Washington University School of Medicine bulletin, 1978-1979

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The on-rushing flood of future possibilities brings with it a spirit of adventure: a need for bold, imaginative thinking, a willingness to gamble on provocative new concepts; the courage to break away from the entrenched viewpoint and the aggressiveness to bring them into reality.

Wendell G. Scott
Both the man of science and the man of art live always at the edge of mystery, surrounded by it; both always, as the measure of their creation, have had to do with the harmonization of what is new and what is familiar, with the balance between novelty and synthesis, with the struggle to make partial order in total chaos.

J. Robert Oppenheimer
It is a rare blending of learning and humanity, incisiveness of intellect, and sensitiveness of the spirit which occasionally come together in an individual who chooses the calling of Medicine, and then we have the great physician.

Hans Zinsser
The whole point of a university, on its educational side, is to bring the young under the intellectual influence of a band of imaginative scholars.

Alfred North Whitehead
Scientific problems are never disposed of by a single worker, however ideal his opportunity, however great his ability, for the questions to be put to nature vary from one generation to another.

Joseph Erlanger
Come, let us work, and in this little
time do some new thing that no one
on this earth has ever thought to do.
Split from the world's eternal truth
some atom of the everlasting! Then
let us die, and leave for coming
generations one bit of knowledge by
which we'll be remembered until
some later one shall show the truth
we found was but a grain gleaned
from some vast store we'd hardly
touched and we shall be forgot and
be remembered—but we, out where
the absolute is near, shall smile
seeing how little a beach of sand
resembles the granite cliff from
which it weathered.

Sam M. Clark, Sr.
Medicine is a jealous god expecting to receive from its votaries all of their talent and energy. It lavishes no rewards upon those who are not fully consecrated to its service.

Evarts A. Graham
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1978

**June**

5  Monday
13, 14 Tuesday, Wednesday

**July**

4  Tuesday

**August**

23  Wednesday
21-25 Monday-Friday (exc. 23) (exc. Wednesday)
26  Saturday
28  Monday

**September**

4  Monday
6, 7 Wednesday, Thursday
26, 27 Tuesday, Wednesday

**November**

23  Thursday
24  Friday

**December**

16  Saturday

**1979**

**January**

3  Wednesday
8-12 Monday-Friday
15  Monday

**March**

7  Wednesday

**April**

6  Friday
10, 11 Tuesday, Wednesday
13-15 Friday-Sunday
16  Monday

**May**

17  Thursday
18  Friday
19  Saturday
25  Friday

Summer quarter begins
National Board Examination, Part I

Independence Day, holiday

Orientation and registration for all new students
Registration for upperclass medical students
Summer quarter ends
First semester classes begin

Labor Day, holiday
National Board Examination Part I
National Board Examination, Part II

Thanksgiving Day, holiday
Thanksgiving holiday for freshman and sophomore classes

Christmas recess begins at 1:00 p.m.

Christmas recess ends at 8:00 a.m.
Registration for second semester Second semester classes begin

National Board Examination, Part III

Spring recess begins at 5:00 p.m. for freshman and sophomore classes
National Board Examination, Part II
Easter holiday for upperclass medical students
Spring recess ends at 8:00 a.m.

Academic year ends at 5:00 p.m. for graduating students
Commencement
Academic year ends for junior class
Academic year ends at 5:00 p.m. for freshman and sophomore classes
<table>
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<th>Period</th>
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<td>Begins</td>
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<td>II</td>
<td>July 17, 1978</td>
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<td>III</td>
<td>August 28, 1978</td>
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<td>IV</td>
<td>October 9, 1978</td>
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<td>VI</td>
<td>January 15, 1979</td>
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<td>VII</td>
<td>February 26, 1979</td>
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<tr>
<td>VIII</td>
<td>April 9, 1979</td>
</tr>
</tbody>
</table>

*Ends May 17, 1979, for students graduating on May 18, 1979.
PHILOSOPHY AND OBJECTIVES

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 1978-79

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.

<table>
<thead>
<tr>
<th>First-year courses</th>
<th>Total clock hours for the year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Anatomy</td>
<td>198</td>
</tr>
<tr>
<td>Biochemistry*</td>
<td>93</td>
</tr>
<tr>
<td>General</td>
<td>77</td>
</tr>
<tr>
<td>Microbiology</td>
<td>180</td>
</tr>
<tr>
<td>Social Aspects of Medicine</td>
<td>36</td>
</tr>
<tr>
<td>Physiology</td>
<td>144</td>
</tr>
<tr>
<td>Microscopic Anatomy</td>
<td>149</td>
</tr>
<tr>
<td>Neural Science</td>
<td>131</td>
</tr>
<tr>
<td>Genetics</td>
<td>36</td>
</tr>
<tr>
<td>Topics in Clinical Medicine</td>
<td>36</td>
</tr>
<tr>
<td>Biostatistics</td>
<td>18</td>
</tr>
<tr>
<td>Total clock hours for the year</td>
<td>1021</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Second-year courses</th>
<th>Total clock hours for the year</th>
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</thead>
<tbody>
<tr>
<td>Pathology</td>
<td>303</td>
</tr>
<tr>
<td>Pharmacology</td>
<td>180</td>
</tr>
<tr>
<td>Pathophysiology</td>
<td></td>
</tr>
<tr>
<td>Infectious Diseases</td>
<td>58½</td>
</tr>
<tr>
<td>Heart, Kidney and Lung</td>
<td>58½</td>
</tr>
<tr>
<td>Metabolism, Endocrinology</td>
<td></td>
</tr>
<tr>
<td>and Gastrointestinal Disorders</td>
<td>60½</td>
</tr>
<tr>
<td>Oncology and Hematology</td>
<td>55½</td>
</tr>
<tr>
<td>Nervous System Disorders</td>
<td>60</td>
</tr>
<tr>
<td>Developmental Biology</td>
<td>60</td>
</tr>
<tr>
<td>Introduction to Clinical Medicine</td>
<td>124</td>
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<td>Introduction to Clinical Psychiatry</td>
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<tr>
<td>Radiology</td>
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<tr>
<td>Surgery</td>
<td>36</td>
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<tr>
<td>Ophthalmology</td>
<td>9</td>
</tr>
<tr>
<td>Otolaryngology</td>
<td>9</td>
</tr>
<tr>
<td>Total clock hours for the year</td>
<td>1099</td>
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</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>Medicine</th>
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<tbody>
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<td>Surgery</td>
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<tr>
<td>Obstetrics and Gynecology</td>
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<tr>
<td>Pediatrics</td>
<td>231</td>
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<tr>
<td>Psychiatry</td>
<td>231</td>
</tr>
<tr>
<td>Neurology</td>
<td>115 1/2</td>
</tr>
<tr>
<td>Otolaryngology</td>
<td>77</td>
</tr>
<tr>
<td>Ophthalmology</td>
<td>38 1/2</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 Assistant 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. 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 .................................. 1188
Total clock hours for four years .................................. 5156
The Study of Medicine

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.

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

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 $3900 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.
Eligibility

Applicants must meet the requirements for admission to both the School of Medicine and the Graduate School of Arts and Sciences. In addition to the minimum requirements established for acceptance into both schools, 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 also recommended. 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 in a research laboratory should apply to the program.

The Program

The program consists of three segments: (1) two years of the usual medical curriculum, (2) three or more years of work in preparing a thesis to satisfy requirements for the Ph.D. degree, 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. In particular, students who wish to begin their research after the first year of the regular medical curriculum may do so after consultation with the Medical Scientist Training Program Committee. Since the fourth year of medical school is completely elective, the medical scientist will have taken the equivalent of that year while preparing his thesis, and thereby he will have completed the total requirements for the M.D. degree.

While the Medical Scientist Training Program includes all those medical 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 Advisory 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.

10
The Study of Medicine

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 the various departments in the School of Medicine and the Department of Biology 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.

The courses differ from the usual medical courses with respect to the laboratory training periods and the availability of additional electives. As students enrolled in the program will have begun laboratory work during the summer and will receive additional intensive laboratory training, they may elect, with approval of the Medical Scientist Training Program Committee, to omit or to take only selected parts of a laboratory component. The time not utilized in the normal components will be spent in research laboratories and in elective tutorial courses which are offered to supplement in depth the normal course material. These courses include advanced biochemistry, microbial genetics, immunology, neurobiology, biophysics, cell biology and cytology, advanced pharmacology, and pathobiology. In addition, the formal graduate courses are available to the more advanced students.

The performance of each student will be reviewed annually, and he will be expected to maintain a high scholastic standing.

Years 3, 4, 5

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 a 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 119 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 the clinical 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. 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.

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 course work 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 Post-Graduate Training to give each hospital to which the student has applied a meaningful, comprehensive summary of the student'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 course work 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 PROMOTION

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

Academic Review and Promotions

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 Promotion will be based only on a presentation of: (1) new and/or different information than 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 Promotion 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 permit 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 I will neither promote a student to the status of Candidate for the Doctor of Medicine degree nor permit a student to begin a Clinical Clerkship until all first- and second-year course work 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.

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*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, awarded each year to selected students who undertake research projects under the direction of faculty members, are an important part of the educational program. These fellowships offer students an opportunity to attempt original work, thus adding another dimension to their experience as investigators. This research allows students to discover first hand the problems of obtaining and assessing new information. Selected faculty members serve as advisers to students interested in special research opportunities.

Fellowships are available to students after admission to 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 significant enough to be reported in scientific journals.

INTERNSHIPS AND RESIDENCIES

Although not required by all states for licensure, an internship in an approved hospital is considered essential preparation for the practice of medicine, and most graduates seek additional experience by serving as residents, and perhaps later as fellows, for periods up to five years.

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

The Assistant Dean for Post-Graduate Training maintains an open file of brochures and other descriptive data regarding internships throughout the country. Included are evaluations of their own internships obtained from our recent graduates. The School participates in the National Intern and 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.
The Washington University School of Medicine selects students on the basis of character, attitude, interest, intellectual ability, motivation, and superior scholastic achievement. Applications are reviewed and independently evaluated by members of the Committee on Admissions. Final decisions are made by the twenty-one-member faculty committee as a whole. All applicants are interviewed prior to their acceptance.

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.

**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;
4. evidence of character, attitude, and interests 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, 1978. To receive this special consideration, the applicant must agree: (1) to apply only to this School prior to receiving its admission decision; (2) to accept a position in the class if offered; (3) to submit all required credentials to AMCAS by August 1, 1978, and (4) to visit the Medical Center for interviews on a mutually convenient date prior to September 1, 1978.

The academic record must show either completion or plans for completion of all courses required for admission, 90 semester hours of course work, and a cumulative grade-point average of 3.70 or above. Scores on the New Medical College Admission Test must document the applicant's strong academic preparation—usually the 85th percentile or above. 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

Other than special handling and processing of Early Decision applicants, all applicants for admission to the Washington University School of Medicine are treated initially with equal consideration. The deadline for receipt of the application at AMCAS is November 1, 1978.

The Committee on Admissions promptly acknowledges receipt of the AMCAS application and forwards to the applicant the 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. Selected applicants are strongly encouraged to visit the Washington University Medical Center and to be interviewed. Applicants are notified as soon as a final admission decision has been made on their application.

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 entirely 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. From September to June, the Office of Admissions is open on weekdays and until noon on Saturday. During the summer months, the office is closed on Saturday.

During November and December, members of the Committee on Admissions usually visit various parts of the country to interview selected applicants. However, an on-campus interview in St. Louis is deemed highly preferable.

ADVANCED STANDING

Applicants who have satisfactorily completed one or two years of study toward the M.D. degree at an approved medical school in the United States may be accepted for admission to the second- or third-year class when vacancies exist, provided that

1. they comply with the requirements for admission to the first-year class;
2. they have satisfactorily completed courses equivalent in general content and duration to those in this School in the years for which credit is asked;
3. they pass any examinations required by the Committee on Admissions in subjects already covered.

An applicant for admission to an upper class must have studied as a matriculated medical student in an approved medical school for a period equivalent to that already spent by the class to which admission is sought.
TUITION AND FEES

The following fees are applicable to first-year new matriculants for the 1978-79 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) ....................................... 5,600

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 1978-79

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 $8,123 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) ................................ $5,600
Microscope rental .......................................................  90
Books and supplies ..................................................... 435
Housing (Olin Residence Hall) ........................................ 864
Board (Medical Center Cafeterias) .................................. 1,134
The ability to finance a medical education at Washington University does not influence the student selection process. 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) Application for Financial Aid will be sent to the student by return mail.

As all students accepted for admission have proven scholastic ability, financial assistance is awarded on a basis of documented financial need which cannot be met by student and family resources. Many students who consider themselves independent of their parents arrange loans from parents with specific terms of repayment and interest.

The GAPSFAS Application for Financial Aid for the academic year 1978-79 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. An official copy of the parents’ and the applicant’s U.S. individual income tax return completes the data required for financial aid consideration.

The School asks that the application be forwarded promptly, hopefully within two weeks from date of receipt, to GAPSFAS for processing. The Committee normally makes an award decision within two weeks of the date the processed Application for Financial Aid is received from GAPSFAS. All information is evaluated by the Committee on Student Financial Aid and 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 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 to a student while enrolled in the School.

All awards are made for a given academic year; however, students may renew 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. Medical students married to schoolmates should submit individual applications, together with financial statements from each student’s parents. First- and second-year students are urged not to accept employment during the academic year. A number of third- and fourth-year students find employment in hospitals within the Medical Center. The Personnel Office provides assistance to students’ spouses seeking employment.

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.

Students are not permitted to travel outside the continental United States during the academic year in which they receive financial aid from the School.
Financial Information

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 beginning in 1979. The scholarships will be awarded, without regard to financial need, to students of proven academic excellence. In early fall 1978, selected applicants to the School's 1979 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 1979 scholarship recipients will be made on February 1, 1979.

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.

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

Harville-Bailey Scholarship. Established in 1970 under the will of Miss Isabel Bailey Harville as a memorial to Dr. Charles Poplin Harville 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.

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 stipend and cost of tuition 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.

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 Vallé Brookings Scholarship and Loan Fund. Established in 1957 by Isabel Vallé 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.
Financial Information

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. Scheve 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.

Gustav 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 need.

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 in Surgical Research. Established in 1970 by an alumnus and his wife to encourage medical students to pursue their interest in 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.

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 Massie 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.

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 Book Prizes. Awarded at the end of the fourth year for general excellence in neurology and 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.

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 Off-Campus Housing Office, located in the Women's Building on the West Campus, Box 1059, Washington University, St. Louis, Missouri 63130, telephone (314) 889-5092, maintains listings of housing appropriate for married and single students.

The Spencer T. Olin Residence Hall has accommodations for approximately 300 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 1978-79 are:

School Year: September-June (Nine Months)
- Two-room suite: $954
- Single room: $864
- Double room: $720
- Large single: $1035

Summer 1978: for Three Months
- Two-room suite: $318
- Single room: $288
- Double room: $240
- Large single: $345

Summer 1978: Weekly Rates for Student Visitor
- Two-room suite: $39
- Single room: $32
- Double room: $26

Daily Rates for Visitors
- Two-room suite: $16
- Single room: $15
- Single room (prospective student): $12
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. An annual permit must be purchased for use of University-owned lots. The use of the Busch lot is free but a permit is required. Permits for both these facilities 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 2.4 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 from John Denver to KISS round out the city's cultural opportunities.

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

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 enthusiastically 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 post-graduate 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 Day at the School of Medicine for Outstanding High School Seniors, a program that permits a freshman medical student to spend time with a local practicing physician who is an alumnus, 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.

LECTURESHPs 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.
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 enabled the School to establish a series of informal discussions led by outstanding scholars from fields other than medicine and the biological sciences. Mr. and Mrs. Graham’s purpose was concordant with that of the School: to encourage opportunities for students to expand their views on social, philosophical, artistic, and political topics. The Graham Colloquia guests, selected by the students, are planned to foster an informal, lively exchange of views.

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 annually a 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.

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.

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

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.

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 formed in 1899 by the union of the first two medical schools established west of the Mississippi River: the Missouri Medical College and the St. Louis Medical College.

These pioneer colleges set high standards for medical education during the heyday of the medical diploma mills, when there were three times as many medical schools operating in St. Louis as there now are in the entire state of Missouri. They raised their graduation requirements, so that at the time they became associated in 1899, each required its students to complete satisfactorily a four-year graded course for the M.D. degree.

Both colleges were particularly fortunate in attracting men of energy, integrity, and skill. Members of their faculties were well known at home and abroad. Charles A. Pope at thirty-six became the youngest president in the first hundred years of the American Medical Association, and his successor as professor of surgery at the St. Louis Medical College, E. H. Gregory, was elected president in 1886. John T. Hodgen, a graduate of the Missouri Medical College and later dean and professor of surgical anatomy at the St. Louis Medical College, was president of the American Medical Association in 1880. Hodgen originated the splint which is still used today for hip fractures.

From their beginnings, each college sought university affiliation. The St. Louis Medical College was established as the Medical Department of St. Louis University, became independent in 1855, and affiliated with Washington University in 1891, although it retained its name until the union with the Missouri Medical College in 1899. The Missouri Medical College, first established as the Medical Department of Kemper College, was later the Medical Department of the University of Missouri. It became independent in 1857. In 1899, the Missouri Medical College affiliated with the St. Louis Medical College, and thus formed the Medical Department of Washington University.

In 1909, Abraham Flexner began a survey of 155 medical schools in the United States and Canada for the Carnegie Foundation for the Advancement of Teaching. The published result was the famous *Bulletin Number Four* on the state of medical education in the United States and Canada. Flexner's survey and a similar survey by the American Medical Association created a national sensation. Some schools collapsed, others pooled their resources, while still others reorganized.

The Medical School of Washington University did not escape criticism. In his report to Dr. Henry Pritchett, president of the Carnegie Foundation for the Advancement of Teaching and former professor of astronomy at Washington University, Flexner said that “the department must be either abolished or reorganized.”
Dr. Pritchett mailed the report to Robert S. Brookings, a St. Louis merchant who was president of the Board of Directors of Washington University. Mr. Brookings immediately went to New York to discuss the report with Mr. Flexner.

The meeting in 1909 of Robert S. Brookings and Abraham Flexner was of unsurpassed significance in the history of the Washington University School of Medicine, for it led to the complete reorganization of the School and the establishment of the present Medical Center. Abraham Flexner inspired the dream of a model medical school. Robert S. Brookings accepted the challenge, and with the energy and vision shown in all his enterprises, made the dream a reality.

During the spring of 1912, construction was begun at a new location for the medical school and hospital buildings which form the nucleus of the present Medical Center. The laboratories were moved from their old quarters in downtown St. Louis into the new buildings on Euclid and Kingshighway during the summer of 1914.

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

These prophetic words of Mr. Brookings have been realized. Local, national, and international recognition has come to the School and to its faculty. Members of the faculty have received numerous awards. Eleven Nobel Laureates have worked in the laboratories of the School’s medical science departments.

In the ensuing years, the Medical Center has continued to grow and to provide excellent facilities. With the increase in the physical plant there has also occurred a great increase in the size of the faculty. The expansion has been made without compromise in the standards which marked the early development of the Medical Center. As a result, significant achievements in both research and clinical areas have been consistently recorded, and the School of Medicine has continued to attract students and faculty of the highest caliber.
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. Multidisciplinary 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 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.

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.

The Library

The School of Medicine Library is one of the largest medical libraries in the Midwest. It contains a collection of more than 150,000 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, Toxline, and Chemical Abstracts Condensates). A small collection of audiovisual materials is maintained, and may be viewed in several locations in the Library.

Library hours are 8:30 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 WEST OF EUCLID AVENUE

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 the 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.

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 Eliot 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.
Facilities Owned by Washington University and Shared with Barnes Hospital

The following buildings are owned by the School of Medicine, with all patient-care services being operated by Barnes Hospital.

Renard Hospital provides 104 beds for patients with psychiatric disorders and contains laboratories and offices for the Department of Psychiatry.

David P. Wohl, Jr., Memorial Hospital, opened in 1953, contains facilities for 80 medical patients. Offices and laboratories for the Departments of Medicine and Surgery are also available in Wohl Hospital.

David P. Wohl, Jr., Memorial—Washington University Clinics 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.

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 650,000 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 federation 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, which is under the aegis of the Washington University 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 $36,000,000 worth of construction has been completed or commissioned.

Barnes Hospital is the largest hospital in the Medical Center. It is independently owned but, through a special agreement, operates all inpatient facilities and clinics owned by the University. These contiguous facilities provide the chief source of clinical experience for medical students. The Barnes Group 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. A large central diagnostic laboratory provides modern diagnostic patient services. The East Pavilion is a fourteen-story inpatient hospital owned jointly by Washington University and Barnes Hospital. This multidisciplinary patient-care center contains 64 private and 200 semiprivate rooms, 30 beds for intensive care, obstetrical delivery suites, and 22 operating rooms for neurosurgery, ophthalmology, otolaryngology, and gynecology.

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.
Teaching Facilities

St. Louis Children's Hospital, from its earliest days, governed by its own directors, 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 for 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 four City Hospitals:
- Max C. Starkloff Hospital, with 550 beds.
- Homer G. Phillips Hospital, with 466 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
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 conjointly 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 lectures dealing with anatomical principles and with human growth and development. The course in microscopic anatomy consists largely of cell and tissue biology, with laboratory sessions paralleling the lectures in these 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 into clinically useful information. Radiologic anatomy and clinical correlation conferences further aid in this process. Occasional attendance at autopsies is recommended. Credit 6 units.
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)
- The structure and pharmacology of the retina. (Dr. Cohen)
- Neural growth and development. (Dr. Cowan)
- 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)

The organization of the mammalian spinal cord. (Dr. Loewy)

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.
Lorraine F. Lake, B.S., Washington University, 1950; M.A., 1954; Ph.D., 1962. (See Irene Walter Johnson Institute of Rehabilitation, Program in Physical Therapy, and Department of Preventive Medicine and Public Health.)

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

Robert H. Waterston, B.S.E., Princeton University, 1965; M.D., Ph.D., University of Chicago, 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 Associate Professors

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

Larry W. Swanson, B.A., Pomona College, 1968; Ph.D., Washington University, 1972.

Research Instructors

Francis A. Mithen, B.S., Tufts University, 1967; M.D., Columbia University, 1971.

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

Research Associate

Roger M. Harris, B.S., Stanford University, 1968; Ph.D., University of Washington, 1975.

Research Assistants


Theodore R. Lane, B.S., Tufts University, 1962; M.S., Purdue University, 1965; Ph.D., 1967.
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, cardiopulmonary 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 A. Felts, B.S., DePauw University, 1943; M.D., Northwestern University, 1946.

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.

A. Ercument Kopman, M.D., Istanbul University, 1947.


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.

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

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.

Barbara R. Krupin, B.S., University of Minnesota, 1966; M.D., 1968. (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 F. Lucas, B.S., John Carroll University, 1953; M.D., St. Louis University, 1958.

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

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, with varying emphasis on enzymology, metabolism, physical chemistry, structural studies, or biochemical genetics. Some summer research scholarships are offered to students of medicine.
RESEARCH

Bio 590. Research opportunities

These are offered in the following general areas of biochemistry:

- X-ray analysis of protein structure; 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. Brown)
- Studies of pathways of carbohydrate metabolism in mammalian tissues. (Dr. Brown)
- Comparative enzymology of purine metabolism in developing muscle and erythrocytes. (Dr. Chilson)
- Mechanism of enzyme reactions. (Dr. Drysdale)
- Structure, function and topography of cell-surface macromolecules which regulate morphogenesis. (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 recognition in the nervous system. (Dr. Gottlieb)
- Computer methods in biochemistry and mass spectrometry. (Dr. Holmes)
- Biochemical studies of protein-lipid interactions; mechanism of blood clotting. (Dr. Jackson)
- Biochemistry of collagen. (Dr. Jeffrey)
- Immune damage to and immunogenicity of natural and model cell membranes. (Dr. Kinsky)
- Research on the structure, function, and biosynthesis of complex oligosaccharides present on mammalian 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 localization, physical and chemical properties. (Dr. B. Moore)

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

Nucleic acid biochemistry of eukaryotes. Regulation of transcription during cell differentiation and during viral oncogenesis. (Dr. Roeder)

Relationship of inositol metabolism to secretory events. (Dr. Sherman)

Membrane biochemistry of prokaryotes and eukaryotes. (Dr. Silber)

Protein biosynthesis of eukaryotes. Translation and processing of secretory proteins and peptide hormones. (Dr. Strauss)

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

Steroid metabolism and action. (Dr. Warren)

Enzyme mechanism, structure and function of serum lipoprotein. (Dr. Weidman)

Biocatalytic transformations of steroid hormones; hormone effects at the cellular level. (Dr. West)

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

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 532. Biochemistry of the Extracellular Matrix
Bio 535. Physical-Chemical Basis of Techniques in Molecular Biology
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.)

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

David J. 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.)

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

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

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.)

Stuart W. Weidman, A.B., Washington University, 1957; M.A., 1963; Ph.D., University of Chicago, 1965. (See Department of Preventive Medicine and Public Health.)

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

Instructors
William H. Holland, A.B., Washington University, 1950. (See Department of Psychiatry.)


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

Bio 537. Protein Chemistry and Enzyme Mechanisms
Bio 538. Structure and Function of Cell Membranes and Surfaces
Bio 540. Cell Surface Receptors
Bio 544. Mechanisms of Disease (Cancer)
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 offer a program of preclinical and graduate instruction in genetics. A medical genetics course in the second semester of the first year is designed to provide the student with background in the basic principles of genetics and to introduce more 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 small. Its research and graduate training programs are concentrated primarily in the areas of immunogenetics and mammalian biochemical genetics. However, a substantial future growth of the Department is now being planned. As the Department expands, other areas of active genetic investigation and interest will be represented and a broad, comprehensive program of research and graduate training opportunities will be developed. An advanced course in immunogenetics is being offered in the second semester. Additional graduate courses will be developed for next year. Opportunities for research training and experience are available at all levels.
FIRST YEAR
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:
- Structure and genetic control of cell membrane alloantigens. (Dr. Cullen)
- Biochemical population genetics. Kinetic analysis of isozymes. (Dr. Johnson)
- Genetics of immune response. Mammalian biochemical genetics. (Dr. Shreffler)

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.
John Milliken
Department of Medicine

The general medicine teaching services of the Department are located at Barnes Hospital, Jewish Hospital, St. Louis City Hospital (Starkloff Division), and Veterans Hospital (John Cochran Division), under the following directors:

Barnes Hospital, Dr. Kipnis
House Staff Training Program, Dr. Aach
Jewish Hospital, Dr. Peck
St. Louis City Hospital, Dr. Vavra
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. Deuel
Immunology and Allergy Diseases, Drs. C. Parker, Little
Infectious Diseases, Drs. Medoff, Liebhaber
Laboratory Medicine, Dr. Jarett
Medical Genetics, Dr. Sly
Pulmonary Diseases, Drs. Pierce, Senior
Renal Diseases, Drs. Klahr, Lubowitz
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 aspect 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.

