunadh Amram
Vicksburg, MS
B.A., Washington University, '98
Internal Medicine
St. John's Mercy Medical Center
St. Louis, MO

Vogt, Kristen Lynn
Elwood, IL
B.S., University of Illinois, Urbana, '98
Pediatrics
University of California, San Diego
San Diego, CA

Walker, John Clinton
Atcoona, KS
B.S., Pittsburgh State University, '98
Orthopaedic Surgery
Barnes-Jewish Hospital
St. Louis, MO

Ward, Christina Marie
Lawrence, KS
B.A., Grinnell College, '98
Orthopaedic Surgery
University of Iowa Hospitals/Clincs
Iowa City, IA

Wildes, Tanya Marya
Plainfield, IL
B.A., Illinois Wesleyan University, '98
Internal Medicine
Barnes-Jewish Hospital
St. Louis, MO

Wildes, Troy Shepard
Honolulu, HI
B.A., Illinois Wesleyan University, '98
Transitional
St. John's Mercy Medical Center
St. Louis, MO

Wolff, Andrew Barrett
St. Louis, MO
B.A., Amherst College, '96
Orthopaedic Surgery
Yale-New Haven Hospital
New Haven, CT

Wolff, Erin Foran
Newark, OH
B.S., Denison University, '98
Obstetrics-Gynecology
Yale-New Haven Hospital
New Haven, CT

Wu, Thomas Yu Lun
Somerset, NJ
B.A., Harvard University, '98
Orthopaedic Surgery
George Washington University
Washington, DC

Yeh, Peter Chung-Iuh
West Hills, CA
B.A., University of California, Berkeley, '98
Internal Medicine, Preliminary
VA Greater Los Angeles Health Care Program
Los Angeles, CA

Zemany, Laura Hyeson
Cambridge, MA
B.A., Harvard University, '97
Internal Medicine
Beth Israel-Deaconess Medical Center
Boston, MA

Medical Scientist Training Program
(M.D. and Ph.D. Degrees)

