1980

Washington University School of Medicine bulletin, 1980-1981

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To gather knowledge and to find out new knowledge is the noblest occupation of the physician. To apply that knowledge... with sympathy born of understanding, to the relief of human suffering, is his loveliest occupation.

Edward Archibald
(1872–1945)
A medical center is one of the few places—perhaps the only place—where one can see the entire exciting process of the mind of man working at its best from start to finish...the birth of an idea; the establishment of its validity; the placing it in a usable concept; the teaching of it to others; the testing it for practical utility; the careful weighing of the moral and ethical questions that inevitably arise concerning its use; and its discriminating application for the benefit of a particular human being.

Walsh McDermott
(1909–       )

Journal of Chronic Diseases
16:108, 1963
Most of the knowledge and much of the genius of the research worker lie behind his selection of what is worth observing. It is a crucial choice, often determining the success or failure of months of work, often differentiating the brilliant discoverer from the plodder.

Alan Gregg
(1890–1957)
The Furtherance of Medical Research
It is no forced extrapolation to state that every physician is perforce also a potential clinical investigator when he soundly fulfills his responsibilities for each patient.

David Seegal
(1899--)

The Pharos of Alpha Omega
Alpha 26:7, 1963
Scientific discovery is not a monopoly of the fully matured investigator. It is not unusual for a student to present interesting and promising ideas. Best was a medical student when he was associated with Banting in the experiment which led to the discovery of insulin. Cannon was a medical student when he suggested the use of bismuth for visualization of hollow organs by X-ray. It is never too soon to be alert and to question all rules as well as all exceptions.

David and Beatrice C. Seegal (1899- ) (1898- )
The Diplomate 22:125, 1950
One of the most valuable experiences the student may have from a pedagogical point of view is to be required to perform a complete physical examination on a patient under the eye of a senior instructor.

Yale Kneeland, Jr.
(1901-       )
and Robert F. Loeb
(1895-       )
Martini’s Principles and Practice of Physical Diagnosis, Ch. 7
The needs of children should not be made to wait.

John F. Kennedy
(1917–1963)
Message to Congress on the Nation's Youth, February 14, 1963
Until homo sapiens becomes more sapient I can see no prospect of his ever avoiding the foolishness of war or of his learning that two automobiles cannot occupy the same spot at the same time, especially when they come from opposite directions. Broken bones and lacerated wounds are therefore likely to require surgical attention for as long as this would-be clairvoyant can see into the future.

Evarts A. Graham
(1883-1957)
Postgraduate Medicine
7:154, 1950
You must always be students, learning and unlearning till your life's end, and if you are not prepared to follow your profession in this spirit, I implore you to leave its ranks and betake yourself to some third-class trade.

Joseph, Lord Lister
(1827-1912)
## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calendar</td>
<td>4</td>
</tr>
<tr>
<td>The Study of Medicine</td>
<td></td>
</tr>
<tr>
<td>Philosophy and Objectives</td>
<td>6</td>
</tr>
<tr>
<td>Curriculum</td>
<td>6</td>
</tr>
<tr>
<td>Degree Programs</td>
<td>9</td>
</tr>
<tr>
<td>Tutorials, Individualized Programs</td>
<td>11</td>
</tr>
<tr>
<td>Grades</td>
<td>12</td>
</tr>
<tr>
<td>Rules Governing Promotions</td>
<td>13</td>
</tr>
<tr>
<td>Student Research Fellowships</td>
<td>15</td>
</tr>
<tr>
<td>Residency Training</td>
<td>15</td>
</tr>
<tr>
<td>Postdoctoral Training</td>
<td>15</td>
</tr>
<tr>
<td>Admission</td>
<td></td>
</tr>
<tr>
<td>Entrance Requirements</td>
<td>16</td>
</tr>
<tr>
<td>Application Procedure</td>
<td>16</td>
</tr>
<tr>
<td>Third-Year Class Transfer Program</td>
<td>18</td>
</tr>
<tr>
<td>Financial Information</td>
<td></td>
</tr>
<tr>
<td>Tuition and Fees</td>
<td>19</td>
</tr>
<tr>
<td>Refunds</td>
<td>19</td>
</tr>
<tr>
<td>Estimate of Expenses</td>
<td>19</td>
</tr>
<tr>
<td>Financial Assistance, Awards, Prizes</td>
<td>20</td>
</tr>
<tr>
<td>Student Life</td>
<td></td>
</tr>
<tr>
<td>Housing</td>
<td>26</td>
</tr>
<tr>
<td>Parking</td>
<td>27</td>
</tr>
<tr>
<td>Student Health Service</td>
<td>27</td>
</tr>
<tr>
<td>Recreational and Cultural Opportunities</td>
<td>28</td>
</tr>
<tr>
<td>Medical Center Alumni Association</td>
<td>30</td>
</tr>
<tr>
<td>Lectureships and Visiting Professorships</td>
<td>30</td>
</tr>
<tr>
<td>Historical Perspective</td>
<td>32</td>
</tr>
<tr>
<td>Teaching Facilities</td>
<td></td>
</tr>
<tr>
<td>The School of Medicine</td>
<td>34</td>
</tr>
<tr>
<td>The Medical Center</td>
<td>36</td>
</tr>
<tr>
<td>Other Institutions</td>
<td>37</td>
</tr>
<tr>
<td>Departments of the School</td>
<td></td>
</tr>
<tr>
<td>Anatomy and Neurobiology</td>
<td>40</td>
</tr>
<tr>
<td>Anesthesiology</td>
<td>43</td>
</tr>
<tr>
<td>Biological Chemistry</td>
<td>45</td>
</tr>
<tr>
<td>Genetics</td>
<td>48</td>
</tr>
<tr>
<td>Medicine</td>
<td>50</td>
</tr>
<tr>
<td>Microbiology and Immunology</td>
<td>63</td>
</tr>
<tr>
<td>Neurology and Neurological Surgery</td>
<td>66</td>
</tr>
<tr>
<td>Date</td>
<td>Event</td>
</tr>
<tr>
<td>----------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>June 9</td>
<td>Monday</td>
</tr>
<tr>
<td>10,11</td>
<td>Tuesday, Wednesday</td>
</tr>
<tr>
<td>July 4</td>
<td>Friday</td>
</tr>
<tr>
<td>August 27</td>
<td>Wednesday</td>
</tr>
<tr>
<td>25,26</td>
<td>Monday, Tuesday</td>
</tr>
<tr>
<td>28,29</td>
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<tr>
<td>30</td>
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<td>Wednesday, Thursday</td>
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<td>Tuesday, Wednesday</td>
</tr>
<tr>
<td>November 27</td>
<td>Thursday</td>
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<tr>
<td>28</td>
<td>Friday</td>
</tr>
<tr>
<td>December 20</td>
<td>Saturday</td>
</tr>
<tr>
<td></td>
<td>Summer quarter begins</td>
</tr>
<tr>
<td></td>
<td>National Board Examination, Part I</td>
</tr>
<tr>
<td></td>
<td>Independence Day, holiday</td>
</tr>
<tr>
<td></td>
<td>Orientation and registration for all new students</td>
</tr>
<tr>
<td></td>
<td>Registration for returning students</td>
</tr>
<tr>
<td></td>
<td>Summer quarter ends</td>
</tr>
<tr>
<td>September 1</td>
<td>Monday</td>
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<tr>
<td>November 27</td>
<td>Thursday</td>
</tr>
<tr>
<td>28</td>
<td>Friday</td>
</tr>
<tr>
<td></td>
<td>Labor Day, holiday</td>
</tr>
<tr>
<td></td>
<td>First semester begins for first-, third- and fourth-year classes</td>
</tr>
<tr>
<td></td>
<td>National Board Examination, Part I</td>
</tr>
<tr>
<td></td>
<td>National Board Examination, Part II</td>
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<tr>
<td>November 27</td>
<td>Thursday</td>
</tr>
<tr>
<td>28</td>
<td>Friday</td>
</tr>
<tr>
<td></td>
<td>Thanksgiving Day, holiday</td>
</tr>
<tr>
<td></td>
<td>Thanksgiving holiday for first- and second-year classes</td>
</tr>
<tr>
<td>December 20</td>
<td>Saturday</td>
</tr>
<tr>
<td></td>
<td>Winter recess begins at 1:00 p.m.</td>
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<tr>
<td>Date</td>
<td>Day</td>
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<tr>
<td>January 5</td>
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<td>5-9</td>
<td>Monday-Friday</td>
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<td>9</td>
<td>Friday</td>
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<td>12</td>
<td>Monday</td>
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<td>16</td>
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<td>17</td>
<td>Saturday</td>
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<td>19</td>
<td>Monday</td>
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<tr>
<td>March 4</td>
<td>Wednesday</td>
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<td>13</td>
<td>Friday</td>
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<td>20</td>
<td>Friday</td>
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<td>23</td>
<td>Monday</td>
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<tr>
<td>30</td>
<td>Monday</td>
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</tbody>
</table>
PHILOSOPHY AND OBJECTIVES

Washington University encourages application from and gives full consideration to all applicants for admission and financial aid without respect to sex, race, handicap, color, creed, or national or ethnic origin. University policies and programs are nondiscriminatory. The School of Medicine is committed to recruiting, enrolling, and educating an increased number of students from racial minority and educationally deprived groups. Masculine pronouns are used in this book for succinctness only; they are intended to refer to both females and males.

The efforts of the School of Medicine are directed toward providing able students with a stimulating and challenging milieu in which they may acquire a thorough background in scientific medicine, as well as a deep understanding of the meaning of comprehensive medical care. In a field that is developing as rapidly as is medicine, education begun in medical school must serve as the foundation for a lifelong course of learning. As Sir William Osler pointed out some decades ago, a faculty, no matter how talented, can "only instill principles, put the student in the right path, give him methods, teach him how to study, and early to discern between essentials and nonessentials."

Today's student is preparing to cope with a changing world; to contribute, in a constructive, considered way, to resolving problems of medicine and of health care. To assist in that preparation, the faculty's mission is to preserve the joy of learning and to foster a spirit of discrimination and creativity. It is hoped that each student will achieve this grounding during his years in the School of Medicine.

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 must also 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 reevaluated.
The curriculum includes a core experience based upon a sequence of courses that will introduce the student 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 the student select the career best suited to his abilities and goals.

The elective program helps the student to decide where his major interests lie. It also enables him to benefit from the wide range of specialized knowledge and skills found in the faculty. As there is not enough time for each student to be introduced to each of today's areas of specialization, the elective program permits him to select, according to his own desires, the areas he wishes to explore or to study in depth.

### Table of Required Hours 1980–81

As reported to the Liaison Committee on Medical Education, representing the Council on Medical Education of the American Medical Association and the Executive Council of the Association of American Medical Colleges, credit hours for courses are expressed in terms of clock hours—the scheduled hours per year of actual lecture and laboratory contact between faculty and students. These clock hours are not to be interpreted as semester or quarter hours.

#### First-year courses are taught during the 36-week academic year.

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Anatomy</td>
<td>198</td>
</tr>
<tr>
<td>Microscopic Anatomy</td>
<td>149</td>
</tr>
<tr>
<td>General Biochemistry*</td>
<td>93</td>
</tr>
<tr>
<td>Advanced Biochemistry*</td>
<td>(93)</td>
</tr>
<tr>
<td>Medical Genetics</td>
<td>36</td>
</tr>
<tr>
<td>Topics in Clinical Medicine</td>
<td>36</td>
</tr>
<tr>
<td>Medical Microbiology</td>
<td>180</td>
</tr>
<tr>
<td>Neural Science</td>
<td>131</td>
</tr>
<tr>
<td>General Physiology</td>
<td>144</td>
</tr>
<tr>
<td>Biomedical Statistics</td>
<td>18</td>
</tr>
<tr>
<td><strong>Total clock hours for the year</strong></td>
<td><strong>985</strong></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Course</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to Clinical Medicine</td>
<td>124</td>
</tr>
<tr>
<td>Ophthalmology Lectures</td>
<td>9</td>
</tr>
<tr>
<td>Otolaryngology Lectures</td>
<td>9</td>
</tr>
<tr>
<td>Pathology</td>
<td>303</td>
</tr>
<tr>
<td>Pharmacology</td>
<td>180</td>
</tr>
<tr>
<td>Human Sexuality</td>
<td>19</td>
</tr>
<tr>
<td>Introduction to Clinical Psychiatry</td>
<td>49</td>
</tr>
<tr>
<td>Radiology Lectures</td>
<td>36</td>
</tr>
<tr>
<td>Surgery Lectures</td>
<td>36</td>
</tr>
<tr>
<td>Pathophysiology</td>
<td></td>
</tr>
<tr>
<td>PP Infectious Diseases</td>
<td>54</td>
</tr>
<tr>
<td>PP Rheumatology</td>
<td>9</td>
</tr>
<tr>
<td>PP Heart</td>
<td>24</td>
</tr>
<tr>
<td>PP Lung</td>
<td>18</td>
</tr>
<tr>
<td>PP Kidney</td>
<td>22</td>
</tr>
<tr>
<td>PP Metabolism–Endocrinology</td>
<td>32</td>
</tr>
<tr>
<td>PP Gastroenterology</td>
<td>28</td>
</tr>
<tr>
<td>PP Hematology</td>
<td>30</td>
</tr>
<tr>
<td>PP Oncology</td>
<td>23</td>
</tr>
<tr>
<td>PP Neurophysiology</td>
<td>58</td>
</tr>
<tr>
<td>PP Developmental Biology</td>
<td>58</td>
</tr>
<tr>
<td><strong>Total clock hours for the year</strong></td>
<td><strong>1121</strong></td>
</tr>
</tbody>
</table>

*Student’s course level determined by Department of Biochemistry.
Clinical Clerkship (Third) Year is a 48-week academic year.

<table>
<thead>
<tr>
<th>Clerkship</th>
<th>Hours</th>
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</thead>
<tbody>
<tr>
<td>Medicine Clerkship</td>
<td>462</td>
</tr>
<tr>
<td>Neurology/Neurosurgery Clerkship</td>
<td>154</td>
</tr>
<tr>
<td>Obstetrics/Gynecology Clerkship</td>
<td>231</td>
</tr>
<tr>
<td>Ophthalmology Clerkship</td>
<td>38.5</td>
</tr>
<tr>
<td>Neurology/Neurosurgery Clerkship</td>
<td>154</td>
</tr>
<tr>
<td>Obstetrics/Gynecology Clerkship</td>
<td>231</td>
</tr>
<tr>
<td>Psychiatry Clerkship</td>
<td>231</td>
</tr>
<tr>
<td>Surgery Clerkship</td>
<td>462</td>
</tr>
</tbody>
</table>

Total clock hours for the year: 1848

Elective (Fourth) Year is a 48-week academic year. Students are required to attend a minimum of 36 weeks.

At least 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; any exceptions to this must be approved by the Associate Dean for Curriculum and the standing subcommittee of the Committee on Academic Review and Promotions (CARP) II. This subcommittee reviews students taking more than twelve weeks at other schools and all individual questions about what merits elective credit. If the faculty or administrator of the elective program has any question about what should receive elective credit, this subcommittee should judge and report to the CARP II for final action.

Credit may be given for elective work done at any point in the standard four-year Doctor of Medicine degree program so long as the duration of 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 sophomore class, the student is a duly registered, full-time student for a minimum of two years and nine months and tuition is paid for three complete academic years; or (c) if transferring into the junior 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.

To qualify for a Doctor of Medicine degree, a student must take a total of at least 36 weeks of full-time courses or approved research. A complete listing of fourth-year elective offerings is available through the Office of the Associate Dean for Curriculum. Full academic credit will be granted for any successfully completed elective that fulfills the following criteria.

**Full-time course electives must:**

1. be approved by a recognized school of medicine and have a designated coursemaster who will evaluate the student’s performance;
2. be taken when the student is enrolled at the Washington University School of Medicine; and
3. be a planned educational program that deals with some aspect of clinical medicine or biological science and encompasses at least three consecutive weeks.

**Research electives must:**

1. be sponsored by a designated investigator who will outline the project, oversee the student’s progress, and evaluate the student’s performance;
2. be accomplished while the student is enrolled at the Washington University School of Medicine; and
3. be a project in which the student has worked full time for a total of at least twelve weeks. Full-time investigative work on such a project prior to enrollment at the Washington University School of Medicine can be used for the twelve-week minimum requirement but will not be credited toward the 36 weeks needed for elective credit.
Students are encouraged to take lecture-seminar elective courses, but such offerings are optional.
Total clock hours for the year ............................................. 1386
Total clock hours for four years ........................................ 5340

DEGREE PROGRAMS

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

Doctor of Medicine, Four-Year Program

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 degree of Doctor of Medicine 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 twenty-one years of age and must have completed four entire academic years in the study of medicine.

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

Doctor of Medicine, Five-Year Program

In addition to the regular four-year program leading to the M.D. degree, this program permits the student to spend one additional year in an investigative or research concentration. The program must be arranged subject to the approval of the Committee on Medical Education.

M.D./Ph.D. Medical Scientist Training Program

The School of Medicine offers a combined M.D./Ph.D. program within the Division of Biology and Biomedical Sciences, designed for selected students who are interested in a research career and whose undergraduate education has placed major emphasis on science. The program permits the student to obtain both the M.D. and the Ph.D. degree, usually within six years of study. The major purpose of the program is to prepare medical scientists, skilled in the study of modern biology, for clinical and preclinical faculties of medicine. Financial support in the form of stipends (currently $5,040 a year) and tuition remission will be available for a period of six years to all students.
admitted to the program. Support is obtained from National Institutes of Health grants and is subject to their policies governing funding. The program maintains a population of approximately 70 students.

In addition to the minimum requirements established for acceptance into both the School of Medicine and the Graduate School of Arts and Sciences, students planning to concentrate in disciplines related to the chemical or physical sciences should have completed mathematics through calculus, physics and physical chemistry (with calculus as a prerequisite), and advanced organic chemistry. A course in differential equations is recommended, but not necessary. For students whose major interests are in the more biological aspects of medical science, the requirements for chemistry are less rigorous, but a strong background in mathematics and physics is essential. Although most individuals will enter the program as first-year students, applications will be accepted from students in residence. Only students who have spent the equivalent of one summer or more in a research laboratory should apply to the program.

The program consists of three segments: 1) two years of the usual medical curriculum, 2) three or more years of work in the graduate school portion of the program as outlined below, and 3) a final year which is the usual clinical year of the medical curriculum, individually adjusted to each student's requirements and career goals. This sequence may be modified to fit individual needs. Completion of this sequence or its equivalent will satisfy requirements for both the Ph.D. and M.D. degree.

While the Medical Scientist Training Program includes all those courses required for the M.D. degree, it incorporates a high degree of flexibility for individual students through a wide range of electives and the large number of thesis programs available at Washington University.

The members of the Medical Scientist Training Program Committee are available to students to help them decide in which elective courses and laboratories they will participate.

Usually the following courses will be taken in the first two years.

**Year 1**

First Semester: Gross Anatomy, Biochemistry, Microbiology, Social Aspects of Medicine.

Second Semester: Microscopic Anatomy, Physiology, Neural Sciences, Genetics, Topics in Clinical Medicine, Biostatistics.

**Year 2**

Third Semester: Pathology, Pathophysiology, Pharmacology, Introduction to Clinical Medicine.


Students begin their training on July 1 of the year they enter the School of Medicine. The first two weeks of the summer will be spent visiting faculty in the various departments in the School of Medicine and the Departments of Biology and Chemistry in order to select a laboratory for summer research. Students will also spend the summer between their first and second years doing research. The laboratory selected for summer research need not be the same laboratory ultimately chosen for the Ph.D. portion of the program.

A student who passes a qualifying examination in any of the regularly offered preclinical courses will be allowed to substitute either advanced course work or laboratory research in the time made available. In this way many students will have an opportunity to begin supervised research immediately after entry. Research can be continued in free periods during the first two years. In addition to normal medical school courses, special tutorials are available for students in the combined degree program.

The performance of each student will be reviewed annually, and he will be expected to maintain a high scholastic standing as well as a commitment to research.
The student will spend the third, fourth, and fifth years in satisfying the requirements of the Graduate School of Arts and Sciences for the Ph.D. degree.

The formal requirements for the Ph.D. degree include (1) completion of course work, (2) successful performance in qualifying examination, usually at the end of the third year, (3) execution of original research suitable for a dissertation, and (4) defense of the thesis. Students are also required to do a teaching assistantship for a semester in one course. Before beginning the third year, the student will select a faculty adviser under whom he will do his thesis research and the training program or department in which he will obtain his Ph.D. degree.

For purposes of graduate training, the Division of Biology and Biomedical Sciences is divided into the following programs: Cellular, Developmental and Systemic Biology, Molecular Biology, Neural Sciences, Plant Biology, and Evolutionary Biology and Ecology. The programs are taught by faculty from all of the preclinical departments of the School of Medicine and from the Department of Biology of the Faculty of Arts and Sciences. These programs provide maximum flexibility for student training and, by providing for interdepartmental teaching, not only avoid duplication but assure that each course is taught by the most qualified faculty, regardless of departmental affiliation. Therefore, course requirements reflect the student's background and interests rather than a rigid course sequence. Students may also receive their graduate training by special arrangement in other graduate science departments within the University.

A detailed listing of the various courses available in the Division of Biology and Biomedical Sciences can be found on page as well as in the sections describing the various departments of the School of Medicine.

A program of special monthly seminars will be arranged for students during the research years. Conducted by medical scientists of both clinical and preclinical departments of the School of Medicine, these seminars are aimed at stimulating student interest in clinical medicine and at increasing awareness of major research problems in clinical medicine.

**Final Year in Clinical Medicine**

The sixth year is the clinical year of the normal medical curriculum. Transition into this year is facilitated by a special two-week course, Introduction to Clinical Medicine. The intensive clinical training provided in this year is the last formal requirement for the M.D. degree. The Ph.D. and M.D. degrees will be granted simultaneously at the end of the final clinical year.

**Doctor of Philosophy Programs**

The Washington University Graduate School of Arts and Sciences, through the Division of Biology and Biomedical Sciences, offers programs in cellular and developmental biology, evolutionary biology and ecology, molecular biology, neural sciences, and plant biology leading to the Ph.D. degree. Study is organized on an interdepartmental basis using the faculty of the seven preclinical departments of the School of Medicine, as well as the Biology Department of the Graduate School. Additional information and the application for admission may be obtained by writing to:

Office of Graduate Student Affairs  
Box 8072  
Washington University School of Medicine  
660 South Euclid Avenue  
St. Louis, Missouri 63110

**TUTORIALS AND INDIVIDUALIZED PROGRAMS**

The educational program is designed to meet the needs of all medical students in an individual and a personalized way. To help students who may be having academic difficulty or who may wish to reinforce their studies, individual tutorials are offered. The School's experience is that tutorials enable students to handle coursework with
improved proficiency. Students who are found to have difficulties in handling the normal academic course load will be asked to take an individualized program which would require five rather than four years to complete.

GRADES

In order to assist the student in evaluating his progress, he is graded in each course by the faculty. In the clinical and elective years, grades are accompanied by detailed descriptive comments characterizing each student's performance. This type of evaluative data is of considerable assistance to the student when applying for internship or residency training, since it permits the Assistant Dean for Postgraduate Training to give each hospital to which the student has applied a meaningful, comprehensive summary of the candidate's attributes, abilities, and performance.

A Pass/Fail grading system is employed for the first semester of the first year. At the conclusion of each academic year every student receives a grade report that indicates achievement in each course taken. 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 courses.

Grades are:

- H = Honors
- HP = High Pass
- P = Pass
- F = Fail
- DF = Deferred
- INC = Incomplete

"Honors" is given for a truly outstanding performance. "High Pass" for very good work, and "Pass" for satisfactory work. "Fail" signifies clearly unsatisfactory performance. "Deferred" indicates a marginal performance with some deficiency that must be removed, and "Incomplete" denotes that coursework has not been completed.
If a departmental coursemaster submits a grade of "Incomplete," "Deferred," or "Fail" for a medical student duly enrolled in any medical school course, the coursemaster will include an accompanying statement which contains the following information:

1. Student's name
2. Course title
3. Inclusive dates of course
4. Grade
5. Description of extent of academic encumbrance
6. Remedial action recommended to remove the academic encumbrance.

This type of statement will be submitted to the Office of the Registrar at the time student grades are reported and prior to the scheduled meetings of the various committees on academic review and promotions.

RULES GOVERNING PROMOTIONS

A faculty Committee on Academic Review and Promotions reviews the records of all students by curriculum level.

First- and Second-Year Curricula

Students must pass all required courses unless excused from their course(s) by the responsible department(s). Students must have satisfactorily completed all the required courses for the first two years in order to be admitted to candidacy for the degree of Doctor of Medicine and to proceed to the third year of the curriculum.

Each student's performance will be evaluated periodically by a Committee on Academic Review and Promotions. One such committee (CARP I) is concerned with the first two years, and the other (CARP II) with the later years of the curriculum. In the case of unsatisfactory progress, as evidenced by failing grades or an inability to develop adequate clinical expertise, the appropriate committee may recommend that the student be reexamined or repeat the relevant course(s). If a student does not achieve or maintain a satisfactory level of scholarship, the Committee may recommend to the Executive Faculty of the School of Medicine that he be dropped from the School. Any action to drop a student from the School will be the result of a determination by either CARP committee (on the basis of the student's performance and on the judgment of the members of the faculty who are familiar with him), that he has demonstrated an inability successfully to complete the requirements of the School for the degree of Doctor of Medicine.

A recommendation by either committee to drop a student from the School may be appealed. The appeal must be submitted, in writing, to the Dean within 72 hours of the student's receipt of notification of the Committee's recommendation. Appeals will be considered within 30 days by a standing Appeals Committee appointed by the Dean of the School of Medicine. This standing committee has limited authority either to uphold the earlier decision of the relevant CARP committee or to recommend to the Executive Faculty that the student be reinstated and allowed to continue his studies in the School. The reversal of a recommendation by a Committee on Academic Review and Promotions will be based only on a presentation of: (1) information which is new and/or different from that previously received by that Committee, and submitted with its recommendation; or (2) evidence of extreme hardship of which the Committee was not fully apprised.

Individualized Programs

The Committee on Academic Review and Promotions responsible for the first two years may recommend to any first-year student whose performance reflects difficulties with the required coursework that he enter an individualized program offering a reduced course load. The Committee's recommendation will be based on a review of the student's performance in the first or second examinations in one or more of the major* first semester courses.

The intent of such individualized programs is to foster the student's optimum chances of successfully completing the requirements
for the first year by permitting him to take up to two years to complete the first year's work. Students who accept the Committee's recommendation will be permitted to withdraw from one, or at the most two, of the major courses taught in the first semester, and will be eligible for individual tutorial help in the remaining course(s). At the end of the first semester the Committee may require a student who has failed one or more of the major courses to enter an individualized program.

Students who have been required to enter an individualized program must pass all of their assigned courses in each semester in order to continue in the School of Medicine. In the absence of such extenuating circumstances as personal ill health, a student on an individualized program who fails a major assigned course will be dropped from the School. No student may take more than three years to complete the coursework required for the first two years of the curriculum.

The Committee on Academic Review and Promotions will neither promote a student to the status of Candidate for the Doctor of Medicine nor permit a student to begin a Clinical Clerkship until all first- and second-year coursework has been satisfactorily completed.

**Beyond the Second-Year Curriculum**

The Committee on Academic Review and Promotions II meets at least twice each year to review the academic progress of all students who have been promoted or admitted to the status of Candidate for the degree of Doctor of Medicine. This includes students in the regular four-year degree program, students taking a five-year degree program, students in the clinical portion of the Medical Scientist Training Program, those selected students with a prior Ph.D. degree who have been approved by the Medical Science Training Placement Curriculum Committee for individualized curricula and are now in the clinical training period of their program (having previously been promoted to the status of Candidate for the degree of Doctor of Medicine), and all others who have successfully completed all aspects of the School's preclinical curriculum. Just prior to the end of each academic year, the Committee meets and recommends to the Executive Faculty those students who, in the opinion of the Committee, are qualified to receive the degree of Doctor of Medicine. Specific rules are as follows:

1. All academic encumbrances must be removed in order for a student to be recommended for graduation.
2. A candidate having failures in two subjects may, at the discretion of the Committee, be dropped from the School or may continue with an individualized program.

* The term “major course(s)” refers to Biological Chemistry, Microbiology, and Gross Anatomy, which are currently taught in the first semester, and Physiology, Microscopic Anatomy and Neural Science, which are currently taught in the second semester.
STUDENT RESEARCH FELLOWSHIPS

No matter what medical career an individual chooses, it will be essential for him to evaluate and use fresh knowledge as he moves through his professional life. Student Research Fellowships in basic science or clinical areas, awarded each year to selected students who undertake research projects under the direction of faculty members, are an important part of the educational program. 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. Selected faculty members serve as advisers to students interested in special research opportunities.

Fellowships are available to students after acceptance into the School. They are granted for a minimum of two months. The research must be undertaken during the student's free time or a vacation period. A number of studies conducted by students are reported in scientific journals.

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 some will gain additional experience as postdoctoral fellows.

In order to aid students in obtaining desirable residency appointments, an active counseling program is maintained by the Assistant Dean for Postgraduate Training. Thus, in their junior year, students are provided with general background information about the kinds of residencies available. Since more residencies exist than there are candidates in any given year, students are able to exercise a considerable degree of selectivity.

The Assistant Dean for Postgraduate Training maintains an open file of brochures and other descriptive data regarding residencies throughout the country. Included are evaluations of their own residencies obtained from our recent graduates. The School participates in the National Resident Matching Program, which offers distinct advantages to applicants.

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 which 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.
ENTRANCE REQUIREMENTS

Entrance requirements to the School of Medicine are:

1. evidence of superior intellectual ability and achievement;
2. completion of at least 90 semester hours of college courses in an approved college or university;
3. completion of the New Medical College Admission Test of the Association of American Medical Colleges no later than September 30, 1980;
4. evidence of intellectual ability, character, attitude, interests, motivation and superior scholastic achievement 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 organic chemistry. A course in physical chemistry (with calculus as a prerequisite) is strongly recommended. 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 presented as prerequisite because a great variety of courses may prepare the student for the many roles he may play in his medical career.

APPLICATION PROCEDURE

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

The AMCAS Application for Admission, common to all participating medical schools, is distributed solely by the AMCAS. For this reason, individuals requesting an application and a Bulletin from Washington University will receive an AMCAS Application Request Card and a brochure which describes the School of Medicine. The Bulletin is mailed to candidates upon receipt of their application credentials from AMCAS. Applicants are urged to file their applications as early as possible.
Early Decision Admission

This is an optional program for the applicant whose first-choice school of medicine is Washington University and who desires an admission decision on his application no later than October 1, 1980. To receive this special consideration, the applicant must agree to: (1) apply only to Washington University prior to receiving its admission decision; (2) present an academic record of 90 semester hours that indicates completion, or plans for completion, of all courses required for admission; (3) have a superior academic record and correspondingly strong scores on the New Medical College Admission Test; (4) submit all required credentials to AMCAS by August 1, 1980; (5) visit the Medical Center for interviews on a mutually convenient date prior to September 1, 1980; and (6) accept a position in the class, if offered one. There is no quota on the maximum number of positions in the class of 120 to be filled by Early Decision applicants. The AMCAS Application for Admission contains complete instructions regarding Early Decision programs.

Regular Admission

All applicants to the Washington University School of Medicine must submit their application to AMCAS by November 1, 1980. On receipt of the application from AMCAS, the Committee on Admissions promptly forwards to applicants the additional materials that must be submitted to complete the application process. At this stage, a nonrefundable Application Service Fee of $25 is charged by the University. Once complete, the applicant's admission credentials are reviewed and independently evaluated by members of the Committee on Admissions. Selected applicants are invited for a personal interview. Final decisions are made by the twenty-member faculty committee. Washington University School of Medicine operates on a rolling admissions schedule beginning October 1, and applicants are notified as soon as a final admission decision has been made on their application. By late May, every applicant should have a final decision—accepted, waiting list, or not accepted.

Personal Interview

The Committee on Admissions would like to interview every applicant who passes the initial evaluation screening process, but since this involves several thousand applicants, it is physically impossible to accomplish. Therefore, selected applicants are invited to visit the Washington University Medical Center for an interview, as well as a
tour of the School of Medicine and its hospitals. This visit will provide an opportunity for the applicant to meet and talk with students and faculty members.

If an applicant is planning an interview trip which will include the St. Louis area, it is appropriate for him to write the Interview-Appointments Secretary, Committee on Admissions, Box 8107, Washington University School of Medicine, 660 South Euclid Avenue, St. Louis, Missouri 63110, and inquire if an interview will be requested of him. The inquiry should be made at least three weeks in advance of the anticipated travel. The Office of Admissions is open on weekdays from 8:30 a.m. to 5:00 p.m. CT.

THIRD-YEAR CLASS TRANSFER PROGRAM

Each year the Washington University School of Medicine accepts approximately twenty transfer students into its third-year class. This class enlargement is permitted because of the abundant clinical training facilities available in the Medical Center and because of the existence of a national need for such transfer positions. Transfer applications are accepted from well-qualified students in the U.S. medical schools where limited facilities require some students to transfer elsewhere for clinical training. Applications are also accepted from students in U.S. schools of medicine who have a cogent reason for requesting transfer and who have the full approval of the Dean of their current school.

Transfer application forms for our 1981 third-year class are available on August 1, 1980. Application deadline is November 1, 1980. Those applicants selected for interview will be invited to visit the Medical Center during November, 1980. All applicants will be notified of the decision of the Committee on Admissions by December 31, 1980. Inquiries should be directed to:

Third-Year Class Transfer Program
Washington University School of Medicine
660 South Euclid Avenue-Box 8077
St. Louis, Missouri 63110
TUITION AND FEES

The following fees are applicable to first-year new matriculants for the 1980-81 academic year:

- Application (nonrefundable) ................. $ 25
- Acceptance deposit (to reserve a place in class; applied to first-semester tuition; refundable upon written request) . 100
- Tuition (including health fee) ..................... 6,325

The University reserves the right to change the fees herein stated at any time without notice. However, if a change is made, it will not become effective until the next academic year.

REFUNDS

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 day withdrawal permission is granted) to the total number of class days in the term for which tuition and fees were paid. 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.

ESTIMATE OF EXPENSES 1980-81

An estimate of the expenses of a single student for one academic year is given below. The total of these figures suggests a basic minimum budget of approximately $9,965 for a single new matriculant in the first-year class. Allowances for entertainment, travel, clothing, and other miscellaneous items must be added to this estimate.

- Tuition (including student health fee) ................. $6,325
- Microscope rental ........................................ 90
- Books ....................................................... 485
- Supplies and instruments ................................. 410
- Housing (Olin Residence Hall) .................. 1,017
- Board (Medical Center Cafeterias) .............. 1,638

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.
At the time accepted students indicate they will matriculate in the School of Medicine, they may request an application for financial aid. The Graduate and Professional School Financial Aid Service (GAPSFAS) Financial Statement and other financial aid materials, information, and instructions will be sent to the students by return mail. The GAPSFAS Financial Statement for the academic year 1980-81 consists of three parts: Part I solicits information about the applicant, including a detailed description of resources and liabilities. In addition, it requests information about the income and expenses of the student’s spouse (or spouse-to-be). Part II solicits information concerning the education and employment history of the student’s spouse (or spouse-to-be) and some other financial information. Part III solicits parents’ financial information. The School asks that the Statement be forwarded promptly, hopefully within two weeks from date of receipt, to GAPSFAS for processing.

Financial aid award decisions are made by the five-member Committee on Student Financial Aid, and applicants are notified of the award decision within two weeks of the date the processed Financial Statement is received from GAPSFAS. An official copy of the parents’ and the applicant’s U.S. individual income tax return completes the data required for financial aid consideration. All information is held in strict confidence.

The composition of a financial aid award from the School is determined by policy which is applied to all recipients of financial aid. For awards that total up to $4,500, the first $3,000 of an award is a loan and is referred to as the “unit loan”; the next $1,500 is a grant or scholarship and is referred to as the “unit grant.” For awards which exceed the unit loan and the unit grant total of $4,500, that portion of the award above $4,500 is funded as one-third grant and two-thirds loan. Exceptions to this policy may be made by the Committee.

Financial awards are normally divided equally between the two semesters. Grant awards are credited toward payment of tuition and fees. Proceeds from loans are usually disbursed directly to the borrower. The loan portion of an award will be funded from funds available to the School of Medicine or through the Guaranteed Student Loan (GSL) 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 of medical school 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 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.

Students are not permitted to travel outside the continental United States during the academic year in which they receive financial aid from the School.
Washington University School of Medicine Merit Scholarships

The School has established five full-tuition scholarships to be awarded annually to members of the entering first-year class. The scholarships will be awarded, without regard to financial need, to students of proven academic excellence. In early fall 1980 selected applicants to the School's 1981 first-year class will be invited to file applications for scholarship consideration. Selection 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 1981 scholarship recipients will be made on February 1, 1981.

The scholarships are subject to annual renewal. Recipients of these scholarships will be expected to maintain academic excellence. If a scholarship is not renewed, the student may file for financial aid from the School.

A scholarship recipient may not concurrently hold an Olin Fellowship from Washington University, or participate in the School's Medical Scientist Training Program, the National Health Service Corps Scholarship Program or the Armed Forces Health Professions Scholarship Program. Scholars may apply to the School for financial aid in addition to the full-tuition scholarship. Additional aid would be determined on the basis of documented financial need.

Scholarship Funds

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.

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

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.

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

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

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

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

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

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

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

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

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.

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

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

Medical Center Alumni Scholarship Fund. Awarded on the basis of academic achievement and financial need.
Roy B. and Viola Miller Memorial Fund. Created in 1963 through the bequest of Roy B. Miller to provide scholarships for medical students and for postgraduate students engaged in study and research in the medical sciences.

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.

William B. Parker Scholarship Fund. Established in 1976 by the School of Medicine in honor of William B. Parker's fifty-one years of service to the School.

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

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


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

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.

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.

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. Initially created with a gift from Dr. and Mrs. Paul Guttman and later supplemented by contributions of other students of Dr. Trotter as a tribute to her many years of teaching in the Department of Anatomy. Provides financial assistance to students who demonstrate financial need.

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

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

Scholarship and Loan Funds

Isabel Valle Brookings Scholarship and Loan Fund. Established in 1957 by Isabel Valle Brookings (Mrs. Robert S.) for scholarships and loans in the School of Medicine.

Danforth Foundation Loan and Scholarship Fund. Provides financial assistance for medical students.

Danforth Medical Foundation Fund. Created through gifts from the Danforth Foundation and the late William H. Danforth to furnish loans, scholarships, or outright grants to talented and promising young men and women engaged in study or research in basic medical or clinical sciences.

Paul H. and Lila L. Guttman Student Aid Fund. Established in 1976 to provide financial assistance to qualified medical students.
Robert Wood Johnson Foundation Fund. Created in 1972 to provide financial assistance for students who are from rural backgrounds, members of specified minority groups, and women.

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

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

Wilkinson Scholarship Fund. Created in 1968 by the bequest of Anna J. Wilkinson in honor of her husband, Dr. George E. Wilkinson. Medical and postdoctoral students are eligible for Wilkinson scholarships or loans.

Loan Funds

American Medical Association Loan Program. Makes available bank loans without collateral to eligible medical students, interns, or residents who are citizens of the United States. Applications for such loans are made through the Education and Research Foundation of the American Medical Association.

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

Federally Insured Student Loan. Washington University acts as the lender for students awarded loans by the School of Medicine.

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

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.

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.

Ophelia H. Kooden and Violet G. Sachs Loan Fund. Created in 1970 to provide loans for medical students in memory of the donors' brother, Jess Klement Goldberg.

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

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.

Robert Wood Johnson Foundation Student Loan Guarantee Program. Provides "a last-resort source of funds for educational expenses."

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

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

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

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 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.

J. Albert Key Fellowship Fund. Provides a stipend for a fellow in orthopedic 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.
George W. Merck Memorial Loan Fund. Established in 1959 through the Merck Company Foundation to encourage deserving interns and residents to seek the best possible postdoctoral training.

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

Student Research Fellowships. Awarded each year to students who undertake special research projects under the direction of a faculty member. They carry a stipend. Application should be made to the Committee on Fellowships and Awards, which supervises the program.

Awards and Prizes

Alpha Omega Alpha Book Prize. Awarded at the end of the fourth year to a member of that class who has performed outstandingly for the entire medical course.

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

Jacques J. Bronfenbrenner Prize. Provided by Dr. Bronfenbrenner’s students in memory of his inspiration as a teacher and 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.

Dr. Richard Brookings and Dr. Robert Carter Medical School Prizes. Provided for medical students through a bequest of Robert S. Brookings.

Kehar S. Chouke Prize. Awarded at the end of the first year to a medical student who has demonstrated superior scholarship in anatomy.

CIBA Award for Outstanding Community Service. Recognizes a sophomore student who has performed laudable extracurricular activity within the community.

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.

Edmund V. Cowdry Prize in Histology. Established in 1969 to honor Dr. Cowdry; awarded to a freshman medical student who has performed meritoriously in microscopic anatomy.

Antoinette Frances Dames Prize in Physiology and Biophysics. Awarded annually to a member of the first-year class who has demonstrated superior scholarship in these fields.

George F. Gill Prizes. One prize awarded at the end of the first year to a member of the class who has demonstrated superior scholarship in anatomy; one prize awarded to a member of the graduating class who has demonstrated superior scholarship in pediatrics.

Alfred Goldman Book Prize. Created in 1972 as an annual award to be given to a student in the School of Medicine who, in the opinion of the faculty, has done outstanding clinical or research work in diseases of the chest or pulmonary physiology.

Dr. J. E. Kirk Scholastic Award. Established in 1975 and awarded to a graduating student of high scholastic standing.

Louis and Dorothy Kovitz Senior Prize in Surgery. Senior award prize in surgery recognizing a member of the senior class who has shown the most outstanding ability, zeal, and interest in surgical problems.


**Lange Medical Publications Book Awards.** Given to members of all four classes for high scholastic standing and achievement in research.

**Irwin Levy Memorial Fund.** 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 clerkship.

**Oliver H. Lowry Prize.** Awarded to a second-year medical student for academic excellence in pharmacology.

**Howard A. McCordock Book Prize.** Awarded at the end of the second year to a member of that class for general excellence in pathology.

**Edward Mussie Prize for Excellence in Cardiology.** Awarded to the member of the graduating class who, in the judgment of the Director of the Division of Cardiovascular Disease of the Department of Medicine, has done the most outstanding clinical or basic research work in the field of cardiovascular disease.

**Medical Center Alumni Scholarship Prize.** Given annually to a student who has shown excellence in his work during the preceding year.

**Medical Fund Society Prizes.** One prize awarded annually to a student of the senior class who has excelled in the study of internal medicine; one prize awarded annually to a student of the senior class who has excelled in the study of surgery. No individual is eligible for both prizes.

**Missouri State Medical Association Award.** A scroll and a U.S. Savings Bond presented annually to an honor graduate of the senior class.

**C. V. Mosby Company Book Awards.** Made to five members of the graduating class for high general scholastic standing and research achievement.

**James L. O’Leary Neuroscience Prize.** Awarded annually to students who demonstrate the best accomplishments in the neuroscience course.

**James L. O’Leary Prize for Research in Neuroscience.** Given annually to a predoctoral or postdoctoral student for the most original and important accomplishment in neuroscience research.

**St. Louis Internists Club Book Prize.** Awarded to the graduating senior who has done the most significant research in any area of internal medicine.

**St. Louis Pediatric Society Senior Prize.** Presented to the senior student showing the greatest promise in clinical pediatrics.

**Sandoz Award.** Given annually to a graduating student who has made a meritorious contribution to psychiatric research.

**Sidney I. Schwab Prize in Psychiatry.** Awarded at the end of the fourth year for general excellence in psychiatry.

**Margaret G. Smith Award.** Given to a woman medical student for outstanding achievement in the first two years of medical school.

**Samuel D. Soule Award in Obstetrics and Gynecology.** Presented to a member of the junior or senior class for meritorious achievement in either basic or clinical investigation in obstetrics and gynecology.

**Upjohn Achievement Award.** Given to the senior student who has done the most meritorious work during his medical school career in the field of metabolism.

**Washington University School of Medicine Academic Achievement Award.** Given annually to a student who has exhibited to an unusual degree the qualities of industry, perseverance, determination, and enthusiasm in the first-year academic program.

**Samson F. Wennerman Prize.** Donated by his wife, Zelda E. Wennerman, and awarded annually to that senior student who has demonstrated promise in surgery.

**Hugh M. Wilson Award for Meritorious Work in Radiology.** Given annually to a graduating medical student in recognition of outstanding work in radiology-related subjects, either clinical or basic science.

**James Henry Yalem Prize in Dermatology.** Established by Charles Yalem in memory of his son and awarded annually to a member of the senior class for outstanding work in dermatology.
Student Life

HOUSING

The Apartment and Housing Referral Services, located in the Millbrook Building on the West Campus, Box 1059, Washington University, St. Louis, Missouri 63130, telephone (314) 889-5092, maintain listings of housing appropriate for married and single students.

The Spencer T. Olin Residence Hall has accommodations for approximately 250 single men and women. This building, made possible by generous gifts from Spencer T. Olin and alumni and friends of the School of Medicine, is located at 4550 Scott Avenue in the Medical Center. Olin Hall is planned for the convenience of students in the medical or paramedical sciences. Every effort is made to provide an atmosphere that not only aids them in meeting their study obligations but also recognizes their privileges as graduate students.

The rates for rooms during 1980-81 are:

School Year: September-June (Nine Months)
Two-room suite ........................................ $1,125
Single room ........................................... 1,017
Double room .......................................... 846
Large single ........................................... 1,215

Summer 1980: for Three Months
Two-room suite ........................................ 375
Single room .......................................... 339
Double room .......................................... 282
Large single .......................................... 405

Summer 1980: Weekly Rates for Student Visitor
Two-room suite ........................................ 45
Single room .......................................... 42
Double room .......................................... 36

Daily Rates for Visitors
Two-room suite ........................................ 18
Single room .......................................... 17
Single room (prospective student) ................. 14
Each occupant is required to pay a $25 security fee in addition to the room rental charge. This fee will be held by the University until termination of residence to cover losses resulting from possible damage to the room or the furniture. Any portion not so used will be refunded.

PARKING

Parking is available on lots owned and operated by the School of Medicine. These lots are located near Olin Hall and various other sites within the Medical Center. The Busch lot, owned jointly by Barnes Hospital and the University, is located between Taylor and Newstead Avenues. An annual permit must be purchased for use of either of these two facilities. These permits are available to students—on a limited basis. Students also qualify to purchase monthly permits in the Washington University-Wayco Garage at the corner of Audubon and Euclid Avenues.

STUDENT HEALTH SERVICE

Entering students are given a complete medical examination and are provided with medical care as long as they are enrolled in the School of Medicine. Physicians are available at the Student Health Service, and a physician is on call for emergency care at Barnes Hospital or in the student's room when necessary. Essential costs of hospitalization are covered. The student or his family is responsible for meeting the costs of hospital care in excess of those paid by the Health Service. The responsibility of the Student Health Service for hospitalization costs will end thirty days after a hospitalized individual ceases to be an officially enrolled student.

Except in certain emergencies, costs will not be covered for outpatient care that is not arranged through the Student Health Service.
RECREATIONAL AND CULTURAL OPPORTUNITIES

St. Louis, home of Washington University, is a city in the center of things, stylistically as well as geographically. Here, the industriousness of the North is tempered by the graciousness of the South, while Eastern respect for tradition is balanced by the pioneering spirit of the West.

A metropolitan area of more than 2.5 million people, St. Louis has one of the most diversified economies of any major U.S. city. Among other endeavors, its workers are engaged in the aerospace industry, automobile assembly, brewing, shoe manufacturing, and chemical production.

The city's cultural and recreational opportunities reflect a similar eclecticism. There are 26 institutions of higher learning in the area, as well as libraries, museums, professional drama companies, a dance society, opera theatre, and the second-oldest symphony orchestra in the nation. Frequent appearances by various popular recording artists round out the city's cultural opportunities.

St. Louis is served by 18 radio stations, and one educational and five commercial television channels. Two daily newspapers of opposing political views are published in the city—the morning Globe-Democrat and the evening Post-Dispatch.

For spectators, there are three major-league sports teams—the baseball and football Cardinals and the hockey Blues. For participants, the four vibrant seasons make outdoor recreation a favorite pastime. Good country for hiking, camping, canoeing, and spelunking is just a short drive from the city.

The construction of the Gateway Arch, the proud symbol of the key role St. Louis played in the nation's westward expansion, sparked an urban renaissance in the 1960's, and the city is now enjoying the results. Within the past few years, the downtown business district has undergone a dramatic transformation, with the opening of a convention center, five new hotels, and a riverfront entertainment district. Some of the city's historic residential neighborhoods, such as Lafayette Square and Soulard, have recently been rediscovered by modern homesteaders, who are restoring once-elegant townhouses to their former glory.
Washington University's School of Medicine is located in a district known as the Central West End—a diverse neighborhood which includes quiet private streets, high-rise apartment buildings, and many small shops, restaurants, and galleries. Under the auspices of the Washington University Medical Center Redevelopment Corporation, this area, too, is experiencing a resurgence of interest from both commercial and residential investors.

One of the city's major attractions, Forest Park, is bounded on the west by the campus of Washington University and on the east by the Washington University Medical Center, which includes the School of Medicine. Originally the site of the St. Louis World's Fair, this 1400-acre expanse of greenery and recreational facilities has paths for running and cycling, courts for tennis and handball, a skating rink, fishing ponds, fields for football, baseball and soccer, and three golf courses. Also located within the Park are the St. Louis Zoo, McDonnell Planetarium, Museum of the Missouri Historical Society, Jewel Box Floral Conservatory, City Art Museum, and Municipal Opera.
WASHINGTON UNIVERSITY MEDICAL CENTER ALUMNI ASSOCIATION

The Washington University Medical Center Alumni Association plays a significant part in the life of the School. It was organized to promote a spirit of class fellowship among its members, to further the aims and purposes of the School, to stimulate interest in the advancement of medical and collateral sciences, and to support postgraduate studies.

Membership is made up of all graduates of the School of Medicine, all members of the faculty, and all former house officers of the Medical Center. It is governed by an Executive Council.

Each year the Alumni Association sponsors the Annual Clinical Conference held in February, receptions at major medical meetings around the country, a welcoming party for incoming freshmen medical students, a welcoming party for new house officers, and an emergency loan fund for qualifying medical students.

Alumni Reunion Days are held in May and feature a scientific program presented by the Office of Continuing Medical Education, a welcoming party, individual class dinners, the Dean's Luncheon, and the Annual Alumni Banquet at which the 50-year reunion class and the graduating seniors are honored guests.

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.

Harry Alexander Visiting Professorship. Established by former house officers 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.

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

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


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

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

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

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

Graham Colloquium. A gift from Mr. and Mrs. Evarts Graham, Jr., in 1963 to encourage opportunities for students to expand their views on social, philosophical, artistic, and political topics.
Evarts A. Graham Memorial Lectureship. Established with a reserve fund left by Dr. Graham for his successors.

Evarts A. Graham Visiting Professorship of Surgery. Established by the Harry Freund Memorial Foundation to support an annual lecture in honor of Dr. Graham's contributions to surgery.

Samuel B. Grant Visiting Professorship. Created to provide an annual visiting professor in the Department of Medicine.

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 by friends interested in pediatrics to provide an annual lecture in Dr. Hartmann's honor.

Irwin Levy Memorial Fund. Supports the Dr. Irwin Levy Visiting Lectureship in Neurology, which was established 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 Orthopedic Surgery. Created by patients, friends, colleagues, and former students in honor of Dr. McCarroll.

Carl V. Moore Lectureship. Established by friends and patients of Dr. Carl V. Moore.

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

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

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

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

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

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

St. Louis Football Cardinals Visiting Professorship in Orthopedic Surgery. Made possible by a donation from the St. Louis Football Cardinals.

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

Robert J. Terry Lectureship. Established by alumni "for the purpose of fostering greater appreciation of the study of human anatomy."

Mildred Trotter Lectureship. Established by friends and former students of Mildred Trotter to bring a distinguished woman scientist to the School of Medicine each year.
The Washington University School of Medicine was established in 1899 as a union of the two oldest medical schools west of the Mississippi River: the Missouri Medical College, a proprietary school organized and owned by the faculty, and the St. Louis Medical College, founded by the local medical society. The Missouri Medical College was strong in clinical teaching, while the St. Louis Medical College stressed research, particularly clinical research. When the two were united as the Medical Department of Washington University, they combined these strengths, with the result that today the Washington University School of Medicine emphasizes both the scientific and research bases of medicine and the application of that knowledge to patient care and clinical practice.