(Department of Medicine 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/she 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 self-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 3.6:1; 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, Starkloff City 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, Vavra, 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 post-mortem 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 pathological findings are presented by the pathologists.

(Dr. Kipnis and Medical Staff, Dr. Kissane and Pathology Staff)
Forth 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, Starkloff City 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, Vavra, and Staff)

Friday Noon Medical Clinics

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

Clinical Pathological Conference

Thursdays, 12-1 p.m., September to June.

(Dr. Kipnis and Medical Staff, Dr. Kissane and Pathology Staff)

Arthritic and Rheumatic Diseases

(a) Clinical Rheumatology. Students will participate in consultations, clinical, 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 occurring at the plasma membrane transmit appropriate signals to cell interior. (Dr. Atkinson)

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

(Dr. Spilberg)

Cardiovascular Disease

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

(Dr. Rutwitch and Staff)

(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.

(Drs. Kleiger, Krone, Oliver, and Staff)
(d) Research. Minimum of 12 weeks, all day.

1. Lipids in cultured myocardial cells. (Dr. Ahumada)
2. Myocardial contractile proteins and assessment of metabolism and function in anoxic and ischemic isolated perfused hearts. (Dr. Henry)
3. External assessment of myocardial metabolism and ischemic injury with positron-emitting isotopes. (Dr. Klein)
4. Hemodynamics, myocardial mechanics, and ventricular function (cardiac catheterization). (Dr. Ludbrook)
5. Protection of ischemic myocardium in the experimental and clinical setting. (Dr. Roberts)
6. Detection, quantification, and assessment of the mediation of myocardial ischemic injury. (Dr. Sobel)
7. Ultrasonic assessment of cardiac metabolism. (Dr. Mimbs)
8. Biochemistry and measurement of cardiac glycosides; studies of the enterohpatic circulation of digoxin. Applications of radioimmunoassays to Cardiology. (Dr. Oliver)
9. Application of digital computers for measuring left ventricular function and contractility. (Drs. Hieb, Krone, Oliver)
10. Experimental analysis of mechanisms of arrhythmia. (Dr. Corr)

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 the hepatitis-associated antigen (HAA). (Drs. Auch, Perrillo)
2. Research on intestinal protein metabolism. (Dr. Alpers)
3. Research on lymphocyte function in intestinal disease. (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. Sly and Staff)

(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.
1. Biochemical studies of the regulation of DNA synthesis in normal and transformed mammalian cells. (Dr. Berger)
2. Normal and deranged iron metabolism. (Dr. Brown)
John G. Haddad, Jr., B.A., Tulane University, 1958; M.D., 1962. (On leave of absence.)

Bevra H. Hahn, B.Sc., Ohio State University, 1960; M.D., Johns Hopkins University, 1964.

Philip D. Henry (Established Investigator of the American Heart Association), M.D., University of Berne, 1960.

Craig M. Jackson, B.S., Washington State University, 1963; Ph.D., University of Washington, 1967. (See Department of Biological Chemistry.)

John J. Jeffrey, Jr. (Dermatology), B.S., College of the Holy Cross, 1958; Ph.D., Georgetown University, 1967. (See Department of Biological Chemistry.)

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

Harvey Liebhaber, A.B., New York University, 1953; M.D., 1957. (See Department of Microbiology and Immunology.)

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

Philip R. Ludbrook, M.B., B.S., University of Adelaide, 1963. (See Department of Radiology.)

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


Mabel L. Purkerson, A.B., Erskine College, 1951; M.D., Medical College of South Carolina, 1956. (See Administration and Department of Pediatrics.)

Robert Roberts, B.Sc., Memorial University, 1961; M.D., Dalhousie University, 1965.

3. Investigation in fields of coagulation, thrombosis, fibrinolysis and hemostasis. (Dr. Fletcher)

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)

6. Biochemistry of platelets, regulation of lipid metabolism in tissue culture; mechanism of platelet thrombus formation. (Dr. Majerus)

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

Hypertension
Research. Individualized research project and or participation in a community hypertension program. (Dr. Perry)

Immunology
Research. Minimum of 12 weeks, all day. Research in areas of experimental immunotherapy of murine leukemias or detection and quantitation of cell membrane antigens by radioimmunoassay. (Dr. Little)

Infectious Disease
(a) Clinical Infectious Diseases. Study of ward and private patients. Barnes Hospital, six weeks, all day. (Dr. Gelb, Medoff)

(b) Research. 1. Integration-function of oncogenic virus DNA; Properties/localization of hepatitis B specific nucleic acids. Properties of varicella-zoster virus DNA and detection in latent infections. (Dr. Gelb) 2. Effective therapy for fungal infections, control of membrane permeability of fungi, normal and transformed animal cell alteration and control of immunologic response to infection and tumors, drug studies on bacterial pathogens. (Dr. Medoff)

Laboratory Medicine
(a) Clinical Microscopy. A lecture-seminar elective, periods one and two. Course designed to study the morphology of blood and bone marrow of the current hematologic patients. (Dr. Minnich)

(b) Clinical Laboratory Medicine. A full-time elective, periods four and six. 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 in the laboratory. (Dr. Jarett and Stahl)

(c) Research.
1. Identification of human cancer plasma membrane antigens absent from normal adult tissue. Further purification of plasma membrane antigen high associated with oat cell carcinoma of the lung. (Dr. Bell)

2. Clinical and analytical enzymology and computerized instrumentation. (Dr. Davis)

3. Mechanism of insulin action, particularly as it relates to the adipocyte. (Dr. Jarett)

4. Research interests, both basic and clinical, involving studies of platelets and platelet function in hemostasis and thrombosis. (Dr. Joisl)

5. Elaboration of physiologic rationale for differences between activity and concentration of electrolytes, particularly calcium. (Dr. Ladenson)
6. Application of computer technology to Laboratory Medicine.  
(Dr. J. Lewis)

7. Purification of RNA polymerase I from resting and serum-stimulated cells to determine if increased activity is due to changes in concentration of enzyme and/or change in its catalytic efficiency.  
(Dr. Mauck)

(Dr. Murray)

9. Mechanism of insulin action at the cellular level and application of cellular research in diagnosis and treatment of diabetics.  
(Dr. McDonald)

10. Research elective designed to familiarize student with fundamental concepts and transplantation immunology.  
(Dr. Rodey)

11. Metabolism of coagulation moieties, in particular fibrinogen and platelets of thrombus localization and of applied blood banking.  
(Dr. L. Sherman)

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)

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

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

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.) (University Health Service.)


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.

Franz U. Steinberg, M.D., University of Bern, 1938. (See Departments of Preventive Medicine and Public Health and Surgery.)

Assistant Professors


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

Clifford A. Birge, A.B., Amherst College, 1956; M.D., Washington University, 1961. (See Division of Health Care Research.)

Robert M. Bruce, A.B., Washington University, 1964; B.S., University of Minnesota, 1968; M.D., 1968.

(c) 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. Six weeks, all day. Study of patients with renal disease and electrolyte disorders. (Drs. Hoffsten, Hruska, Klahr, and Statopoulos)

(b) Renal and Electrolyte Disorders. Jewish Hospital, six weeks, all day. (Dr. Lubowitz and Staff)

(c) Mixed clinical and research electives.

1. Effects of phosphate depletion on glucose utilization, effects of PTH on carbohydrate intolerance of uremia, effects of PTH and phosphate depletion 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. Harter)

2. Pathogenesis of glomerulonephritis with emphasis on experimental animal models and prevention of disease. (Dr. Hoffsten)

3. Effects of parathyroid hormone on glucose metabolism by the liver. Studies on cyclic AMP metabolism by liver and kidney. (Dr. Hruska)

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

5. Pathophysiology of renal and electrolyte disorders, 12 weeks, all day. (Drs. Lubowitz, Mazumdar, Maloni)

6. Methodology used in transmission and scanning electron microscopy. (Dr. Purkerson)

7. 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)

8. Radioimmunoassay for parathyroid hormone. Studies investigate interrelationship between vitamin D metabolism and parathyroid metabolism. (Dr. Slatopolsky)
John E. Burkert, B.S., University of San Francisco, 1963; M.D., Marquette University, 1968.


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


Ali Akbar Ehsani, M.D., Tehran University, 1965. (Department of Preventive Medicine and Public Health.)


Lawrence D. Gelb (Howard Hughes Medical Institute Investigator in Medicine), B.S., University of Michigan, 1963; M.D., Harvard University, 1967. (See Department of Microbiology and Immunology.)


Andrew P. Goldberg, B.A., Clark University, 1965; M.D., State University of New York, Downstate, 1969. (See Department of Preventive Medicine and Public Health.)

Siddhesh Gowda, M.B., B.S., Medical College Bellary Mysore, 1969.

Theodore J. Hahn, Jr., A.B., Princeton University, 1960; M.D., Johns Hopkins University, 1964.

Herschel R. Harter, B.S., Marquette University, 1962; M.D., Georgetown University, 1966.

Geoffrey P. Herzig (Leukemia Society of America Scholar), B.S., University of Cincinnati, 1963; M.D., Western Reserve University, 1967.


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

Keith A. Hruska, B.S., Creighton University, 1965; M.D., 1969.


Johann H. Joist, M.D., University of Cologne, 1962. (See Department of Pathology.)

Donald K. King, A.B., Fairfield University, 1966; M.D., Johns Hopkins University, 1970.

John H. Kissel, B.S., Georgetown University, 1967; M.D., Harvard University, 1971.

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

Ronald Krone (John E. Simon Scholar in Medicine), M.D., University of Chicago, 1966.

Anthony Kulecycki, Jr., A.B., Princeton University, 1966; M.D., Harvard University, 1970.

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

Paul D. Laman, Jr., B.S., Rensselaer Polytechnic Institute, 1966; M.D., University of Pittsburgh, 1970.


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


John C. Mauck, B.S., Purdue University, 1967; Ph.D., Washington University, 1971. (See Department of Pathology.)

Debesh Mazumdar, M.B., All India Institute of Medical Sciences, 1964; B.S., 1964.

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


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.


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.

Cary A. Presant, M.D., State University of New York at Buffalo, 1966. (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.)

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.)

Kongsak Tumphaichitr, M.D., Siriraj Hospital Medical School, 1970. (See Division of Health Care Research.)

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

Joseph L. Witztum, A.B., University of Helsinki, 1965; M.D., Vanderbilt University, 1969. (See Department of Preventive Medicine and Public Health.)

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

Research Assistant Professors


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

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


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

Doris Rolf, A.B., Harris Teachers College, 1936.

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

Jo L. Seltzer (Dermatology), A.B., Washington University, 1963; Ph.D., 1969.


Shiu Y. Yu, B.S., Provincial College, 1951; M.S., Oklahoma State University, 1956; Ph.D., St. Louis University, 1963.

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.

Morris Moore (Mycology-Dermatology), S.B., Boston University, 1928; A.M., Harvard University, 1929; Ph.D., Harvard University, 1933.

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


Ray D. Williams, A.B., Hampden-Sydney College, 1930; M.S., Emory University, 1931; M.D., Washington University, 1937.

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, 1990; M.D., 1993. (Director, Medical Service, Homer G. Philips Hospital.)


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.


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

Francis J. Catanzaro, M.D., Washington University, 1948.


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.

Mervin 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., University of Arkansas, 1942; M.D., University of Arkansas, 1948.


William G. Juergens, Jr., M.D., University of Missouri, 1959.

Owen S. Kantor, M.D., University of Washington, 1933; M.D., 1937.

Owen S. Kantor, M.D., University of Washington, 1933; M.D., 1937.


Bernard Hulbert, B.A., University of Wisconsin, 1938; M.D., 1941.

James H. Hutchinson, Jr., B.S., University of Arkansas, 1942; M.D., University of Arkansas, 1948.


William G. Juergens, Jr., M.D., University of Missouri, 1959.

Owen S. Kantor, M.D., University of Washington, 1933; M.D., 1937.

Norman P. Knowlton, Jr., B.S., Harvard University, 1942; M.D., 1947.


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. (See Biomedical Computer Laboratory.)
Robert S. Mendelsohn, B.A., Washington University, 1950; M.D., St. Louis University, 1954.
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 F. Nickel, A.B., University of Oklahoma, 1944; M.D., Washington University, 1948.
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.
James C. Sisk (Dermatology), A.B., Washington University, 1943; M.D., 1946.
Ross 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. Wennever, A.B., Washington University, 1949; M.D., 1953.
Herbert B. Zimmerman, M.D., Washington University, 1951.
Instructors
James K. Burks, B.S., Texas Tech University, 1967; University of Texas Southwestern Medical School, 1971.
Greta Camel, A.B., University of Wisconsin, 1946; M.D., 1949.
Edward J. Campbell, B.S., Purdue University, 1969; M.D., Washington University, 1972.
Nicholas V. Costrini, B.S., Georgia State University, 1967; Ph.D., Marquette University, 1970; M.D., Medical College of Wisconsin, 1973.
Guner B. Gulmen, M.D., Hacettepe University, 1969. (See Division of Health Care Research.)
Milton S. Klein, B.S., McGill University, 1968; M.D., University of California, 1972.
Larry Kurz, B.S., Washington University, 1966; M.D., 1970; M.Div., Union Theological Seminary, 1974. (See Division of Health Care Research.)
Marshall R. Levine, B.A., Emory University, 1970; M.D., Cornell University, 1974. (See Division of Health Care Research.)


John M. Michael, B.A., University of Kansas, 1969; M.D., Washington University, 1973. (See Department of Pathology.)


Gordon L. Phillips II, B.A., University of Oklahoma, 1966; M.D., 1971. (See Department of Radiology.)


Frederick J. Schwartz, M.D., Washington University, 1974. (See Division of Health Care Research.)


Louis Simchowitz, B.S., City College of New York, 1966; M.D., New York University, 1970.


Elizabeth A. Stoddard, B.S., Montana State University, 1954; M.D., Washington University, 1957. (See Department of Preventive Medicine and Public Health.)

Research Instructor Emeritus

Teofil Kheim, M.D., University of Budapest, 1934.

Research Instructors


Joseph D. Byrne

Elaine M. Carlson, B.A., Northeastern University, 1966; M.S., Massachusetts Institute of Technology, 1968.


Norma J. Janes, B.S., Millikin University, 1953; M.S., State University of Iowa, 1964.

Mary C. Johnson, A.B., Washington University, 1938.

Buddhiraju V. Kumar, B.S., Osmania University, 1963; M.S., 1965; Ph.D., 1970.

Seppo K. Lindy (Visiting Staff, Dermatology), M.D., University of Helsinki, 1968; B.M., 1969; Ph.D., 1970.

Ingrid R. Albert (Dermatology), A.B., Barnard College, 1967; M.D., Albert Einstein College of Medicine, 1970.

Instructors Emeriti (Clinical)

Harry Agress, B.S., Washington University, 1932; M.D., 1932.

Louis F. Aitken, B.S., University of Illinois, 1923; M.D., Washington University, 1927.

Edward W. Cannady, A.B., Washington University, 1927; M.D., 1931.


Julius Elson, M.D., Washington University, 1928.

Lee B. Harrison, A.B., University of Utah, 1925; M.D., Washington University, 1927.

J. Ted Jean, A.B., Indiana University, 1924; M.D.; Washington University, 1928.

John W. Seddon, Ph.B., Yale University, 1931; M.D., Washington University, 1935.


Instructors (Clinical)


Jerome M. Aronberg (Dermatology), A.B., Washington University, 1947; M.D., 1951.

Walter M. Baumgarten, Jr., A.B., Washington University, 1935; M.D., 1939.

Frederick D. Bauschard (Dermatology), A.B., Allegheny College, 1941; M.D., University of Pittsburgh, 1948.

Aaron Birenbaum, M.D., Washington University, 1948.


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.

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, 1945; M.D., Louisiana State University, 1969.


David N. Kerr, A.B., University of Colorado, 1936; M.D., Washington University, 1941.

Melvin B. Kirstein, B.S., Indiana University, 1936; M.D., 1933.


Ralph F. Kuhlman, M.D., University of Illinois, 1964. (Also Student Health Service.)

Daniel K. Lane (Dermatology), B.A., Princeton University, 1955; M.D., Washington University, 1959.

Ellis S. Lipsitz, A.B., Yale University, 1940; M.D., St. Louis University, 1943.


Richard W. Maxwell, A.B., Greenville College, 1932; M.D., University of Chicago, 1937.

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.

Arlen E. Montgomery, M.D., University of Pittsburgh, 1954.


Lamar H. Ochs, A.B., Washington University, 1941; M.D., 1944.


David W. Orthals, B.S., St. Louis University, 1966; M.D., Washington University, 1970.

Robert F. Owen, B.A., Princeton University, 1948; M.D., Yale University, 1952.

Daniel E. Potts, B.S., Baylor University, 1968; M.D., Washington University, 1972.

John A. Powell (Dermatology), B.S., University of Notre Dame, 1967; M.D., University of Michigan, 1971.

Vincent J. Proskey, B.S., University of Detroit, 1954; M.D., Marquette University, 1964.


Samuel E. Schechter, M.D., Washington University, 1941.

John B. Shapleigh II, M.D., Washington University, 1946.

John S. Skinner, M.D., Washington University, 1940.

Paul M. Stein, A.B., University of Rochester, 1967; M.D., St. Louis University, 1971.

Arnold S. Tepper, B.S., St. Louis College of Pharmacy, 1966; M.D., University of Missouri, 1970.


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


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

E. Dwight Wooster III, B.S., Wake Forest University, 1967; M.D., University of Virginia, 1971.

Research Associates

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

Anthony S. Hajek, B.A., Lewis College, 1966; M.S., De Paul University, 1969; Ph.D., University of Iowa, 1974.

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

Mary A. Lavin, B.S., St. Louis University, 1964; M.S., 1970; M.S., Harvard University, 1974.

Charles W. Lee, B.S., University of Chicago, 1959; M.S., 1960; Ph.D., Texas A & M University, 1966.

Alice Robinson, A.B., University of California, 1962.

Assistants

Robert L. Fletcher, B.A., University of Kansas, 1974; B.S., Johns Hopkins University, 1976. (See Division of Health Care Research.)

Barbara B. Gross, R.N., Massachusetts General Hospital School of Nursing, 1971; M.N.P., St. Louis Municipal Hospital Nurse Practitioner Program, 1974. (See Division of Health Care Research.)

Janet D. Hoy, B.S., Carroll College, 1975. (See Division of Health Care Research.)

Maureen M. Prange, R.N., Mt. Sinai Hospital School of Nursing, 1966. (See Division of Health Care Research.)

Research Assistants

Hans D. Ambos

Mary J. Baumann, B.S., Southeast Missouri State University, 1967.


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

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

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


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.

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

Kenneth O. Henderson (Dermatology), B.S., University of Missouri, St. Louis, 1971.


Thomas Howard, Sr.

Paul F. Huebner, B.S., Southeast Missouri State College, 1963; M.S., 1968.

Yu-Chiang Lee, B.S., Taiwan Christian College, 1959; Ph.D., Oklahoma State University, 1969.


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


Audrey A. Painter, M.S., Northwestern University, 1956.

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

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

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

Bakula L. Trivedi, M.S., Sarvajanik Science College, 1961.


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 Biomedical 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).
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. (Dr. Berg)

Polymorphism of Ir (immune response) gene products is being studied by chemical means with the aim of relating structure to function. (Dr. Cullen)

Antibody diversity; role of T lymphocytes in B cell differentiation. (Dr. Davie)

Structure and biosynthesis of antibodies; molecular genetics of antibody formation. (Dr. Fleischman)

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

The genetics and immunology of tissue transplantation. Studies of tumor immunology. (Dr. Graff)

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; in particular the dimorphic organism, Histoplasma capsulatum; host-parasite interaction of opportunistic fungus diseases. (Drs. Kobayashi, Medoff)

The structure and biosynthesis of lymphocyte cell surface antigens and lymphocyte triggering mechanisms. The effects as adjuvants in 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)

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

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

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 infection-viral-antibody complexes. (Dr. Schlesinger)

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

RNA processing and the balance of RNA synthesis and degradation in bacteria and mammalian cells. (Dr. D. Schlessinger)

Structure-function relationships of transplantation antigens and immune response region associated antigens. (Dr. Schwartz)

The structure of the polynuclear immunoglobulins, IgA, and IgM. Present emphasis is focused on the structure of J chain and its role in the polymerization of IgA. Effects of acute and chronic viral infections on immunocompetent cells. (E. Simms)

Clinical microbiology, anaerobes, endogenous infections enterics 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 course...
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 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.

(Drs. D. Schlessinger and 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, polytenic 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 hormone teratomas, somatic cell genetics, nuclear cytoplasmic relationships, plasmids and cloning of eukaryotic genes in bacteria. Credit 3 units.

(Dr. Apirion)

Bio 539. Molecular Biology of Animal Viruses

Molecular biology of DNA and RNA animal viruses, with emphasis on viral replication and viral-induced transformation of cells in tissue culture and slow viral diseases in animals. Credit 3 units.

(Drs. J. Perrault, 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 543. Molecular Biology of Bacterial Viruses

Structure of bacterial viruses and metabolism of the infected cell, with emphasis on the genetics of host and virus controlled functions. Relationships of virus to cell, e.g., lysogeny, immunity, and virulence, with emphasis on Lambda and T-even bacteriophages. Lectures and seminars. Offered in alternate years. Credit 3 units.

(Drs. Berg, 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, Simms)
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 is the major contributor to an interdepartmental course in Pathophysiology of Nervous System Disorders. Here are demonstrated the interrelationships between knowledge derived from basic investigative and from clinical sources. In addition, there are lectures and exercises with patients in neurological physical diagnosis. Third-year activities are based on a full-time inpatient and outpatient clerkship in clinical neurology. In the fourth year, there are opportunities for clinical externships and for investigation of nervous system functioning in every aspect.

SECOND YEAR
Neurological Examination in Clinical Diagnosis (part of interdepartmental course in clinical diagnosis)
Lectures, demonstrations, and practice examinations of neurological patients.
(Dr. Eliasson and Staff)
Pathology of Nervous System Disorders (part of course in pathophysiology)
A collaborative sequence with other clinical and basic science departments concerned with diseases of the nervous system. Lectures and seminar-symposia.
(Dr. Eliasson and combined Neurology-Neurosurgery Staff)

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

FOURTH YEAR
Electives
Research
A 12-week elective is available in many areas such as neuroanat-
Marcus E. Raichle, B.S., University of Washington, 1960; M.D., 1964. (See Department of Radiology.)

Edward E. Vastola, B.S., Yale University, 1945; M.D., Columbia College of Physicians and Surgeons, 1947. (Starkloff Hospital.)

Professor Emeritus (Clinical)
Irwin Levy, A.B., Cornell University, 1927; M.D., St. Louis University, 1931; D.M.Sc. Columbia University, 1935.

Professors (Clinical)

Associate Professors
Harish C. Agrawal (Neurochemistry), B.Sc., Allahabad University, 1957; M.S., 1959; Ph.D., 1964. (See Department of Pediatrics.)
Lawrence A. Cohen, B.S., Western Reserve University, 1948; M.D., 1954; M.A., Northwestern University, 1951.
Alan L. Pearlman, A.B., State University of Iowa, 1958; M.D., Washington University, 1961. (See Department of Physiology and Biophysics.)
W. Thomas Thach, Jr., A.B., Princeton University, 1959; M.D., Harvard University, 1964. (See Department of Anatomy and Neurobiology.)
Joseph J. Volpe, B.A., Bowdoin College, 1960; M.D., Harvard University, 1964. (See Department of Pediatrics.)

Associate Professor Emeritus (Clinical)
Andrew B. Jones, M.D., Vanderbilt University, 1916.

Clinical Neurology
A six-week 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. (Drs. Goldring, Landau, and combined Neurology-Neurosurgery 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 neurological 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 Clopton Amphitheatre 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 autopsy conference room on Thursday at 12:30 p.m.
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.)
Robert C. Collins, B.A., University of California-Berkeley, 1964; M.D., Cornell University, 1969. (Starkloff Hospital.)
Ruthmary K. Deuel, B.A., Mount Holyoke College, 1956; M.D., Columbia College of Physicians and Surgeons, 1961. (See Department of Pediatrics.)

W. Edwin Dodson, A.B., Duke University, 1963; M.D., 1967. (See Department of Pediatrics.)
Joseph Hanaway, B.A., McGill University, 1956; M.D., 1960; C.M., 1960. (See Department of Anatomy and Neurobiology.)
Charles P. Hughes, B.A., Yale University, 1960; M.D., Case Western Reserve University, 1964.

George F. Wooten, Jr., B.A., Rice University, 1965; M.D., Cornell University Medical College, 1970. (Starkloff Hospital.)

Research Assistant Professors
Mary I. Johnson, B.S., Washington State University, 1964; M.D., Johns Hopkins University, 1968. (See Departments of Anatomy and Neurobiology and Pediatrics.)
Kenneth K. Kaiser, B.S., Colorado State University, 1968

Assistant Professors (Clinical)
Joseph T. Black, B.A., University of Rochester, 1961; M.D., Upstate Medical Center, Syracuse, 1965.
Joseph M. Dooley, Jr., B.S., St. Louis University, 1954; M.D., 1958.

Instructors
Charles S. C. Chang, B.S., Johns Hopkins University, 1968; M.D., 1972. (See Department of Pediatrics.)

Instructor (Clinical)
Robert J. Mueller, M.D., Washington University, 1936; M.S., University of Michigan, 1942.