Tenth-Year Trainees

Frohner, Paul
Frankfurt, Germany
B.S., Macalester College, '92

Lee, Christopher W.
San Jose, CA
B.A., Harvard University, '90

Ninth-Year Trainees

Clements, Mark Allen
Plymouth, IN
B.S., Butler University, '93

Putcha, Girish
Bhilai, India
B.A., Rice University, '91

Saifee, Owais
 Karachi, Pakistan
B.S., Northwestern University, '93

Zarrin, Amy
New York, NY
B.S., Cornell University, '93

Eighth-Year Trainees

Banerjee, Ritu
Bergen, NJ
B.A., Swarthmore College, '94

Bernstein, Michael Lyn
Woodbury, IA
B.A., The Johns Hopkins University, '94

Murata, Haruhiko
Clark, WA
B.A., Washington University, '94

Nagarajan, Rakesh
Henrico, VA
B.A., University of Virginia, '94

Seventh-Year Trainees

Afkarian, Maryam
Tehran, Iran
B.A., University of California, Berkeley, '94

Bruce, Allen Thomas
North Attleboro, MA
B.A., The Johns Hopkins University, '95

Cole, John Charles
Keokuk, IA
B.S., Washington University, '95

Edelson, Brian Todd
Roslyn, NY
Sc.B., Brown University, '95

Gimenez, Mary Ann Tan
Greendale, WI
B.S., University of Wisconsin, '95

Ho, Alan L.
Des Plaines, IA
B.S., Stanford University, '95

Ho, Emily L.
Rochester, NY
B.S., Yale University, '95

Johnson, Hillary Danielle
Iowa City, IA
B.S., University of Iowa, '95

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### Register of Students

#### Sixth-Year Trainees

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<td>Bartnikas, Thomas B.</td>
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<td>Burlingame, Oname O.</td>
<td>Claremont, CA</td>
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<td>Stanford University</td>
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<td>Cukras, Catherine A.</td>
<td>Scarsdale, NY</td>
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<td>Fink, Doran L.</td>
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<td>Washington University</td>
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<td>Hellman, Nathan E.</td>
<td>New Haven, CT</td>
<td>B.S.</td>
<td>Yale University</td>
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<td>Hofling, August A.</td>
<td>Cream Ridge, NJ</td>
<td>B.A.</td>
<td>Cornell University</td>
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<td>Jacoby, Meagan A.</td>
<td>Baltimore, MD</td>
<td>B.A.</td>
<td>The Johns Hopkins University</td>
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<td>King, Katherine Y.</td>
<td>Houston, TX</td>
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<td>Schilling, Joel D.</td>
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<td>Van Berkel, Victor H.</td>
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<td>Willis, David M.</td>
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<td>Pelosof, Lorraine Cheryl</td>
<td>Dallas, TX</td>
<td>B.S., University of Texas, Austin</td>
<td>'97</td>
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<td>Popkin, Daniel Lewis</td>
<td>Nashville, TN</td>
<td>B.A., Princeton University</td>
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<td>Snyder, Eric Lee</td>
<td>Painted Post, NY</td>
<td>B.S., Pennsylvania State University</td>
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<td>Stacy, Rebecca Colleen</td>
<td>Fairport, NY</td>
<td>B.S., Duke University</td>
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<td>Stricker, Thomas Paul</td>
<td>Bettendorf, IA</td>
<td>B.S., University of Nevada, Reno</td>
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<td>Wang, Leo Hongli</td>
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<td>St. Louis, MO</td>
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<td>University City, MO</td>
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<td>McClellan, James Scott</td>
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<td>Sun, Yang</td>
<td>College Park, MD</td>
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<td>Woodridge, IL</td>
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<td>Surana, Neeraj K.</td>
<td>Evansville, IN</td>
<td>B.S., B.A., Indiana University, Bloomington, '99</td>
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<tr>
<td>Young, Arthur Paul</td>
<td>San Mateo, CA</td>
<td>B.S., University of California, '97</td>
<td></td>
</tr>
<tr>
<td>Alexander, Jennifer Marie</td>
<td>Columbus, NE</td>
<td>B.S., University of Nebraska, Lincoln, '99</td>
<td></td>
</tr>
<tr>
<td>Chan, Sherwin Shiu-Cheung</td>
<td>Vancouver, British Columbia, Canada</td>
<td>B.S., Queen's University at Kingston, '00</td>
<td></td>
</tr>
<tr>
<td>Chiang, Herbert CheuHui</td>
<td>Memphis, TN</td>
<td>B.A., Washington University, '00</td>
<td></td>
</tr>
<tr>
<td>Cho, Soo-Jin</td>
<td>Arcadia, CA</td>
<td>B.S., M.S., Yale University, '00</td>
<td></td>
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<tr>
<td>Diamond, Mark Stephen</td>
<td>Washington, DC</td>
<td>B.A., Princeton University, '00</td>
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<td>Dosenbach, Nico Urs</td>
<td>Calw, Germany</td>
<td>B.A., Columbia University, '00</td>
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<tr>
<td>Grimm, Andrew Alexander</td>
<td>Burnsville, MN</td>
<td>B.S., Massachusetts Institute of Technology, '00</td>
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<tr>
<td>Hagemann, Ian Sean</td>
<td>Alexandria, VA</td>
<td>B.A., Princeton University, '00</td>
<td></td>
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<tr>
<td>Hasbani, Daphne Maya</td>
<td>Woodbridge, CT</td>
<td>B.A., B.H., University of Rochester, '99</td>
<td></td>
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<tr>
<td>Kesarwala, Aparna Hemant</td>
<td>Lawrenceville, NJ</td>
<td>B.A., Princeton University, '00</td>
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<tr>
<td>Klc0, Jeffery Michael</td>
<td>Perry, OH</td>
<td>B.S., Boston College, '98</td>
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<tr>
<td>Lau, Man Chun Jeffrey</td>
<td>Macau</td>
<td>B.A., Washington University, '00</td>
<td></td>
</tr>
<tr>
<td>Martinez, Sara Cecilia</td>
<td>Denton, TX</td>
<td>B.S., University of Texas, Austin, '00; B.H., University of North Texas, '97</td>
<td></td>
</tr>
<tr>
<td>Masia, Ricard</td>
<td>Gerona, Spain</td>
<td>B.A., Cornell University, '00</td>
<td></td>
</tr>
<tr>
<td>Morales, Percy Francisco</td>
<td>Chicago, IL</td>
<td>B.S., University of Illinois, Urbana-Champaign, '00</td>
<td></td>
</tr>
<tr>
<td>Nybakken, Grant Edward</td>
<td>Piedmont, CA</td>
<td>B.S., Haverford College, '00</td>
<td></td>
</tr>
<tr>
<td>Patel, Gaurav Hiren</td>
<td>Evansville, IN</td>
<td>B.A., Washington University, '99</td>
<td></td>
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<tr>
<td>Roizen, Jeffrey David</td>
<td>Chicago, IL</td>
<td>B.S., Williams College, '00</td>
<td></td>
</tr>
<tr>
<td>Sprague, Jennifer Eryn</td>
<td>Nashville, IN</td>
<td>B.S., Indiana University, Bloomington, '00</td>
<td></td>
</tr>
</tbody>
</table>