Reorganized after the famous Flexner Report of 1912, with the help of the Carnegie Foundation for the Advancement of Teaching and funds provided by St. Louis philanthropist and civic leader Robert Brookings, the School restructured its program, built a new campus and appointed an entirely new faculty who had been trained in the new "scientific" medicine. Among the features adopted by the reorganized school were: full-time teaching appointments, enlarged hospital and outpatient facilities, laboratory space for both preclinical and clinical departments, faculty time for research, and a teaching program which allowed undergraduate, graduate and postgraduate students to have meaningful contact with distinguished faculty members in informal small group settings. These tenets have resulted in bringing together a faculty, staff and alumni who have been awarded twelve Nobel Prizes in physiology and medicine, as well as many other honors, appointments and elections to important professional offices. Three faculty members have been elected to the National Academy of Sciences, eight are members of the Academy's Institute of Medicine and many more are members of advisory boards of foundations and governmental granting agencies.

Over the years, the Washington University School of Medicine and its affiliated hospitals have worked and grown together, and in 1962 these several institutions formalized their relationships and established what is now termed the Washington University Medical Center. The Center consists of the Washington University School of Medicine, Barnes Hospital, the Jewish Hospital of St. Louis, St. Louis Children's Hospital, Barnard Hospital and the Central Institute for the Deaf. Integral units of the Medical Center include the world-famous Mallinckrodt Institute of Radiology, the Biomedical Computer Center, and the Irene Walter Johnson Institute of Rehabilitation. Extensive basic and clinical programs are carried on in the various institutions in the Medical Center. In 1979, Principal Investigatorships on one or more federal research grants were held by 218 faculty members. Twenty-five Program Project and Center Grants are held in the fields of cancer, general clinical research, thrombosis, diabetes, arthritis, renal diseases, asthma, stroke, glaucoma, drug abuse, lipid research, emphysema, heart disease, genetics, reproduction, alcoholism, neurobiology and affective disorders.
New methods of offering health care have been developed through such means as the School’s prepaid health maintenance organization, the Medical Care Group, which provides comprehensive health care for more than twenty thousand patients. The Queeny Tower is a multipurpose building and includes several floors of doctors’ offices in addition to acute-care and limited-care patient facilities and hotel accommodations for patients undergoing outpatient medical evaluation. The institutions in the Medical Center have more than a quarter of a million clinic and emergency room visits annually. Patients come to the Center from the metropolitan St. Louis area and the surrounding regions in Missouri and Illinois. Patients with especially difficult diagnostic and therapeutic problems are referred from throughout the Midwest and beyond.

The Washington University School of Medicine has a unique full-time faculty system. In 1980 the School employed 648 full-time, salaried faculty members in its eighteen preclinical and clinical departments. The clinical departments are further greatly strengthened by 690 part-time faculty members. The latter group of physicians includes men and women who practice their medical specialties in St. Louis and are members of one or more of the staffs of the six hospitals in the Center. Medical students and resident physicians also receive extensive and valuable clinical training in programs at the St. Louis City Hospital, St. Louis County Hospital and Cochran Veterans Administration Hospital, which are served by full-time and part-time faculty members of the School of Medicine.

The student body of the School of Medicine numbers approximately 550 medical students. Programs are also conducted for students in health care administration, occupational therapy, physical therapy, radiologic technology and pediatric nurse practice. The Division of Biology and Biomedical Sciences has extensive graduate training programs for students seeking Doctor of Philosophy degrees in areas of developmental, cellular and systemic biology, evolutionary biology and ecology, molecular biology, neural sciences and plant biology. The outstanding Washington University School of Dental Medicine is adjacent to the School of Medicine. Unaffiliated with Washington University but located close to the Medical Center is the St. Louis College of Pharmacy.

Each year the School of Medicine and the Washington University Medical Center Alumni Association, through the Division of Continuing Medical Education, offer many short postgraduate training courses for physicians and other health professionals. These programs provide medical alumni and practicing physicians in St. Louis and the Midwest with the opportunity to keep abreast of rapidly changing medical concepts, information, techniques and treatment.

In summary, the Washington University School of Medicine and the several institutions in the Washington University Medical Center are committed to providing patients with high-quality medical care in a concerned, compassionate way, to educating superbly qualified young men and women in the health professions, and to increasing medical knowledge through research.
Teaching Facilities

THE SCHOOL OF MEDICINE

The Washington University School of Medicine and the Medical Center are located along the eastern edge of Forest Park in St. Louis. Along the western edge of the park is the West Campus of the University. A regularly scheduled shuttle bus, operated for the benefit of students and faculty, brings the two campuses within ten minutes of each other. Spread over two city blocks, the School of Medicine is separated by Euclid Avenue, with preclinical departments predominating on the eastern side.

The focal point of teaching facilities is the McDonnell Medical Sciences Building. The McDonnell Building, with 300,000 square feet of the most technologically advanced research laboratories and classroom space in the country, was made possible by James Smith McDonnell, a generous benefactor of Washington University. Dedicated in the fall of 1970, it is the center of activity for entering medical students. Rising nine floors above ground, it contains administrative offices and two lecture halls on the first floor. Multi-disciplinary teaching laboratories for first- and second-year students, and offices and research laboratories for the seven existing basic science departments and the Division of Biology and Biomedical Sciences are located on the upper floors. Modern centralized animal quarters are housed in the basement.

The older structures, the North and South Buildings, in which centered the work of several Nobel Laureates, have been extensively renovated. Along with the Cancer Research Building, they continue to provide space for laboratories, offices, the library, and some departmental facilities.

West of Euclid Avenue but connected by a pedestrian bridge are the major clinical departments of the School of Medicine, housed in eight buildings. Here the medical school facilities are closely intertwined physically (and programmatically) with Barnes and Children’s Hospitals. Located here are the following facilities owned and operated by Washington University:

Edward Mallinckrodt Institute of Radiology, one of the largest and best-equipped in the world, houses two functioning cyclotrons and diagnostic, therapeutic, and research activities of the Department of Radiology. It is connected on most of its floors with the adjoining Barnes and Barnard Hospitals, and through them with other hospitals of the group, thus providing easy access for all inpatients.

Renard Hospital, an eight-story structure, is undergoing extensive renovation. With consolidation of patient-care services in the West Pavilion, it will provide additional office and laboratory space for the Department of Psychiatry.

David P. Wohl, Jr., Memorial Hospital (ten floors) opened in 1953, and until 1980 housed 80 medical patients. Current plans call for Wohl Hospital to be totally renovated into badly needed research and office space, principally for the Departments of Medicine and Surgery.
St. Louis Maternity Hospital houses offices and research laboratories for the Department of Obstetrics and Gynecology. A new Perinatal Center and laboratories for research in the physiology of reproduction are located in this building.

Irene Walter Johnson Institute of Rehabilitation is a center for training personnel in rehabilitation procedures, for treatment of disabled persons in the St. Louis metropolitan area, and for research related to chronic diseases.

Oscar Johnson Institute for Medical Research occupies the top five floors of the McMillan Hospital.

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

West Building contains offices and research laboratories for the Department of Preventive Medicine and Public Health, as well as for the Department of Pathology.

William Greenleaf Elliot Division of Child Psychiatry, located about a mile from the Medical Center at 367 North Taylor Avenue, conducts an advanced teaching program in child psychiatry and is the focus for research and treatment in child psychiatry.

Biomedical Computer Laboratory

An outstanding group of computer scientists, engineers and their students are engaged in the development and application of computer technology to biomedical problems.

The Biomedical Computer Laboratory and the Computer Systems Laboratory are located in adjoining buildings at 700 and 724 South Euclid, which also house the Division of Biostatistics of the Department of Preventive Medicine and Public Health.

Library

The School of Medicine Library is one of the largest medical libraries in the Midwest. It contains a collection of more than 175,000 volumes and subscribes to more than 2,000 serials. Special holdings include a rare book collection, the School's historical archives, memorabilia, and manuscript copies of the scientific papers of such outstanding men of medicine as Doctors William Beaumont, Joseph Erlanger, E. V. Cowdry, Evarts Graham, Leo Loeb, Philip Shaffer, Robert J. Terry, Carl V. Moore, and others.

The Library is deeply involved in computer research and use. It runs a serials control system for a number of medical libraries throughout the U.S. at cost. Its cataloging is done in conjunction with the national computer group at the Ohio College Library Center in Columbus as an extension of its own computer cataloging. The Library provides services to local hospitals and is deeply involved in the seven-state Mid-Continental Regional Medical Library (National Library of Medicine).

Two computer terminals are available for computer-assisted instruction and for searching remote computer data bases (including MEDLINE, Toxlinc, and Chemical Abstracts Condensates). A collection of audiovisual materials is maintained, and may be viewed in the Learning Resources Center on the first floor of the Library.
Library hours are 8:00 a.m. to 12 midnight on weekdays; 8:30 a.m. to 6:00 p.m. on Saturdays; and 1:00 p.m. to 10:00 p.m. on Sundays. A student reading room is open twenty-four hours a day. In the summer and on holidays, special hours are maintained.

Further information can be found in the “Library Guide,” “Library Notes,” and special pamphlets on computer services.

Facilities Owned by Washington University and Shared with Barnes Hospital

David P. Wohl, Jr., Memorial—Washington University Clinics are administered by Barnes Hospital and handle about 150,000 outpatient visits a year. Five floors of the building are devoted to the Clinics and five floors to research, including the Division of Health Care Research. This building is owned by the School of Medicine, with all patient-care services being operated by Barnes Hospital.

THE MEDICAL CENTER, ITS HOSPITALS AND INSTITUTIONS

The School of Medicine is part of a medical center of nearly 2,000 beds and 10,000 employees, providing nearly 630,000 days of care and more than 425,000 ambulatory care visits each year. Organized formally in 1962, the umbrella organization now known as the Washington University Medical Center consists of a confederation of six strong, private institutions committed to the pursuit of excellence in health care, teaching, and research. Students receive clinical instruction and gain experience in all divisions of the Medical Center.

Over the past fifteen years, with the growing confidence of working together, the Washington University Medical Center has undertaken increasingly complex projects. Evidence of this is the massive redevelopment project under way in the 36-block area surrounding the Medical Center. Working closely with the neighborhood, the Washington University Medical Center Redevelopment Corporation will, over a nine-year period, provide impetus for new office buildings, laboratories, apartment buildings, commercial areas, renovated single dwellings, and many public improvements. To date, over $450,000 worth of construction has been completed or commissioned.

Barnes Hospital is the largest hospital in the Medical Center. It is independently owned and, through special agreement, operates outpatient clinics in buildings owned by the University. The contiguous facilities provide a major source of clinical experience for medical students. Barnes Hospital has a capacity of approximately 1,204 beds, and includes teaching facilities for all clinical departments except Pediatrics. All activities of the School of Medicine and Barnes Hospital are closely integrated, and the hospital staff is composed exclusively of members of the Faculty of Medicine.

The eighteen-story Queeny Tower has five nursing floors and two self-care floors, plus five floors of doctors' offices. Just completed is the addition of four floors to the East Pavilion and a companion struct-
ture, the entirely new eighteen-story West Pavilion. This combined facility houses over 730 patient-care beds, over 50 operating rooms, a chronic renal dialysis unit, a 110-seat amphitheatre, doctors' offices, and additional facilities for the Mallinckrodt Institute of Radiology.

The combined East-West Pavilion, jointly owned by Barnes Hospital and the University, is one of the largest most sophisticated tertiary medical facilities in the world. A large central diagnostic laboratory provides modern diagnostic patient services.

Barnard Free Skin and Cancer Hospital is independently owned but is operated by Barnes Hospital. It is a 44-bed hospital for the care and treatment of patients who suffer from skin diseases and cancer or who are undergoing special tests in the Clinical Research Center.

St. Louis Children's Hospital, governed by its own directors from its earliest days, has been an integral part of the Medical Center and a leader in the development of academic pediatrics. Its professional staff are members of the Faculty of Medicine, and the medical director is also professor and head of the Department of Pediatrics at Washington University. Considerable clinical service and research are conducted at Children's. Of particular interest is the recently created Ranken-Jordan Center of Metabolic Diseases.

Jewish Hospital of St. Louis contains 577 beds. Its departments represent each of the major specialties except pediatrics. The Aaron Waldheim Outpatient Clinics provide all facets of health care to the community, while the Yalem Research Building contains important research facilities for the Hospital and School of Medicine. The new nine-story Sydney M. Shoenberg Pavilion provides inpatient rooms, surgical suites, and facilities for radiology.

Central Institute for the Deaf, a nationally known institution, provides facilities for research into hearing problems, maintains a school for deaf and speech-handicapped children, provides outpatient clinics for children and adults, and engages in a program of professional education for scholars in the fields of audiology and otolaryngology.

OTHER INSTITUTIONS

In addition to the above facilities which make up the Washington University Medical Center, the following hospitals are affiliated with the School of Medicine, and various members of the staffs hold University appointments.

The three City Hospitals:
- Max C. Starkloff Hospital, with 550 beds.
- Robert Koch Hospital, with 691 beds.
- Harry S Truman Restorative Center, with 375 beds.
- Malcolm Bliss Mental Health Center, with 210 beds.
- Ellis Fischel State Cancer Hospital, Columbia, Missouri, with 113 beds.

St. John's Mercy Hospital, with 607 beds.
St. Louis Veterans Administration Hospitals, with 947 beds.
St. Louis County Hospital, with 200 beds.
St. Louis Shriners Hospital for Crippled Children, with 80 beds.
St. Louis State Hospital, with 700 beds.
St. Luke's Hospitals, with 683 beds.
Departments of the School of Medicine
Department of Anatomy and Neurobiology

The anatomical sciences are presented in three required courses: gross anatomy, offered in the first semester; and microscopic anatomy and neural science, taught in the second semester. The course in neural science is taught jointly with the Department of Physiology and Biophysics. In addition, the Department offers a series of graduate courses which may be taken as electives by senior students. Gross anatomy is taught essentially as a laboratory course, but with some lecture dealing with anatomical principles and with human growth and development. The course in microscopic anatomy consists largely of cellular and tissue biology, with laboratory sessions paralleling the lectures in the areas. Neural science is taught mainly from an experimental point of view, with particular emphasis upon the development and organization of selected neural systems. Throughout all three courses, attention is paid to the results of recent investigations and to major developments in each field. The Department is well equipped for special work in several areas, including gross anatomy, electron microscopy, tissue culture, neurobiology, cell biology, and developmental and reproductive biology.

FIRST YEAR
Bio 501. Human Anatomy
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 X-ray films, cineradiography films, fresh organs, and cross sections aid in the synthesis of knowledge gained through dissection in clinically useful information. Radiologic anatomy and clinical correlation conferences further aid in this process. Occasional attendance at autopsies is recommended. Credit 6 units.
Harold Burton, B.A., University of Michigan, 1964; Ph.D., University of Wisconsin, 1968. (See Department of Physiology and Biophysics.)

Theodore J. Cicero, B.S., Villanova University, 1964; M.S., Purdue University, 1966; Ph.D., 1968. (See Department of Psychiatry.)

Milton N. Goldstein, B.S., Western Reserve University, 1946; M.S., 1947; Ph.D., 1952. (See Department of Pathology.)

Ursula W. Goodenough, A.B., Barnard College, 1963; M.A., Columbia University, 1965; Ph.D., Harvard University, 1969. (Also Faculty of Arts and Sciences.)

David I. Gottlieb, B.A., State University of New York, Binghamton, 1964; M.A., University of Wisconsin, 1969; Ph.D., Washington University, 1971. (See Department of Biological Chemistry.)

Boyd K. Hartman, A.B., University of Kansas, 1962; M.D., 1966. (See Department of Psychiatry.)

Arthur D. Loewy, B.A., Lawrence University, 1964; Ph.D., University of Wisconsin, 1969.

David N. Menton, B.S., Mankato State College, 1959; Ph.D., Brown University, 1966. (See Department of Pathology.)


Thomas A. Woolsey, B.S., University of Wisconsin, 1965; M.D., Johns Hopkins University, 1969. (See Department of Pathology and Biophysics.)

Assistant Professors


William A. Frazier, A.B., Johns Hopkins University, 1969; Ph.D., Washington University, 1973. (See Department of Biological Chemistry.)

Bio 506. Microscopic Anatomy
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, of preparations of fresh tissues, and of electron micrographs. Each student is required to rent a microscope from the School or have his own. Credit 6 units.

Bio 554. Neural Sciences
This course, taught conjointly by the Departments of Anatomy and Neurobiology and of Physiology and Biophysics, provides a broad introduction to modern neurobiology. The neuroanatomical aspects deal primarily with the tissues of the central nervous system from an experimental point of view. The course occupies approximately two half days a week throughout the second semester. Each student is required to have or rent a microscope. Credit 5 units.

RESEARCH
Bio 590. Research Opportunities
These are offered in the following areas:

The cell cycle and cellular differentiation. (Dr. Bischoff)

The history of medicine. (Dr. Brodman)

The cytology of neural tissue. (Dr. M. Bunge)

The growth and maturation of neural tissue in vitro. (Dr. R. Bunge)

Cutaneous sensibility and electrophysiology of cultured neurons. (Dr. Burton)

Insulin gene organization and expression. (Dr. Chirgwin)

The structure and pharmacology of the retina. (Dr. Cohen)

Growth and differentiation of neuroblastoma and other cultured cell lines. (Dr. Goldstein)

Cell surface glycoproteins. (Dr. C. Gottlieb)

Cell-cell recognition. (Dr. D. Gottlieb)

The anatomy of the cerebral cortex and of somatosensory and auditory systems. (Dr. Jones)

Central autonomic pathways. (Dr. Loewy)

The structure and function of the skin. (Dr. Menton)

Cross sectional anatomy. (Dr. Peterson)

The organization of the olfactory system. (Dr. Price)

The physiology of the cerebellum. (Dr. Thach)

Cell growth and radiation effects. (Dr. Tolmach)

Muscle differentiation. (Dr. Waterston)

Axonal transport. (Dr. Willard)

The organization of the somatosensory cortex. (Dr. Woolsey)

Mary I. Johnson, B.S., Washington State University, 1964; M.D., Johns Hopkins University, 1968. (See Departments of Neurology and Neurological Surgery and Pediatrics.)

Robert H. Waterston, B.S.E., Princeton University, 1965; M.D., University of Chicago, 1972; Ph.D., 1972. (See Department of Genetics.)

Mark B. Willard, B.A., Oberlin College, 1965; Ph.D., University of Wisconsin, 1971. (See Department of Biological Chemistry.)

Research Assistant Professor
Steven M. Rothman, M.D., State University of New York, Upstate, 1973. (See Departments of Pediatrics and Neurology and Neurological Surgery.)

Research Instructor
Patrick M. Wood, A.B., Centre College of Kentucky, 1961; M.S., Purdue University, 1965; Ph.D., 1968.

ELECTIVES

The Department offers a number of graduate-level courses which 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. These course descriptions are presented in the section on Biology and Biomedical Sciences.

Bio 428. Developmental Neurobiology
Bio 457. Somatosensory System

Bio 551, 552. Topics in Neurobiology
Bio 561. Topics in Molecular Neurobiology
Bio 562. Neural Control of Posture and Movement
Bio 563, 564. Techniques in Neural Sciences

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.
Department of Anesthesiology

According to the American Board of Anesthesiology, this specialty may be described as a practice of medicine which encompasses (1) the management of procedures for rendering a patient insensible to pain during surgical procedures, (2) the support of life functions under the stress of anesthetic and surgical manipulations, (3) the clinical management of the patient, unconscious from whatever cause, (4) the management of problems in pain relief, (5) the management of problems in cardiac and respiratory resuscitation, (6) the application of specific methods of inhalational therapy, and (7) the clinical management of various fluid, electrolyte, and metabolic disturbances.

With these objectives in mind, this Department is dedicated to presenting to the student, as opportunities develop, (1) clinical applications of certain anatomic relationships, e.g., regional nerve blocks, (2) applications of principles of respiratory physiology, e.g., mechanics of ventilation under various circumstances, cardiorespiratory resuscitation, (3) application of pharmacologic knowledge related to sedative, narcotic, and anesthetic drugs, and to compounds affecting the autonomic nervous system, (4) clinical problems related to acid-base, fluid, and electrolyte balance in surgical patients, and (5) principles underlying the approaches to the emerging concept of "acute medicine."

After the second year of medical school, preceptorships in anesthesiology are available for eight-week periods by individual application. Each preceptee is assigned to a staff anesthesiologist and gains experience in the performance of clinical anesthesia, participates in conferences and seminars, and joins in ward rounds in the recovery room and intensive care unit.

An elective in clinical anesthesiology is offered every six weeks for up to ten students. The pharmacology of inhalation, intravenous, and local anesthetic drugs is demonstrated by practical application by the student in the operating room. The importance of blood gas determinations in evaluating the efficacy of ventilation is shown.

Opportunities to develop proficiency in techniques such as endotracheal intubation are available. Special sessions on cardiopulmonary resuscitation are conducted and students are expected to attend the regular anesthesia conferences and seminars.
James J. Jenkins, B.A., Duke University, 1966; M.D., University of North Carolina, 1970. (Jewish Hospital.)

Sara T. Jones, B.A., University of North Carolina, 1958; M.D., Bowman Gray School of Medicine, 1962.

Barbara R. Krupin, B.S., University of Minnesota, 1966; M.D., 1968. (Jewish Hospital.)

Necita L. Roa, B.S., University of the Philippines, 1964; M.D., 1969.

Cyril M. Sliom, M.B., B.Ch., University of Wiwatersrand, 1947; F.F.A., South African College of Medicine, 1962. (Jewish Hospital.)

Susan L. Wilson, A.B., Washington University, 1967; M.D., University of Louisville, 1972.

Instructors

Spomenko Bauer, M.D., University of Zagreb Faculty of Medicine, 1968. (Jewish Hospital.)


William J. Gallagher, B.A., Holy Cross College, 1943; M.D., Cornell University, 1947.

Barry A. Graff, B.A., MacMurray College, 1972; M.D., Saint Louis University, 1976. (Jewish Hospital.)

Louise S. Grove, R.N., St. Mary’s Memorial Hospital School of Nursing, 1946; C.R.N.A., Barnes Hospital, 1960; B.A., Webster College, 1976.


Robert B. Holloway, B.S., LeMoyne College, 1952; M.D., Meharry Medical College, 1956. (St. Louis V.A. Hospitals.)

Akira Iwane, M.D., Nihon University, 1966.

M. Emin Kiyucuclar, M.D., Ain-Shams University, 1970.


Scott W. Snyder, B.A., University of Colorado, 1972; M.D., Washington University, 1976. (Jewish Hospital.)

Silvestre A. Tomeland, B.S., Far Eastern University, 1964; M.D., 1970. (Jewish Hospital.)

Lawrence S. Waldbaum, A.B., Cornell University, 1969; M.D., Washington University, 1973. (Jewish Hospital.)

Instructors (Clinical)


Francis G. Duffy, M.D., B.Ch., B.A.O., University College of Dublin, 1951.

Robert C. Engelhardt, B.S., University of South Carolina, 1946; M.D., University of Missouri, 1950.

Paul L. Friedman, A.B., Washington University, 1953; M.D., 1957.


George E. Lucas, B.S., John Carroll University, 1953; M.D., St. Louis University, 1958.

Daniel W. Platt, M.D., Chicago Medical College, 1949.

Department of Biological Chemistry

The Department offers a general introductory course, an advanced course relating the subject to biology and medicine, and several specialized courses in the major aspects of biochemistry. Students of medicine and in the Graduate School of Arts and Sciences may enroll in the courses or pursue research work under the direction of the staff. Facilities in research are provided in carbohydrate, lipid, nucleic acid, protein, and steroid biochemistry, and varying emphasis on enzymology, metabolism, physical chemistry, structural studies, or biochemical genetics. Some summer research scholarships are offered to students of medicine.

FIRST YEAR

Bio 451. General Biochemistry
Involves the basic concepts of biochemistry. Designed for qualified undergraduate, medical, and graduate students, the course is required of all graduate students in the Department, and either this course or an equivalent course is a prerequisite for advanced courses. Lectures only. Credit 4 units.

Bio 531. Advanced Biochemistry
A discussion of the biochemistry of organized systems, with special emphasis on problems relevant to medicine. Extensive reading of original literature will be required. The course will consist of four parts: (1) metabolic regulation, including a study of hormonal control; (2) structure and function of membranes and organelle biogenesis; (3) gene expression in higher organisms, including malignant transformation; (4) biochemistry of specialized organs or tissues, for example, connective tissue, bone, blood clotting, etc. Credit 4 units.

RESEARCH

Bio 590. Research Opportunities
These are offered in the following general areas of biochemistry: X-ray analysis of protein structure; structure and mechanism of enzymes, lipoproteins.

(Dr. Banaszak)
DNA sequence analysis and genetic engineering of bacterial DNA; transcriptional control of bacterial operons. (Dr. Barnes)
Structure-function relationships in proteins and enzymes.

(Dr. Bradshaw)
Biochemical investigation of metabolic disorders of carbohydrate metabolism. (Dr. B. Brown)
Studies of pathways of carbohydrate metabolism in mammalian tissues. (Dr. D. Brown)
Comparative enzymology of purine metabolism in developing muscle and erythrocytes.

(Dr. Chilson)
Mechanism of enzyme reactions.

(Dr. Drysdale)
Studies of mobility on animal cell surfaces.

(Dr. E. Elson)
Garland R. Marshall, B.S.,
California Institute of Technology,
1962; Ph.D., Rockefeller University,
1966. (See Department of Physiology
and Biophysics.)

F. Scott Mathews, B.S., University
of California, 1955; Ph.D.,
University of Minnesota, 1959. (See
Department of Physiology and
Biophysics.)

Blake W. Moore, B.S., University of
Akron, 1948; Ph.D., Northwestern
University, 1952. (See Department of
Psychiatry.)

William D. Phillips, B.A.,
University of Kansas, 1948;
Ph.D., Massachusetts Institute of
Technology, 1951. (Also
Faculty of Arts and Sciences.)

Robert G. Roeder, M.S., University
of Illinois, 1965; Ph.D., University
of Washington, 1969. (See
Department of Genetics.)

William R. Sherman, A.B.,
Columbia University, 1951; Ph.D.,
University of Illinois, 1955. (See
Department of Psychiatry.)

David F. Silbert, A.B., Harvard
University, 1958; M.D., 1962.

Robert E. Thach, A.B., Princeton
University, 1961; Ph.D., Harvard
University, 1964. (Also Faculty of
Arts and Sciences.)

Joseph J. Volpe, B.A., Bowdoin
College, 1960; M.D., Harvard
University, 1964. (See Departments
of Neurology and Neurological
Surgery and Pediatrics.)

James C. Warren, A.B., University
of Wichita, 1950; M.D., University
of Kansas, 1954; Ph.D., University
of Nebraska, 1961. (See Department
of Obstetrics and Gynecology.)

Associate Professors

Oscar P. Chilson, B.S., Arkansas
State Teachers College, 1955; M.S.,
University of Arkansas, 1958; Ph.D.,
Florida State University, 1963. (Also
Faculty of Arts and Sciences.)

Structure, function and topog-
raphy of cell-surface macro-
molecules which regulate mor-
phogenesis. 
(Dr. Frazier)

Relationship of enzyme structure
and function. Kinetic theory and
applications to enzyme reactions.
Protein-protein interactions.
(Dr. Frieden)

Cell-cell recognition in normal
and malignant cells. Mechanism
of cell wall biosynthesis.
(Dr. Glaser)

Molecular basis of cell-cell recog-
nition in the nervous system.
(Dr. D. Gottlieb)

Computer methods in biochemis-
try and mass spectrometry; micro-
computers applied to analytical
instruments. 
(Dr. Holmes)

Biochemical studies of protein-
lipid interactions; mechanisms of
blood clotting. 
(Dr. Jackson)

Biochemistry of collagen.
(Dr. Jeffrey)

Research on the structure, function,
and biosynthesis of complex
oligosaccharides present on ma-
malian cell surfaces and in serum
glycoproteins. 
(Dr. S. Kornfeld)

Biochemistry and physiology of
blood platelets and coagulation.
(Dr. Majerus)

Conformation and chemistry of
polypeptide hormones.
(Dr. Marshall)

Crystal structure and conformation
of proteins. 
(Dr. Mathews)

Studies of proteins specific to the
nervous system; their localiza-
tion, physical and chemical prop-
erties. 
(Dr. B. Moore)

Protein nucleic acid interactions
associated with DNA replication.
(Dr. Morris)

Nucleic acid biochemistry of
eukaryotes. Regulation of tran-
scription during cell differentia-
tion and during viral oncogenesis.
(Dr. Roeder)

Relationship of inositol metabo-
lism to secretory events.
(Dr. Sherman)

Membrane biochemistry of pro-
karyotes and eukaryotes.
(Dr. Silbert)

Protein biosynthesis of eukary-
otes. Translation and processing of
secretory proteins and peptide
hormones. 
(Dr. Strauss)

Regulation of protein synthesis;
replication of virulent and onco-
genic viruses and their effects on
host cells. 
(Dr. Thach)

Steroid metabolism and action.
(Dr. Warren)

Enzyme mechanism, structure
and function of serum lipopro-
tein. 
(Dr. Weidman)

Biochemical transformation of
steroid hormones; hormone ef-
facts at the cellular level.
(Dr. Wiest)

The function and regulation of in-
tra-axonally transported proteins.
(Dr. Willard)

William D. Phillips, B.A.,
University of Kansas, 1948;
Ph.D., Northwestern
University, 1952. (See Department of
Psychiatry.)
William A. Frazier, A.B., Johns Hopkins University, 1969; Ph.D., Washington University, 1973. (See Department of Anatomy and Neurobiology.)

David I. Gottlieb, B.A., State University of New York-Binghamton, 1964; M.A., University of Wisconsin, 1969; Ph.D., Washington University, 1971. (See Department of Anatomy and Neurobiology.)

William F. Holmes, A.B., Princeton University, 1953; Ph.D., University of Pennsylvania, 1960. (See Biomedical Computer Laboratory.)

Rosalind H. Kornfeld, B.S., George Washington University, 1957; Ph.D., Washington University, 1961. (See Department of Medicine.)

Assistant Professors

Wayne M. Barnes, A.B., University of California, 1969; Ph.D., University of Wisconsin, 1974.

Thomas F. Deuel, A.B., Princeton University, 1957; M.D., Columbia University, 1961. (See Department of Medicine.)

John J. Jeffrey, Jr., B.S., College of the Holy Cross, 1958; Ph.D., Georgetown University, 1965. (See Department of Medicine.)

Charles F. Morris, B.S., Baylor University, 1968; Ph.D., University of Wisconsin, 1973.

Arnold W. Strauss, B.A., Stanford University, 1966; M.D., Washington University, 1970. (See Department of Pediatrics.)

Mark B. Willard, B.A., Oberlin College, 1965; Ph.D., University of Wisconsin, 1971. (See Department of Anatomy and Neurobiology.)

Lecturer

Walter G. Wiest, A.B., Brigham Young University, 1948; Ph.D., University of Wisconsin, 1952. (See Department of Obstetrics and Gynecology.)

ELECTIVES

Descriptions of the elective courses are listed under the Division of Biology and Biomedical Sciences.

Bio 452. Biochemistry Laboratory

Bio 527. Reproductive Endocrinology

Bio 530. Digital Computers for Laboratory Use

Bio 537. Protein Chemistry and Enzyme Mechanisms

Bio 538. Structure and Function of Cell Membranes and Surfaces

Bio 5451. Introductory Bio-Physical Chemistry

Bio 548. Nucleic Acids and Protein Biosynthesis

Note—The number preceding the course indicates that the course carries credit in the Graduate School of Arts and Sciences.
The James S. McDonnell Department of Genetics was formed in the fall of 1975 to develop a program of preclinical and graduate instruction in genetics. A medical genetics course in the second semester of the first year is designed to introduce advanced aspects of human and medical genetics. (Clinical training in genetics is offered in the fourth year by the Division of Medical Genetics of the Departments of Medicine and Pediatrics.)

The faculty of this new Department is currently being recruited. As the Department expands, most major areas of active genetic investigation and interest will be represented and a broad, comprehensive program of research and graduate training opportunities will be developed. Advanced courses in human genetics and immunogenetics are offered in the second semester. Additional graduate courses are being developed. Opportunities for research training and experience are available at all levels.

**FIRST YEAR**

**Bio 550. Medical Genetics**

An initial segment covers the fundamental principles of genetics. Later segments introduce more advanced topics, including population and quantitative genetics, clinical cytogenetics, biochemical genetics and metabolic defects, counseling, and immunogenetics. Lectures only. Credit 2 units.

**RESEARCH**

**Bio 590. Research Opportunities**

These are offered in the following areas of genetics:

- Immunogenetics and mammalian biochemical genetics. (Dr. Shreffler)
- Gene transposition and plasmid host cell interactions. (Dr. Berg)
- Genetics of psychiatric disease. (Dr. Cloninger)
Alan R. Templeton, A.B., Washington University, 1969; M.A., University of Michigan, 1972; Ph.D., 1972. (Also Faculty of Arts and Sciences.)

Assistant Professors

Douglas E. Berg, B.S., Cornell University, 1964; Ph.D., University of Washington, 1969. (See Department of Microbiology and Immunology.)

Susan E. Cullen, B.S., College of Mount St. Vincent, 1965; Ph.D., Yeshiva University, 1971. (See Department of Microbiology and Immunology.)

Maynard V. Olson, B.S., California Institute of Technology, 1965; Ph.D., Stanford University, 1970.

Brian K. Suarez, B.A., San Fernando Valley State College, 1967; M.A., University of California, Los Angeles, 1972; Ph.D., 1974. (See Department of Psychiatry.)

Robert H. Waterston, B.S.E., Princeton University, 1965; M.D., University of Chicago, 1972; Ph.D., 1972. (See Department of Anatomy and Neurobiology.)

Research Assistant Professors

Miroslav Hauptfeld, M.D., University of Zagreb, 1963.

Vera Hauptfeld, Ph.D., Charles University, 1968.

Instructor

Shozo Yokoyama, B.S., Miyazaki University, 1968; M.S., Kyushu University, 1971; Ph.D., University of Washington, 1977. (See Department of Psychiatry.)

Research Associates

Sai-Kit Alex Law, B.Sc., California Institute of Technology, 1972; Ph.D., Harvard University, 1978.

Mutsuhiko Minami, M.D., University of Tokyo, 1969; Ph.D., 1978.

Hideki Miyamoto, M.D., Gunma University, 1969; D.M.S., Osaka University, 1973.

Molecular-genetic relationships of cell membrane alloantigens. (Dr. Cullen)

Behavioral genetics. (Dr. Gottesman)

Genetic and immunologic bases for transplantation reactions. (Dr. Graff)

Genetic disorders of amino acid metabolism. (Dr. Hillman)

Population and biochemical genetics of enzyme polymorphisms. (Dr. Johnson)

Genetic specification of membrane structure. (Dr. Levine)

Molecular organization of eukaryotic chromosomes. (Dr. Olson)

Population genetics. (Dr. Rao)

Genetics of psychiatric disease. (Dr. Reich)

Transcriptional regulation of gene expression. (Dr. Roeder)

Genetics of lysosomal storage diseases. (Dr. Sly)

Population genetics. (Dr. Suarez)

Population and developmental genetics. (Dr. Templeton)

Genetics of muscle development. (Dr. Waterston)

Population genetics. (Dr. Yokoyama)

ELECTIVE

Bio 522. Immunogenetics

Genetic and immunologic aspects of variant systems detected by immunologic methods: blood groups, allotypes, histocompatibility antigens. Genetic dissection of immunologic mechanisms.

Note—The number preceding the course title indicates that the course carries credit in the Graduate School of Arts and Sciences.
Adolphus Busch Professor and Chairman of Department
David M. Kipnis, A.B., Johns Hopkins University, 1945; M.A., 1949; M.D., University of Maryland, 1951.

John E. and Adaline Simon Professor and Associate Chairman of Department

Sydney M. and Stella H. Shoenberg Professor
Louis V. Avioli, B.A., Princeton University, 1953; M.D., Yale University, 1957.

Professors Emeriti
Carl G. Harford, A.B., Amherst College, 1928; M.D., Washington University, 1933. (See Medical Care Group.)
Virginia Minnich, B.S., Ohio State University, 1937; M.S., Iowa State College, 1938.

Professors
Elmer B. Brown, Jr., A.B., Oberlin College, 1946; M.D., Washington University, 1950. (See Administration.)
Hugh Chaplin, Jr., A.B., Princeton University, 1943; M.D., Columbia University, 1947. (See Department of Preventive Medicine and Public Health.)
William H. Danforth, A.B., Princeton University, 1947; M.D., Harvard University, 1951. (See Administration.)
William H. Daughaday, A.B., Harvard University, 1940; M.D., 1943.

John Milliken
Department of Medicine

The general medicine teaching services of the Department are located at Barnes Hospital, Jewish Hospital, and Veterans Hospital (John Cochran Division) under the following directors:
Barnes Hospital, Dr. Kipnis
House Staff Training Program, Dr. Aach
Jewish Hospital, Dr. Peck
Veterans Hospital, Dr. Chase

In addition, for the purposes of both teaching and research, the Department of Medicine is divided into specialty divisions at Barnes Hospital and Jewish Hospital under the following directors:
Bone and Mineral Diseases, Dr. Avioli
Cardiovascular Diseases, Drs. Sobel, Oliver
Dermatology, Dr. Eisen
Endocrinology and Metabolism, Dr. Daughaday
Gastroenterology, Dr. Alpers
Hematology-Oncology, Drs. Majerus, S. Kornfeld, Reinhard, T. Dean
Immunology and Allergy Diseases, Drs. C. Parker, Little
Infectious Diseases, Dr. Medoff
Laboratory Medicine, Dr. McDonald
Medical Genetics, Dr. Sly
Pulmonary Diseases, Drs. Pierce, Senior
Renal Diseases, Drs. Klahr, Hruska
Rheumatology, Dr. Atkinson

Instruction in Medicine is provided during all four years of the medical curriculum, beginning with human genetics and an introductory course in the first year. Teaching in the second year has two main objectives: the correlation of the basic sciences with the 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 prepared for supervised clinical study of individual patients. A junior clerkship of twelve weeks, divided into two six-week periods, is served on one of the medical services supervised by the Department. In the final year, students may elect a subinternship in general medicine or select any of a series of elective courses offered in the various medical subspecialties.
FIRST YEAR

Topics in Clinical Medicine
This interdepartmental course is designed to stimulate student interest in clinical medicine through carefully selected and presented discussions of both the clinical and basic science features of a number of illnesses. The course director involves faculty from the several clinical departments in structuring the direction, content, and presentation of the subject. (Dr. Kipnis and Staff)

SECOND YEAR

Teaching by the Department of Medicine is designed to (1) prepare the student for the transition from the preclinical sciences to the study of the sick patient at the bedside, (2) help him analyze the manifestations of disease in terms of the altered mechanisms responsible for these manifestations, and (3) introduce him to the techniques of examination which are used regularly on all clinical services with the beginning of junior clerkships. This instruction is at times undertaken jointly with members of other clinical departments, and is coordinated when practicable with subject matter presented by the Department of Pathology.

(a) Pathophysiology
Selected topics in clinical medicine are discussed in detail to illustrate the application of biochemical, physiological, and anatomical information in the understanding of pathological states. Infectious, cardiovascular and renal, neurological, gastrointestinal, hematological, metabolic, nutritional, and developmental diseases are reviewed by an interdepartmental faculty. Emphasis is placed on the use of fundamental information in approaching clinical problems as a way of thinking in preparation for a lifetime of medicine, during which much new information will constantly be acquired.

(Dr. Kipnis and Staff)

(b) Introduction to Clinical Medicine
The primary goal of Introduction to Clinical Medicine is to provide a clinical learning experience early in the second year where a student begins to become proficient in the collection, communication, and interpretation of patient-related data so that he can participate profitably in third-year clinical activities as a member of the health-care team. This is accomplished by using a variety of instructional formats including: lectures, demonstrations, film and videotape, supervised peer examination sessions, clinical subjects, patient simulation, and supervised interaction with patients in both the ambulatory and hospital setting. The understanding of the patient, his interaction with illness, and the importance of a good physician-patient relationship is emphasized. During the 124 instructional hours the mean student/faculty ratio is 5.6:1; in the clinical setting, the student/faculty ratio is 4:1.

(Dr. Tuteur and Staff)

THIRD YEAR

General Medicine
Supervised study of patients on the medical nursing divisions of Barnes Hospital (both Blue and Red), Jewish Hospital, and St. Louis Veterans Administration Hospital. Students are assigned in rotation as clinical clerks to the patients admitted to these services. Teaching is provided by attending physicians, house officers, consultants, and at regularly scheduled conferences. Formal instruction will be given in medical therapeutics during the junior clerkship. Students serve for six weeks on two of the five services.

(Drs. Aach, Chase, Kipnis, Peck, and Staff)

(a) Friday Noon Medical Clinics
Patients who have been studied by students working in the wards of Barnes Hospital are presented before the third- and fourth-year classes to illustrate medical problems of particular interest.

(Dr. Kipnis and Staff)

(b) Clinical Pathological Conference
Abstracts of the clinical records of patients upon whom postmortem examinations have been performed are presented in advance to members of the third- and fourth-year classes and to members of the medical staff. At each conference the diagnosis is discussed in detail by the clinical staff before the anatomical findings are presented by the pathologists.

(Dr. Kipnis and Medical Staff, Dr. Kissane and Pathology Staff)
FOURTH YEAR ELECTIVES

Medical Subinternship

Medical subinternships, in multiples of six weeks, are offered to a limited number of students on the following medical services: Barnes Hospital Blue Service, Jewish Hospital, St. Louis Veterans Administration Hospital, and St. Luke's Hospital. Duties and responsibilities, including nights on call, will be those of an intern, with the proviso that requirements of Missouri state law must be met (e.g., orders must be countersigned by a licensed physician, etc.). The workload will be lighter than that for interns to insure ample time for reading about patients. Instruction and supervision will be provided by the appropriate chief of service, attending physicians, consultants, and house officers. Attendance at scheduled teaching conferences is required. The subinternship should be especially valuable to students who plan to take straight medical internships and to those who plan to go directly into a specialty residency program without first serving an internship of any kind (e.g., neurology, psychiatry, etc.).

(Drs. Aach, Chase, Kipnis, Paine, Peck, and Staff)

Friday Noon Medical Clinics

Medical problems of particular interest. (Drs. Kipnis and Staff)

Clinical Pathological Conference

Thursday, 12 to 1 p.m., September to June.

(Dr. Kipnis and Medical Staff)

Arthritic and Rheumatic Disease

(a) Clinical Rheumatology

Students will participate in consultations, clinic, and inpatient practice. Laboratory experience also available.

(Dr. Atkinson and Staff)

(b) Research

1. Studies related to complement deficiency states and immunogenetics of complement proteins and mechanisms whereby immunologic events occur at the plasma membrane transmit appropriate signals to the interior.

(Dr. Atkinson and Staff)

2. Students to participate in research procedures which include quantitation of the functions of chemotaxis, phagocytosis, and lysosomal enzyme release, isolation of cell receptors for chemotactic factors and purification of enzymes involved in neutrophil activation.

(Dr. Spilberg)

John Color University and Medical
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A.B.,
M.D.

Edward Uni

Profe
I. J. Uni
Bern
Wash
Ralph Wash
Micha Wisc of Lo
Virgil Uni
Robert Uni
Franz of Bel Preva

G. Charles Oliver, A.B., Harvard University, 1953; M.D., 1957. (See Biomedical Computer Laboratory.)

Charles W. Parker, (Howard Hughes Medical Institute Investigator in Medicine), M.D., Washington University, 1953. (See Department of Microbiology and Immunology.)

H. Mitchell Perry, M.D., Washington University, 1946.

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

Edward H. Reinhard, A.B., Washington University, 1935; M.D., 1939. (See Department of Radiology.)

David Schlessinger, (Microbiology), B.A., University of Illinois, 1955; B.S., 1957; Ph.D., Harvard University, 1960. (See Department of Microbiology and Immunology.)

Gustav Schonfeld, A.B., Washington University, 1956; M.D., 1960. (See Department of Preventive Medicine and Public Health.)


Robert E. Shank, A.B., Westminster College, 1935; M.D., Washington University, 1939. (See Department of Preventive Medicine and Public Health.)

Laurence A. Sherman, B.A., B.S., University of Chicago, 1956; M.D., Albany Medical College, 1964. (See Department of Pathology.)

Eduardo Slatopolsky, M.D., University of Buenos Aires, 1958.

William S. Sly, M.D., St. Louis University, 1957. (See Departments of Genetics and Pediatrics.)

John D. Vavra, B.A., University of Colorado, 1950; M.D., Washington University, 1954. (See Administration and Department of Preventive Medicine and Public Health.)

R. Dean Woehner, A.B., Arizona State University, 1956; M.D., Washington University, 1960. (Hospital Commissioner of St. Louis and Director of Health and Hospitals.) (See Department of Preventive Medicine and Public Health.)

Professor (Adjunct)
Robert M. Donati, B.S., St. Louis University, 1955; M.D., 1959. (Chief of Staff, Veterans Administration Hospital.)

Research Professor
Delmar R. Finco, (Physiology and Pharmacology) (Visiting Staff), University of Minnesota, 1957; D.V.M., 1959; Ph.D., 1966.

Professors Emeriti (Clinical)
Clinton W. Lane, (Dermatology), A.B., St. Mary's College, 1916; M.D., St. Louis University, 1921.
Edward Massie, A.B., Washington University, 1931; M.D., 1935.

Professors (Clinical)
Ralph V. Gieselman, M.D., Washington University, 1947.
Michael M. Karl, B.S., University of Wisconsin, 1936; M.D., University of Louisville, 1938.
Virgil Loeb, Jr., M.D., Washington University, 1944.
Robert Paine, M.D., Harvard University, 1944.
Franz U. Steinberg, M.D., University of Berne, 1938. (See Departments of Preventive Medicine and Public Health and Surgery.)

Cardiovascular Disease
(a) Clinical Cardiology. Barnes Hospital, six weeks, all day. Students will participate as members of Cardiovascular Division clinical team, both in the Cardiac Diagnostic Laboratory and Cardiac Care Unit. Particular emphasis will be placed on clinical diagnosis, electrocardiography and the noninvasive techniques.

(b) Clinical Cardiology. St. Luke's Hospital, six weeks, all day. Students are assigned to intensive care service, the heart station, and the Radiology Department.

(c) Clinical Cardiology. Jewish Hospital, six weeks, all day. Students have experience in seeing patients in consultation, reading electrocardiograms, and participating in activities of the Coronary Care Unit and the Graphics Laboratory. In addition, students may observe procedures in the cardiac catheterization laboratory.

(d) Cardiac Catheterization and Hemodynamics. Highly specialized elective. Six weeks. Students will attend cardiac catheterization procedures and conferences; will perform complete "workups" of patients in preparation for catheterization, etc. Will observe all hemodynamic and angiographic procedures.

(e) Electrocardiography. Jewish Hospital. Course designed to give the student familiarity with concepts involved in the interpretation of electrocardiography.

(f) Research. Minimum of 12 weeks, all day.

1. Lipids in cultured myocardial cells. (Dr. Ahumada)

2. External assessment of myocardial metabolism and ischemic injury with positron-emitting isotopes. (Dr. S. Bergmann)

3. Experimental analysis of mechanisms of arrhythmia. (Dr. Corr)

4. Exercise physiology. (Dr. Ehsani)

5. Myocardial contractile proteins and assessment of metabolism and function in anoxic and ischemic isolated perfused hearts. (Dr. Henry)

6. Hemodynamics, myocardial mechanics, and ventricular function (cardiac catheterization). (Dr. Ludbrook)

7. Ultrasonic assessment of cardiac metabolism. (Dr. Mimbs)

8. Protection of ischemic myocardium in the experimental and clinical setting. (Dr. Roberts)

9. Detection, quantification, and assessment of the mediation of myocardial ischemic injury. (Dr. Sobel)

10. Application of digital computers for measuring left ventricular function and contractility. (Drs. Hieb, Krone, Oliver)

11. Biochemistry and measurement of cardiac glycosides; studies of the enterohepatic circulation of digitoxin. Applications of radioimmunoassays to Cardiology. (Dr. Oliver)
**Dermatology**

(a) Clinical Clerkship. Students participate in both inpatient and outpatient care. Stress is placed on the dermatologic variations normally encountered, identification of common skin diseases, dermatologic clues to systemic disease, etc. Instruction is given in cutaneous histopathology and clinical mycology.

(Dr. Eisen and Staff)

(b) Research. Minimum of 12 weeks, all day.

1. Connective tissue, macromolecular organization, degradation, and related problems.

   (Drs. Bauer, Eisen, Jeffrey, Seltzer)

2. Physiology and immunology of pathogenic fungi; molecular basis of morphogenesis and cellular differentiation in *Histoplasma capsulatum: host-parasite interaction and experimental therapeutics in the systemic mycotic infections.*

   (Dr. Kobayashi)

**Gastroenterology**

(a) Clinical Gastroenterology. Six weeks, all day. Students participate in the study of patients on whom consultations have been requested, receive instruction in specialized diagnostic techniques, and participate in the conferences and clinics run by the Division.

   (Dr. Zuckerman)

(b) Research. Minimum of 12 weeks, all day.

1. Clinically applied research on viral hepatitis.

   (Drs. Aach, Perrillo)

2. Research on intestinal protein metabolism. (Dr. Alpers)


   (Dr. R. MacDermott)

**Genetics**

(a) Clinical Genetics. Six weeks, all day. Students participate in evaluation of patients on whom consultations are requested, receive instructions in interpreting cytogenetics and other specialized laboratory information, and in techniques used in genetic counseling.

   (Dr. Taysi)

(b) Research. Minimum of 12 weeks, all day.

1. Investigation of inherited amino acid transport defects and enzyme replacement therapy and lysosomal storage diseases.

   (Dr. Sly)

2. Chromosome disorders.

   (Dr. Taysi)

**Hematology and Oncology**

(a) Clinical Hematology and Oncology. Six weeks, all day. Students receive intensive instruction in morphology, specialized diagnostic techniques, management of patients with hematologic and oncologic disorders. Two separate clerkships are offered.

   (Drs. S. Kornfeld, Majerus, Reinhard)

(b) Research. Minimum of 12 weeks, all day.


   (Dr. Baenziger)

2. Biochemical studies of poly(adenosine diphosphate ribose) synthesis and its role in DNA replication and repair.


   (Dr. T. Deuel)

4. Studies of neutrophil physiology, cryopreservation of bone marrow stem cells and effector mechanism in tumor immunity.

   (Dr. Herzig)

5. Biochemistry of mammalian cell membranes.

   (Drs. R. Kornfeld, S. Kornfeld)


   (Dr. Majerus)

7. DNA sequence amplification in human lymphocytes; molecular biology of synthesis, processing and release of amplified DNA.

   (Dr. Rogers)

**Hypertension**

Research. Individualized research project and/or participation in a community hypertension program.

   (Dr. Perry)

**Immunology**

Research. Minimum of 12 weeks, all day.

1. Research in areas of experimental immunotherapy of murine leukemia or detection and quantitation of cell membrane antigens by radioimmunoassay.

   (Dr. Little)

2. The structure and biosynthesis of lymphocyte cell surface antigens and lymphocyte triggering mechanisms. The effects of adjuvants in modulating the immune response.

