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University
of Oregon
Bulletin

University
of Oregon
Medical
School

GRADUATE
STUDIES
PROGRAM

PORTLAND

1968-70

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Oregon State
System of
Higher Education

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1968-70
CATALOG

GRADUATE
STUDIES
PROGRAM

University of
Oregon
MEDICAL
SCHOOL

3181 S.W. Sam
Jackson Park Road
Portland 97201



Education with a Purpose

Because of the remarkable and outstanding achievements made in the prevention and control of organic disease, and a more complete understanding of mental health, the first half of the twentieth century often has been referred to as "medicine's golden age." Medicine is now in an era which holds promise of even greater future achievements. New medical techniques and methods of treating disease resulting from years of basic and clinical research have provided the tools for the practicing physician—and he has applied them with competence and effectiveness.

Since 1887, the University of Oregon Medical School has placed an increasingly important role in contributing to the general medical welfare of this community and region. The Medical School initially was established to teach qualified young men and women the art and science of medicine for the purpose of making available to the citizens of this area and to the nation the highest level of medical care.

An extension of the School's educational responsibilities is to be found in the active and vital graduate studies program leading to the post-baccalaureate degrees of Master of Science and Doctor of Philosophy which exists to further the institution's fundamental objectives of discovering, conserving, and disseminating knowledge. This program provides opportunity for scholarly specialization toward the mastery of a particular field, and is planned to complement the breadth of preparatory college education and enrich professional life. The graduate program is small enough to maintain a close professor-student relationship in classes, seminars, and laboratories and in advanced study and research.

The Medical School's graduate studies program aims to close the gap between the widespread need for teachers and investigators and those actually entering the profession in the areas of biology which are basic to medical science. To this end, the program assists students in acquiring the broad profile of information and proficiency which is necessary for the development of creative contributions in a limited segment of biology and at the same time guards against the creation of individuals with a narrow range of highly specialized skills. Emphasis is placed on the philosophy and application of the scientific method in the acquisition of new knowledge—through training in the critical evaluation of older and new sources of information and in the application of special skills and techniques pertinent to the student's field of inquiry.

In the years ahead the opportunities for improving our knowledge and its application to human welfare should be greater than they have been in the past. We plan, with faith and courage, to advance existing medical techniques and methods of treating disease by expanding our knowledge of the basic processes which occur in living systems.

An Overview

The Oregon State System of Higher Education, organized in 1932, provides educational opportunities to young people and adults throughout the State of Oregon. Member institutions are elements of an articulated system, parts of an integrated whole.

Opportunities for general education are distributed as widely as possible throughout the state, while specialized, professional and technical programs are centered at specific institutions.

The institutions of the state system of higher education are Oregon State University at Corvallis, the University of Oregon at Eugene, Portland State College at Portland, Oregon College of Education at Monmouth, Southern Oregon College at Ashland, Eastern Oregon College at La Grande, and Oregon Technical Institute at Klamath Falls. The University of Oregon Medical School and the University of Oregon Dental School are located in Portland.

The Division of Continuing Education represents all the institutions in making college level courses and special programs available to all citizens. The Division has offices in Salem as well as on most OSSHE campuses.

An interinstitutional booklet, "Your Education," lists fields of study at all State System institutions, and gives other important information for prospective students. For a free copy, write "Your Education," State Board of Higher Education, P.O. Box 3175, Eugene, Oregon 97403.

State Board of Higher Education

Board members are appointed to six-year terms by the Governor of Oregon with confirmation by the State Senate.

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Office of State Board of Higher Education
Post Office Box 3175
Eugene, Oregon 97403

MEDICAL AND GRADUATE STUDENTS

Fall Term, 1968

September 16, <i>Monday</i>	Registration
September 17, <i>Tuesday</i>	Instruction begins; Last day for medical students to pay fees
September 20, <i>Friday</i>	Last day for graduate students to pay fees
September 30, <i>Monday</i>	Last day to register for full credit or to change courses
November 28, <i>Thursday</i>	Thanksgiving Day, holiday
December 7, <i>Saturday</i>	Fall term ends