Second-Year Trainees

<table>
<thead>
<tr>
<th>Name</th>
<th>City, State</th>
<th>Degree Institution</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alexander, Jennifer Marie</td>
<td>Columbus, NE</td>
<td>B.S., University of Nebraska, Lincoln, '99</td>
<td></td>
</tr>
<tr>
<td>Chan, Sherwin Shiu-Cheung</td>
<td>Vancouver, British Columbia, Canada</td>
<td>B.S., Queen's University at Kingston, '00</td>
<td></td>
</tr>
</tbody>
</table>
Register of Students

Sternhell, Kara Ellen
Bryn Mawr, PA
B.A., Washington University, '99

Tao, Ting Yin
Knoxville, TN
B.A., Washington University, '00

Taylor, Sara Jane
Muncie, IN
B.S., Washington University, '99;
M.S., '00

Tehrani, Shandiz
Simi Valley, CA
B.A., Occidental College, '00

Wahrle, Suzanne Elizabeth
Lakewood, CO
B.S., Millsaps College, '99

Wylie, John David
Redmond, WA
B.S., Ohio State University, '00

First-Year Trainees

Baylor, Lauren Ashley
Brecksville, OH
B.S., Ohio State University, '01

Belinda, Steve-Felix
Yaounde, Cameroon
B.S., Pennsylvania State University, '00

Chachu, Karen Amia-Serwa
Cape Coast, Ghana
B.A., Williams College, '01

DeBosch, Brian Jesse
Ann Arbor, MI
B.S., University of Michigan,
Ann Arbor, '00

Fox, Michael David
West Chester, OH
B.S., Ohio State University, '01

Hendrickson, Rebecca Cappel
Seattle, WA
B.S., University of Washington, '01

Hirbe, Angela Christine
St. Charles, MO
B.A., Washington University, '01

Huckfeldt, Rachel Marilyn
Bloomington, IN
B.A., Washington University, '01

LaRiviere, Lori Loraine
San Jose, CA
M.S., University of California,
Santa Barbara, '01; B.S., California
State University, Chico, '98

Lavine, Kory Joshua
St. Louis, MO
B.S., University of Rochester, '01

Lindsley Jr., Robert Coleman
Wynnewood, PA
B.A., Swarthmore College, '98

McCann, Corey Michael
Oley, PA
B.S., The Pennsylvania State
University, '01

Morgan, Michael Land
McComb, MS
B.S., University of Mississippi, '00;
B.A., Rice University, '97

Nadler, Jacob Ward
E. Amherst, NY
B.S., University of Pittsburgh, '01

Rodrigues, Randall John
Morgan Hill, CA
B.S., University of California, '01

Sandmark, Danielle Kaye
Pensgrove, CA
B.A., Coo College, '01

Steed, Ashley Lynn
Raeford, NC
B.S., Duke University, '01

Wen, Leana Sheryle
Temple City, CA
B.S., California State University,
Los Angeles, '01

M.A. and M.D. Degrees
Trainees

Apicelli III, Anthony John
Tritusville, NJ
B.A., Princeton University, '99

Cohen, Michael
Woburn, MA
B.A., Harvard University, '98

Fialkowski, Elizabeth Anderson
Birmingham, AL
B.A., Rice University, '99

Geula, Foead
Woodland Hills, CA
B.S., University of California,
San Diego, '99

Grenda, David Stanley
Las Vegas, NV
B.A., Harvard University, '94

Henderson, Jessica Nicole
Oakton, VA
B.A., Harvard University, '98

Leha, Rachel Leah
Livermore, CA
B.S., University of San Francisco, '98

Lee, Eunice Sue-Jin
Northfield, IL
B.A., Princeton University, '95

Richards, Jeremy Benjamin
Madison, WI
B.A., University of Wisconsin,
Madison, '99

Rovelstad, Susan Jennifer
Waynesboro, PA
B.S., University of Illinois, Urbana-
Champaign, '98