Research Associates
David E. Crowley, B.A., Middlebury College, 1961; M.A., University of Vermont, 1963; Ph.D., Princeton University, 1965. (Also Computer Systems Laboratory.)

Research Assistants
Joseph Inukai (See Neurological Surgery.)
JoAnne D. Scarpellini

Lloyd N. Simpson (See Neurological Surgery.)
Jeanne M. Smith

NEUROLOGICAL SURGERY
Professor and Head
Sidney Goldring, B.S., Washington University, 1943; M.D., 1947.
August A. Busch, Jr., Professor
Henry G. Schwartz, A.B., Princeton University, 1928; M.D., Johns Hopkins University, 1932.

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

Professor Emeritus (Clinical)
Leonard T. Furlow, B.A., Emory University, 1923; 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
Shi H. Huang, B.M., National Taiwan University, 1946; M.D., 1951

Instructor
Arthur B. Jenny II, B.A., Johns Hopkins University, 1936; M.D., 1939

Research Assistants
Isaac A. Edwards
Joseph Inukai (See Neurology.)
Carl S. Pieper
Lloyd N. Simpson (See Neurology.)
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.
of Pharmacy, 1964; M.S., Purdue University, 1966; Ph.D., Washington University, 1970. (See Department of Pharmacology.)

H. Marvin Camel, M.D., Creighton University, 1950.


James D. Jones II, B.S., Louisiana State University, 1940; D.D.S., Loyola University of the South, 1945; M.D., University of Alabama, 1957. (See Department of Anesthesiology.)

Jacques Sauvage, B.S., University of Liege, 1953; M.D., 1957.

Research Associate Professor
Frederick Sweet, B.S., City University of New York, 1960; Ph.D., University of Alberta, 1968.

Associate Professors (Clinical)

Charles R. Gulick, A.B., Central College, 1940; M.D., St. Louis University, 1943.


David Rothman, B.S., Washington University, 1935; M.D., 1935.

Assistant Professors
James P. Crane, A.B., Indiana University, 1966; M.D., 1970.

Ming-Shian Kao, M.D., National Taiwan University Medical College, 1961.

David W. Keller, B.S., Canisius College, 1960; M.D., University of Buffalo, 1964.

Kenneth V. Polakoski, B.S., Wisconsin State University, 1966; M.S., University of Georgia, 1971; Ph.D., 1972.

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 quantification 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
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. Camel)

Perinatal Medicine
Electroencephalographic 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. Sauvage)

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, have assigned reading and obtain experience in clinical research including techniques of radioimmunoassay of protein hormones.
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. Saifee)

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-labeled steroids and anti-steroids and their application to disease states and population control.

**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.

**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.

**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.

**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. Physico-chemical methods are used to study steroid-protein interaction.
Andrew Galakatos, B.S., St. Louis College of Pharmacy, 1960; M.D., University of Missouri, 1965.


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 Remillard, 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.


M. Bryant Thompson, A.B., Eastern New Mexico University, 1957; M.D., University of California, 1961.


Carol F. Williams, B.A., University of Tennessee, 1952; M.D., 1955.

Seth E. Wissner, A.B., Washington University, 1942; M.D., 1945.

Instructors
Edward G. Peskin, B.A., University of Wisconsin, 1970; M.D., Washington University, 1974. (See Division of Health Care Research.)

Salma Saifee, M.D., University of Sind, 1961.

Instructors Emeriti (Clinical)
Hubert L. Allen, A.B., University of Kansas, 1932; M.D., Tulane University, 1936.

Paul F. Max, B.S., Washington University, 1932; M.D., 1932.

Frances H. Stewart, M.D., Washington University, 1927.

Instructors (Clinical)

Joe E. Belew, A.B., Central College, 1953; M.D., St. Louis University, 1957.

Bryce H. Bondurant, A.B., Northeast Missouri State Teachers College, 1936; D.O., Kirksville College of Osteopathy and Surgery, 1940; M.D., Washington University, 1943.


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

Gordon M. Goldman, B.S., Toledo University, 1962; M.D., St. Louis University, 1966.


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

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


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


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

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


Gerald Newport, A.B., Washington University, 1948; M.D., 1953.


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.

Arthur A. Smith, B.A., Southwestern State University, 1952; M.S., University of Arkansas, 1954; M.D., St. Louis University, 1958.

Herman Taute, M.D., Phillips University, 1954.

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

Bernice A. Torin, A.B., Washington University, 1937; M.D., 1941.

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 placed on the use of the ophthalmoscope. During the second year a series of nine didactic lectures is given as an introduction to various aspects of ocular disease. During the third year students are assigned to an ophthalmology clerkship for one week. In the fourth year, a six-week ophthalmology elective is offered to senior students, which affords opportunity for work with patients under supervision.

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

THIRD YEAR
Ophthalmology
All 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 six weeks. He is given instruction in the basic principles of an ophthalmologic examination, including slit lamp biomicroscopy, motility evaluation, neuro-ophthalmologic evaluation, perimetry, ophthalmoscopy, tonometry, etc. He assists in the workup of eye patients at the St. Louis Veterans Administration Hospital and in the East Pavilion and attends all rounds and conferences. This elective is primarily 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. (Drs. Waltman, Palmberg)
Experimental research in anatomy and physiology. (Dr. Cohen)
Associate Professors Emeriti (Clinical)
Howard R. Hildreth, M.D., Washington University, 1928.
Theodore E. Sanders, B.S., University of Nebraska, 1931; M.D., 1933.
Frederick O. Schwartz, M.D., Washington University, 1910.

Associate Professors (Clinical)
Benjamin Milder, M.D., Washington University, 1939.
Edward Okun, B.S., Dartmouth College, 1952; M.D., University of Vermont, 1956.

Assistant Professors
Robert H. Greenfield, B.S., New York University 1966; M.S., 1967; D.Sc., Washington University, 1976. (See Biomedical Computer Laboratory.)
William M. Hart, Jr., Ph.D., University of Maryland, 1970; M.D., 1970.
Paul F. Palmberg, Ph.D., Northwestern University, 1969; M.D., 1970.
Mitchel L. Wolf, B.A., Yeshiva College, 1964, M.D., Albert Einstein College of Medicine, 1968.

Assistant Professors Emeriti (Clinical)
Daniel Bisno, B.A., University of Wisconsin, 1927; M.D., Johns Hopkins University, 1931.

Assistant Professors (Clinical)
Edmund B. Alvis, M.D., Washington University, 1934.
Nevi P. Arribas, M.D., Manila Central University, 1954.

George M. Bohigian, A.B., Washington University, 1961; M.D., St Louis University, 1965.
Isaac Bonik, B.S., Dalhousie University, 1958; M.D., 1962.
Dean B. Burgess, A.B., Occidental College, 1963; M.D., University of California, 1967.
Samuel A. Camaan, Jr., A.B., State University of Iowa, 1942; M.A., Columbia University, 1948; M.D., Meharry Medical College, 1954.
Jack Hartstein, B.S., University of Missouri, 1953; M.D., University of Cincinnati, 1955.
Glen P. Johnston, A.B., Washington University, 1953; M.D., 1956.
Jack Kayes, B.A., Yale University, 1953; M.D., Washington University, 1957.
Terence G. Klingele, M.D., University of California, 1970.
Matthew Newman, A.B., Vanderbilt University, 1956; M.D., Columbia University, 1959.
Lawrence T. Post, Jr., M.D., Washington University, 1948.
Harry D. Rosenbaum, M.D., Washington University, 1934.
Bernd Silver, B.S., University of Louisville, 1952; M.D., 1956.
H. Philip Venable, B.S., Wayne State University, 1938; M.D., 1940.
Charles E. Windsor, A.B., Carleton College, 1956; M.D., University of Rochester, 1960.

Instructor

Research Instructors
Walter J. Grodzki, 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. Blisch, B.S., University of Toledo, 1963; M.D., Washington University, 1967.
Richard F. Escoffery, M.B., B.S., University of West Indies Medical School, 1969.
Ruth S. Friedman, 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.
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.

Assistants
Lisa M. Cibis, M.D., University of Heidelberg, 1939; Certified Orthoptist, Washington University, 1956.
Clemens H. Jacques, B.S., University of California, 1949; O.D., 1949. (See Division of Health Care Research.)
Research Assistants
Nels J. Holmberg, B.S., Oklahoma State University, 1953; M.S., 1956.
Thom F. Wentlandt
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 two weeks on one of the services in East Pavilion, St. Louis Veterans Administration, Max C. Starkloff, or Homer G. Phillips 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.

The ENT rotation is highlighted by a field trip to an outlying community, where a full-time member of the Department evaluates and treats adults and children with common ENT problems. 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 diseases 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. (Dr. Thawley)

THIRD YEAR
Otolaryngology Clerkship
Practical instruction in diagnosis and treatment. Two weeks. (Dr. Thawley)

FOURTH YEAR
Electives
Structure and Innervation of Labyrinth (Dr. Bohne)
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. (Dr. Thawley)

Research Electives
Cytology, neurology, and histochemistry of membranous labyrinth. (Dr. Bohne)
Physiology of larynx. (Drs. Ogura, Harvey)
Nasopulmonary physiology. (Dr. Ogura)
Metabolism of the inner ear. Physiological and biochemical aspects. (Drs. Bohne, Thalmann)
Otoneurology labs. (Dr. Stroud)
Development of otic capsule and ossicles. (Dr. Bohne)
Audiology. (Mr. Phon)
Professor (Clinical)

Associate Professors
Stanley E. Thawley, B.A., University of Texas, 1963; M.D., University of Texas Medical Branch, 1967.
James M. Toomey, B.S., College of the Holy Cross, 1951; D.M.D., Harvard University, 1955; M.D., Boston University, 1958.

Associate Professors Emeriti (Clinical)
William T. K. Bryan, A.B., Washington University, 1929; M.D., 1933.
Harold M. Cutler, A.B., University of Maine, 1930; M.D., Tufts College, 1937.
French K. Hansel, M.D., St. Louis University, 1918; M.S., University of Minnesota, 1923.
Guerdan Hardy, M.D., Washington University, 1929.
Robert E. Votaw, 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, 1936; M.D., 1938.
Joseph W. West, M.D., Duke University, 1944.

Assistant Professors
Joseph A. Davidenas (Microbiology), B.S., University of Alberta, 1964; Ph.D., 1970.

Norman S. Druck, A.B., Washington University, 1967; M.D., University of Illinois, 1970. (Jewish Hospital.)
Timothy J. Reichert, B.S., St. John's University, 1966; B.S., University of North Dakota, 1967; M.D., University of Illinois, 1969. (St. Louis Children's Hospital.)

Assistant Professors Emeriti (Clinical)
Alfred J. Cone, B.S., State University of Iowa, 1921; M.D., 1923; M.S., 1927.
Herbert M. Smith, 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.
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.

Research Assistants
Charles D. Carr

Research Associates
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 the 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. Jarett
- Neuropathology, Dr. Nelson
- Pediatric Pathology, Dr. Kissane
- Surgical Pathology, Dr. W. Bauer

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.)
Leonard Jarett, B.A., Rice University, 1958; M.D., Washington University, 1962. (See Department of Medicine.)
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.
James S. Nelson, M.D., St. Louis University, 1957. (See Department of Pediatrics.)
John W. Olney, B.A., Iowa University, 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. (Jewish Hospital.)
Heschel J. Raskas, B.S., Massachusetts Institute of Technology, 1962; Ph.D., Harvard University, 1967. (See Department of Microbiology and Immunology.)
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 disease (2) cardiovascular, pulmonary and renal diseases, (3) metabolic, endocrine, and gastrointestinal disease, (4) hematologic and oncology, (5) neurophysiology, and (6) developmental, pediatric, obstetric, and gynecologic diseases.

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.

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)
Mechanisms of immune resistance to experimental plasmacytomas. (Dr. Bridges)
Viral infections of the inner ear, environmental pathology. (Dr. G. Davis)
Clinical and analytical enzymology and computerized instrumentation. (Dr. J. Davis)
Experimental analysis of gastric secretion by rat pyloric antral cells in vitro. (Dr. DeSchryver)
Structure and function of endothelial cells of the gastrointestinal tract and pancreas. (Dr. Greider)
Environmental pathology, renin-erythropoietin-juxtaglomerular cells. (Dr. Hartroft)
Mechanism of action of insulin. (Dr. Jarett)
Cellular immunology with particular emphasis on genetic control of antibody responses. (Dr. Kapp)
Surgical pathology of the lung and breast. (Dr. Katzenstein)
Renal pathology, pediatric pathology. (Dr. Kissane)
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)
Application of computer technology and physical instrumentation to the clinical laboratory. (Dr. Lewis)
Chemical carcinogenesis and enzymology of DNA repair. (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)

John S. Meyer, A.B., Yale University, 1952; M.D., Washington University, 1956. (Jewish Hospital.)

Peter A. Pullon, B.A., Albion College, 1960; D.D.S., University of Michigan, 1965; M.S., 1968. (Also School of Dental Medicine.)

Glenn E. Rodey, B.S., Ohio University, 1957; M.D., Ohio State University, 1961. (See Department of Medicine.)


Carl H. Smith, B.A., Swarthmore College, 1955; M.D., Yale University, 1959. (See Department of Pediatrics.)

Steven L. Teitelbaum, B.A., Columbia University, 1960; M.D., Washington University, 1964. (Jewish Hospital.)

Associate Professors (Visiting Staff)

Frederick 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.)

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

Assistant Professors


C. Elliott Bell, Jr., B.S., Tulane University, 1960; M.D., 1964. (See Department of Medicine.)


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.

RNA metabolism in cultured fibroblasts. (Dr. Mauck)

Analysis of predictability of clinical laboratory diagnostic tests; the influence of normal respiratory flora on respiratory problems. (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)

Immunoelectron microscopy; secretory immunoglobulin system. (Dr. Poger)

Biochemistry of DNA tumor viruses. (Dr. Raskas)

Transplantation immunology. (Dr. Rodey)

Biochemical and ultrastructural aspects of peripheral nerve disease. (Dr. Schlaepfer)

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)

Pathogenesis of diabetic vascular disease. Cellular mechanisms of endocytosis and macromolecular transport by endothelium. (Dr. Williamson)

Electives

Advanced Special Pathology

A series of seminars discussing timely selected topics in special pathology of human disease, augmented by illustrative cases and emphasizing clinipathologic 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 choice. (Dr. Kissane)

The role of divalent cations in the mechanism of hormone action. (Dr. McDonald)

Biochemical and ultrastructural aspects of anterior pituitary secretion. (Dr. McKeel)

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 four and six. 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. Jarett 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 Disease**

**Note**—The number preceding the course title indicates that the course carries credit in the Graduate School of Arts and Sciences.
Daniel W. McKeel, B.S., Hampden-Sydney College, 1961; M.D., University of Virginia, 1966.

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.

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

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

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

Sue C. Stevens, A.B., Goucher College, 1930; M.A., 1931; Ph.D., Columbia University, 1940. (Jewish Hospital.)

Rogers Griffith, B.S., University of Arkansas, 1972.

Wei Hsueh, M.B., National Taiwan University, 1968; Ph.D., Indiana University, 1972.

John Klaas, B.S., Wofford College, 1967; M.S.P.H., University of North Carolina, 1968; Ph.D., 1974. (Jewish Hospital.)

John M. Michael, B.A., University of Kansas, 1969; M.D., Washington University, 1973. (See Department of Medicine.)

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


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.

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

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.


Ursula Sclafford, B.S., Howard University, 1942; M.D., 1945.

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.


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 180, 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, precatheterization critiques once a week, and a weekly conference on catheterization laboratory findings.

Outpatient Service
New patients for consultation, as well as follow-up on past patients. (Dr. Goldring)

Laboratory Diagnostic Procedures
The student will be involved initially as observer and eventually as a participant in the catheterization and angiocardiographic 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, Electrophysiologic Studies
In this intensive course, emphasis will be on the electrophysiology and theory as well as interpretation of electrocardiograms, vectorcardiograms, phonocardiograms, and ergometry on inpatients and outpatients. The student may participate in other activities of the Pediatric Cardiology Division as time permits. (Dr. Hernandez)

Pediatric Neurology
Clinical Elective
The student participates as a full member of the neurology ward team and is directly responsible for a proportion of the patients on the service under the direction of the senior resident. He is expected to take night call every third or fourth night, during which time he is responsible for the medical care of the entire ward, as well as for emergency admissions.

(Drs. Dodge, Prensky)

Research Elective
The student has an opportunity to learn some of the chromatographic 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, DeVivo, Fishman, Prensky)

Pediatric Infectious Diseases
Clinical Elective
The student works as a subintern 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. Shackelford, Stechenberg, Gardner)

Research Elective
Laboratory research programs are available in the areas of (1) fetal and neonatal bacterial infections, (2) rapid diagnosis of infections, and (3) antibiotic pharmacokinetics. Prospective studies of Group B streptococcal meningitis will be pursued from a clinical and laboratory point of view.

(Drs. Shackelford, Stechenberg, Gardner)

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, Strandjord, Vietti, Zarkowsky)
Pediatric Allergy and Immunology

Pediatric Clinical Allergy
The student spends six weeks learning the principal clinical expressions of allergic disease: allergic rhinitis, asthma, and eczema. He attends Allergy Clinic two days a week and assists the coursemaster in the management of private patients as well. Emphasis will be placed on environmental control, modern chemotherapy, and specific immunotherapy of allergic disease. The student will be required to make one formal presentation of a subject pertinent to his clinical experience at a division seminar.
(Drs. Shearer, Strominger, Thurston)

Pediatric Immunology
The student spends a minimum of three months of in-depth research in the area of cellular activation by immune mechanisms. The work will explore the phenomenon of immunostimulation of tumor cell growth in vitro whereby membrane antigen-specific antibody acting in concert with activated complement augments nucleoside transport, DNA synthesis, and growth of several cell lines. The student will become acquainted with the fundamentals of cellular immunology and tumor immunology and some techniques of tissue culture. The student may participate in hospital consultations and laboratory investigations pertaining to children with immune deficiency states.
(Dr. Shearer)

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. Cole, Conley, 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 subspecialties and in community clinics are also offered.
(Dr. Middlekamp)
Bernard Schwartzman, A.B., Washington University, 1931; M.D., 1935.

Robert H. Friedman, M.D., Washington University, 1935.

Maurice J. Keller, A.B., Yale University, 1936; M.D., Columbia University, 1940.


Norman Hankin, A.B., University of Wisconsin, 1940; M.D., 1943.

Maurice J. Keller, A.B., Yale University, 1936; M.D., Columbia University, 1940.

John C. Martz, A.B., University of Tennessee, 1940; M.D., Washington University, 1942.

David N. McClure, M.D., University of Pennsylvania, 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.

George Sato, M.D., Washington University, 1947.

Donald B. Strominger, B.A., Yale University, 1948; M.D., Washington University, 1953.

Argyrios A. Tsifutis, M.D., Aristotelion University of Thessalonika, 1954.

Frank S. Wissmath, A.B., Washington University, 1939; M.D., 1943.

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, junior and senior 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. Bier, Hillman, Santiago, Weldon)

Pediatric Endocrinology and Metabolism
This elective is designed to include broad clinical experience in both pediatric and adult endocrine problems. The student has an opportunity to work up all of the pediatric endocrine patients and to see some adult patients during weekly rounds. He attends rounds in pediatric metabolism, pediatric-endocrine and diabetic clinics, and the adult metabolic research seminar and rounds. There is an opportunity to attend pediatric and medical grand rounds and metabolic rounds at Jewish Hospital. A large number of patients with all types of endocrine disorders are studied in depth. (Drs. Bier, Hillman, Santiago, Weldon)

Genetics
Medical Genetics
Twelve weeks, all day. Combined clinical and research course. (Drs. Hillman, 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. Hillman, Sly, Taysi)

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 prematures. 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. (Drs. Hillman, Marshall, Maurer, Thach)

Research
Placental amino acid transfer—in vitro tissue incubation, regulation, and relation to needs of the fetus. Composition and function of trophoblast plasma membrane. (Dr. Smith)

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 in vivo measurements of the rates of enzyme activity and performing mathematical analyses of the kinetic data. (Drs. Dietzler, Smith)
Assistant Professors

Martin J. Bell, B.A., New York University, 1959; M.D., State University of New York, Downstate, 1963. (See Department of Surgery.)

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

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.)

Milton L. Cobb, B.A., Baylor University, 1964; M.D., University of Texas (Southwestern) Medical School, 1968. (See Department of Anesthesiology.)


Ruthmary K. Deuel, B.A., Mount Holyoke College, 1956; M.D., Columbia University College of Physicians and Surgeons, 1961. (See Department of Neurology and Neurological Surgery.)

W. Edwin Dodson, A.B., Duke University, 1963; M.D., 1967. (See Department of Neurology and Neurological Surgery.)


Barbara M. Herjanic, B.A., Northwestern University, 1943; B.S., Western Michigan College, 1946; M.D., University of Michigan, 1950. (See Department of Psychiatry.)

Laura S. Hillman, B.A., Carleton College, 1964; M.D., Yale University, 1968.


Helen Falkes (Psychology), B.S., Washington University, 1966; M.A., 1968.

Mabel I. Purkerson, A.B., Erskine College, 1951; M.D., Medical College of South Carolina, 1956. (See Administration and Department of Medicine.)

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

Gary D. Shackelford, B.A., Northwestern University, 1964; M.D., Washington University, 1968. (See Department of Radiology.)

Penelope G. Shackelford, B.S., University of Wisconsin, 1964; M.D., Washington University, 1968.

Paul S. Simons, B.A., University of Texas, 1963; M.D., Washington University, 1967. (See Division of Health Care Research.)

Barbara W. Stechenberg, A.B., Brandeis University, 1968; M.D., University of Vermont, 1972.

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.


Julian C. Williams, B.A., Rice University, 1967; M.S., Massachusetts Institute of Technology, 1968; Ph.D., University of California, Berkeley, 1972; M.D., Washington University, 1974.

Research Assistant Professors


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.)
Assistant Professors Emeriti (Clinical)
Marianne Kuttner, M.D., Johann Wolfgang Goethe University, 1931.
Maurice J. Lonsway, B.S., Valparaiso University, 1910; M.D., St. Louis University, 1914.
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.
Martin Calodney, B.S., College of the City of New York, 1930; M.D., New York University, 1936.
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., 1960.
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.)
Alfred S. Schwartz, A.B., Amherst College, 1932; M.D., Johns Hopkins University, 1936.
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. Burgdorf, A.B., Washington University, 1970; M.D., 1974. (See Division of Health Care Research.)
Charles S. C. Chang, B.A., Johns Hopkins University, 1967; M.D., 1972. (See Department of Neurology and Neurosurgical Surgery.)
Margaret J. Chang, B.A., Johns Hopkins University, 1967; M.D., University of Maryland, 1971. (See Department of Biomedical Chemistry.)
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 Wehner, M.D., Hebrew University, 1961. (See Department of Psychiatry.)

Instructor Emeritus (Clinical)
Joseph A. Bauer, M.D., Washington University, 1925.

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.
Elliot F. Gelmian, B.A., State University of Iowa, 1957; M.D., University of Missouri, 1961.
Roman E. Hammes, B.A., University of Iowa, 1950; M.D., 1954.
Carl S. Ingber, 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.
Steven L. Plax, A.B., University of Missouri, 1957; M.D., 1961.
Jeffrey I. Schulman, B.A., Yale University, 1970; M.D., University of Kentucky, 1974.
Warren G. Sherman, B.A., University of Missouri, 1965; M.D., Tulane University, 1969.
Mary A. T. Tillman, M.D., Howard University, 1960.
Orestes S. Valdes, B.S., Instituto de Santa Clara, 1947; M.D., University of Havana, 1954.
Barbara N. Voeg, B.S., University of Illinois, 1950; M.D., Washington University, 1957.
H. Benjamin Zwirn, M.D., University of Basel, 1954.
Research Associates
Assistants
Marion H. Baker (Health Services), R.N., St. John's Hospital, 1946; P.N.P., Cardinal Glennon Memorial Hospital for Children, 1973. (See Division of Health Care Research.)
Martha Fenger (Health Services), B.A., Texas Christian University, 1962; M.S.W., Louisiana State University, 1964. (See Division of Health Care Research.)
Susan K. Keating (Health Services), B.S., University of North Carolina School of Nursing, 1965; P.N.P., Washington University, 1970.
Kathleen Potts (Health Services), R.N., B.S., St. Louis University, 1969; M.S., Boston University, 1970; P.N.P., Washington University, 1976. (See Division of Health Care Research.)
Research Assistants
Charles E. Crawford, Jr., B.S., Washington University, 1956.
Assistants (Clinical)
Jean M. Auguste, B.A., Lycee T. L'ouverture, 1950; M.D., Medical School of Haiti, 1956.
Florentina U. Garcia, M.D., University of the Philippines, 1965.
Seymour M. Schlansky, M.D., Chicago Medical School, 1950.
Edward Mallinckrodt Department of Pharmacology

It is the purpose of the pharmacology course, through discussions 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. Needleman 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. Berger)

Biosynthesis of peptide hormones in human placenta and pancreatic islets. (Dr. Boime)

Problems in the biochemical development of rat kidney; transport mechanisms in rat kidney; renal histochemistry. (Dr. Burch)

Lipids of the nervous system; structural components of myelin; functional roles of gangliosides; chemistry of the synapse; psychoactive drugs. (Dr. Burton)
Research Assistant Professors


Sr. Barbara A. Jakschik, B.S., Duquesne University, 1963; M.S., 1965; Ph.D., Washington University, 1974.

Lecturer

David N. Dietzler, A.B., Washington University, 1957; Ph.D., 1963. (See Department of Pediatrics.)

Neurochemistry of seizures; neuropharmacology of anticonvulsant and psychotropic drugs; role of cyclic nucleotides in nervous tissue function and metabolism. (Dr. Ferrendelli)

Synthesis and biological characterization of “suicide substrates” as potential inhibitors of androgen and estrogen biosynthesis in normal and carcinogenic tissue.

(Dr. Covey)

Secretion of macromolecules. Serum albumin biosynthesis and secretion.

(Dr. Geller)

Purification and properties of the drug metabolizing enzymes. Studies on oxidative phosphorylation and mitochondrial structure.