   (Dr. Little)
Infectious Disease
(a) Clinical Infectious Diseases. Study of ward and private patients. Barnes Hospital, six weeks, all day.
(Drs. Gelb, Medoff)
(b) Research.
(Dr. Gelb)
2. Effective therapy for fungal infections, control of membrane permeability of fungi, normal and transformed animal cells, alteration and control of immunologic response to infection and tumors, drug studies on bacterial pathogens.
(Dr. Medoff)

Laboratory Medicine
Research.
1. Antigens and immunity in human lung carcinomas. Projects include: purification of lung carcinoma plasma membrane antigens absent from normal adult tissue and non-lung tumors, purification and characterization of immune complexes from lung carcinoma patients, development of *in vitro* immunologic assays involving these antigens. (Dr. Bell)
2. Clinical and analytical enzymology; computerized instrumentation; control of experiments through high level languages; optimization theory.
(Dr. J. Davis)
(Dr. Krogstad)
4. Elaboration of physiological rationale for differences between activity and concentration of electrolytes, particularly calcium.
(Dr. Ladenson)
5. Development of rapid techniques for recognition and identification of anaerobic bacteria in body fluids, analysis of nutritional requirements of anaerobic bacteria, development of standardized susceptibility testing methods for anaerobic bacteria, and *in vitro* assays of new antimicrobial agents.
(Dr. Murray)
(Dr. McDonald)
7. Research elective designed to familiarize student with fundamental concepts and transplantation immunology.
(Dr. Rodey)
8. Metabolism of coagulation moieties, in particular fibrinogen and platelets of thrombus localization and of applied blood banking.
(Dr. L. Sherman)

Metabolism and Endocrinology
(a) Clinical Clerkship. Students see patients with endocrine and metabolic disease in the outpatient Metabolism Clinic and Barnes and Jewish Hospitals. Six weeks, all day.
(Drs. Avioli, Daughaday, and Staff)
(b) Bone and Mineral Metabolism. Jewish Hospital. Designed to acquaint student with clinical, radiological, and pathological manifestations of generalized disorders of the skeleton and to expose him to current concepts of therapy.
(Drs. Avioli and S. Birge)
(c) Research. Minimum of 12 weeks, all day.
1. Mineral homeostasis: calcitonin, parathyroid and vitamin D.
(Drs. Avioli, Birge, Haddad, Hahn)
2. Pituitary physiology: growth hormone, prolactin.
(Dr. Daughaday)
3. Polypeptide hormone receptors in endocrine research: theoretical background developed. Radioreceptor assay experience provided and clinical applications of assays will be emphasized.
(Dr. Gavin)
4. The pathophysiology of hypercholesterolemias. Cultured human skin fibroblasts and arterial endothelial and smooth muscle cells are used to study the interaction of lipoproteins with tissues in well-defined familial hypercholesterolemias. Relationship of contractile proteins to hormone secretion.
(Dr. Ostlund)
5. Clinical research in disorders of carbohydrate metabolism, studying patients with reactive hypoglycemia, and laboratory research in insulin biosynthesis-cell-free synthesis, isolation of proinsulin messenger RNA.
(Dr. Permutt)
Glenn E. Rodey, B.S., Ohio University, 1957; M.D., Ohio State University, 1961. (See Department of Pathology.)

Benjamin D. Schwartz, (Howard Hughes Medical Institute Investigator in Medicine), B.A., Columbia College, 1965; Ph.D., Albert Einstein College of Medicine, 1971; M.D., 1972. (See Department of Microbiology and Immunology.)

Barry A. Siegel, A.B., Washington University, 1965; M.D., 1969. (See Department of Radiology.)

Isaias Spilberg, B.S., University of San Marcos, 1956; M.D., 1963.

Peter G. Tuteur, A.B., Johns Hopkins University, 1962; M.D., University of Illinois, 1966.


Research Associate Professors

Norma A. Fletcher, M.S., Technical University, 1949; Ph.D., University of Copenhagen, 1965.

Irene E. Karl, B.S., University of Wisconsin, 1937; M.A., 1938; Ph.D., 1940. (Also Clinical Research Center.)


Associate Professors Emeriti (Clinical)

James W. Bagby, (Dermatology), A.B., University of Missouri, 1930; B.S.Med., 1931; M.D., Washington University, 1933.

Paul O. Hagemann, A.B., Washington University, 1930; M.D., 1934.

Stanley F. Hampton, A.B., Washington and Lee University, 1930; M.D., Washington University, 1934.

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

Pharmacology/Medicine

Role of prostaglandins, thromboxane and prostacyclin on renal endocrine and excretory function. (Dr. Morrison)

Pulmonary Disease and Function

(a) Medical Aspects of Pulmonary Disease. A full-time elective, periods three through eight. Elective offered at both Barnes and Cochran V.A. Hospital. (Drs. Pierce, Tuteur and Staff)

(b) Pulmonary Medicine. Six weeks. Students will work up patients and participate in teaching conferences and work rounds, Jewish Hospital. (Dr. Senior)

(e) A full-time elective in Intensive Care Medicine offered in the MICU at Jewish Hospital, periods one through eight. (Dr. Lefrak and Staff)

(d) Research.

1. Clinical research in various aspects of chronic obstructive pulmonary disease. (Dr. Pierce)

2. Mechanisms of destruction and synthesis of pulmonary connective tissue. (Dr. Senior)

Renal Disease

(a) Clinical Nephrology. Barnes Hospital, six weeks, all day. Study of patients with renal disease and electrolyte disorders. (Drs. Klahr and Slatopolsky)

(b) Clinical Nephrology. Jewish Hospital. Students will be provided opportunity to evaluate patients on the renal consultant service, participate in daily clinical nephrology rounds, and participate in combined rounds. (Dr. Hruska)

(c) Mixed clinical and research electives.

1. Studies on the physiological and metabolic effects of chronic ambulatory peritoneal dialysis in patients with end stage renal disease. (Dr. Delme)

2. Effects of phosphorus deprivation on glucose utilization effects on PTH on carbohydrate intolerance of uremia, effects of PTH and phosphorus deprivation on peripheral glucose utilization. Effect of uremia and dialysis on plasma catecholamine levels and gastrointestinal abnormalities associated with chronic renal disease, hemodialysis and renal transplantation. (Dr. Harker)

3. Cellular mechanisms of parathyroid hormone action. Renal phospholipid metabolism and effects of parathyroid hormone. (Dr. Hruska)

4. Methodology of ion transport and principles of energy transfer and ion transfer. (Dr. Klahr)

5. Studies on the metabolism of parathyroid hormone by isolated adult perfused bone. (Dr. K. Martin)

6. Studies on the biochemical control of parathyroid hormone synthesis and release. (Dr. Morris)

7. Structural-functional correlations in renal disease. Methodology used in transmission and scanning electron microscopy. (Dr. Purkerson)

8. Biochemical methods and techniques used in the investigation of the composition and function of epithelial membranes and the molecular basis for ion transport. (Dr. Rodriguez)

9. Radioimmunoassay for parathyroid hormone. Studies investigate interrelationships between vitamin D metabolites and parathyroid metabolism. (Dr. Slatopolsky)
Assistant Professors


Elsa Bello-Reuss, B.A., University of Chile, 1957; M.D., 1964. (See Department of Physiology and Biophysics.)

Steven R. Bergmann, (Medical Physiology), B.A., George Washington University, 1972; Ph.D., Hahnemann Medical College, 1977.

Dennis M. Bier, B.S., LeMoyne College, 1962; M.D., New Jersey College of Medicine, 1966. (See Department of Pediatrics.)

John E. Buerkert, B.S., University of San Francisco, 1963; M.D., Marquette University, 1968.


Peter B. Corr, (Pharmacology), Union University, 1971; Ph.D., Georgetown University, 1975. (See Department of Pharmacology.)


James E. Davis, B.A., Occidental College, 1963; M.S., Duke University, 1969; Ph.D., 1970. (See Department of Pathology.)


Ali A. Ehsoni, M.D., Tehran University, 1965. (See Department of Preventive Medicine and Public Health.)

Siddhesh Gowda, M.B., B.S., Medical College Bellary Mysore, 1969. (See Department of Radiology.)

Guenter B. Guilmen, M.D., Hacettepe University, 1969. (See Medical Care Group.)


John O. Holloszy, M.D., Washington University, 1957. (See Department of Preventive Medicine and Public Health.)

Keith A. Hruska, (Established Investigator of the American Heart Association), B.S., Creighdon University, 1965; M.D., 1969.


Donald K. King, A.B., Fairfield University, 1966; M.D., Johns Hopkins University, 1970. (See Medical Care Group.)

Donald J. Krogstad, A.B., Bowdoin College, 1965; M.D., Harvard University, 1969. (See Department of Pathology.) (Director of Microbiology Laboratory, Barnes Hospital.)

Anthony Kulczycki, Jr., A.B., Princeton University, 1966; M.D., Harvard University, 1970. (See Department of Microbiology and Immunology.)

Jack H. Ludenson, B.S., Pennsylvania State University, 1964; Ph.D., University of Maryland, 1971. (See Department of Pathology.)


Richard P. MacDermott, (Howard Hughes Medical Institute Investigator in Medicine), B.A., Oberlin College, 1965; M.D., Ohio State University, 1969.


Jay M. McDonald, B.S., Tufts University, 1965; M.D., Wayne State University, 1969. (See Department of Pathology.) (Director of Diagnostic Laboratories, Barnes Hospital.)

Associate Professors (Clinical)

Morton A. Binder, B.S., Yale University, 1948; M.D., Columbia University, 1951.

Neville Grant, A.B., Yale University, 1950; M.D., Columbia University, 1954.


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

Marvin E. Levin, A.B., Washington University, 1947; M.D., 1951.

Harvey Liebhaber, A.B., New York University, 1953; M.D., 1957.

Herbert Lubowitz, A.B., Clark University, 1954; M.D., Washington University, 1958.

James F. Nickel, A.B., University of Oklahoma, 1944; M.D., Washington University, 1948.


Mary L. Parker, B.S., Florida State University, 1946; M.S., 1949; M.D., Washington University, 1953. (See Department of Preventive Medicine and Public Health.)


Ernest T. Rouse, B.S., Alabama Polytechnic Institute, 1939; M.D., Washington University, 1943.

Llewellyn Sale, Jr., A.B., Yale University, 1936; M.D., Washington University, 1940.

Burton A. Shatz, A.B., Washington University, 1940; M.D., 1943.

James C. Sisk, (Dermatology), A.B., Washington University, 1943; M.D., 1946.

Robert C. McKnight, B.S., Florida State University, 1957; M.D., Washington University, 1961. (See Department of Radiology.)

James W. Mimbs, B.A., Emory University, 1965; M.D., Medical College of Georgia, 1969.

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

Patrick R. Murray, B.S., St. Mary’s College, 1969; Ph.D., University of California, 1974. (See Department of Pathology.)

Richard E. Ostlund, Jr., B.S., University of Utah, 1966; M.D., 1970.

Robert P. Perrillo, B.S., Fordham University, 1966; M.D., Georgetown University, 1970.

Gordon I. Phillips II, (American Cancer Society Junior Faculty Clinical Fellow), B.A., University of Oklahoma, 1966; M.D., 1971. (See Department of Radiology.)

Alan M. Robson, M.B., B.S., University of Durham, 1959; M.D., 1964. (See Department of Pediatrics.)


John C. Rogers, B.S., University of Nebraska, 1966; M.S., 1968; M.D., 1968.

Rudolphe Ruffy, M.D., University of Lausanne, 1968.

Julio V. Santiago, B.S., Manhattan College, 1963; M.D., University of Puerto Rico, 1967. (See Department of Pediatrics.)


Robert J. Stine, B.A., Williams College, 1964; M.A.T., Harvard University, 1965; M.D., Vanderbilt University, 1972. (See Department of Surgery.)

Kongsak Tanphaichitr, M.D., Siriraj Hospital Medical School, 1970. (See Medical Care Group.)

Samer Thanavaro, B.Sc., Madhiol University, 1970; M.D., 1972.


George D. Wilner, B.S., Northwestern University, 1962; M.D., 1965. (See Department of Pathology.)


Gary R. Zuckerman, B.S., St. Louis College of Pharmacy, 1958; D.O., Kansas City College of Osteopathic Medicine, 1963.

Research Assistant Professors


Janina M. Brajtburg, M.S., University of Lodz, 1950; Ph.D., 1968.


Gregory A. Grant, (Dermatology), B.S., Iowa State University, 1971; Ph.D., University of Wisconsin, 1975.


Dwight E. Matthews, B.A., DePauw University, 1973; Ph.D., Indiana University, 1977.


James G. Miller, A.B., St. Louis University, 1964; M.A., Washington University, 1966; Ph.D., 1969. (See Biomedical Computer Laboratory.) (Also Faculty of Arts and Sciences.)

Jeremiah J. Morrissey, B.A., MacMurray College, 1969; Ph.D., St. Louis University, 1974.

Klaus Olgaard, (Visiting Staff), M.D., University of Copenhagen, 1970.


Bellur Seetharam, B.S., Mysore University, 1961; M.S., Bangalore University, 1965; Ph.D., 1972.


Assistant Professors Emeriti (Clinical)

Joseph C. Edwards, A.B., University of Oklahoma, 1930; M.D., Harvard University, 1934.

Samuel B. Grant, B.S., Washington University, 1918; M.D., 1920.

M. Norman Orgel, B.S., College of the City of New York, 1929; M.A., Harvard University, 1930; M.D., Washington University, 1934.


Keith S. Wilson, A.B., Williams College, 1930; M.D., Washington University, 1934.

Assistant Professors (Clinical)

Morris Alex, B.S., University of Missouri, 1942; M.D., Washington University, 1943.

France Alexander, A.B., Indiana University, 1950; M.D., 1953.


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


Grace E. Bergner, A.B., Washington University, 1939; M.D., 1943.

John W. Berry, B.S., University of Toledo, 1943; M.D., St. Louis University, 1946.


Benjie Boonshaft, A.B., Harvard University, 1928; M.D., 1930.

Bernard W. F. Brelsford, A.B., University of Wisconsin, 1929; M.D., 1932.

James W. Berry, A.B., University of Wisconsin, 1929; M.D., 1932.

Sidney W. Bowers, M.D., University of Minnesota, 1926; M.D., 1932.

William G. Breda, B.S., Harvard University, 1928; M.D., 1932.

Owen B. Broda, M.D., University of Wisconsin, 1923; M.D., 1932.

Edward M. Wolin, M.D., University of Rochester, 1934; M.D., 1938.

William G. Breda, B.S., Harvard University, 1928; M.D., 1932.

Owen B. Broda, M.D., University of Wisconsin, 1923; M.D., 1932.

Edward M. Wolin, M.D., University of Rochester, 1934; M.D., 1938.
Arnold Dankner, M.D., Washington University, 1947.
John D. Davidson, A.B., Washington University, 1948; M.D., 1952.
Arthur H. Gale, B.S., Washington University, 1955; M.D., University of Missouri, 1959.
Melvin L. Goldman, A.B., Washington University, 1939; M.D., 1943.
John M. Grant, A.B., Princeton University, 1950; M.D., Washington University, 1954.
William K. Hall, (Dermatology), B.S., Yale University, 1939; M.D., Harvard University, 1942.
Bernard Hulbert, B.A., University of Wisconsin, 1938; M.D., 1941.
James H. Hutchinson, Jr., B.S., Arkansas A & M College, 1942; M.D., University of Arkansas, 1945.
Owen S. Kantor, M.D., University of Missouri, 1968.
John J. Kelly, B.S., Rockhurst College, 1959; M.D., St. Louis University, 1963.
Robert C. Kingshand, A.B., Washington University, 1933; M.D., 1937.
John H. Kissel, B.S., Georgetown University, 1967; M.D., Harvard University, 1971.
Norman P. Knowlton, Jr., B.S., Harvard University, 1942; M.D., 1945.
Philip E. Korenblat, M.D., University of Arkansas, 1960.
David M. Lieberman, M.D., Vanderbilt University, 1949.
Warren M. Lonergan, A.B., Westminster College, 1936; M.D., Vanderbilt University, 1940.
Thomas F. Martin, B.S., St. Louis University, 1961; M.D., 1965.
Edward J. Miller, B.A., St. John’s University, 1958; M.D., St. Louis University, 1962.
Gordon Newton, M.D., University of Arkansas, 1958.
James W. Owen, Jr., M.D., Washington University, 1946.
Kenneth C. Price, M.D., University of Washington, 1951.
Gary A. Ratkin, B.A., Rice University, 1963; M.D., Washington University, 1967. (See Department of Radiology.)
Lester T. Reese, (Dermatology), M.D., Tulane University, 1966.
Harold K. Roberts, B.A., Ohio State University, 1935; M.D., 1939.
Leon R. Robinson, B.A., Oberlin College, 1963; M.D., Case Western Reserve University, 1968.
Joseph F. Ruwisch, Jr., M.D., Washington University, 1966.
All Salimi, M.D., University of Tehran, 1965.
Roy B. Sommer, A.B., Miami University, 1949; M.D., Cornell University, 1949.
Alan R. Spivack, A.B., Washington University, 1960; M.D., St. Louis University, 1964.
J. Allen Thiel, B.S., Rockhurst College, 1956; M.D., St. Louis University, 1960.
Stanley M. Wald, M.D., Washington University, 1946.
Alvin S. Wennerk, A.B., Washington University, 1949; M.D., 1953.
Herbert B. Zimmerman, M.D., Washington University, 1951.
Frederick D. Bauschard.
(Dermatology), A.B., Allegheny College, 1964; M.D., University of Pittsburgh, 1968.
Aaron Birenbaum, M.D., Washington University, 1948.
Leslie M. Brandwin, B.S., City College of New York, 1967; M.D., St. Louis University, 1971.
Jeffrey S. Brooks, (Podiatry), B.S., University of Missouri, 1969; D.P.M., New York College of Podiatric Medicine, 1974.
John M. Cary, A.B., Central College, 1954; M.D., St. Louis University, 1958.
Margaret Chieffi, M.D., University of New Zealand, 1937.
Frank Cohen, M.D., University of Toronto, 1939.
Ralph Copp, Jr., A.B., Washington University, 1948; M.D., 1952.
Duane E. Cozart, Ph.B., University of Chicago, 1947; A.B., Washington University, 1949; M.D., Medical College of Virginia, 1959.
Randall B. Currie, B.S., Louisiana State University, 1971; M.D., University of Mississippi, 1975.
David Feldman, M.D., Washington University, 1943.
Alfred Fleishman, B.S., Washington University, 1935; M.D., 1935.
B. Todd Forsyth, M.D., Washington University, 1947.
Philip S. B. Fuller, B.S., United States Military Academy, 1964; M.D., Jefferson Medical College, 1973.
Ronald K. Grady, B.S., Purdue University, 1956; M.S., 1957; M.D., Washington University, 1966.
Anne Herron, M.B., B.Ch., Dublin University, 1965.
Bruce J. Hookerman, (Dermatology), A.B., Dartmouth College, 1964; M.D., St. Louis University, 1968.
Richard F. Huck, B.S., Notre Dame University, 1947; M.D., Washington University, 1948.
Myron H. Jacobs, B.A., Vanderbilt University, 1965; M.D., Louisiana State University, 1969.
Ralph F. Kuhlman, M.D., University of Illinois, 1964; M.D., 1964. (Also Student Health Service.)
Daniel K. Lane, (Dermatology), B.A., Princeton University, 1955; M.D., Washington University, 1959.
Steven A. Lauter, B.S., Wayne State University, 1968; M.D., 1971.
Ellis S. Lipsitz, A.B., Yale University, 1940; M.D., St. Louis University, 1943.
Jerald Mastanko, M.D., Emory University, 1975. (See Medical Care Group.)
Oliver A. McKee, (Dermatology), L.R.C.P., Royal College of Physicians and Surgeons, 1949; S.M., 1949.
Charles W. Miller, (Dermatology), B.S., Trinity College, 1968; M.D., Washington University, 1972.
Austin F. Montgomery, M.D., University of Pittsburgh, 1954.
Lamar H. Ochs, A.B., Washington University, 1941; M.D., 1944.


Hugh R. Waters, B.S., Northwestern University, 1942; M.D., Washington University, 1945.


Herbert C. Wiegand, A.B., Washington University, 1940; M.D., 1943.

Elsie Winstead, B.S., East Carolina University, 1973; M.D., University of North Carolina, 1977. (See Medical Care Group.)


John A. Wood, M.D., Oklahoma University, 1968.

Research Associates

Charles D. Alley, Jr., (Howard Hughes Medical Institute Research Associate), B.S., College of William and Mary, 1971; M.A., 1972; Ph.D., Medical College of Virginia, 1977.

Randy L. Bell, B.S., Utah State University, 1973; Ph.D., University of Oregon, 1977.

George F. Dancey, (Howard Hughes Medical Institute Research Associate), B.S., Oregon State University, 1970; Ph.D., University of Washington, 1975.

Nancy S. Davis, B.S., Purdue University, 1972.

Fanny M. Ebling, B.S., College of Guayaquil, 1954; Ph.D., University of Guayaquil, 1959.

Walter T. Gregory, B.S., St. Louis University, 1960.

Shirley A. Hajek, B.S., Ball State University, 1964; M.S., University of Iowa, 1967; Ph.D., 1974.

John J. Huang, (Howard Hughes Medical Institute Research Associate), B.S., Chung Yuan College, 1962; M.A., Bowling Green State University, 1966; Ph.D., Wayne State University, 1972.

Carol D. Klahr, B.S., St. Louis University, 1960; M.S., Washington University, 1965.

Katherine D. Little, B.S., Illinois Wesleyan University, 1952; M.S., University of Rochester, 1954; Ph.D., 1957.


Margherita Sacco, Ph.D., University of Naples, 1978.

Suresh D. Shah, B.S., Gujarat University, 1956; M.S., 1959; M.S., St. Louis University, 1972.

Assistant

Janet D. Hoy, B.S., Carroll College, 1975. (See Medical Care Group.)

Research Assistants


Howard L. Christopherson, B.S., University of Minnesota, 1949; M.S., 1953.

Margaret W. Erlanger, B.A., University of Iowa, 1932; M.S., 1938.


Foster Harris, B.A., University of Missouri, 1969.

Thomas Howard, Sr.

Jagdish M. Mehta, B.S., Gujarat University, 1960; M.S., 1962; M.S., University of Missouri, 1966; Ph.D., 1968.


Dale F. Osborne, B.S., Louisiana State University, 1971.


Claire K. Pedersen, B.S., Quincy College, 1948.

Betty F. Perry, A.B., Washington University, 1945.


Dennis Q. Roy, B.S., University of Missouri, 1974.


Assistant (Clinical)

Department of Microbiology and Immunology

The Department teaches a one-semester introductory course in microbiology for first-year medical students and for graduate students. The course is concerned particularly with principles of microbial physiology and genetics, and of immunology and, through a limited survey of pathogenic bacteria, viruses, and fungi, attempts to prepare medical students for more advanced study of infectious diseases later in the curriculum. The Department also offers a number of advanced elective research activities. A limited number of summer research fellowships are available.

FIRST YEAR

Medical Microbiology

Lectures and laboratory. This course presents the basic principles relating to the growth and reproduction of bacteria and viruses and to the immune responses of the host to diverse substances, including pathogenic microbes and their metabolic products. The sequence followed is: immunology, microbial physiology and genetics, virology, and a survey of pathogenic bacteria and fungi. Medical students with sufficient background in one of these subjects may substitute that section with a graduate course (see Electives). The immunology part of the course emphasizes structure, function, and biosynthesis of antibodies, and provides an introduction to cell-mediated immune responses. In terms of these concepts, specific groups of pathogenic organisms and viruses are considered. The interaction between host and parasite is studied by analyzing wherever possible the molecular basis for the pathogenicity of the microbe and for the immune reactions of man. The factors that make microorganisms vulnerable or resistant to chemotherapeutic agents are emphasized. Credit 6 units. (Staff)

Individuals other than medical students may register for limited parts of the course (see listing for the Division of Biology and Bio-medical Sciences: under Bio 517, General Immunology, 2 units; Bio 523, Microbial Physiology and Genetics, 1 unit; Bio 529, Animal Virology, 1 unit; Bio 533, Pathogenic Microbiology, 2 units).
Benjamin D. Schwartz, B.A., Columbia College, 1965; Ph.D., Albert Einstein College, 1971; M.D., 1972. (See Department of Medicine.)

Simon D. Silver, B.A., University of Michigan, 1957; Ph.D., Massachusetts Institute of Technology, 1962. (Also Faculty of Arts and Sciences.)

Alexander C. Sonnenwirth, A.B., University of Nebraska, 1950; M.S., Purdue University, 1953; Ph.D., Washington University, 1960. (See Department of Pathology.) (Jewish Hospital.)

Associate Professors

John P. Atkinson, A.B., Kansas University, 1965; M.D., 1969. (See Department of Medicine.)

Julian B. Fleischman, B.S., Yale University, 1955; Ph.D., Harvard University, 1960.

Ernest S. Simms

Assistant Professors

Douglas E. Berg, B.S., Cornell University, 1964; Ph.D., University of Washington, 1969. (See Department of Genetics.)

Lawrence D. Gelb, B.S., University of Michigan, 1963; M.D., Harvard University, 1967. (See Department of Medicine.)

Judith A. Kapp-Pierce, B.A., Miami University, 1965; M.S., Indiana University, 1969; Ph.D., Harvard University, 1976. (See Department of Pathology.) (Jewish Hospital.)

Anthony Kulczycki, Jr., A.B., Princeton University, 1966; M.D., Harvard University, 1970. (See Department of Medicine.)

Hsiu-san Lin, M.D., Taiwan University, 1960; Ph.D., University of Chicago, 1968. (See Department of Radiology.)

Jacques Perrault, B.S., McGill University, 1964; Ph.D., University of California, 1972.

RESEARCH

Bio 590.

These electives acquaint the student with the analyses that are used in present-day biomedical research, especially at the molecular level. (Staff)

Processing and decay of RNA in E. coli and mammalian cells, normal and malignant. Differentiation-activation of unexpressed genes in mammalian cells. (Dr. Apirion)

Mechanisms of gene transposition in bacteria. Mechanisms and evolution of antibiotic resistance in bacteria. (Dr. Berg)

Biochemical and serological polymorphism of Ir gene products is being studied with the aim of relating structure to immunoregulatory function. (Dr. Cullen)

B cell subsets, mechanisms of antibody diversity. (Dr. Davie)

Structure and biosynthesis of antibodies; immunoglobulin gene expression in myeloma cells. (Dr. Fleischman)

Biochemistry of tumor viruses, varicella-zoster, and hepatitis B virus. (Dr. Gelb)

Biochemistry and genetics of macromolecule regulation: mRNA metabolism in bacteria; regulation of metabolism in cultured mammalian cells. (Dr. Kennell)

Immunology and biochemistry of the medically important fungi, particularly the dimorphic organism, Histoplasma capsulatum. Host-parasite interaction of opportunistic fungal diseases. (Drs. Kobayashi, Medoff, Prof. Simms)

The structure and biosynthesis of lymphocyte cell surface antigens and lymphocyte triggering mechanisms. The effects as adjuvants of modulating the immune response. (Dr. Little)

Differentiation and function of mononuclear phagocytes. (Dr. Lin)

Development of therapy for intracellular bacterial and fungal infections. (Drs. Kobayashi, Medoff)

Tumor immunotherapy. Establishment of animal models of human malignancy. (Dr. Medoff)

Cellular immunology; immediate hypersensitivity. (Dr. Parker)

The biochemistry of defective interfering virus particles (virus particles with specific genome deletions) in vesicular stomatitis, polio, measles and influenza viruses and their role in the aetiology of virus persistence and chronic degenerative disease. (Dr. Peraud)

Mechanisms regulating immune responses in tissue culture systems. (Dr. Pierce)

Biochemistry and replication of oncogenic adenoviruses. (Dr. Raskas)

Interactions between RNA animal viruses and their host cells. Emphasis on maturation and assembly of viral proteins. The immune response to viruses: formation and properties of infectious viral-antibody complexes. (Dr. M. Schlesinger)

Structure and replication of enveloped RNA animal viruses. (Dr. Schlesinger)

Ribosome formation; processing and turnover of RNA in bacteria and mammalian cells. (Dr. D. Schlessinger)

Structure of histocompatibility and immune response region associated antigens. Mechanisms of HLA and disease associations. (Dr. Schwartz)

Clinical microbiology, anaerobic and endogenous infections; enteric and enteric infections. (Dr. Sonnenwirth)
ELECTIVES

At present the primary enrollees in these 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. Emphasis is placed on the organization and function of living systems at the molecular level. The courses combine formal lectures with student-directed seminars. In the latter, each student has an opportunity to integrate various disciplines of modern molecular biology into the area of biology or medicine that is of particular interest to him. Those courses most relevant to the field of microbiology are listed under the Division of Biology and Biomedical Sciences.


The mechanisms of regulation of immune responses by antigen, macrophages, T cells, B cells and their products will be discussed. The material covered will vary in emphasis from year to year and will stress critical analysis of the literature. Credit 2 units. (Also Pathology.) (Dr. Pierce)

Bio 528. Cell Development in Animals and in Culture

Lectures and student seminars on the fate of individual cell types in animals and in cell culture. Principles of cell renewal exemplified in muscle, chondrocytes, and hemopoiesis. Cell culture, including growth factors, hormonal factors, cyclic nucleotide effects, and genetics of cultured cells. Programmed cell death discussed along with the relation of differentiation to cell division, the role of cell-cell interactions, and studies of teratomas. Credit 3 units. (Drs. D. Schlessinger, Lieberman)

Bio 534. Gene Expression and Differentiation in Eukaryotic Cells

Emphasis will be on nuclear events which are relevant to gene expression. Material covered will include examples mainly from Drosophila, mouse, chicken, and cells in tissue culture. We shall cover the cell cycle, mitosis, meiosis, organization of chromatin and chromosomes, the content of the nucleus, chromosomal proteins, nuclear RNA, polytene chromosomes, the transcription machinery, expression of rRNA genes in pro- and eukaryotes, nucleolus, turnover and processing of RNA in the nucleus and cytoplasm, expression of the globin genes and genes induced by steroid hormones, teratomas, somatic cell genetics, nuclear cytoplasmic relationships, plasmids and cloning of eukaryotic genes in bacteria. Credit 3 units. (Dr. Apirion)

Bio 539. Topics in Animal Virology

The course will consist of readings and seminars in specific areas of animal virology. The topics will vary from year to year. Credit 2 units. (Not offered in fall 1980.) (Drs. M. Schlesinger, S. Schlesinger)

Bio 541. Molecular Biology of Prokaryotes

Growth, metabolism and genetics of the bacterial cell, including transport mechanisms, the regulation of gene expression and protein synthesis and the molecular biology of virus infection by virulent and temperate bacteriophages. The conceptual and experimental bases for present knowledge, as well as major problems to be solved, will be emphasized. About 15 hours of lecture followed by seminar presentations on selected topics by each student. Credit 2 units. (Dr. Kennell)

Bio 546. Antibodies: Structure, Function, and Formation

The principal features of the structure and function of antibody molecules will be examined in lectures, assigned reading of current research papers, and in student seminar presentations. Emphasis will be placed on the genetic and molecular events which govern the appearance of antibodies during the immune response. (Drs. Fleischman, Little, Prof. Simms)

Note—The number preceding the course title indicates that the course carries credit in the Graduate School of Arts and Sciences.
Department of Neurology and Neurological Surgery

Neurology and neurological surgery 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 provided by the Departments of Anatomy and Neurobiology and of Physiology and Biophysics. In the second year, the Department presents the course in Pathophysiology of Nervous System Disorders. Here are demonstrated the interrelationships between knowledge derived from basic investigatory and from clinical sources. In addition, there are lectures and exercises with patients in neurological physical diagnosis. A full-time, four-week clerkship in the third year, with collaborative teaching by both Neurology and Neurological Surgery services, introduces the phenomenology of the diseased nervous system. In the fourth year, there are opportunities for clinical externships and many varieties of research experience.

Several divisions within Neurology provide an informal organizational base for specialized teaching and research purposes. These include:

- **Division of Pediatric Neurology**, Dr. Prensky (Director), Drs. Carroll, Demel, Dodge, Dodson, Rothman, Volpe
- **Division of Clinical Neuropharmacology**, Dr. Ferrendelli (Director), Drs. Collins, Dodson, Lothman, Wooten
- **Division of Neuromuscular Diseases**, Drs. Brooke, Carroll, Eliasson, Shumate

### SECOND YEAR

#### Pathophysiology of Nervous System Disorders (part of course in pathophysiology)

A collaborative sequence concerned with mechanisms of disease of the nervous system. Lectures and seminar-symposia.

(Dr. Eliasson and combined Neurology-Neurosurgery Staff)

#### Neurological Examination in Clinical Diagnosis (part of interdepartmental course in clinical diagnosis)

Lectures, demonstrations, and practice examinations of neurological patients.

(Dr. Eliasson and Staff)
THIRD YEAR
Combined Neurology-Neurosurgical Clerkship
A full-time, four-week clerkship is provided on the Neurology services at Barnes and City Hospital-Starkloff Memorial and the Barnes Hospital Neurosurgical service. Patients are assigned to students who follow them with the resident staff and discuss them regularly in conferences with the senior neurological and neurosurgical staff. Students also work in the neurology and neurosurgical clinics under staff supervision. (Drs. Eliasson, Landau, Goldring, and Staff)

FOURTH YEAR
ELECTIVES
Research
A 6- to 12-week elective is available in many areas such as neuroanatomy, neurophysiology, cerebral metabolism and circulation, neurochemistry, neuropharmacology, etc. Facilities are available for qualified students in any year to undertake original research in the laboratories of the Department or in the clinics and wards. (Drs. Goldring, Landau, and combined Neurology-Neurosurgery Staff)

Clinical Neurology
A six-week subintern elective on the Starkloff Hospital Neurology service provides direct patient responsibility as a member of the housestaff team. Organized conferences and reading with housestaff members and staff are provided. (Dr. Collins and Staff)

A six-week consult elective is offered at Barnes Hospital. The student works directly with the chief resident and senior staff covering consultations at Barnes and Jewish Hospitals. Selected reading assignments on current topics in neurology are made. (Dr. Eliasson and Staff)

A six-week consult elective organized in the same manner is offered at Starkloff Hospital. (Dr. Collins and Staff)

Clinical Neurosurgery
The goal of the six-week clerkship at Barnes Hospital is to provide an overview of neurological surgery. Responsibilities include patient workup, pre- and post-operative care, and attendance at selected neurosurgical operations. Daily teaching rounds are held with a member of the attending staff. Students also work in the Neurosurgical Clinic and attend the weekly staff conferences. (Dr. Goldring and Staff)

Staff Conferences
Students are invited to attend the Conjoint Neurological Conference (neuropathology, neuroradiology, medical neurology, pediatric neurology, and neurological surgery) held on Wednesday afternoon. The Conference is held in West Pavilion Auditorium at 1:30 p.m. except on the second Wednesday of each month, when it is held at City Hospital-Starkloff Memorial at 1:45 p.m. in the third-floor conference room. The format of the conferences includes clinical presentations, symposia, and CPCs. Neurosurgery Grand Rounds are held weekly at 4:00 p.m. on Friday. Neuropathology brain-cutting conferences are held in the Pathology Department on Monday at 1:00 p.m. and in the Starkloff Hospital morgue on Monday at 11:30 a.m.
Charles P. Hughes, B.A., Yale University, 1960; M.D., Case Western Reserve University, 1964. (Starkloff Hospital.)

George F. Wootten, Jr., B.A., Rice University, 1965; M.D., Cornell University Medical College, 1970. (See Department of Pharmacology.) (Starkloff Hospital.)

Associate Professor Emeritus (Clinical)

Andrew B. Jones, M.D., Vanderbilt University, 1916.

Associate Professors (Clinical)

Earl R. Schultz, A.B., Southeast Missouri State College, 1952; B.S.Med., University of Missouri, 1953; M.D., Washington University, 1955. (See Department of Psychiatry.)


Assistant Professors

James E. Carroll, B.S., University of Louisville, 1966; M.D., 1969. (See Department of Pediatrics and Irene Walter Johnson Institute of Rehabilitation.)

Mary I. Johnson, B.S., Washington State University, 1964; M.D., Johns Hopkins University, 1968. (See Departments of Anatomy and Neurobiology and Pediatrics.)

Eric William Lothman, B.A., Duke University, 1969; Ph.D., 1974; M.D., 1975. (Starkloff Hospital.)

Joseph A. Rothman, M.D., State University of New York, Upstate, 1969. (See Departments of Anatomy and Neurobiology and Pediatrics.)

Shirley A. Sahrman, (Neurophysiology), B.S.P.T., Washington University, 1958; M.A., 1971; Ph.D., 1973. (See Department of Physiology and Biophysics and Program in Physical Therapy.)

Jack B. Shumate, B.S., University of Florida, 1968; M.D., 1972. (See Irene Walter Johnson Institute of Rehabilitation.)


Research Assistant Professors

Chuan Huan Cheng, B.S., China National Central University, 1944; M.S., Cornell University, 1950; Ph.D., Michigan State University, 1955.


Arthur W. Tota, B.S., University of Massachusetts, 1974; M.S., St. Louis University, 1965; Ph.D., 1978.

Assistant Professors (Clinical)


Joseph M. Dooley, Jr., B.S., St. Louis University, 1954; M.D., 1958.

William B. Hardin, B.S., Rice University, 1953; M.D., University of Texas Medical School at Galveston, 1957.


Research Instructors


Erwin B. Montgomery, Jr., B.S., State University of New York, Buffalo, 1972; M.D., 1976.


Instructor (Clinical)

Robert J. Mueller, M.D., Washington University, 1936; M.S., University of Michigan, 1942.

Research Associates

Joseph Inukai (See Neurological Surgery.)

Lloyd N. Simpson (See Neurological Surgery.)

Research Assistants

Isaac A. Edwards

Stuart A. Golden

Cari F. Pieper

JoAnne D. Scarpellini

Jeanne M. Smith

NEUROLOGICAL SURGERY
Professor and Head

Sidney Goldring, B.S., Washington University, 1943; M.D., 1947.

August A. Bussch, Jr., Professor

Henry G. Schwartz, A.B., Princeton University, 1928; M.D., Johns Hopkins University, 1932.

Professor

William S. Cox, B.S., Hampden-Sydney College, 1945; M.D., Johns Hopkins University, 1948.

Professor Emeritus (Clinical)

Leonard T. Farlow, B.A., Emory University, 1925; M.D., 1925.

Associate Professors

Robert L. Grubb, Jr., A.B., University of North Carolina, 1961; M.D., 1965. (See Department of Radiology.)


Assistant Professor


Research Associates

Joseph Inukai (See Neurology.)

Lloyd N. Simpson (See Neurology.)

Research Assistants

Isaac A. Edwards

Stuart A. Golden

Cari F. Pieper
Department of Obstetrics and Gynecology

The student’s involvement in obstetrics and gynecology consists of a thorough exposure to the basic concepts in reproductive biology and an active participation in the delivery of medical care to women with gestations normal or at risk, congenital anomalies of pelvic viscera, structural disorders secondary to difficult childbirth, reproductive endocrinopathies and infertility, and gynecologic malignancies. The junior clerkship is conducted at Barnes Hospital, Jewish Hospital and St. Louis County Hospital, with the majority of the students stationed at Barnes. Senior electives may be taken at Barnes Hospital or in the many affiliated hospitals in St. Louis. Regularly held conferences in reproductive biology, perinatal medicine, ob-gyn pathology, and oncology supplement the student’s education.

SECOND YEAR

The sophomore is introduced to obstetrics and gynecology with lectures in reproductive biology touching on pelvic anatomy, physiology of tubal transport and ovarian control, myometrial function, placental perfusion, steroidogenesis, genetics and prenatal diagnosis.

THIRD YEAR

Students are each assigned to a resident-senior staff team, and the residents and staff physicians serve as preceptors during the students’ six-week stay in the Department. Every woman seen in the office or cared for in the hospital by the team of physicians is considered in her entirety. Attention is paid to the manner in which her social and economic situation has modified her response to disease. Environmental manipulation, in addition to the traditional ways of medical care, is resorted to in attempting to improve her health. The team method ensures that personalized care is given by arranging for the same group of physicians to meet a woman’s health needs during each visit. The residents in a team function like a group in obstetrics and gynecology practice, and the student works like an intern in the specialty. He sees patients in the office with his resident group, attends deliveries, assists in surgery, and goes to conferences and night call with them.
FOURTH YEAR

Seniors wishing to take an externship or research elective can choose from a variety of courses:

Ob-Gyn Externships

Endocrinology-Infertility Externship
In the office and hospital, the extern participates in the study and treatment of women with reproductive endocrine disorders and infertility. He presents patients in conferences, has assigned reading, and obtains experience in the techniques of steroid and gonadotropin quantitation as well as various manipulative procedures. (Dr. Warren)

Pathology Externship
The elective elucidates the principles of anatomic pathology as applied to operative material in obstetrics and gynecology. The extern examines gross and microscopic specimens in the Ob-Gyn Pathology Laboratory and reviews pertinent literature with a senior pathologist. (Dr. Askin)

Gyn Oncology Externship
This elective concerns itself with the diagnosis and treatment of malignant tumors of the female reproductive tract. The extern is involved in all aspects of the care of women with gyn malignant tumors. This experience will include the surgical treatment, radiation therapy and chemotherapy. (Dr. Askin)

Perinatal Medicine Externship
Electronic and biochemical surveillance of the human fetus and mother before and during parturition. The extern is involved in the care of women with gestations at risk (i.e., diabetes, hypertension, toxemia, renal disease, fetopelvic disproportion, etc.). (Dr. Camel)

Ob-Gyn Preceptorship
The student spends six weeks with a clinical faculty member who is in private practice. He makes hospital rounds and operates with his preceptor at Barnes and other community hospitals. He becomes familiar with the experiences of the private practitioner. (Dr. Warren)

Endocrinologic Function and Disease During Pregnancy Subinternship
While on elective, the senior student will participate in both clinical and research activities leading to a basic understanding of the endocrinology of pregnancy and endocrine dysfunction during pregnancy. He will present patients in conferences, has assigned reading and obtains experience in clinical research including techniques of radioimmunoassay of protein hormones.

Genetics Subinternship
This elective involves clinical exposure to preconceptional and preamniocentesis counseling methods of prenatal diagnosis (genetic amniocentesis, diagnostic ultrasound, amniography, etc.) and physical diagnosis of genetic disease. Laboratory experience in cytogenetic techniques such as amniotic fluid, lymphocyte, bone marrow and tissue culture is also included. (Dr. Crane)

Obstetric Anesthesiology
In this clinical elective, students receive instruction in the fundamentals of obstetric pain relief and newborn infant management and resuscitation. The pharmacology of sedatives, tranquilizers, narcotics, local anesthetics, inhalation and intravenous drugs are demonstrated by practical application, emphasizing fetal-maternal implications in the management of labor. Special local anesthetic blocks such as caudal, lumbar epidural, and spinal. Experience is also gained in the management of general anesthesia for minor gynecologic procedures such as postpartum tubal ligation.

Obstetrics and Gynecology Traveling Perinatal Subinternship
Arrangements will be made for the student to function with the perinatal team at either the University of Southern California (Los Angeles County Hospital) under the supervision of Dr. Ted Quilligan or the Ohio State University in Columbus, under the supervision of Dr. Fred Zuspan. The Ohio State program encompasses fewer deliveries than our program at Barnes Hospital, but with a very high proportion of high-risk obstetrics. The Los Angeles County Hospital is probably the largest delivery service in the United States, with some 15,000 deliveries annually. It provides extensive experience not only in the practice but also in the research of fetal monitoring.
General Ob-Gyn Externships

Jewish Hospital  (Dr. Burstein)
St. Louis County Hospital  (Dr. Morgan)
The externship in each of these affiliated hospitals allows the student a greater degree of participation and responsibility in the care of patients. There is a wealth of clinical material in each of these facilities.

RESEARCH ELECTIVES

Molecular Aspects of Endocrinology and Population Control
The research involves the study of the topography of macromolecular steroid binding sites, evaluation of the role of steroid "receptor" proteins in molecular mechanisms of steroid action, and the synthesis of affinity-labeling steroids and anti-steroids and their application to disease states and population control.

(Dr. Warren)

Radioimmunoassay
Radioimmunoassay is now the most widely applied in vitro assay procedure. This elective is designed to acquaint the student with basic theoretical considerations as well as with technical and practical applications of assays of value in obstetrics and gynecology. The student will be given opportunity to develop, evaluate and apply clinically an assay of choice.

(Dr. Wiest)

Regulation of Placental Hormone Synthesis
Our laboratory is concerned with studying the factors regulating the biosynthesis of protein hormones in the placenta, human placental lactogen (hPL), and human chorionic gonadotropin (hCG). The appearance of these hormones in maternal serum differs markedly. For these studies the template mRNAs have been isolated and we are generating complementary DNAs to the corresponding mRNAs. These DNA probes will be used to assay gene activities in normal and pathological tissues. Students will be concerned with the concepts and techniques of molecular biology as applied to the above research.

(Dr. Boime)

Sperm Biochemistry and Andrology
Research is performed which is aimed at the understanding and control of the molecular events which allow for sperm penetration of the ovum. Investigations into male infertility centering on sperm motility, bacteriological considerations, and freezing of semen are also conducted.

(Dr. Polakoski)

Bio-Organic Chemical Endocrinology
The mechanism of steroid hormone action at the molecular level is approached by producing new progesterone and estrogen analogs by organic synthesis. The student can work at the organic synthetic or biochemical level. Isolation of uterine estrogen and progesterone receptor proteins by a newly synthesized affinity chromatography system is in progress. Also, new steroids containing alkylating functional groups are synthesized and have a dual research role: to serve as tools with which to probe the steroid-macromolecular binding phenomenon and to produce biologically active steroids with persistent hormone activity or hormone blocking action. Physicochemical methods are used to study steroid-protein interaction.

(Dr. Sweet)
Jacob Klein, B.S., Muhlenberg College, 1964; M.D., Jefferson Medical College, 1968.

Frank B. Long, Jr., M.D., Washington University, 1947.


Laurence E. Maze, M.D., Washington University, 1948.


James Pennoyer, B.S., Hobart College, 1933; M.D., University of Rochester, 1939.

Marvin Rennard, A.B., Washington University, 1947; B.S., University of Missouri, 1950; M.S., 1950; M.D., Washington University, 1952.

Melvin M. Schwartz, A.B., University of Nebraska, 1945; M.D., 1947.

William L. Smiley, A.B., Ohio State University, 1933; M.D., 1937.

Chotchai Srisuro, M.D., Faculty of Medical Sciences, 1967.


Ira C. Gall, B.S., University of Cincinnati, 1948; M.D., 1951.


Joseph Hazan, M.D., Ege Medical School, 1971.

Godofredo M. Herzog, B.S., Louisiana State University, 1953; M.D., Washington University, 1957.

Michael K. Johnson, B.S., Ohio State University, 1970; M.D., St. Louis University, 1975.

James W. Kessel, M.D., University of Chicago, 1975; Ph.D., California Institute of Technology, 1963.


Justin F. Kramer, M.D., University of Michigan, 1949.


F. Delbert Moeller, B.S., Muskingum College, 1965; M.D., Ohio State University, 1969.

Sam Montazee, M.D., Shiraz Medical School, 1961.


Jonathan R. Reed, B.A., Fisk University, 1956; M.D., Meharry Medical College, 1965.

James Sawyer, A.B., Ohio State University, 1949; M.D., 1951.

Albro C. Tobey, Jr., B.S., Butler University, 1965; M.D., Trinity College, University of Dublin, 1972.

Parker H. Word, B.S., Virginia State College, 1941; M.D., Howard Medical School, 1944.

Mitchell Yanow, M.D., Washington University, 1941.
Department of Ophthalmology

Instruction begins in the second year with methods of examination of the eye. Emphasis is on the use of the ophthalmoscope. There are also several lectures on various aspects of ocular disease. During the third year, students are assigned to an ophthalmology clerkship for one week. In the fourth year, six-week and twelve-week clinical or research electives are offered.

SECOND YEAR
Ophthalmology
Lectures and demonstrations in the basic principles of ophthalmology. (Staff)

THIRD YEAR
Ophthalmology
Students rotate through the Eye Clinic for a one-week clinical clerkship. (Staff)

FOURTH YEAR
ELECTIVES
Clinical Clerkship in Ophthalmology
One student rotates through the Department of Ophthalmology for either a six-week period or a twelve-week period. He is given instruction in the basic principles of ophthalmologic examination and assists in the workup of eye patients at St. Louis Veterans Administration Hospital and at Washington University Medical Center (Barnes Hospital). He is expected to present cases at rounds and conferences. This elective is geared to the student who plans to enter the specialty of ophthalmology.

RESEARCH ELECTIVES
Experimental and clinical research in glaucoma. (Drs. Kass, Krupin)
Experimental and diagnostic ophthalmic pathology. (Dr. M. Smith)
Experimental research in ocular physiology. (Dr. Moses)
Clinical research in diabetes. (Dr. Waltman)
Experimental research in anatomy and physiology. (Dr. Cohen)
Experimental research in visual physiology. (Dr. R. Miller)
Theodore Krupin, A.B., Washington University, 1964; M.D., St. Louis University, 1968.
Robert F. Miller, M.D., University of Utah, 1967. (See Department of Physiology and Biophysics.)

Associate Professors Emeriti (Clinical)
Howard R. Hildreth, M.D., Washington University, 1928.
Theodore E. Sanders, B.S., University of Nebraska, 1931; M.D., 1933.

Associate Professor (Clinical)
Benjamin Milder, M.D., Washington University, 1939.

Assistant Professors
William M. Hart, Jr., Ph.D., University of Maryland, 1970; M.D., 1970.
David W. Meltzer, A.B., Princeton University, 1965; Ph.D., University of Rochester, 1970; M.D./Ph.D., University of Miami, 1975.
Michel L. Wolf, B.A., Yeshiva College, 1964; M.D., Albert Einstein College of Medicine, 1968.

Assistant Professors Emeriti (Clinical)
Edmund B. Alvis, M.D., Washington University, 1934.
Daniel Bisno, B.A., University of Wisconsin, 1927; M.D., Johns Hopkins University, 1931.
William H. Meinenberg, B.S., Washington University, 1932; M.D., 1932.

Assistant Professors (Clinical)
Neva P. Arribas, M.D., Manila Central University, 1954.
Instructors
Lawrence H. Schoch, Jr., B.Ch.E., University of Louisville, 1972; M.D., 1976.

Research Instructors
Walter J. Grodski, D.D.S., St. Louis University, 1944.
Elaine Miller, A.B., Judson College, 1944; M.D., Medical College of Alabama, 1949. (See Department of Pediatrics.)

Instructors (Clinical)
Ronald C. Bilchik, B.S., University of Toledo, 1963; M.D., Washington University, 1967.
James C. Bobrow, B.A., Yale University, 1966; M.D., Johns Hopkins University, 1970.
Ruth S. Freedman, A.B., Washington University, 1938; M.D., 1942.
David M. Freeman, A.B., University of Missouri, 1940; B.S.Med., 1941; M.D., Washington University, 1943.
M. Gilbert Grand, B.S., Tufts University, 1964; M.D., Yale University, 1968.
Anthony S. Hajek, B.A., Lewis College, 1966; M.S., DePaul University, 1969; Ph.D., University of Iowa, 1974.
Maxwell Rachlin, M.D., University of Toronto, 1942.

Mickey L. Salmon, M.D., Louisiana State University, 1959.
Arthur W. Stickle, Jr., M.D., University of Oklahoma, 1943.

Assistant
Clemens H. Jacques, B.S., University of California, 1949; O.D., 1949. (See Medical Care Group.)

Research Assistants
Nels J. Holmberg, B.S., Oklahoma State University, 1963; M.S., 1966.

Thom F. Wentlandt 75
Department of Otolaryngology

Otolaryngology is presented to students during their sophomore, junior, and senior years. A clinical pathologic correlation lecture series is presented to sophomores. In the junior year, each student spends one week on one of the services in East Pavilion, St. Louis Veterans Administration, or Max C. Starkloff Hospitals. 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 Thursdays, and an introduction to audiology as well as to basic ENT research.

Senior students who show a special interest may take a rotating elective in ENT suited to their interests. Some possibilities include research or clinical work. Ample research facilities and ongoing projects are available. Clinical exposure could include oncologic disease related to the head and neck, otologic diseases, otoneurology, audiology, or middle-ear surgery.

SECOND YEAR
Otolaryngology and Physical Diagnosis
Clinical pathologic correlative lectures in otolaryngology are given to the entire class.

THIRD YEAR
Otolaryngology Clerkship
Practical instruction in diagnosis and treatment. One week.

FOURTH YEAR
ELECTIVES
Structure and Innervation of Labyrinth
Clinical Clerkship
A six-week rotation which stresses outpatient diagnosis and management of ENT problems.

Lectures, field trips, office practice, and operating room exposure round out the rotation. Two students are accepted for each rotation.

Research Professor Emeritus and Lecturer
Hallowell Davis, A.B., Harvard University, 1918; M.D., 1922; Sc.D. (hon.), Colby College, 1954; Sc.D. (hon.), Northwestern University, 1962; Sc.D. (hon.), Washington University, 1973. (See Department of Physiology and Biophysics.) (Also Central Institute for the Deaf.)

Research Professors
Donald H. Eldridge, S.B., Harvard University, 1943; M.D., 1946. (Also Central Institute for the Deaf and Faculty of Arts and Sciences.)

Ira J. Hirsch, (Audiology), New York State College for Teachers (Albany), 1942; M.A., Northwestern University, 1943; M.A., Harvard University, 1947; Ph.D., 1948. (Also Central Institute for the Deaf and Faculty of Arts and Sciences.)

Research Professor Emeritus
Hallowell Davis, A.B., Harvard University, 1918; M.D., 1922; Sc.D. (hon.), Colby College, 1954; Sc.D. (hon.), Northwestern University, 1962; Sc.D. (hon.), Washington University, 1973. (See Department of Physiology and Biophysics.) (Also Central Institute for the Deaf.)