Wee, Raymond
Lake Forest, IL
B.S., M.S., Yale University, '98

M.D. Degree Trainees

Fourth-Year Class

Martinez, Christopher Stephen
Grand Junction, CO
B.A., Harvard University, '98

Nakamura, Sterling Moichiro
Burlingame, CA
B.S., University of California,
Los Angeles, '96

Smith, Rebecca Armstrong
Madison, WI
B.A., Smith College, '95

Walab, Sasha Hyatt
Washington, DC
B.A., University of Virginia, '97

Five-Year Research Program

De Shields, Alex Martin
Easton, MA
B.A., Swarthmore College, '98

Martinez, Carlo Obet
Valle Park, MO
B.S., University of Texas,
San Antonio, '99

Third-Year Class

Alba, Tracie Lynette
St. Louis, MO
B.A., Baylor University, '99

Albrecht, Suzanne Grace
O'Fallon, MO
B.S., University of South Carolina,
Columbia, '99

Anast, Jason William
St. Louis, MO
B.S., Washington University, '99

Arcott, Christopher Thomas
Chesterfield, MO
B.A., Washington University, '99

Aumock, Angel Kay
Elkhorn, WI
B.S., University of Wisconsin,
Madison, '99

Berry, Paul Anthony
Tampa, FL
B.S., University of South Florida, '98

Bork, Sarah E.
Toledo, OH
B.S., Michigan State University, '99
Borman-Shoap, Emily Cray  
Altoona, WI  
B.A., Carleton College, '99

Brady, Patrick Wharton  
Columbus, OH  
B.A., University of Virginia, '99

Brandstetter, Kevin David  
Town and Country, MO  
B.S., Northwestern University, '99

Burgner, Karen Marie  
Naperville, IL  
B.S., University of Illinois, Urbana-Champaign, '99

Canales, John Fierros  
San Antonio, TX  
B.A., University of Texas, Austin, '99

Chan, Stanley Uy  
Salisbury, MD  
B.S., Duke University, '97

Chang, Jerry  
Taipei, Taiwan  
B.S., Duke University, '98

Chao, Andrea  
Princeton Junction, NJ  
B.S., Cornell University, '99

Chavez-Frazier, Arianne  
Pearland, TX  
B.A., Rice University, '99

Chen, Joseph  
Reno, NV  
B.S., A.B., Stanford University, '97

Chen, Li Ern  
Singapore, Republic of China  
B.A., Washington University, '99

Chen-Becker, Deborah  
Dublin, OH  
B.A., Case Western Reserve University, '99

Cheng, Amy S.  
Monterey Park, CA  
B.A., University of California, Berkeley, '99

Clifford, Keri Shannon  
Stevens Point, WI  
B.S., University of Wisconsin, Madison, '99

Connelly, James Albert  
Dubuque, IA  
B.S., University of Iowa, '99

Craig, Vanessa Jane  
Mont Vernon, NH  
B.A., Columbia University, '99

Daniels, Lauren Cecelia  
St. Louis, MO  
B.S., Massachusetts Institute of Technology, '99

Daymont, Carrie Bess  
Erdlenheim, PA  
B.S., Duke University, '99

Fair, Joanna Ruth  
Huntsville, TX  
B.A., Rice University, '95

Feldmann, Amy Ganze  
San Rafael, CA  
B.A., Dartmouth College, '98

Filippino, Scott Robert  
North Canton, OH  
B.S., Carnegie Mellon University, '99

Flynn, Ashley Carter  
Portland, ME  
B.A., Swarthmore College, '98

Gabriel, Peter Edward  
Moorstown, NJ  
B.A., Duke University, '99

Ginde, Adit Arun  
Upper Marlboro, MD  
B.A., Rice University, '99

Goldstein, Jordan Louis  
Highland Park, IL  
B.A., University of Pennsylvania, '99

Hampton, David Akinyele  
Bellevue, WA  
B.S., M.E., Massachusetts Institute of Technology, '97

Hatfield, Daniel Eric  
Gilbertsville, KY  
B.S., University of Notre Dame, '99

Heaton, Jennifer Jill  
Tulsa, OK  
B.A., Pomona College, '98

Hu, Shasa  
St. Louis, MO  
B.S., Stanford University, '98

Iofin, Ilya  
Rockville, MD  
B.A., Princeton University, '99

Irving, Sarah Elizabeth  
Hingham, MA  
B.A., Dartmouth College, '95

Jarrett, Delma Yemisi  
Chicago, IL  
B.A., Harvard University, '99

Johnson, Christopher Alan  
Kailua, HI  
B.S., Willamette University, '99

Jones, Rachel Ann  
Florissant, MO  
B.S., Washington University, '99

Kamath, Ganesh Vasant  
Jacksonville, MO  
B.S., The Johns Hopkins University, '99