Winter Term, 1968-69

December 9, <i>Monday</i>	Instruction begins
December 10, <i>Tuesday</i>	Last day for medical students to pay fees
December 13, <i>Friday</i>	Last day for graduate students to pay fees
December 20, <i>Friday</i>	Last day to register for full credit or to change courses
December 22, <i>Sunday</i> through January 5, <i>Sunday</i>	Christmas vacation
March 15, <i>Saturday</i>	Winter term ends

Spring Term, 1969

March 24, <i>Monday</i>	Instruction begins
March 25, <i>Tuesday</i>	Last day for medical students to pay fees
March 28, <i>Friday</i>	Last day for graduate students to pay fees
April 7, <i>Monday</i>	Last day to register for full credit or to change courses
May 30, <i>Friday</i>	Memorial Day, holiday
June 13, <i>Friday</i>	Commencement
June 14, <i>Saturday</i>	Spring term ends

Summer Term, 1969

June 16, <i>Monday</i>	Registration; Instruction begins
June 20, <i>Friday</i>	Last day for graduate students to pay fees
June 30, <i>Monday</i>	Last day to register for full credit or to change courses
July 4, <i>Friday</i>	Independence Day, holiday
September 5, <i>Saturday</i>	Summer term ends

University of Oregon Medical School

OFFICERS OF ADMINISTRATION

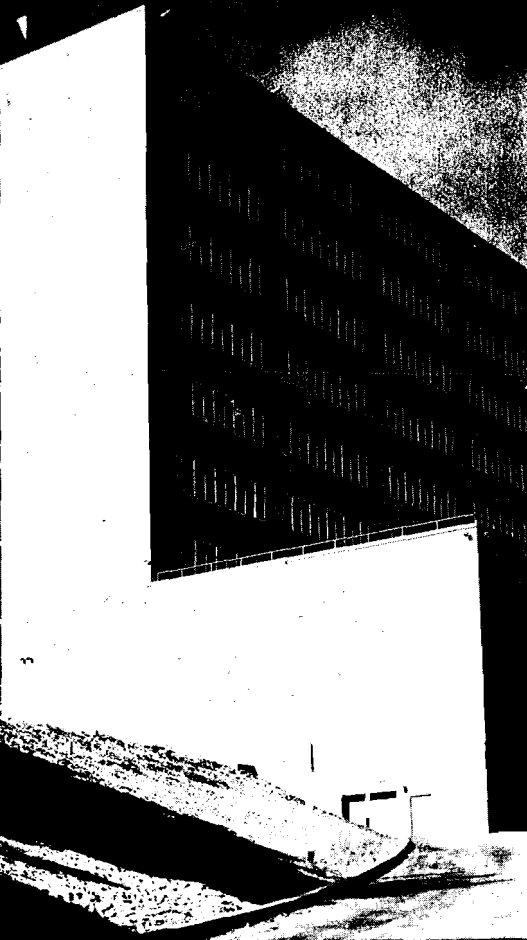
Charles N. Holman, M.D., Dean
William A. Zimmerman, B.S., Associate Dean for Business Affairs.
Joseph J. Adams, B.B.A., Assistant Dean
Richard L. Sleeter, M.D., Assistant Dean

Jarvis Gould, M.D., Associate Medical Director and Associate Administrator
Hospitals and Clinics
Myron R. Grover, Jr., M.D., Assistant Medical Director and Assistant Administrator,
Hospitals and Clinics; Director of Continuing Medical Education
Michael D. Baird, M.D., Assistant Medical Director of Hospitals and Clinics
Gwynn C. Brice, Assistant Director of Outpatient Clinic
Barbara Hiatt, M.S., R.N., Assistant Administrator, University State Tuberculosis
Hospital
Gary J. Rood, M.A., Assistant Administrator, University of Oregon Medical
School Hospital
Richard L. Sleeter, M.D., Director, Crippled Children's Division

A. J. Clemons, Director of Facilities Planning
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Ralph Tuomi, B.S., Director, Physical Plant

1

GENERAL
INFORMATION
FOR
STUDENTS



GENERAL INFORMATION

The University of Oregon Medical School is located in Portland (population 384,000), the largest city in the state of Oregon. Situated on the Willamett River near its junction with the Columbia River, Portland is a city of diverse business and industrial activities and, although 85 miles from the Pacific Ocean an important seaport. The city is well-known for its beautiful homes, parks, and boulevards and for its mild climate. The foothills of the Cascade Mountains rise on the outskirts of Portland; Mount Hood, one of the major peaks of the range towers on the southeastern horizon.