Research Professors
Donald H. Eldridge, S.B., Harvard University, 1943; M.D., 1946. (Also Central Institute for the Deaf and Faculty of Arts and Sciences.)

Ira J. Hirsch, (Audiology), New York State College for Teachers (Albany), 1942; M.A., Northwestern University, 1943; M.A., Harvard University, 1947; Ph.D., 1948. (Also Central Institute for the Deaf and Faculty of Arts and Sciences.)

76
Professors Emeriti (Clinical)

Ben H. Scurluria, A.B., Washington University, 1931; M.D., 1935.

Harold M. Cutler, A.B., University of Maine, 1930; M.D., Tufts College, 1937.

Associate Professors


Stanley E. Thawley, B.A., University of Texas, 1963; M.D., University of Texas Medical Branch, 1967.

Associate Professors Emeriti (Clinical)

William T. K. Bryan, A.B., Washington University, 1929; M.D., 1933.

French K. Hansel, M.D., St. Louis University, 1918; M.S., University of Minnesota, 1923.

Guerdan Hardy, M.D., Washington University, 1929.

Robert E. Yotaw, B.S., State University of Iowa, 1927; M.D., 1929.

Associate Professors (Clinical)

Benard C. Adler, B.S., Washington University, 1937; M.D., 1937.

Morris Davidson, B.S., Indiana University, 1926; M.D., 1938.


Edward H. Lyman, B.S., Washington University, 1937; M.D., 1937.

Wayne A. Viers, B.S., Phillips University, 1952; M.D., University of Oklahoma, 1956.

Joseph W. West, M.D., Duke University, 1944.

Assistant Professors


Timothy J. Reichert, B.S., St. John's University, 1966; B.S., University of North Dakota, 1967; M.D., University of Illinois, 1969. (See Department of Pediatrics.) (St. Louis Children's Hospital.)

Research Assistant Professor


Assistant Professors Emeriti (Clinical)

Alfred J. Cone, B.S., State University of Iowa, 1921; M.D., 1923; M.S., 1927.

Herbert M. Smil, M.D., St. Louis University, 1933.

Assistant Professors (Clinical)


Carl F. Ehrlich, B.S., St. Louis University, 1961; M.D., University of Missouri, Columbia, 1965.

Donald R. Ingram, M.D., University of Illinois, 1956.

Arnoldo Kuczer, M.D., University of Buenos Aires, 1955. (Jewish Hospital.)

Instructor


Research Instructor

Marion P. Bryan, A.B., Washington University, 1931.

Instructors (Clinical)

Wallace P. Berkowitz, B.S., University of Notre Dame, 1963; M.D., Boston University, 1967.


Philip L. Martin, B.A., St. Louis University, 1968; M.D., 1968.


Supote Phipatanakul, M.D., Chulalongkorn Hospital Medical School, 1965. (St. Louis County Hospital.)

Lloyd Thompson, B.A., Union College, 1960; M.D., Howard University, 1964.

Research Associates


Research Assistants

Charles D. Carr
Gertraude Thallinger

Consultants


Department of Pathology

Modern pathology is concerned with the molecular and ultrastructural basis of disease. Historically, morphologic studies provided the foundations of our concepts of disease, and ultrastructural studies continue to add to our understanding, but modern pathology utilizes virtually all of the tools of basic sciences. Pathologists are involved in diagnostic, teaching, and research activities.

In addition to the sophomore year of pathology, the Department conducts numerous combined conferences which third- and fourth-year students attend as part of individual clinical clerkships. These are described below.

Students, usually in their fourth year, may elect to participate in advanced courses or clerkships in autopsy or surgical pathology or laboratory medicine, or to pursue research in experimental pathology.

The Department offers a course of study leading to the Ph.D. degree. Medical students who desire to combine graduate and medical programs of study should consult Dr. Michael Lieberman.

For the purpose of teaching, research, and service, the Department is divided into specialty divisions under the following directors:

Autopsy Pathology, Dr. Kissane
Graduate Programs in Experimental Pathology, Dr. Lieberman
Laboratory Medicine, Dr. McDonald
Neuropathology, Dr. Nelson
Pediatric Pathology, Dr. Kissane
Surgical Pathology, Dr. W. Bauer

SECOND YEAR

Bio 515, 516. General Pathology

This course is a comprehensive study of the cellular and molecular basis of disease. Lectures, gross and microscopic demonstrations, laboratory work, tutorials, case studies, and experimental pathology seminars are all utilized. The course is divided into six sections, each consisting of a six-week period of study that is correlated with the subject matter concurrently presented in the sophomore pathophysiology course. The sections consist of (1) general pathology and infectious diseases, (2) cardiovascular, pulmonary and renal diseases, (3) metabolic, endocrine, and gastrointestinal diseases, (4) hematology and oncology, (5) neurology, and (6) development, pediatric, obstetric, and gynecologic diseases.

Edward Mallinckrodt Professor and Head of Department
Paul E. Lacy, B.A., Ohio State University, 1945; M.D., 1948; M.S., 1948; Ph.D., University of Minnesota, 1955.

Professors Emeriti
Lauren V. Ackerman, (Pathology and Surgical Pathology), A.B., Hamilton College, 1927; M.D., University of Rochester, 1932. (Also Consultant.)
Ruth Silberberg, M.D., University of Breslau, 1931. (Also Lecturer.)

Professors
Walter C. Bauer, B.S., Ohio State University, 1946; M.D., Washington University, 1954.
Joseph M. Davie, A.B., Indiana University, 1962; M.A., 1964; Ph.D., 1966; M.D., Washington University, 1968. (See Department of Microbiology and Immunology.)
John M. Kissane, A.B., University of Rochester, 1948; M.D., Washington University, 1952. (See Department of Pediatrics.)
Charles Kuhn, A.B., Harvard University, 1955; M.D., Washington University, 1959.
Michael Kyriakos, B.S., City College of New York, 1958; M.D., Albert Einstein College of Medicine, 1962.
Robert W. McDivitt, M.D., Yale Medical School, 1956. (Jewish Hospital.)
James S. Nelson, M.D., St. Louis University, 1957. (See Department of Pediatrics.)
John W. Olney, B.A., University of Iowa, 1956; M.D., 1963. (See Department of Psychiatry.)
Carl W. Pierce, A.B., Colgate University, 1962; M.D., University of Chicago, 1966; Ph.D., 1966. (See Department of Microbiology and Immunology.) (Jewish Hospital.)
Heschel J. Raskas, B.S., Massachusetts Institute of Technology, 1962; Ph.D., Harvard University, 1967. (See Department of Microbiology and Immunology.)

Laurence A. Sherman, B.A., B.S., University of Chicago, 1956; M.D., Albany Medical College, 1964. (See Department of Medicine.)

Morion E. Smith, B.S., University of Maryland, 1956; M.D., 1960. (See Department of Ophthalmology.)

Alexander C. Sonnenwirth, A.B., University of Nebraska, 1950; M.S., Purdue University, 1953; Ph.D., Washington University, 1960. (See Department of Microbiology and Immunology.) (Jewish Hospital.)

Richard Torack, B.S., Seton Hall University, 1948; M.D., Georgetown University, 1952.


Professor (Visiting Staff)
Frederick G. Germuth, Jr., A.B., Johns Hopkins University, 1942; M.D., 1945.

Associate Professors
Harish C. Agrawal, B.Sc., Allahabad University, 1957; M.Sc., 1959; Ph.D., 1964. (See Departments of Pediatrics and Neurology and Neurological Surgery.)
C. Elliott Bell, Jr., B.S., Tulane University, 1960; M.D., 1964. (See Department of Medicine.)
Gustave L. Davis, B.A., Union College, 1959; M.D., State University of New York, Syracuse, 1963. (Jewish Hospital.)
David N. Dietzler, A.B., Washington University, 1957; Ph.D., 1963. (See Department of Medicine.)

THIRD AND FOURTH YEARS
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 the students an opportunity to interpret the clinical observations in the light of the post-mortem findings. One hour a week during the year.

(Tumor Conference
One hour each week for twelve weeks during the surgery and obstetrics and gynecology clerkships. Problem cases are presented for illustration and discussion of all aspects of neoplastic disease.

(Teacher)

RESEARCH
Bio 590.
The department encompasses all of the major areas of investigation in experimental pathology. Examples include:
Lung development and pediatric lung disease. (Dr. Askin)
Definition of the structure and function of oligosaccharide moieties present on glycoproteins. (Dr. Baenziger)
Kinetics and hormonal aspects of neoplastic cell growth.
(Drs. Bauer, Meyer)
Plasma membrane tumor associated antigens and immunity to them in human lung cancer.
(Dr. Bell)
Mechanism of antigen recognition by cytolytic T lymphocytes. (Dr. Braciale)
Viral infections of the inner ear, environmental pathology.
(Dr. Davis)
Clinical and analytical enzymology and computerized instrumentation.
(Dr. J. Davis)
Experimental analysis of gastrin secretion by rat pyloric antral cells in vitro. (Dr. DeSchryver)
The coordination and interregulation of the pathways of carbon and energy metabolism in vivo using Escherichia coli as a model system.
(Dr. Dietzler)
Functional and biochemical characterization of human T lymphocyte subpopulations and identification of human immune response genes. (Dr. Gebel)

Structure and function of endocrine cells of the gastrointestinal tract and pancreas. (Dr. Greider)
Environmental pathology, renin-erythropoietin-juxtaglomerular cells. (Dr. Hartroft)
Cellular immunology with particular emphasis on genetic control of antibody responses. (Dr. Kapp)
Renal pathology, pediatric pathology.
(Dr. Kissane)
Mechanisms of antimicrobial action and resistance.
(Dr. Krogstad)
Experimental pulmonary diseases, environmental pathology.
(Dr. Kuhn)
Experimental diabetes mellitus, tissue culture of islets, transplantation of islets. (Dr. Lacy)
Distribution of electrolytes and trace metals in blood.
(Dr. Ladenson)
Chemical carcinogenesis and enzymology of DNA repair, chromatin structure. (Dr. Lieberman)
Immunoregulatory mechanisms controlling the differentiation of hapten-binding myeloma cells.
(Dr. Lynch)
Experimental diabetes: Biochemical studies of insulin release mechanisms in vitro.
(Dr. M. McDaniel)
Biology of breast cancer. (Dr. McDivitt)
Cellular mechanism of insulin and related hormone action with emphasis on the role of intracellular divalent cations.
(Dr. McDonald)
Pathology and biochemistry of human and rodent pituitary neoplasms. (Dr. McKee)
Analysis of predictability of clinical laboratory diagnostic tests.
(Dr. Murray)
Pathogenesis of cerebral microcirculatory injury: response of the autonomic nervous system to injury; pathology and pathogenesis of lesions associated with vitamin E deficiency; pathogenesis of skeletal muscle injury.
(Dr. Nelson)
Mechanisms regulating immune responses in tissue culture systems.
(Dr. Pierce)
Biochemistry of DNA tumor viruses.
(Dr. Raskas)
Transplantation immunology.
(Dr. Rodey)
Metabolism of coagulation moieties (fibrinogen and platelets), thrombus localization, and applied blood banking.
(Dr. Sherman)
Placental transport and surface membrane structure and function.
(Dr. C. Smith)
Clinical microbiology, anaerobes, endogenous infections.
(Dr. Sonnenwirth)
Metabolic bone diseases.
(Dr. Teitelbaum)
Mechanisms regulating lymphocyte activation.
(Dr. Thomas)
(Dr. Williamson)
Immunohemistry of fibrinopeptide.
(Dr. Wilner)

**ELECTIVES**

**Advanced Special Pathology**
A series of seminars discussing timely selected topics in special pathology of human disease, augmented by illustrative case studies and emphasizing clinicopathologic correlations. Reading lists will be circulated and active discussion is encouraged. If the size of the group makes it practical to do so, each student will prepare and conduct a session on a subject of his interest. (Dr. Kissane)

Selected Topics in Immunology and Immunopathology
This seminar course emphasizes those areas which are most applicable to the understanding of human disease states. The subject matter can be selected so as to suit the interest of the student, but will include immune deficiency states, the role of the thymus in immune competence, immunoglobulin structure and function, immunological disorders accompanying neoplasia, tumor immunology, and autoimmune disorders. (Dr. Lynch)

**Neuropathology Seminar**
Clinical pathological correlations of neurological diseases will be investigated by the case study method using current and documented material. Participants will partake in gross neuropathological examinations and will be assigned selected cases for discussion of clinical data and gross and microscopic pathological findings, especially in relationship to evolution and mechanism of disease processes. Topics covered will include vascular, infectious, demyelinating, and neuronal diseases, as well as neoplasms of the nervous system. (Dr. Nelson)

**Clinical Laboratory Medicine**
A full-time elective, periods three and five. Designed to acquaint the student with the proper use of the laboratory in clinical medicine and to expose the student to the basic operation of each area of the laboratory. (Dr. McDonald and Staff)

In addition to the above, the Department offers a number of 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.

**Bio 504. Environmental Pathology**
**Bio 518, 519. Pathology Research Seminar**
**Bio 520. Methods in Experimental Pathology**
**Bio 521. Cellular Aspects of the Immune Response**
**Bio 544. Mechanisms of Neoplasia**

*Note—The number preceding the course title indicates that the course carries credit in the Graduate School of Arts and Sciences.*
George D. Wilner, B.S., Northwestern University, 1962; M.D., 1965. (See Department of Medicine.)

Fredrick T. Kraus, B.A., College of William and Mary, 1951; M.D., Washington University, 1955.

William V. Miller, A.B., University of Missouri, 1962; M.D., 1966. (See Department of Medicine.)

Blanca M. Perez, B.A., Universidad del Valle, 1953; M.D., 1961. (Jewish Hospital.)

William R. Platt, B.S., University of Maryland, 1936; M.D., 1940.


James E. Davis, B.A., Occidental College, 1965; M.S., Duke University, 1969; Ph.D., 1970. (See Department of Medicine.)

Katherine DeSchryver, M.D., University of Louvain, 1971.

Samir K. El-Mofty, B.D.S., Cairo University, 1959; M.Sc., University of Pennsylvania, 1966; Ph.D., Temple University, 1975. (Also School of Dental Medicine.)

Howard M. Gebel, (Clinical Immunology), B.S., University of Illinois, 1973; Ph.D., University of Missouri, 1976. (See Department of Medicine.)


Suleyman Gulmen, D.D.S., Hacettepe University, 1968; M.D.S., University of Minnesota, 1972. (Also School of Dental Medicine.)

Thomas E. Hewitt, B.Sc., University of Alberta, 1970; M.S., Purdue University, 1972; Ph.D., 1974. (Jewish Hospital.)

Judith A. Kapp-Pierce, B.A., Miami University, 1965; M.S., Indiana University, 1969; Ph.D., Harvard University, 1976. (See Department of Microbiology and Immunology.) (Jewish Hospital.)

Donald J. Kroghstad, A.B., Bowdoin College, 1965; M.D., Harvard Medical School, 1969. (See Department of Medicine.)


David N. Menton, B.S., Mankato State College, 1959; Ph.D., Brown University, 1966. (See Department of Anatomy and Neurobiology.)

Patrick Murray, B.S., Saint Mary's College, 1969; Ph.D., University of California, 1974. (See Department of Medicine.)

Marshall Poger, A.B., Washington University, 1961; M.A., Brandeis University, 1963; M.D., University of Tennessee, 1969. (Jewish Hospital.)

Daniel Santa Cruz, M.D., University of Buenos Aires, 1971.

E. Kaye Smith, B.S., Webster College, 1957; M.S., St. Louis University, 1963; D.V.M., Kansas State University, 1965.

David W. Thomas, B.A., University of Kansas, 1969; Ph.D., University of Colorado, 1975. (See Department of Microbiology and Immunology.) (Jewish Hospital.)

Roland Valdes, Jr., B.S., University of Miami, 1969; M.S., California State University, 1972; Ph.D., University of Virginia, 1976. (Jewish Hospital.)

Research Assistant Professors


Ian M. Zitron, B.Sc., University of London, 1969; Ph.D., Council for National Academic Awards, 1974. (Jewish Hospital.)

Assistant Professors (Visiting Staff)

Wagih M. Abdel-Bari, B.A., School of Science, 1948; M.D., Ein Shams University, 1953; Ph.D., Washington University, 1965.

John D. Bauer, B.Sc., University of Innsbruck, 1938; L.R.C.P. and S., University of Glasgow, 1944; M.D., Marquette University, 1947.

Luis Q. Del Rosario, M.D., University of Santo Tomas, 1954.

Valgard Jonsson, B.S., North Dakota State University, 1958; M.S.P.H., University of North Carolina, 1961; Ph.D., 1965.

Richard A. Kahn, A.B., University of Missouri, 1966; M.D., 1968; Ph.D., Georgetown University, 1972.

Kathleen S. McLaughlin, B.S., St. Louis University, 1960; M.D., Washington University, 1964.

Robert W. Ogilvie, B.A., University of Utah, 1943; M.D., 1946.

Donald J. Parker, B.S., Duquesne University, 1959; M.S., 1964; Ph.D., Kansas State University, 1967.


Luis Tumialan, M.D., University of San Marcos, 1965.
Andres J. Valdes, B.S., Institute de Santa Clara, 1949; M.D., University of Havana, 1957.

Instructors
Alice S. Weissfeld, B.A., Boston University, 1970; M.S., Rutgers University, 1972; Ph.D., 1976.

(Jewish Hospital.)

Research Instructors
Saumya Bhaduri, B.S., Vidyasagar College, 1963; M.S., Calcutta University, 1965; Ph.D., 1970.

Instructors (Visiting Staff)
Tomas Aquino, S.B., Santa Clara Institute, 1949; M.D., University of Havana, 1957; Ph.D., University of Chicago, 1967.
Virgilio P. Dumadag, M.D., Far Eastern University Institute of Medicine, 1961.
Rodolfo A. Latorre, M.D., University of the East, Ramon Magsaysay Memorial Medical Center, 1961.
Manuel Marban, A.A., Xavier University, 1959; M.D., University of Santo Tomas, 1964.

Carlos Perez-Mesa, M.D., University of Havana, 1950.

Katherine Chang, B.S., University of Taiwan, 1969; Ph.D., University of Iowa, 1974.
Maria Chraplyvy, B.S., St. Louis University, 1964; M.S., 1967.
Dorothy J. Fiete, B.S., Marymount College, 1966.
Joan Lee, B.S., Taiwan Christian College, 1960; M.S., Oklahoma State University, 1967.

Research Assistants
Cheryl Bry, B.A., Harvard University, 1976.

Professor
Philip R. Grossman, University of Nebraska College of Medicine, Department of Neurology.

Assistant Professor
Arthur L. Blank, University of California, San Francisco, Department of Neurology.

Professor
Donald L. Sanna, University of California, San Francisco, Department of Neurology.

Professor
Harish C. Prabhu, Allahabad University, 1959; Ph.D., University of Nebraska, Department of Neurological Surgery and Neurosurgery.

David Goldstein, University of California, San Francisco.

Alexis F. M. Rabinovitch, Washington University, M.D., 1958.


Richard E. Gugler, University of Cincinnati, Department of Medicine, University of Cincinnati, Department of Genetics.

Lawrence L. Kravitz, Research Center, University of Alabama, Department of Medicine, University of Alabama, Department of Public Health, Department of Biostatistics, Department of Pediatrics, Department of Preventive Medicine.

James P. Reinhard, University of Kansas, Department of Medicine.

John M. W. Thompson, University of Rochester, Department of Pathology.
Edward Mallinckrodt
Department of Pediatrics

The primary aim of the Department of Pediatrics in the teaching program 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 will have an appreciation of pediatric problems regardless of his future choice of a career in medicine.

The major clinical and research facilities are in the St. Louis Children's Hospital and the St. Louis Maternity Hospital. The former has a bed capacity of 182, and accepts children through adolescence with all types of medical problems. Hospital admittances average 6,000 annually. The Pediatric Outpatient Division averages about 70,000 visits a year. In the Medical Center the yearly number of newborn infants averages more than 4,000.

SECOND YEAR
The student is introduced to pediatrics and to the full-time staff through a series of lectures designed to acquaint him with the concepts of human growth and development, genetics, and the effects of age and maturity on reactions to injury and disease. A second series of talks highlights the important disorders commonly encountered in infants and children. The unique aspects of the physical examination of the infant and child are presented during the course in physical diagnosis. Members of the Department also participate in the sophomore course in pathology.

THIRD YEAR
A clerkship of six weeks is scheduled, where the student participates in the following:

1. Care of inpatients, sharing responsibility with intern or resident.
2. Daily ward rounds and bedside conferences with house staff and attending physician.
3. Special conferences on various facets of pediatrics.
4. Tutorial with junior faculty.
5. Weekly grand rounds.
FOURTH YEAR

This year is devoted to elective time which may be spent according to the individual preferences of the student, who may serve as an intern substitute or in the research laboratory or combine clinical and laboratory work. The following electives are offered:

Pediatric Cardiology

Inpatient Service

Diagnosis and management of patients with acquired and congenital heart disease, including critically ill and post-operative patients in the Intensive Care Unit. Activities will include daily ward rounds, precatheaterization critiques once a week, and a weekly conference on catheterization laboratory findings.

(Drs. Goldring, Hartmann, Hernandez, Strauss)

Outpatient Service

New patients for consultation, as well as follow-up on old patients.

(Dr. Goldring)

Laboratory Diagnostic Procedures

The student will be involved initially as observer and eventually as a participant in the catheterization and angiographic studies. The theory and interpretation of physiologic data will be reviewed in daily sessions. The students may participate in the other activities of the Pediatric Cardiology Division as time permits.

(Dr. Hartmann)

Electrocardiography, Vectorcardiography, Electrocardiography, Phonocardiography, and Ergometry

In this intensive course, emphasis will be on the electrophysiology and theory as well as interpretation of electrocardiograms, vectorcardiograms, echocardiograms, phonocardiograms, and ergometry in patients and outpatients. The student may participate in other activities of the Pediatric Cardiology Division as time permits.

(Dr. Hartmann)

Research Electives

The student has an opportunity to learn some of the chromato- graphic and spectrophotometric techniques frequently used in developmental neurochemistry, while working on a project of his choosing or one that is currently in progress in the laboratory. Prior discussion is necessary.

(Drs. Agrawal, Prensky)

Pediatric Infectious Diseases

Clinical Elective

The student works as a substitute and is assigned selected patients on the Isolation Division for initial evaluation and continuing care. He attends daily ward rounds and all scheduled conferences. Instruction is given in diagnostic bacteriology and serology.

(Drs. Gardner, Granoff, Shackelford)

Research Electives

Research is aimed at individual identification of the antigens of Varicella Zoster Virus (VZV) and correlation of individual viral proteins with the antigenic determinants of humoral and some mediated host immune response to VZV infection. Techniques

Professors Emeriti (Clinical)

Joseph C. Jaudon, A.B., Washington University, 1926; M.D., 1933.
involved are tissue culture, virus purification, immunofluorescence and ELISA assays, lymphocyte blastogenesis assays, gel electrophoresis radioimmune precipitation and affinity column chromatography. (Dr. Gardner)

This work focuses on H. influenzae type b infections in children—epidemiology, immune response and prevention through immunization. We are attempting to delineate the composition and immunogenicity of the noncapsular surface antigens of this organism. Also of interest— genetic determinants of human antibody response to H. influenzae, type b. (Dr. Granoff)

**Pediatric Hematology and Oncology**

Large numbers of children with diverse hematological and oncological problems are seen. During the six-week rotation the student is expected to acquire sufficient knowledge to interpret the blood smears, bone marrows, and special laboratory studies. Concepts of management and differential diagnosis are reviewed.

(Drs. Land, Vietti, Zarkowsky)

**Pediatric Renal Disease**

The students are responsible for evaluating, following, and presenting children who are on the inpatient and outpatient services and who have renal disease; this includes the patients on chronic hemodialysis and those who are recipients of renal transplants. Discussions and rounds with the attending staff and fellows emphasize the relationship between clinical problems and the pathophysiology of the underlying disease. Organized teaching sessions, held in conjunction with the adult renal division, include renal pathology seminars in which all renal biopsies are reviewed, journal clubs in which renal physiology is emphasized, and informal teaching sessions on selected topics in clinical or research areas of nephrology. The students are expected to review at least two subjects of their own choosing in detail, and are expected to attend other pediatric teaching functions such as grand rounds on clinical case conferences.

(Drs. Beale, Cole, Robson)

**General Pediatrics**

**Pediatric Ambulatory Service**

A six-week course with participation in all aspects of ambulatory care of children under the direction of St. Louis Children's Hospital staff physicians. Includes diagnosis and treatment of acute and chronic illness in general pediatric service, in private physicians' offices, and in the emergency room. Experiences in subspecialty clinics are also offered.

(Drs. Middelkamp, Walker)
Charles B. Manley, Jr., (Genitourinary Surgery), A.B., University of Missouri, 1955; M.D., 1958. (See Department of Surgery.) (Jewish Hospital.)
Julio V. Santiago, B.S., Manhattan College, 1963; M.D., University of Puerto Rico, 1967. (See Department of Medicine.)
Penelope G. Shackelford, B.S., University of Wisconsin, 1964; M.D., Washington University, 1968.
Carol H. Smith, B.A., Swarthmore College, 1955; M.D., Yale University, 1959. (See Department of Pathology.)
Arnold W. Strauss, B.A., Stanford University, 1966; M.D., Washington University, 1970. (See Department of Biological Chemistry.)
Kutay Taysi, M.D., Ankara University School of Medicine, 1961.
James K. Turner, A.B., Washington University, 1949; M.D., 1953. (See Medical Care Group.)
Associate Professors Emeriti (Clinical)
Helen M. Aff, B.S., Washington University, 1934; M.D., 1934.
Max Deuch, M.D., Washington University, 1926.
Stanley L. Harrison, B.S., Washington University, 1928; M.D., 1930.
Frederick A. Jacobs, B.S., Washington University, 1927; M.D., 1928.
Sol Londe, B.S., Washington University, 1925; M.D., 1927.
Bernard Schwartzman, A.B., Washington University, 1931; M.D., 1935.

Pediatric Endocrinology and Metabolism
This elective is designed to include broad clinical experience in pediatric endocrine and metabolic problems. The student has the opportunity to evaluate many of the pediatric endocrine patients and to see some adult patients during weekly rounds. Emphasis is placed on the practical management of common problems. The student attends rounds and clinics (endocrine, metabolic, and diabetic) and the joint metabolic seminar and rounds held with the medical service. A large number of patients with varied problems are studied in depth during any six-week period.
(Drs. Bier, Blethen, Granoff, Hillman, Santiago, Weldon, White)

Genetics
Medical Genetics
Twelve weeks, all day. Combined clinical and research course.
(Drs. Sly, Taysi)
Clinical Genetics
Six weeks, all day. Experience in clinical/laboratory approach to study of genetic problems. Students see all consultations referred to the Division of Medical Genetics. They work in the Medical Genetics Clinic on Monday afternoons, attend daily genetics rounds, and participate in scheduled seminars.
(Drs. Sly, Taysi)

General Clinical Pediatrics
The student participates as an active member of the pediatric care team at the St. Louis County Hospital. Under supervision of faculty, senior and junior residents, he is involved with patients in the pediatric clinics, the emergency department, the newborn nursery, and the inpatient service. The elective provides a general pediatric experience, with emphasis on ambulatory care and neonatology.
(Drs. Keller, Loney, Squires)

Neonatology
Clinical Neonatology
The time is spent at St. Louis Children's Hospital in the intensive care nursery learning the care of severely ill newborns and premature infants. During the entire six weeks, daily teaching rounds will be held on the Intensive Care Unit at Children's Hospital. Interested students may arrange to spend time at Maternity Hospital learning the examination and care of normal newborn and premature infants, as well as those with less severe illnesses that do not require intensive care. Students will be offered considerable responsibility in patient care and may participate in the transportation of ill patients from other hospitals to St. Louis Children's Hospital. Opportunities are available for clinical research in perinatal medicine.
(Dr. Smith)

Research
Placental amino acid transfer—glycine, aspartic acid, and arginine. (Drs. Hillman, Marshall, Maurer, Thach)

Seminar Elective
Developmental Neurobiology
This course covers selected topics in the development of the nervous system. While emphasis is given to the neurochemical aspects of brain growth and maturation, there are also discussions of the neurophysiological and functional development of the brain. The relationship between chemical, physiological, and functional development and underlying anatomical changes is stressed. The course is conducted as a seminar, with papers assigned prior to each meeting. Members of the Departments of Pediatrics and Neurology and Neurological Surgery are present at these discussions to clarify obscure points and to add additional information when possible. (Dr. Agrawal)

Clinical Chemistry Laboratory
(1) Development of laboratory procedures in enzymology, gas chromatography, drug analysis and other areas; establishment of normal values in children and clinical-laboratory correlations.
(2) The student may participate in studies correlating the fluorometric measurements of in vivo concentrations of allosteric regulators with the rates of enzyme activity and performing mathematical analyses of the kinetic data.
(Dr. Smith)
Associate Professors (Clinical)

C. Read Boles, A.B., Washington University, 1940; M.D., 1943.

Robert H. Friedman, M.D., Washington University, 1948.

Gene H. Grabau, B.S., St. Louis College of Pharmacy, 1937; M.D., Washington University, 1942.


Norman Hankin, A.B., University of Wisconsin, 1940; M.D., 1943.

Kenneth A. Koerner, A.B., Washington University, 1935; M.D., 1941.


John C. Martz, A.B., University of Missouri, 1938; M.D., Washington University, 1942.

David N. McClure, M.D., University of Tennessee, 1940.

Helen E. Nash, A.B., Spelman College, 1942; M.D., Meharry Medical College, 1945.

Frederick D. Peterson, A.B., Knox College, 1953; M.D., Washington University, 1957.

Argyrios A. Tsifutis, M.D., Aristotelian University of Thessaloniki, 1954.

Frank S. Wissmath, A.B., Washington University, 1939; M.D., 1943.

Assistant Professors


Martin J. Bell, B.A., New York University, 1959; M.D., State University of New York, Downstate, 1963. (See Department of Surgery.)

Sandra L. Blethen, B.S., University of Chicago, 1961; Ph.D., University of California, Berkeley, 1965; M.D., Albert Einstein College of Medicine, 1975.

Richard J. Bower, B.S., Northern Illinois University, 1965; M.D., University of Virginia, 1969. (See Department of Surgery.)

James E. Carroll, B.S., University of Louisville, 1966; M.D., 1969. (See Department of Neurology and Neurological Surgery and Irene Walter Johnson Institute of Rehabilitation.)

Milton L. Cobb, B.A., Baylor University, 1964; M.D., University of Texas Southwestern Medical School, 1968. (See Department of Anesthesiology.)

C. Read Boles, A.B., Washington University, 1940; M.D., 1943.

Robert H. Friedman, M.D., Washington University, 1948.

Gene H. Grabau, B.S., St. Louis College of Pharmacy, 1937; M.D., Washington University, 1942.


Norman Hankin, A.B., University of Wisconsin, 1940; M.D., 1943.

Kenneth A. Koerner, A.B., Washington University, 1935; M.D., 1941.


John C. Martz, A.B., University of Missouri, 1938; M.D., Washington University, 1942.

David N. McClure, M.D., University of Tennessee, 1940.

Helen E. Nash, A.B., Spelman College, 1942; M.D., Meharry Medical College, 1945.

Frederick D. Peterson, A.B., Knox College, 1953; M.D., Washington University, 1957.

Argyrios A. Tsifutis, M.D., Aristotelian University of Thessaloniki, 1954.

Frank S. Wissmath, A.B., Washington University, 1939; M.D., 1943.

Assistant Professors (Clinical)

C. Read Boles, A.B., Washington University, 1940; M.D., 1943.

Robert H. Friedman, M.D., Washington University, 1948.

Gene H. Grabau, B.S., St. Louis College of Pharmacy, 1937; M.D., Washington University, 1942.


Norman Hankin, A.B., University of Wisconsin, 1940; M.D., 1943.

Kenneth A. Koerner, A.B., Washington University, 1935; M.D., 1941.


John C. Martz, A.B., University of Missouri, 1938; M.D., Washington University, 1942.

David N. McClure, M.D., University of Tennessee, 1940.

Helen E. Nash, A.B., Spelman College, 1942; M.D., Meharry Medical College, 1945.

Frederick D. Peterson, A.B., Knox College, 1953; M.D., Washington University, 1957.

Argyrios A. Tsifutis, M.D., Aristotelian University of Thessaloniki, 1954.

Frank S. Wissmath, A.B., Washington University, 1939; M.D., 1943.

Richard J. Bower, B.S., Northern Illinois University, 1965; M.D., University of Virginia, 1969. (See Department of Surgery.)

James E. Carroll, B.S., University of Louisville, 1966; M.D., 1969. (See Department of Neurology and Neurological Surgery and Irene Walter Johnson Institute of Rehabilitation.)

Milton L. Cobb, B.A., Baylor University, 1964; M.D., University of Texas Southwestern Medical School, 1968. (See Department of Anesthesiology.)

C. Read Boles, A.B., Washington University, 1940; M.D., 1943.

Robert H. Friedman, M.D., Washington University, 1948.

Gene H. Grabau, B.S., St. Louis College of Pharmacy, 1937; M.D., Washington University, 1942.


Norman Hankin, A.B., University of Wisconsin, 1940; M.D., 1943.

Kenneth A. Koerner, A.B., Washington University, 1935; M.D., 1941.


John C. Martz, A.B., University of Missouri, 1938; M.D., Washington University, 1942.

David N. McClure, M.D., University of Tennessee, 1940.

Helen E. Nash, A.B., Spelman College, 1942; M.D., Meharry Medical College, 1945.

Frederick D. Peterson, A.B., Knox College, 1953; M.D., Washington University, 1957.

Argyrios A. Tsifutis, M.D., Aristotelian University of Thessaloniki, 1954.

Frank S. Wissmath, A.B., Washington University, 1939; M.D., 1943.

Richard J. Bower, B.S., Northern Illinois University, 1965; M.D., University of Virginia, 1969. (See Department of Surgery.)

James E. Carroll, B.S., University of Louisville, 1966; M.D., 1969. (See Department of Neurology and Neurological Surgery and Irene Walter Johnson Institute of Rehabilitation.)

Milton L. Cobb, B.A., Baylor University, 1964; M.D., University of Texas Southwestern Medical School, 1968. (See Department of Anesthesiology.)


Alice B. Granoff, B.A., University of Texas, Austin, 1959; M.D., University of Texas Southwestern Medical School, 1963.

Barbel Holtmann, B.S.Ed., A.B., University of Missouri, 1964; M.D., 1968. (See Department of Surgery.)

Mary L. Johnson, B.S., Washington State University, 1964; M.D., Johns Hopkins University, 1968. (See Departments of Anatomy and Neurobiology and Neurology and Neurological Surgery.)

Jeffrey L. Marsh, B.A., Johns Hopkins University, 1967; M.D., 1970. (See Department of Surgery.)


Mabel L. Purkerson, A.B., Erskine College, 1951; M.D., Medical College of South Carolina, 1956. (See Administration and Department of Medicine.)

Timothy J. Reichert, B.S., St. John's University, 1966; B.S., University of North Dakota, 1967; M.D., University of Illinois, 1969. (See Department of Otolaryngology.)

Steven M. Rothman, M.D., State University of New York, Upstate, 1973. (See Departments of Anatomy and Neurobiology and Neurology and Neurological Surgery.)

Gary D. Shackelford, B.A., Northwestern University, 1964; M.D., Washington University, 1968. (See Department of Radiology.)

Marilyn J. Siegel, A.B., Washington University, 1965; M.D., State University of New York, Downstate, 1969. (See Department of Radiology.)

Paul S. Simons, B.A., University of Texas, 1963; M.D., Washington University, 1967. (See Medical Care Group.)

Research Assistant Professors

Ronald L. Gingerich, B.A., Goshen College, 1970; Ph.D., Indiana University, 1975. (See Department of Medicine.)

William A. Maltese, B.S., St. Francis College, 1972; Ph.D., Syracuse University, 1977.


Assistant Professors Emeriti (Clinical)

Martin Calodney, B.S., College of the City of New York, 1930; M.D., New York University, 1936.
Marianne Kuttncr, M.D., Johann Wolfgang Goethe University, 1931.
Edith C. Robinson, A.B., Randolph-Macon College, 1927; M.S., University of South Carolina, 1928; M.D., Johns Hopkins University, 1932.

Assistant Professors (Clinical)
Edward T. Barker, A.B., Princeton University, 1953; M.D., Washington University, 1957.
Gerald J. Duling, B.S., Xavier University, 1955; M.D., St. Louis University, 1959.
Ira J. Friedman, B.S., University of Arkansas, 1955; M.D., 1959.
Elliot F. Gellman, B.A., State University of Iowa, 1957; M.D., University of Missouri, 1961.
Samuel W. Gollub, B.S., Washington University, 1941; M.D., 1941.
James R. Heersma, B.S., Western Michigan College, 1946; M.S., Northwestern University, 1948; M.D., 1949.
Henry L. Knock, A.B., Johns Hopkins University, 1949; M.D., 1953.
Richard Margolis, B.S., College of William and Mary, 1947; M.D., Western Reserve University, 1951.
Paul H. Painter, M.D., St. Louis University, 1947. (See Division of Child Psychiatry.)

Steven I. Plax, A.B., University of Missouri, 1957; M.D., 1961.
Alfred S. Schwartz, A.B., Amherst College, 1932; M.D., Johns Hopkins University, 1936.
Warren G. Sherman, B.A., University of Missouri, 1965; M.D., Tulane University, 1969.
Mary A. T. Tillman, M.D., Howard University, 1960.
George T. Wilkins, Jr., B.S., University of Illinois, 1956; M.D., 1957.
Kathleen Winters, B.S., Winthrop College, 1946; M.D., Medical College of South Carolina, 1955.

Instructors
Barbara J. Anderson, (Psychology), B.A., Trinity University, 1969; M.A., Peabody College, 1970; Ph.D., 1975. (See Department of Psychiatry.)
Max H. Burgdorff, A.B., Washington University, 1970; M.D., 1974. (See Medical Care Group.)
John Gilster, (Dental Medicine), D.D.S., Washington University, 1944.

Donald V. Huebner, (Dental Medicine), D.D.S., Washington University, 1969. (See Department of Radiology.)
Zila Welner, M.D., Hebrew University, 1961. (See Department of Psychiatry.)
Neil H. White, B.S., State University of New York, Albany, 1971; Albert Einstein College of Medicine, 1975.

Instructor Emeritus (Clinical)
Joseph A. Bauer, M.D., Washington University, 1926.

Instructors (Clinical)
Christos A. Antoniou, M.D., University of Athens, 1958.
Huldah C. Blamoville, B.S., Queens College, 1959; M.D., Meharry Medical College, 1965.


Roman E. Hammes, B.A., University of Iowa, 1950; M.D., 1954.


Carl S. Inger, A.B., University of Rochester, 1968; M.D., Boston University, 1972.

Sheldon Kessler, M.D., St. Louis University, 1951.


Robert D. Lins, A.B., University of Missouri, 1965; M.D., 1969.

Stanley B. Lyss, A.B., Harvard University, 1958; M.D., Washington University, 1962.

Elaine Miller, A.B., Judson College, 1944; M.D., Medical College of Alabama, 1949. (See Department of Ophthalmology.)

Homer E. Nash, Jr., B.S., Morehouse College, 1948; M.D., Meharry Medical College, 1951.


Eugenia M. Pierce, M.D., St. Louis University, 1958.

Jeffrey L. Schulman, B.A., Yale University, 1970; M.D., University of Kentucky, 1974.


Orestes S. Valdes, B.S., Instituto de Santa Clara, 1947; M.D., University of Havana, 1954.

Barbara N. Voege, B.S., University of Illinois, 1950; M.D., Washington University, 1957.


Patricia B. Wolff, B.A., University of Minnesota, 1968; M.D., 1972. (See Medical Care Group.)

H. Benjamin Zwirn, M.D., University of Basel, 1954.

Assistant

Marion H. Baker, (Health Services), R.N., St. John's Hospital, 1946; P.N.P., Cardinal Glennon Memorial Hospital for Children, 1973. (See Medical Care Group.)

Jeannette M. Broering, (Health Services), B.S.N., St. Louis University, 1974; P.N.P., Cardinal Glennon Memorial Hospital, 1976. (See Medical Care Group.)

Susann M. Furberman, (Health Services), R.N., B.S., St. Louis University, 1970; P.N.P., Washington University, 1975. (Also Pediatric Nurse Practitioner Program.)

Martha Fenger, (Health Services), B.S.N., St. Louis University, 1962; M.S.W., Louisiana State University, 1964. (Also Pediatric Nurse Practitioner Program.)


Kathleen Potts, (Health Services), R.N., B.S., St. Louis University, 1969; M.S., Boston University, 1970; P.N.P., Washington University, 1976.

Mary J. Straika, (Health Services), R.N., Holy Cross School of Nursing, 1966; B.S.N., St. Louis University, 1970; P.N.P., Cardinal Glennon Memorial Hospital, 1971; M.S.N., St. Louis University, 1978. (Also Pediatric Nurse Practitioner Program.)

Research Assistants

Charles E. Crawford, Jr., B.S., Washington University, 1936.


Assistants (Clinical)

Jean M. Auguste, B.A., Lycee T. L'Ouverture, 1950; M.D., Medical School of Haiti, 1956.

Jill M. Baer, B.S., University of Kentucky, 1972; M.D., 1975.

Marietta O. Belen, M.D., Far Eastern University, 1963.

Florentina U. Garcia, M.D., University of the Philippines, 1965.

Robert L. Quuas, B.A., Syracuse University, 1965; B.S., University of South Dakota, 1973; M.D., University of Chicago, 1975.


Seymour M. Schlansky, M.D., Chicago Medical School, 1950.

Lecturers

Dorothy J. Jones, A.B., Oberlin College, 1930; M.D., Washington University, 1934. (Also Pediatric Nurse Practitioner Program.)

Donald L. Thurston, B.S., Vanderbilt University, 1934; M.D., 1937.
Edward Mallinckrodt
Department of Pharmacology

It is the purpose of the pharmacology course, through discussion of existing drugs, to develop general principles which will be applicable as well to drugs of the future. Pharmacology draws heavily on biochemistry, physiology, and microbiology for an understanding of drug action. It looks toward pathology, medicine, and surgery for its uses.

The laboratory portion of the course is closely coordinated with the lecture material and is designed to demonstrate and emphasize pertinent pharmacological principles and to employ agents, equipment, and skills relevant to current medical practice.

A selection of mini-courses (Special Topics), dealing in depth with more advanced concepts of pharmacology and related topics is integrated into the medical pharmacology course. Small groups of students regularly meet with the faculty to review and discuss the details and interpretation of original literature articles.

SECOND YEAR

Bio 507, 508. Pharmacology
(a) Lectures, conferences, panel discussions. (b) Laboratory course. Credit 7 units for the year.
(Dr. McDougal and Staff)

RESEARCH

Bio 590.
The facilities of the research laboratories are available to those who wish to carry on an original investigation on problems of their own or on those the Department is prepared to suggest.

- Neurochemistry; regulation of metabolism; quantitative histochemistry; micro-analytical methods.
  (Dr. Boime)
- Synthesis and biological characterization of "suicide substrates" as potential inhibitors of androgen and estrogen biosynthesis in normal and carcinogenic tissue. Computer-assisted drug design.
  (Dr. Covey)
- Problems in the biochemical development of rat kidney; transport mechanisms in rat kidney; renal histochemistry.
  (Dr. Burch)
- Experimental analysis of mechanisms of dysrhythmia; electrophysiology; membrane chemistry and autonomic neural effects.
  (Dr. Corr)
- Neurochemistry of seizures; neuropharmacology of anticonvulsant and psychotropic drugs; role of cyclic nucleotides in nervous tissue function and metabolism.
  (Dr. Ferrendelli)
Aubrey R. Morrison, M.B., B.S., University of London, 1970. (See Department of Medicine.)  
George F. Woolen, Jr., B.A., Rice University, 1965; M.D., Cornell University Medical College, 1970. (See Department of Neurology and Neurological Surgery.)  
Sr. Barbara A. Jakschik, B.S., Duquesne University, 1963; M.S., 1965; Ph.D., Washington University, 1974.  

Secretion of macromolecules. Serum albumin biosynthesis and secretion. (Dr. Geller)  
Purification and properties of the drug metabolizing enzymes. Glutathione dependent enzymes of metabolism and detoxication. (Dr. Hunter)  
The biosynthesis and chemical and biological characterization of leukotrienes and other arachidonate metabolites. (Dr. Jakschik)  
Normal and abnormal development of the sympathetic nervous system; physiology and pathophysiology of the sympathetic nervous system. (Dr. Johnson)  
Neurochemistry; regulation of metabolism; quantitative histochromy; the chemistry of individual human muscle fibers. (Dr. Lowry)  
Pineal-hypothalamic pituitary interactions in the regulation of pituitary function. (Dr. Martin)  
Energy metabolism in nerve, axonal flow, and the biochemistry of sensory neurons. (Dr. McDougal)  
Regulation of endogenous renal hormones and their effects on renal blood flow and excretory function. (Dr. Morrison)  
Pharmacology and biochemistry of prostaglandins, thromboxanes and prostacyclins. (Dr. Needleman)  
Biology of cytotoxic lymphocytes and mechanisms of immune damage. (Dr. Russell)  
Pharmacology and biochemistry of neurotransmission in the basal ganglia. (Dr. Wooten)

ELECTIVES

364. Principles of Drug Action  
A brief study of pharmacology and pharmacodynamics. This course discusses the biological, chemical, and molecular basis of action of drugs in general and of selected specific drugs in detail. Topics covered will include general pharmacologic principles; receptor theory; drug kinetics; distribution and metabolism; drugs which inhibit cellular growth, e.g., antibiotics, anticancer; endocrine drugs; both the autonomic and central action of drugs; drugs which act on the cardiovascular and renal systems; and elements of psychoactive drugs and of drug abuse. (Dr. Johnson and Staff)  

Descriptions of the following courses are shown in the Division of Biology and Biomedical Sciences:  
Bio 509, 510. Current Topics in Pharmacology  
Bio 540. Cell Surface Receptors  
Bio 548. Nucleic Acids and Protein Biosynthesis  
Bio 560. Pharmacology of the Nervous System

Note—The number preceding the course title indicates that the course carries credit in the Graduate School of Arts and Sciences.
Department of Physiology and Biophysics

The Department offers instruction to medical and graduate students. A course in the second semester of the first year of the medical curriculum 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 physiology and biophysics.

The following research interests are represented in the Department at the present time: macromolecular structure as studied by X-ray crystallography and other physical methods, the mechanism of action of polypeptide hormones, transport across cell membranes, epithelial transport, intracellular transport, secretion and uptake of macromolecules, and renal physiology, neurophysiology, contractile activation of muscle, peripheral circulation, respiration, and the application of computer techniques to biological problems. The interests in neurophysiology concern principally membrane phenomena in nerve fibers, the physiology of synapse, and the function of receptors and sensory systems. Electron microscopy of nerve and muscle is used to relate structure and function in these tissues.

FIRST YEAR

Bio 502. General Physiology
Lectures, demonstrations, and laboratory experiments are utilized to provide a basis for understanding general physiological mechanisms and the functional organization of physiological systems that are of immediate or potential importance in medicine. Credit 8 units. (Staff)

Bio 554. Neural Sciences
An integrated course dealing with the anatomy and physiology of the nervous system at the cellular level, leading on to a consideration of sensory and motor systems. Credit 5 units.

RESEARCH

Bio 590. Research
The Department offers a variety of research opportunities, particularly in the following areas: macromolecular structure as studied by X-ray crystallography; synthesis and biological activities of polypeptides; membrane transport; lysosomes and intracellular transport; neurophysiology, including nerve membrane, muscle, synaptic transmission, sensory systems (especially auditory and visual), electron microscopy of neural tissues, and biochemical regulation in neurons; circulation; respiration; renal physiology, and the application of computer sciences to physiological problems. (Staff)
Dale Purves, A.B., Yale University, 1960; M.D., Harvard University, 1964.
Luis Reuss, B.A., University of Chile, 1957; M.D., 1964.
Albert Roos, M.D., University of Groningen, 1940. (See Department of Anesthesiology.)
Carl M. Rovainen, B.S., California Institute of Technology, 1962; Ph.D., Harvard University, 1967.

Associate Professors
Leonard J. Banaszak, B.S.,
University of Wisconsin, 1955;
M.S., Loyola University, 1960;
Ph.D., 1961. (See Department of Biological Chemistry.)
C. David Barry, B.Sc., Manchester University, 1962; Ph.D., 1965. (Also Computer Systems Laboratory.)
Harold Burton, B.A., University of Michigan, 1964; Ph.D., University of Wisconsin, 1968. (See Department of Anatomy and Neurobiology.)
Yasuaki Fukami, M.D., Kyoto University, 1957; Ph.D., 1961.
Stanley Lang, Ph.B., University of Chicago, 1948; B.S., 1949; M.S., 1951; Ph.D., 1953.
Robert F. Miller, M.D., University of Utah, 1967. (See Department of Ophthalmology.)
(See Department of Neurology and Neurosurgical Surgery.)
Phillip D. Stahl, B.S., West Liberty State College, 1964; Ph.D., West Virginia University, 1967.
Lewis J. Thomas, Jr., B.S., Haverford College, 1953; M.D., Washington University, 1957. (See Department of Anesthesiology and Biomedical Computer Laboratory.)

Assistant Professors
Elsa Bello-Reuss, B.A., University of Chile, 1957; M.D., 1964.
(See Department of Medicine.)

Duck O. Kim, B.S., Seoul National University, 1968; M.S., Rose Polytechnic Institute, 1969; D.Sc., Washington University, 1972. (Also Computer Systems Laboratory.)
Robert F. Rakowski, B.Ch.E., Cornell University, 1964; M. Eng., 1966; Ph.D., University of Rochester, 1972.
Thomas A. Woolsey, B.S., University of Wisconsin, 1965; M.D., Johns Hopkins University, 1969.
(See Department of Anatomy and Neurobiology.)

Research Assistant Professor

Instructor
Shirley A. Sahrmann, B.S.P.T.,
Washington University, 1958;
(See Departments of Neurology and Neurological Surgery and Program in Physical Therapy.)

ELECTIVES
Descriptions of the following courses may be found under the Division of Biology and Biomedical Sciences.

Bio 401. Vertebrate Physiology
Bio 457. Somatosensory System
Bio 458. Biophysics of the Ear
Bio 459. Vision
Bio 525. Fundamental Concepts in Cell Membrane Physiology and Biophysics
Bio 526. Selected Topics in the Physiology and Biophysics of Cell Membranes
Bio 5451. Introductory Biophysical Chemistry
Bio 558. Formation and Maintenance of Synaptic Connections
Bio 559. Nerve, Muscle and Synapse
Bio 562. Neural Control of Posture and Movement

Note—The number preceding the course title indicates that the course carries credit in the Graduate School of Arts and Sciences.
Department of Preventive Medicine and Public Health

The Department offers instruction during the first and second years of the curriculum and provides other learning experience in elective courses in the fourth year. In clinical clerkships of other departments, students have experience in rehabilitation in the Irene Walter Johnson Institute of Rehabilitation. In the first semester of the first year, the course Introduction to Social Medicine and Medical Ethics provides background information, and students are encouraged to participate in discussion of important and evolving issues of medical care. A course in statistical methods in medicine, given in the second semester, affords a basis of understanding of quantitative assessment in biology and medicine and prepares the student for critical evaluation of reports in the medical literature. During the second year in the course in pathophysiology, the Department contributes material concerning the epidemiology of disease and the variety of factors in the person and environment which contribute to the occurrence of disease, and provides approaches and methods for prevention and control. Interested students may choose to participate in more intensive study of certain of these subject areas in the departmental elective offerings.

Opportunities for clinical and/or research experience are provided by the following organizational units within the Department or cooperating with it:

- Division of Applied Physiology, Dr. John Holloszy
- Division of Biostatistics, Dr. D. C. Rao
- Division of Health Care Research, Dr. Lee Benham
- Nutrition Research Laboratories, Dr. Robert Shank, Dr. Ruth Brennan
- Irene Walter Johnson Institute of Rehabilitation, Dr. Michael Brooke
- Lipid Research Center, Dr. Gustav Schonfeld

Donforth Professor and Head of Department
Robert E. Shank, A.B., Westminster College, 1935; M.D., Washington University, 1939. (See Department of Medicine.)

Kountz Professor
Hugh Chaplin, Jr., A.B., Princeton University, 1943; M.D., Columbia University, 1947. (See Department of Medicine.)

Professor and Director of Applied Physiology Division
John O. Holloszy, M.D., Washington University, 1957. (See Department of Medicine.)