(Dr. Hunter)

The biosynthesis and chemical and biological characterization of slow-reacting substance of anaphylaxis (SRS-A).

(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 histology; the chemistry of individual human muscle fibres.

(Dr. Lowry)

Pineal-hypothalamic pituitary interactions in the regulation of reproductive function.

(Dr. Martin)

Energy metabolism in nerve, axonal flow, and the biochemical effects of thiamine deficiency.

(Dr. McDougal)

Pharmacology of vasoactive substances, e.g., prostaglandins, angiotensin, bradykinin.

(Dr. Needleman)

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 agents, androgens; 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 532. Mechanism and Regulation of Protein Biosynthesis

Bio 546. Cell Surface Receptors

Bio 555. Neurological Pharmacology

Bio 556. Biochemistry of the Nervous System

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.

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 agents, androgens; 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 532. Mechanism and Regulation of Protein Biosynthesis

Bio 546. Cell Surface Receptors

Bio 555. Neurological Pharmacology

Bio 556. Biochemistry of the Nervous System

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.

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)

Electives

Descriptions of the following courses may be found under the Division of Biology and Biomedical Sciences.

Bio 401. Vertebrate Physiology

Bio 431. Principles of Cellular Physiology

Bio 457. Somatosensory System

Bio 459. Vision

Bio 525. Fundamental Concepts in Cell Membrane Physiology and Biophysics

Bio 526. Advanced Topics in the Physiology and Biophysics of Cell Membranes

Bio 545. Conformational Analysis of Macromolecules

Bio 558. Long-term Changes in the Nervous System

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. Reimut Wette
- Division of Health Care Research, Dr. Gerald Perkoff
- Nutrition Research Laboratories, Dr. Robert Shank, Dr. Ruth Brennan
- Irene Walter Johnson Institute of Rehabilitation, Dr. Marvin Fishman
- Lipid Research Center, Dr. Gustav Schonfeld
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, a modern definition of social medicine is developed, with emphasis progressing from this general subject to specific discussions of the determinants of medical care utilization, the organization of medical care, the 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, concluding with the discussion of the finite limitations on resources available for medical care. 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. (Drs. Perkoff and Vavra)

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. (Dr. Wette and Staff)

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.)
(Drs. Fishman, Hollosy)

FOURTH YEAR
Electives
Clerkship in Primary Care
This clerkship is designed to provide the student with firsthand experience with medical practice, much in the same manner that clerks in other medical disciplines provide patient care experience in supervised settings. The clerkship uses as its clinical setting the Medical Care Group of Washington University (MCG), a teaching and research prepaid group practice.

Students will join individual physicians in the Medical Care Group of Washington University 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. Each student will be requested to write a description of his six-week period tabulating patients seen by age, race and diagnosis. One patient will be described in detail, including such social, family, and community aspects of his problems as are applicable. A simple diary of the student's daily experience (rounds and calls made, conferences attended, etc.) will also be required. 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.

John D. Vavra, B.A., University of Colorado, 1956; M.D., Washington University, 1954. (See Administration, Department of Medicine, and Division of Health Care Research.)

R. Dean Wochner, A.B., Arizona State University, 1956; M.D., Washington University, 1960. (Hospital Commissioner of St. Louis and Director of Health and Hospitals.)

Associate Professor Emeritus
M. Frances Watson (Social and Environmental Studies, B.S., Northeast Missouri State Teachers College, 1932; M.S.W., Washington University, 1949.)

Associate Professors
Lee Benham, B.A., Knox College, 1962; Ph.D., Stanford University, 1970. (See Division of Health Care Research.) (Also Faculty of Arts and Sciences.)

Sung C. Choi (Biostatistics, B.S., University of Washington, 1957; M.A., 1960; Ph.D., University of California, 1966.

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

Associate Professor (Clinical)
Franz U. Steinberg, M.D., University of Berne, 1938. (See Departments of Medicine and Surgery.) (Jewish Hospital.)

Assistant Professors
William C. Banton II, M.D., Howard University, 1946; M.P.H., Johns Hopkins University, 1970. (Director of Department of Community Health and Medical Care, St. Louis County.)

Edward J. Berger, M.D., Washington University, 1937. (Medical Director, Labor Health Institute.)

Ruth E. Fishman, M.D., University of Minnesota, 1967; M.P.H., University of Minnesota, 1970.

Ali A. Fishman, B.A., University of California, 1967; M.A., University of California, 1968; Ph.D., University of California, 1970. (See Institute of Rehabilitation.)

Barbara F. Long, B.S., University of California, 1967; Ph.D., University of California, 1970.

Ingrid E. Persson, B.S., University of California, 1967; M.S., Stanford University, 1970. (See Institute of Rehabilitation.)


Shirley T. Wilcox, B.S., Washington University, 1964; A.M., University of California, 1965; Ph.D., University of California, 1968. (See Institute of Rehabilitation.)

Stuart Zuckerman, B.S., Washington University, 1960; M.D., University of Washington, 1964. (See Institute of Rehabilitation.)

J. M. Wetter, B.A., University of Minnesota, 1960; M.S.W., University of California, 1960. (See Institute of Rehabilitation.)

M. C. Wetter, M.D., University of Washington, 1960. (See Institute of Rehabilitation.)
Clinical Bioethics

Regular clinical rounds and weekly bioethics conferences to identify and discuss major ethical issues as they occur on a day-to-day basis in the various hospital and ambulatory care settings related to Washington University School of Medicine. Readings will be assigned in bioethical, philosophic, and clinical literature. Examples from the Human Experimentation Committee also will be discussed. (Drs. Kurz, Lefrak, Ludmurre, Perkoff, Vavra)

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 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. Perkoff)

Primary Care Rounds

Presentations and discussions of primary care subjects: medical, organizational, fiscal, and social. (Dr. Perkoff)

Clinical Elective

Physical disability and rehabilitation. (See Institute of Rehabilitation.) (Drs. Fishman, Holloszy)

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 (Visiting Nurses Association, Special School District, Shriners Hospital, Central Institute for the Deaf, manufacturers of prosthetics and orthotic devices). 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. Fishman)
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 fifty-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, strokes, Parkinson’s disease, and arthritis. The Department holds an Amputee Clinic twice a month and does all the electromyographic examinations for the 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)

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, Witztum)

World Population Problems

Five or six seminars will be conducted by invited guest faculty who are nationally recognized in their field.
experts in the demographic, sociological, 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 serum triglyceride lowering effect of exercise; the biochemical basis of muscle fatigue.
(Drs. Ehsani, Holloszy, Winder)

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.
(Drs. Choi, Miller, Wette)

Clinical and Experimental Nutrition
The student engages in a selected research project under supervision of staff of this laboratory. Occasional opportunities may be made to study and observe major problems of deficiency disease in other countries.
(Drs. Brennan, Holloszy, Schonfeld, Shank)

Immunohematology
Application of serologic and immunoochemical techniques in basic studies of erythrocyte autoantibodies 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)

Rehabilitation Engineering
The student collaborates with the staff of the Rehabilitation Engineering Unit, employing electronic instrumentation to obtain objective measurements of spasticity and impaired voluntary motor function in patients with neurological and neuromuscular disorders. The equipment includes electrically driven and hydraulic systems, EMG recordings, and computer analysis of data. Machine findings are correlated with clinical performance based on standardized functional evaluation tests.
(Dr. Fishmann and Staff)

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.
(Drs. Kahn, Perkoff 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)
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, demonstrations, discussions.

(Prof. 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.

(Prof. Coughlan 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.

(Prof. Ziegler, Ms. Smith)
William R. Sherman (Biochemistry), A.B., Columbia University, 1951; Ph.D., University of Illinois, 1955. (See Department of Biological Chemistry.)

Kathleen Smith, B.S., University of Arkansas, 1944; M.D., Washington University, 1949. (Malcolm Bliss Hospital.)

Research Professor

Mitchell Taibleson (Mathematics), S.M., University of Chicago, 1960; Ph.D., 1962. (Also Faculty of Arts and Sciences.)

Professor Emeritus (Clinical)

Margaret C. L. Gildea, B.S., University of Chicago, 1923; M.D., Yale University, 1936.

Professors (Clinical)

Alex H. Kaplan, B.S., College of City of New York, 1932; M.D., St. Louis University, 1936.
Frank O. Shobe, A.B., Washington University, 1938; M.D., 1942.

Associate Professors

Barbara M. Herjanic (Child Psychiatry), B.A., Northwestern University, 1943; B.S., Western Michigan College, 1946; M.D., University of Michigan, 1950. (See Department of Pediatrics.)

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 Mental Health Center. (Drs. M. Herjanic and Tomelleri)

Child Psychiatry, 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. McDougall, 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)
Amos Welner, M.D., Hebrew University Hadassah Medical School, 1960.

Research Associate Professor
David J. Pittman (Sociology), A.B., University of North Carolina, 1949; M.A., 1950; Ph.D., University of Chicago, 1956. (Also Social Science Institute.)

Associate Professors (Clinical)
John M. Anderson, B.S., Colorado State University, 1938; M.D., Meharry Medical College, 1958. (Malcolm Bliss Hospital.)

Robert B. Deitchman, B.A., University of Virginia, 1949; M.D., 1953.

Edward H. Kowert, A.B., Washington University, 1940; M.D., 1943. (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.

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 Neurosurgical 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
Lucie Healy (Social Work), A.B., College of St. Catherine, 1922; M.A., University of Minnesota, 1927; M.S.W., Washington University, 1949.

Assistant Professors

Jack L. Coughran, B.A., University of Kansas, 1964; M.D., Kansas University, 1968.

Philip M. Fishman (Computer Science), B.S., Brooklyn College, 1964; M.S., New York University, 1969; Ph.D., Washington University, 1974.

Julian C. Hall (Social Work), B.S., University of Louisville, 1949; M.S., 1951; D.S.W., Washington University, 1966. (Malcolm Bliss Hospital.)

John E. Helzer, M.D., University of Utah, 1967.


Elizabeth M. Smith (Social Work), B.A., University of Nebraska, 1960; M.S.W., 1962.


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.

Vincent E. Ziegler, B.S., Xavier University, 1968; M.D., University of Kentucky, 1972.

Research Assistant Professors
Paul P. Hixps (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.)


Hyman H. Fingert, B.A., State University of Iowa, 1931; M.D., 1934.

Assistant Professors (Clinical)


Robert D. Brookes, A.B., DePauw University, 1934; M.D., Washington University, 1938.

Jane B. Brownstone (Medical Psychology), A.B., Washington University, 1961; A.M., 1964; Ph.D., 1968. (Malcolm Bliss Hospital)

Lincoln B. Calvin, B.Ed., Illinois State University, 1942; M.D., Meharry Medical College, 1951. (Malcolm Bliss Hospital.)

Sei Y. Choi, B.S., Woo Sok University, 1951; M.D., 1963. (Malcolm Bliss Hospital.)

Juan C. Corvalan, M.D., Argentina National University, 1965. (Malcolm Bliss Hospital.)

Mary E. Cox, A.B., Washington University, 1941; M.D., 1944.

Mary Davis, B.A., Ohio State University, 1947; M.D., Washington University, 1952.

Paride De. Deza, M.D., University of Santo Tomas, 1956. (Malcolm Bliss Hospital.)

Wilbur H. Gearhart, B.S., Butler College, 1949; M.D., Hahnemann Medical College, 1950.

Robert 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.


Jay Meyer, A.B., Washington University, 1956; M.D., St. Louis University, 1960.

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. Sumer, M.D., Istanbul University, 1951. (Malcolm Bliss Hospital.)

Carlos Tomelleri, B.A., Colegio San Jose, 1955; M.D., Universidad Javeriana, 1965. (Malcolm Bliss Hospital.)

Instructors

Bernardo G. Aleksander, M.D., University of Buenos Aires, 1959. (Malcolm Bliss Hospital.)

Barbara J. Anderson (Medical Psychology), B.A., Trinity University, 1968; M.A., George Peabody College, 1970; Ph.D., 1975. (See Department of Pediatrics.)

Michael D. Bieri, B.A., University of Kansas, 1968; M.D., Washington University, 1972. (Malcolm Bliss Hospital.)

Anna K. Bradley (Social Work), B.S., St. Louis University, 1936; M.S.W., Washington University, 1938. (Malcolm Bliss Hospital.)

Marguerite Cannon (Social Work), B.S., St. Louis University, 1936; M.S.W., Washington University, 1948.

Bun Tee Co, Jr., B.S., University of Santo Tomas, 1963; M.D., 1967. (Malcolm Bliss Hospital.)

John F. Mueller (Social Work), B.S., Washington University, 1947; M.S.W., 1952. (Malcolm Bliss Hospital.)


Earni Pal, M.B.B.S., Andhra University, 1965. (Malcolm Bliss Hospital.)


Kenneth L. Russ (Medical Psychology), A.B., University of Rochester, 1965; M.S., University of Pittsburgh, 1969; Ph.D., 1970.


Laurence T. Wylie, B.S., University of Illinois, 1970; M.D., McGill University, 1974. (Malcolm Bliss Hospital.)


Patricia A. West (Sociology), B.S., Memphis State University, 1967; M.A., 1969; Ph.D., St. Louis University, 1975.

Eric D. Wish (Medical Psychology), B.S., University of Massachusetts, 1968; Ph.D., Washington University, 1976.

Instructors Emeriti (Clinical)

Robert M. Bell, M.D., St. Louis University, 1928.

Barbara S. Kendall (Medical Psychology), A.B., Radcliffe College, 1913; Ed.M., Harvard University, 1928.

Reese H. Potter, A.B., University of Kansas, 1931; B.S., University of Missouri, 1933; M.D., Washington University, 1935.

Instructors (Clinical)


Felipe Crimi, M.D., National University of Cordoba, 1946. (Malcolm Bliss Hospital.)

Alejandro M. Datun, A.A., University of Santo Tomas, 1951; M.D., 1965. (Malcolm Bliss Hospital.)


Eduardo A. Garcia-Ferrera, M.D., Havana University, 1952. (Malcolm Bliss Hospital.)

Fred W. Gaskin, B.S., University of Minnesota, 1966; M.D., 1968. (Malcolm Bliss Hospital.)


Natarajan Lakshminarayanan, M.B., University of Madras, 1960; M.S., 1960; M.D., 1967. (Malcolm Bliss Hospital.)

Elizabeth Mann, B.S., Valparaiso University, 1966; M.D., St. Louis University, 1970.

Mary A. Mazur, A.B., Vassar College, 1967; M.D., Northwestern University, 1973. (Malcolm Bliss Hospital.)

Ronald A. Oliver (Medical Psychology), B.A., University of Rhode Island, 1968; M.A., Xavier University, 1970; Ph.D., Iowa State University, 1973. (Malcolm Bliss Hospital.)

William M. Riedesel II, A.B., University of Rochester, 1968; M.D., Cornell University, 1973. (Malcolm Bliss Hospital.)

Howard E. Rogers (Medical Psychology), B.A., New York City College, 1960; M.A., Los Angeles State College, 1963; Ph.D., Arizona State University, 1969. (Malcolm Bliss Hospital.)

John Sweet, B.A., University of Michigan, 1964; M.D., University of Missouri, 1968. (Malcolm Bliss Hospital.)

Jaime Vargas, M.D., National University of Colombia, 1954. (Malcolm Bliss Hospital.)

Lecturer (Clinical)

Rheu L. Dornbush (Medical Psychology), B.A., Queens College, 1962; M.A., 1963; Ph.D., City University of New York, 1967. (Reproductive Biology Research Foundation.)
WILLIAM GREENLEAF
ELIOT DIVISION OF
CHILD PSYCHIATRY

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. Intleson
Professor
Assistant Professor Emeritus
Loretta K. Cass (Medical Psychology), B.A., Colorado College, 1934; M.A., 1942; Ph.D., Ohio State University, 1950.
Assistant Professors
Doris C. Gilpin (Child Psychiatry), B.S., Drury College, 1944; M.D., University of Chicago School of Medicine, 1948.
Assistant Professors (Clinical)
Ebrahim Amanat (Child Psychiatry), M.D., Tehran University Medical Faculty, 1959. (Child Center of Our Lady of Grace.)
Haruo Kusama (Child Psychiatry), A.B., Washington University, 1960; M.D., 1965. (St. Louis State Hospital Youth Center.)
Roy M. Mendelsohn (Child Psychiatry), B.S., University of Illinois, 1950; M.D., 1952.
Paul H. Painter (Child Psychiatry), M.D., St. Louis University, 1947. (See Department of Pediatrics.)
Seyed A. Raza (Child Psychiatry), M.D., Dow Medical College, 1959. (St. Louis State Hospital Youth Center.)
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
Robert P. Wade (Psychiatric Social Work), B.A., Maryknoll College, 1960; M.S.W., St. Louis University, 1969.

Research Instructor

Instructors (Clinical)
Neil S. Alex (Child Psychiatry), B.A., Yale University, 1966; M.D., Washington University, 1970.
Eduyn A. Figueroa (Child Psychiatry), M.D., University of San Carlos, 1970. (St. Louis State Hospital Youth Center.)
Alicia D. Gonzalez (Child Psychiatry), M.D., University of Buenos Aires, 1961. (St. Louis State Hospital Youth Center.)
Anna E. Hartnett (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 Georges Medical College, 1959; M.D., Lucknow University, 1964. (St. Louis State Hospital Youth Center.)
Eliza E. Wochnik (Child Psychiatry), M.D., Medical Academy of Warsaw, 1962. (St. Louis State Hospital Youth Center.)
Department of Radiology

The Department of Radiology occupies the Edward Mallinckrodt Institute of Radiology and provides diagnostic radiology, nuclear medicine, and radiation oncology services to Barnes and St. Louis Children's Hospitals. It connects by corridor and tunnel with Barnes, St. Louis Children's, East Pavilion, Wohl, Barnard, and Renard Hospitals, Queeny Tower, and the Washington University Clinic.

Clinical facilities for the Division of Radiation Oncology are located on the ground floor of the Institute and in Barnard Hospital. The therapy equipment consists of an advanced 35 MeV linear accelerator, 24 MeV Betatron, 4 MeV 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 Scarpellino Auditorium.

Diagnostic radiology facilities are located on the second floor (chest, musculoskeletal radiology and mammography), third floor (two cardiac catheterization laboratories, two head computerized tomography facilities, special neuroradiological and vascular radiological equipment, ultrasound and genitourinary radiology), fourth floor (gastrointestinal and genitourinary radiology), and the fifth floor (pediatric radiology). Five CT scanners are available within the Institute.

The sixth floor contains the Division of Radiation Sciences, which also utilizes the medical cyclotron in Barnard Hospital. Nuclear Medicine is also located on this floor and in the adjoining Barnard Hospital. Research facilities are located on the seventh floor (nuclear medicine and cancer biology), ninth floor (diagnostic radiology) and tenth floor (cancer biology).

Administrative, teaching, and support functions occupy the eighth and eleventh floors. The twelfth floor has been completed in order to develop modern computer facilities for clinical, research, and teaching use.

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 roentgen and clinical findings through interdepartmental conferences, consultations, and group discussions. The thirteen floors of the Mallinckrodt Institute are utilized for the following academic activities.
SECOND YEAR

Thirty-four 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 the fields of diagnostic radiology, therapeutic radiology, radiation physics, nuclear medicine, and radiation biology.

SUMMER ELECTIVE 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 in a series of lectures, seminars, and case presentation conferences. 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. (Dr. Lee or Stewart)

CANCER BIOLOGY PROGRAM

The section of cancer biology provides a twelve-week (full time) oncology training program beginning in January in even-numbered years. A series of laboratory exercises, with emphasis on quantitative cellular cancer biology, constitutes the major portion of this course. Experiments in tissue culture systems and in mice have been chosen to emphasize aspects of oncology important in the understanding of cancer biology and in its application for optimal cancer therapy. A number of concepts necessary to the understanding of tumor biology and cancer therapy are presented through three sets of formal lectures: radiation biology; cellular kinetics of normal and tumor tissues; and the biochemical, cellular, and clinical action of anticancer drugs. Each set consists of approximately twenty one-hour lectures. In addition, an informal seminar series will be presented to include topics in molecular biology, cell biology, immunology, virology, statistics, and instrumentation.

(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...
Clerkship in Diagnostic Radiology

A six-week elective in which approximately half of the student's time will be spent attending lectures, seminars, and conferences emphasizing the principles of general radiology, including film interpretation and the role of radiology in the solution of clinical diagnostic problems. The remaining time will be divided between elective periods on subspecialty rotations within the Department (thoracic, abdominal, musculoskeletal, neurologic, pediatric, nuclear medicine, radiation oncology) under the direct supervision of a senior faculty member. The student will be exposed to the daily workload of a subspecialty radiologist, and have an opportunity to observe the appropriate diagnostic and therapeutic procedures in each section. (Dr. Shackelford)

Additional six-week clerkships in diagnostic radiology are offered at Jewish Hospital (Dr. Hyman Senturia) and St. Luke's Hospital. (Drs. Sumber, Holtz)

Clerkship in Clinical Nuclear Medicine

A six-week elective in which the student will be exposed to the full range of techniques including organ imaging with radionuclides, nuclear hematology, in vitro tests, and radionuclide therapy. The student will be responsible for planning appropriate isotope studies in patients referred to the Department in conjunction with the staff. Opportunity exists to learn instrumental techniques, including newer ones such as computer applications. Participation in clinical and laboratory research projects may also be arranged if desirable. There are daily conferences and scan interpretation sessions. (Dr. Siegel)
The Department of Surgery includes general surgery, plastic and reconstructive surgery, orthopedic surgery, gynecological 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 affiliated hospitals. Students attend patient rounds with resident and staff daily during the week and attend seminars conducted by the general and specialty surgical staffs.

Students are encouraged to attend and assist in operations upon patients assigned to them. The physiology, pathophysiology, and pharmacology of pre-operative and post-operative care are stressed. Experience is also gained in the diagnosis of surgical problems 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 elective periods: (1) medical clerkships 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 of minimum or maximum twelve weeks. (3) elective in pediatric surgery, thoracic, and cardiothoracic surgery, orthopedics, neurosurgery, pediatrics, and emergency room surgery.

In the third and fourth years, a series of computer-assisted tutorials is an integral part of the surgical curriculum. The tutorials 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
Panel discussions present certain fundamental principles of physiology, biochemistry, and pathology as applied to surgery. Recitations and demonstrations are included. 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 take case histories and make the physical examinations and the usual laboratory examinations on the patients assigned to them. They are assigned patients with diseases treated by both surgical specialists and general surgeons. They assist at operations and do some surgical dressings. 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 postoperative 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 clinic and attend a 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 attendings.

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, St. Lukes, Jewish, and St. Luke's Hospitals, where the student acts as an intern under the guidance of the senior staff. (Dr. Jaffe 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. Jaffe 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. In addition to the daily ward rounds, conferences are arranged twice a week to discuss the etiology, diagnosis, and treatment of disorders that have not been encountered on the ward. The student also attends the general surgery pediatric clinic where he participates in postoperative follow-up of patients. Once a week the student attends the pediatric oncology clinic. Pertinent pediatric X-ray films are reviewed regularly. (Dr. Ternberg and Staff)

Carl A. Wattenberg, A.B., University of Kansas, 1934; M.D., 1937.

Assistant Professors
Lawrence Cheung, M.D., National Defense Medical Center, 1968. (St. Louis V.A. Hospitals.)
Thomas H. Covey, Jr., A.B., West Virginia University, 1957; M.D., Harvard University, 1961.
Robert C. Donaldson, A.B., University of Missouri, 1941; M.D., Washington University, 1944. (St. Louis V.A. Hospitals.)
Edward E. Etheredge, B.A., Yale College, 1961; M.D., Yale University, 1965; Ph.D., University of Minnesota, 1974. (See Division of Health Care Research.)
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 student 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 micro-circulation. 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)

Plastic and Reconstructive Surgery Preceptorship

The aim of this elective is to familiarize the student with some of the problems in plastic and reconstructive surgery. The student has an opportunity to discuss the application of principles of tissue repair to a variety of surgical conditions, including burns and other forms of trauma, and major soft tissue injury associated with cancer surgery. There is a constant personal relationship between the student and the attending staff during the period.

(Dr. Weeks and Staff)
Instructor
Gregorio Sicard, B.S., St. Louis University, 1965; M.D., University of Puerto Rico, 1972.

Instructors Emeriti (Clinical)
Virgil O. Fish, M.D., Washington University, 1930.
George C. Wex, M.D., University of Louisville, 1931.

Instructors (Clinical)
Robert R. Anschuetz, M.D., Washington University, 1940.
Arthur R. Dalton, B.S, University of Missouri, 1938; B.S. Med., Northwestern University, 1940; M.D., 1941. (Jewish Hospital.)
Fleming B. Harper, M.D., Medical College of Virginia, 1947.
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.

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)
George A. Oliver, A.B., Washington University, 1948; M.D., 1952.


Joseph C. Peden, Jr., B.S., Harvard University, 1940; M.D., 1943.

Mather Pfeiffenberger, Jr., A.B., Vale University, 1941; M.D., Harvard University, 1944.


Joseph C. Peden, Jr., B.S., Harvard University, 1940; M.D., 1943.

Mather Pfeiffenberger, Jr., A.B., Yale University, 1941; M.D., Harvard University, 1944.

George B. Rader, M.D., Washington University, 1951.

Frank O. Richards, A.B., Tallaidega College, 1944; M.D., Howard University, 1947.


Belmont R. Thiele, M.D., St. Louis University, 1948. (St. Louis County Hospital.)

Assistants (Clinical)


Leslie F. Bond, A.B., University of Illinois, 1948; M.D., Meharry Medical College, 1952.


James R. Criscione, B.S., Youngstown University, 1943; M.D., St. Louis University, 1951.

Samuel Lugo, B.S., St. Louis University, 1954; M.D., 1958.

Raj N. Mohapatra, I.Sc., Utkat University, 1953; M.B.B.S., 1958; F.R.C.S., Royal College of Surgeons, 1967. (St. Louis V.A. Hospitals.)

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.

CARDIOTHORACIC SURGERY

Professors

Richard E. Clark, B.S.F., Princeton University, 1956; M.D., Cornell University, 1960; M.S., University of Virginia, 1962.