History

The year 1867 saw the beginning of medical education in Oregon. In that year Willamette University, Salem, first offered courses and lectures to medical students through its medical department. A lack of clinical facilities and variety of patients caused the Willamette medical department to move to Portland after only ten years of operation, to take advantage of the greater population and hospital facilities.

During this same period, a group of Portland physicians petitioned the Board of Regents of the University of Oregon to grant a charter for a medical school to be located in Portland. In 1887 the charter was granted and the University of Oregon Medical School became a reality—in a two-room building in northwest Portland.

In 1895 the Willamette University medical department returned to Salem. Because of limited facilities in that city and the lack of funds to continue operation, it merged with the University of Oregon Medical School in 1913. Under terms of the merger, the students of Willamette's medical department were transferred to the University of Oregon Medical School and received diplomas indicating the consolidation. At the same time the two alumni groups also merged.

The Medical School moved to its present campus, on a 101-acre tract in Sam Jackson Park overlooking the city of Portland, in 1919. The original tract included 20 acres donated in 1914 by the Oregon-Washington Railroad and Navigation Company and 88 acres given by the late Mrs. C. S. Jackson and the late Philip Jackson in memory of C. S. Jackson, publisher of the *Oregon Journal*. In 1958, the Oregon State Board of Higher Education accepted the gift of an additional 27 acres from the Journal Publishing Company.

Because the location, away from the congested area but within one and one-half miles of the business district, provided an ideal setting for medical center buildings and affiliated units, the University of Oregon Medical School in 1920 conveyed to Multnomah County 9 acres of the campus for construction of a general charity hospital; in 1926 a 25-acre tract was deeded to the United States government as the site of a U.S. Veterans Hospital.

Graduate education, leading to Master of Science and Doctor of Philosophy degrees, was offered as early as 1920. The first Master of Science degree was awarded in 1922 and the first Ph.D. in 1924. Until the middle 1940s the number of graduate students was small, with degrees awarded by the University of Oregon. During World War II it became obvious that there was an increasing need for more vigorous attention to the education of teachers and investigators in the fields of the basic medical sciences. In recognition of certain administrative needs, the University of Oregon Medical School was given authority to supervise its own graduate training activities although degrees continued to be awarded by the University of Oregon.

The nation's growing need for experienced educators in the medical sciences has been reflected by the growth of the University of Oregon Medical School. In 1941 only 15 faculty members served the institution full time. By 1945 the number had grown to 30; in 1968 the full-time faculty exceeds 220. The volunteer faculty has grown from 175 in 1944 to more than 650 in 1968.

This growth at the University of Oregon Medical School typifies the experience of institutions of medical education and research throughout the country, directly resulting from the rising population and greater emphasis on human health as a valuable national resource. Paralleling the growth of medical education, facilities and funds for graduate education in the medical sciences have also received increasing attention; the number of graduate degrees awarded at the University of Oregon Medical School in the basic medical sciences has more than doubled in the past five years.

Physical Facilities

Constantly expanding in educational, service, and research programs since its founding in 1887, the University of Oregon Medical School today has physical facilities valued at more than \$27,500,000 on its campus.

The first unit of the *Medical Science Building* was completed in 1919. The three-story structure was financed through an appropriation of \$110,000 by the 1917 State Legislature and by cash donations of \$25,000 from Portland citizens. *Mackenzie Hall* (1922), the second unit, was financed through an appropriation of \$113,000 by the 1921 State Legislature, matched by an equal gift from the General Education Board of New York. Named in honor of the late Dean Kenneth A. J. Mackenzie, the building is four stories high, similar in construction to the first unit, with twice the capacity. A three-story laboratory wing was added in 1939. Today the Medical Science Building houses basic science classrooms and laboratories and offices of the departments of Anatomy, Biochemistry, Microbiology, and Pharmacology. The Department of Surgery and the School of Nursing are also located in this building.