Professor Emeritus
C. Howe Eller, (Public Health), A.B., Stanford University, 1927; M.D., University of Colorado, 1930; Ph.D., Johns Hopkins University, 1934.

Professors
Michael H. Brooke, (Rehabilitation), M.B., B.Ch., Cambridge University, 1958. (See Department of Neurology and Neurological Surgery and Irene Walter Johnson Institute of Rehabilitation.)
Lawrence I. Kuhn, (Health Care Research), A.B., University of Alabama, 1941; M.D., Louisiana State University, 1945. (See Department of Pediatrics and Medical Care Group.) (Also Pediatric Nurse Practitioner Program.)
M. Kenton King, B.A., University of Oklahoma, 1947; M.D., Vanderbilt University, 1951. (See Administration and Department of Medicine.)
Gustav Schonfeld, A.B., Washington University, 1956; M.D., 1960. (See Department of Medicine.)
John D. Vavra, B.A., University of Colorado, 1950; M.D., Washington University, 1954. (See Administration and Department of Medicine.)

Lawrence I. Kahn, B.A., University of Alabama, 1943; M.D., Louisiana State University, 1945. (See Department of Pediatrics and Medical Care Group.) (Also Pediatric Nurse Practitioner Program.)

M. Kenton King, B.A., University of Oklahoma, 1947; M.D., Vanderbilt University, 1951. (See Administration and Department of Medicine.)
Gustav Schonfeld, A.B., Washington University, 1956; M.D., 1960. (See Department of Medicine.)
John D. Vavra, B.A., University of Colorado, 1950; M.D., Washington University, 1954. (See Administration and Department of Medicine.)
FIRST YEAR
Introduction to Social Medicine and Medical Ethics
This lecture-discussion course is presented in eighteen two-hour sessions in the first semester of the freshman year. In the first half, topics considered include determinants of medical care utilization, the organization of medical care, differences between health care and medical care with special attention to effectiveness/non-effectiveness of various measures, the problem of the cost of health and medical care including health insurance. The economics of medical care are used as a conceptual bridge to discussions of the allocation of scarce resources which initiate the second half of the course, dealing with ethical and philosophic problems in medicine. Throughout the course conceptual and theoretical materials provide the basis for subsequent discussions of the main subjects. The first half of the course, therefore, is based primarily upon concepts of health services research and public health while the last is built around philosophic, ethical and moral theory. Clinical examples are used wherever appropriate, both to illustrate the principles involved and to make clear the pertinence of the theoretical and factual material to medicine and medical care.
(Dr. Shank and Staff)

Biomedical Statistics
This introduction to the principles and methods of biostatistics emphasizes the concepts of statistical methodology as being essential to proper application and interpretation of statistical methods. Elementary statistical techniques illustrating the use of statistical principles in experimentation and clinical research are discussed. Second semester.
(Drs. Boxerman, Lee, Spitznagel)

SECOND YEAR
Pathophysiology
In lectures and demonstrations, there is description of the patterns of occurrence and the distribution of selected diseases in populations. Consideration is given to the variety of characteristics of host, agent, and environment which determine the occurrence of specific disorders. Procedures which may be utilized to prevent or interrupt the course of disease and disability are described and evaluated. Patterns of provision of medical care and the social factors influencing health care needs are discussed.
(Dr. Shank and Staff)

Summer Traineeships in Physical Disability and Rehabilitation
See Institute of Rehabilitation.
(Dr. Brooke)

FOURTH YEAR
ELECTIVES
Clerkship in Primary Care I
This clerkship is designed to provide the student with firsthand experience with medical practice, in much the same manner that clerkships in other medical disciplines provide patients' experience in supervised settings. The clerkship uses as its clinical setting the Medical Care Group of St. Louis (MCG), a teaching and research prepaid group practice.
Students will join individual physicians in the Medical Care Group of St. Louis or in their private practices, and will work in their offices caring for patients under supervision. Preventive, social, and continuing aspects of medical practice will be emphasized. It is hoped that this elective will give an overview of medical practice in internal medicine and in pediatrics, and will provide an opportunity for the student to see comprehensive medical care as it is practiced in St. Louis and as it exists in a group practice model: the Medical Care Group.
(Drs. Dengiz and Turner)

Clerkship in Primary Care II
Community Medicine with the Mayan Indians—Guatemala
Students work with Dr. Carroll Behrhorst in his central clinic and hospital caring for Indian patients, participating in training sessions for community health leaders and visiting health and agricultural activities in Indians' villages. Dr. Behrhorst is responsible for 60 communities and has students from Columbia University, University of Kentucky, and elsewhere. Requirements: Students must be able to speak Spanish. Transportation at student's expense; room and board provided in Guatemala. Students
must agree to spend a minimum of ten weeks in Guatemala. A simple diary of the student’s daily experience will be required.

(Dr. Shank)

**Family Practice Preceptorship**

The Division of Health Care Research will monitor this elective. The student wishing such an experience should find the practitioner with whom he or she wishes to work and request that this physician send Dr. Gerald T. Perkoff of the School of Medicine (1) a statement of his (the physician’s) own training and experience for approval (he would need to be a bona fide licensed M.D. in practice), (2) an outline of the program he will offer the student, i.e., supervised office work and hospital visits, discussion of family problems as they bear on the patient’s illness, availability of community resources, etc., and (3) a commitment to evaluate the student’s performance. The student must then give Dr. Perkoff (1) his agreement to the proposed program, (2) a diary of patients seen and visits made and a summary of positive and negative aspects of the practice in which he was involved, and (3) a report of his study of particular problems in the community or presented by a given patient, i.e., a brief paper. This material would have to be presented in acceptable form for credit to be given.

(Dr. Dengiz)

**Clinical Elective**

Physical disability and rehabilitation. (See Institute of Rehabilitation.)

(Dr. Brooke)

**Physical Disability and Rehabilitation**

The student will become familiar at first hand with the techniques for defining the extent of physical disability and with various approaches to its treatment. Emphasis will be placed on methods used in physical, occupational, and speech therapy, and on the specialized contribution to be made by rehabilitation social work, nursing, and vocational testing and counseling. Supervised visits may be arranged to specially related outside facilities and agencies. All the above will be accomplished in relation to selected patients assigned to the student for his supervision of their rehabilitation programs. In general, these will include inpatients on the Pediatrics, Medical, Neurology, Neurosurgical, Orthopedic, and Plastic Surgery Services. Special emphasis on any one or any combination of the above services can be arranged to suit the interests of individual students.

In addition to the programs available at the Rehabilitation Institute, the student may choose to spend part of the elective at Jewish Hospital on the Rehabilitation Service. (Dr. Brooke)

**Inpatient Rehabilitation Care**

The Department of Rehabilitation Medicine of Jewish Hospital offers a six- or twelve-week elective course to senior medical students. The Department operates a sixty-six bed service for patients with physical disabilities, under the supervision of three full-time physicians. The case material is varied and includes patients with spinal cord injuries, stroke, Parkinson’s disease, and arthritis. The Department holds an Ambulance Clinic twice a month and does all the radiographic examinations for Jewish Hospital. The medical student serves as an extern.

He gains experience in the prescription of a rehabilitation program and follows his patients in physical therapy, occupational therapy, speech therapy, or whatever other activity is applicable. He works with the orthopedic, neurological, urological, and plastic surgery consultants who serve this unit. The details of the program can be adapted to fit the particular interests of the individual student.

(Dr. Steinberg and Staff)
Jacqueline Harlman, (Speech Pathology), B.A., Western Reserve University, 1963; A.M., Washington University, 1965. (Also Faculty of Arts and Sciences.)

A. Donna King, (Social Work), B.A., Western Maryland College, 1960; M.S.W., Washington University, 1966. (See Medical Care Group.)

Diana L. Reed, (Social Work), A.B., Washington University, 1968; M.S.W., 1970.

Elizabeth A. Stoddard, (Rehabilitation), B.S., Montana State University, 1954; M.D., Washington University, 1957. (See Department of Medicine.) (Jewish Hospital.)

In Soo Sunwoo, (Rehabilitation), M.D., Woo Sok University, 1959. (Jewish Hospital.)

Research Instructor
Barbara A. Pfleger, B.S., St. Louis University, 1957.

Research Assistant

Lecturer

Miscellaneous
Mary K. Kuxhaus, (Rehabilitation), B.S., Washington University, 1973. (See Program in Occupational Therapy.)

Debra L. Strobach, (Rehabilitation), B.S., University of Missouri, 1973; M.A., University of North Carolina, 1975. (See Program in Physical Therapy.)

SEMINAR ELECTIVES

Clinical Nutrition
The seminars and activities of this elective will afford information and utilization of the knowledge of nutrition for purposes of patient management and the prevention of disease. Topics to be included are nutrient requirements of humans, methodology for the assessment of nutritional status, an overview of nutrition in relation to the development of atherosclerosis, dietary management of specific medical disorders (diabetes, hyperlipidemia, chronic renal failure, obesity and cancer), and the use of nutritional information for the most favorable outcome of pregnancy, growth and development in infancy and childhood and avoidance of disease. Readings will be assigned and case demonstrations utilized.

(Drs. Brennan, Goldberg, Holloszy, Schonfeld, Shank)

Applied Biostatistical Techniques
This seminar is intended for students who have completed a basic biostatistics course and who want to increase their understanding of contemporary statistical techniques, particularly those commonly applied in clinical research. Students will be expected to participate in analysis and critique of studies appearing in the medical literature. The emphasis will be on the appropriateness of the statistical techniques and underlying rationale rather than on mathematical details of the techniques. Both basic (e.g., tests, chi-squared tests, correlation, regression) and more advanced multivariate techniques (e.g., multiple regression, discriminant analysis, analysis of variance) will be covered during the seminar.

(Drs. Boxerman, Lee, Rao, Spitznagel, Mr. Miller)

World Population Problems
Five or six seminars will be conducted by invited guest faculty who are nationally recognized experts in the demographic, sociologic, economic, political, food-supply, and ethical aspects of world population growth. The first 45 minutes of each seminar is given to a presentation of key background material by the seminar leader; the final 45 minutes, to free discussion initiated by students. Suggested reading lists will be provided where appropriate.

(Dr. Chaplin)
RESEARCH ELECTIVES

Biochemistry of Exercise
Research deals with the acute and chronic responses to exercise. Areas of interest include biochemical adaptations in muscle in response to endurance exercise and to heavy resistance exercise; effects of exercise on body composition during growth and during weight reduction; cardiac adaptations to increased work load; the biochemical basis of muscle fatigue.
(Drs. Ehsani, Hagberg, Holloszy)

Biomedical Statistics
Students will be supervised and gain experience in the proper application of statistical methods (including computer usage) to health research problems; qualified students can also engage in research projects concerned with the development of statistical methods for special biomedical and clinical research situations.
(Dr. Rao and Staff)

Immunohematology
Application of serologic and immunochemical techniques in basic studies of erythrocyte auto-antibodies and isoantibodies encountered in hemolytic disease of the newborn, leukemias, lymphomas, malignancies, and connective tissue diseases. Special problems in transfusion practice are also covered with blood bank personnel.
(Dr. Chaplin)

Mathematical Biology
Qualified students may engage in research concerned with the mathematical modeling and analysis (including computing techniques) of biologic processes such as tumor growth and radiation response.
(Dr. Wette)

Health Care Research
Students will, with advice and consent of preceptor, engage in studies pertinent to: 1) Medical Care in Group Practice (e.g., medical care utilization, reaction to illness, screening, etc.); 2) Studies in Adult Ambulatory Care (included would be utilization, social and economic aspects of medical care, problems in medical care organization, or in community projects); 3) Studies in Pediatric Ambulatory Care, and 4) any other topic in this area which is of mutual interest to the student and his supervisor.
(Dr. Kahn and Staff)

Topics in Medical Economics
This course is designed to expose students to economic issues in the medical sector. Students will pursue a selected research topic under an economist's supervision. Emphasis will be placed on policy issues concerning the effective allocation of medical expenditures. Examples of topics which can be considered are: the economics of excess capacity in surgery; the economics of prepaid group practice; the cost effectiveness of therapy for hypertension; cost differences of therapies for a given medical problem as a function of physicians' specialties; responsiveness of physician to alternative incentive schemes; criteria to be used in determining the allocation of resources among the medical subsectors.
(Dr. Benham)

Decision Risk Analysis in Medicine
Introduction to the basics of inductive interpretation of data, decision analysis, and benefit-cost analysis. Discussion of the concepts of expected utility, expected cost, and the marginal value of additional information in clinical medicine. Critique of a variety of applications to clinical decision making, including protocol selection for breast cancer detection, risk-benefit trade-offs for mammography, early detection of cancer of the uterine/cervix and of the colon/rectum, and hypertension management. One paper is required.
(Dr. Gohagan)
Department of Psychiatry

Instruction in psychiatry is given in the last three years of the medical course. Emphasis is on teaching 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. Recognition of current limitations of knowledge combined with an appreciation of what is known leads to a spirit of constructive skepticism. This attitude permits the student to study psychiatry in depth and broadly without preconceived theories.

SECOND YEAR
Introduction to Clinical Psychiatry
Emphasis is upon (a) effective interviewing in preparation for medical history taking, (b) evaluation of behavioral and emotional factors in patients with various kinds of illnesses, (c) the diagnosis and natural history of the major psychiatric disorders, (d) critical evaluation of conceptual and methodologic problems in psychiatry and psychology. Lectures, demonstration interviews, discussions.

(Dr. Cloninger and Staff)

THIRD YEAR
Psychiatry Clerkship
Students in groups of about fifteen spend six weeks on the inpatient services of Renard, Jewish and Bliss Hospitals.

(Dr. Croughan and Staff)

FOURTH YEAR ELECTIVES
Outpatient Psychiatry
This is a flexible clerkship tailored to the student's interests. Adult psychiatric patients in the Washington University Psychiatric Clinic present a variety of psychological and interpersonal problems similar to those encountered in the office practice of a psychiatrist, an internist, or a family physician. Students have an opportunity to learn a variety of treatment techniques under supervision.

Students also manage patients in a community mental health center located in an inner-city area. There, students see how psychiatry works with social agencies, schools, and other institutions utilizing paramedical personnel in the detection and treatment of mental illness.

(Drs. Smith, Taylor)
Clinical Psychiatry in
Renard Hospital

This is a senior course providing the student with an opportunity to learn clinical psychiatry by functioning as an extern on a six-week rotation. The student participates in a role similar to that of a first-year resident and attends all rounds and conferences for first-year psychiatry residents. The student takes night call approximately every fifth or sixth night. Supervision is by the chief resident and the director of the inpatient service. This rotation is particularly desirable for students going into family practice, general internal medicine, general pediatrics, or other nonpsychiatry specialties. The rotation provides an excellent opportunity to learn firsthand about psychiatric diagnosis, psychopharmacology, community resources, familial interventions, and further insights into the current literature.

(Dr. Clayton)

Clinical Psychiatry in a
Community Mental
Health Center

This elective course provides students with opportunities to become key medical members of psychiatric treatment teams dealing with evaluation of patients in an emergency room, selective admissions of certain cases, diagnosis and management of particular patients. Supervision is provided by the full-time supervising psychiatrist in charge of wards to which the student may be assigned. The student participates in teaching sessions arranged for first-year psychiatric residents in training at the Malcolm Bliss Hospital.

(Dr. McDougal)

Clinical Psychiatry in Children's
Hospital and the Washington
University Child Guidance Clinic

This clerkship in child psychiatry gives students an appreciation of the intricacies of diagnosis and treatment of emotionally disturbed children. The clerkship involves working up a small number of preadolescent, as well as adolescent children under the supervision of senior staff members. Didactic teaching is available, as well as individual supervision of patients. Students gain an appreciation of both drug treatment and the limitations of drug treatment. They are exposed to the roles of community agencies such as settlement houses, juvenile courts, and various private agencies with which a child psychiatrist must work. Students also gain appreciation of the roles of nurse, social worker, teacher, and occupational therapist in collaboration with individuals of these disciplines.

(Dr. B. Herjanic)

Neurochemistry

This course is given jointly by the Departments of Psychiatry and Pharmacology. Topics covered include carbohydrates; energy metabolism, including changes found in different functional states; amino-acid metabolism and its relation to protein and transmitter synthesis; special proteins and protein metabolism; cerebral lipids, membranes, and normal and disordered lipid metabolism; transmitters and modulators; learning, growth, development, and trophic functions; cerebral blood flow, blood brain barrier.

(Drs. McDougal, B. Moore)

Selected Topics in Research

Students may elect to work full time in psychiatric research at any time during their elective year. Twelve weeks is the minimum time allowed; no maximum time is specified. The arrangements are made on an individual basis with the appropriate investigators.

(Drs. Cicero, Clayton, Guze, Hartman, B. Herjanic, Murphy, Olney, Reich, and Staff)
Assistant Professors

Michael D. Bien, B.A.,
University of Kansas, 1968; M.D.,
Washington University, 1972.
(Malcolm Bliss Hospital.)

Jack L. Crouch, B.A., University
of Kansas, 1964; M.D., Kansas
University, 1968.

Paul N. Duckro, (Medical
Psychology), B.S., University of
Dayton, 1969; M.S., Miami
University, 1971; Ph.D., Texas
Tech University, 1977. (Malcolm
Bliss Hospital.)

Julian C. Hall, (Social Work),
B.S., University of Louisville,
1949; M.S., 1951; D.S.W.,
Washington University, 1968.
(Malcolm Bliss Hospital.)

Collins E. Lewis, B.A., A.B.,
University, 1967; M.D., Harvard
University, 1971; M.P.H., 1975.

Ronald L. Martin, B.A.,
Northwestern University, 1967;
M.D., 1971.

Lynn J. McLaughlin, (Medical
Psychology), B.A., Gonzaga
University, 1965; M.S., St. Louis
University, 1968; Ph.D., 1972.
(Malcolm Bliss Hospital.)

Bharat R. S. Nakra, F.Sc., Punjab
University, 1961; M.B.B.S., 1966.
(Malcolm Bliss Hospital.)

Michael F. O’Connell, (Medical
Psychology), B.S., University of
Michigan, 1970; M.A., University of
Montana, 1974; Ph.D., 1976.

Kathryn S. Ratcliff, (Sociology),
B.A., University of Washington,
1966; M.S., University of Wisconsin,
1968; Ph.D., 1977.

John P. Rice, (Mathematics), B.A.,
Cornell University, 1969; M.A.,
Washington University, 1972;
Ph.D., 1975.

Elizabeth M. Smith, (Social Work),
B.A., University of Nebraska, 1960;
M.S.W., 1962; Ph.D., Washington
University, 1978.

Brian K. Suarez, (Genetics), B.A.,
San Fernando Valley State College,
1967; M.A., University of California,
Los Angeles, 1972; Ph.D., 1974. (See
Department of Genetics.)

John R. Taylor, B.S., Loyola
University, 1970; M.D., 1974.

Robert H. Vanderpearl, A.B.,
Washington University, 1950; M.D.,
1954. (Malcolm Bliss Hospital.)

Zila Welner, (Child Psychiatry),
M.D., Hebrew University Hadassah
Medical School, 1961. (See
Department of Pediatrics.)

Richard D. Wetzel, (Medical
Psychology), B.A., Concordia
College, 1959; B.D., Concordia
Seminary, 1963; Ph.D., St. Louis
University, 1974.

Shozy Yokoyama, (Genetics), B.S.,
Miyazaki University, 1968; M.S.,
Kyushu University, 1971; Ph.D.,
(See Department of Genetics.)

Research Assistant Professors

Paul P. Hipp, (Biochemistry), B.S.,
Lakeland College, 1966; Ph.D.,
North Dakota State University, 1971.

William H. Holland, (Electronics),
A.B., Washington University, 1950. (See
Department of Biological Chemistry.)

Madelon T. Price, (Neurobiology),
A.B., Washington University, 1953;

Assistant Professors Emeriti

(See Departments of Genetics
and Preventive Medicine and
Public Health.)

Amos Welner, M.D., Hebrew
University Hadassah Medical School,
1960.

Associate Professors (Clinical)

John M. Anderson, B.S., Colorado
State University, 1938; M.D.,
Meharry Medical College, 1958.
(Malcolm Bliss Hospital.)

John T. Biggs, Jr., A.B., Drury
College, 1963; M.S., University of

Robert B. Deitchman, B.A.,
University of Virginia, 1949;
M.D., 1953.

Edward H. Kowert, A.B.,
Washington University, 1940; M.D.,
1942. (Malcolm Bliss Hospital.)

Wanda M. Lamb, B.S., University of
Missouri, 1946; M.D., Washington
University, 1948.

Patricia L. O’Neal, A.B.,
Washington University, 1944;
M.D., 1948.

Paul M. Packman, A.B., Washington
University, 1959; M.D., 1963.

Marcel T. Saghir, B.Sc., American
University of Beirut, 1959;
M.D., 1963.

Earl R. Schultz, A.B., Southeast
Missouri State College, 1952;
B.S.Med., University of Missouri,
1953; M.D., Washington University,
1955. (See Department of Neurology
and Neurological Surgery.)

Harold D. Wolff, A.B., Washington
University, 1952; B.S., University of
Missouri, 1953; M.D., State
University of Iowa, 1955.

Assistant Professor Emeritus

Lucile Healy, (Social Work),
A.B., College of St. Catherine,
1922; M.A., University of Minnesota,
1927; M.S.W., Washington
University, 1949.
Mary Davis, B.A., Ohio State University, 1947; M.D., Washington University, 1952.

Phalidel C. Deza, M.D., University of Santo Tomas, 1956. (Malcolm Bliss Hospital.)


Fred W. Gaskin, B.S., University of Minnesota, 1966; M.D., 1968.

Wilbur H. Gearhart, B.S., Butler University, 1949; M.D., Hahnemann Medical College, 1950.

James N. Haddock, A.B., University of Missouri, 1940; M.A., 1942; M.D., Washington University, 1943.

Robert S. Hicks, A.B., Hendrix College, 1951; M.D., University of Arkansas, 1958.


Natarajan Lakshminarayanan, M.B., University of Madras, 1960; M.S., 1960; M.D., 1967. (Malcolm Bliss Hospital.)


Jay Meyer, A.B., Washington University, 1956; M.D., St. Louis University, 1960.

Mary A. Montgomery, A.B., Vassar College, 1967; M.D., Northwestern University, 1973. (Malcolm Bliss Hospital.)

William M. Riedesel II, A.B., University of Rochester, 1968; M.D., Cornell University, 1973. (Malcolm Bliss Hospital.)

Thomas F. Richardson, B.A., Millikin University, 1959; M.D., Washington University, 1963.


Alberto Soto, B.S., Instituto de Santiago, 1951; M.D., Havana University, 1960.

Cengiz M. Sunner, M.D., Istanbul University, 1951. (Malcolm Bliss Hospital.)

John Sweet, B.A., University of Michigan, 1944; M.D., University of Missouri, 1968. (Malcolm Bliss Hospital.)

Jaime Vargas, M.D., National University of Colombia, 1954. (Malcolm Bliss Hospital.)

Leonard J. Wiedershine, A.B., Washington University, 1943; M.D., 1946.


Instructors


Bernardo G. Aleksander, M.D., University of Buenos Aires, 1959. (Malcolm Bliss Hospital.)

Barbara J. Anderson, (Medical Psychology), B.A., Trinity University, 1969; M.A., George Peabody College, 1970; Ph.D., 1975. (See Department of Pediatrics.)

Zipora K. Arison, M.D., Sackler Medical School, 1975. (Malcolm Bliss Hospital.)

Kathryn G. Bennett, (Social Work), B.A., University of Kansas, 1938; M.S.W., Smith College, 1940. (Jewish Hospital.)

Anna K. Bradley, (Social Work), B.S., University of Missouri, 1956; M.S.W., Washington University, 1958. (Malcolm Bliss Hospital.)

Marguerite Cannon, (Social Work), B.S., St. Louis University, 1936; M.S.W., Washington University, 1948. (Malcolm Bliss Hospital.)

Robert M. Carney, (Medical Psychology), B.A., University of Missouri, St. Louis, 1969; M.S., Eastern Kentucky University, 1972; Ph.D., Washington University, 1978.

Pacita C. Dy, A.A., University of the East, 1959; M.D., Far Eastern University, 1967. (Malcolm Bliss Hospital.)

Terry A. Fuller, B.S., University of Notre Dame du Lac, 1970; M.D., Washington University, 1974.

Barry A. Hong, (Medical Psychology), B.A., Concordia Senior College, 1969; M.Div., Concordia Seminary, 1972; Ph.D., St. Louis University, 1978.

Judith A. McGee, (Medical Psychology), B.A., Long Island University, 1969; M.S., St. Louis University, 1975; Ph.D., 1979. (Malcolm Bliss Hospital.)

John F. Mueller, (Social Work), B.S., Washington University, 1947; M.S.W., 1952. (Malcolm Bliss Hospital.)

Rashmi R. Nakra, M.B.B.S., University of Delhi, 1970.

Muniyapla T. Rajappa, M.B.B.S., Mysore Medical College, 1973. (Malcolm Bliss Hospital.)

Dean L. Rosen, (Medical Psychology), B.S., University of Iowa, 1968; Psy.D., University of Illinois, 1977. (Malcolm Bliss Hospital.)


Michael N. Stake, (Medical Psychology), B.A., Long Beach State University, 1970; M.A., Arizona State University, 1974; Ph.D., 1976. (Malcolm Bliss Hospital.)


Deborah E. Wald, (Social Work), B.A., University of Hawaii, 1975; M.S.W., Washington University, 1975. (Jewish Hospital.)

Research Instructor


Instructor Emeritus (Clinical)

Barbara S. Kendall, (Medical Psychology), A.B., Radcliffe College, 1913; Ed.M., Harvard University, 1928.

Instructors (Clinical)

Felipe Crimi, M.D., National University of Cordoba, 1946. (Malcolm Bliss Hospital.)

Alejandro M. Datuin, A.A., University of Santo Tomas, 1951; M.D., 1965. (Malcolm Bliss Hospital.)

Eduardo A. Garcia-Ferrer, M.D., Havana University, 1952. (Malcolm Bliss Hospital.)

Clifford Gilpin, S.B., University of Chicago, 1945; M.D., 1948. (Malcolm Bliss Hospital.)

Randy L. Hammer, (Medical Psychology), B.A., Washington University, 1970; Ph.D., 1975. (Jewish Hospital.)
The Division of Child Psychiatry offers a varied teaching program for residents in psychiatry and fellows in child psychiatry through its Child Psychiatry Clinic at 369 North Taylor Avenue, the St. Louis Children’s Hospital, and the Youth Center at the St. Louis State Hospital. Trainees are assigned to these various units, where they participate in diagnostic evaluations and see patients in treatment under supervision. Seminars in child psychiatry, child development, individual and group treatment, clinical psychology, social work, and research are held weekly. New methods of teaching and observation (videotaped sessions, one-way screens, clinical films) are in regular use. The Harry Edison Child Development Research Center, attached to the Division of Child Psychiatry, carries out research in child psychiatry. Fellows in child psychiatry participate in the various research programs.

**Director and Blanche F. Ittleson Professor**


**Assistant Professor Emeritus**


**Assistant Professors**

Doris C. Gilpin, (Child Psychiatry), B.S., Drury College, 1944; M.D., University of Chicago School of Medicine, 1948.


Haruo Kusama, (Child Psychiatry), A.B., Washington University, 1960; M.D., 1965. (St. Louis State Hospital Youth Center.)


Paul H. Painter, (Child Psychiatry), M.D., St. Louis University, 1947. (See Department of Pediatrics.)


Emel A. Sumer, (Child Psychiatry), M.D., University of Istanbul, 1957. (St. Louis State Hospital Youth Center.)

**Instructor Emeritus**

Louetta Berger, (Psychiatric Social Work), B.S., University of Wichita, 1941; M.S.W., Washington University, 1946.

**Instructors**

Erna C. Jenkins, (Psychiatric Social Work), A.B., Fontbonne College, 1959; M.S.W., University of Missouri, 1961.


Gail A. Overbey, (Medical Psychology), B.S., Southeast Missouri State University, 1973; Ph.D., University of Texas at Austin, 1979.


**Instructors (Clinical)**

Alicia D. Gonzalez, (Child Psychiatry), M.D., University of Buenos Aires, 1961. (St. Louis State Hospital Youth Center.)

Anna E. Harinett, (Child Psychiatry), B.S., Loyola University, 1956; M.D., University of Ottawa, 1960.

Julio Morales, (Child Psychiatry), M.D., University of Trujillo, 1966.


Jagdish C. Suri, (Child Psychiatry), B.Sc., Lucknow University, 1954; M.B.B.S., King George’s Medical College, 1959; M.D., Lucknow University, 1964. (St. Louis State Hospital Youth Center.)

Ella E. Wochnik, (Child Psychiatry), M.D., Medical Academy of Warsaw, 1962. (St. Louis State Hospital Youth Center.)
Department of Radiology

The Department of Radiology is primarily located in the thirteen-story Mallinckrodt Institute of Radiology, but also occupies space in the West Pavilion of Barnes Hospital, Barnard Hospital, St. Louis Children's Hospital, and the Washington University Clinic Building. The Department provides diagnostic radiology, nuclear medicine, and radiation oncology services to Barnes Hospital and St. Louis Children’s Hospital.

Clinical facilities for the Division of Radiation Oncology are located on the ground floor of the Institute and in Barnard Hospital. Therapy equipment consists of an advanced 35 MV linear accelerator, 20 MV linear accelerator, 4 MV linear accelerator, and Cobalt 60 therapy. There are also facilities and an ample stock of Cesium 137 sources for both interstitial and intracavitary therapy.

The first floor of the Institute houses administrative and business offices, film library, consulting viewing rooms, and the 135-seat Scarpello Auditorium.

Fifty-five examination rooms for diagnostic radiology are available in the Institute and the newly constructed West Pavilion. Institute facilities are located on the second floor (chest, musculoskeletal radiology, and mammography), third floor (neuroradiology, vascular radiology, ultrasound, and genitourinary radiology), fourth floor (gastrointestinal and genitourinary radiology), and the fifth floor (pediatric radiology). Cardiac radiology and the Division of Nuclear Medicine are located on the ninth floor of the West Pavilion. The tenth floor of the West Pavilion is dedicated entirely to outpatient services. The modern features of the Institute include five CT scanners.

The sixth floor of the Institute contains the Division of Radiation Sciences, which also utilizes two medical cyclotrons in Barnard Hospital. Additional research facilities are located on the seventh floor (nuclear medicine), ninth floor (diagnostic radiology), tenth floor (cancer biology), sixth floor of Barnard Hospital (radiation oncology), and the 4511 Forest Park building (cancer biology).

Administrative, teaching, and support functions occupy the eighth and eleventh floors. The twelfth floor is occupied by sophisticated computer facilities that are utilized for clinical, research, and teaching applications.

The undergraduate teaching program is designed to present both diagnostic and therapeutic radiology to students as part of the clinical clerkship experience. Every effort is made to provide an opportunity to correlate radiologic and clinical findings through interdepartmental conferences, consultations, and group discussions.
SECOND YEAR
Twenty-six hours of lecture are devoted to an introduction to radiology. The majority of the course is devoted to diagnostic radiology. Other topics included are ultrasound, nuclear medicine, and radiation oncology.

ELECTIVES

RESEARCH ELECTIVES
Opportunity is available to carry out research in the laboratories under the guidance of the staff in fields of diagnostic radiology, therapeutic radiology, radiation physics, nuclear medicine, and radiation and cancer biology.

ONCOLOGY CLERKSHIP FOR FRESHMAN STUDENTS
A ten-week summer clerkship program is available for freshman medical and dental students. The students participate in the clinical activities of the Division of Radiation Oncology and are exposed to the fundamental concepts of cancer biology and clinical radiation therapy. They have the opportunity to conduct some laboratory research or clinical investigation under the direction of the staff members of the sections of Clinical Radiation Oncology and Cancer Biology.

(Prof. Simpson or Stewart)

CANCER BIOLOGY COURSE
January-April; consult Course master for exact time and dates. Topics to be covered include: Interaction of radiation with matter; radiation chemistry and effect on macromolecules; target theory and dose-survival curves; cellular radiobiology with emphasis on nuclear effects, age-response and repair, the oxygen effect and dose fractionation; radiation effects on cell renewal systems and on organs; radiation genetics and long-term effects; radiation sensitization and interaction with other anticancer agents. (Dr. Valeriote)

FOURTH YEAR

ELECTIVES
Clerkship in Radiation Oncology
Six-week elective in which the student has the opportunity to see patients being evaluated and treated in Radiation Oncology. Emphasis is on techniques of cancer diagnosis and localization, selection of therapy, indications for irradiation and techniques on treatment planning, simulation and irradiation of a variety of tumors. There are several conferences to which the students participate, including new case planning conferences, clinical physics conference, protocol conference, and interdepartmental conferences with the Departments of Pediatrics, Obstetrics and Gynecology, Surgery, and Pathology.

(Prof. Simpson or Perez)
Robert C. McKnight, B.S., Florida State University, 1957; M.D., Washington University, 1961. (See Department of Medicine.)


William A. Murphy, Jr., B.S., University of Pittsburgh, 1966; M.D., Pennsylvania State University, 1971.

James A. Purdy, (Radiation Physics), B.S., Lamar University, 1967; Ph.D., University of Texas, 1969; Ph.D., 1971.

Gary D. Shackelford, B.A., Northwestern University, 1964; M.D., Washington University, 1968. (See Department of Pediatrics.)


Associate Professor Emeritus (Clinical)

A. Norman Arneson, B.S., Texas Christian University, 1924; M.D., Washington University, 1928. (See Department of Obstetrics and Gynecology.)

Associate Professors (Clinical)

Mark D. Eagleton, Jr., A.B., Amherst College, 1947; M.D., Washington University, 1950.

Sumner Holtz, M.D., St. Louis University, 1948.

Noah Susman, A.B., Washington University, 1948; M.D., 1952. (Jewish Hospital.)

Assistant Professors


Robert J. Bagland, B.S., University of Kentucky, 1965; Ph.D., University of California, 1970; M.D., Washington University, 1976.


Glen P. Glasgow, (Radiation Physics), B.S., Western Kentucky State College, 1967; M.S., University of Kentucky, 1969; Ph.D., 1974.

Siddhesh Gowda, M.B., B.S., Medical College Bellary Mysore, 1969. (See Department of Medicine.)

Rexford L. Hill, (Computer Sciences), B.S., University of Cincinnati, 1964; M.S., 1966. (See Biomedical Computer Laboratory.)

Donald V. Huebener, (Dental Medicine), D.D.S., Washington University, 1969. (See Department of Pediatrics.) (Also School of Dental Medicine.)

Bharath A. K. Kumar, M.B., B.S., Andhra University Medical College, 1969.

Jeanette Y. Lee, (Biostatistics), B.S., Boston University, 1972; Ph.D., Johns Hopkins University, 1976. (See Department of Preventive Medicine and Public Health.)


Alexander N. Nakeff, (Cancer Biology), B.S., University of Toronto, 1962; M.S., 1965; Ph.D., University of Rochester, 1969.


Gordon I. Phillips, B.A., University of Oklahoma, 1966; M.D., 1971. (See Department of Medicine.)

Miljenko V. Pilipich, M.D., University of Zagreb, 1965.

Satish C. Prasad, (Radiation Physics), B.S., University of Patna, 1963; M.S., University of Delhi, 1965; M.S., University of Massachusetts, 1968; Ph.D., 1972; M.S., University of Colorado, 1976.


Marilyn J. Siegel, A.B., Washington University, 1965; M.D., State University of New York, 1969. (See Department of Pediatrics.)


Chandrakant C. Tailor, M.B., B.S., Maharaja Sayajirao University of Baroda, 1972.


Todd H. Wasserman, A.B., University of Rochester, 1968; M.D., University of Rochester School of Medicine and Dentistry, 1972.

Philip J. Weyman, B.A., Yale University, 1968; M.D., 1972.

Assistant Professors (Clinical)


Enrique Cubillo, M.D., University of Madrid, 1962.


Guillermo C. Geisse, B.A., University of Chile, 1957; M.D., 1965.


MacDonald B. Logie, B.S., Northwestern University, 1965; M.D., 1967.


Christopher J. Moran, B.S., University of Notre Dame, 1970; M.D., St. Louis University, 1974.


Wayne A. Simril, A.B., Culver-School College, 1941; M.D., 1944.

Instructors

Frederick G. Abrath, (Radiation Physics), B.S., University of Wisconsin, 1967; Ph.D., North Texas State University, 1974.

Dennis M. Balfe, B.S., University of Santa Clara, 1968; M.D., Medical College of Wisconsin, 1975.


Judy M. Destouet, B.S., University of Southwestern Louisiana, 1969; M.D., Baylor College of Medicine, 1975.


Charles M. Glasier, B.A., Emory University, 1972; M.D., University of Virginia, 1976.

Fernando R. Gutierrez, M.D., University of Valladolid, 1974.

Ashwani Kapila, M.B., B.S., All-India Institute of Medical Sciences, 1975.


Research Instructors

Minoru Maeda, B.S., Kyushu University, 1969; M.S., 1971; Ph.D., 1974.


Instructors (Clinical)


Daniel J. Leary, Jr., B.S., St. Louis University, 1962; M.D., Washington University, 1966.

Gary H. Omell, M.D., University of Tennessee, 1967.

Gary A. Ratkin, B.A., Rice University, 1963; M.D., Washington University, 1967. (See Department of Medicine.)


Gerald L. Shaikun, B.S., University of Kentucky, 1960; M.D., University of Chicago, 1964.


Frederick R. Zivnuska, B.S., St. Procopius College, 1961; M.S., Marquette University, 1964; M.D., University of Wisconsin, 1970.

Research Associates


Consultants

Edward H. Reinhard, (Hematology and Oncology), A.B., Washington University, 1935; M.D., 1939. (See Department of Medicine.)

Mary Culver
Department of Surgery

The Department of Surgery includes general surgery, plastic and reconstructive surgery, orthopedic surgery, urological surgery, cardiothoracic surgery, and pediatric surgery.

The formal instruction begins in the second year with an introduction to surgical principles. For the most part, these surgical principles are derived from concepts in the preclinical sciences which the students have been studying since the beginning of the freshman year. Although in this course a few patients are used for the demonstration of lesions which illustrate the principles of surgery, it is in the junior year that the first personal contact with patients occurs. Students in the third year are assigned to general surgical clinical clerkships in the hospitals, where they have an opportunity to study the frequent and important surgical diseases.

The junior surgical clerkship, lasting twelve weeks, is spent on the surgical services of the Medical Center and allied hospitals. Students attend patient rounds with residents and staff daily during the clerkship and attend seminars conducted by the general and specialty surgical staffs.

Students are encouraged to attend and assist at operations upon patients assigned to them. The physiology, pathology, chemistry, and bacteriology of pre- and post-operative care are stressed. Experience is acquired in surgical diagnosis and in the use of scientific methods that permit students to assess the effectiveness of what they do.

The fourth-year surgical program permits the senior student to select any of the following types of electives for periods of six to eighteen weeks: (1) subinternships and preceptorships in which the student is assigned to a staff member for instruction and exposure to the problems of clinical practice; (2) surgical research under supervision (minimum time twelve weeks); (3) electives in pediatric surgery, thoracic and cardiac surgery, orthopedics, neurosurgery, urology, oncology, transplantation, and emergency room surgery.

In both the third and fourth years, a series of computer-assisted CORE seminars is an integral part of the surgical curriculum. The seminars contain both didactic material and clinical simulations. They are highly interactive and individualized, and may be taken at a number of locations within the Barnes complex and at some outlying hospitals where students rotate.
SECOND YEAR

Introduction to Surgery

Lectures present certain fundamental principles of physiology, biochemistry, and pathology as applied to surgery. Recitations and demonstrations are included. Patient problems are discussed and related to physiologic and biochemical abnormalities. Two hours weekly for eighteen weeks during the second and third trimesters of the second year.

THIRD YEAR

Surgical Wards

For twelve weeks the students serve as clerks in surgery, working on the wards of the hospitals of the Medical Center. Students are assigned patients on their rotations and participate in their care, including assisting in the operating room. Surgical pathological material is followed as an integral part of the case study. At regular intervals the students meet with residents and attending staff in informal conferences, when questions which have arisen during the day are discussed and various aspects of the care of the patient considered. In addition, the material is presented to students in small discussion groups with their preceptors. They follow their patients after discharge in the post-operative and outpatient clinic. Particular effort is made to see that students have some experience with the more frequent and important surgical lesions, and that the assigned cases are sufficiently diversified to afford an accurate perspective of surgery. Students are encouraged to consult the library frequently in the solution of problems concerning patients. One afternoon a week students participate in the tumor conference held jointly by the Departments of Surgery, Pathology, and Radiology. Students may attend a variety of other scheduled conferences conducted by the various divisions of the Department. Finally, by rotation, students spend time in the emergency room, where they function under the supervision of house staff and attending surgeons.

FOURTH YEAR

The electives offered to senior students are principally clinical subinternships or research.

Surgical Preceptorships and Subinternships

Each student is assigned to a carefully selected senior general surgeon. The student sees patients in the surgeon's office, takes histories, performs physical examinations on the patients, and follows them in the hospital. The student is expected to attend the surgeon's office hours, operate with him, and make rounds with him. Reading assignments are evaluated by the surgeon to whom the student is assigned. Projects of a clinical nature may be undertaken during this preceptorship. Subinternships are offered at Barnes, Starkloff, Jewish, Cochran V.A., and St. Luke's Hospitals, where the student acts as an intern under the guidance of the senior staff.

(Dr. Etheredge and Staff)

Surgical Research Elective

This elective introduces the student to the general approach to analyzing clinical problems of surgery in the laboratory and familiarizes him with some of the investigative methods in surgery. In general, the student gains more experience by working with an established investigator on a current project. The student is encouraged, however, to plan and execute a laboratory solution to a specific problem within the limitations of his elective time. The student participates in the weekly departmental research seminars, where investigators describe a wide range of current topics.

(Dr. Scharp and Staff)

Pediatric Surgery Elective

Emphasis is placed on the different problems this age group presents in respect to type of surgical diseases and their care. The student gains exposure to many surgical conditions seen only in children. The exposure includes daily morning and evening rounds as well as participation in the operative procedures. Diagnostic X-rays are reviewed on a daily basis, and the student is encouraged to attend the many weekly conferences of the Surgery Department and Pediatrics Department. Students are expected to participate actively in clinical care and not merely to be observers. The student may also elect to spend a portion of the time in an introduction to ongoing research within the Division. Currently, the student is assigned to a pediatric surgeon who is engaged in current research and serves as clerk and preceptor for the student.
areas of activity include surgical bacteriology, short gut syndrome, and experimental animal fetal surgery. (Dr. Ternberg and Staff)

**Principles of Thoracic and Cardiac Surgery**

Two avenues are available which may be mixed. The first involves a clinical rotation on cardiothoracic surgical service where the students will be assigned duties comparable to that of an intern. They will share night call under supervision of the first- and second-year residents in rotation with the ward interns. They will have the prerogative of selection of operative cases on which to scrub and are at liberty to spend time within the cardiac catheterization laboratory, with members of the cardiopulmonary bypass team, or on any particular problem of acute pulmonary or hemodynamic nature in the Intensive Care Unit. The second alternative is six weeks in the laboratory working on ongoing projects having to do with ischemic heart disease and a myocardial infarction model, prosthetic heart valves, perfusion techniques for infants and the studies of the pulmonary microcirculation. Individual meetings with Drs. Weldon and Clark or both are available on a weekly basis. (Dr. Weldon and Staff)

**Orthopedic Surgery Elective**

Clinical clerkship electives are available for six weeks, during which time the student attends conferences and outpatient clinics and serves in the various orthopedic clinical divisions. It is also possible to establish a research elective in the Orthopedic Research Laboratory under the guidance of Dr. David Simmons and Dr. Leo Whiteside. Students on the clinical elective become an active part of the orthopedic team and may spend part of their time at the Shriners Hospital for Crippled Children, Veterans Hospital and Barnes Hospital, the exact program to be worked out on an individual basis with the Chairman of the Division. (Dr. Whiteside and Staff)

**Urology Elective**

A six-week clinical clerkship offers the interested student an adequate knowledge of the type of problems with which the clinical urologist deals. The student is taught the basic diagnostic procedures and the management of surgical and nonsurgical patients on both the private and ward services. The experience involves direct care of patients in the clinic, as well as the urologic admissions to the hospital. Daily morning and evening rounds of all patients.
a particular service are conducted by the responsible resident. Two additional teaching rounds for the house staff and students are held weekly. In addition, the student attends daily X-ray conferences, the weekly staff conference, and the weekly research seminar. The student is given an opportunity to assist in open and endoscopic surgery, as well as in the various diagnostic procedures performed in the cystoscopy and urography section.

(Dr. Fair and Staff)

**Oncology Elective**

Students electing to study the theoretical and practical aspects of the epidemiology, diagnosis, treatment, and prognosis of neoplastic diseases in man may select a program (subject to the approval of the Tumor Committee) which includes interdepartmental experience in several of the following areas of knowledge:

(a) Surgical Pathology of Neoplasms.  
(Dr. Bauer)

(b) Neoplasms in Children.  
(Dr. Vietti)

(c) Head and Neck Cancer.  
(Dr. Ogura)

(d) Radiation Therapy of Neoplasms.  
(Dr. Perez)

(e) Hematologic Neoplastic Disease.  
(Dr. Reinhard)

(f) Chemotherapy of Solid Tumors.  
(Dr. Philpott)

All students attending the oncology elective will be expected to attend the tumor, gynecologic cancer, ENT tumor, and neoplastic hematology conferences, as well as the cancer workshop.

Each student taking an elective in oncology must select (or be assigned) a problem for study in this field. Each student is expected to report to his peers and instructors on the selected subject at the end of the elective period. Members of the Tumor Committee evaluate the report, as well as the student’s performance during the elective.

(Drs. Bauer, Philpott, and Staff)

**Transplantation Elective**

This orientation course is designed to offer the student an overview of the entire field of organ transplantation. The student is an integral part of the renal transplantation team and assumes appropriate responsibilities under supervision.

(Dr. Anderson and Staff)

**Urology Research Elective**

A unique opportunity is afforded the student interested in surgical research to participate in any of the research activities in the Division of Urology. This elective may be structured so as to be meaningful to the student with no previous research experience who desires an exposure to the techniques and methodology utilized in surgical research. The student may participate in any one of a number of ongoing projects dealing with the pathogenesis and etiology of urinary tract infections, mechanisms involved in normal and abnormal prostatic growth, urologic oncology with specific emphasis on tumor immunology, the use of prostheses in urology and studies on the etiology of urinary tract calculi.

Students with prior investigative experience will be encouraged to outline and execute a specific laboratory problems within the time limitations of the elective. Student will also be invited to participate in all research seminars within the Division.

(Drs. Fair, Heston and Staff)
Eugene N. Mitchell, B.S., St. Louis University, 1955; M.D., University of Missouri, 1960.
Julian C. Mosley, Jr., B.S., St. Louis University, 1966; M.D., Washington University, 1972.
George A. Oliver, A.B., Washington University, 1948; M.D., 1952.
Joseph C. Peden, Jr., B.S., Harvard College, 1940; M.D., 1943.
Mather Pfeifferenger, Jr., A.B., Yale University, 1941; M.D., Harvard University, 1944.
George B. Rader, M.D., Washington University, 1951.
Frank O. Richards, A.B., Talladega College, 1944; M.D., Howard University, 1947.
 Belmont R. Thiele, M.D., St. Louis University, 1948.

Research Associate

Research Assistants
Sayfra A. Brafberg, B.S., Institute of Stalingrad, 1944.
Cassandra Smith, B.S., Northern Illinois University, 1975.

Assistants (Clinical)
Leslie F. Bond, A.B., University of Illinois, 1948; M.D., Meharry Medical College, 1952.
Katherine Crawford, B.S., Michigan State College, 1943; M.D., Woman's Medical College of Pennsylvania, 1946.
James R. Cristofore, B.S., Youngstown University, 1943; M.D., St. Louis University, 1951.
Samuel Lugo, B.S., St. Louis University, 1954; M.D., 1958.
Lester J. Nathan, B.A., University of Omaha, 1949; M.D., University of Nebraska, 1952.

Robert Rainey, B.S., Yale University, 1944; M.D., Washington University, 1947.

DIVISION OF ORTHOPEDIC SURGERY

Acting Head of Division
Perry L. Schoenecker
Professor Emeritus
Fred C. Reynolds, A.B., Washington University, 1931; M.D., 1934. (Also Professor in Clinical Surgery.)

Professor (Clinical)

Associate Professor
Lee T. Ford, M.D., University of Tennessee, 1940.

Research Associate Professor
David J. Simmons, B.A., Boston University, 1954; M.D., Clark University, 1956; Ph.D., University of Chicago, 1959.

Associate Professors (Clinical)
Harry C. Morgan, B.A., University of Missouri, 1949; B.S., 1951; M.D., Harvard University, 1953.

Assistant Professors
Leo A. Whiteside, B.S., University of Oklahoma, 1965; M.D., University of Texas, 1969.

Assistant Professor Emeritus
J. Otto Lotters, Ph.B., St. Louis College of Pharmacy, 1926; Ph.G., 1928; A.B., University of Missouri, 1934; B.S., 1935; M.D., University of Louisville, 1937.

Assistant Professors (Clinical)


Earl P. Holt, Jr., A.B., Duke University, 1942; M.D., 1945.


George E. Scheer, B.A., Municipal University of Wichita, 1940; M.D., Washington University, 1943.

Instructors

Instructors (Clinical)
Vilray P. Blair, Jr., University of Virginia, 1935; Washington University, 1939.


Research Associate

Assistants (Clinical)
John P. Arnot, B.A., Rice University, 1954; M.D., Yale University, 1958.

Kyu Sop Cho, M.D., Yon-Sei University, 1954.


DIVISION OF PEDIATRIC SURGERY

Head of Division
Jessie L. Ternberg, M.D.

Professor
Jessie L. Ternberg, A.B., Grinnell College, 1946; Ph.D., University of Texas, 1950; M.D., Washington University, 1953. (See Department of Pediatrics.)

Associate Professor
Martin J. Bell, B.A., New York University, 1959; M.D., State University of New York, Downstate, 1963. (See Department of Pediatrics.)

Assistant Professor
Richard J. Bower, B.S., Northern Illinois University, 1965; M.D., University of Virginia, 1969. (See Department of Pediatrics.)

Research Assistant Professor

Research Associate
DIVISION OF PLASTIC AND RECONSTRUCTIVE SURGERY

Head of Division
Paul M. Weeks, M.D.

Professor
Paul M. Weeks, A.B., Duke University, 1954; M.D., University of North Carolina, 1958. (See Irene Walter Johnson Institute of Rehabilitation.)

Professor (Clinical)
Minot P. Fryer, A.B., Brown University, 1936; M.D., Johns Hopkins University, 1940; D.S.C., Brown University, 1972.

Associate Professor

Assistant Professors
Barbel Holtmann, B.S.Ed., A.B., University of Missouri, 1964; M.D., 1968. (See Department of Pediatrics.)
Jeffrey L. Marsh, B.A., Johns Hopkins University, 1967; M.D., 1970. (See Department of Pediatrics.)
Vernon Leroy Young, B.A., University of Kentucky, 1966; M.D., 1970.

Assistant Professors (Clinical)
John J. Delfino, B.S., Holy Cross College, 1960; D.D.S., Temple University, 1967. (Also School of Dental Medicine.)
George H. Zografakis, M.S., Rutgers University, 1955; M.D., State University of New York, Upstate, 1959.

Richard Shatz, B.A., University of Missouri, 1968; M.D., St. Louis University, 1972.
Bruce L. White, M.D., Washington University, 1964.

Leroy W. Peterson, D.D.S., University of Michigan, 1940. (Also School of Dental Medicine.)

Instructor

Associate Professor Emeritus (Clinical)
Cari A. Wattenberg, A.B., University of Kansas, 1934; M.D., 1937.

Associate Professors (Clinical)
Morris Abrams, B.S., University of Illinois, 1934; M.D., 1937.

Consultant in Oral Surgery
Leroy W. Peterson, D.D.S., University of Michigan, 1940. (Also School of Dental Medicine.)

Consultant in Speech Pathology in Surgery (Plastic and Reconstructive Surgery)
Richard Merson, Ph.D., University of Wisconsin, 1970. (Also School of Dental Medicine.)

DIVISION OF UROLOGY

Head of Division
William R. Fair, M.D.

Professors
Saul Boyarsky, B.S., University of Vermont, 1943; M.D., 1946.

Professor (Clinical)
Robert K. Royce, B.S., University of Mississippi, 1979; M.D., Washington University, 1942.