Kawamura, David Hiroshi  
Portage, MI  
B.A., Columbia University, '99

King, Erin Lee  
Redwood City, CA  
B.A., Stanford University, '97

Koay, Kelly Weiwei  
Singapore  
B.A., University of Michigan, Ann Arbor, '98

Ladha, Alim Mirza  
Miami, FL  
B.S., University of Miami, '98

Lawson, Amy L.  
Overland, MO  
B.S., University of Nebraska, Lincoln, '99

Lucco, Kerith Lucia  
Edwardsville, IL  
B.S., Stanford University, '98

Mahoney, Heather Jeanine  
Flower Mound, TX  
B.S., Texas A&M University, '97

Marcotte-McKay, Sarah Elaine  
Ann Arbor, MI  
B.S., University of Michigan, Ann Arbor, '98

McGregor, Tracy Lynn  
St. Louis, MO  
B.S., University of Notre Dame, '99

Mesher, Staci Alison  
Baldwin, NY  
B.A., Yale University, '99

Miyashita, Yosuke  
Columbus, OH  
B.S., Washington University, '99

Montalvo, Valerie Hope  
Eureka, CA  
B.A., Washington University, '98

Namazie, Sheyda  
Brookline, MA  
B.A., Williams College, '97

O'Donnell, Heather Colleen  
Yorktown Heights, NY  
B.A., College of the Holy Cross, '97

Oberhelman, Amy Patricia  
Manhattan, KS  
B.A., Stanford University, '99

Patil, Avinash Shantagonda  
Lafayette, CA  
B.S., University of California, Davis, '98

Pettit, Kelli Ann  
Racine, WI  
B.H., University of Wisconsin, Madison, '99
Prager, Jeremy David
Ann Arbor, MI

Quant, Eudocia Carmen
Miami, FL
B.S., Northwestern University, ’98

Ragar, Brent Allen
Cabot, AR
B.H., University of Arkansas, ’99

Reyes, Michael John
Santa Clarita, CA
B.S., University of California, Los Angeles, ’98

Rich, Rachel Aileen
Newhall, CA
B.S., University of California, Los Angeles, ’98

Roy, Lance Atlas
Chesapeake, VA
B.A., Florida State University, ’99

Schmitt, Sarah Elizabeth
Summerville, SC
B.S., Brown University, ’99

Sharma, Umang
Carmel, IN
B.S., Purdue University, ’99

Sibley, Adam Justin
Rolla, MO
B.S., Texas A&M University, ’99

Soden, Cyblurn Earl
Silver Spring, MD
B.S., University of Maryland, ’99

Somsel, Elizabeth Lee
Marshall, MI
B.S., University of Michigan, Ann Arbor, ’99

Srokowski, Tomasz Pawel
Wroclaw, Poland
B.S., Southern Illinois University, Edwardsville, ’99

Stark, Timothy Daniel
Rochester Hills, MI
B.H., University of Michigan, Ann Arbor, ’98

Stephenson, Leroi Arthur
Wycoff, NJ
B.A., Rutgers, The State University of New Jersey, Newark, ’99

Stover, Mark Conrad
Lawrence, KS
B.S., University of Kansas, ’96

Sun, Diane Ruolin
St. Louis, MO
B.S., Washington University, ’99

Swenson, Casey Tad
Cody, WY

Tang, Michele Wen
Kailua, HI
B.S., Rice University, ’98

Terrenzi, Kristen Ingrid
Medfield, MA
B.S., Tulane University, ’99

Torgenson, Marcus Jewell
St. George, UT
B.S., University of Utah, ’99

Tsai, Katherine Shuangchy
Irvine, CA
B.S., University of California, Irvine, ’99

Wang, Lillian Chiao
 Parsippany, NJ
B.A., Princeton University, ’99

Warrier, Kavita Shanker
West Bloomfield, MI
B.S., University of Michigan, Ann Arbor, ’99

Wartman, Lukas Delbert
Dyer, IN
B.S., University of Wisconsin, Madison, ’99

Wecsms, Danielle Marie
St. Louis, MO
B.S., University of Mississippi, ’94

Yang, Roberta Kuoju
Saratoga, CA
B.S., University of California, Los Angeles, ’98