The *Library and Auditorium* (1939) was erected through a gift of \$100,000 from Dr. John E. Weeks, a gift of \$100,000 from the Rockefeller Foundation, and a grant of \$163,500 from the Public Works Administration. (See also page 15.)

The *Auditorium* with a seating capacity of just over 600, affords facilities for lectures and scientific meetings.

Renovation and expansion of Library facilities was completed in 1967 at a cost of \$305,000. As a result, one large and six small study rooms were added as were typing, work and duplicating rooms and additional stack tiers.

The *Laboratory and Administration Building* (1949) was financed through a state appropriation of \$663,000. The building houses classrooms, research and teaching laboratories, and offices for the departments of Pathology and Physiology, together with administrative offices of the Medical School.

The *Medical Research Laboratories Building* (1962), built at a cost of \$2,611,955, was financed through a state appropriation and matching funds from the National Institutes of Health, U.S. Public Health Service. The entire nine-story structure houses laboratories devoted to medical research.

Air-conditioned quarters for animals occupy two floors of the building. This area contains a modern surgery with five operating stations and the most modern operating room equipment. In the animal quarters is a special surgery for open-heart

GENERAL INFORMATION

procedures, complete with heart-lung machine and other instruments exactly like those used in human surgery.

The Medical School supports a centralized *Research Instrument Service* which provides for the engineering, design, fabrication, maintenance and repair of scientific instruments. Engineering consultation is offered to faculty members and students. A mechanical shop, a glass-blowing shop and an electronics shop carry out fabrication of new instruments and maintenance and repair of existing instruments.

Operated as a unit under the Research Instrument Service, the institution supports an IBM 1130 Computing System with peripheral equipment. This facility is available to investigators at the Medical School. The *Computer Service* also provides programming and operational assistance to users.

The *Student Activities Building* (1960), built at a cost of \$358,000, is a two-story structure providing recreational and athletic facilities for all student groups on the campus. There are outstanding facilities for most indoor activities, including a full-size gymnasium, a meeting room that can be used for dancing, with kitchen nearby, a beautiful lounge, a game room, a well-equipped exercise room, and shower facilities.

Clinical facilities of the University of Oregon Medical School include:

The *Outpatient Clinic* (1931), open to patients from throughout the state of Oregon who are without funds to provide for their medical care or who are referred by their physician for consultation and treatment, affords teaching facilities for the clinical branches of the Medical School. More than 200,000 patient visits are recorded annually. A \$2.5 million, seven-story addition to the Clinic was completed in 1968.

Multnomah Hospital (1923, 1950), constructed through funds supplied by Multnomah County, has a capacity of 295 beds with facilities for general, medical, surgical, and obstetrical patients. Under terms of a contractual arrangement between the commissioners of Multnomah County and the Oregon State Board of Higher Education, the Medical School has access to the hospital for teaching purposes and the professional staff of the hospital is appointed by the Medical School. Included in the Multnomah Hospital group are the *Heating Plant* (1923) and the *Emma Jones Nurses' Residence* (1927).

The *Crippled Children's Division* (1954) has modern office space and clinical facilities for the statewide crippled children's service administered by the Medical School.

The *University of Oregon Medical School Hospital* (1955), a 268-bed teaching and research hospital, contains 127 beds for general, medical, and surgical patients, 28 beds for psychiatric care, and 113 beds for pediatrics (Doernbecher Memorial Hospital for Children).

The *Clinical Laboratories Building* (1926) originally housed Doernbecher Hospital. In 1957 the structure was remodeled for use as clinical laboratory facilities, departmental offices, clinical facilities, and student teaching laboratories.

Although not a part of the physical facilities of the University of Oregon Medical School proper, the *U. S. Veterans Administration Hospital*, located adjacent to the campus, serves as one of the teaching units of the Medical School. This government-owned hospital has 555 beds.

ADMINISTRATION AND FACULTY

The *University State Tuberculosis Hospital* (1939) has an 80-bed capacity and a large outpatient unit, the Julius L. Meier Memorial Clinic. The hospital has medical and surgical facilities for teaching medical students, interns, residents, and nurses.