Associate Professors
Charles B. Manley, Jr., A.B., University of Missouri, 1955; M.D., 1958. (See Department of Pediatrics.)

Associate Professor Emeritus (Clinical)
Cari A. Wattenberg, A.B., University of Kansas, 1934; M.D., 1937.

Associate Professors (Clinical)
Morris Abrams, B.S., University of Illinois, 1934; M.D., 1937.

M. Richard Carlin, B.A., Dartmouth College, 1944; M.D., Yale University, 1947.

Assistant Professor
Mani Menon, B.S., St. Thomas College, 1964; M.D., Madras University, 1969.

Research Assistant Professors
Warren D. Heston, Ph.D., University of Colorado, 1968.
Timothy L. Ratliff, B.S., University of Texas, 1971; M.S., East Texas University, 1974; Ph.D., University of Arkansas, 1977.
Franz U. Steinberg, M.D., University of Berne, 1938. (See Departments of Medicine and Preventive Medicine and Public Health.)
George E. Swaneck, B.S., Universidad Catolica, 1958; M.D., 1962. (Jewish Hospital.)

Assistant Professors (Clinical)
Richard P. Parsons, B.D., Missouri Valley College, 1954; M.D., Washington University, 1958.

Instructor

Instructors (Clinical)
Lawrence M. Aronberg, A.B., Washington University, 1932; M.D., 1936.
J. Byron Beare, B.S., St. Louis University, 1936; M.D., 1939; M.S., University of Minnesota, 1947.
Saul Klein, M.D., Syracuse University Medical Center, 1959.
Neal Neuman, M.D., St. Louis University, 1971.

Research Associate
Rose Boyarsky, B.S., University of Vermont, 1944; M.A., Columbia University, 1946; Ph.D., Duke University, 1969.
Teaching and Research Divisions

BIOMEDICAL COMPUTER LABORATORY

The Biomedical Computer Laboratory collaborates with research investigators at the Medical Center in the application of modern information processing techniques to problems in biology and medicine. The laboratory currently has active programs in real-time and high-speed ECG analysis, clinical pathophysiologic research, tomography, central nervous system diseases and encephalogram analysis, speech synthesis and models of cochlear function and patient-based medical information systems.

Research and training are offered to medical and graduate students in mathematical techniques, digital system design, and advanced programming techniques applied to the biomedical problems described above. Opportunities to carry out research are available to students who have completed the first year of the medical school curriculum and to graduate students on a year-round basis. A number of assistantships are available. The Laboratory participates in the interdepartmental programs in Biomedical Engineering and Health Care Technology.

The Biomedical Computer Laboratory is affiliated with the Computer Systems Laboratory located in nearby quarters at the School of Medicine. The mission of the Computer Systems Laboratory is the design and development of advanced computer systems with a current focus on the development of modular processors. These systems are being applied to molecular and neural modeling, electrocardiographic rhythm analysis and speech synthesis.

ELECTIVES

Bio 530. Digital Computers for Laboratory Use
Methods of using small digital computers with laboratory instruments. Basic programming, data collection and conversion, data processing, digital control, output techniques. Credit 3 units.

(Professor Holmes)

BMed 693. Physical and Mathematical Principles of Tracer Kinetics
Theoretical foundations of tracer-kinetic methods. Topics covered are differential equations for conservation of tracer mass, applications of elementary linear systems theory, stochastic and compartmental models, methods of ac-
counting for tracer recirculation, and methods of data-processing.

(Dr. Larson)

**Programming for Medical Information Systems**

An interpretive language designed for medical information systems is described, with programming examples from hospital and ambulatory care settings. The language used is MUMPS (MGH Utility Multi-Programming System). Three hours of class work plus laboratory each week for six weeks.

(Dr. Blaine and Staff)

**Introduction to Programming a Laboratory Computer**

A generalized description of digital computers, octal and binary number systems, structured programming techniques, assembly language for the PC (Programmed Console), and introduction to higher level languages (FORTRAN). Three hours of class work plus laboratory each week for six weeks.

(Dr. Blaine and Staff)

**Survey of Biomedical Computer Techniques**

This course is directed toward biological scientists who seek an appreciation of the capabilities and limitations of digital computers as applied to biomedical problems. Only a minimal background in mathematics and electrical theory will be assumed. Three class hours each week. Demonstrations and laboratory exercises provide an opportunity for “hands-on” experience.

(Dr. Blaine and Staff)
THE MEDICAL CARE GROUP OF ST. LOUIS (MCG)

MCG is a prepaid group practice providing comprehensive health services to more than 21,000 members. Since its beginning eleven years ago, MCG’s relationship with the School of Medicine has been as a teaching and research unit serving as a model practice setting within a medical school environment. It is housed in a separate facility on the medical school campus. The practice is a site for optional programs for advanced residents in general internal medicine and general pediatrics. An elective is available for senior medical students.

MCG is a source of data for various clinical and health services research.

The practice is staffed by physicians who are members of the faculty of the School of Medicine in the Departments of Internal Medicine, Pediatrics, and Obstetrics and Gynecology. They are supported by medical, pediatric, and obstetric nurse practitioners as well as physician’s assistants, psychiatric social workers, a dietician, and an optometrist. Subspecialty care is delivered by other members of the faculty in the various clinical departments of the School of Medicine.

Kwangsup S. Kim, M.D., Seoul National University, 1963; Ph.D., 1970. (See Department of Medicine.)
A. Donna King, B.A., Western Maryland College, 1960; M.S.W., Washington University, 1966. (See Department of Preventive Medicine and Public Health.)
Donald K. King, A.B., Fairfield University, 1966; M.D., Johns Hopkins University, 1970. (See Department of Medicine.)
Jerald Maslanko, M.D., Emory University, 1975. (See Department of Medicine.)
Edward G. Peskin, B.A., University of Wisconsin, 1970; M.M.S., Rutgers University, 1972; M.D., Washington University, 1974. (See Department of Obstetrics and Gynecology.)
Paul S. Simons, B.A., University of Texas, 1963; M.D., Washington University, 1967. (See Department of Pediatrics.)
Kongsa Tanphaichitr, M.D., Siriraj Hospital Medical School, 1970. (See Department of Medicine.)
James K. Turner, A.B., Washington University, 1949; M.D., 1953. (See Department of Pediatrics.)
Chinda Vanasin, M.D., Siriraj Medical School, 1968.
Elsie Winstead, B.S., East Carolina University, 1973; M.D., University of North Carolina 1977. (See Department of Medicine.)
Patricia B. Wolff, B.A., University of Minnesota, 1968; M.D., 1972. (See Department of Pediatrics.)
BEAUMONT-MAY INSTITUTE OF NEUROLOGY

The Beaumont-May Institute of Neurology was established in 1955 by gifts from the Louis D. Beaumont Foundation, Mrs. Charles M. Rice, and Morton J. May. It is the purpose of the Institute to foster basic and clinical research in neurology, with special reference to defects in the structure of the nerve cell which occasion important neurological disorders having a high incidence of prolonged disability.

DIVISION OF TUMOR SERVICES

The Division of Tumor Services was organized by the coordinating committee for the cancer education program. Cancer, like many other subjects in the medical curriculum, is taught in an interdepartmental manner. In the sophomore year, a six-week interdepartmental course in hematology and oncology is taught as part of the pathophysiology course by members of all clinical departments which participate in the Division. In the junior year, students are assigned to the tumor clinics of the various services, where they gain first-hand experience with cancer.

Interdepartmental tumor conferences, held each week for members of the junior class, postgraduate students, visitors, and staff, serve as a forum to demonstrate some of the complex problems in diagnosis and therapy which arise in patients with malignant disease. Other tumor conferences are held at regular intervals by the various clinical departments.

In the senior year, students may elect periods of study which expose them to the theoretical and practical aspects of the epidemiology, diagnosis, treatment, and prognosis of various human neoplasms. This program is tailored to the particular interests of each student with the approval of the executive committee of the Division of Tumor Services. The oncological electives available to seniors include studies in any of the following fields: surgical pathology, neoplasms in children, surgical oncology, radiation therapy, hematologic neoplasms, and epidemiology of cancer.
THE IRENE WALTER JOHNSON INSTITUTE OF REHABILITATION

The teaching of rehabilitation is conducted by the Department of Preventive Medicine and Public Health in collaboration with various specialty services. The Irene Walter Johnson Institute of Rehabilitation is a modern, five-story facility that is air-conditioned and well equipped for the care of disabled patients. Students of medicine, house officers, and students of paramedical services have an opportunity to affiliate with the Institute.

Traineeship Elective

Traineeships in Physical Disability and Rehabilitation of eight weeks’ duration may be elected during the interval between the end of the spring semester and beginning of the fall semester by up to eight students who have completed the first year of the medical school curriculum. Specific instruction is given by means of informal lectures, demonstrations, and seminars. Part of the time will be spent in the Department of Rehabilitation Medicine at Jewish Hospital.

Senior Elective

In the six-week elective in physical disability and rehabilitation, the student becomes familiar at first hand with the techniques for defining the extent of physical disability and with various approaches to its treatment. Emphasis is placed on methods used in physical, occupational, and speech therapy, and on the specialized contributions to be made by rehabilitation, social work, nursing, and vocational testing and counseling. Opportunity is made available for special emphasis on the rehabilitation of hand injuries and for participating in research activities of the Rehabilitation Engineering Unit.

Interests of the students will be met by arranging experience in rehabilitation medicine at extramural facilities, including Jewish Hospital.

(To be selected)
Graduate Training

DIVISION OF BIOLOGY AND BIOMEDICAL SCIENCES

The Division of Biology and Biomedical Sciences, formed in the summer of 1973, was established because of the realization that training and research in modern biology transcend the limits of departmental structure, and scientists interested in related areas of investigation are distributed among many departments in the School of Medicine, as well as the Department of Biology in the Graduate School of Arts and Sciences. The faculty consists of members of preclinical departments of the School of Medicine: Anatomy and Neurobiology, Biological Chemistry, Genetics, Microbiology and Immunology, Pathology, Pharmacology, Physiology and Biophysics; and of the Department of Biology of the Faculty of Arts and Sciences. For purposes of graduate training, the Division is divided into the following programs: Developmental, Cellular, and Systemic Biology, Evolutionary Biology and Ecology, Molecular Biology, Neural Sciences and Plant Biology.

The faculty in each of these programs participates in the presentation of divisional courses and sets the requirements for the Ph.D. degree within the programs. These courses are also available to medical students as senior electives. The Ph.D. requirements in all programs are highly flexible. They include courses which are adjusted to the student's background and interest, a qualifying examination to be taken in the second year, execution of original research suitable for a dissertation, and defense of the thesis. Graduate students are admitted to the Division as students-at-large for the first year of their training. During the first year, advisers are appointed to assist students in selecting courses and to help them become acquainted with the various research programs in the Division. At the conclusion of the first year, it is expected that students will make a decision as to which program they wish to join and, by choosing a research adviser, will be located in one of the departments which comprise the Division.

Graduate students may also select training programs within the disciplines represented by the departments. The Ph.D. degree requirements for these students will be determined by the individual departments. In order to obtain expertise in teaching as well as research, all students serve as teaching assistants for two semesters during their graduate training.

Students in the Ph.D. program will receive full tuition remission and stipends at the level of $5,040. In many cases the award is made from an NIH training grant and is subject to the payback agreement and taxability provisions appropriate to such awards.
Applications for admission are due no later than January 31 of the academic year preceding that in which study is to begin. Admission is based solely on ability and the number of openings currently available. In general, a student should have completed at a high scholastic level undergraduate training in biology, chemistry, or physics, and have completed most of the following courses: biology, genetics, chemistry (general, analytical, organic, and physical), physics, and calculus. It is possible for the student, in exceptional cases, to fill some lack of basic entrance requirements for the specific program by electing these courses in the beginning year of graduate study. It is strongly recommended that the applicant take the Graduate Record Examination, both the aptitude and advanced portions. Additional information and the application for admission may be obtained by writing directly to the Office of Graduate Student Affairs, Box 8072, Washington University School of Medicine, 660 South Euclid Avenue, St. Louis, Missouri 63110.

For the 1980-81 academic year, the tuition and health fee in the Graduate School of Arts and Sciences will be $2,737.50 a semester for full-time study. For students enrolled for fewer than twelve units, the rate is $225 a unit. Graduate students who are enrolled for more than six units per semester in courses at the Medical Center are required to participate in the Medical Center Student Health Service. The health fee is payable each semester at the time of registration.

The following graduate courses are offered by the Division of Biology and Biomedical Sciences. Those courses which are particularly relevant to any given department are cross-listed under that department in this Bulletin. The faculty member in charge of the course and his departmental affiliation are shown at the end of each course.

**Bio 401. Vertebrate Physiology**

Two hours each week will be devoted to an examination of the functional anatomy and the function of the great organ system of the mammal (exclusive of the nervous system). One hour will involve discussion of the pertinent phylogeny and important variations in the particular system under study. Prerequisites: general chemistry, physics and college algebra or their equivalents. Credit 3 units.

(Lang [Physiology])

**Bio 404. Laboratory of Neurophysiology**

Elements of the nervous system, neural analysis of sensory information and organization of neural activity will be electrophysiologically studied by students to find out how some of the interesting experiments in neurophysiology are actually performed. Resting and action potentials, sound- and photoreception, organized activity of motoneurons, analysis of human and animal sounds, and psychological phenomena will be examined. Credit 3 units.

(Suga [Biology])

**Bio 405. Physiological Basis of Acoustic Communication**

Lectures and seminars in hearing of various species of animals, from invertebrates to humans. Structural and functional adaptation to the environment in which their acoustic communication is performed is considered. Not only auditory physiology, but also sound production, acoustic communication, echolocation in bats, and electroreception by lateral line organs of fishes will be discussed. Demonstrations of neural responses to acoustic stimuli will be included. Credit 2 units.

(Suga [Biology])

**Bio 406. Experimental Approaches in Embryology**

A lecture-laboratory course in which classical analytical studies of embryonic development and cellular differentiation are reexamined in an attempt to elucidate underlying mechanisms at the molecular level. The laboratory will include morphological and biochemical studies of selected developmental systems in intact embryos and cultured organs and tissues. Credit 4 units.

(Kirk [Biology])

**Bio 407. Developmental Genetics**

Following a brief review of key concepts derived from classical investigations, a few selected systems will be analyzed in detail in an attempt to discern the molecular mechanisms underlying the spatial and temporal control of gene
expression in developing eukaryotes. Credit 3 units.

(Goodenough [Biology], Kirk, Waterston)

Bio 408. Human Evolution
The fossil evidence for human and nonhuman primate evolution. Classification and genetics in evolutionary perspectives, relationships between biology and culture in ancient and modern populations. (Sussman [Anthropology])

Bio 410. Molecular Virology
A comprehensive study of the virus world—including animal, plant, and bacterial viruses—with emphasis on the molecular biology of virus structure and replication. Credit 3 units.

(M. J. Schlesinger, S. Schlesinger, Beachy [Microbiology])

Bio 411. Phycology
A systematic treatment of the freshwater and marine algae. Emphasis primarily on morphology, physiology, taxonomy, and genetics of the major and minor algal groups. Certain aspects of recent research and present problems in phycology will be considered. Credit 4 units.

(Nichols [Biology])

Bio 412. Experimental Aquatic Biology
Studies of current research problems and research techniques devoted to aquatic flora and fauna. The course will include a group or individual participation in a research project or problems dealing with individual aquatic components of the aquatic environment or their interaction. Credit 4 units. (Nichols [Biology])

Bio 413. Structure and Function of Plants: Development
The formation of gametes, fertilization, embryogenesis, growth and continuing developmental processes, hormonal control and responses to the environment. Credit 3 units.

(Walbot [Biology], Beachy)

Bio 414. Structure and Function of Plants: Physiology
The daily metabolic activities of the mature green plant. Credit 3 units. (Outlaw [Biology])

Bio 415. Theoretical Population Genetics
A rigorous introduction to the theoretical basis of population genetics and evolutionary mechanisms. Quantitative genetics and population structure will be investigated first, followed by an examination of how selection, population structure and ecological factors interact in determining the evolutionary fate of a population. Credit 3 units.

(Templeton [Biology])

Bio 416. Evolutionary Biology
Individual areas of evolutionary biology will be discussed in depth. Topics will include the Biological Species concept, the hypothesis of selective neutrality of enzyme polymorphism, modern concepts in systematics, molecular approaches to the study of adaptation, the coevolution of insects and plants, and other topics of current evolutionary interest. Credit 3 units.

(Johnson [Biology], Stalker)

Bio 417. Mathematical Ecology
The theory of the Leslie Matrix will be developed with respect to population growth, colonization, demography and evolution of life history attributes. Matrix approaches will next be used to study species interactions and communities. Finally, the use and limitations of optimization models in ecology will be discussed. Credit 3 units.

(Templeton [Biology])

Bio 418. Population Genetics
An introduction to the basic principles of population and ecological genetics. The mechanisms of microevolutionary processes are discussed, and an integrated ecological and genetic approach is used to study the adaptive nature of evolutionary processes. Credit 3 units.

(Templeton [Biology])

Bio 419. Ecology
A survey of ecological principles underlying the spatial and temporal distribution of populations and biological communities. Credit 3 units.

(Sexton [Biology])

Bio 420. Selected Topics in Life History: Strategies of Tetrapod Vertebrates
Lectures, discussions and laboratory field trips devoted to the analysis of vertebrate life tables, growth, reproductive cycles, predation and distribution in space and time, with special reference to amphibians and reptiles. Individual research projects will be required. Credit 3 units.

(Sexton [Biology])

Bio 424. Immunology
The basic molecular and cellular aspects of the vertebrate immune response, emphasizing the specificity of antibody reactions, the molecular structure of antibodies, the genetic origin of their diversity, and the cellular basis of their formation. Other topics will include adaptive responses to infection, tumor rejection, and transplantation.

(Templeton [Biology])

Bio 426. Evolutionary Biology
Individual areas of evolutionary biology will be discussed in depth. Topics will include the Biological Species concept, the hypothesis of selective neutrality of enzyme polymorphism, modern concepts in systematics, molecular approaches to the study of adaptation, the coevolution of insects and plants, and other topics of current evolutionary interest. Credit 3 units.

(Johnson [Biology], Stalker)
include tolerance, autoimmunity, allergies, blood groups, and tissue transplantation. Credit 3 units. (Heischman [Microbiology and Immunology])

Bio 425. Microbial Physiology
An in-depth coverage of selected topics in microbial physiology and molecular biology. Topics may vary from year to year but could include cell regulation and growth, bioenergetics, sporulation, bacterial genetics, plasmid structure, and recombinant DNA research. Credit 3 units. (Silver [Biology])

Bio 428. Developmental Neurobiology
Lectures, demonstration, and discussions presenting a survey of the major features of neuroembryology (induction of neural tissue, cell proliferation, migration, and specification) and the contributions of tissue culture (cellular and organotypic) to the understanding of neural development. Credit 2 units. (Bunge [Anatomy and Neurobiology], Hamburger, M. Johnson)

Bio 434. Cell Physiology
The physiology of prokaryotic and eukaryotic cells in culture and the structure and function of their viruses. Credit 3 units. (Hopkins [Biology])

Bio 435. History of Biology and Related Sciences. Antiquity through the Seventeenth Century
The first of two semesters, this course will cover the basic development of the life sciences from antiquity through the scientific revolution. Emphasis will be placed on the interaction of biology with physics, chemistry, cosmochemistry, philosophy and the social sciences. The course is approached from a Marxist perspective. Credit 3 units. (Allen [Biology])

Bio 436. History of Biology and Related Sciences from the Seventeenth Century to the Present
The second of two semesters, this course covers the development of the life sciences from the seventeenth through the mid-twentieth centuries. Emphasis will be placed on the development of biology, and its interactions with physics, chemistry, astronomy, philosophy, and the social sciences. The course is approached from a Marxist perspective. Credit 3 units. (Allen [Biology], Hall)

Bio 446. Biology of the Fungi
General aspects of the biology of the major fungal groups, including their development, genetics, cytology, metabolism and ecology. Roles these microorganisms play in nature, research, medicine, and agriculture. Credit 3 units. (Maniatis [Biology])

Bio 448. Plant Systematics Workshop
A series of workshops, each consisting of laboratories and tutorials for advanced undergraduates and graduates contemplating careers in systematics, ecology or natural history: Section 1—monographic studies; Section 2—cytotaxonomy; Section 3—palynology; Section 4—microtechnique; Section 5—chemosystematics. Credit 1 unit for each section. (Goldblatt [Biology])

Bio 450. Topics in the History of Eugenics
A seminar in which students will carry out in-depth research projects on eugenics movements in the United States or Europe (1890-1960). Topics can include: genetic basis of eugenic theories, funding of the Eugenics Movement, connections between U.S. and other (e.g., Nazi) eugenics movements, etc. Credit 3 units. (Allen [Biology])

Bio 451. General Biochemistry
See Department of Biological Chemistry.

Bio 452. Biochemistry Laboratory
An experimental approach to a number of topical biochemical problems, with emphasis on the isolation and purification of biological macromolecules, studies on their biosynthesis and degradation, and mechanisms by which their concentration and activity are regulated. Credit 4 units. (Nulty [Biochemistry], Staff)

Bio 453. Basic Principles of Nucleic Acids and Protein Synthesis
A study of basic principles of DNA synthesis and replication and protein synthesis. Credit 1 unit. (Morris [Biology], Staff)

Bio 454. History of Genetics
A seminar dealing with selected topics in the history of genetics, focusing largely on the period since 1900. The first part of the seminar (weeks 1-7) will be devoted to exploration of specific topics (with primary and secondary source readings) such as: the background development of Mendel's work, cytology (1860-1930); the biometrical movement, heredity and evolution (1860-1900); the rediscovery of Mendel, the chromosome theory and the Morgan school, Mendelism and Darwinism (1900-1940); biochemical genetics, molecular genetics, the Eugenics Movement (1890-1940). The second part of the course will be devoted to presentation and discussion of student research papers. Credit 3 units. (Allen [Biology])

Bio 457. Somatosensory System
This course is designed to correlate anatomical, physiological and psychophysical information on tactile sensation, proprioception, thermal and pain sensation. Emphasis will be placed on peripheral receptor mechanisms as well as central nervous system processing ofafferent inputs in each somesthetic system. Credit 2 units. (Burton [Anatomy], Hunt, Jones)

Bio 458. Biophysics of the Ear
Intended to expose students to ongoing research in the biophysics and electrophysiology of the peripheral auditory system. Topics: mechanics of the ear; mecano-neural transduction; spatiotemporal patterns of cochlear responses; mathematical and computation models; digital instrumentation. Credit 3 units. (Kim, C. Molnar [Physiology])

Bio 459. Vision
A course designed to bring together the anatomy, physiology, and psychology of vision to provide an understanding of function. Properties of light and receptors will be covered, and analysis of form, movement, color and depth in the vertebrate visual system, with some material on invertebrates. Credit 3 units. (Daw [Physiology and Biophysics], Cohen, Miller, Pearlman)
Bio 461. Electrobiology
Introduction to the origin, nature, and detection of electric potentials in plants and animals. Coverage of a variety of advanced topics, including neural data processing, the detection of electric fields by fish, the dielectric properties of tissue, plant electrophysiology, and neurotoxicology. Credit 3 units.
(W. Pickard [Engineering])

Bio 467, 468. Seminar in Floristic Taxonomy
A survey of angiosperm families, their morphology, cytology, anatomy, palynology, chemistry and evolution. Credit 1 unit.
(Gentry [Biology])

Bio 470. Ethology
Advanced course dealing with selected in-depth topics: social organization and social ecology; behavior genetics; evolution; human behavior and development; neural and endocrine models. A Gestalt approach to the intrinsic complexities of organism-environment interaction will be made. Credit 3 units.
(Lockwood [Psychology])

Bio 471. Phytogeography
An introduction to the current and past geographical distributions of plants, emphasizing ecological, geological and historical factors. Credit 3 unit.
(Gentry [Biology], D'Arcy, and Staff)

Bio 481. Ecology and the Environment
Typical lecture topics include: the N-cycle and the use of fertilizers; pests, pesticides, and pest control; the Green Revolution, its advocates, and its technical and social critics; Malthus and the Neo-Mathusians; the demographic transition, social and economic influences on population growth rates. However, topics vary from year to year depending in part on student interests and topical importance. Credit 2 units.
(Kohl [Biology])

Bio 482. Ecology: Ecosystems
A study of selected topics including measurements of species diversity, productivity, carbon cycle, energy flow, and secondary succession with emphasis on trophic dynamics of specific interactions such as predation and grazing. Credit 3 units.
(Covich [Biology])

Bio 484. Techniques in Field Biology
A survey of field and laboratory techniques as applied to specific problems in population biology. Emphasis on both theory and application. Credit 3 units.
(Sexton [Biology])

Bio 4851. Physiological Ecology of the Vertebrates
An examination of the adaptations of organ and system physiology in the vertebrate which enable the animal to exploit difficult environments. Students will participate in a team project on behavioral thermoregulation involving biotelemetry of body temperature and location from free living vertebrates at Tyson. Credit 3 units.
(Coles [Biology])

Bio 4884. Environmental Pathology
Lectures and seminars discussing the effect of modern industrial environment on man's health. The adaptability of man, his ability to manipulate his environment and the effects of these manipulations in regard to health and disease will be discussed. Topics include acute and chronic diseases associated with air and water pollution, waste disposal, pesticide usage, transportation and urban living and noise. Credit 2 units.
(Kuhn [Pathology], Davis)

Bio 501. Human Anatomy
See Department of Anatomy and Neurobiology.

Bio 502. General Physiology
See Department of Physiology and Biophysics.

Bio 503. Endocrine Physiology and Pharmacology
A lecture course for in-depth coverage of general endocrinology. Major areas covered will include neuroendocrinology, steroid hormones, reproduction, calcium homeostasis, and metabolic fuel regulation. Each area will be discussed at the whole animal, cellular, and subcellular levels with particular emphasis on the integrative function of endocrine systems and on mechanisms of hormone action. Credit 3 units.
(J. Martin [Pharmacology])

Bio 504. Environmental Pathology
See Department of Anatomy and Neurobiology.

Bio 5051. Foundations in Immunology I
A two-semester course designed for graduate students as an in-depth introduction to immunology. Topics will include antibody structure, antibody genetics, cellular immunity, complement, the major histocompatibility complex, effector mechanisms of the immune response, autoimmune and immunodeficiency. Credit 3 units.
(Schwartz [Microbiology])

Bio 506. Microscopic Anatomy
See Department of Anatomy and Neurobiology.

Bio 507, 508. Pharmacology
See Department of Pharmacology.

Bio 509, 510. Current Topics in Pharmacology
Topics of current interest will be presented and discussed. Critical evaluation will be made of recent articles in the scientific literature. Credit 2 units for the year.
(Geller [Pharmacology], Staff)
Bio 511. Intracellular Transport of Macromolecules in Animal Cells
A discussion of the organelles responsible for the movement of macromolecules in cells. Endoplasmic reticulum, the Golgi apparatus, secretory vesicles, plasma membrane, lysosomes. Emphasis will be placed on specific recognition as a means for translocation of macromolecules. Part of the course will use the seminar format. Credit 2 units.
(Stahl [Physiology and Biophysics])

Bio 512. Selected Topics in Developmental Biology
A lecture-seminar course devoted to an in-depth analysis of a restricted number of topics of major current interest in developmental biology. A series of guest lecturers whose research is at the forefront of the area of interest will be invited to the campus to discuss their research activities with the class. These guest lectures will be supplemented by extensive readings from the current literature, lectures by local faculty and informal discussions. Students will be evaluated on the basis of two research proposals they will prepare during the semester. Credit 2 units.
(Kirk [Biology])

Bio 514. Advanced Cell Biology
A course designed for advanced students in the area of cell biology and related sciences. Lectures will stress recent advances in the field of eukaryotic cell biology. Emphasis will be placed on chromosome structure and function, cytoplasmic genomes, membrane organization and cellular interactions. Credit 3 units.
(Goodenough, Yao [Biology])

Bio 515, 516. General Pathology
See Department of Pathology.

Bio 517. Introduction to Immunology
A short introduction to Humoral and Cellular Immunity for non-specialists. Students intending to take more advanced courses in Immunology or who are preparing for preliminary examinations in Immunology should take Bio 5051. Credit 2 units.
(Dave [Microbiology])

Bio 518, 519. Pathology Research Seminar
Study of current and reported research in experimental pathology. Credit 2 units.
(Williamson [Pathology], Staff)

Bio 520. Methods in Experimental Pathology
Discussions and demonstration of routine and special microscopic techniques (light, phase, fluorescent, transmission, and scanning electron microscopy); other techniques (bio- and immunohistochemistry, various physiologic correlative methods). Design of experiments using laboratory animals and autopsy specimens will be emphasized. Students will be expected to do a short research project of interest to them. Credit 2 units.
(Hartroft, Greider [Pathology])

The mechanisms of regulation of immune responses by antigen, macrophages, T cells, B cells, and their products will be discussed. The material covered will vary in emphasis from year to year and will stress critical analysis of the literature. Credit 2 units.
(Pierce [Pathology])

Bio 522. Immunogenetics
Lectures on selected examples of application of immunologic techniques to detection of genetic variations in macromolecules (blood groups, allotypes, lymphocyte antigens), genetic dissection of immune mechanisms (immune response genes, immuno-deficiencies), and genetics and immunology of transplantation and of neoplasia. Credit 2 units.
(Shreffler [Genetics])

Bio 523. Microbial Physiology and Genetics
Molecular and cellular aspects of microbial growth and reproduction. Lectures and laboratory in the first nine weeks of the fall semester. Credit 1 unit.
(S. Schlessinger [Microbiology and Immunology])

Bio 524. Radiation Biology
The action of ionizing radiation at the biochemical, cellular, tissue, and whole organism levels will be discussed. A cellular approach will be taken for a number of topics such as the target for lethality, the biological basis of radiation therapy, and radiation effects on specific tissues in mammals. Credit 2 units.
(Valerote [Cancer Biology])

Bio 525. Fundamental Concepts in Cell Membrane Physiology and Biophysics
A lecture course devoted to the theoretical principles underlying the physiological properties of biological membranes. Topics to be covered include (1) a review of aqueous solution thermodynamics, (2) properties of electrolyte solutions, (3) diffusion and osmosis, (4) electro-diffusion, with applications to membranes, (5) membrane potentials and interfacial potentials, (6) kinetics and thermodynamics of carrier-mediated transport. Credit 3 units.
(De Weer, Rakowski, Reuss [Physiology and Biophysics])

Bio 526. Selected Topics in the Physiology and Biophysics of Cell Membranes
A seminar course devoted to an in-depth analysis of selected readings. The topics to be covered include: ionophorous antibiotics and artificial membranes; movements of salt and water across organelle and cell membranes and epithelia; kinetics of carrier mechanisms; and the chemistry and kinetics of the sodium pump. Credit 3 units.
(Reuss, Staff [Physiology and Biophysics])

Bio 527. Reproductive Endocrinology
This course will present current concepts of the molecular mechanisms of hormone action directly related to the endocrinology of mammalian male and female reproduction, including hypothalamic, pituitary, ovarian and testicular hormones. Consideration of the mechanism of hormone action will be directed toward the function of mobile and fixed receptors, second messengers, nuclear acceptors and translational processes. Credit 3 units.
(Wiest, Staff [Biochemistry])

Bio 528. Cell Development in Animals and in Culture
Lectures and student seminars on the fate of individual cell types in animals and in cell culture. Principles of cell renewal exemplified by exocrine and endocrine
pancreas and hemopoiesis. General cell culture, including growth factors, hormonal factors, cyclic nucleotide effects, and genetics of cultured cells. Programmed cell death discussed along with the relation of differentiation to cell division, the role of cell-cell interactions, and studies of teratomas. Credit 3 units. (D. Schlessinger [Microbiology & Immunology], Lieberman)

Bio 529. Animal Virology
A general introduction to bacterial, animal and human viruses. Lectures in the second nine weeks of the fall semester. Credit 1 unit. (Perrault [Microbiology and Immunology])

Bio 530. Digital Computers for Laboratory Use
Methods of using small digital computers with laboratory instruments. Basic programming, data collection and conversion, data processing, digital control, output techniques. Credit 3 units. (Holmes [Biochemistry])

Bio 531. Advanced Biochemistry
See Department of Biological Chemistry.

Bio 532. Biochemistry of the Extracellular Matrix
An in-depth survey of the chemistry and metabolism of the principal components of the extra-cellular matrix, principally collagen, elastin and the glycosaminoglycans. Chemical and physical properties of these molecules will be discussed, as well as aspects of their biosynthesis and degradation. Emphasis will be placed on the relationships between structural features and metabolic events involving these complex molecules and their physiological function: the maintenance of the stable three-dimensional architecture of animal tissues. Credit 2 units. (Jeffrey [Biochemistry])

Bio 533. Pathogenic Microbiology
A survey of the major genera of pathogenic bacteria, fungi and parasites. Lectures and laboratory in the second nine weeks of the fall semester. Credit 2 units. (Simms [Microbiology and Immunology])

Bio 534. Gene Expression and Differentiation in Eukaryotic Cells
Emphasis will be on nuclear events which are relevant to gene expression. Material covered will include examples mainly from Drosophila, mouse, chicken, and cells in tissue culture. We shall cover the cell cycle, meiosis, organization of chromatin and chromosomes, the content of the nucleus, chromosomal proteins, nuclear RNA, polytene chromosomes, the transcription machinery, expression of rRNA genes in pro- and eukaryotes, nucleolus turnover and processing of RNA in the nucleus and cytoplasm, expression of the globin genes and genes induced by steroid hormones, teratomas, and somatic cell genetics, nuclear cytoplasmic relationships, plasmids and cloning of eukaryotic genes in bacteria. Credit 3 units. (Apirion [Microbiology and Immunology])

Bio 535. Physical Chemistry of Macromolecules
Application of physical chemistry to the study of proteins, nucleic acids and other natural and synthetic polymers. The thermodynamics of macromolecular solutions and the use of osmotic pressure, light scattering, viscosity, ultracentrifugation, diffusion, and birefringence experiments in the determination of the molecular structures of these substances. Credit 3 units. (Holtzer [Chemistry])

Bio 536. Protein Chemistry and Enzyme Mechanisms
Protein chemistry: peptide synthesis; sequence analysis; development of enzyme kinetic theory, including concepts of regulatory enzymes. Credit 3 units. (Bradshaw [Biochemistry])

Bio 537. Structure and Function of Cell Membranes and Surfaces
Topics include contemporary cell membrane models; membrane structure as revealed by electron microscopy, X-ray analysis, etc.; physical properties of lipids and membrane proteins; model membranes and their applications; permeability and active transport in mammalian and bacterial systems; cell recognition, contact inhibition, and transformation; immunological characteristics of membranes. Credit 3 units. (Silbert [Biochemistry])

Bio 538. Topics in Animal Virology
The course will consist of readings and seminars in specific areas of animal virology. The topics will vary from year to year. Credit 2 units. (S. Schlesinger [Microbiology and Immunology])

Bio 539. Cell Surface Receptors
Course will consist of discussion of cell surface components which allow cells to interact specifically with a variety of environmental substances such as drugs, neurotransmitters, protein hormones, toxins and other cells.

Bio 540. Protein Chemistry
The course will provide an introduction to the physical chemistry of proteins. The primary emphasis will be on the interaction of proteins with other macromolecules. Credit 3 units. (S. Schlesinger [Microbiology and Immunology])
Bio 541. Molecular Biology of Prokaryotes

About 15 hours of lecture followed by seminar presentations on selected topics by each student. Growth, metabolism and genetics of the bacterial cell including transport mechanisms, the regulation of gene expression and protein synthesis and the molecular biology of virus infection by virulent and temperate bacteriophages. Lectures and seminars. Offered in alternate years. Credit 3 units. (Lieberman [Pharmacology], D. Schlessinger, Staff)  

Bio 544. Mechanisms of Neoplasia

The first part of the course provides a basic background in neoplasia in man and animals as a framework for the application of concepts in cell and molecular biology to neoplasia. The major part of the course will be devoted to analyzing the role of chemical, physical, and viral carcinogens in the induction of cancer, promoters, the role of mutation and gene expression in neoplasia, changes in the cell surface and metastasis. Credit 2 units. (Lieberman [Pathology], D. Schlessinger, Staff)  

Bio 545. Introductory Biophysical Chemistry

Applications of physical chemistry to biochemical problems at an introductory level. There will be three sections: multiple equilibria, spectroscopy, and kinetics, each comprising about one third of the course. One section may be taken individually for one credit. Permission of instructor. Three class hours per week. Credit 3 units. (Elson [Biochemistry])  

Bio 546. Antibodies: Structure, Function, and Formation

The principal features will be examined in lectures, assigned reading of current research papers, and in student seminar presentations. Emphasis will be placed on the genetic and molecular events which govern the appearance of serum antibodies during the immune response. Credit 2 units. (Simms [Microbiology])  

Bio 548. Nucleic Acids and Protein Biosynthesis

This course will cover fundamental aspects of the structure, biosynthesis and function of nucleic acids and the biosynthesis of proteins in eukaryotes, prokaryotes and their viruses. Emphasis will be placed on mechanisms involved in the biosynthetic processes and the regulation thereof. Special topics relevant to these processes will also be discussed. Credit 3 units. (Roeder [Biochemistry], Staff)  

Bio 550. Human Genetics

A survey of human and medical genetics, including cytogenetics, metabolic disorders, counseling, population genetics and immunogenetics. Prerequisite: an introductory genetics course or permission of the instructor. Credit 2 units. (Levine [Genetics])  

Bio 551, 552. Topics in Neurobiology

A weekly seminar series on selected topics of current interest in neurobiology, such as synaptic and neuromuscular transmission, plasticity in the nervous system, the structure and function of receptors, etc. No credit. (Staff [Anatomy, Physiology and Pharmacology])  

Bio 553. Seminar in Cellular Basis of Behavior

Weekly meetings will consider theoretical and experimental work with neuronal networks. Emphasis will be placed on systems controlling motor behavior. Credit 2 units. (Stein [Biology])  

Bio 554. Neural Sciences

See Departments of Anatomy and Neurobiology and Physiology and Biophysics.  

Bio 555. Neurological Pharmacology

Basic neuropharmacology for graduate students. The course covers the principles of general pharmacology, drug metabolism, and autonomic and neuromuscular pharmacology. Credit 3 units. May be taken without laboratory for 2 units of credit. (Ferrendelli [Pharmacology], Staff)  

Bio 556. Biochemistry of the Nervous System

Topics covered include carbohydrates; energy metabolism related to different functional states; amino acid metabolism in relation to protein and transmitter synthesis; cerebral lipids, membranes, lipid metabolism; cerebral blood brain barrier. Credit 2 units. (McDougal [Pharmacology], Moore)  

Bio 558. The Formation and Maintenance of Synaptic Connections

This course will cover what is known about the formation and regulation of synapses, with particular emphasis on the specificity of neural connections. Credit 2 units. (Purves [Physiology and Biophysics])
Bio 559. Nerve, Muscle, and Synapse
The ionic basis of the resting and action potentials and the mechanisms of synaptic transmission. Students will be expected to present two to five one-hour seminars based on assigned original papers. Credit 2 units.
(Rovainen [Physiology and Biophysics], Staff)

Bio 560. Pharmacology of the Nervous System
Topics covered include biochemistry of neurotransmitters, mechanisms of neurotransmission, and mechanisms of action of psychoactive agents. Credit 2 units.
(McDougal [Pharmacology], Moore)

Bio 561. Topics in Molecular Neurobiology
The course will consist of lectures and seminars on selected areas in which the function of the nervous system is being studied at the molecular level. Among topics considered will be: behavior in simple organisms, continuous neuronal lines, intraxonal transport, transmitter receptors, transmitter biosynthesis, cell recognition, filamentous proteins of the nervous system. Credit 2 units.
(D. Gottlieb, Willard [Anatomy and Neurobiology])

Bio 562. Neural Control of Posture and Movement
Advanced seminar course. Part I—Sensory and motor innervation of muscle. Spinal reflex organization. Part II—Supraspinal control. Cerebral cortex, cerebellum, basal ganglia, brain stem. Credit 2 units.
(Part I—(Hunt [Physiology and Biophysics])
Part II—(Thach [Anatomy and Neurobiology])

Bio 563, 564. Techniques in Neural Sciences
A laboratory course for first-year graduate students in the Neural Sciences program, including intracellular recordings from muscle fibers; growth of nerve tissue culture and electron microscopy of it; recording of synaptic potentials in crayfish muscle; extracellular recording in lateral geniculate and visual cortex; tracing of thalamo-cortical pathways by an autoradiographic technique; and biochemical analysis of proteins transported down an axon.
(Jones [Anatomy and Neurobiology], Staff)

Bio 566. Sensory Receptors
Advanced seminar course on structure and function of visual, auditory, vestibular, cutaneous and muscle receptors. Credit 2 units.
(Hunt [Physiology])

Bio 572. Seminar in Plant Biology: Plant Biochemistry
Discussion of current research and concepts of morphogenesis, growth, and development. Credit 2 units.
(Varner [Biologist])

Bio 574. Systematics and Ecology of Monocotyledoneae
The course will survey all monocotyledonous groups of plants with systematic emphasis given to the familial level. A review of modern evolutionary theories for the class Monocotyledoneae will be presented. The course outline will follow the system of Cronquist. Particular emphasis will be given to the families Cyperaceae, Gramineae, Bromeliaceae, Zingiberaceae, Marantaceae, Palmae, Cyclanthaceae, Araceae, Liliaceae and Iridaceae, for which instructors have a special interest. The morphology systematics and ecology of each family will be discussed, with special emphasis given to their phenological behavior, pollination and fruit dispersal biology when sufficient information is available. Credit 2 units.
(Gentry [Biology])

This weekly seminar, covering topics in both population genetics and ecology, will be taken by graduate students in this program each semester. Research and literature reports will be given by staff, visitors and graduate students. Credit 2 or 3 units.
(Johnson [Biology], Raven, Staff)

Bio 581. Seminar in Techniques in Field Biology
Planning and presentation of techniques in selected areas of population biology. Credit 3 units.
(Sexton [Biology])

Bio 590. Research
Credit to be arranged. (Staff)

Note—The number preceding the course title indicates that the course carries credit in the Graduate School of Arts and Sciences.
PROGRAM IN BIOMEDICAL ENGINEERING

This course of graduate study is designed to provide education and training for students wishing to apply principles of modern engineering and mathematics to theoretical and practical problems in biology and medicine. Students and faculty of both the School of Engineering and Applied Science and the School of Medicine participate in the program.

Every student seeking an advanced degree in engineering must be admitted to one of the participating departments of the Sever Institute of Technology, the graduate division of the School of Engineering and Applied Science. The program permits the student to earn a certificate in biomedical engineering in addition to the M.S. or D.Sc. degree in a chosen engineering field. Students not candidates for a degree are welcome to take courses as electives.

Graduate study plans are tailored to the individual’s needs and interests, and provide essential background in the related areas of life and medical sciences. Students with diverse undergraduate backgrounds may be admitted provided they have adequate preparation and experience in mathematics and the physical sciences. Areas of specialization include sensory communications, electrocardiography, flow and diffusion in biological systems, electrophotobiology, technology in health care, biomedical statistics, modeling of biological systems, engineering of artificial organs, drug concentration control, urodynamics, and applications of advanced computer techniques to biology and medicine. Research facilities available to the program are located in the School of Engineering and Applied Science, the School of Medicine, and the Washington University Computer Laboratories. The faculty includes representatives from the Biomedical Computer Laboratory, the Departments of Biological Chemistry, Physiology and Biophysics, Preventive Medicine and Public Health, Radiology, Surgery, and Anatomy and Neurobiology in the School of Medicine; and the Departments of Computer Science, Chemical, Civil, Electrical, and Mechanical Engineering, and Systems Science and Mathematics in the School of Engineering and Applied Science.

Complete course listings and information about application and degree requirements may be found in the Bulletin of the School of Engineering and Applied Science.

Biomedical Engineering course offerings:

Bio 458. Biophysics of the Ear
EE 481. Foundations of Bioengineering
BMed 502. Mathematical Methods in Biophysics
BMed 547. Biological Mass and Momentum Transfer
BMed 560. Biomechanics
BMed 576. Sensory Communications
BMed 581. Principles of Clinical Engineering
BMed 582. Biophysical Measurement
BMed 600. Research for Doctoral Dissertation
BMed 651. Science of Synthetic and Biological Polymers
BMed 660. Biomedical Applications of Small Digital Computers
BMed 682. Technology in Health Care
BMed 693. Special Topics in Biomedical Engineering
BMed 694. Special Topics in Clinical Engineering
BMed 695. Clinical Engineering Internship

For additional related courses, see Biomedical Computer Laboratory in this Bulletin and the Bulletin of the School of Engineering and Applied Science.
Allied Health Professions

Programs are conducted by the School of Medicine in health care administration, occupational therapy, physical therapy, radiologic technology, and pediatric nursing practice. All courses are approved by the American Medical Association of other certifying agencies, and graduates qualify for certifying examinations. For further information, write to the director or educational director listed under the particular program, 660 South Euclid Avenue, St. Louis, Missouri 63110.

HEALTH ADMINISTRATION AND PLANNING PROGRAM

The Philosophy

The faculty of the Health Administration and Planning Program of Washington University believes that administrative personnel in health organizations require not only a solid foundation in management but also in understanding of those aspects of finance, regulation, and planning unique to the health care field. Additionally, since its inception in 1946, the Program has acted on the premise that health administration students would benefit from exposure to the environment in which they will ultimately be involved. To this end the Program has maintained an organizational structure consisting of a core faculty located within the School of Medicine, augmented by faculty from other schools and departments within the University, as well as affiliated institutions and agencies. This multidisciplinary approach enables the student to acquire not only specific management skills but an understanding of the many complexities unique to the health care sector.

Curriculum and Sequence of Study

Required courses constitute 50 percent of the course sequence for the Master of Health Administration degree, offering vital exposure to the generic knowledge in the health administration and planning area. In addition to the elective courses available within the Health Administration and Planning Program (HAPP), students may take up to 15 semester hours of graduate work in other units of Washington University. The HAPP student's faculty adviser must approve the selection of courses and is responsible for the balance of the generalist/specialist viewpoints in the student's curriculum. The student’s previous academic work, employment experience, and ultimate performance goals enter into the individual’s personalized curriculum.

As a means of furthering interdisciplinary study, up to fifteen semester hours of HAPP courses are open to interested graduate students from other areas of Washington University. There is also a joint
M.H.A.-J.D. degree between the Health Administration and Planning Program and the School of Law. In addition, there are joint degrees that are under development between the Health Administration and Planning Program and the School of Law. In addition, there are joint degrees that are under development between the Health Administration and Planning Program and the graduate schools of Business and Social Work.

The sequence of study requires two years, each consisting of a fall and spring semester. There is an option of completing an independent study during the summer between the first and second year. Upon completion of the four semesters, or a total of 60 units which includes the required thesis, the student will receive a Master 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-month postgraduate administrative residency. A certificate will be awarded by Washington University School of Medicine and the affiliated residency organization upon completion of the residency.

### Administrative Residency

The twelve-month optional postgraduate administrative residency will be served in a hospital, health agency, or health organization which 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 residency 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 residency is strongly recommended as this postgraduate clinical exposure is deemed necessary for adequate professional career preparation. The residency is completed under the direction of a well-qualified and experienced hospital administrator who is given an annual adjunct faculty appointment at Washington University School of Medicine.

The full-time faculty maintains close liaison with the administrative resident and the preceptor. An educational plan which outlines the resident’s activities for the coming year must be filed by the preceptor. The preceptor also sends two evaluation reports to the Director of the HAP and shares the responsibility for recommending awarding of the certificate by Washington University School of Medicine and the residency site organization.

Within available resources an on-campus faculty member visits the residency site to meet with the preceptor and resident. The HAP also sponsors an annual preceptors conference at Washington University. Interaction of these site and campus visits enables joint review of the resident’s progress, as well as evaluation and refinement of the administrative residency experience.

### Admission Requirements

Washington University's Health Administration and Planning 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), the Miller Analogies Test or the Graduate Management Aptitude Test. No specific undergraduate major field of study is required for admission into the Program; however, introductory courses to accounting, economics, statistics (or their equivalents), and mathematics through college algebra are very strongly recommended.

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<tr>
<th>Component</th>
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<tr>
<td>Tuition per semester</td>
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<td>Application fee (nonrefundable)</td>
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Ronald E. Gribbins, B.A.,
St. Norbert College, 1966; M.B.A.,
University of Wisconsin, 1971;
Ph.D., 1975.

Virginia D. Hennebly, B.S., Maryville
College, 1966; M.H.A., Washington
University, 1971; Ph.D., 1977.

Robert J. Hickok, B.S., Washington
University, 1953; M.H.A., 1971. (See
Administration and Program in
Physical Therapy.)

Robert S. Woodward, (Health Care
Research), B.A., Haverford College,
1965; Ph.D., Washington University,
1972. (See Department of Preventive
Medicine and Public Health.)

Assistant Professors (Adjunct)

Donald W. Cordes, A.B., Hope
College, 1940; M.A., University of
Michigan, 1941.

Robert E. Frank, B.S., St. Louis
University, 1950; M.A., 1962.

Frank S. Groner, A.B., Baylor
University, 1934; LL.D., East Texas
Baptist College, 1946.

Roy C. House, A.B., Evansville
College, 1939; M.S.H.A., Northwestern
University, 1949; H.S.D., Southwestern

Rita E. Numerof, B.A., Syracuse
University, 1969; M.S.S., Bryn

Boone Powell, LL.D., Baylor
University, 1958.

Sister Mary R. Rocklage, B.S.,
S. Xavier College, 1961; M.H.A.,
St. Louis University, 1963.

Robert F. Scales, B.A., Baylor
University, 1939.

Glenn N. Scott, B.A., Oklahoma
Baptist University, 1956; M.H.A.,
Washington University, 1962.

Marc D. Smith, B.S., University of
Missouri, 1971; M.Div., Concordia
Seminary, 1975; Ph.D., St. Louis
University, 1979.

Gail L. Warden, A.B., Dartmouth
College, 1960; M.H.A., University of
Michigan, 1962.
Instructors (Adjunct)

Arthurline Cline, D.S., University of Houston, 1957; M.H.A., Washington University, 1959.
Paul F. Detrick, B.A., Kansas State Teachers College, 1949; M.H.A., Northwestern University, 1951.

Edgar O. Mansfield, B.S., Northwestern University, 1950; M.H.A., 1952; Dr.P.H., Ohio Northern University, 1956.
Elwood P. Opstad, B.S., State University of Iowa, 1947; M.H.A., Washington University, 1949.
James C. Ruthrauff, B.S.B.A., University of Kansas, 1937; M.S., Northwestern University, 1939.

John Warmbrot, B.S., St. Louis University, 1939.

Lecturers

Harold Hinderer, B.A., College of St. Thomas, 1952.

Lecturers (Adjunct)

Gerald J. Malloy, Ph.B., Marquette University, 1950; J.D., 1953; M.H.A., St. Louis University, 1955.
Associate Professor Emeritus

Assistant Professor Emeritus

Associate Professor and Director
Steven J. Rose, B.S., Ithaca College, 1961; Ph.D., Albert Einstein College of Medicine, 1977.

Assistant Professors
(See Administration and Health Administration and Planning Program.)

(See Departments of Neurology and Neurological Surgery and Physiology and Biophysics.)

Instructors
Joseph R. Harabson, B.A., California State University, Northridge, 1967; M.B.A., St. Louis University, 1975.
Susan S. McCrackin, B.S., University of Kansas, 1969.
Debra L. Strobach, B.S., University of Missouri, 1973; M.A., University of North Carolina, 1975. (See Department of Preventive Medicine and Public Health.)

PROGRAM IN PHYSICAL THERAPY
The program of instruction leading to the degree of Bachelor of Science in Physical Therapy is an intensive two-year curriculum offered at the School of Medicine. Applicants for admission must have completed sixty hours at an accredited college or university. Requirements are specific courses in English, psychology, biology, physics, chemistry, and social sciences.

Kinesiology and pathokinesiology form the core of the curriculum. Kinesiology/pathokinesiology is the integrative study and application of physical, biological, and applied science principles to normal and abnormal human movement. The basic and clinical sciences of kinesiology and pathokinesiology provide the foundation upon which the physical therapist can develop and apply scientific principles to patient care. The goal of the curriculum is to produce practitioners who can competently utilize the scientific approach to assess, remediate, and prevent pathokinesiological disorders.

The Program provides an environment in which students, faculty, and physical therapy practitioners are guided in the acquisition of the requisite body of knowledge for the current and future practice of physical therapy. The Program strives to bring scholarly knowledge to bear on the problems of the profession through research activities of the faculty. By providing an environment which permits expression of the individual’s imagination and creativity, the Program encourages the professional growth of its constituents.