Yoder, Jeffrey Allen
Frederick, MD
B.S., University of Maryland, ’99

Yung, Katherine Chiayee
Houston, TX
B.S., Stanford University, ’98

Zauber, S. Elizabeth
South Orange, NJ
B.S., Haverford College, ’99

Second-Year Class

Ahmed, Kenisha Natalie
Kingston, Jamaica
B.A., Cornell University, ’00

Baker, Jonathan Craig
Cincinnati, OH
B.A., St. Louis University, ’00

Baumann, Aimee Marguerite
Minden, NV
B.A., Cornell University, ’00

Biehl, Kenneth John
Mesa, AZ
B.S., Brigham Young University, ’00

Bonds, Cale Walter
Englewood, CO
B.S., U.S. Air Force Academy, ’00

Brigg, Michael Joseph
Leavenworth, KS
B.A., Dartmouth College, ’00

Brooks, Erica Lynne
St. Louis, MO
B.A., Harvard University, ’99

Browning, Alyssa Camille
St. Louis, MO
B.A., Rhodes College, ’97

Bullock, Andrea Julie
Longmeadow, MA
B.S., Duke University, ’00

Butler, Andrew Shine
B.S., University of North Carolina, Chapel Hill, ’00

Byrd, Greg Dee
Hillsboro, OR
B.S., University of Oregon, ’00

Callisto, Anthony Jay
St. Louis, MO
B.S., University of Southern California, ’00

Campbell, John Allan
Peoria, IL
B.S., University of Illinois, Urbana-Champaign, ’98

Campbell, Kenisha Natalie
University City, MO
B.A., Cornell University, ’00

Carlisle, John Chamberlain
Lee’s Summit, MO
B.S., Duke University, ’99

Carlson, Kathryn Lynne
Statesboro, GA
B.S., Cornell University, ’99

Chan, Walter Wayip
San Francisco, CA
B.S., Washington University, ’00

Chern, Peggy Lecann
St. Louis, MO
M.A., University of California, Berkeley, ’99; B.S., University of California, Los Angeles, ’97

Cho, Samuel Kangwook
Abington, PA
B.A., University of Virginia, ’99

Christopher, Matthew John
St. Louis, MO
B.A., St. Louis University, ’93

Chu, Celeste Ming
Newport Beach, CA
B.A., Pomona College, ’00

Chun, Wendy Eun
Northbrook, IL
B.A., Yale University, ’00
Register of Students

Chung, Jonathan Hero
Glenview, IL
B.S., Union College, '00

Council, Matthew Daniel
Laurel, MS
B.S., University of Mississippi, '00

Cui, Qi
Brookfield, WI
B.S., Massachusetts Institute of Technology, '99

Daaga, Nefertari
Port of Spain, Trinidad
B.A., Dartmouth College, '00

Dean, Joel Glenn
Morris Plains, NJ
B.S., Cedarville College, '99

Deem, Kenneth Clark
Tacoma, WA
B.A., Dartmouth College, '98

Duker, Daniel Ervin
Northport, AL
B.S., University of Notre Dame, '00

Durley, Alison Patricia
Chesterfield, MO
M.S., Massachusetts Institute of Technology, '97, B.S., '96

Ehlers, Justis Potter
Fenton, MO
B.S., University of Notre Dame, '00

Faller, Bryan Andrew
Potomac, MD
B.S., University of Michigan, Ann Arbor, '00

Fowler, Rachel Lyn
Collinsville, IL
B.A., Washington University, '00

Gerlach, David John
Burnsville, MN
B.A., Duke University, '99

Ghuman, Anoopindar Kaur
Huntington Beach, CA
B.S., University of California, Berkeley, '00

Greene, Riley Erickson
Denver, CO
B.S., Washington and Lee University, '00

Haberfeld, Elizabeth
Englewood, NJ
B.A., Vassar College, '92

Hagemann, Andrea Ruth
Davenport, IA
B.A., Princeton University, '00

Harari, Avital
Houston, TX
B.A., University of Texas, Austin, '99

Harris, Vernetta Lee
St. Louis, MO
B.S., Trinity University, '00

Hershenson, Jared Adam
Indianapolis, IN
B.S., Indiana University, Bloomington, '99