Other buildings on the campus include the *Physical Plant Shop and Warehouse* (1953), *Gaines Hall* (1943) and the *Women's Residence Hall* (1964).

The *Medical School Farm*, on 180 acres southwest of Portland, was purchased in 1961 to house and breed animals for teaching and investigative programs. The farm is ideally suited to the raising and breeding of animals in their natural environments.

Associated with the University of Oregon Medical School is:

The *Oregon Regional Primate Research Center* (1960), on a 250-acre tract 10 miles west of Portland, was the first of its kind in the United States. The University of Oregon Medical School is the host institution for the Center with the Dean of the Medical School administratively responsible for its operation. The Center offers an unusual opportunity for the training of qualified research personnel and at the same time enables these researchers to investigate primates in depth throughout the life cycle and to correlate the efforts of the many scientific disciplines involved. The Center provides an optimum environment where scientists and students of science may advance all possible areas of knowledge relating to the biological characteristics of these animals and appropriate related species.

Administration and Faculty

Although the Medical School, chartered by the Board of Regents of the University of Oregon in 1887, has administrative and faculty autonomy, the academic position of the school as an integral part of the University of Oregon is established in its charter and is recognized under the organizational plan of the Oregon State System of Higher Education. A legislative act more than thirty years ago combined all of Oregon's state-operated institutions of higher education into the Oregon State System of Higher Education, which is administered by a nine-member lay board appointed by the Governor. The Chancellor is the chief executive officer.

Under this organizational plan, the Dean of the Medical School is its chief executive officer, reporting to the Chancellor and to the Board of Higher Education in all matters pertaining to general administration, budgets, and appointment of faculty and staff. The University of Oregon, created by an act of the Oregon State Legislature in 1872 and located in Eugene, grants the Medical School degrees.

The Medical School has more than 220 full-time faculty members serving in its basic and clinical science departments and 650 volunteer faculty members practicing medicine in Portland and the surrounding area, who donate a portion of their time to the teaching and research programs of the Medical School.

As executive officer of the Medical School, the Dean is also responsible for the development of graduate training activities. In this capacity he seeks the advice of the Graduate Council, a standing committee of the faculty. This group is responsible for the maintenance of the high standards of quality in the graduate studies program, defines the requirements for graduate degrees and sets the standards for acceptable academic performance. The Graduate Council examines requests

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from various departments for permission to initiate programs of training leading to graduate degrees and makes appropriate recommendations to the Executive Faculty. It also acts as an admissions committee for the graduate studies program, supervises oral examinations of candidates for degrees, and recommends students to the Executive Faculty for the receipt of graduate degrees.

Instruction

The Medical School offers graduate programs in the basic medical sciences, leading to the Master of Science and Doctor of Philosophy degrees; the degrees are conferred by the University of Oregon upon recommendation of the faculty of the Medical School. Work leading to the M.S. or Ph.D. degree is offered in anatomy, biochemistry, medical psychology, microbiology, pathology, pharmacology, and physiology. Work toward the master's degree is offered in medical technology.

All faculty members having appointments in those departments authorized to grant graduate degrees are available for guidance of graduate students. In addition to formal advanced courses, each department offers more informal seminar-type courses and specialized reading and conference instruction. A most important aspect of the training program for a graduate degree is the research work which leads to the thesis. Credit hours are granted for thesis research under the courses numbered 501.

All of the instructional facilities of the Medical School are available for the support of the graduate studies program. Graduate student research is conducted in special laboratories or in research laboratories assigned to faculty members.

To supplement their educational programs, graduate students at the University of Oregon Medical School may take advantage of the facilities of Reed College and Portland State College, both in Portland, and the University of Oregon, Eugene, and Oregon State University, Corvallis, for needed course work in mathematics, physics, chemistry, and languages not available at the Medical School.