Clarence S. Weldon, A.B., University of Michigan, 1951; M.D., Johns Hopkins University, 1955. (See Department of Pediatrics.)

Professor (Clinical)


Associate Professor

John P. Connors, A.B., Holy Cross College, 1961; M.D., Georgetown University, 1965. (Jewish Hospital.)

Associate Professors (Clinical)

Martin Bergman, A.B., Washington University, 1942; M.D., 1945.


Assistant Professors

Joseph G. Sandza, M.D., University of Puerto Rico, 1969.


GENITOURINARY SURGERY

Professor Emeritus

Justin J. Cordonnier, B.S., Washington University, 1926; M.D., 1928. (Also Lecturer.)

Professor

Saul Boyarsky, B.S., University of Vermont, 1943; M.D., 1946.

Associate Professors (Clinical)

Morris Abrams, B.S., University of Illinois, 1934; M.D., 1937.

William T. Bowles, M.D., Stanford University, 1955.

Assistant Professors

David B. Crane, M.D., University of Rochester, 1968.


Research Assistant Professors

Warren D. Heston, Ph.D., University of Colorado, 1972.

Franz U. Steinberg, M.D., University of Berne, 1938. (See Departments of Medicine and Preventive Medicine and Public Health.)

Assistant Professors (Clinical)


M. Richard Carlin, B.A., Dartmouth College, 1944; M.D., Yale University, 1947.


Instructors (Clinical)

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.


Research Associate

Rose E. Boyarsky, B.S., University of Vermont, 1944; M.A., Columbia University, 1946; Ph.D., Duke University, 1969.

ORTHOPEDIC SURGERY

Professor Emeritus

Fred C. Reynolds, A.B., Washington University, 1931; M.D., 1934. (Also Lecturer.)

Professor (Clinical)


Research Associate Professor

David J. Simmons, B.S., Boston University, 1954; M.A., Clark University, 1956; Ph.D., University of Chicago, 1959.


PLASTIC AND RECONSTRUCTIVE SURGERY

Professor
Paul M. Weeks, A.B., Duke University, 1954; M.D., University of North Carolina, 1958. (See Department of Preventive Medicine and Public Health and Irene Walter Johnson Institute of Rehabilitation.)

Professor (Clinical)
Minot P. Fryer, A.B., Brown University, 1938; M.D., Johns Hopkins University, 1940; D.S.C., Brown University, 1972.

Associate Professor

Assistant Professors
Leo A. Whiteside, B.S., University of Oklahoma, 1965; M.D., University of Texas, 1969. (See Irene Walter Johnson Institute of Rehabilitation.)

Assistant Professors (Clinical)
Marcy A. Goldstein, M.D., Washington University, 1951.
George H. Zografakis, M.S., Rutgers University, 1955; M.D., State University of New York, Upstate Medical College, 1959.

Assistant Professors (Clinical)
Earl P. Holt, Jr., B.A., Duke University, 1942; M.D., 1945.
George E. Scheer, A.B., Municipal University of Wichita, 1940; M.D., Washington University, 1943.

Instructor
Jordan H. Ginsberg, A.B., University of Michigan, 1948; M.D., University of Illinois, 1972. (See Irene Walter Johnson Institute of Rehabilitation.)

Instructors (Clinical)
Vilray P. Blair, Jr., M.D., Washington University, 1939.
Neal Neuman, M.D., St. Louis University, 1971.

Assistant Professors

Assistant Professors (Clinical)
Marcy A. Goldstein, M.D., Washington University, 1951.
George H. Zografakis, M.S., Rutgers University, 1955; M.D., State University of New York, Upstate Medical College, 1959.

Instructors (Clinical)
Richard Shat, A.B., University of Missouri, 1968; M.D., St. Louis University, 1972.
Bruce I. White, M.D., Washington University, 1964.

Consultant in Oral Surgery
Leroy W. Peterson, D.D.S., University of Michigan, 1940. (Also School of Dental Medicine.)
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 electrocardiographic rhythm analysis, monitoring the critically ill in a surgical Intensive Care Unit, cardiac catheterization data processing, regional tracer kinetics in nuclear medicine, clinical research and diagnosis using mass spectrometry, 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. Externships in biomedical computing of two to three months' duration are offered during the summer for students who have completed the first year of the medical school curriculum. Opportunities to carry out research are also available 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 a compatible set of "macro-modules" for which arbitrary large, complex, or specialized computer systems can be assembled. These systems are being applied to molecular and neural modeling, electrocardiographic rhythm analysis, speech synthesis, and ventricular dynamics.
A. Maynard Engebretson, B.S.,
University of Minnesota, 1958;
M.S., Washington University, 1963;
D.Sc., 1970. (Also Central Institute
for the Deaf.)

Kenneth B. Larson, Met.E., Colorado
School of Mines, 1954; S.M.,
Massachusetts Institute of

Bruce F. Spenner, B.S., Washington
University, 1969; M.S., 1971; D.Sc.,
1976.

Joan Zimmerman, B.S., Leeds
University, 1966; Ph.D., Oxford
University, 1970.

Assistant Professors

Rexford L. Hill, B.S., University of
Cincinnati, 1964; M.S., 1966. (See
Department of Radiology.)

John W. Lewis III, B.S., Georgia
Institute of Technology, 1966; M.S.,
1968; Ph.D., 1971. (See Department
of Pathology.)

Thomas F. Martin, B.S., St. Louis
University, 1961; M.D., 1965. (See
Department of Medicine.)

Assistant Professor

J. Philip Miller, A.B., Washington
University, 1965. (See Department of
Preventive Medicine and Public
Health.)

Research Assistant Professor

Robert H. Greenfield, B.S., New York
University, 1966; M.S., 1967; D.Sc.,
Washington University, 1976. (See
Department of Ophthalmology.)

Elective Courses

Bio 530. Digital Computers for
Laboratory Use
Methods of using small digital
computers with laboratory instru-
ments. Basic programming,
data collection and conversion,
data processing, digital control,
output techniques. Credit 3 units.
(Dr. Holmes)

BMed 693. Physical and
Mathematical Principles of
Tracer Kinetics
Theoretical foundations of
tracer-kinetic methods. Topics
covered are differential equa-
tions for conservation of tracer
mass, applications of elementary
linear systems theory, stochastic
and compartmental models,
methods of accounting for tracer
recirculation, and methods of
data-processing. (Dr. Larson)

Programming for Medical
Information Systems
An interpretive language de-
signed for medical information
systems is described, with pro-
gramming examples from hos-
pital and ambulatory care set-
tings. The language used is
MUMPS (MGH Utility Multi-
Programming System). Three
hours of class work plus labora-
tory each week for six weeks.
(Dr. Greenfield)

Introduction to Programming a
Laboratory Computer
A generalized description of
digital computers, octal and
binary number systems, struc-
tured programming techniques,
assembly language for the PC
(Programmed Console), and in-
troduction to higher level lan-
guages (FORTRAN). Three hours
of class work plus laboratory
each week for six weeks.
(Mr. Garfield)

Survey of Biomedical Computer
Techniques
This course is directed toward
biological scientists who seek
an appreciation of the capabil-
ities and limitations of digital
computers as applied to bio-
medical problems. Only a mini-
mal background in mathematics
and electrical theory will be as-
sumed. Topics include elements
of sampling theory relevant to
computer processing of biological
signals, architectures of com-
puters and computer systems,
pertinent number systems, logical
design of digital computers,
programming techniques in-
cluding elements of machine,
assembler, and higher level lan-
guages, input and output devices.
Three class hours each week.
Demonstrations and laboratory
exercises provide an opportunity
for "hands-on" experience.
(Dr. Blaine and Staff)
DIVISION OF HEALTH CARE RESEARCH

The Division of Health Care Research is an extradepartmental unit of the School, directly responsible to the Dean. Staff members hold appointments in a variety of departments of the School of Medicine and the University; indeed, broad multidisciplinary staffing is considered appropriate for address to the complicated sociomedical and economic problems of health care and education. The primary function of the divisional staff is to contribute to the solution of such problems. Its responsibilities include:

The Medical Care Group of Washington University (MCG)

MCG is a teaching and research prepaid group practice which is operated as an integral part of the medical school. The practice is the site of a Primary Care Option for Medicine and Pediatrics Residents, electives for medical students and is a source of data for various health services and clinical research projects. It has over 20,000 enrollees from over 160 employed groups and provides more than 80,000 visits per year. The practice is staffed by physicians who are full-time faculty members of the Departments of Internal Medicine and Pediatrics, and by pediatric nurse practitioners, physician's assistants, adult nurse practitioners, psychiatric social workers, optometrists and a nutritionist. Specialty care is provided all enrollees by the members of the full-time faculty in the various clinical specialty departments of the medical school.

Research in Health Care

Studies of several broad areas are conducted by the staff of the Division, including investigations into effects of various methods of practice on medical care costs, factors in the organization of medical care, studies of triage in emergency rooms, sociologic and economic aspects of medical care, and methods of education for comprehensive care.

Medical and Paramedical Education

The Division is responsible for a first-year course titled "Introduction to Social Medicine and Medical Ethics," a series of 18 two-hour lecture discussion periods dealing with health care utilization, medical care organization, health maintenance, costs of medical care, allocation of scarce resources, and medical philosophy and ethics. An attempt is made throughout to relate basic health services, economic, sociologic and philosophic theory to practical problems in the covered fields. The Division also sponsors senior electives in Family Practice, Primary Care, Health Services Research and Clinical Bioethics (see Preventive Medicine and Public Health for further description of the medical student electives). In addition the Washington University Program for Pediatric Nurse Practitioners (PNP) is based in the Division (see page 135 for further description of the PNP program and page 134 for a description of the interinstitutional program for physician's assistants).
Carol E. Giblin, B.S., Fontbonne College, 1957; M.P.H., University of California, 1966. (See Department of Preventive Medicine and Public Health.)

Barbara A. Gross, R.N., Massachusetts General Hospital School of Nursing, 1971; M.N.P., St. Louis Municipal Hospitals Medical Nurse Practitioner Program, 1974. (See Department of Medicine.)

Barbara A. Gross, R.N., Massachusetts General Hospital School of Nursing, 1971; M.N.P., St. Louis Municipal Hospitals Medical Nurse Practitioner Program, 1974. (See Department of Medicine.)

Guner B. Gulmen, M.D., Hacettepe University Medical School, 1969. (See Department of Medicine.)

Carl G. Harford, A.B., Amherst College, 1928; M.D., Washington University, 1933.

Janet D. Hoy, B.S., Carroll College, 1975; P.A., St. Louis University, 1977. (See Department of Medicine.)

Clemens H. Jacques, B.S., University of California, 1949; O.D., 1949. (See Department of Ophthalmology.)

Dorothy J. Jones, A.B., Oberlin College, 1930; M.D., Washington University, 1934. (See Department of Pediatrics.)

Lawrence I. Kahn, A.B., University of Alabama, 1941; M.D., Louisiana State University, 1945. (See Department of Pediatrics.) (Also Pediatric Nurse Practitioners Program.)

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.)

Larry S. Kurz, B.A., Washington University, 1966; M.D., 1970. (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.)

Connie M. Pollock, B.S., Indiana University, 1972; O.D., 1974. (See Department of Ophthalmology.)

Kathleen Potts, R.N., St. Louis University, 1969; B.S., 1969; M.S., Boston University, 1970. (See Department of Pediatrics.)

Maureen M. Prange, R.N., Mt. Sinai Hospital, 1966; M.N.P., Starkloff Hospital, 1975. (See Department of Medicine.)

Calixto A. Romero, B.A., University of Pennsylvania, 1942; M.D., 1945. (See Department of Medicine.)

Frederick J. Schwartz, M.D., Washington University, 1974. (See Department of Medicine.)

Paul S. Simons, B.A., University of Texas, 1963; M.D., Washington University, 1967. (See Department of Pediatrics.)

Kongsak 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.)

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

Patricia Wirth, B.A., University of Nebraska, 1971. (See Department of Preventive Medicine.)
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 firsthand 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.

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.
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 six 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.

(Dr. Fishman)
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 transcends 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 $3,900. 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 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 1978-79 academic year, the tuition in the Graduate School of Arts and Sciences will be $2212 a semester for full-time study. For students enrolled for fewer than twelve units, the rate is $180 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**

Lectures on general physiology of muscles and comparative physiology of respiratory, cardiovascular, renal-osmoregulatory and temperature regulating systems. Endocrinology and neurobiology discussed in the context of these systems. Equal emphasis on basic physiological mechanisms and physiological adaptations to the environment. Laboratory includes mechanics and pharmacology of muscles, control of heart rate, blood pressure, ventilation rate, oxygen consumption and body temperature. Prerequisite, one year of college biology. Credit 4 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, excitation transmission, 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 re-examined 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.
(Nichols [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.
(Kirk [Biology])

Bio 408. Human Evolution
The fossil evidence for human and nonhuman primate evolution. Classification and genetics in evolutionary perspectives, relations between biology and culture in ancient and modern populations.
(Sussman [Anthropology])

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 group or individual participation in a research problem 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.
(Varner [Biology])

Bio 414. Structure and Function of Plants: Physiology
The daily metabolic activities of the mature green plant. Credit 3 units.
(Varner [Biology], Walbot)

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 423. Physiology of Development
Special topics in modern developmental biology, including fertilization and early development, morphogenesis, tissue interactions, synthesis of new substances, and hormonal control of developmental events. Credit 3 units.
(Moog [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 tolerance, autoimmunity, allergy, blood groups, and tissue transplantation. Credit 3 units.
(Fleischman [Microbiology and Immunology])

Bio 428. Developmental Neurobiology
Lectures, demonstrations, 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], Cowan, Hamburger)

Bio 429. General and Comparative Endocrinology
Lecture course dealing first with neuroendocrine integration in insects and vertebrates followed by detailed consideration of one or two endocrine systems of vertebrates, including biochemical actions of hormones and their role in physiology and development. Last phase of the course is devoted to in-depth treatment of selected topics in current research. A term paper will be assigned. Credit 3 units.
(Moog [Biology])

Bio 431. Principles of Cellular Physiology
A course in basic physiological principles with emphasis on cellular mechanisms. Four major topics are considered: (1) exchange of oxygen and carbon dioxide between cells and environment, (2) membrane function in the regulation of cell volume and composition, (3) properties of excitable and contractile cells, and (4) the role of cellular and subcellular organization in cell function. Credit 3 units.
(Roos [Physiology])

Bio 432. Tropical Botany
Lectures and/or outside reading on a variety of subjects with emphasis on pollination biology, phenoology and reproductive capacity of tropical plants, accompanying three weeks of intensive field work in Panama. Enrollment limited. Credit 3 units.
(Croat [Biology])

Bio 439. History of Scientific Thought to Newton
Mainstreams of cosmological, physical, chemical, and biological thought from the pre-Socrates to Newton. Credit 3 units.
(Hall [Biology])
Bio 440. History of Scientific Thought Since Newton
A chronological continuation of Bio 439, the course covers the period 1700 to the present. It begins with a historical analysis of the origins of the scientific, political, and industrial revolutions of the eighteenth century; it proceeds to discuss Newtonianism in the eighteenth century, the chemical revolution, German "nature-philosophy" in the early nineteenth century, Darwinism, thermodynamics, quantum and relativity theory in the middle and late 1900's. The rise of genetics, social Darwinism, and eugenics will form the focus of developments in the early twentieth century. The course will focus on the interrelationships between economics, science, politics, philosophy and art as interpreted from a Marxist view of history. Credit 3 units. (Allen [Biology], Hall)

Bio 442. Advanced Genetics
A general genetics course designed for graduate and advanced undergraduate students. Content will vary from year to year and will include such topics as: techniques in genetic analysis, the nature of mutation, mapping and recombination, genetics of regulation, genetics of indispensable cellular processes, genetics of organelles, Drosophila fate maps and genetic engineering. Credit 3 units. (Apriion [Microbiology and Immunology], Staff)

Bio 444. Experimental Genetics Laboratory
A laboratory course introducing experimental approaches employed in major areas of genetics. Experiments such as genetic cross analysis in Drosophila, mutagenesis in bacteriophage, biochemical pathway analysis in fungi, electrophoretic survey of enzyme polymorphism, marker-release-recapture analysis, cytogenetic analysis in plants, and karyotype analysis in humans will be included. Each experiment will be taught by a faculty member experienced in the experimental approach. Credit 3 units. (Johnson [Biology], Staff)

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. (Maniotis [Biology])

Bio 448. Plant Systems Technology Workshop
A series of workshops, each consisting of laboratories and tutorials for advanced undergraduates and graduates contemplating careers in systemsatics, 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. (Lewis [Biology])

Bio 450. Topics in the History of Eugenics
A research 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. (Brown [Biochemistry], 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 somesthesis system. Credit 2 units. (Burton [Anatomy], Hunt, Jones)

Bio 458. Topics in the History of Genomics
A survey of genomics in plants and animals, their morphology, cytology, anatomy, palynology, chemistry and evolution. Credit 1 unit. (Gentry [Biology])

Bio 467 and Bio 468. Seminar in Floristic Taxonomy
A survey of angiosperm families, their morphology, cytology, anatomy, palynology, chemistry and evolution. Credit 3 units. (Daw [Physiology and Biophysics], Cohen, Miller, Pearlman)

Bio 469. 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. (Johnson [Biology], Staff)

Bio 470. Ethology
Identical with Psych 470. 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 units.
(Gentry [Biology], D'Arcy, and Staff)

This course will examine selected elements of modern agriculture and the relationships among the food supply, population size and hunger. Lecture topics will include: the N-cycle and the use of fertilizer N; pests, pesticides and pest control; the Green Revolution, its advocates and its technical, social and economic influences on population growth rates. Credit 2 units.
(Sexton [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 501. Human Anatomy
(See Department of Anatomy and Neurobiology.)

Bio 502. General Physiology
(See Department of Physiology and Biophysics.)

Bio 504. 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])

Bio 506. Microscopic Anatomy
(See Department of Anatomy and Neurobiology.)

Bio 507 and Bio 508. Pharmacology
(See Department of Pharmacology.)

Bio 509 and Bio 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.
(Needleman [Pharmacology], Staff)

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. Cardiovascular Pharmacology and Physiology: Advanced Concepts and Methods
The course is designed to cover the background, essential aspects, methodology, and most recent advances in cardiovascular research, including: (1) chemistry and biology of vasoactive substances (prostaglandins, angiotensins and kinins); (2) pharmacological and biochemical assessment of sympathectomy; (3) morphological analysis of central neuronal pathways; and (4) electrophysiological and biochemical mechanisms in vascular smooth muscle and in the action of digitalis. Credit 2 units.
(Needleman [Pharmacology])

Bio 515 and Bio 516. General Pathology
(See Department of Pathology.)

Bio 517. General Immunology
A general introduction to humoral and cellular immunity. Lectures and laboratory in the first nine weeks of the fall semester. Credit 2 units.
(Davie [Microbiology & Immunology])

Bio 518 and Bio 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 immunoassay, various physiologic correlates). 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 [Pathology], Grieder)

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
Offered in spring semester only. 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. (D. 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. (Valierote [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) electrodiffusion, with applications to membranes, (5) membrane potentials and interfacial potentials, (6) kinetics and thermodynamics of carrier-mediated transport. Credit 3 units. (De Weer [Physiology and Biophysics], Blaustein)

Bio 526. Advanced Topics in the Physiology and Biophysics of Cell Membranes
A seminar course devoted to in-depth analysis of selected readings. 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. (Blaustein [Physiology and Biophysics], De Weer)

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 [Biochemistry], Staff)

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. (S. Schlesinger [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 extracellular 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 physiologic 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, mitosis, meiosis, organization of chromatin and chromosomes, the content of the nucleus, chromosomal proteins, nuclear RNA, polytenic 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 hormone teratomas, somatic cell genetics, nuclear cytoplasmic relationships, plasmids and cloning of eukaryotic genes in bacteria. Credit 3 units.

(Apirion [Microbiology and Immunology])

Bio 535. Physical-Chemical Basis of Techniques in Molecular Biology
The following techniques will be discussed from a physical-chemical viewpoint: sedimentation, viscosity, electrophoresis, chromatography, radioactivity counting, electron microscopy, spectrophotometry, X-ray diffraction, nuclear magnetic resonance and electron spin resonance. Credit 2 units.

(Thach [Biochemistry])

Bio 536. 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 537. 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 538. 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 539. Molecular Biology of Animal Viruses
Molecular biology of DNA and RNA animal viruses, with emphasis on viral replication and transformation in animal cell culture. Credit 3 units.

(M. Schlesinger, S. Schlesinger [Microbiology and Immunology])

Bio 540. 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. This course will include a consideration of cell-cell interactions, macromolecule receptors and small molecule receptors. Credit 2 units.

(Needelman [Pharmacology], Bradshaw, Frazier)

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. The conceptual and experimental bases for present knowledge, as well as major problems to be solved, will be emphasized. Credit 2 units.

(Kennell [Microbiology and Immunology])

Bio 543. Molecular Biology of Bacterial Viruses
(See Department of Microbiology and Immunology.)

Bio 544. Mechanisms of Disease (Cancer)
This course embodies a multidisciplinary approach to cancer. Experimental results from basic research on tissue culture cells
and animal tumors will be correlated with clinical observations on human cancer. Lectures will contain some background material, but will be primarily devoted to explicating current trends and ideas in research. Subject areas dealt with include biochemical and regulatory aspects of the cancer cell, causative agents, host-tumor interactions, and modes of treatment of human cancer. Credit 2 units.

(Thach [Biochemistry], Staff)

Bio 545. Conformational Analysis
Structure of macromolecules. Emphasis on CD, ORD, fluorescence, ESR, NMR, fiber and single crystal X-ray analysis, theoretical energy calculations. Credit 3 units. (Marshall [Physiology and Biophysics])

Bio 546. Antibodies: Structure, Function, and Formation
(See Department of Microbiology and Immunology.)

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], Boime)

Bio 551 and Bio 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. (Cowan [Anatomy and Neurobiology], Staff)
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 [Anatomy and Neurobiology], Willard)

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 and Bio 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 572. Seminar in Plant Biology: Plant Biochemistry
Discussion of current research and concepts of morphogenesis, growth, and development. Credit 2 units.
(Varner [Biology])

Bio 574. Systematics and Ecology of Monocotyledonae
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, Cynanethaceae, 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])

Bio 575. Advanced Studies in Plant Systematics
Seminars in specific topics including anatomy, chemotaxonomy, cytology, ecotaxonomy, embryology, nomenclature, palynology, phytogeography and bibliography. Credit 1 unit.
(Lewis [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 or health care technology 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, electrobiology, 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:

EE 481. Foundations of Bioengineering
EE 490. Biomedical Measurements and Instrumentation
BMed 545. Hospital Electrical Systems and Instrumentation
BMed 547. Biological Mass and Momentum Transfer
BMed 549. Engineering Aspects of Health Care Delivery
BMed 560. Biomechanics
BMed 573. Electrobiology
BMed 576. Sensory Communications
BMed 600. Research for Doctoral Dissertation
BMed 610. Clinical Engineering Practicum I
(BFor Technology in Health Care students only.)

BMed 611. Clinical Engineering Practicum II
(For Technology in Health Care students only.)

BMed 612. Clinical Engineering Practicum III
(For Technology in Health Care students only.)

BMed 651. Science of Synthetic and Biological Polymers
BMed 660. Biomedical Applications of Small Digital Computers
BMed 675. Mathematical Methods in Physiology

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 and 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 65 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. The core faculty, augmented by faculty from other schools and departments within the University, as well as affiliated institutions and agencies, maintains 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.

Assistant Professors and Director

Associate Professor and Deputy Director
Donald J. Horsh, B.S.B.A., University of Nebraska, 1941; M.H.A., Washington University, 1951; J.D., St. Louis University, 1953.

Associate Professor

Assistant Professors

Assistant Professors (Adjunct)
Ted Bowen, B.S., Austin College, 1941; M.H.A., Washington University, 1948.
Donald W. Cordes, A.B., Hope College, 1940; M.A., University of Michigan, 1941.
Frank S. Groner, A.B., Baylor University, 1934; LL.D., East Texas Baptist College, 1946; Union University, 1952; Baylor University, 1969.
James D. Harvey, B.A., University of South Dakota, 1950; M.H.A., University of Minnesota, 1952.
(See Program in Physical Therapy.)
Boone Powell, L.L.D., Baylor University, 1958.
Mary Roch Rucklage, B.S., St. Xavier College, 1961; M.H.A., St. Louis University, 1963.
Robert F. Seates, B.A., Baylor University, 1939.

Instructors (Adjunct)

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 discussion and development between the Health Administration and Planning Program and the graduate schools of Business, Technology in Health Care 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 most 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 HAPP 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 HAPP 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.

Tuition per semester, effective 1977 .................. $2,200
(Four semesters .................................. $8,800)
Books and supplies (per semester) .................. $80-100
Application fee (nonrefundable) .................. $15


Joseph B. Mackey, A.B., University of Missouri, 1951; M.H.A., St. Louis University, 1954.

Joseph C. Mackney


Edgar O. Mansfield, B.S., Northwestern University, 1950; M.H.A., 1952; Ph.D., Ohio Northern University, 1956.


Beverly B. Monical, B.S., University of California, 1947.


Gerald C. Stewert, B. Comm., University of Saskatchewan, 1948; Diploma in Hospital Administration, University of Toronto, 1949.


Lecturers

Harold Hinderer, B.A., College of St. Thomas, 1952.


PROGRAM IN PHYSICAL THERAPY

The program of instruction in physical therapy in the School of Medicine consists of the junior and senior years of a four-year college curriculum leading to the degree of Bachelor of Science in Physical Therapy.

Students entering this program must have satisfactorily completed sixty semester hours in an accredited college or university. Required are courses in English, psychology, biology, physics, chemistry, and social sciences.

The program includes courses in the basic medical sciences, medical and surgical lectures as applied to the practice of physical therapy, theory and application of physical therapy procedures, and a minimum of 800 hours of clinical experience.

The aim of the program is the development of competent physical therapists whose broad cultural backgrounds and thorough professional training prepare them to accept appropriate responsibilities in the comprehensive care program of modern medicine.