Holekamp, Terrence Fletcher
Columbia, MO
B.A., Amherst College, '99

Homes, Kristen Joy
St. Louis, MO
B.A., University of Colorado, Boulder, '00

Hsu, Tony Yun
Godfrey, IL
B.S., University of Illinois, Urbana-Champaign, '00

Huang, Yihung
El Cerrito, CA
B.A., B.S., Stanford University, '99

Inoue, Shane Y.
Honolulu, HI
B.S., University of Hawaii, Manoa, '00

Jones, Angela Eve
Redmond, WA
B.S., University of Washington, Seattle, '99

Ju, Albert Changwon
Bethel Park, PA
B.A., Harvard University, '00

Kaufman, Jennifer Erin
Germantown, TN
B.S., University of Michigan, Ann Arbor, '99

Kelly, James Edward
St. Louis, MO
B.S., University of Notre Dame, '99

Kemp, Jamie Dawn
Lexington, KY
B.S., University of Kentucky, '00

Knipstein, Jeffrey Alan
Carmel, IN
B.A., Washington University, '99

Kwan, Rita Ophelia
Clovis, NM
B.S., Creighton University, '00

Lacy, Molly Lauren
Pittsburgh, PA
B.A., Dartmouth College, '00

Larson, Michelle Lyn
Great Falls, MT
B.A., University of Rochester, '97

Lee, Annie Chiasan
Edwardsville, PA
B.A., Harvard University, '00

Lee, Bryan Sukwoo
Houston, TX
B.S., Harvard University, '00

Lester, Martha Laurin
New Iberia, LA
B.S., Louisiana State University, '00

Lindblom, Annette Elizabeth
St. Louis, MO
M.S., B.S., Tulane University, '00

Lu, Daping
Memphis, TN
B.S., Washington University, '00

Madden, Kate
Ithaca, NY
B.A., Brown University, '99

McKinnon, Megan Heather
Santa Barbara, CA
B.A., Oberlin College, '00

Melander, Sigrid Birgitta
Leawood, KS
B.A., Washington University, '00

Moore, Robert Paul
Staten Island, NY
B.A., New York University, '00

Moran, Kelsey James
Lincoln, NE
B.S., University of Nebraska, Lincoln, '00

Nunnikhoven, Amy Kathleen
Cordova, TN
B.A., Rice University, '00

O'Brien, Cara Louise
Coral Springs, FL
B.A., Harvard University, '99

Olweny, Ephrem Odo
Kampala, Uganda
B.A., Macalester College, '98

Omotoso, Omoniyi Omojowolo
St. Louis, MO
B.A., Baylor University, '00

Pace, Rebecca Dawn
Kinnelon, NJ
B.A., Yale University, '00

Page, Nathan Clarke
Addison, IL
B.A., Brigham Young University, '00

Patillo, Dominick Patrick
Salt Lake City, UT
B.S., Harvard University, '00

Peakman, Lindsay Anne
Englewood, CO
B.S., Wheaton College, '00

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Peros, James Nicholas  
Burlingame, CA  
B.S., Stanford University, '00

Pine, Elyse Dara  
Plainview, NY  
B.A., Case Western Reserve University, '00

Pingsterhaus, Joyce Marie  
Germantown, IL  
B.A., Northwestern University, '99

Pittman, Jessica Erin  
Takoma Park, MD  
B.A., Oberlin College, '98

Pradhan, Shilpi  
Bluefield, WV  
B.S., Emory University, '00

Rogers, Erica Jean  
Cary, IL  
B.S., University of Illinois, Urbana-Champaign, '01

Rosenblum, Keren  
St. Louis, MO  
B.A., Brown University, '98

Rubin, Stacey Leigh  
Elkins Park, PA  
B.A., Cornell University, '99

Rubinstein, Roe Elan  
Sharon, MA  
B.A., Harvard University, '00

Rogers, Jessica Erin  
Plainfield, IL  
B.A., University of Illinois, Urbana-Champaign, '01

Sahandy, Shirin Jacqueline  
Annapolis, MD  
B.S., Duke University, '99

Sandige, Heidi Linda  
St. Louis, MO  
M.A., Yale University, '93; B.A., Northwestern University, '91