The needs of the physician-scientist are considered in the conduct of the graduate studies program as well. Some medical students plan their education to prepare themselves for careers in academic medicine as physicians, teachers, and investigators. These students are given an opportunity to participate in a program of training which combines the medical and graduate curricula. A student may elect to spend five years in residence and include six academic terms of work toward the two degrees of M.S. and M.D. A student may also elect to combine work toward the Ph.D. degree with that leading to the M.D. The latter program is more rigorous and usually requires seven years in residence. These programs of study result in a broadening and enrichment of the student's experience and knowledge in a basic science, and prepares him to utilize the philosophy and techniques of science in a basic science or in a clinical field (see also page 28).

The University of Oregon Medical School also offers a curriculum leading to the degree of Doctor of Medicine. It conducts training programs for interns and residents in the School's hospitals and clinics, courses in medical technology, and radiologic technology, a dietetic internship, and a clinical affiliation in occupational therapy and cytology, as well as an extensive continuing education program for physicians from the states of the Pacific Northwest, British Columbia, and Alaska. The University of Oregon School of Nursing is located on the Medical School campus and offers both baccalaureate and masters degree programs.

Research

Although the primary purpose of the University of Oregon Medical School is education, another vital function is investigation into any area of knowledge having potential importance to the problems of human biology.

In the world-wide struggle to improve the health and happiness of mankind, millions of research dollars are expended annually in the nation's medical schools. Oregon is no exception. Investigations under way at the Medical School are supported by gifts and grants amounting to more than \$5.5 million annually. These funds are made available by private individuals and industry, by foundations and societies, and by state and Federal governments.

Currently over 300 research projects are being conducted at the School in virtually every area of biomedical science. Contributions made to knowledge in the health-related sciences by the University of Oregon Medical School investigators have been numerous and have received world-wide recognition. Traditionally, the highest earned degree is awarded for independent, original, scholarly contributions to knowledge. Education of the graduate student in the basic medical science disciplines, therefore, includes training as an investigator in search of new information. Unlike the learning of established fact, the most effective framework in which to learn the philosophy and techniques of scientific problem solving involves a close personal relationship with a trained investigator. This philosophy is reflected by the extremely low student/faculty ratio that characterizes this kind of training. Graduate students are encouraged to participate in ongoing projects, not only as a preliminary to the development of their own and independent thesis projects. They are expected to grow into competent research workers during their training period in order to be qualified for professional employment after graduation.

Library

The Medical School Library, with stacks providing shelving space for 100,000 volumes, which may be expanded to accommodate an additional 100,000 volumes, contains more than 130,000 volumes of books and bound and unbound periodicals. Approximately 1,800 current serial publications are received. Through the privileges of interlibrary loan and microfilm service, it is possible to obtain within a few days materials not contained in this collection. The Library has a copying machine for the duplication of material in the Library collection.

The book and periodical stacks are open to the public. For the convenience of readers, individual study desks and tables are located in the stacks.

A special feature of the Library is the Historical Book Room housing historical books on medicine and allied subjects and the Pacific Northwest collection. Most of this literature has been received by direct gift from individuals and organizations or purchased with monetary gifts presented for this purpose. A noteworthy gift of \$2,500 for historical medical books has been given by the Portland Academy of Medicine. In recognition of this gift, the room is reserved for historical reading, research and seminars.

The Library has been enriched through many valuable gifts of books and periodicals. Members of the Women's Auxiliary of the Oregon Medical Association and other friends of the Medical School aid in assembling books and objects of medical-

GENERAL INFORMATION

historical interest. The Oregon State Board of Medical Examiners, the Portland Academy of Medicine and the Multnomah County Medical Society contribute to the annual operating fund. Public acknowledgement of gifts is made annually in the Medical School's gift list.

Medical Research Foundation of Oregon

The Medical Research Foundation was incorporated in 1942 as a nonprofit organization for the support of medical education and medical research. The foundation is administered by a board of 20 trustees selected from the executive faculty and alumni of the University of Oregon Medical School, the Portland Academy of Medicine, the Oregon Medical Association, and private citizens. The Foundation's income is derived from gifts, grants and bequests. The funds are administered by the trustees on the basis of recommendations from the Research Committee of the Medical School. Funds received for specific purposes are administered in accordance with the wishes of the donors.