Tuition (three semesters), per semester $2,125
Tuition, final clinical semester 1,425

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 enroll at Washington University may enter the program as freshmen.

Upon completion of four academic semesters at the School of Medicine, the degree of Bachelor of Science in Occupational Therapy is conferred. Six months of supervised field work experience is required following graduation.

Tuition, per semester ........................................ $2,125
Fee, field work experience .................................. 500

For further information, contact the Office of Admissions, Washington University, Lindell and Skinker Boulevards, St. Louis, Missouri 63130, or the Program in Occupational Therapy, 4567 Scott Avenue, St. Louis, Missouri 63110. Phone: (314) 454-2564.

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: Sensi-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.

Curriculum

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.
The program of study normally requires four academic semesters for completion. Students without professional certification may expect their course of study to require an additional calendar year.

**Admission**

Persons with a baccalaureate degree, evidence of a strong academic record and satisfactory Graduate Record Examination scores are encouraged to apply.

Tuition, per semester .................................................. $2,200
Administrative fee for scheduling clinical internships for students without professional certification ..................................... 250

For further information, contact the Graduate Program in Occupational Therapy, 4567 Scott Avenue, St. Louis, Missouri 63110. Phone: (314) 454-2933.

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**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 the St. Louis University School of Nursing and Allied Health Professions. This 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
PROGRAM IN NURSE ANESTHESIA

Barnes Hospital School of Nurse Anesthesia, established in 1929, offers an accredited two-year program to registered nurses. Applicants for admission must have graduated from an accredited nursing school in which they have maintained an outstanding academic and clinical performance.

The purpose of the Program is to provide a correlated academic and clinical background to enable the student to administer anesthesia with competence and confidence. Approximately 400 didactic hours are presented to the students in anatomy, physiology, chemistry, physics, anesthetic agents, and all subjects related to the field of anesthesia. Approximately 850 anesthetics are administered by each student under supervision. Clinical experience is received in all types of anesthetic techniques.

After graduation, the student is required to take the National Qualifying Examination of the American Association of Nurse Anesthetists. Upon successful completion of this examination, the student becomes a Certified Registered Nurse Anesthetist (C.R.N.A.).

Tuition (for entire 24-month program) ........................................... $200
Stipend and maintenance
First year (per month) .................................................... 325
Second year (per month) ............................................. 385

PEDDIEEIC NURSE PRACTITIONER PROGRAM

The School of Medicine through the Department of Pediatrics and the Division of Health Care Research 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. The instruction is centered at the St. Louis Children's Hospital and the Division of Health Care Research.

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 faculty of 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.

Tuition ................................................................. $2,625.00
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 (319 hours) and practical experience. The student receives a monthly stipend of $300. Candidates for admission must be registered technologists (A.R.R.T.) or registered nurses with two years of college or with a baccalaureate degree. Medical technologists or persons having a B.S. degree with a major in biology, chemistry, or physics may also be considered if they have completed basic courses in human anatomy and physiology of at least 60 class hours.

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 MeV linear accelerator, a 4 MeV linear accelerator, a 25 MeV betatron, a cobalt unit, and a superficial ortho-voltage machine. 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. In addition, a simulator is available for treatment planning and the students are assigned to this area for a portion of their training.
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Mary L. Parker, B.S., M.S., M.D., Director of University Health Services
John L. Midkiff, B.S., B.A., Business Manager
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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FACULTY COUNCIL
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:

James P. Keating  
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Penelope G. Shackleford  
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Secretary
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Preclinical Representative to the Executive Committee of the Faculty Council
Barbara R. Cole  
Clinical Representative to the Executive Committee of the Faculty Council
David J. Gottlieb  
Preclinical Representative to the Executive Committee of the Faculty Council
William Cox  
Clinical Representative to the Executive Committee of the Faculty Council
Gerald Medoff  
Clinical Representative to the Executive Committee of the Faculty Council
Alan L. Pearlman  
Representative to the Senate Council of Washington University
Walter Bauer  
Clinical Representative to the Executive Committee of the Faculty Council
Milton J. Schlesinger  
Preclinical Representative to the Executive Faculty

STANDING COMMITTEES
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Chairman
Sven G. Eliasson
Robert Lee
John L. Schultz
John F. Walters
Committee on Academic Review and Promotions I
Selected faculty members
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John C. Herweg  
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Charles B. Anderson
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Harold Zarkowsky

1Representing the Faculty Council during 1978-79.
2Part-time faculty representative to the Executive Faculty during 1977-78.
3Honorary member.

1The Dean is ex officio a member of all standing committees.
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Georgana P. Buchler
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Steven Littman-Perlmutter
Student Representative
Mabel L. Purkerson
John L. Schultz
ex officio
James C. Warren
Frank Witkowski
Student Representative
DOCTOR OF MEDICINE DEGREE

Graduating Class—August 19, 1977
Residency 1977-78

Bischoff, Marshall Burnicc, B.S., University of Illinois, '60; M.S., '62—U.S. Army Hospital, San Antonio, Texas

Rhoades, Daniel Jay, Jr., A.B., Stanford University, '73—Undetermined

Graduating Class—December 23, 1977
Residency 1978-79

Bischoff, Marshall Burnicc, B.S., University of Illinois, '60; M.S., '62—U.S. Army Hospital, San Antonio, Texas

Khoades, Daniel Jay, Jr., A.B., Stanford University, '73—Undetermined

Mayers, Douglas Bruce, A.B., Washington University, '71—Case Western Reserve University Affiliated Hospitals, Cleveland, Ohio

Robinson, Margaret Lynn, B.S., Stanford University, '73—Duke University Medical Center, Durham, North Carolina

Baird, John Robert, B.S., North Dakota State University, '74; B.S., North Dakota Medical School, '76—University of North Dakota Affiliated Hospitals, Grand Forks, North Dakota

Baslan, Robert Wilfred, B.S., Greenville College, '74—Jewish Hospital, St. Louis, Missouri

Blaufluss, Mark Charles, B.S., University of North Dakota, '74—St. Louis Children's Hospital, St. Louis, Missouri

Boies, Eyla Glee, B.S., College of Idaho, '74—St. Louis Children's Hospital, St. Louis, Missouri

Brewer, Keith Frederic, A.B., Indiana University, '74—North Carolina Memorial Hospital, Chapel Hill, North Carolina

Brim, John Anthony, A.B., Washington University, '62, A.M., '64; Ph.D., Stanford University, '70—Fresno County Department of Health, Fresno, California

Bruzlaff, Diane Claire, B.S., University of Nebraska, '73; B.S. Med. Tech., '74—Barnes Hospital, St. Louis, Missouri

Cantrell, Cathy Jo, B.S., University of Nevada, '74—William A. Shands Teaching Hospital and Clinics, Gainesville, Florida

Capps, Robert James, B.S., Stanford University, '74—University of Kentucky Medical Center, Lexington, Kentucky

Clark, Howard Brent, B.A., Macalester College, '70—Barnes Hospital, St. Louis, Missouri

Clayburgh, Robert Henry, B.A., St. Olaf College, '74—Mayo Graduate School of Medicine, Rochester, Minnesota

Colter, Kim David, B.S., University of Missouri at Rolla, '73; M.S., University of California, '74—University of Missouri Medical Center, Columbia, Missouri

Couper, Nicholas Beemer, B.A., University of Virginia, '74—Medical College of Wisconsin Affiliated Hospitals, Milwaukee, Wisconsin

Crump, Nathaniel Lloyd, B.S., Howard University, '74—University of Chicago Clinics, Chicago, Illinois

David, Laura Jean, B.A., Grinnell College, '74—Case Western Reserve University Affiliated Hospitals, Cleveland, Ohio

Davidson, Raymond Pearson, II, B.S., Washington and Lee University, '74—Barnes Hospital, St. Louis, Missouri

Albert, Moses Kadarrol, B.S., Georgetown University, '74—George Washington University Hospitals, Washington, D.C.

Alexander, Victor, A.B., Harvard College, '72; M.M.S., Rutgers Medical School, '74; M.P.H., Harvard School of Public Health, '76; M.I.H., '76—Occupational Safety and Health Administration, U.S. Department of Labor, Washington, D.C.

Amusa, Kweli Johara, B.S., University of Illinois, '73—Mount Sinai Medical Center, Chicago, Illinois

Auffenberg, Robert John, Colorado State University—St. Louis University Group Hospitals, St. Louis, Missouri

Baird, John Robert, B.S., North Dakota State University, '74; B.S., North Dakota Medical School, '76—University of North Dakota Affiliated Hospitals, Grand Forks, North Dakota

Basilan, Robert Wilfred, B.S., Greenville College, '74—Jewish Hospital, St. Louis, Missouri

Clayburgh, Robert Henry, B.A., St. Olaf College, '74—Mayo Graduate School of Medicine, Rochester, Minnesota

Colter, Kim David, B.S., University of Missouri at Rolla, '73; M.S., University of California, '74—University of Missouri Medical Center, Columbia, Missouri

Couper, Nicholas Beemer, B.A., University of Virginia, '74—Medical College of Wisconsin Affiliated Hospitals, Milwaukee, Wisconsin

Crump, Nathaniel Lloyd, B.S., Howard University, '74—University of Chicago Clinics, Chicago, Illinois

David, Laura Jean, B.A., Grinnell College, '74—Case Western Reserve University Affiliated Hospitals, Cleveland, Ohio

Davidson, Raymond Pearson, II, B.S., Washington and Lee University, '74—Barnes Hospital, St. Louis, Missouri
Dichler, Andrew Cronson, B.A.,
University of Hawaii, '74—Jewish Hospital, St. Louis, Missouri

Doby, Jeffrey Edward, B.A.,
Stanford University, '74—University of California Hospital at Los Angeles, Los Angeles, California

Diller, Joseph A., Washington University, '74—St. Mary's Hospital, St. Louis, Missouri

Dingle, Sister Jeffrey, B.A.,
Briarcliff College, '63—Siouxland Medical Educational Foundation, Sioux City, Iowa

Eitelson, Charles David, A.B.,
Oberlin College, '74—Washington University Affiliated Hospitals, St. Louis, Missouri

Erb, Barry Miller, B.A., University of Mississippi, '75—University of Virginia Hospital, Charlottesville, Virginia

Finkel, Richard Sanford, B.A.,
Washington and Jefferson College, '74—Children's Hospital, Boston, Massachusetts

Foster, Carol Marvel, B.S., Purdue University, '74—University of Utah Affiliated Hospitals, Salt Lake City, Utah

Frisoe, Mark Edwin, B.S., University of Notre Dame, '74—Barnes Hospital, St. Louis, Missouri

Galpin, Pamela Frances, A.B.,
Washington University, '74; B.S., '74


Gergel, Harry Steven, A.B.,
Princeton University, '74—University of California Hospital at Los Angeles, Los Angeles, California

Gibb, Marcy Lynn, B.S., Washington State University, '72; M.H.A., University of Washington, '74—University of Colorado Affiliated Hospitals, Denver, Colorado

Glueck, Charles Arthur, Emory University—University of Miami Affiliated Hospitals, Miami, Florida

Goldstein, Carl Samuel, A.B., Cornell University, '73—University of Minnesota Hospitals, Minneapolis, Minnesota

Goran, Daniel David, A.B.,
Washington University, '73—University of Southern Florida Affiliated Hospitals, Tampa, Florida

Gunn, Debra Clark, B.A., Fisk University, '72—Baylor College of Medicine Affiliated Hospitals, Houston, Texas

Hartley-Brewer, Valerie Forbes,
University of Birmingham, England

Henry, Ann Katherine, B.S.,
University of Nebraska, '74—University of Virginia Hospital, Charlottesville, Virginia

Hochreiter, Margaret Campbell, B.S., Maryville College, '66—Ph.D., Johns Hopkins University, '70—Jewish Hospital, St. Louis, Missouri

Holers, Vernon Michael, B.S.,
Purdue University, '73—Barnes Hospital, St. Louis, Missouri

Hoover, Richard Glenn, B.S.,
University of Notre Dame, '74—Barnes Hospital, St. Louis, Missouri

Horn, Mary O'Flaherty, B.A.,
University of Idaho, '74—St. Luke's Hospital, St. Louis, Missouri

Huck, Robert Love, A.B.,
Middlebury College, '74—Duke University Medical Center, Durham, North Carolina

Jenson, David Richard, B.S.,
Brigham Young University, '75—Los Angeles County-University of Southern California Medical Center, Los Angeles, California

Johnson, Denise Lynn, Northwestern University; B.S.Med., Northwestern University School of Medicine, '76—Jewish Hospital, St. Louis, Missouri

Juergens, Andrew Louis, Montana State College—University of Utah Affiliated Hospitals, Salt Lake City, Utah

Kent, Harold Lee, B.A., Kansas State College of Pittsburgh, '74—U.S. Naval Medical Center, San Diego, California

King, Frances Allene, B.S.,
University of Oklahoma, '66—University of Texas Affiliated Hospitals, Houston, Texas

Kirk, Scott Harold, B.S., University of Illinois, '75—Carraway Methodist Hospital, Birmingham, Alabama

Kleyman, Thomas Ralph, B.S.,
Syracuse University, '73—Presbyterian Hospital, New York, New York

Koller, Hermann Michael, B.S.,
Stanford University, '74—University of Kansas Medical Center, Kansas City, Kansas

Koppenol, Carolyn Sue, B.A., Grand Valley State College, '69—Washington University Affiliated Hospitals, St. Louis, Missouri

Kreiss, Joan Kathryn, B.A., Reed College, '73—University Hospital, San Diego, California

Kurlan, Roger Mark, B.A., University of Rochester, '74—Jewish Hospital, St. Louis, Missouri

Kurnik, Brenda Rosalind Chinn, B.S., Massachusetts Institute of Technology, '74—Syracuse Medical Center, Syracuse, New York

Kurnik, Peter Barry, B.S., Massachusetts Institute of Technology, '74; M.S., '74—Syracuse Medical Center, Syracuse, New York

Kwong, Kwong-Fai, B.S., University of Washington, '74; A.B., '74—Veterans Administration Center, Los Angeles, California

Leavitt, Randi Yvette, B.S., Brooklyn College, '72—Yale-New Haven Medical Center, New Haven, Connecticut

Levinson, Mark Allen, A.B., University of Missouri at Columbia, '73—Jewish Hospital, St. Louis, Missouri

Ley, Timothy James, B.A., Drake University, '74—Massachusetts General Hospital, Boston, Massachusetts

Lincoln, Michael Allen, B.A., Harvard College, '74—Georgetown University Hospital, Washington, D.C.

Malan, Scott Lynn, B.S., Brigham Young University, '71—University of California at Davis Affiliated Hospitals, Redding, California

Marchetta, Joseph Peter, B.A., University of Wisconsin, '74—Brookdale Hospital Center, Brooklyn, New York

Margulies, Thomas Daniel, B.S.,
University of Iowa, '74—St. John's Mercy Hospital, St. Louis, Missouri

McQueen, Charles Edward, B.S.,
University of Illinois, '74—Mayo Graduate School of Medicine, Rochester, Minnesota
Meldi, Dominic Matthew, B.S., University of Illinois, '74—Barnes Hospital, St. Louis, Missouri.

Melnyk, Larysa Maria, A.B., Douglass College, '74; M.S., Rutgers University, '74—Syracuse Medical Center, Syracuse, New York.

Merrill, Charles Robert, B.S., University of Southern California, '74—St. Louis Children's Hospital, St. Louis, Missouri.

Michalski, Martha Caroline, B.A., Oakland University, '71—George Washington University Hospital, Washington, D.C.

Milbrandt, Jeffrey Dean, B.S., University of Nebraska, '74—Medical College of Wisconsin Affiliated Hospitals, Milwaukee, Wisconsin.

Montana, Margaret Anne, B.A., Colorado College, '74—Presbyterian Medical Center, Denver, Colorado.

Mooney, Ellen, B.S., University of Utah, '74—University of Iceland Affiliated Hospitals, Reykjavik, Iceland.

Moran, Stanford Mark, B.S., University of Oklahoma, '70—University of Oklahoma Hospitals, Oklahoma City, Oklahoma.

Morgan, Ross Eric, B.S., Colorado State University, '72; B.S., '74—University of Utah Affiliated Hospitals, Salt Lake City, Utah.

Mullenger, Keith Lee, B.S., Iowa State University, '74—Washington University Affiliated Hospitals, St. Louis, Missouri.

Murphy, Thomas Aquinas, B.S., University of Notre Dame, '74—Case Western Reserve University Affiliated Hospitals, Cleveland, Ohio.


Nasca, David, A.B., Stanford University, '73—Geising Medical Center, Danville, Pennsylvania.

Nelson, Carol Jane, B.A., Concordia College, '74; B.S., University of North Dakota Medical School, '76—Barnes Hospital, St. Louis, Missouri.

Nelson, Susan Jorden, A.B., Oberlin College, '69; A.M., '71—St. Louis Children's Hospital, St. Louis, Missouri.

Nowak, Felicia V., A.B., Trinity College, '70; Ph.D., University of Wisconsin, '75—St. Louis, Missouri.

O'Connor, John James, B.A., University of Missouri at St. Louis, '74—St. Francis Hospital, Peoria, Illinois.

Oldham, John Timothy, A.B., Washington University, '74—St. Louis, Missouri.

Orlofski, Richard, B.A., Southern Illinois University at Carbondale, '74—Barnes Hospital, St. Louis, Missouri.

Ozanieh, Katherine Mary, B.S., University of Pittsburgh, '71—St. John's Mercy Hospital, St. Louis, Missouri.

Palmer, Ronald Lee, B.S., University of Florida, '73—Washington University, St. Louis, Missouri.

Parenti, Dennis Louis, B.S., Rutgers University, '73—Temple University Hospitals, Philadelphia, Pennsylvania.

Pearse, Carlton Sherman, B.S., Ch.E., University of Colorado at Boulder, '73—Case Western Reserve University Affiliated Hospitals, Cleveland, Ohio.

Poindexter, Theresa Parker, B.A., Pomona College, '73—Northwestern Hospital, Minneapolis, Minnesota.

Portnoy, Lee Stuart, B.S., Purdue University, '72; M.A., University of California at Berkeley, '74—Stanford University Hospitals, Stanford, California.

Reed, Barbara Diane, Part University of Utah Affiliated Hospitals, Salt Lake City, Utah.

Regenstein, Frederic Gary, B.A., Rutgers College, '74—Barnes Hospital, St. Louis, Missouri.

Renie, William Andrew, A.B., Washington University, '73—Johns Hopkins Hospital, Baltimore, Maryland.

Rhinehart, Kenneth Bernard, B.S., Duke University, '74—North Carolina Memorial Hospital, Chapel Hill, North Carolina.

Rich, Andrew Adam, B.A., Yale University, '74—Sloan Kettering Institute, New York City, New York.

Robinette, Charles Leonard, Jr., B.F., Vanderbilt University, '65—Vanderbilt University Affiliated Hospitals, Nashville, Tennessee.

Roes, William Frederick, B.A., University of Washington, '73—Virginia Mason Hospital, Seattle, Washington.

Rubin, Eugene Harold, B.A., University of Rochester, '71—Washington University Affiliated Hospitals, St. Louis, Missouri.

Schmitz, Robert Lowell, A.B., Stanford University, '74—Duke University Medical Center, Durham, North Carolina.

Schwartz, Bruce Mitchell, B.A., Johns Hopkins University, '74—Washington University Affiliated Hospitals, St. Louis, Missouri.

Schwartz, Mary Rebecca, A.B., Stanford University, '74—Baylor College of Medicine Affiliated Hospitals, Houston, Texas.

Schweitzer, John Butler, B.S., E.E., Washington University, '74—Barnes Hospital, St. Louis, Missouri.

Sedman, Allen Jeffry, B.S., Ch.E., University of Michigan, '69; B.S., '69; M.S., '73; Ph.D., '74—University of Colorado Affiliated Hospitals, Denver, Colorado.

Shega, John Francis, B.S., E.E., University of Pittsburgh, '74—U.S. Naval Medical Center, San Diego, California.


Sisk, Clark Edmund, A.B., Stanford University, '74—St. Vincent's Hospital, Portland, Oregon.

Spaulding, Sandra Louise, B.A., Montana State University, '74—University of California at Los Angeles, Los Angeles, California.

Spellen, Carol Denise, B.S., Duke University, '74—Washington University Affiliated Hospitals, St. Louis, Missouri.

Stricker, Charles X., A.B., University of Missouri at Columbia, '73—Duke University Medical Center, Durham, North Carolina.

Stuart, Mary Hamilton, A.B., Grinnell College, '72—Iowa Methodist Hospital, Des Moines, Iowa.

Stull, Carol Grammer, B.S., Duke University, '74—Cincinnati General Hospital, Cincinnati, Ohio.

Stull, John Davis, B.S., University of Illinois, '74—Cincinnati General Hospital, Cincinnati, Ohio.

Thaler, Bruce Jay, A.B., Hamilton College, '74—Washington University Affiliated Hospitals, St. Louis, Missouri.

Toth, Joseph Karoly, B.S., Stanford University, '68—St. Louis Children's Hospital, St. Louis, Missouri.
Register of Students

Turner, Donn Martin, B.A., Colorado College, ’74—University of Iowa Hospitals, Iowa City, Iowa
Vander Waude, John Cecil, Jr., B.A., Augustana College, ’74; B.S., University of South Dakota School of Medicine, ’76—Washington University Affiliated Hospitals, St. Louis, Missouri
Wahl, Richard Leo, B.A., Wartberg College, ’74—University Hospital, San Diego, California
Walker, Gaylord Tenold, B.A., University of the South, ’74—University of Southern Alabama Medical Center, Mobile, Alabama
Warren, Robert Wells, B.A., Yale College, ’72—Duke University Medical Center, Durham, North Carolina
Watkins, David Lynn, A.B., University of Missouri at Columbia, ’74—University of Texas Medical Branch Hospital, Galveston, Texas
Webber, Paul Michael, B.S., U.S. Military Academy, ’74—William Beaumont Army Hospital, El Paso, Texas
White, John Robert, B.S., University of Kentucky, ’74—University of Kentucky Medical Center, Lexington, Kentucky
Wilkinson, Robin Ann, B.A., University of Texas at Austin, ’74—St. Luke’s Hospital, St. Louis, Missouri
Witkowski, Francis Xavier, B.S.E.E., Manhattan College, ’69; M.S., Northeastern University, ’72—Barnes Hospital, St. Louis, Missouri
Young, Stephen Granville, A.B., Princeton University, ’74—University of California Medical Center, San Francisco, California
Zavora, Philip Bertram, B.A., Northwestern University, ’73; M.S., ’74—University of Utah Affiliated Hospitals, Salt Lake City, Utah

Third-Year Class 1977-78.