Slansky, Amy Deanne  
St. Louis, MO  
B.S., Stanford University, '00

Snyder, Alison Kay  
St. Louis, MO  
B.A., Knox College, '00

Stephenson, Jason Woods  
St. Louis, MO  
B.A., Stanford University, '97

Sucherman, Daniel Robert  
Highland Park, IL  
B.A., Washington University, '00

Teneyck, Lisa Dawn  
Boise, ID  
B.A., Scripps College, '00

Tierney, Ryan Menzies  
Carmel, IN  
B.A., Indiana University, Bloomington, '00

Tu, Daniel Chen  
Edwardsville, IL  
B.A., Washington University, '00

Turnbull, Isaiah Richard  
Pond Lake, WI  
B.S., University of Oregon, '98

Ushe, Mwiza  
West Springfield, MA  
B.S., University of Pittsburgh, '00

Wilcox, Susan Renee  
Yukon, OK  
B.A., University of Oklahoma, Norman, '00

Williams, Kimberly Jo  
Dallas, TX  
B.A., Dartmouth College, '96

Wong, Jason K.  
Tucson, AZ  
B.A., University of California, Berkeley, '00

Yu, Vivian Mae  
Edmonton, Alberta, Canada  
B.S., Northwestern University, '00

Zink, Karen Anne  
Schaumburg, IL  
B.A., University of Illinois, Urbana-Champaign, '99

First-Year Class

Ahmad, Omar Rizwan  
Murphysboro, IL  
B.S., The University of Chicago, '01

Ambekar, Anil  
Lima, OH  
B.S., Northwestern University, '01

Austin, Karen Lynn  
Chatham, NJ  
B.A., Yale University, '01

Barnett, Kara Michelle  
Livingston, NJ  
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Funk, Margo Christiane  
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B.S., Indiana University, Bloomington, '99

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Old Tappan, NJ  
B.S., Georgetown University, '99

Gardner, Jennifer Michelle  
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Gee, Albert Ooguen  
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B.S., University of Illinois, Urbana-Champaign, '01
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<td>M.S., University of Virginia, '90; B.S., Tulane University, '94</td>
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| Pannucci, Christopher John| Naperville, IL            | B.S., Indiana University, Bloomington, '01        |
| Patel, Archit Vipul      | Irvine, CA                | B.S., Washington University, '01                  |
| Pierce, Virginia Margaret| Shaker Heights, OH        | B.S., Brown University, '00                       |
| Pomerantz, Joel Meyer    | Pittsburgh, PA            | B.S., Yale University, '01                        |
| Ramo, Brandon Aaron      | Dunwoody, GA              | B.S., University of Georgia, '01                  |
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| Reisiger, Karen Elaine   | Vestal, NY                | B.S., University of Pittsburgh, '01               |
| Ridenour, Robert Vincent | Eau Claire, WI            | B.S., University of Notre Dame, '01               |
| Rick, Amy Elizabeth      | Delafield, WI             | B.S., University of Wisconsin, Madison, '01      |
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**SUMMARY OF STUDENTS IN THE SCHOOL OF MEDICINE (2001-02)**

**Doctor of Medicine and Doctor of Philosophy Degrees**
- Graduating Class: 16
- Tenth-Year Trainees: 2
- Ninth-Year Trainees: 4
- Eighth-Year Trainees: 4
- Seventh-Year Trainees: 11
- Sixth-Year Trainees: 19
- Fifth-Year Trainees: 19
- Fourth-Year Trainees: 23
- Third-Year Trainees: 16
- Second-Year Trainees: 25
- First-Year Trainees: 18

**Doctor of Medicine and Master of Arts Degrees**
- Graduating Class: 4
- Trainees: 11

**Doctor of Medicine Degree**
- Graduating Class: 89
- Fourth-Year Class: 4
- Five-Year Research Program: 2
- Third-Year Class: 88
- Second-Year Class: 99
- First-Year Class: 101

**Doctor of Physical Therapy Degree**
- First-Year Class: 46
- Part-Time Students: 35

**Doctor of Occupational Therapy Degree**
- Third-Year Class: 4
- Second-Year Class: 9

**Master of Science in Clinical Investigation Degree**
- Part-Time Students: 2

**Master of Health Administration Degree**
- Graduating Class: 12
- First-Year Class: 22
- Part-Time Students: 4

**Master of Science in Physical Therapy Degree**
- Graduating Class: 80
- Second-Year Class: 73

**Master of Science (Occupational Therapy)**
- Part-Time Student: 1

**Master of Science in Occupational Therapy Degree**
- Graduating Class: 54
- Third-Year Class: 9
- Second-Year Class: 30
- First-Year Class: 34
- Part-Time Students: 1

**Master of Science in Psychiatric Epidemiology**
- First-Year Class: 11

**Total**: 982
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