Tuition (first three semesters), per semester $2,675
Tuition for clinical semester ....................... 1,783

Further information may be secured by direct correspondence with the Program in Physical Therapy, Box 8083, 660 South Euclid Avenue, St. Louis, Missouri 63110.
PROGRAM IN OCCUPATIONAL THERAPY

The efforts of the Program in Occupational Therapy are directed toward providing students with a thorough background in occupational therapy in preparation as practitioners in a rapidly developing field. The primary focus of occupational therapy is the development of adaptive skills and improved performance, not only in the realm of working for a living but also in tasks and activities concerned with leisure, daily living, and avocations. It follows that the occupational therapist must be concerned with external and environmental barriers as well as biological or psychological problems which inhibit occupational performance. The therapist must be equally alert to factors which enhance performance.

Within this context of concerns, occupational therapists work with individuals whose abilities to cope with tasks of living are threatened or impaired by such problems as the aging process, physical illness or injury, psychological and/or social disability, chronic conditions, poverty and cultural differences, or deficits in perceptual-sensory-motor control or in cognitive, emotional, or social development.

Undergraduate Program

The curriculum consists of the junior and senior years of a four-year baccalaureate degree program. Applicants for transfer must present a minimum of sixty semester hours (including required prerequisites) from an accredited college or university. Students wishing to enter Washington University as freshmen must complete the following.

Tuition, per semester ................................................. $2,675
Fee, Department, per semester ................................ 40
Fee, Clinical Internship ........................................... 600

For further information, contact the Office of Admissions, Washington University, Lindell and Skinker Boulevards, St. Louis, Missouri 63130. Phone: (314) 889-6000.


Instructors (Clinical)
Margaret Bartley
Kate Burgess
Winnie Daussman
Barbara N. Goldsmith
LaVerne W. Grady
Paula Habecker
Celesline Hamant
Michelle Isserman
Pat Libinski
Susan Lowrey-Flaherty
Patricia J. Melechen
Sylvia Metzler
Susan Meyers
Mary K. Murphy
El R. Nieuwenhuijzen
Jo Anne Powers
Carla Schnewerk
Ruth K. Schwartz
Mary Skowrya
Mary B. Smith
Bettie Sturley
Marlene R. Swan
Martha VanSweden
Janet E. Williamson
Susan Wilson

Lecturer
Joseph C. Kempe, Jr.

Graduate Program

The Graduate Program in Occupational Therapy prepares students to become clinical specialists, researchers or educators in one of the major areas of current practice: Sensori-motor Integration, Psychiatry or Physical Dysfunction. By selectively ordering their studies, students may orient their specialization toward service delivery in community, medical or educational settings.

All candidates for the Master of Science degree complete a core program consisting of advanced courses and seminars in occupational therapy theory; clinical, research and teaching practice; research procedures; tests and measurements; and strategies of scientific practice. Students' interests and needs determine the selection of electives to complement core courses and to create individual programs of study leading to clinical specialization. Occupational Therapy students have access to the extensive resources of the medical school, the patients and clinics of the University hospitals and to the resources of the Graduate School of Arts and Sciences located on the Lindell and Skinker campus. Electives applicable to area specialization may include courses offered throughout Washington University. All students are required to submit and defend a research thesis in their area of concentration.

Students without professional certification must complete basic courses in occupational therapy and biological sciences before beginning the graduate core-course sequence. These students must also complete six months of clinical internship in preparation for the national certification examination. These requirements can be fulfilled as part of the Master of Science degree.

Residency requirements are two academic semesters of full-time study. Students without professional certification must complete one summer and two additional academic semesters for residency requirements plus three months of full-time internship.

Persons with a baccalaureate degree, evidence of a strong academic record, and satisfactory Graduate Record Examination scores are encouraged to apply.

Tuition, per semester ........................................... $2,675
Tuition, Summer School, per credit hour ................................... 70
Fee, Department, per semester ........................................... 40
Fee, Department, Summer School ........................................... 30
Administrative fee for scheduling clinical internships for students without professional certification ........................................... 300

For further information, contact the Graduate Program in Occupational Therapy, 4567 Scott Avenue, St. Louis, Missouri, 63110. Phone: (314) 454-2933.
ST. LOUIS INTERINSTITUTIONAL PHYSICIAN'S ASSISTANT PROGRAM

Washington University, in conjunction with St. Louis University and the St. Louis Veterans Administration Hospital, participates in the St. Louis Interinstitutional Physician's Assistant Program administered through St. Louis University School of Allied Health Professions. The A.M.A.-accredited 24-month program consists of three phases: basic sciences, clinical inpatient and outpatient rotations, and a twenty-week community preceptorship. Students are trained to collect historical and physical data and to perform various diagnostic and therapeutic procedures. The goal is to produce individuals capable of assisting the primary care physician and extending the effectiveness of his/her medical practice. For application forms and further information, contact:

Director
Physician's Assistant Program
1504 South Grand Boulevard
St. Louis, Missouri 63104

PEDIATRIC NURSE PRACTITIONER PROGRAM

The School of Medicine through the Department of Pediatrics offers a program for preparing Pediatric Nurse Practitioners in collaboration with the Department of Nursing of Maryville College. In addition to providing certification, the Program provides the opportunity to obtain academic credit through Maryville College toward a baccalaureate degree in nursing.

The Program was developed to help meet the challenge of needed health services in the pediatric community by preparing registered nurses to deliver primary pediatric health care.

The Pediatric Nurse Practitioner (PNP) is a registered nurse whose special training enables her to play a larger role in pediatric health care. She obtains histories, performs physical examinations, and appraises physical, psychological, and intellectual growth and development. The pediatric nurse practitioner is competent to counsel families in matters concerning nutrition, accident prevention, and child-rearing. With the physician, she participates in the management of acute and chronic illnesses.

The Program curriculum covers a nine-month period divided into a sixteen-week didactic portion followed by a seventeen-week practicum. The practicum may be obtained through the facilities of the program or, by special arrangement, at the site of future employment for those nurses who are sponsored by an employer or agency guaranteeing an appropriate position upon the completion of the Program.

Supervised clinical practice is scheduled in a variety of settings, including public health clinics, neighborhood health centers, and private pediatricians' offices. Instruction is shared by medical and nursing faculties of Washington University and Maryville College.

Applicants must be registered nurses with at least one year of nursing experience, preferably in pediatric nursing or public health nursing. On completion of the Program, the PNP is qualified to serve wherever pediatric services are needed. The Program has been accredited by the American Nurses Association, and complies with the guidelines for such programs as proposed by the American Academy of Pediatrics and the American Nurses Association.

Program Tuition ........................................ $2,850
PROGRAMS IN RADIOLOGIC TECHNOLOGY

The Department of Radiology, which has its headquarters in the Edward Mallinckrodt Institute of Radiology, offers a basic course in X-ray technology and two one-year postgraduate courses. Each course leads to a certificate awarded by the Washington University School of Medicine, Department of Radiology.

X-ray Technology

This two-year program is approved by the American Society of Radiologic Technologists, the American College of Radiology, the Joint Review Committee on Education in Radiologic Technology, the Council on Medical Education of the American Medical Association, and the Veterans Administration. It includes the following courses: radiation protection, professional ethics, anatomy and physiology, nursing procedures, radiation physics, medical terminology, survey of medical and surgical diseases, radiographic positioning, darkroom processing procedures, radiation therapy, radiation biology, nuclear medicine, special procedure radiography, room design and selection of equipment, and introduction to business administration and personnel management. Course work totals approximately 600 hours.

During the first six months, a student is on probation. Upon satisfactory completion of this work, he will be paid a monthly stipend of $50 for the next six months. This stipend increases to $75 for the third six months and $100 for the last six months. During the twenty-four months, the student is assigned tours of duty in various diagnostic and therapeutic areas for practical experience, amounting to a total of 30 contact hours a week.

Candidates for admission must be graduates of an accredited secondary school and should rank in the upper third of their class. Special consideration is given to graduates of schools of nursing that are recognized by the State Board of Nurse Examiners and to students who have passed a college entrance examination. A one-year postgraduate course is offered in the fields of therapy and nuclear medicine.

Nuclear Medicine Technology

This course covers twelve consecutive months, divided between didactic course material (225 hours) and practical experience. Persons admitted into the nuclear medicine technology program shall have completed high school, or its equivalent, and have completed post-secondary courses in the following areas: anatomy and physiology, basic physics, basic mathematics, medical terminology, oral and written communications, general chemistry, psychology and sociology, medical ethics, and jurisprudence.

Qualified medical technologists [MT (ASCP) or eligible], radiographers [RT (R) (ARRT) or eligible], and registered nurses [RN], are presumed to have the necessary credentials to meet the entrance requirements.

Graduate Course in Radiation Therapy Technology

The Division of Radiation Oncology offers a twelve-month postgraduate course in radiation therapy technology. This course consists of 260 hours of didactic material plus extensive practical experience and training in the clinical application and dosimetry procedures of radiation therapy. Approximately 1,400 new patients are treated each year. The equipment includes a 35 MV linear accelerator, a Clinac 20 linear accelerator, a 4 MV linear accelerator, a cobalt unit, a superficial ortho-voltage machine, and two simulators. Students obtain experience on each of the therapy machines as well as in the dosimetry and treatment planning area and in nursing procedures. Two on-site computers are used for dosimetry and treatment planning computations. The students rotate through the physics and treatment planning service in addition to attending practical demonstrations.
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THE MEDICAL CENTER

The Washington University Medical Center comprises six institutions. They are: Barnard Free Skin and Cancer Hospital, Barnes Hospital, Central Institute for the Deaf, Jewish Hospital of St. Louis, St. Louis Children's Hospital, and the Washington University School of Medicine.

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The faculty Council consists of all full-time members of the faculty with the rank of professor, associate professor, assistant professor, and those instructors who have been on the faculty for at least three years. The officers and executive committee are:

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'The Dean is ex officio a member of all standing committees.

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Honorary member.

Representing the Faculty Council during 1980-81.
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Institute of Neurology
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Animal Care
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Register of Students

DOCTOR OF MEDICINE

Graduating Class—
June 29, 1979
Residency 1979-80

McKenzie, Douglas Bruce, B.S.,
Stanford University, '72—St. Mary's
Hospital, Long Beach, California

Graduating Class—
May 16, 1980
Residency 1980-81

Adams, Ava Marie, B.S., Loyola
University, '75—Not taking a
residency in 1980-81
Adler, Steven Jay, B.A., Swarthmore
College, '76—Washington University
Affiliated Hospitals, St. Louis, Missouri
Aeber, Mark Irwin, B.S., Bucknell
University, '76; M.S., '77—
University Hospitals of Cleveland,
Cleveland, Ohio
Akright, Bruce Donald, B.S.,
Southern Methodist University, '75—
San Antonio Teaching Hospital,
San Antonio, Texas
Akright, Laura Elizabeth, B.S.,
Southern Methodist University, '76—
San Antonio Teaching Hospital,
San Antonio, Texas
Albi, Joyce Adelle, B.A., Colorado
College, '76—Case Western Reserve
University Hospital, Cleveland, Ohio
Allen, Gregory James, B.S.E.E.,
Massachusetts Institute of
Technology, '76—University of
California Affiliated Hospital,
Irvine, California
Aronson, Thomas Alan, B.A.,
Amherst College, '76—Jewish
Hospital, St. Louis, Missouri
Auer, Roy Raymond, Jr., B.S.E.E.,
Washington University, '76—
Presbyterian-St. Luke's Hospital,
Chicago, Illinois
Bader, Teddy Fritz, B.S.,
Bethany Nazarene College, '76—
Riverside General Hospital,
Riverside, California

Bell, Patricia Evelyn, B.A., Emory
University, '76—Medical College of
Virginia, Richmond, Virginia
Bevan, Herbert Everett, III, B.A.,
University of Kansas, '76—United
States Naval Medical Center,
San Diego, California
Blair, Harry Colbert, A.B.,
Washington University, '76—
University of Miami Affiliated
Hospitals, Miami, Florida
Bodner, Matthew Scott, A.B.,
Washington University, '75—
University of Alabama Medical
Center, Birmingham, Alabama
Brooks, Rodney Wayne, B.S.,
Stanford University, '76—Cleveland
Metropolitan General Hospital,
Cleveland, Ohio
Burroughs, Kim D., B.A., University
of Colorado, '75—Tucson Hospitals,
Tucson, Arizona
Butler, John Cecil, B.S., University
of Notre Dame, '76—Michael Reese
Hospital, Chicago, Illinois
Calvin, Steven Earl, B.A.,
Bethel College, '76—University of
Minnesota Hospitals, Minneapolis, Minnesota
Caras, Marie Alexandra, A.B.,
Washington University, '76—Barnes
Hospital, St. Louis, Missouri
Chapin, David Dunbar, A.B.,
Harvard University, '73—University
of Texas Southwestern Medical
School Affiliated Hospitals,
Dallas, Texas
Choy, Michael, B.S., University of
California at Davis, '76—University
of Michigan Affiliated Hospitals,
Ann Arbor, Michigan
Clifton, Devoree Ann, B.S., Regis
College, '75—Barnes Hospital,
St. Louis, Missouri
Cooper, Robert Alan, A.B.,
Washington University, '76—
University Hospital,
San Diego, California
Cox, Jefferson Dec., A.B., University
of Oregon, '70—Baylor University
Medical Center, Dallas, Texas
Cutter, John Robert, A.B.,
Washington University, '74—New
York Hospital, New York, New York
Devito, Dennis Peter, B.S., Duke
University, '76—Duke University
Medical Center, Durham,
North Carolina

Caras, Marie Alexandra, A.B.,
Washington University, '76—Barnes
Hospital, St. Louis, Missouri
Chapin, David Dunbar, A.B.,
Harvard University, '73—University
of Texas Southwestern Medical
School Affiliated Hospitals,
Dallas, Texas
Choy, Michael, B.S., University of
California at Davis, '76—University
of Michigan Affiliated Hospitals,
Ann Arbor, Michigan
Clifton, Devoree Ann, B.S., Regis
College, '75—Barnes Hospital,
St. Louis, Missouri
Cooper, Robert Alan, A.B.,
Washington University, '76—
University Hospital,
San Diego, California
Cox, Jefferson Dec., A.B., University
of Oregon, '70—Baylor University
Medical Center, Dallas, Texas
Cutter, John Robert, A.B.,
Washington University, '74—New
York Hospital, New York, New York
Devito, Dennis Peter, B.S., Duke
University, '76—Duke University
Medical Center, Durham,
North Carolina

Dine, University,
St. Louis, Missouri
Brook, University,
Memphis, Tennessee
Dyer, University,
California
Edelson, University,
Los Angeles, California
Engel, University,
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Nashville, Tennessee
Ferry, University,
Chicago, Illinois
Finkel, University,
Northwestern University,
Chicago, Illinois
Fleshman, University,
Washington, D.C.
Fried, University,
Washington, D.C.
Frye, University,
San Francisco, California
Gardner, Vance Oliver, B.S., University of Southern California, ’75—University of California Affiliated Hospitals, Irvine, California

Gerstenberger, Patrick Dean, A.B., University of California at Berkeley, ’76—University of New Mexico Affiliated Hospitals, Albuquerque, New Mexico

Goebel, Joel Alan, B.S., University of Notre Dame, ’76—University of Utah Medical Center, Salt Lake City, Utah

Jahraus, Joel Patrick, B.A., University of North Dakota, ’76—University of Utah Medical Center, Salt Lake City, Utah

Kappelman, Michael Porter, B.A., University of Utah Medical Center, Salt Lake City, Utah

Kilzer, Paul Bernard, B.S., University of Utah Medical Center, Salt Lake City, Utah

King, Bernard Francis, B.S., University of Utah Medical Center, Salt Lake City, Utah

Knoll, Sandra Aiko, B.S., University of Utah Medical Center, Salt Lake City, Utah

Kono, Donna Aiko, B.S., University of California at Davis, ’76—Washington University Affiliated Hospitals, St. Louis, Missouri

Konwiser, Mark B.S., Columbia University, ’76; M.S., University of Michigan, ’76—Michael Reese Hospital, Chicago, Illinois

Kowaleski, Kevin Robert, B.A., St. Louis University, ’76—St. Louis Children’s Hospital, St. Louis, Missouri

Kramer, Jeffrey Bruce, B.A., Haverford College, ’76—Washington University Affiliated Hospitals, St. Louis, Missouri

Ibsen, Mark Stephen, Williams College—University of Utah Affiliated Hospitals, Salt Lake City, Utah
Kuwata, John Hiroshi, B.S.,
University of California at Irvine, '76; B.A., '76—University of California at Los Angeles Medical Center, Torrance, California

Laakman, Robert William, B.S.,
Indiana University, '76—Washington University Affiliated Hospitals, St. Louis, Missouri

Lacy, Steven Talbot, B.A., Oberlin College, '76—Cambridge Hospital, Cambridge, Massachusetts

Lage, Janice Marie, B.S., California State University at Fresno, '73—Stanford University Hospital, Stanford, California

Laux, Brian Edward, B.A.,
University of Delaware, '74; B.S., '74—Strong Memorial Hospital, Rochester, New York

Levine, Vicki Joy, B.S.,
State University of New York at Albany, '76—Montefiore Hospital Center, New York, New York

Levite, Howard Allan, B.A., Yale University, '76—University of Chicago Clinics, Chicago, Illinois

Lewis, Karen, B.A., Brigham Young University, '75—Good Samaritan Hospital, Phoenix, Arizona

Li, Ellen, B.S., Stanford University, '74—Massachusetts General Hospital, Boston, Massachusetts

Lichtman, Jeff William, A.B.,
Bowdoin College, '73—Harvard University School of Medicine, Research Fellow in Neurobiology, Boston, Massachusetts

Littman, Dan Rudolf, A.B.,
Princeton University, '74—Presbyterian Hospital, New York, New York

Loder, Randall Thomas, B.A.,
University of Colorado, '76—Medical College of Ohio Affiliated Hospitals, Toledo, Ohio

Loeb, Thomas Wolf, B.A.,
Northwestern University, '76—New York University Medical Center, New York, New York

Lovejoy, Bette Anne, B.S.,
Tufts University, '75—Dartmouth-Hitchcock Center, Hanover, New Hampshire

Ludvigsen, Carl William, Jr., B.A.,
University of Colorado at Boulder, '74—University of Minnesota Hospitals, Minneapolis, Minnesota

Mandelbaum, Bert Roland, B.S.,
State University of New York at Cortland, '75—Johns Hopkins Hospital, Baltimore, Maryland

Mark, Steven David, B.S.,
Massachusetts Institute of Technology, '74—Stanford University Hospital, Stanford, California

McGee, Steven Roy, B.S., Oregon State University, '75—University of Washington Affiliated Hospitals, Seattle, Washington

McKinney, Thomas Casey, Jr., B.A.,
Illinois Wesleyan University, '76—St. Louis Children's Hospital, St. Louis, Missouri

Meuleman, John Robert, University of Notre Dame—William Shands Hospital, Gainesville, Florida

Miller, Randall Lee, B.A.,
Dartmouth College, '76—University of Texas Southwestern Medical School Affiliated Hospitals, Dallas, Texas

Morgan, William Stephen, A.B.,
Washington University, '76—Children's Hospital, Los Angeles, California

Morris, Robert Charles, B.S.,
University of Notre Dame, '76—Loyola University Affiliated Hospitals, Maywood, Illinois

Mutch, David Gardner, Carleton College—Barnes Hospital, St. Louis, Missouri

Nachbar, James Milton, B.A.,
University of Chicago, '76—University of Arizona Medical Center, Tucson, Arizona

Nash, Darryl Harrington, B.A., Yale University, '76—Barnes Hospital, St. Louis, Missouri

Neely, Claire Suzanne, B.S.,
University of Illinois, '76—University of Illinois Hospitals, Chicago, Illinois

Nickol, Thomas Edward, B.A.,
Carroll College, '76—University of Utah Affiliated Hospitals, Salt Lake City, Utah

Norman, Fred Anthony, B.S.,
St. Mary's College, '70; M.S., University of the Pacific, '72—University of California Affiliated Hospitals, Davis, California

Olson, David Lewis, B.S., Southern Methodist University, '75—Medical College of Wisconsin Affiliated Hospitals, Milwaukee, Wisconsin

Panullo, Wayne Thomas, B.A.,
Johns Hopkins University, '76—Georgetown University Hospital, Washington, D.C.

Pavlovitz, Gwenn Karen, B.A.,
Johns Hopkins University, '76; M.A., '76—Jewish Hospital, St. Louis, Missouri

Perlmutter, Steven Barry, A.B.,
Sarah Lawrence College, '76—St. John's Mercy Hospital, St. Louis, Missouri

Phillips, Daniel, B.S., Northwestern University, '76—Baylor College Affiliated Hospitals, Houston, Texas
Poindexter, James Milton, Jr., B.A., Northwestern University, '75—Charity Hospital, Louisiana State University Service, New Orleans, Louisiana

Pransky, Seth Marc, B.A., University of Pennsylvania, '76—State University of New York, Upstate Medical Center, Syracuse, New York

Press, Gary Allen, B.A., Yale University, '75—University of California Affiliated Hospitals, Los Angeles, California

Prince, Charles Roderick, B.S., University of Alabama, '75—Baylor College Affiliated Hospitals, Houston, Texas

Quagliarello, Vincent James, B.A., Johns Hopkins University, '76—Yale-New Haven Medical Center, New Haven, Connecticut

Raish, Robert John, A.B., Washington University, '76—University of Iowa Hospitals, Iowa City, Iowa

Rath, Richard, B.A., Yale University, '76—University of California at Los Angeles Medical Center, Torrance, California

Ring, Lisa Brodsky, B.S., Washington University, '76—Barnes Hospital, St. Louis, Missouri

Roberts, Lee Ann Rhudy, B.S., University of North Carolina, '76—Not taking a residency in 1980-81

Rothberg, Robert Keith, B.A., American University, '76—St. John's Mercy Hospital, St. Louis, Missouri

Saint, John Gardner, A.B., Oberlin College, '76—Barnes Hospital, St. Louis, Missouri

Saltman, Robert Jon, B.A., Yale University, '76—Barnes Hospital, St. Louis, Missouri

Saltzer, James Lawrence, B.S., Stanford University, '74—Jewish Hospital, St. Louis, Missouri

Sanofsky, Stephen Jay, B.A., Northwestern University, '75—University of Texas Affiliated Hospitals, Houston, Texas

Schlafly, Bruce Stewart, B.S.E.E., Washington University, '76—University of Texas Affiliated Hospitals, Houston, Texas

Schlafly, Edward Frauenheim, Jr., B.S., Stanford University, '76—Washington University Affiliated Hospitals, St. Louis, Missouri

Schul, Jeffrey Lynn, B.A., University of Kansas, '76—Medical College of Virginia, Richmond, Virginia

Shapiro, Michael Barry, Emory University—Mercy Hospital, San Diego, California

Shayman, James Alan, A.B., Cornell University, '76—Barnes Hospital, St. Louis, Missouri

Siegel, Alan David, B.A., University of Wisconsin, '76—William Shands Hospital, Gainesville, Florida

Smith, Steven Allen, B.S., University of Southern California, '76—Mercy Hospital, San Diego, California

Sommer, Rand Washburn, B.S., Davidson College, '76—Barnes Hospital, St. Louis, Missouri

Sorokin, Rachel Bernice, B.S., Yale University, '76—Hospital of the University of Pennsylvania, Philadelphia, Pennsylvania

Spratt, John Arthur, B.A., University of Colorado, '75; M.S., University of Missouri at Columbia, '76—Duke University Medical Center, Durham, North Carolina

Sparrow, Mark H., B.A., Kansas State University, '76—San Francisco General Hospital, San Francisco, California

Steinman, Howard Kenneth, B.A., Pomona College, '76—University of California Affiliated Hospitals, Irvine, California

Stevens, William Grant, B.S., University of Oregon, '76—University of California at Los Angeles Medical Center, Torrance, California

Tabus-Myers, Maxine Claire, B.A., Washington University, '76—Jewish Hospital, St. Louis, Missouri

Taylor, Ellis Reneau, Jr., B.S., University of Florida, '76—Washington University Affiliated Hospitals, St. Louis, Missouri

Thaler, Fred Joseph, B.A., Wesleyan University, '76—University of Texas Southwestern Medical School Affiliated Hospitals, Dallas, Texas

Thornton, Fergus Paul, B.A., University of California at Santa Barbara, '73—William Shands Hospital, Gainesville, Florida

Tillinghast, Jeffrey Paul, B.S., State University of New York at Albany, '76—Barnes Hospital, St. Louis, Missouri

Walter, Darrell Dennis, South Dakota State University at Brookings—St. Joseph's Hospital, Denver, Colorado

Watts, Ray Lannom, B.S.E., University of Alabama at Birmingham, '76—Massachusetts General Hospital, Boston, Massachusetts

Wheelan, Kevin Robert, University of Texas at Austin—Baylor University Medical Center, Dallas, Texas

Whitehead, Daniel William, Jr., B.S., Drexel University, '75—St. Luke's Hospital, St. Louis, Missouri

Williams, John B.A., St. Louis University, '76—Washington University Affiliated Hospitals, St. Louis, Missouri

Wilson, Cynthia B.S., Pacific Lutheran University, '76—Tacoma Family Medicine, Allenmore Medical Center, Tacoma, Washington

Winters, Kenneth John, B.S., Calvin College, '76—Barnes Hospital, St. Louis, Missouri

Wolff, Andrew Aloysius, B.A., University of Dayton, '76—Barnes Hospital, St. Louis, Missouri
Third-Year Class 1979-80

Alexander, Kimberley, B.A., Pomona College, ‘77—Northridge, California

Anderson, Kurt Morgan, B.A., College of St. Thomas, ‘77—St. Paul, Minnesota


Apple, Bryan Stanley, B.S., Brown University, ‘77—Detroit, Michigan

Armstead, Valerie Elizabeth, B.A., University of Chicago, ‘77—Moorestown, New Jersey

Arnall, Michael Frank, B.A., University of California at La Jolla, ‘77—Redlands, California

Ashton, James Michael, B.S., Michigan State University, ‘77—Glassport, Pennsylvania

Bach, Bruce Allen, B.S., Stanford University, ‘74; A.M., ‘74; Ph.D., Harvard University, ‘79—Lake Forest, Illinois

Bennett, James Fredrick, University of Texas at Austin—Conroe, Texas

Berman, Michele Rhonda, B.A., Johns Hopkins University, ‘77—Commaq, New York

Binder, Ellen Frances, A.B., University of Michigan, ‘77—St. Louis, Missouri

Bolger, Michael Joseph, State University of New York at Binghamton—Binghamton, New York


Brun, Michael Eugene, B.S., University of Notre Dame, ‘77—Leawood, Kansas

Budd, Dianne, B.A., Pitzer College, ‘77—Anaheim, California

Butcher, Jean Elizabeth, B.S., Westminster College, ‘77—Logan, Utah

Camel, Mark Howard, B.A., University of Rochester, ‘77—St. Louis, Missouri

Cheadle, Margaret Jensen, B.A., Denison University, ‘74—St. Louis, Missouri

Cheong, Edmund Hung Kei, B.S., University of Minnesota, ‘74; M.S., University of Southern California, ‘77—Hacienda Heights, California

Christiansen, Neal Paul, B.S., Valparaiso University, ‘77—O’Fallon, Missouri

Cobb, Audrey Denise, A.B., Mount Holyoke College, ‘76—Boston, Massachusetts

Cornella, Jeffrey Lynn, B.S., University of North Dakota, ‘77—Hettinger, North Dakota

Cosgrove, Daniel Scott, A.B., University of California at Los Angeles, ‘77—Brea, California

Danik, Francis John, B.S., University of North Dakota, ‘77—Detroit, Michigan

Davey, William Patrick, B.S., University of Iowa, ‘75—Sioux City, Iowa

Davis, Marjorie Diane, B.S., Cornell University, ‘78—Sioux Falls, South Dakota

Denholm, Todd Andrew, B.A., Miami University, ‘77—Akron, Ohio

De Santola, Joseph Robert, B.A., University of Rochester, ‘77; B.S., ‘77—Millwood, New York

Dial, Lanyard Kirby, B.S., University of California at Irvine, ‘77—Los Angeles, California

Dial, Mary Elizabeth Benson, B.S., University of California at Irvine, ‘77—Canoga Park, California

Duncan-Myers, Darcy Aileen, B.A., Concordia College, ‘77—Port Ludlow, Washington

Duncan-Myers, Jeffrey Leon, B.A., Concordia College, ‘77—Fargo, North Dakota

Dwyer, Jean Mueller, B.S., University of Kansas, ‘68; M.S.W., Washington University, ‘77—St. Louis, Missouri

Eaton, Molly Ellen, B.A., Emory University, ‘77—Paducah, Kentucky

Emery, Waden Everett, B.S., Bethany Nazarene College, ‘77; A.B., ‘77—Oklahoma City, Oklahoma

Engel, Edgar Leo, Jr., B.A., Wabash College, ‘72; Ph.D., University of Tennessee Center for Health Sciences, ‘77—Evansville, Indiana

Frank, Gary David, B.A., Northwestern University, ‘77—Rochester, New York

Furlong, Lesley Anne, B.Sc., McGill University, ‘75; M.S., University of Wisconsin at Madison, ‘77—Dorval, Quebec, Canada

Gantt, Gerald, B.A., Williams College, ‘75—Denver, Colorado

Gee, William Michael, B.A., Cornell College, ‘77—Chesterfield, Missouri

Gelstein, Laurence David, B.S., University of Michigan, ‘77—Orchard Lake, Michigan

George, Samuel Everett, A.B., University of California at Berkeley, ‘76—Menlo Park, California

Glasser, Ralph Brian, B.S., University of Michigan, ‘77—Oak Park, Illinois

Gluckstein, Daniel Peter, B.S., University of Michigan, ‘77—Detroit, Michigan

Glashen, Steven Kent, B.S., University of North Dakota, ‘77—Kokomo, North Dakota

Goldman, Charles David, A.B., Brandeis University, ‘77—Flushing, New York

Golon, Stanley Walter, B.S., Fairfield University, ‘77—New Britain, Connecticut

Grant, William Thomas, A.B., Occidental College, ‘77—Glendora, California

Gray, John F., B.S., University of Nevada, ‘72—Las Vegas, Nevada
Gross, Ernest Rinaldo, Jr., B.A.,
Rutgers University, ’62; B.S., ’63;
A.B., Princeton University, ’66;
Ph.D., ’68—Birmingham, Alabama
Griesski, Alice Ann, B.S., Chestnut
Hill College, ’77—Willow Grove,
Pennsylvania
Grossman, Alan Mark, A.B.,
Stanford University, ’77—Woodland
Hill, California
Gross, Goldie Hannah, B.A.,
University of the Pacific, ’73; M.S.,
San Diego State University, ’76—
Lafayette, California
Hall, Leslie Walter, B.S., Bethany
Nursery, ’77—Blackwell,
Oklahoma
Hamvas, Aaron, B.S., Rensselaer
Polytechnic Institute, ’77—Yankton,
South Dakota
Harris, David Tab, B.A., Whittier
College, ’76—Whittier, California
Heinricke, Jay Walter, B.S., Antioch
College, ’77—St. Louis, Missouri
Herbst, Timothy John, B.S.,
California Institute of Technology,
’76—Phoenix, Arizona
Hindelinger, Alan Lee, B.S.,
University of Illinois, ’77—
Jacksonville, Illinois
Huerta, Christopher Lawrence, B.S.,
Arizona State University, ’77—
Tempe, Arizona
Hubert, Laura Ruth, A.B.,
Washington University, ’76—
St. Louis, Missouri
Hunt, Steven Thomas, B.A.,
University of California at Los
Angeles, ’77—Garden Grove,
California
Jones, Charles Kim, B.S., Oklahoma
State University, ’77—Sallisaw,
Oklahoma
Jones, Rex Franklin, A.B., Stanford
University, ’77—La Canada,
California
Kahn, Janis Claire, A.B.,
Washington University, ’76—
Indianapolis, Indiana
Karp, Jeffrey W., M.S., Medical
College of Virginia, ’71; D.D.S.,
’71—Miami Beach, Florida
Kemp, Michele Elsa, A.B.,
Washington University, ’77—
St. Louis, Missouri
Kleinman, Micki, B.S., Stanford
University, ’77—Palo Alto,
California
Klopf, Fredric Howard, B.A.,
University of Wisconsin, ’77—
Madison, Wisconsin
Kurtzman, Gary Jay, B.S., Stanford
University, ’77—Sherman Oaks,
California
Kusuda, Leo, B.S.E., Johns Hopkins
University, ’77—Bethesda, Maryland
Lacey, Stephen Ward, B.S., Central
Missouri State University, ’76—
Independence, Missouri
Lazarus, Cathy Jane, B.S., University
of Michigan, ’77—Highland Park,
Illinois
Lee, Suzanne YooKyung Ree, A.B.,
Washington University, ’77—
St. Louis, Missouri
Lenardo, Michael Joseph, B.A.,
Johns Hopkins University, ’77—Park
Ridge, Illinois
Leong, Ronald Wing, A.B.,
Washington University, ’76—
University City, Missouri
Levine, David, B.S.E., Stanford
University, ’77—Scarsdale, New York
Loehr, James Paul, B.S., Stanford
University, ’75—San Jose, California
Malek, Steven Joe, B.A., Carroll
College, ’77—Conrad, Montana
Martinez, Mike, B.A., University
of Notre Dame, ’77—Tampa, Florida
Meador, Steven Arthur, B.S.E.,
Duke University, ’77; A.B., ’77—
Kensington, Maryland
Mintun, Mark Arthur, B.S.,
Massachusetts Institute of
Technology, ’77—Topeka, Kansas
Moody, Laura Maria, B.A., Carleton
College, ’77—Chicago, Illinois
Moskal, Joseph Tuvia, B.A.,
State University of New York at
Binghamton, ’77—Brooklyn,
New York
Mosley, Janet Debra, A.B.,
Washington University, ’77—
St. Ann, Missouri
Newell, Anthony Maurice, B.A.,
Lawrence University, ’76—Chicago,
Illinois
Norsoph, Ellis Bradley, A.B.,
Princeton University, ’77—
Philadelphia, Pennsylvania
O’Quinn, Bancroft, Jr., A.B.,
Princeton University, ’76—Chicago,
Illinois
Organ, Brian Christopher, B.A.,
Southern Methodist University, ’77—
Omaha, Nebraska
Ouzounian, Tye Jerome, B.S.,
University of California at Los
Angeles, ’77—Los Angeles,
California
Paine, Robert III, B.A., Amherst
College, ’73; B.Phil., Oxford
University, ’75—St. Louis, Missouri
Paraskevas, James George, B.A.,
University of Notre Dame, ’77—
Linden, New Jersey
Peairs, Carol W ald, A.B.,
Washington University, ’76—
St. Louis, Missouri
Pesicka, Gary Allen, B.S., University
of South Dakota, ’77—Mitchell,
South Dakota
Phillips, Raymond Wayne, A.B.,
Princeton University, ’77—Fords, Arizona
Piro, Lawrence Dominick, B.A.,
University of California at San
Diego, ’77—San Diego, California
Pogwizd, Steven Michael, B.A.,
University of Chicago, ’77—Chicago,
Illinois
Porter, Ross William, B.S.,
University of Oregon, ’77—Salem,
Oregon
Ray, John Doran, Jr., B.S., Milligan
College, ’77—Louisville, Kentucky
Rediker, Donald Ellis, B.S.,
Massachusetts Institute of
Technology, ’77—Stoneham,
Massachusetts
Reeder, Ralph Frederick, Jr., B.S.,
University of Illinois, ’77—Granite
City, Illinois
Rudloff, Martin Derwin, B.A.,
Central Methodist College, ’77—
Crystal City, Missouri
Ryon, Judith Jones, B.A., State
University of New York at Albany,
’72—Albany, New York
Sadovskv, Henry F., B.S., University
of Illinois, ’77—Skokie, Illinois
Saltz, Robert Mark, B.A.,
Washington University, ’77—
St. Louis, Missouri
Schwob, Valerie Sue Hensley, B.S.,
University of Iowa, ’75—St. Louis,
Missouri
Secosan, Craig John, B.A., Emory
University, ’77—Cincinnati, Ohio
Semenkovich, Clay Farmer, B.A.,
University of Virginia, ’77—
Roanoke, Virginia
Semenkovich, Janice Wann, B.S.,
Yale University, ’77—St. Louis,
Missouri
Silverstein, Barry Owen, A.B., Cornell University, '76—East Brunswick, New Jersey
Spiegel, David Morris, A.B., Washington University, '77—Columbus, Georgia
Staros, Eric Bruce, B.A., University of Pennsylvania, '77—Melville, New York
Steinmetz, Samuel Edwin, A.B., Eastern Illinois University, '77—Charleston, Illinois
Stewart, William Thomas, B.S., Brigham Young University, '77—Las Vegas, Nevada
Stone, Arvey Max, B.S., University of Illinois, '77—Olympia Fields, Illinois
Tannenbaum, Myron, B.S., Tulane University, '77—Great Neck, New York
Tape, Thomas Gerald, B.A., Dartmouth College, '77—Bethesda, Maryland
Thompson, David Earl, Mississippi State University—Jackson, Mississippi
Tillman, Barry Forrest, B.A., Vanderbilt University, '77—Natchez, Mississippi
Turkula, Louise Diane, B.S., University of North Dakota, '77—Duluth, North Dakota
Von Essen, Susanna Gertrude, A.B., University of Nebraska, '76—Pender, Nebraska
Wahl, Naomi Lyn, B.S., University of North Dakota, '77—Dickinson, North Dakota
Watson, Douglas Cutter, B.A., St. Louis University, '77—St. Louis, Missouri
Willett, Rita Mary, A.B., Oberlin College, '77—Omaha, Nebraska
Williams, Michael Jon, B.A., Augustana College, '77—Bismarck, North Dakota
Winston, Jeffrey Victor, B.S.E.E., Washington University, '77—St. Louis, Missouri
Wisneski, John Thomas, Jr., B.A., Johns Hopkins University, '77—Prospect, Connecticut
Wright, Delbert Lee, B.S., Utah State University, '77—Danville, California
Yue, Genevieve Man-Yee, B.A., Carleton College, '70; Ph.D., State University of New York at Stony Brook, '76—St. Louis, Missouri

Second-Year Class 1979-80
Afflano, Paul Anthony, A.B., Harvard University, '78—Chesterfield, Missouri
Ashworth, William Dean, Jr., B.A., University of Utah, '77—Salt Lake City, Utah
Barnett, Robert Eugene, B.S., Washburn University, '78—Wakarusa, Kansas
Becker, Steven George, B.S., Brown University, '78—Hazel Park, Michigan
Beeson, Debra Ann, B.A., Denison University, '78—Brookfield, Illinois
Benson, Robert Granger, III, B.A., University of Kansas, '78—Topeka, Kansas
Bermudez, Joseph Anthony, B.A., Washington University, '78—St. Louis, Missouri
Black, William Howard, B.A., Washburn University, '77—Lawrence, Kansas
Blackett, Melrose Ingle, B.A., Brown University, '78—Charles town, Nevis, West Indies
Block, Joel Arthur, B.A., University of Chicago, '78—Wilmette, Illinois
Brown, Yolette Vancy, B.S., The City College of City University of New York, '76—New York, New York
Brownridge, Seth Jonathan, A.B., Washington University, '78—Centreville, Illinois
Burton, James Edward, III, B.A., University of Rochester, '77—Arlington, Massachusetts
Carr, Kenneson, B.S., Georgia Institute of Technology, '78—Conyers, Georgia
Chang, Akemi Chu-Shih, B.S., Stanford University, '78—Los Angeles, California
Chao, Ann Tien-Ling, B.S., Stanford University, '78—Anchorage, Alaska
Cook, Denise, A.B., Occidental College, '78—St. Louis, Missouri
Corrigan, Lawrence Edward, B.A., Case Western Reserve University, '75—New York, New York
Cosulich, William Francis, Jr., B.S.E., University of Pennsylvania, '78—Syosset, New York
Couch, Michael Wayne, B.S., Massachusetts Institute of Technology, '78—Willow Grove, Pennsylvania
Craig, Harry Randall, A.B., Grinnell College, '78—Phoenix, Arizona
Curry, Raymond Howard, A.B., University of Kentucky, '77—Lexington, Kentucky
Daily, Bill Bates, Jr., B.A., Northwestern University, '78—Midland, Michigan
Dannenberg, Andrew Jess, B.S., Tufts University, '78—Great Neck, New York
Donzis, Paul Bennett, A.B., Princeton University, '78—Beverly Hills, California
Duncan, Eric DeWitt, B.A., Illinois Wesleyan University, '78—Polo, Illinois
Dunkin, Pamela Ann, A.B., Indiana University, '78—Glenview, Illinois
Eby, Patricia Lynn, B.S., Georgetown University, '78—Gordonville, Pennsylvania
Hutchison, William G., B.A., University of Dayton, ‘78—Kettering, Ohio
Jiminez, Jose Francisco, B.A., Johns Hopkins University, ‘78—Baltimore, Maryland
Kamson, Solomon, B.S., University of Michigan, ‘78—Ann Arbor, Michigan
Kerley, Suzanne Michelle, B.S., Stanford University, ‘78—St. Louis, Missouri
Kiessling, Lou Ann, B.S., University of Michigan, ‘78—Jackson, Michigan
Killion, Douglas Joseph, B.S., University of Maryland, ‘78—Vienna, Virginia
Kraus, David Jonathan, B.S., Yale University, ‘78—Larchmont, New York
Kuhlenegel, Keith Ralph, B.S., Bradley University, ‘78—Trenton, Illinois
Lew, Brian Thomas, California Institute of Technology—Monterey Park, California
Lewis, John Malin, B.A., Brigham Young University, ‘78—Wilmette, Illinois
Lieb, Nancy Susan, B.S., Washington University, ‘78—Joliet, Illinois
Loor, Christopher Morton, B.S., Texas A & M University, ‘78—College Station, Texas
Manary, Mark John, B.S., Massachusetts Institute of Technology, ‘77—Midland, Michigan
Marn, Charles Stephen, B.A., Hiram College, ‘78—Conneaut, Ohio
McCluskey, Edward Robert, B.S., Stanford University, ‘75—Palo Alto, California
McLean, Mary Susan, A.B., Washington University, ‘75—Munster, Indiana
Mealman, Terence Lee, B.S., Stanford University, ‘78—Kansas City, Missouri
Meehan, Patrick John, B.A., University of California at Santa Cruz, ‘78—Tustin, California
Merlo, Clifford Joseph, B.S., University of Michigan, ‘77—Troy, Michigan
Mermel, Gary Warren, B.A., Oberlin College, ‘78—Skokie, Illinois
Michelson, Edward Allen, B.S., Massachusetts Institute of Technology, ‘78—Randelstown, Maryland
Mink, Richard Bruce, B.A., Franklin and Marshall College, ‘78—Flourtown, Pennsylvania
Morrison, Beverly Anne, B.A., Webster College, ‘76—St. Louis, Missouri
Murphy, Mary Anne, B.A., Illinois Wesleyan University, ‘78—Pontiac, Illinois
Neihart, Robert Earl, B.A., Baker University, ‘78—Kansas City, Missouri
Neimeyer, John Hart, B.S., University of Michigan, ‘78—Cuyahoga Falls, Ohio
Olsen, Mary Louise, B.S., University of Illinois, ‘78—Champaign, Illinois
Olson, Linda Marian, B.S., Washington State University, ‘76—Tacoma, Washington
Organ, Paul Gerard, A.B., Harvard University, ‘78—Omaha, Nebraska
Pace, Denise Karin, A.B., University of California at Berkeley, ‘76—Oakland, California
Pan, Golden, B.S., Rice University, ‘78—Dallas, Texas
Park, James Vance, B.S., University of Colorado, ‘78—Lodi, Wisconsin
Parker, Charles S., University of Oregon—Eugene, Oregon
Peters, Walter Russell, Jr., B.S., Western Illinois University, ‘78—Macomb, Illinois
Plotke, Gary Steven, B.S., Tulane University, ‘78—St. Paul, Minnesota
Pollei, Steven Ray, B.A., Luther College, ‘78—Fon du Lac, Wisconsin
Randolph, Lilly, B.S., South Carolina State College, ’78—Hopkins, South Carolina
Ray, Daniel William, B.S., Vanderbilt University, ’78—Nashville, Tennessee
Reed, Fred D., B.S., Arizona State University, ’78—Mesa, Arizona
Ronish, Ross Henry, Carroll College—Denton, Montana
Rosenbaum, Peter Jon, University of Minnesota—Milwaukee, Wisconsin
Rubin, Jeremy Bennett, B.S., Stanford University, ’78—Beverly Hills, California
Sanlmann, John Bryant, B.A., Johns Hopkins University, ’77—Babylon, New York
Satchell, Cynthia Vale, B.S., University of California at Davis, ’78—Carmel, California
Segal, Paul Miles, B.S., University of Pennsylvania, ’78—Livingston, New Jersey
Shaw, Frederick Carl, B.A., Gustavus Adolphus College, ’77—Clarkdale, Mississippi
Sherman, John Emery, B.A., St. Olaf College, ’78—LaCrosse, Wisconsin
Sherman, Stuart, B.A., State University of New York at Binghamton, ’77—Douglasston, New York
Simpson, Ross Wyatt, B.S., University of Illinois at Urbana, ’78—Woodstock, Illinois
Stein, Jeffrey Stephen, B.S., Massachusetts Institute of Technology, ’78—Whitestone, New York
Szeto, Albert Kwok Choy, B.S.E., Princeton University, ’78—Hong Kong
Tarlow, David Michael, B.S., University of Massachusetts, ’73; Ph.D., Johns Hopkins University, ’76—Revere, Massachusetts
Taylor, Lynne Patricia, A.B., University of Illinois, ’74—St. Louis, Missouri
Tesi, Raymond Joseph, II, B.S., Utah State University, ’77—Belle Vernon, Pennsylvania
Thomasson, Jeffrey Lee, B.A., St. Louis University, ’78—St. Louis, Missouri
Thompson, Van Eric, B.S., Washington University, ’78—Ridgefield, Connecticut
Thomquist, Robert Keith, Stanford University—Saratoga, California
Tung, Glenn Albert, B.A., Yale University, ’78—Olivet, Missouri
Walker, Janet Margaret, B.S., Ohio State University, ’78—Mount View, California
Wanderman, Mark Joseph, B.A., State University of New York at Binghamton, ’77—Lawrence, New York
Weiner, Marc Alan, B.S., Massachusetts Institute of Technology, ’78—DeWitt, New York
Willey, Dennis Ray, B.S., Emporia Kansas State College, ’77—Emporia, Kansas
Word, Bonnie Marie, B.S., Chestnut Hill College, ’78—Willingboro, New Jersey
Yeung, Horatio Him-Tai, B.S., University of Wisconsin, ’78—Cerritos, California
Young, Rolly Steven, A.B., Washington University, ’78—Oklahoma City, Oklahoma

First-Year Class 1979-80
April, Brian Scott, B.A., Whittier College, ’79—Morton Grove, Illinois
Austin, Mark Bickford, B.S., University of Michigan at Ann Arbor, ’78—St. Louis, Missouri
Baisch, Tim Joseph, B.S., University of Wisconsin at Madison, ’79—Kaukauna, Wisconsin
Ballin, Daniel Spencer, B.S., Brown University, ’78—Stamford, Connecticut
Benedict, Robert Edwin, B.A., Augustana College, ’79—St. Charles, Minnesota
Blatt, Mitchel Evan, B.Mus.A., University of Michigan at Ann Arbor, ’79—Camp Springs, Maryland
Blum, Julia Elizabeth, B.S., University of Pittsburgh, ’79—Curwensville, Pennsylvania
Blumenthal, David Evan, B.A., Brown University, ’79—Fayetteville, New York
Bonner, Michael Wayne, B.A., Dillard University, ’78—Houston, Texas
Brammer, Ellen Ann, B.A., Olivet Nazarene College, ’79—Burrfdttston, Pennsylvania
Brand, John Schindler, B.A., University of Wisconsin at Madison, ’79—Monroe, Wisconsin
Brown, Robert John, B.S., Saint Peter’s College, ’77—Jersey City, New Jersey
Carpenter, David Adams, B.A., Amherst College, ’79—Canandaigua, New York
Cheilmsky, Thomas Charles, A.B., Harvard University, ’79—Fairfax, Virginia
Chung, Mina Kay, B.A., University of California at San Diego, ’79—Monterey Park, California
Clanahan, James John, B.S., University of Illinois at Urbana, ’79—Herrin, Illinois
Cohen, Alan Mathew, B.S., University of Illinois at Urbana, ’74; Ph.D., University of Virginia, ’69—Baltimore, Maryland
Cohen, Mark Allen, A.B., Washington University, ’79—Chicago, Illinois
Collins, Gregory B., University of California at Santa Barbara, ’75—Bonita, California
Corteville, Jane Elizabeth, B.S., Michigan State University, ’79—Grosse Pointe Woods, Michigan