Allen, Brent Terry, B.S., Utah State University, ’75—Reno, Nevada
Anderson, Dale Johnson, A.B., Oberlin College, ’75—St. Louis, Missouri
Armbruster, Thomas John, B.A., Adelphi University, ’75—Rockville Centre, New York
Attiah, Augustine Kwadno, B.S., University of Chicago, ’75—Ghana, Africa
Bahcock, Susan Kay, B.A., Augsburg College, ’75—Anoka, Minnesota
Barber, Frank Ernest, B.A.S., University of Pennsylvania, ’75—Woodcliffe Lake, New Jersey
Barker, Kendall Howard, A.B., Oberlin College, ’75—Grosse Pointe Farms, Michigan
Bartness, John Edgar, B.A., Vanderbilt University, ’74—Sheffield, Alabama
Beatie, William Edward, B.S., Northwestern University, ’74—Chicago, Illinois
Bechtold, Robert Edmond, B.A., Duke University, ’72; M.S., Florida State University, ’76—Tallahassee, Florida
Bell, Richard Edwin, B.S., Utah State University, ’75—Reno, Nevada
Blodi, Christopher Frederick, B.A., University of Iowa, ’75; B.S., ’75—Iowa City, Iowa
Bradley, Stephen Kent, B.A., Duke University, ’75—Lenexa, Kansas
Brotherson, Kurt Jeffrey, A.B., Washington University, ’75—Springfield, Illinois
Brown, Stephanie Cordell, B.A., Williams College, ’76—Brooklyn, New York
Clarek, John Ross, B.S., Brown University, ’75—Philadelphia, Pennsylvania
Coe, Jeffrey Dean, B.S.E.E., University of Notre Dame, ’75—San Antonio, Texas
Connor, Robert Emmet, B.S., Massachusetts Institute of Technology, ’75—Ossining, New York
Cook, Debra Lynn, B.S., Denison University, ’75—Park Ridge, Illinois
Craver, Jeffrey Lloyd, A.B., Cornell University, ’75—Pelham Manor, New York
Dambro, Mark Richard, B.S., University of Arizona, ’72—Las Vegas, Nevada
Dann, John Joseph, III, B.A., College of Holy Cross, ’69; D.M.D., Harvard School of Dental Medicine, ’73—Ft. Worth, Texas
Darrah, Lee Bryan, B.S., University of Utah, ’75—Las Vegas, Nevada
Demers, Renee Carol, B.A., Northwestern University, ’74; M.S., ’74—West Orange, New Jersey
Derechin, Neil Mark, B.A., Brown University, ’75—St. Paul, Minnesota
DiMarco, Jack Peter, B.S., St. John’s University, ’75—Jackson Heights, New York
Doan, Nancy Grace, B.A., St. Olaf College, ’75—Minnetonka, Minnesota
Dooley, David Patrick, B.S., University of Notre Dame, ’75—Sharonville, Ohio
Dumier, Thomas Lee, B.A., Colorado College, ’74—Denver, Colorado
Ferguson, Thomas Bruce, Jr., B.A., Williams College, ’75—St. Louis, Missouri
Fillingame, Ralph Alan, B.S., University of California at Davis, ’75—Red Bluff, California
Findlay, Robert Frank, B.S., North Dakota State University, ’74—Williston, North Dakota
Fishman, Leslie E., B.S., University of Michigan, ’75—Pittsburgh, Pennsylvania
Fitts, William Elton, B.A., Boise State University, ’75—Boise, Idaho
Fogel, Sandy Lewis, A.B., Washington University, ’75—Monsey, New York
Forstate, William Jacob, B.A., Washington and Jefferson College, ’68—North Miami Beach, Florida
Frame, John Raymond, University of Oklahoma—Mequon, Wisconsin
Frankel, Scott Jay, A.B., Grinnell College, ’75—St. Louis, Missouri
King, Gregory Steven, B.A.,
University of Kansas, '73—Lenexa, Kansas

King, Patrick Holt, B.S., Mount
Marty College, '75—Vermillion, South Dakota

Kolh, Susan Elizabeth, B.A., Johns
Hopkins University, '76—LaVale, Maryland

Kraemer, Bruce Alan, B.S.,
University of Tulsa, '75—Tulsa, Oklahoma

Kunkel, Steve Edward, A.B.,
University of Missouri at Columbia, '75—Mankato, Minnesota

Langguth, Steven David, A.B.,
Drury College, '75—Overland, Missouri

Larsen, Robert Allen, B.A.,
Colorado College, '74—Denver, Colorado

Leonard, Patrice Ann, B.A.,
University of Colorado, '74—Boulder, Colorado

Liu, Kathy Jung-Mei, A.B.,
Washington University, '74—St. Louis, Missouri

Lloyd, Frances Ann, B.A.,
Millsaps College, '74—Jackson, Mississippi

Lowenstein, Gail Irene, B.S.,
Fordham University, '75—New York, New York

Lowy, Richard Gabriel, B.S.,
University of California at Los Angeles, '74—Las Vegas, Nevada

Lund, Robert Herluf, Jr., B.A.,
Williams College, '75—St. Louis, Missouri

Maret, Christopher Richard, A.B.,
Washington University, '75—St. Louis, Missouri

Marquardt, Diana Lee, A.B.,
David Lipscomb College, '75—Vail, Colorado

McKenzie, Douglas Bruce, B.S.,
Stanford University, '72—Reno, Nevada

Melman, Kenneth Howard, A.B.,
University of Michigan, '75—St. Louis, Missouri

Mercer, Brian Scott, B.S.,
Massachusetts Institute of Technology, '75—Clifton, New Jersey

Miller, Edward Charles, B.S.E.E.,
University of Missouri at Columbia, '75—St. Louis, Missouri

Mitchell, Carol Marie, B.S.,
University of Southern California, '75—St. Louis, Missouri

Moltoris, Bruce Albert, B.S.,
University of Illinois, '73; M.S., '75—New Berlin, Illinois

Mufroy, John Joseph, Jr., B.S.,
Ursinus College, '75—Edison, New Jersey

New, Nancy Beth, University of
Colorado—Scottsdale, Arizona

Opila, Donald Andrew, B.S.,
Michigan State University, '75—Chicago Heights, Illinois

Owen, James Wilson, III, B.A.,
Southern Methodist University, '75—Bartlesville, Oklahoma

Patton, Timothy John, B.S., University of
Washington, '75—Seattle, Washington

Piercy, Stephen Lester, B.A.,
Greenville College, '74—Ellery, Illinois

Ratcliffe, Stephen Douglas, B.S.,
Bethany College, '74—New Martinsville, West Virginia

Robinson, David Edward, B.S.,
Duke University, '74—Bethesda, Maryland

Roden, Raymond Alan, B.S.,
Northern Illinois University, '74—South Holland, Illinois

Rosenberg, Robert David, B.S.,
University of California at Riverside, '75—Encino, California

Rowell, David Paul, B.S., Oregon
State University, '75—Salem, Oregon

Rudloff, Mary Anne, B.A., University of
North Carolina, '71—Elgin Air Force Base, Florida

Sando, William Craig, B.S.E.E.,
Duke University, '75—Kettering, Ohio

Sanoffsky, Stephen Jay, B.A.,
Northwestern University, '75—St. Louis, Missouri

Sayre, Robert Lynn, B.S., Colorado
State University, '75—Delta, Colorado

Schmitt, Philip John, B.S.Ch.E.,
Washington University, '75—Kansas City, Missouri

Schuh, Marilyn Ellen, B.S.,
University of North Dakota, '73; B.S., '77—Lakota, North Dakota

Scissors, Kenneth Neil, A.B.,
Washington University, '75—St. Louis, Missouri
Sear, Mark Richard, B.A., Johns Hopkins University, '75—Omaha, Nebraska
Shapiro, Martin Robert, A.B., Hamilton College, '75—Sands Point, New York
Sheffner, Steven Elliott, B.S., Tulane University, '75—Livingston, New Jersey
Shipp, Margaret Ann, B.A., Southern Methodist University, '75—Houston, Texas
Shoback, Barbara Rose, A.B., Vassar College, '74—New Brunswick, New Jersey
Sidorow, Barry Jay, A.B., Washington University, '74—Oceanside, New York
Silverman, Howard Jay, B.A., Skidmore College, '75—Massapequa, New York
Smith, Gary Mark, B.S., U.S. Air Force Academy, '64; M.S. Astr., Purdue University, '65—Duarte, California
Sortwell, Cynthia Gerry, B.A., Boston University, '75—Sherborn, Massachusetts
Spratt, Lorenzo, B.S., Prairie View A & M College, '69—McCamey, Texas
Stergis, George Nicholas, B.S., Duke University, '75—Kennett Square, Pennsylvania
Stivers, Richard Kent, B.S., Colorado State University, '74—Northglenn, Colorado
Stuart, Catherine Hyde, A.B., Cornell University, '74—Garden City, New York
Sundermann, Richard Henry, Jr., B.A., Vanderbilt University, '74—Little Rock, Arkansas
Swensson, Erik Earl, A.B., Drury College, '75—Springfield, Missouri
Terrell, Wanda Tyrone, A.B., Washington University, '75—Memphis, Tennessee
Thalgott, John Stanley, B.S., University of Illinois, '75—Las Vegas, Nevada
Thompson, Jimmie Lee, B.S., Tougaloo College, '72—Madison, Mississippi
Trout, Anne Carla, A.B., Washington University, '75—Denver, Colorado
Wehrli, Craig John, B.S., University of Southern California, '73; M.S., University of California at Davis, '75—Los Altos, California
Weinstein, James Barry, A.B., Washington University, '74—Pittsburgh, Pennsylvania
Weltin, Gregory Gerhardt, B.S.E.E., Washington University, '75—St. Louis, Missouri
Wershil, Barry Kent, A.B., Washington University, '75—East Massapequa, New York
Wheeler, Dawn Elaine, B.S., University of Minnesota, '75—St. Paul, Minnesota
White, David Scott, Antioch College—St. Louis, Missouri
Wilder, Gary Alan, A.B., Washington University, '74—St. Louis, Missouri
Williams, William Turney, B.S., Northern State College, '73; M.S., University of Nebraska at Lincoln, '75—Rapid City, South Dakota
Winokur, Thomas Seth, B.S., Stanford University, '75—Iowa City, Iowa
Wright, Jeffrey Mason, B.S., Vanderbilt University, '75—St. Louis, Missouri
Yeh, Shirley, B.S., Purdue University, '75—West Lafayette, Indiana
Zakem, James Francis, B.S., University of Michigan, '74—Grosse Pointe Park, Michigan

Second-Year Class 1977-78

Adams, Ava Marie, B.S., Loyola University, '75—Chicago, Illinois
Adler, Steven Jay, B.A., Swarthmore College, '76—Spring Valley, New York
Aeder, Mark Irwin, B.S., Bucknell University, '76; M.S., '77—Bergenfield, New Jersey
Akright, Bruce Donald, B.S., Southern Methodist University, '75—Leawood, Kansas
Akright, Laura Elizabeth, B.S., Southern Methodist University, '76—Phoenix, Arizona
Albi, Joyce Adelle, B.A., Colorado College, '76—Longmont, Colorado
Allen, Gregory James, B.S.E.E., Massachusetts Institute of Technology, '76—Mercer Island, Washington
Aronson, Thomas Alan, B.A., Amherst College, '76—St. Louis, Missouri
Auer, Roy Raymond, Jr., B.S.E.E., Washington University, '76—St. Louis, Missouri
Bader, Teddy Fritz, B.S., Bethany Nazarene College, '76—Colorado Springs, Colorado
Barshop, Bruce Allen, A.B., Brandeis University, '76—Freehold, New Jersey
Bell, Patricia Evelyn, B.A., Emory University, '76—Nashville, Tennessee
Bevan, Herbert Everett, III, B.A., University of Kansas, '76—Wichita, Kansas
Blair, Harry Colbert, A.B., Washington University, '76—Boulder, Colorado
Bloch, Michelle Helene, B.S., Cornell University, '76—Flushing, New York
Bodner, Matthew Scott, A.B., Washington University, '76—Rego Park, New York
Boothby, Mark Robin, B.S., University of Wisconsin, '76—St. Louis, Missouri

Sear, Mark Richard, B.A., Johns Hopkins University, '75—Omaha, Nebraska
Shapiro, Martin Robert, A.B., Hamilton College, '75—Sands Point, New York
Sheffner, Steven Elliott, B.S., Tulane University, '75—Livingston, New Jersey
Shipp, Margaret Ann, B.A., Southern Methodist University, '75—Houston, Texas
Shoback, Barbara Rose, A.B., Vassar College, '74—New Brunswick, New Jersey
Sidorow, Barry Jay, A.B., Washington University, '74—Oceanside, New York
Silverman, Howard Jay, B.A., Skidmore College, '75—Massapequa, New York
Smith, Gary Mark, B.S., U.S. Air Force Academy, '64; M.S. Astr., Purdue University, '65—Duarte, California
Sortwell, Cynthia Gerry, B.A., Boston University, '75—Sherborn, Massachusetts
Spratt, Lorenzo, B.S., Prairie View A & M College, '69—McCamey, Texas
Stergis, George Nicholas, B.S., Duke University, '75—Kennett Square, Pennsylvania
Stivers, Richard Kent, B.S., Colorado State University, '74—Northglenn, Colorado
Stuart, Catherine Hyde, A.B., Cornell University, '74—Garden City, New York
Sundermann, Richard Henry, Jr., B.A., Vanderbilt University, '74—Little Rock, Arkansas
Swensson, Erik Earl, A.B., Drury College, '75—Springfield, Missouri
Terrell, Wanda Tyrone, A.B., Washington University, '75—Memphis, Tennessee
Thalgott, John Stanley, B.S., University of Illinois, '75—Las Vegas, Nevada
Thompson, Jimmie Lee, B.S., Tougaloo College, '72—Madison, Mississippi
Trout, Anne Carla, A.B., Washington University, '75—Denver, Colorado
Wehrli, Craig John, B.S., University of Southern California, '73; M.S., University of California at Davis, '75—Los Altos, California
Weinstein, James Barry, A.B., Washington University, '74—Pittsburgh, Pennsylvania
Weltin, Gregory Gerhardt, B.S.E.E., Washington University, '75—St. Louis, Missouri
Wershil, Barry Kent, A.B., Washington University, '75—East Massapequa, New York
Wheeler, Dawn Elaine, B.S., University of Minnesota, '75—St. Paul, Minnesota
White, David Scott, Antioch College—St. Louis, Missouri
Wilder, Gary Alan, A.B., Washington University, '74—St. Louis, Missouri
Williams, William Turney, B.S., Northern State College, '73; M.S., University of Nebraska at Lincoln, '75—Rapid City, South Dakota
Winokur, Thomas Seth, B.S., Stanford University, '75—Iowa City, Iowa
Wright, Jeffrey Mason, B.S., Vanderbilt University, '75—St. Louis, Missouri
Yeh, Shirley, B.S., Purdue University, '75—West Lafayette, Indiana
Zakem, James Francis, B.S., University of Michigan, '74—Grosse Pointe Park, Michigan

Second-Year Class 1977-78

Adams, Ava Marie, B.S., Loyola University, '75—Chicago, Illinois
Adler, Steven Jay, B.A., Swarthmore College, '76—Spring Valley, New York
Aeder, Mark Irwin, B.S., Bucknell University, '76; M.S., '77—Bergenfield, New Jersey
Akright, Bruce Donald, B.S., Southern Methodist University, '75—Leawood, Kansas
Akright, Laura Elizabeth, B.S., Southern Methodist University, '76—Phoenix, Arizona
Albi, Joyce Adelle, B.A., Colorado College, '76—Longmont, Colorado
Allen, Gregory James, B.S.E.E., Massachusetts Institute of Technology, '76—Mercer Island, Washington
Aronson, Thomas Alan, B.A., Amherst College, '76—St. Louis, Missouri
Auer, Roy Raymond, Jr., B.S.E.E., Washington University, '76—St. Louis, Missouri
Bader, Teddy Fritz, B.S., Bethany Nazarene College, '76—Colorado Springs, Colorado
Barshop, Bruce Allen, A.B., Brandeis University, '76—Freehold, New Jersey
Bell, Patricia Evelyn, B.A., Emory University, '76—Nashville, Tennessee
Bevan, Herbert Everett, III, B.A., University of Kansas, '76—Wichita, Kansas
Blair, Harry Colbert, A.B., Washington University, '76—Boulder, Colorado
Bloch, Michelle Helene, B.S., Cornell University, '76—Flushing, New York
Bodner, Matthew Scott, A.B., Washington University, '76—Rego Park, New York
Boothby, Mark Robin, B.S., University of Wisconsin, '76—St. Louis, Missouri
Brooks, Rodney Wayne, B.S., Stanford University, '76—Little Rock, Arkansas

Butler, John Cecil, B.S., University of Notre Dame, '76—Bluffton, Indiana

Calvin, Steven Earl, B.A., Bethel College, '76—Tucson, Arizona

Caras, Marie Alexandra, A.B., Washington University, '76—Tucson, Arizona

Clifton, Devoree Ann, B.S., Regis College, '75—Denver, Colorado

Cooper, Robert Alan, A.B., Washington University, '76—Chicago, Illinois

Cox, Jefferson Dee, B.A., University of Oregon, '76—Eugene, Oregon

Cutler, John Robert, A.B., Washington University, '74—St. Louis, Missouri

Dinerman, Harry, B.S., State University of New York at Stony Brook, '76—Howard Beach, New York

Droge, Elizabeth Ann, B.A., St. Louis University, '76—St. Louis, Missouri

Duerger, Bruce Kirby, A.B., University of Missouri at Columbia, '76—St. Louis, Missouri

Dyorkin, Michael Lewis, B.A., University of Chicago, '76—New York, New York

Eaton, Charles James, B.S., Emory University, '76—West Palm Beach, Florida

Edelman, Alan Stewart, B.A., Swarthmore College, '75—North Bay Village, Florida

Edmonds, Pamela Ruth, B.A., Central Methodist College, '76—Independence, Missouri

Ferry, David Arthur, B.A., Claremont Men's College, '76—Fullerton, California

Finkelstein, Joel Stephen, B.A., Northwestern University, '76; M.S., '76—Columbus, Ohio

Fleshman, James Walter, Jr., A.B., Washington University, '75—St. Louis, Missouri

Fried, Robert Carey, A.B., Washington University, '75—Short Hills, New Jersey

Fyfe, Gwendolyn Ann, A.B., Washington University, '74—Terre Haute, Indiana

George, Samuel Everett, A.B., University of California, '76—Menlo Park, California

Gibson, Ronald Lyne, Jr., B.S., University of Washington, '75—Seattle, Washington

Goebel, Joel Alan, B.S., University of Notre Dame, '76—Notre Dame, Indiana

Graboyes, Joseph Hillel, B.S., Brown University, '76—Broomall, Pennsylvania

Gregg, Mary Grace, B.S., University of Pittsburgh, '75—Pittsburgh, Pennsylvania

Grosserode, Robert Stephen, A.B., University of Nebraska, '76—Lincoln, Nebraska

Grubbs, David Scott, B.S., Wheaton College, '76—Atlanta, Georgia

Haladay, George Jeffrey, Brown University—Brockville, Ohio

Heine, Robin Lee, B.S., University of Akron, '76—Akron, Ohio

Hempstead, Barbara Louise, B.A., Tufts University, '76—Andover, Massachusetts

Herbst, Timothy John, B.S., California Institute of Technology, '76—Phoenix, Arizona

Holcombe, Faith Hollowell, B.A., Radcliffe College, '76—Alexandria, Virginia

Hortin, Glen Lee, B.S., Illinois State University, '76—Zion, Illinois

Hudlin, Irving Christopher, Jr., B.S., Michigan State University, '76—Columbus, Georgia

Ibsen, Mark Stephen, Williams College—Geneva, Illinois

Kane, William Harrison, B.S., University of Iowa, '76—Iowa City, Iowa

Kappelman, Michael Porter, B.A., Carleton College, '74—Wichita, Kansas

Knight, Shirley Mae, B.A., Dillard University, '76—Dublin, Georgia

Kono, Donna Aiko, B.S., University of California at Davis, '76—Davis, California

Kowalski, Kevin Robert, B.A., St. Louis University, '76—Elyria, Ohio

Kramer, Jeffrey Bruce, B.A., Haverford College, '76—Shawnee Mission, Kansas

Kuwata, John Hiroshi, B.S., University of California at Irvine, '76—Rolling Hills Estates, California

Laakman, Robert William, B.S., Indiana University, '76—St. Louis, Missouri

Lacy, Stephen Talbot, B.A., Oberlin College, '76—St. Louis, Missouri

Lage, Janice Marie, B.S., California State University, '73—Clovis, California


Levite, Howard Allan, B.A., Yale University, '76—Brooklyn, New York

Lewis, Karen, B.A., Brigham Young University, '75—Wilmette, Illinois

Littman-Perlmutter, Steven Barry, A.B., Sarah Lawrence College, '75—North Woodmere, New York

Loder, Randall Thomas, B.A., University of Colorado, '76—Golden, Colorado

Loeb, Thomas Wolf, B.A., Northwestern University, '76—Birmingham, Alabama

Lovejoy, Bette Anne, B.S., Tufts University, '75—Pittsfield, Massachusetts

Mandelbaum, Bert Roland, B.S., State University of New York at Cortland, '75—Baltimore, Maryland
Register of Students

Press, Gary Allen, B.S., Yale University, '75—New York, New York
Prince, Charles Roderick, B.S., University of Alabama, '75—Birmingham, Alabama
Quagliarello, Vincent James, B.A., Johns Hopkins University, '76—Minneapolis, New York
Raih, Robert John, A.B., Washington University, '76—St. Louis, Missouri
Rath, Richard, B.A., Yale University, '76—Clearwater, Florida
Ring, Lisa Brodsky, B.S., Washington University, '76—Larchmont, New York
Roberts, Lee Ann Rhudy, B.S., University of North Carolina, '76—Raleigh, North Carolina
Rothenberg, Robert Keith, B.A., American University, '73—St. Louis, Missouri
Saint, John Gardner, A.B., Oberlin College, '76—Winnetka, Illinois
Saltman, Robert Jon, B.A., Yale University, '76—Holyoke, Massachusetts
Schlafly, Bruce Stewart, B.S.E.E., Washington University, '76—Alton, Illinois
Schlafly, Edward Frauenthen, Jr., B.S., Stanford University, '76—St. Louis, Missouri
Schul, Jeffrey Lynn, B.A., University of Kansas, '76—Lawrence, Kansas
Shapiro, Michael Barry, Emory University—Oceanside, New York
Shayman, James Alan, A.B., Cornell University, '76—Highland Park, Illinois
Siegel, Alan David, B.A., University of Wisconsin, '76—Fox Point, Wisconsin
Silverstein, Barry Owen, A.B., Cornell University, '76—East Brunswick, New Jersey
Smith, Steve Allen, B.A., University of Southern California, '76—Long Beach, California
Sommer, Rand Washburn, B.S., Davidson College, '76—St. Louis, Missouri
Sorokin, Rachel Bernice, B.S., Yale University, '76—West Hartford, Connecticut
Spratt, John Arthur, B.A., University of Colorado, '75; M.S., University of Missouri at Columbia, '76—Columbia, Missouri
Spurrier, Mark H., B.A., Kansas State University, '76—Manhattan, Kansas

Steinman, Howard Kenneth, B.A., Pomona College, '76—Los Angeles, California
Stevens, William Grant, B.S., University of Oregon, '76—Eugene, Oregon
Sullivan, Mark Daniel, B.S., University of Michigan, '76—Elmhurst, Illinois
Taylor, Ellis Reneau, Jr., B.S., University of Florida, '76—Gainesville, Florida
Thaler, Fred Joseph, B.A., Wesleyan University, '76—Laurel Hollow, New York
Tillinghast, Jeffrey Paul, B.S., State University of New York at Albany, '76—Port Chester, New York
Tweedt, Kenneth George, B.A., California State College at Sonoma, '75—Petaluma, California
Watts, Ray Lannom, B.S.E., University of Alabama at Birmingham, '76—Birmingham, Alabama
Weaver, Daniel Carl, B.S., Indiana University, '72—Danville, Indiana
Wheelan, Kevin Robert, University of Texas at Austin—Dallas, Texas
Whitehead, Daniel William, Jr., B.S., Drexel University, '75—Sharon Hill, Pennsylvania
Williams, John, B.A., St. Louis University, '76—St. Louis, Missouri
Wilson, Cynthia, B.S., Pacific Lutheran University, '76—Tacoma, Washington
Wolff, Andrew Aloysius, B.A., University of Dayton, '76—Dayton, Ohio