Second-Year Class 1979-80
<table>
<thead>
<tr>
<th>Name</th>
<th>Degree</th>
<th>Institution</th>
<th>Location</th>
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<tr>
<td>Courtney, Ronald Stanley, B.S.</td>
<td></td>
<td>University of Detroit, '78—Mt. Clemens, Michigan</td>
<td></td>
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<tr>
<td>Cox, Jamie Mae, B.A.</td>
<td></td>
<td>Ohio Nazarene College, '79—Clermontville, Indiana</td>
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<td>Crowe, Paul James, Carleton College—Minneapolis, Minnesota</td>
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<td>Davis, Andrew George, A.B.</td>
<td></td>
<td>Brandeis University, '79—Chevy Chase, Maryland</td>
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<td>Detjen, Paul Kinley, B.A.</td>
<td></td>
<td>Williams College, '79—St. Louis, Missouri</td>
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<td>Dewitt, Steven Keith, B.S.</td>
<td></td>
<td>University of Hawaii at Manoa, '79—Honolulu, Hawaii</td>
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<tr>
<td>Dexter, Sara Kathleen, A.B.</td>
<td></td>
<td>Bryn Mawr College, '79—Clayton, California</td>
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<td>Dunagan, William Claiborne, B.S.</td>
<td></td>
<td>University of Texas at Austin, '78—Melbourn, Texas</td>
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<td>Egerl, Bryn George, George</td>
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<td>Washington University—West Deal, New Jersey</td>
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<tr>
<td>England, James Morris, A.B.</td>
<td></td>
<td>Lafayette College, '64; Ph.D., Washington University, '70—Upper Darby, Pennsylvania</td>
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<td>Epstein, David Marc, A.B.</td>
<td></td>
<td>Columbia University, '79—Wilmington, Delaware</td>
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<td>Etlinger, Neil Allan, B.S.</td>
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<td>Vanderbilt University, '79—Miami, Florida</td>
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<tr>
<td>Farber, Sharon Nancy, A.B.</td>
<td></td>
<td>University of California at Santa Cruz, '74; B.A., California State College at Sonoma, '78—San Francisco, California</td>
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<td>Feingold, Anat Rachel, A.B.</td>
<td></td>
<td>Dartmouth College, '79—Pittsburgh, Pennsylvania</td>
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<td>Fein, Steven Aaron, B.A.</td>
<td></td>
<td>La Salle College, '79—Philadelphia, Pennsylvania</td>
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<td>Fichter, Elizabeth Ann, B.A.</td>
<td></td>
<td>Northwestern University, '79—Elk Grove, Illinois</td>
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<td>Fiedler, Brian S., B.S.</td>
<td></td>
<td>University of Wisconsin at Madison, '79—Mt. Horeb, Wisconsin</td>
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<td>Fillmore, Karl Max, B.A.</td>
<td></td>
<td>University of Kansas at Lawrence, '79—Osage City, Kansas</td>
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<td>Frank, Mark Steven, A.B.</td>
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<td>Transylvania University, '79—Somerset, Kentucky</td>
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<td>Frank, Thomas Seymour, B.A.</td>
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<td>Northwestern University, '79—Clayton, Missouri</td>
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<td>Fry, Edward T. A., A.B.</td>
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<td>Grinnell College, '79—Oak Ridge, Tennessee</td>
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<td>Fulwiler, Carl Edward, B.A.</td>
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<td>Hofstra University, '78—Mt. Laurel, New Jersey</td>
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<td>Grotten, Dawn Marie, B.S.</td>
<td></td>
<td>University of California at Davis, '78—Campbell, California</td>
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<td>Hall, Jonathan Daniel, B.A.</td>
<td></td>
<td>Miami University, '79—Perrysburg, Ohio</td>
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<tr>
<td>Hamm, John Richard, B.A., Stevens Institute of Technology, '71; Ph.D., State University of New York at Stony Brook, '78—Bronx, New York</td>
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<td>Hanko, Rodger Alan, B.A.</td>
<td></td>
<td>University of Colorado at Boulder, '79—Colorado Springs, Colorado</td>
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<td>Hansen, Keith Allen, B.S., Carroll College, '79—Wall, South Dakota</td>
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<td>Harsch, John Arthur, B.S.</td>
<td></td>
<td>University of North Carolina at Chapel Hill, '78—Atlanta, Georgia</td>
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<td>Hartoch, Richard Stephen, B.A.</td>
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<td>Rutgers University, '79—Teaneck, New Jersey</td>
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<td>Haskel, Ethan Jay, B.S.</td>
<td></td>
<td>Brown University, '79—Huntington, New York</td>
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<td>Hills, John Foster, Jr., B.A.</td>
<td></td>
<td>Macalester College, '75; M.S., University of Colorado at Boulder, '78—Littleton, Colorado</td>
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<td>Horstman, William Glynn, B.S.</td>
<td></td>
<td>University of South Dakota at Vermillion, '79—Parkston, South Dakota</td>
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<td>Horwitz, Kenneth Bruce, A.B.</td>
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<td>Dartmouth College, '79—Bethesda, Maryland</td>
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<td>Hubbard, Thomas Joseph, B.S.</td>
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<td>University of Notre Dame, '79—Decatur, Illinois</td>
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<td>Iqbal, Vaseem, University of Michigan at Ann Arbor—London, England</td>
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<td>Jacobs, Daryl Larkin, B.S.</td>
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<td>Washington University, '77; M.S., Carnegie-Mellon University, '79—Broadview Heights, Ohio</td>
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<td>James, Stephen Mark, B.S.</td>
<td></td>
<td>University of Massachusetts at Amherst, '79—Scott Air Force Base, Illinois</td>
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<td>Jantz, Jonathan Willard, B.A.</td>
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<td>Bethel College, '79—Bellevue, Kansas</td>
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<td>Jenkins, Deborah Elaine, A.B.</td>
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<td>Mount Holyoke College, '79—Tulsa, Oklahoma</td>
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<td>Johnson, Jerry Avila, A.B.</td>
<td></td>
<td>University of Michigan at Ann Arbor, '78—Encorae, Michigan</td>
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<td>Johnsrud, Lorraine Alice, B.A.</td>
<td></td>
<td>Carleton College, '74; Ph.D., Harvard University, '78—Albert Lea, Minnesota</td>
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<td>Jones, Robin Doreen, B.A.</td>
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<td>Rutgers University, '79—East Orange, New Jersey</td>
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<td>Kellis, Dana Sterling, B.S.</td>
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<td>Brigham Young University, '79—Glendale, Arizona</td>
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<td>Kramer, Robert Scott, A.B.</td>
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<td>Harvard University, '79—Creve Coeur, Missouri</td>
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<td>Krieg, Arthur Mertz, B.S.</td>
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<td>Haverford College, '79—Hershey, Pennsylvania</td>
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<td>Laitman, Robert Steven, B.A.</td>
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<td>Northwestern University, '79—Wanamassa, New Jersey</td>
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<td>Name</td>
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<td>Washington University</td>
<td>Yreka, California</td>
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<td>Lewis, Jeanne Dahlmen</td>
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<td>Lafayette, Colorado</td>
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<td>Link, Robert Nathan</td>
<td>Butler University</td>
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<td>University of Southern California at Los Angeles</td>
<td>Monterey Park, California</td>
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<td>Luecke, Gail Anne</td>
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<td>St. Louis, Missouri</td>
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<td>MacCollin, Mia Michelle</td>
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<td>Salem, Oregon</td>
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<td>Dartmouth College</td>
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<td>McCormick, Wayne C.</td>
<td>University of Missouri at Columbia</td>
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<td>Moitoza, David John</td>
<td>University of California at Davis</td>
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<td>Monroe, Harry Keith</td>
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<td>Washington, D.C.</td>
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<td>Vanderbilt University</td>
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<td>Kansas City, Missouri</td>
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<td>Grand Junction, Colorado</td>
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<td>Ohtani, Robb Kenji</td>
<td>Occidental College</td>
<td>Honolulu, Hawaii</td>
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<td>Parker, Christine Mershon</td>
<td>Carleton College</td>
<td>Webster Groves, Missouri</td>
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<td>Parker, Katherine Anne</td>
<td>Stanford University</td>
<td>Webster Groves, Missouri</td>
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<td>Pearson, Michele Leontyne</td>
<td>Emory University</td>
<td>Jacksonville, Florida</td>
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<td>Pfeffer, David Michael</td>
<td>Johns Hopkins University</td>
<td>New York</td>
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<td>Prater, Thomas G.</td>
<td>Southern Methodist University</td>
<td>Springfield, Missouri</td>
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<td>Puchalsky, David Ralph</td>
<td>University of Connecticut</td>
<td>Boston, Massachusetts</td>
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<td>Ragsin, Mark</td>
<td>California Institute of Technology</td>
<td>Woodland Hills, California</td>
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<td>Ravenscraft, Mark</td>
<td>Harvard University</td>
<td>Fort Thomas, Kentucky</td>
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<td>Roberts, Craig Stanley</td>
<td>George Fox College</td>
<td>Central Point, Oregon</td>
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<td>Sato, Randall Eric</td>
<td>University of Colorado</td>
<td>St. Louis, Missouri</td>
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<td>Scanlan, Brian Edward</td>
<td>University of Illinois at Urbana</td>
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<td>Washington University</td>
<td>Athens, Georgia</td>
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<td>Dartmouth College</td>
<td>Evanston, Illinois</td>
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<td>Princeton University</td>
<td>Scituate, Massachusetts</td>
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<td>Smith College</td>
<td>St. Louis, Missouri</td>
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<td>Carleton College</td>
<td>Highland Park, Illinois</td>
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<td>Siebens, David Phillips</td>
<td>College of Wooster</td>
<td>Baltimore, Maryland</td>
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<td>Smyth, Sandra Jean</td>
<td>University of Wisconsin at Madison</td>
<td>Austin, Minnesota</td>
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<td>Spalte, Daniel Wayne</td>
<td>Point Loma College</td>
<td>Fresno, California</td>
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<td>Northwestern University</td>
<td>Fairview Heights, Illinois</td>
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<td>Purdue University</td>
<td>Hoopeston, Illinois</td>
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<td>Swann, Robert Alexander</td>
<td>Oberlin College</td>
<td>Ridgewood, New York</td>
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<td>Taylor, Megan Beth</td>
<td>University of North Carolina at Chapel Hill</td>
<td>Pittsburgh, Pennsylvania</td>
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<td>Tsilas, Theodore T.</td>
<td>University of Pennsylvania</td>
<td>Villanova, Pennsylvania</td>
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<td>Vernon, Hazel Jane</td>
<td>Baylor University</td>
<td>Baton Rouge, Louisiana</td>
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<td>Wilkerson, Donald Keith</td>
<td>Washington University</td>
<td>Memphis, Tennessee</td>
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<td>Winek, David Kent</td>
<td>University of Wisconsin at Madison</td>
<td>Wauwatosa, Wisconsin</td>
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<td>Wolin, Dana E.</td>
<td>Washington University</td>
<td>Staten Island, New York</td>
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<td>Wu, Andrew Christopher</td>
<td>Johns Hopkins University</td>
<td>Memphis, Tennessee</td>
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<td>Yi, Hokyun</td>
<td>Vanderbilt University</td>
<td>Nashville, Tennessee</td>
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<td>Younkin, Casey Carrick</td>
<td>Johns Hopkins University</td>
<td>Springfield, Illinois</td>
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</tbody>
</table>

Summary of Students in the School of Medicine, 1979-1980

Graduating Class—June 29, 1979 ........................................... 1
Graduating Class—May 16, 1980 ........................................... 122
Doctor of Medicine Degrees .............................................. 132
Doctor of Medicine and Doctor of Philosophy Degrees ............. 8
Doctor of Medicine Degree
Third-Year Class ......................................................... 130
Second-Year Class ....................................................... 121
First-Year Class .......................................................... 113
Medical Scientist Training Program
Doctor of Medicine and Doctor of Philosophy Degrees
Sixth-Year Trainees ....................................................... 10
Fifth-Year Trainees ....................................................... 8
Fourth-Year Trainees .................................................. 12
Third-Year Trainees ...................................................... 12
Second-Year Trainees .................................................. 11
First-Year Trainees ..................................................... 7
Total ................................................................. 130
DOCTOR OF MEDICINE
AND DOCTOR OF
PHILOSOPHY DEGREES

Medical Scientist
Training Program
Graduates—May 16, 1980

Chaplin, David Dunbar, A.B.,
Harvard University, '73—St. Louis,
Missouri

Kenney, Donald Alan, A.B.,
Harvard University, '74—Darien,
Connecticut

Laux, Brian Edward, B.A.,
University of Delaware, '74; B.S.,
'74—Wilmington, Delaware

Liu, Ellen, B.S., Stanford University,
'74—Chicago, Illinois

Lichtman, Jeff William, A.B.,
Bowdoin College, '73—Rehoboth,
Massachusetts

Little, John Rudolf, A.B.,
Princeton University, '74—
Wynnewood, Pennsylvania

Ludvigsen, Carl William, Jr., B.A.,
University of Colorado at Boulder,
'74—Littleton, Colorado

Salzer, James Lawrence, B.S.,
Stanford University, '74—Worcester,
Massachusetts

Sixth-Year Trainees 1979-80

Brown, Laura Jane, B.A., Vassar
College, '74—Madison, Wisconsin

Rubin, Jeffrey Steven, A.B., Harvard
University, '74; A.M., '74—New
York City, New York

Schieber, Marc Hudson, A.B.,
Washington University, '74—Winter
Park, Florida

Sweeney, Thomas Kevin, A.B.,
Cornell University, '74—Ithaca,
New York

Fifth-Year Trainees 1979-80

Breitmeyer, James Bradley, A.B.,
University of California at Santa
Cruz, '75—Atherton, California

Buty, Ralph Patterson, B.A., Austin
College, '75—Sherman, Texas

Freter, Carl Ernest, B.A., University
of California at San Diego, '75—San
Diego, California

Green, Michael Richard, B.S.,
University of Wisconsin, '74—
St. Louis, Missouri

Gross, Robert Alan, A.B., Harvard
University, '75—Worcester,
Massachusetts

Lebovitz, Russell Martin, University
of Michigan—Pittsburgh,
Pennsylvania

Parker, Keith Langston, Williams
College—St. Louis, Missouri

Schwob, James Edward, B.S.,
University of Iowa, '75—Iowa City,
Iowa

Tabas, Ira Abram, B.S., Tufts
University, '75—Cheltenham,
Pennsylvania

Udey, Mark Charles, B.S.,
University of Wisconsin at Madison,
'75—Fort Atkinson, Wisconsin

Fourth-Year Trainees 1979-80

Barshop, Bruce Allen, A.B.,
Brandeis University, '76—Freehold,
New Jersey

Bloch, Michele Helene, B.S., Cornell
University, '76—Flushing, New York

Boothby, Mark Robin, B.S.,
University of Wisconsin, '76—
St. Louis, Missouri

Gibson, Ronald Lyne, Jr., B.S.,
University of Washington, '75—
Seattle, Washington

Hempstead, Barbara Louise, B.A.,
Tufts University, '76—Andover,
Massachusetts

Hortin, Glen Lee, B.S., Illinois State
University, '76—Zion, Illinois

Kane, William Harrison, B.S.,
University of Iowa, '76—Iowa City,
Iowa

Natowicz, Marvin Roy, A.B.,
Washington University, '76—Oak
Park, Michigan

Third-Year Trainees 1979-80

Feldman, Susan Florence, A.B.,
Radcliffe College, '77—Augusta,
Georgia

Ginsberg, Ann Meredith, A.B.,
Radcliffe College, '77—New York,
New York

Hofmann, Sandra Lee, B.A.,
University of Virginia, '77—
Monroeville, Pennsylvania

Kastan, Michael Barry, B.S.,
University of North Carolina, '77—
Chapel Hill, North Carolina

Kreisle, Regina Ann, B.A.,
Kalamazoo College, '77—South
Bend, Indiana

Mellis, Scott Jeffrey, B.A., Johns
Hopkins University, '77—
Hempstead, New York

Neil, Jeffrey Joseph, A.B.,
Washington University, '77—North
Olmstead, Ohio

Reitman, Marc Lionel, B.S.,
Massachusetts Institute of
Technology, '77—Stamford,
Connecticut

Rothenberg, Paul Louis, B.S.,
Cornell University, '77—Doughlas,
New York

Tait, Jonathan Francis, A.B.,
Harvard University, '77—Salisbury,
Connecticut

Townsend, Ronald Ross, B.A.,
University of California at Irvine,
'77; B.S., '77—Anaheim, California

Weinman, Steven Alan, A.B.,
Harvard University, '77—Elmont,
New York

Register of Students
Second-Year Trainees 1979-80

Bryski, Solomon Eli, B.S., Brooklyn College, ’78—Brooklyn, New York

Faustman, Denise Louise, B.S., University of Michigan, ’78—Dearborn Heights, Michigan

Karp, David Ross, B.S., Massachusetts Institute of Technology, ’78—Northfield, Ohio

King, Thomas Charles, B.A., Washington University, ’78—Rancho Palos Verdes, California

Kleinschmidt, Donn Craig, B.A., University of Wisconsin at Madison, ’75—University City, Missouri

Klunk, William Edward, B.A., Shippensburg State College, ’78—Hanover, Pennsylvania

Milstone, Dave Stanley, B.A., University of California at Santa Barbara, ’76—Mountain View, California

First-Year Trainees 1979-80

Darnell, Robert Bernard, A.B., Columbia University, ’79—Larchmont, New York

Floeter, Mary Kay, B.S., University of Illinois at Urbana, ’78—Crystal Lake, Illinois

Goldberg, Daniel Eliot, A.B., Harvard University, ’78—Brookline, Massachusetts

Harding, Clifford Vincent, A.B., Harvard University, ’79—Detroit, Michigan

Hollifield, William Claude, Jr., B.S., University of California at Berkeley, ’74; M.A., ’78—Sacramento, California

Lentz, Steven Russell, B.S., Iowa State University of Science and Technology, ’79—St. Paul, Minnesota

Ling, Richard Takkam, B.A., Johns Hopkins University, ’79; M.A., ’79—Hong Kong

Martin, Paul Langlie, A.B., Harvard University, ’79—New Britain, Connecticut

Nelson, Raoul Devin, B.A., St. Olaf College, ’79—Bloomington, Minnesota

Neufeld, Ellis Jacob, B.A., Wesleyan University, ’79—Bethesda, Maryland

Sommerer, John Curtis, B.S., Washington University, ’79; M.S., ’79—Wauwatosa, Wisconsin

Usdin, Ted Bjorn, B.A., Johns Hopkins University, ’78—Arlington, Virginia

Belton, Dennis Garry, A.A., Questa Junior College, ’67; B.A., Cal Poly University, ’70—Tulsa, Oklahoma

Bernstein, Lee Alan, B.A., University of Missouri, Columbia, ’76—St. Louis, Missouri

Boyce, Walter Lee, B.S., University of Illinois, Urbana, ’69; M.S., Southern Illinois University, Edwardsville, ’74—East St. Louis, Illinois

Cooper, Russell E., Jr., B.F.A., Kansas University, ’51—St. Louis, Missouri

Demme, Leslie James, B.S., University of Missouri, Columbia, ’73—St. Louis, Missouri

Dubis, John Steve, B.A., Washington University, ’77—St. Louis, Missouri

Flanagan, Lynn Evette, A.B., Washington University, ’76—Chicago, Illinois

Garrett, James Brian, B.A., University of Iowa, ’76—Ames, Iowa

Gibson, Donald Ray, B.A., Southern Illinois University, Edwardsville, ’72; M.S., ’75—St. Louis, Missouri

Health Administration and Planning Program

Part-Time Students 1979-80

Brotherton, Thomas J., B.A., Central Methodist College, ’67; M.S., University of Missouri, Columbia, ’69—St. Louis, Missouri

Jones, M. Michael, A.B., University of Missouri, St. Louis, ’69—St. Louis, Missouri

Sorenson, Martin Ray, B.A., Auburn University, ’67; M.B.A., St. Louis University, ’72—Festus, Missouri

Velat, Mark William, B.S., Wayne State University, ’71—Detroit, Michigan

Second-Year Class 1979-80

Alley, Lewis Ingram, B.S., University of Tennessee, ’77—Hermitage, Tennessee

Banus, Peter Mario, B.S., B.A., Suffolk University, ’77—Boston, Massachusetts

Baumann, Barbara Ann, B.S., Purdue University, ’75—Paris, Illinois

Belton, Dennis Garry, A.A., Questa Junior College, ’67; B.A., Cal Poly University, ’70—Tulsa, Oklahoma

Bernstein, Lee Alan, B.A., University of Missouri, Columbia, ’76—St. Louis, Missouri

Boyce, Walter Lee, B.S., University of Illinois, Urbana, ’69; M.S., Southern Illinois University, Edwardsville, ’74—East St. Louis, Illinois

Cooper, Russell E., Jr., B.F.A., Kansas University, ’51—St. Louis, Missouri

Demme, Leslie James, B.S., University of Missouri, Columbia, ’73—St. Louis, Missouri

Dubis, John Steve, B.A., Washington University, ’77—St. Louis, Missouri

Flanagan, Lynn Evette, A.B., Washington University, ’76—Chicago, Illinois

Garrett, James Brian, B.A., University of Iowa, ’76—Ames, Iowa

Gibson, Donald Ray, B.A., Southern Illinois University, Edwardsville, ’72; M.S., ’75—St. Louis, Missouri

Graber, Brad Steve, B.A., State University of New York, Buffalo, ’77—Flushing, New York

Graber, James Brian, B.A., University of Iowa, ’76—Ames, Iowa

Gibson, Donald Ray, B.A., Southern Illinois University, Edwardsville, ’72; M.S., ’75—St. Louis, Missouri

Graber, Brad Steve, B.A., State University of New York, Buffalo, ’77—Flushing, New York
Wallenberg, Todd Nord, B.A.,
Valparaiso University, '73—Everett,
Washington
Wills, Michael Ross, A.A.,
Massachusetts Bay Community
College, '73; B.A., Colby College,
'75—Milton, Massachusetts

First-Year Students 1979-80
Baltzer, David John, B.A., Webster
College, '78—St. Louis, Missouri
Bertogli, Dana Kim, B.B.A.,
University of Iowa, '79—
Ankeny, Iowa
Brosnan, Timothy John, B.S.,
Villanova University, '78—Oak
Lawn, Illinois
Bullis, Cordell Wayne, B.S.,
Chadron State College, '73—
Ravenna, Nebraska
Bush, Nan Washichek, B.S.,
University of Wisconsin, '77—
Brookfield, Wisconsin
Chambers, Donna Marie, B.S.,
University of New Haven, '79—New
Haven, Connecticut
Clark, Dan Lloyd, B.A., University of
Missouri, '73—St. Louis, Missouri
Collins, Robert Douglas, B.S.,
University of Alabama, Birmingham,
'77—Birmingham, Alabama
Fale, Robert Albin, B.S., University of
Wisconsin, Oshkosh, '78—
Sheboygan, Wisconsin
Fendler, Mary Margaret, B.A.,
Benedictine College, '74; B.S., St.
Louis University, '75—St. Louis,
Missouri
Garrett, Robert Charles, B.A., State
University of New York,
Binghamton, '79—Plainview,
New York
Gradman, Lisa Diane, B.A., Sophie
Newcomb College, '79—Jacksonville,
Florida
Grady, Catherine Anne, A.B.,
Washington University, '78—
St. Louis, Missouri
Grinnex, Jay Frederik, B.A., St. Olaf
College, '73—Racine, Wisconsin
Gruer, Jeffrey Mann, B.A., Miami
University, '79—Waupeka, Wisconsin
Harris, Melville Francis, III, B.S.,
Southwestern at Memphis, '78—
Memphis, Tennessee
Heyman, Neil Fredric, B.A., State
University of New York, Buffalo,
'79—Belmore, New York
Hirschberg, Mark Irwin, B.S.,
Northwestern University, '74;—
M.A., University of Illinois, '75—
Phoenix, Arizona

Hoffman, Amy Felissa, B.A.,
University of Toronto, '79—
Milwaukee, Wisconsin
Kasey, Jack D., B.A., Wabash
College, '79—Evansville, Indiana
Lallarge, Robert J., B.A., University
of Notre Dame, '78—Clarendon
Hills, Illinois
Mahoney, Michael Patrick, B.S.,
University of Oregon, '78—
San Francisco, California
Murphy, Peter Joseph, B.A.,
St. Louis University, '78—
St. Louis, Missouri
Peters, Thomas Arthur, B.B.A.,
University of Wisconsin, Madison,
'69; M.B.A., Southern Illinois
University, '73—Milwaukee,
Wisconsin
Roberts, George Travis, Jr., B.B.A.,
Southern Methodist University, '78—
Memphis, Tennessee
Rodier, Hugo Eneinas, B.S.,
Brigham Young University, '78—
Nampa, Idaho
Selle, Shirley Ann, B.S., St. Louis
University, '77—St. Louis, Missouri
Shiramizu, Laurel Ann, B.D.,
University of California, '75—
Denver, Colorado
Steiner, Barbara Claire, B.S.,
University of Missouri, Columbia,
'73—St. Louis, Missouri
Talbot, Ellen, B.S., Spelman College,
'79—St. Louis, Missouri
Trent, Deborah Ratcliff, B.A., Rice
University, '79—St. Louis, Missouri
Turk, Rita Shoshana, B.A.,
University of Virginia, '76—
Alexandria, Virginia
Valerius, Thomas John, B.A., San
Diego State University, '70; A.S.,
San Diego City College, '75—
Minneapolis, Minnesota
Wasserman, Ellen Sue, A.B., Bard
College, '68; M.A., University of
Rochester, '72—Freeport, New York
Weber, Mark Francis, B.A.,
University of Missouri, Columbia,
'77—St. Louis, Missouri
West, Jeanne Marie, B.A.,
St. Mary's College, '78—
Fresno, California
Wolin, Harry, B.A., Knox College,
'75—St. Louis, Missouri
Zwicky, David George, B.S.,
Bradley, University, '76—
Peoria, Illinois
PROGRAM IN PHYSICAL THERAPY

Senior Class 1979-80
Bauersfeld, Richard Karl, Oregon College of Education—Independence, Oregon
Broich, Marlys Anne, Briar Cliff College—Gray, Iowa
Cupples, Janet Sue, A.B., Washington University, '77—St. Louis, Missouri
Erdal, Jean Elizabeth, B.S., University of Minnesota, '77—Lawrence, Kansas
Goldstein, Susan Joy, Washington University—Skokie, Illinois
Hickok, Lisa Marie, Washington University—St. Louis, Missouri
Jacobson, Gail Marie, Muhlenberg College—Barnardville, New Jersey
Koschoff, Denise Marie, Washington University—St. Louis, Missouri
Kunza, Mary Elizabeth, Washington University—St. Louis, Missouri
Lepp, Laura Marie, B.S., Nebraska Wesleyan University, '78—Central City, Nebraska
McClaine, Joan Eloise, B.A., De Pauw University, '77—St. Louis, Missouri
McDonald, Kevin, Indiana University—Munster, Indiana
Matthews, Lydia Lyne, Washington University—Middlesboro, Kentucky
Powers, Sheila Gail, University of Tennessee—Hermitage, Tennessee
Raddatz, Susan Elizabeth, Washington University—LaGrange Park, Illinois
Raider, Ellen Jo, Washington University—Chattanooga, Tennessee
Topper, Rick James, B.S., Millersville State College, '75—York, Pennsylvania
Weir, Jennifer Lynn, University of Iowa—Bement, Illinois
Young, Vicki Lee, Iowa State University—Central City, Iowa

Junior Class 1979-80
Bouma, Lynette Sue, Southern Illinois University—Evergreen Park, Illinois
Chapman, Jo Anna Schroer, University of Missouri—St. Louis, Missouri
Clem, Carol Ann, Southern Oregon State College—Portland, Oregon
Crane, Susan Beth, Washington University—Jackson, Tennessee
Glaenzer, Cynthia Taphorn, Southern Illinois University—Belleville, Illinois
Koch, Elizabeth Jean, Iowa State University—Iowa City, Iowa
Lang, Jo Ann Dee, B.A., University of Missouri—Boston, Massachusetts
Lewis, Cynthia Beatrice, University of Missouri—St. Louis, Missouri
Meyer, Theresa Packard, University of Missouri—St. Charles, Missouri
Meyer, Timothy Michael, Washington University—Green Bay, Wisconsin
Meyers, Donna Ann, Kean College of New Jersey—Philadelphia, Pennsylvania
Miller, Jerri Anne, Southern Illinois University—Quincy City, Illinois
Nathan, Julie Ann, Washington University—Chicago, Illinois
Ouwer, Mary Frances, University of Illinois—Akron, Ohio
Reynolds, Bradley Scott, B.S., Washington State University—Jerome, Idaho
Rubin, Lisa Ann, University of Cincinnati—Oak Park, Michigan
Shiffer, Mark Dewey, B.A., University of Nebraska—Iowa City, Iowa
Stutsman, Rhonda Beth, Illinois State University—Peoria, Illinois
Tiktinsky, Miriam Helene, Washington University—Englewood, New Jersey
Wiley, Valla Denise, Forest Park Junior College—St. Louis, Missouri
Wolfe, Betsy Kline, University of Colorado—St. Louis, Missouri
Wollenweber, Judy Lynn, Kaskaskia College—Breeze, Illinois

PROGRAM IN OCCUPATIONAL THERAPY

Graduate Class 1979-80
Baron, Leslie Stone, B.A., Muhlenberg College, '76—St. Louis, Missouri
Chang, Jane Ling-Jen, B.S., National Taiwan University, '75—Taipei, Taiwan
Dubiske, Susan Grebowski, B.S., University of Illinois, '78—Chicago, Illinois
Erwin, S. Ellen, B.S., Texas Woman's University, '75—St. Louis, Missouri
Flecher, Catherine Spademak, B.A., Newcomb College, '70—Boulder, Colorado
Haffner, Cynthia Kathryn, B.S., Fontbonne College, '76—St. Louis, Missouri
Halpern, Renannah, B.A., University of Michigan, '76—Champaign, Illinois
Kozial, Catherine Mary, B.A., Rockhurst College, '76—Chicago, Illinois
Levine, Cynthia Rachel, B.A., Queens College, '79—Fresh Meadows, New York
Lewis, Terry Lynn, B.S., Ohio State University, '78—New Philadelphia, Ohio
Lin, Fen-Min, B.S., National Taiwan University, '76—Kaohsiung, Taiwan
Mendelson, Mary Lavis, B.S., Washington University, '53—St. Louis, Missouri
Pennington, Dorothy Johnson, B.A., University of Mississippi, '65—St. Louis, Missouri
Phillips, Anne Marie, B.A., Valparaiso University, '79—Wheaton, Illinois
Prins, Steven Scott, B.S., Grand Valley State College, '76—Zeeland, Michigan
Rice, Mary Saviano, B.S., State University of New York, '72—St. Louis, Missouri
Rogers, Wends Apgar, B.S., Ohio State University, '73—Chesterfield, Missouri
Royeen, Charlotte Brasic, B.S., Truth University, '76—Cincinnati, Ohio
Stamper, Mary Beth, B.S., University of Iowa, '76—Waver, Iowa
Stemmler, Loren JoAnn, B.S., Fontbonne College, '79—St. Louis, Missouri
Senior Class 1979-80
Ainsworth, Phillip E., Meramec Community College—Fenton, Missouri
Beatty, Janet Lynn, University of Wisconsin—Sheboygan Falls, Wisconsin
Brackin, Mary Rebecca, Roosevelt University—Oak Park, Illinois
Collins, Debra Ann, Washington University—St. Louis, Missouri
Craft, Marjorie McCaddin, Dickinson College—Fairfield, Connecticut
Denny, Deborah Sue, University of Missouri, St. Louis—St. Louis, Missouri
Fischberg, Eve Jean, Washington University—West Newton, Massachusetts
Fishman, Caren Jane, Washington University—West Orange, New Jersey
Klocekner, Jeanne Marie, Forest Park Community College—St. Louis, Missouri
Krohn, Susan Ellen, Washington University—Zanesville, Ohio
Lifton, Claudia Ann, Washington University—Skokie, Illinois
Messina, Susan Claire, Washington University—St. Louis, Missouri
Peskin, Julie Gale, Washington University—Augusta, Georgia
Price, Joy Louise, Forest Park Community College—St. Louis, Missouri
Ragan, Carole Sue, Florissant Valley Community College—St. Louis, Missouri
Relley, Ann Regina, Xavier University—Middletown, Ohio
Rubin, Amy Sharon, Washington University—Beachwood, Ohio
Rupe, Nancy Elaine, Indiana University—Elkhart, Indiana
Schmidt, Linda Diane, Washington University—St. Louis, Missouri
Sobol, Eileen Sharon, University of Michigan—Great Neck, New York
Sutula, Noreen Ellen, Washington University—Mundelein, Illinois

Calcaterra, Rebecca Marie, Forest Park Community College—St. Louis, Missouri
Dunbar, Vicki Marie, Washington University—Winona, Minnesota
Eckelkamp, Judith Ann, East Central Junior College—Washington, Missouri
Elleman, Laura Lee, Indiana University—Kokomo, Indiana
Emanuel, Linda Marie, Kearney State College—North Bend, Nebraska
Goldstein, Kathryn Lynn, College of the Redwoods—San Lorenzo, California
Jones, Mildred Irene, Indiana University—Bucknell, Indiana
Lawler, Ann Louise, Carleton College—Cheyenne, Wyoming
Maack, Alice Sharon, University of Missouri—St. Louis, Missouri
Millington, Rebecca Lyn, University of Maryland—Upper Marlboro, Maryland
Molina, Rossana Marie, Washington University—St. Louis, Missouri
Muller, Geralyn Marie, Indiana University—Syosset, New York
Pankey, Annette Mae, Washington University—Virginia, Illinois
Reiman, Beth Elta, University of Vermont—Port Washington, New York
Walker, Beverly Cheryl, Tennessee State University—Gates, Tennessee

Junior Class, 1979-80
Aboudi, Ellen Jane, Washington University—Eastchester, New York
Beaulieu, Debra Ann, University of Delaware—Newtown Square, Pennsylvania
Burson, Katherine Ann, Washington University—Evanston, Illinois

Register of Students
<table>
<thead>
<tr>
<th>Name</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abel, Oliver</td>
<td>111, 60</td>
</tr>
<tr>
<td>Abel, Charles C.</td>
<td>60</td>
</tr>
<tr>
<td>Abel, Oliver, III.</td>
<td>60</td>
</tr>
<tr>
<td>Abichandani, Lachman K.</td>
<td>102</td>
</tr>
<tr>
<td>Abigd, Morris</td>
<td>114</td>
</tr>
<tr>
<td>Abramson, Charles L.</td>
<td>106</td>
</tr>
<tr>
<td>Abrath, Frederick G.</td>
<td>106</td>
</tr>
<tr>
<td>Ackerman, Lauren V.</td>
<td>78</td>
</tr>
<tr>
<td>Adler, Benard C.</td>
<td>77</td>
</tr>
<tr>
<td>Aff, Helen M.</td>
<td>86</td>
</tr>
<tr>
<td>Agrawal, Harish C.</td>
<td>66, 79, 83</td>
</tr>
<tr>
<td>Ageris, Harry</td>
<td>60</td>
</tr>
<tr>
<td>Ahumada, Gail A.</td>
<td>57</td>
</tr>
<tr>
<td>Aitken, Louis F.</td>
<td>60</td>
</tr>
<tr>
<td>Albert, Ingrid R.</td>
<td>60</td>
</tr>
<tr>
<td>Alegre, Jorge M.</td>
<td>60</td>
</tr>
<tr>
<td>Aleksander, Bernardo G.</td>
<td>102</td>
</tr>
<tr>
<td>Alex, Morris</td>
<td>58</td>
</tr>
<tr>
<td>Alexander, France</td>
<td>58</td>
</tr>
<tr>
<td>Allen, Hubert L.</td>
<td>72</td>
</tr>
<tr>
<td>Allen, William E., Jr.</td>
<td>105</td>
</tr>
<tr>
<td>Alley, Charles D., Jr.</td>
<td>62</td>
</tr>
<tr>
<td>Alpers, David H.</td>
<td>50, 141</td>
</tr>
<tr>
<td>Alvis, Edmund B.</td>
<td>74</td>
</tr>
<tr>
<td>Ambos, Hans D.</td>
<td>60</td>
</tr>
<tr>
<td>Amin, Nevinkumar J.</td>
<td>75</td>
</tr>
<tr>
<td>Anderson, Barbara J.</td>
<td>88, 102</td>
</tr>
<tr>
<td>Anderson, Charles B.</td>
<td>109</td>
</tr>
<tr>
<td>Anderson, John M.</td>
<td>101</td>
</tr>
<tr>
<td>Anschutz, Robert R.</td>
<td>112</td>
</tr>
<tr>
<td>Anthony, E. James</td>
<td>103</td>
</tr>
<tr>
<td>Antoniou, Christos A.</td>
<td>88</td>
</tr>
<tr>
<td>Apirion, David</td>
<td>63</td>
</tr>
<tr>
<td>Aquino, Tomas</td>
<td>82</td>
</tr>
<tr>
<td>Arbo, David A.</td>
<td>133</td>
</tr>
<tr>
<td>Arias, Fernando</td>
<td>69</td>
</tr>
<tr>
<td>Arison, Zipora K.</td>
<td>102</td>
</tr>
<tr>
<td>Arneson, A. Norman</td>
<td>69, 106</td>
</tr>
<tr>
<td>Arnold, Kenneth J.</td>
<td>111, 141</td>
</tr>
<tr>
<td>Arnott, John P.</td>
<td>113</td>
</tr>
<tr>
<td>Arnt, John P.</td>
<td>113</td>
</tr>
<tr>
<td>Arntzen, Robert J.</td>
<td>115</td>
</tr>
<tr>
<td>Aronberg, Dixie J.</td>
<td>106</td>
</tr>
<tr>
<td>Aronberg, Jerome M.</td>
<td>60</td>
</tr>
<tr>
<td>Aronberg, Lawrence M.</td>
<td>114</td>
</tr>
<tr>
<td>Arribas, Neva P.</td>
<td>74</td>
</tr>
<tr>
<td>Arthur, R. Martin</td>
<td>112</td>
</tr>
<tr>
<td>Ashin, Frederic B.</td>
<td>79</td>
</tr>
<tr>
<td>Atkinson, John P.</td>
<td>54, 64</td>
</tr>
<tr>
<td>Auer, Arthur I.</td>
<td>112</td>
</tr>
<tr>
<td>AufderHeide, John F.</td>
<td>107</td>
</tr>
<tr>
<td>Auguste, Jean M.</td>
<td>89</td>
</tr>
<tr>
<td>Avioli, Louis V.</td>
<td>50</td>
</tr>
<tr>
<td>Ayata, Sedat M.</td>
<td>44</td>
</tr>
<tr>
<td>Baenziger, Jacques U.</td>
<td>81</td>
</tr>
<tr>
<td>Baenziger, Nancy L.</td>
<td>58</td>
</tr>
<tr>
<td>Baer, Jill M.</td>
<td>89</td>
</tr>
<tr>
<td>Bagby, James W.</td>
<td>56</td>
</tr>
<tr>
<td>Bagland, Robert J.</td>
<td>106</td>
</tr>
<tr>
<td>Bagwe, Ranjit M.</td>
<td>59</td>
</tr>
<tr>
<td>Bahl, Om P.</td>
<td>58</td>
</tr>
<tr>
<td>Baker, Marion H.</td>
<td>89, 117</td>
</tr>
<tr>
<td>Balle, Dennis M.</td>
<td>107</td>
</tr>
<tr>
<td>Ballinger, Walter F.</td>
<td>109</td>
</tr>
<tr>
<td>Banaszak, Leonard J.</td>
<td>45, 93, 141</td>
</tr>
<tr>
<td>Bardsley, John L.</td>
<td>106</td>
</tr>
<tr>
<td>Barker, Edward T.</td>
<td>88</td>
</tr>
<tr>
<td>Barnes, Wayne M.</td>
<td>47</td>
</tr>
<tr>
<td>Barnes, Zane E.</td>
<td>138</td>
</tr>
<tr>
<td>Barrett, Scott R., Jr.</td>
<td>72</td>
</tr>
<tr>
<td>Barrett, Scott, Sr.</td>
<td>72</td>
</tr>
<tr>
<td>Barrow, Jack</td>
<td>58</td>
</tr>
<tr>
<td>Barry, C. David</td>
<td>93</td>
</tr>
<tr>
<td>Barsanti, John R., Jr.</td>
<td>138</td>
</tr>
<tr>
<td>Bartley, Margaret</td>
<td>135</td>
</tr>
<tr>
<td>Barton, Robert W.</td>
<td>58</td>
</tr>
<tr>
<td>Bauer, Eugene A.</td>
<td>54, 141</td>
</tr>
<tr>
<td>Bauer, John D.</td>
<td>81</td>
</tr>
<tr>
<td>Bauer, Joseph A.</td>
<td>88</td>
</tr>
<tr>
<td>Bauer, Spomenko</td>
<td>44</td>
</tr>
<tr>
<td>Bauer, Walter C.</td>
<td>78, 118, 140</td>
</tr>
<tr>
<td>Baumer, Susan L.</td>
<td>88</td>
</tr>
<tr>
<td>Baumgart, Walter M., Jr.</td>
<td>60</td>
</tr>
<tr>
<td>Bausschard, Frederick D.</td>
<td>61</td>
</tr>
<tr>
<td>Bauwens, Daniel B.</td>
<td>59</td>
</tr>
<tr>
<td>Beale, Mary G.</td>
<td>87</td>
</tr>
<tr>
<td>Beamer, Susan</td>
<td>133</td>
</tr>
<tr>
<td>Beare, J. Byron</td>
<td>114</td>
</tr>
<tr>
<td>Becker, Bernard</td>
<td>73, 140</td>
</tr>
<tr>
<td>Becker, Robert L.</td>
<td>72</td>
</tr>
<tr>
<td>Becker, Stanley C.</td>
<td>74</td>
</tr>
<tr>
<td>Bedwinek, John M.</td>
<td>106</td>
</tr>
<tr>
<td>Beetham, Karen L.</td>
<td>107</td>
</tr>
<tr>
<td>Bellen, Marietta O.</td>
<td>89</td>
</tr>
<tr>
<td>Belew, Joe E.</td>
<td>72</td>
</tr>
<tr>
<td>Bell, C. Elliott, Jr.</td>
<td>54, 79</td>
</tr>
<tr>
<td>Bell, Martin J.</td>
<td>87, 113</td>
</tr>
<tr>
<td>Bell, Randy L.</td>
<td>62</td>
</tr>
<tr>
<td>Bell, Robert M.</td>
<td>101</td>
</tr>
<tr>
<td>Bello-Reuss, Elsa</td>
<td>57, 93</td>
</tr>
<tr>
<td>Bellorin, Ezequiel R.</td>
<td>59</td>
</tr>
<tr>
<td>Benedici, William W.</td>
<td>61</td>
</tr>
<tr>
<td>Benham, Lee</td>
<td>95</td>
</tr>
<tr>
<td>Bennett, Kathryn G.</td>
<td>102</td>
</tr>
<tr>
<td>Bennett, Kenneth J., 111</td>
<td>111</td>
</tr>
<tr>
<td>Benoit, Walter F.</td>
<td>88</td>
</tr>
<tr>
<td>Berg, Douglas E.</td>
<td>49, 64</td>
</tr>
<tr>
<td>Berg, Edward F.</td>
<td>74</td>
</tr>
<tr>
<td>Berg, Leonard</td>
<td>67</td>
</tr>
<tr>
<td>Berger, Edward J.</td>
<td>96</td>
</tr>
<tr>
<td>Berger, Louetta</td>
<td>103</td>
</tr>
<tr>
<td>Berger, Nathan A.</td>
<td>54</td>
</tr>
<tr>
<td>Berger, Somassja J.</td>
<td>91</td>
</tr>
<tr>
<td>Bergman, Martin</td>
<td>108</td>
</tr>
<tr>
<td>Bergmann, John F.</td>
<td>101</td>
</tr>
<tr>
<td>Bergmann, Steven R.</td>
<td>57</td>
</tr>
<tr>
<td>Bergner, Grace E.</td>
<td>58</td>
</tr>
<tr>
<td>Berkowitz, Wallace P.</td>
<td>77</td>
</tr>
<tr>
<td>Berman, William</td>
<td>71</td>
</tr>
<tr>
<td>Berry, John W.</td>
<td>58</td>
</tr>
<tr>
<td>Bhaturi, Saumya</td>
<td>82</td>
</tr>
<tr>
<td>Bello, Daniel R.</td>
<td>106</td>
</tr>
<tr>
<td>Bier, Dennis M.</td>
<td>57, 85</td>
</tr>
<tr>
<td>Bier, Michael D.</td>
<td>101</td>
</tr>
<tr>
<td>Biggs, F. Douglas</td>
<td>61</td>
</tr>
<tr>
<td>Biggs, John H.</td>
<td>138</td>
</tr>
<tr>
<td>Biggs, John T., Jr.</td>
<td>101</td>
</tr>
<tr>
<td>Bilon, Ronald C.</td>
<td>75</td>
</tr>
<tr>
<td>Binder, Morton A.</td>
<td>57</td>
</tr>
<tr>
<td>Birenbaum, Aaron</td>
<td>61</td>
</tr>
<tr>
<td>Birge, Clifford A.</td>
<td>58</td>
</tr>
<tr>
<td>Birge, Stanley J., Jr.</td>
<td>54</td>
</tr>
<tr>
<td>Bischoff, E. Richard</td>
<td>40, 140</td>
</tr>
<tr>
<td>Bisno, Daniel</td>
<td>74</td>
</tr>
<tr>
<td>Black, Joseph T.</td>
<td>68</td>
</tr>
<tr>
<td>Blaine, G. James, III</td>
<td>115</td>
</tr>
<tr>
<td>Blair, Vilray P., Jr.</td>
<td>113</td>
</tr>
<tr>
<td>Blamoville, Huldah C.</td>
<td>89</td>
</tr>
<tr>
<td>Blegen, Sandra L.</td>
<td>87</td>
</tr>
<tr>
<td>Bloomberg, Gordon R.</td>
<td>88</td>
</tr>
<tr>
<td>Bobrow, James C.</td>
<td>75</td>
</tr>
<tr>
<td>Bohigian, George M.</td>
<td>74</td>
</tr>
<tr>
<td>Bohne, Barbara A.</td>
<td>77</td>
</tr>
<tr>
<td>Boime, Irving</td>
<td>70, 90, 141</td>
</tr>
<tr>
<td>Boles, C. Read</td>
<td>87</td>
</tr>
<tr>
<td>Bond, Leslie F.</td>
<td>112</td>
</tr>
<tr>
<td>Boniuk, Isaac</td>
<td>74</td>
</tr>
<tr>
<td>Boonschaft, Benje</td>
<td>58</td>
</tr>
<tr>
<td>Borowski, Benjamin A.</td>
<td>58</td>
</tr>
<tr>
<td>Bortnick, Arthur R.</td>
<td>71</td>
</tr>
<tr>
<td>Boswell, Dec C.</td>
<td>61</td>
</tr>
<tr>
<td>Bourque, Susan A.</td>
<td>133</td>
</tr>
<tr>
<td>Bowen, Ted</td>
<td>130</td>
</tr>
<tr>
<td>Bower, Richard J.</td>
<td>87, 113</td>
</tr>
<tr>
<td>Bowles, William T.</td>
<td>114</td>
</tr>
<tr>
<td>Boxerman, Stuart B.</td>
<td>96, 129, 130</td>
</tr>
<tr>
<td>Boyarsky, Rose F.</td>
<td>114</td>
</tr>
<tr>
<td>Boyarsky, Saul</td>
<td>114, 129</td>
</tr>
<tr>
<td>Braciale, Thomas J.</td>
<td>81</td>
</tr>
<tr>
<td>Braciale, Vivian</td>
<td>82</td>
</tr>
<tr>
<td>Bradley, Anna K.</td>
<td>102</td>
</tr>
<tr>
<td>Bradley, Richard V.</td>
<td>111</td>
</tr>
<tr>
<td>Bradshaw, Ralph A.</td>
<td>45</td>
</tr>
<tr>
<td>Braftburg, Szyfra A.</td>
<td>112</td>
</tr>
<tr>
<td>Braitburg, Janina M.</td>
<td>58</td>
</tr>
<tr>
<td>Brancato, Donald H.</td>
<td>113</td>
</tr>
<tr>
<td>Brandin, Donald N.</td>
<td>138</td>
</tr>
<tr>
<td>Brandwin, Leslie M.</td>
<td>61</td>
</tr>
<tr>
<td>Brennan, Ruth E.</td>
<td>96</td>
</tr>
<tr>
<td>Brett, Allan S.</td>
<td>59, 117</td>
</tr>
<tr>
<td>Bricker, Eugene M.</td>
<td>109</td>
</tr>
<tr>
<td>Brigham, Franciska L.</td>
<td>106</td>
</tr>
<tr>
<td>Britton, Carmelita V.</td>
<td>89</td>
</tr>
<tr>
<td>Brodman, Estelle</td>
<td>40, 139, 140</td>
</tr>
<tr>
<td>Broeering, Jeanette M.</td>
<td>89</td>
</tr>
<tr>
<td>Brooke, Michael H.</td>
<td>66, 94, 110</td>
</tr>
<tr>
<td>Brookes, Robert D.</td>
<td>101</td>
</tr>
<tr>
<td>Brooks, Jeffrey S.</td>
<td>61</td>
</tr>
<tr>
<td>Brown, Barbara L.</td>
<td>45</td>
</tr>
<tr>
<td>Brown, Elmer B., Jr.</td>
<td>50, 139</td>
</tr>
<tr>
<td>Brown, Freeman F., III</td>
<td>44</td>
</tr>
<tr>
<td>Brown, Miner L.</td>
<td>132</td>
</tr>
</tbody>
</table>
Taibleson, Mitchell, 100
Tailor, Chandrakant C., 106
Talent, Barbara K., 88
Tanphaichitr, Kongsak, 58, 117
Tao, William K. Y., 138
Taussig, Barrett L., 58
Taxman, Robert M., 59
Taylor, Eugene D., 72
Taylor, John R., 101
Taylor, Sallie E., 135
Taysi, Kutay, 86
Teltelbaum, Steven L., 80
Templeton, Alan R., 49
Tepper, Arnold S., 62
Ternberg, Jessie L., 84, 113
Ter-Pogossian, Michel M., 104, 129
Tewson, Timothy J., 106
Thach, Bradley T., 86
Thach, Robert E., 46
Thach, W. Thomas, Jr., 40, 67, 141
Thallinger, Gertraude, 77
Thalmann, Isolde, 77
Thalmann, Ruediger, 77
Thanavarro, Samer, 58
Thawley, Stanley E., 77
Thayer, Harold E., 139
Themelis, Garth, 116
Thies, Curt, 129
Thiele, Charles E., 132
Thomas, Charles A., 138
Thomas, David W., 65, 81
Thomas, Lewis J., Jr., 43, 93, 115, 129
Thomas, Lorraine L., 89
Thomas, Patrick R. M., 106
Thompson, Lloyd, 77
Thompson, M. Bryant, 72
Thurston, Donald L., 83, 89
Thurston, Jean H., 84
Tiefenbrunn, Alan J., 58
Tillman, Mary A. T., 88
Timpe, G. Michael, 139
Tober, Albro C., Jr., 72
Toga, Arthur W., 68
Tolleson, Douglas M., 58
Tolmach, Leonard J., 40, 104
Tomeldan, Silvestre A., 44
Toomey, James M., 76
Torrack, Richard, 79
Totty, William G., 107
Trivedi, Bakula A., 62
Trotter, John L., 68
Trotter, Mildred, 40, 107
Tsifutis, Argyrios A., 87
Tubbs, Garth D., 134
Tucker, Dolores R., 62
Tucker, George L., 110
Tumialan, Luis, 81
Turner, Mary, 141
Turner, James K., 86, 117
Tuteur, Peter G., 56
Tyson, Ellen T., 134
Valdes, Andres J., 82
Valdes, Orestes S., 89
Valdes, Roland, Jr., 81
Valeriote, Frederick A., 104
Van Amburg, Albert L., III, 62
Vanass, Chinda, 117
Vanderpearl, Robert H., 101
Van Sweden, Martha, 135
Vargas, Jaime, 102
Varki, Ajit P., 60
Vastola, Edward E., 67
Vavra, John D., 53, 94, 139, 141
Venable, H. Phillip, 74
Viers, Wayne A., 77
Vetrie, Teresa A., 104, 118
Voegel, Barbara N., 89
Volpe, Joseph J., 46, 67, 84
Votaw, Robert E., 77
Wade, Robert P., 103
Wal, Deborah E., 102
Wald, Stanley M., 59
Waldbaum, Lawrence S., 44
Walker, J. Leslie, 72
Walker, Susanah, 88
Walker, William B., 111
Wallack, Marc K., 111
Walsh, James W., 59
Walters, John F., 139, 140
Walters, Richard C., 62
Waltman, Stephen R., 73
Walton, Franklin E., 110
Walz, Bruce J., 106
Wann, Donald F., 129
Ward, Diane E., 135
Warden, Gail L., 131
Warmbrodt, John, 132
Warren, James C., 46, 69, 140, 141
Warren-Boulton, Elizabeth, 60
Wasserman, Helman C., 71
Wasserman, Todd H., 106
Waters, Hugh R., 62
Waterston, Robert H., 42, 49
Watson, M. Frances, 95
Wattenberg, Carl A., 114
Waxelman, Roger J., 89
Webster, William H., 138
Wedner, H. James, 56
Wee, George C., 112
Weeks, David G., 103
Weeks, Paul M., 114, 119
Weger, Lillian B., 103
Weiss, Alan N., 59
Weiss, Stuart, 68
Weissfield, Alice S., 82
Welch, Michael J., 105
Weldon, Clarence S., 84, 108
Weldon, Virginia V., 84, 139
Welner, Ames, 101
Welner, Zila, 88, 101
Wenneker, Alvin S., 59
Wentlandt, Thom F., 75
West, Joseph W., 77
Wette, Reimut, 62
White, Bruce I., 114
White, Neil H., 88
White, Park J., 85
White, William C., 107
Whiteside, Leo A., 112, 121, 141
Whyte, Michael P., 58
Wiant, James R., 62
Wiedershine, Leonard J., 102
Wiegand, Herbert C., 62
Wiest, Walter G., 47, 69
Wilkos, Ronald P., 72
Wilkins, George T., Jr., 88
Willard, Mark B., 42, 47
Williams, Carol F., 72
Williamson, Janet, 135
Williamson, Joseph R., 79
Wilner, George D., 58, 81
Wilson, Keith S., 58
Wilson, Margaret B., 138
Wilson, Susan L., 44, 135
Winston, Charles E., 74
Winer, Michael H., 113
Winstead, Elsie, 62, 117
Winters, Kathleen, 88
Wissmath, Frank S., 87
Witcoff, Raymond H., 138, 139
Witter, Ray, 141
Wochner, R. Dean, 53, 95
Wochnik, Eliza E., 103
Wolf, Mitchel L., 74
Wolfe, Edward M., 62
Wolff, Gerald A., 59
Wolff, Harold D., 101
Wolff, Patricia B., 89, 117
Wolffgram, Edwin D., 102
Wolin, Edward M., 58
Wood, James A., 62
Wood, John A., 62
Wood, Patrick M., 42
Woodward, Robert S., 96, 131
Wool, Gerald, 88
Woolsey, Thomas A., 41, 93
Wooten, George F., Jr., 68, 91
Word, Parker H., 72
Worland, Julien, 103
Wray, Robert C., Jr., 114
Wulf, Maureen P., 133
Wulf, Maureen P., 133
Wulf, George J., Jr., 69
Wunderlich, Paul H., 132
Yanow, Mitchell, 72
Yates, Jesse T., 62
Yokoyama, Shozo, 49, 101
Youens, Edith K., 133
Young, Vernon L., 114
Zahalak, George L., 129
Zarkowsky, Harold, 86, 140, 141
Zibit, Helen L., 103
Zimmerman, Herbert B., 59
Zirron, Ian M., 81
Zivnuska, Frederick R., 107
Zografakis, George H., 114
Zuckerman, Gary R., 58, 141
Zwirn, H. Benjamin, 89
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UNIVERSITY COLLEGE

THE SUMMER SCHOOL

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Index