First-Year Class 1977-78

Alexander, Kimberly, B.A., Pomona College, '77—Northridge, California
Anderson, Kurt Morgan, B.A., College of St. Thomas, '77—St. Paul, Minnesota
Anschuetz, Sara Louise, A.B., Smith College, '76—Alton, Illinois
Apple, Bryan Stanley, B.S., Brown University, '77—Detroit, Michigan
Armstead, Valerie Elizabeth, B.A., University of Chicago, '77—Moorstown, 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—Glossport, Pennsylvania
Bennett, James Fredrick, B.A., University of Texas at Austin, '76—Conroe, Texas
Berman, Michele Rhonda, B.A., Johns Hopkins University, '77—Commack, 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
Brown, Yolette Vanyce, B.S., City College of City University of New York, '76—New York, 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
Cheadle, Margaret Jensen, B.A., Denison University, '74—St. Louis, Missouri
Cheong, Edmund Hung Kei, B.S., University of Minnesota, '74; B.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
Cosgrove, Daniel Scott, A.B., University of California at Los Angeles, '77—Brea, California
Denholm, Todd Andrew, B.A., Miami University, '77—Akron, Ohio
DeSantola, Joseph Robert, B.A., University of Rochester, '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
Douyon, Karl Emanuel, B.A., State University of New York at Buffalo, '74; M.S., State University of New York at Roswell Park, Graduate Division, '76—New York, New York
Dwyer, Jean Mueller, B.S., University of Kansas, '68; M.S.W., Washington University, '77—St. Louis, Missouri
Eatton, Molly Ellen, B.A., Emory University, '77—Paducah, Kentucky
Ellis, Wilfred J. G., B.S., University of Dayton, '75; M.S., '77—Dayton, Ohio
Emery, Waden Everett, B.S., Bethany Nazarene College, '77, A.B., '77—Oklahoma City, Oklahoma
Engel, Edgar Leo, Jr., B.A., Washash College, '72; Ph.D., University of Tennessee Center for the Health Sciences, '77—Evansville, Indiana
Feldman, Susan Florence, B.A., Radcliffe College, '77—Augusta, Georgia
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
Gathe, Joseph Clayton, Jr., Trinity University—Dallas, Texas
Gee, William Michael, B.A., Cornell College, '77—Chesterfield, Missouri
Gelstein, Laurence David, B.S., University of Michigan, '77—Orchard Lake, Michigan
Ginsberg, Ann Meredith, A.B., Radcliffe College, '77—New York, New York
Glasser, Ralph Brian, B.S., University of Michigan, '77—Oak Park, Illinois
Gluckstein, Daniel Peter, B.S., University of Michigan, '77—Detroit, Michigan
Goldman, Charles David, B.A., Brandeis University, '77—Flushing, New York
Golon, Stanley Walter, B.S., Fairfield University, '77—New Britain, Connecticut
Grant, William Thomas, B.S., Occidental College, '77—Glendora, California
Greene, Ernest Rinaldo, Jr., B.A., Rice University, '62; B.S., '63; M.A., Princeton University, '66; Ph.D., '68—Birmingham, Alabama
Griesski, Alice Ann, B.S., Chestnut Hill College, '77—Willow Grove, Pennsylvania
Grobman, Alan Mark, B.A., Stanford University, '77—Woodland Hills, California
Gross, Golde Hanna, B.A., University of the Pacific, '73; M.S., San Diego University, '76—Lafayette, California
Hall, Leslie Walter, B.S., Bethany Nazarene College, '77—Blackwell, Oklahoma
Harris, David Tab, B.A., Whittier College, '76—Whittier, California
Hawkins, Roland Benton, B.S., Washington University, '62; Ph.D., '67—St. Louis, Missouri
Heinecke, Jay Walter, B.S., Antioch College, '77—St. Louis, Missouri
Hinderliter, Alan Lee, B.S., University of Illinois, '77—Jacksonville, Illinois
Hofmann, Sandra Lee, B.A., University of Virginia, '77—Monroeville, Pennsylvania
Huerta, Christopher Lawrence, B.S., Arizona State University, '77—Tempe, Arizona
<table>
<thead>
<tr>
<th>Name</th>
<th>Degree</th>
<th>Institution</th>
<th>City, State</th>
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<tbody>
<tr>
<td>Bister, Laura Ruth</td>
<td>A.B.</td>
<td>Washington University, 76—St. Louis, Missouri</td>
<td></td>
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<tr>
<td>Hunt, Steven Thomas</td>
<td>B.A.</td>
<td>University of California at Los Angeles, 77—Garden Grove, California</td>
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<td>Jones, Rex Franklin</td>
<td>B.A.</td>
<td>Stanford University, 77—La Canada, California</td>
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<td>Kahn, Janis Claire</td>
<td>B.A.</td>
<td>Washington University, 76—Indianapolis, Indiana</td>
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<tr>
<td>Kastan, Michael Barry</td>
<td>B.S.</td>
<td>University of North Carolina, 77—Chapel Hill, North Carolina</td>
<td></td>
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<tr>
<td>Kemp, Michele Elsa</td>
<td>B.A.</td>
<td>Washington University, 77—St. Louis, Missouri</td>
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<td>Klearman, Micki</td>
<td>B.S.</td>
<td>Stanford University, 77—Palo Alto, California</td>
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<td>Klop, Fredric Howard</td>
<td>B.A.</td>
<td>University of Wisconsin, 77—Madison, Wisconsin</td>
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<td>Kreisle, Regina Ann</td>
<td>B.A.</td>
<td>Kalamazoo College, 76—South Bend, Indiana</td>
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<td>Kurtzman, Gary Jay</td>
<td>B.S.</td>
<td>Stanford University, 77—Sherman Oaks, California</td>
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<td>Kusuda, Leo</td>
<td>B.S.</td>
<td>Johns Hopkins University, 77—Bethesda, Maryland</td>
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<td>Lacey, Stephen Ward</td>
<td>B.S.</td>
<td>Central Missouri State University, 76—Independence, Missouri</td>
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<td>Lazarus, Cathy Jane</td>
<td>B.S.</td>
<td>University of Michigan, 77—Highland Park, Illinois</td>
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<tr>
<td>Lee, Suzanne YooKyoung Rhee</td>
<td>B.S.</td>
<td>Washington University, 77—St. Louis, Missouri</td>
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<td>Lenardo, Michael Joseph</td>
<td>B.A.</td>
<td>Johns Hopkins University, 77—Park Ridge, Illinois</td>
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<td>Leong, Ronald Wing</td>
<td>A.B.</td>
<td>Washington University, 76—Tehran, Iran</td>
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<td>Levine, David</td>
<td>B.S.E.</td>
<td>Princeton University, 77—Scarsdale, New York</td>
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<td>Loehr, James Paul</td>
<td>B.S.</td>
<td>Stanford University, 75—San Jose, California</td>
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<td>Malek, Steven Joe</td>
<td>B.A.</td>
<td>Carroll College, 77—Conrad, Montana</td>
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<td>Martinez, Mike</td>
<td>B.S.E.</td>
<td>University of Notre Dame, 77—Tampa, Florida</td>
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<td>Meador, Steven Arthur</td>
<td>B.S.E.</td>
<td>Duke University, 77—B.S.E., 77; A.B., 77—Kensington, Maryland</td>
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<td>Mellis, Scott Jeffrey</td>
<td>B.A.</td>
<td>Johns Hopkins University, 77—West Hempstead, New York</td>
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<td>Moody, Laura Maria</td>
<td>B.A.</td>
<td>Carleton College, 77—Chicago, Illinois</td>
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<td>Morrison, Beverly Anne</td>
<td>B.A.</td>
<td>Webster College, 76—St. Louis, Missouri</td>
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<td>Moskal, Joseph Turia</td>
<td>B.A.</td>
<td>State University of New York at Binghamton, 77—Brooklyn, New York</td>
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<tr>
<td>Mosley, Janet Debra</td>
<td>A.B.</td>
<td>Washington University, 77—St. Ann, Missouri</td>
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<td>Neil, Jeffrey Joseph</td>
<td>B.A.</td>
<td>Washington University, 77—North Olmsted, Ohio</td>
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<td>Newell, Anthony Maurice</td>
<td>B.A.</td>
<td>Lawrence University, 76—Chicago, Illinois</td>
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<td>O’Quinn, Bancroft</td>
<td>Jr.</td>
<td>Princeton University, 76—Chicago, Illinois</td>
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<td>Organ, Brian Christopher</td>
<td>B.A.</td>
<td>Southern Methodist University, 77—Omaha, Nebraska</td>
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<td>Ouzounian, Tye Jerome</td>
<td>B.S.</td>
<td>University of California at Los Angeles, 77—Los Angeles, California</td>
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<tr>
<td>Paine, Robert III</td>
<td>B.A.</td>
<td>Amherst College, 73; B.Phil., Oxford University, 75—St. Louis, Missouri</td>
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<td>Parasevias, James George</td>
<td>B.A.</td>
<td>University of Notre Dame, 77—Linden, New Jersey</td>
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<td>Phillips, Raymond Wynne</td>
<td>B.A.</td>
<td>Princeton University, 77—Fords, New Jersey</td>
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<td>Porter, Ross William</td>
<td>B.S.</td>
<td>University of Oregon, 77—Salem, Oregon</td>
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<td>Ray, John Doran, Jr.</td>
<td>B.S.</td>
<td>Milligan College, 77—Louisville, Kentucky</td>
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<td>Rediker, Donald Ellis</td>
<td>B.S.</td>
<td>Massachusetts Institute of Technology, 77; B.S., 77—Stoneham, Massachusetts</td>
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<td>Redder, Ralph Frederick, Jr.</td>
<td>B.S.</td>
<td>University of Illinois, 77—Granite City, Illinois</td>
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<td>Reitman, Marc Lionel</td>
<td>B.S.</td>
<td>Massachusetts Institute of Technology, 77; B.S., 77—Stamford, Connecticut</td>
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<td>Rothenberg, Paul Louis</td>
<td>B.S.</td>
<td>Cornell University, 77—Douglaston, New York</td>
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<td>Rubin, Jeremy Bennett</td>
<td>B.S.</td>
<td>Stanford University, 77—Beverly Hills, California</td>
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<td>Rudloff, Martin Derwin</td>
<td>B.A.</td>
<td>Central Methodist College, 77—Crystal City, Missouri</td>
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</table>
Sadowsky, Henry F., B.S., University of Illinois, '77—Skokie, Illinois
Saitz, Robert Mark, B.A., Washington University, '77—St. Louis, Missouri
Santmann, John Bryant, B.A., Johns Hopkins University, '77—Babylon, New York
Schoob, Valerie Sue Hensley, B.S., University of Iowa, '75—St. Louis, Missouri
Secosan, Craig John, B.A., Emory University, '77—Cincinnati, Ohio
Selifer, Leonard Stuart, Reed College—Far Rockaway, New York
Semenkovich, Clay Farmer, B.A., University of Virginia, '77—Roanoke, Virginia
Shaw, Frederick Carl, B.A., Gustavus Adolphus College, '77—Clarkdale, Mississippi
Spiegel, David Morris, B.A., Washington University, '77—Columbus, Georgia
Starros, Eric Bruce, B.A., University of Pennsylvania, '77—Melville, New York
Steinmetz, Samuel Edwin, B.S., 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
Tait, Jonathan Francis, A.B., Harvard University, '77—Salisbury, Connecticut
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
Townsend, Ronald Ross, B.A., University of California at Irvine, '77; B.S., '77—Anaheim, California
Von Essen, Susanna Gertrude, B.A., University of Nebraska, '76—Pender, Nebraska
Wald, Carol Jean, B.A., Washington University, '76—Northbrook, Illinois
Wann, Janice Rochelle, B.S., Yale University, '77—St. Louis, Missouri
Weinman, Steven Alan, A.B., Harvard University, '77—Elmont, New York
Willett, Rita Mary, B.A., Oberlin College, '77—Omaha, Nebraska
Winston, Jeffrey Victor, B.S., 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

Summary of Students in the School of Medicine

First-year Class 128
Second-year Class 120
M.St.P. Students in Graduate Phase of Program 31
Third-year Class 137
Graduating Class—August 1977 2
Graduating Class—December 1977 5
Graduating Class—May 1978 131
Total 554
DOCTOR OF MEDICINE AND
DOCTOR OF PHILOSOPHY
DEGREES

Medical Scientist Training
Program

Graduates—December 1977

Mayers, Douglas Bruce, A.B.,
Washington University, '71—Coral
Gables, Florida
Stricklin, George Putnam, B.A.,
David Lipscomb College, '71—
Palatka, Florida

Graduates—May 1978

Clark, Howard Brent, B.A.,
Maclester College, '70—Truman,
Minnesota
Leavitt, Randi Yvette, B.S.,
Brooklyn College, '72—Brooklyn,
New York
Rubin, Eugene Harold, B.A.,
University of Rochester, '71—
Brooklyn, Massachusetts
Silverman, Robert Eliot, B.A.,
University of Pennsylvania, '72—
Silver Spring, Maryland
Warren, Robert Wells, B.A., Yale
University, '72—Athens, Georgia

Sixth-Year Trainees 1977-78

Estridge, Mitchel Gene, B.A.,
Berea College, '72—Berea, Kentucky
Pischell, Ken Donald, B.S., California
Institute of Technology, '72—
Santa Barbara, California

Fifth-Year Trainees 1977-78

Chaplin, David Dunbar, A.B.,
Harvard University, '73—St. Louis,
Missouri
Gorin, Fredric Austin, B.S.,
University of California at Davis,
'73—Hillsborough, California

Lichtman, Jeff William, A.B.,
Bowdoin College, '73—Rehoboth,
Massachusetts
Miletich, Joseph Paul, B.S.,
Michigan State University, '72—
Akon, Ohio
Permutter, Roger Matthew, B.A.,
Reed College, '73—Denver, Colorado
Salzer, James Lawrence, B.S.,
Stanford University, '74—
Worcester, Massachusetts
Whittenberger, Brock Poston, B.A.,
Amherst College, '73—Grand Rapids,
Michigan

Fourth-Year Trainees 1977-78

Brown, Laura Jane, B.A., Vassar
College, '74—Madison, Wisconsin
Kennertly, Donald Alan, A.B.,
Harvard University, '74—Darien,
Connecticut
Laux, Brian Edward, B.A., University
of Delaware, '74; B.S., '74—
Wilmington, Delaware
Li, Ellen, B.S., Stanford University,
'74—Chicago, Illinois
Littman, Dan Rudolf, A.B., Princeton
University, '74—Wynnewood,
Pennsylvania
Ludvigsen, Carl William, Jr., B.A.,
University of Colorado at Boulder,
'74—Littleton, Colorado
Rubin, Jeffrey Steven, A.B., Harvard
University, '74; A.M., '74—New 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

Third-Year Trainees 1977-78

Breitmeyer, James Bradley, A.B.,
University of California at Santa
Cruz, '75—Atherton, California
Bucy, 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
Lebowitz, 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

Second-Year Trainees 1977-78

Barshop, Bruce Allen, A.B., Brandeis
University, '76—Freehold, New Jersey
Bloch, Michelle Helene, B.S., Cornell
University, '76—Flushing, New York
Bothby, Mark Robin, B.S.,
University of Wisconsin, '76—
St. Louis, Missouri
Gibson, Ronald Lyne, Jr., B.S.,
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

First-Year Trainees 1977-78

Feldman, Susan Florence, B.A.,
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, B.A.,
Washington University, '77—North
Olmstead, Ohio
Reitman, Marc Lionel, B.S.,
Massachusetts Institute of
Technology, '77; B.S., '77—Stamford,
Connecticut
Rothenberg, Paul Louis, B.S.,
Cornell University, '77—Douglaston,
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
College, '77—Elmont, New York

HEALTH ADMINISTRATION
AND PLANNING PROGRAM

Second-Year Class 1977-78

Allen, Richard Lee, Jr., B.A., Drake
University '75—Bloomfield, Iowa
Anderson, Eric Christopher, A.B.,
University of California, Berkeley,
'75—Walnut Creek, California
Barron, Eugene Devine, Jr., B.S.,
Washington University, '74—Glenview,
Illinois
Bezanson, Robert Howard, B.S.,
University of Maryland, '69—
Timonium, Maryland
Biggino, James Craig, A.B.,
Washington University, '76—Afton,
Missouri
Brown, Patricia Jean, B.A.,
University of Missouri, Columbia,
'71; M.S., '73—St. Louis, Missouri
Burns, Michael James, B.A., State
University of New York, Cortland,
'74—Jamaica, New York
Cook, LaRue Earl, B.S., Western
Illinois University, '74—Chicago,
Illinois
Cooper, Galen Morgan, B.S., Ohio
State University, '67—Newark, Ohio
Dawkins, Jeffrey Hunt, B.A., Eureka
College, '75—Hazelcrest, Illinois
DeSalvo, Genyth Smith, B.S.,
Southwestern at Memphis, '71—
Natchez, Mississippi
Dunn, Sister Mary Edel, B.S.N.,
St. Louis University, '67—Wexford,
England
Eisele, John Greg, B.S., University of
Illinois, '74—Springfield, Illinois
Eurek, Thomas Anthony, B.S.,
Ithaca College, '73—Belvidere,
Illinois
Fraser, John Martin, B.A., Washington
University, '76—St. Louis, Missouri
Friedman, Marc Michael, B.A.,
Wayne State University, '73—Detroit,
Michigan

Gee, Thomas Harold, B.A., DePauw
University, '73—Chesterfield, Missouri
Gelb, Randy, B.A., Queens College,
'75—New York City, New York
Gilmore, Phillip King, B.S.,
University of Southern Mississippi,
'71; M.S., '73—Lena, Mississippi
Glosenger, Sister Katherine Marie,
A.B., Fontbonne College, '71—Fort
Smith, Arkansas
Goldberg, Sylvan Lee, B.C.,
Washington University, '62; B.A.,
'68—St. Louis, Missouri
Gordon, Robert Steven, B.A.,
University of Kentucky, '75—
Louisville, Kentucky
Gray, Paul Eugene, B.S., Colorado
State University, '69—Shawnee,
Kansas
Holmes, Sandra Johnson, B.S.,
Washington University, '76—
Milwaukee, Wisconsin
Kling, Debra Wohlschlag, A.B.,
Washington University, '76—St. Louis,
Missouri
Lampkin, Steven Bradley, B.S.,
Oklahoma State University, '75—
Broken Arrow, Oklahoma
Levitan, Howard Louis, B.S.B.A.,
Washington University, '76—St. Louis,
Missouri
Quartier, Michael Joseph, B.S.,
St. Bonaventure University,
'75—Syracuse, New York
Resnick, Lindsay Ross, B.S.,
Northeastern University, '76—
Oceanside, New Jersey
Ross, James Herschel, B.B.S.,
Memphis State University,
'75—Nashville, Tennessee
Smith, Robert Lynn, B.A., University of
Missouri, St. Louis, '73—St. Louis,
Missouri
Strussin, Martin John, B.S., St. Louis
University, '69—Shadyside, Ohio
Thigpen, Rosalind Frances, B.A.,
Washington University, '76—St.
Louis, Missouri
Vasquez, Lloyd John, Jr., B.A.,
University of Missouri, St. Louis,
'74—St. Louis, Missouri
Wallace, Mark Allen, B.S.B.A.,
Oklahoma Baptist University,
'75—Oklahoma City, Oklahoma
Wells, Wendy Martin, B.S.,
University of Kansas, '76—Leawood,
Kansas

First-Year Class 1977-78

Abdulian, Carl Frederick, B.A.,
University of Southern Florida,
'75—Tampa, Florida
Acker, Lawrence Edmonds, B.A.,
St. Louis University, '77—St. Louis,
Missouri
Barry, Thomas Francis, B.A.,
University of California, Los Angeles,
'75—Chicago, Illinois
Bese, Donald Eric, B.S., Utah
State University, Logan, '69—
Graham, Utah
Diamond, Larry Dean, B.A.,
Ithaca College, Ithaca, '74—Creve Coeur,
Illinois
Erkkila, Raymond Keith, B.S., Ball
State University, Muncie, '77—
Morton, Illinois
Fallast, Terri Sue, B.A., University of
Missouri, Columbia, '77—
Columbia, Missouri
Fried, Jeffrey Michael, B.G.S.,
University of Kansas, Lawrence,
'75—Shawnee Mission, Kansas
Gilm, Sister Catherine, B.A.,
Fontbonne College, '54; M.Ed.,
St. Louis University, '58—
Zanesville, Ohio
Goldmann, James Allen, A.B.,
Harvard University, '75—Mequon,
Wisconsin
Gordon, Marcie Gale, B.S., University of
Connecticut, Storrs, '77—
Manchester, Connecticut
Gross, Mark Franklin, A.B., Indiana
University, '77—Cherry Hill,
New Jersey
Jackson, Harper Scales, Jr., B.S.B.A.,
University of Arkansas, Fayetteville,
'73—Dallas, Texas
Kandel, Madeline Fay, B.A.,
Washington University, '77—
Roslyn, New York
Lehmann, Charlotte, B.S., Washington
University, '63—St. Louis, Missouri
Linneberger, Richard Allan, A.B.,
St. Louis University, '71—St. Louis,
Missouri
Lovy, Keith Jeffrey, A.B., Miami University, Oxford, ’77—Skokie, Illinois
Mbanugo, Akachukwu Obi, A.B., Washington University, ’76—Nigeria
McKenna, James Patrick, B.A., King’s College, ’74—Neptune, New Jersey
Patterson, William McRee, B.A., Southern Methodist University, ’72; M.P.A., ’76—Memphis, Tennessee
Pohlmann, Thomas Edwin, B.A., Hamline University, ’76—Minneapolis, Minnesota
Prosser, Phillip Edward, B.S., Oklahoma Christian College, ’76—Dallas, Texas
Ramsey, David Lewis, B.A., University of Missouri, St. Louis, ’74; M.S., ’77—St. Louis, Missouri
Ryan, Mary Alice Ortmann, B.A., Southeast Missouri State Teachers College, ’72—St. Louis, Missouri
Shircliff, Robert Lee, B.S.C., University of Louisville, ’77—Louisville, Kentucky
Whalen, Peter John, B.S., Washington University, ’73—Staten Island, New York
Wiener, Mark Seth, B.S., Wagner College, ’77—Staten Island, New York
Zsoldos, Phillip Michael, B.A., West Virginia University, ’73; M.S., ’76—Beckley, West Virginia

Creighton, Mary Danahay, Nebraska Wesleyan University—St. Louis, Missouri
Davis, Danna, Washington University—Mexico, Missouri
Duhme, Mary Alice, B.A., University of California, San Diego ’76—Santa Cruz, California
Eichelkraut, Diana Lynn, Illinois Central College—Washington, Illinois
Engle, Susan, Illinois Central College—East Peoria, Illinois
Freund, Deborah Jean, Northern Illinois University—McHenry, Illinois
Gabel, Joan Mary, B.A., University of Minnesota, ’69—Glen Carbon, Illinois
Jordan, Janine Marie, Washington University—St. Joseph, Michigan
Martin, Mary Elizabeth, Washington University—Dubuque, Iowa
Mueller, Michael Jeffery, Vanderbilt University—St. Louis, Missouri
Olson, Margaret Elaine, Drake University—Belvidere, Illinois
Rubin, Marilyn Carrol, B.S., York College, ’75—St. Louis, Missouri
Samuelson, Karen Margaret, Wartburg College—Sheffield, Iowa
Sargeant, Linda Louise, Kankakee Community College—Cabery, Illinois
Showalter, Debra Ann, University of Illinois, Champaign—Duquoin, Illinois
Taylor, Jan, B.A., Washington University, ’77—Baltimore, Maryland
Weber, Lisa Jo, Millikin University—Newton, Illinois

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Senior Class 1977-78

Biehler, Sandra Kay, B.S., Eastern Illinois University, ’71—Shelbyville, Illinois
Chinworth, Susan Anette, Washington University—Forth Worth, Texas
Cronstein, Frances Beth, Washington University—Cincinnati, Ohio
Davis, Nancy Jo, Southern Methodist University—Mt. Vernon, Illinois

Flentje, Linda Lorraine, Millikin University—Auburn, Illinois
Johansdottir, Solvej Margret, Washington University—Akureyri, Iceland
Johnson, Diane Zeta, University of Washington—Grandview, Washington
Kayhoe, Valle Michelle, University of North Carolina—Kensington, Maryland
Kingery, Marilyn Dean, Wartburg College—Charles City, Iowa
McKibbin, Amy Jo, Wayne State College—Madison, Nebraska
Millea, Timothy Patrick, Briar Cliff College—Graettinger, Iowa
Rosenblum, Nancy Ilene, Washington University—St. Louis, Missouri
Sattgast, Deborah Rae, Concordia College, Portland—Rupert, Idaho
Strasburg, Debra Mindinger, Washington University—Jacksonville, Illinois
Theel, Karen Lynn, Washington University—St. Louis, Missouri
Travis, Debra Lynn, University of Iowa—Creston, Iowa
Verbrugge, Clarence John, B.A., Dart College, ’74—Rock Valley, Iowa
Villars, Patricia Jo, B.S., Nebraska Wesleyan University ’77—Minden, Nebraska
Weesner, Elizabeth, Olney Central College—Olney, Illinois
Zabel, Carolyn Rae, B.S., Nebraska Wesleyan University ’77—Cook, Nebraska

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Azbel, Kristina Lynn, Monmouth College—Table Grove, Illinois

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Bloom, Nancy Jo, B.A., University of Virginia, '76—St. Louis, Missouri
Dowling, Ann Elizabeth, B.S., University of Kentucky, '76—St. Louis, Missouri
Fletcher, Cathy, B.A., Newcomb College, '70—Boulder, Colorado
Koziol, Catherine, B.A., Rockhurst College, '76—Chicago, Illinois
Haffner, Cynthia Kathryn, B.S., Fontbonne College, '76—St. Louis, Missouri
Lin, Fen-Min, B.S., National Taiwan University, '76—Kaohsiung Hsien, Taiwan
Saviano, Mary, B.S., Downstate Medical Center, '72—St. Louis, Missouri

Senior Class 1977-78

Abrams, Cathy Joy, B.A., University of Missouri, St. Louis, '75—St. Louis, Missouri
Bates, Theresa Marie, University of Arizona—Tucson, Arizona
Braxton, Sally Barrows, Jr., Emory University—St. Louis, Missouri
Bruns, Kathleen Auburn, St. Louis University—St. Louis, Missouri
Carnett, Janis Lynell, Southeastern Illinois College—Harrisburg, Illinois
Egan, Anne Marie, Cornell College—Mt. Vernon, Iowa
Flavin, Peggy Anne, Meramec Community College—St. Louis, Missouri
Formby, Mary Childs, Memphis State University—Hartford, Alabama
Haffner, Cynthia Kathryn, University of Missouri, St. Louis—St. Louis, Missouri
Imboden, Shirley Inez, University of Missouri, St. Louis—St. Louis, Missouri
Levit, Jan Alyse, Washington University—Houston, Texas
Lidsky, Karen Beth, Purdue University—Bloomington, Indiana
Meier, Lynn Marie, University of Missouri, Columbia—St. Louis, Missouri
Rapp, Rebecca Elaine, University of Virginia—Weyers Cave, Virginia

Junior Class 1977-78

Arunski, Sandra Mary, Washington University—St. Louis, Missouri
Brown, Amy Jo, University of Michigan—Ann Arbor, Michigan
Danner, Sharon Kay, Washington University—St. Louis, Missouri
DeJean, Susan Elise, Maryville College—St. Louis, Missouri
Ellis, Terry Ann, University of Illinois—St. Louis, Missouri
Eimer, Deborah Susan, Southwest Missouri State University—St. Louis, Missouri
Fox, Mary Susan, University of Massachusetts—Cohasset, Massachusetts
Genetti, Catherine Mary, Northern Illinois University—Belleville, Illinois
Green, Stephanie Robin, Washington University—Roslyn, New York
Hirsch, Dvorah Thea, Rockland Community College—Orangeburg, New York
Jordan, Patricia Ann, Washington University—Little Rock, Arkansas

Shumow, Amy Beth, Washington University—Milwaukee, Wisconsin
Solomon, Janet Ellen, Washington University—Washington, Missouri

Kavan, Cynthia Lynne, Wayne State University—North Bend, Nebraska
Keshner, Cheryl Ellene, Washington University—St. Louis, Missouri
Kugman, Susan Shayne, University of Missouri—St. Louis, Missouri
Lyman, Beth, Millikin University—Oak Park, Illinois
McGregor, Jane Carol, Wayne State University—St. Louis, Missouri
Naylor, Joan Marie, Southeast Missouri State University—St. Louis, Missouri
Nickol, Mary Rita, Carroll College—Walla Walla, Washington
Redington, Elizabeth Ann, Meramec Community College—St. Louis, Missouri
Rimmerman, Natalie, B.A., Washington University, '74—St. Louis, Missouri
Rowe, Zanetta Therese, Washington University—Clearwater, Florida
Rutledge, Elizabeth Jolley, B.A., Skidmore College, '74—St. Louis, Missouri
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Schools of Washington University

All schools are located on the main campus at Lindell and Skinker Boulevards, St. Louis, Missouri 63130, except Medicine (660 South Euclid Avenue, 63110) and Dental Medicine (4559 Scott Avenue, 63110). A University-sponsored shuttle bus travels between the main campus and the medical/dental campus every 20 minutes.

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THE SCHOOL OF SOCIAL WORK
THE SCHOOL OF LAW
THE SCHOOL OF MEDICINE
THE SCHOOL OF DENTAL MEDICINE
UNIVERSITY COLLEGE
THE SUMMER SCHOOL

The information which appears in this Bulletin was compiled in the spring of 1978. It is current as of April 1, 1978.
1. Spencer T. Olin Residence Hall
2. McDonnell Medical Sciences Building
3. North Building
4. Cancer Research Building
5. South Building
6. West Building
7. Irene Walter Johnson Institute of Rehabilitation
8. McMillan Hospital and Oscar Johnson Institute for Medical Research
9. St. Louis Maternity Hospital
10. David P. Wohl, Jr., Memorial-Washington University Clinics
11. Renard Hospital
12. David P. Wohl, Jr., Hospital
13. Barnard Free Skin and Cancer Hospital
14. Edward Mallinckrodt Institute of Radiology
15. Barnes Hospital
   a. Medical Wing
   b. Rand-Johnson Memorial Surgical Wing
   c. Queeny Tower
   d. Diagnostic Laboratories, Service Center
   e. East Pavilion
   f. West Pavilion (under construction)
16. Clinical Research Building
17. St. Louis Children's Hospital
18. 700 and 724 South Euclid Buildings
   a. Biomedical Computer Laboratory
   b. Physical Therapy
   c. Hospital Administration, Biostatistics
   d. Computer Systems Laboratory
19. Central Institute for the Deaf
20. Central Institute for the Deaf Residence
21. School of Dental Medicine
22. Occupational Therapy
23. Power Plant
24. Medical Care Group
25. Jewish Hospital
   a. West Building
   b. Shoenberg Pavilion
   c. Medical Building
   d. Nursing Residence
26. Parking
   a. Public
   b. Washington University Medical School Permit Parking Only
   c. Jewish Hospital
   d. Barnes Hospital Permit Parking Only
   e. Underground Garage
27. Medical Library Archives