Alumni Association

Founded in 1913, the Alumni Association of the University of Oregon Medical School also includes graduates of the Willamette University department of medicine. The Association is devoted to the interests of students and graduates and to the encouragement of scientific and professional progress among members of the medical profession generally. Its membership numbers more than 2,700.

In 1962, the Association was expanded to include all recipients of Master of Science and Doctor of Philosophy degrees from the University of Oregon Medical School as affiliate members, enjoying all privileges of active members except holding office and voting. All Association members receive the quarterly *Report to the Alumni*.

In the spring of each year, the Alumni Association sponsors a three-day scientific meeting on the Medical School campus. Alumni Association officers for 1968-69 are:

Lendon H. Smith, M.D., '46, Portland	President
Robert P. Burns, M.D., '47, Portland	Vice President
Glenn H. Brokaw, M.D., '52, Tacoma, Washington	Vice President
Richard D. Brust, M.D., '59, Independence	Vice President
Raymond D. Grondahl, M.D., '44, Butte, Montana	Vice President
Edwin C. Jungck, M.D., '49, Augusta, Georgia	Vice President
Gerald E. Kinzel, M.D., '36, Portland	Secretary
Willis J. Irvine, M.D., '48, Portland	Treasurer

Cultural and Recreational Activities

General invitations are extended to all students to attend special lectures and meetings in the Medical School Auditorium and in various lecture halls on the campus. Notices of these events are posted on student bulletin boards.

Because of enrollment limitations each year and the highly specialized and concentrated nature of medical and graduate subjects, the Medical School is unable

to sponsor athletics officially. However, students may participate in an active intramural sports program at the Student Activities Building.

Holidays and other time away from studies can be spent in a variety of ways: trips to Oregon's beaches (two hours from Portland), or swimming, sailing, and water skiing in nearby rivers. Oregon's Blue, Wallowa, and Cascade mountains with their lakes and streams, scenic views, and snowy mountain trails, provide ideal settings for hiking, fishing, mountain climbing, and skiing.

Within the greater Portland area are many recreational and cultural opportunities: beautiful green golf courses and cool city parks, Portland's Civic Theatre and a number of other amateur theatrical groups, known for their excellent productions, the city's Symphony and Junior Symphony orchestras, the Portland Art Museum and several private galleries, a new zoo, and a new Museum of Science and Industry. Tickets to artists' series, lectures, and road companies of Broadway theater productions are readily available, usually at special student prices. There are nine fully accredited undergraduate colleges and universities located in the immediate area.

Housing

While no facilities for housing male students are provided on the Medical School campus, many apartments and boarding houses are located near the School. An up-to-date list of vacancies in apartments and boarding houses is posted on the student bulletin board in the Administration Building. Female graduate students may live in the dormitories on campus [*Emma Jones Nurses' Dormitory* (1927) or the *Women's Residence Hall* (1964)] if there is space available.

Student Health Service

The Student Health Service operates from fees paid by students. It provides outpatient care during the school day within the limits of the facility. The usual services of the Outpatient Clinic are available, as well as the Clinic Laboratory and the X-ray Department. The Multnomah Hospital Emergency Room is available when acute illness occurs out of hours. Fifteen days of hospitalization for acute medical or surgical disease are available.

Coverage by the Health Service is available if the student is registered for 7 hours or more credit in the current term and has paid the Health Service fee. Students' dependents are eligible for the Outpatient Clinic service. Accessory insurance for all students is designed to give relatively complete coverage in and out of the city and during vacation periods. Married students are especially advised to buy this coverage for their dependents.

Detailed information is provided in the Health Service pamphlet available at the Registrar's Office at registration.

Fees and Expenses

The Board of Higher Education reserves the right to make changes in the fee schedule without notice.

GENERAL INFORMATION

Fees and deposits paid by the students in the graduate studies program are as follows:

Graduate Fees¹

Graduate students (candidates for M.A., M.S., Ph.D.), per term	\$143.00
Graduate students enrolled for 7 term hours of work or less	\$15.50 per term hour (minimum, \$31.00)
Graduate students employed as research assistants or fellows, per term	\$39.00

Special Fees

Evaluation fee (charges for the evaluation of transcripts submitted with the application for admission; not refundable)	\$ 10.00
Late registration fee, per day (no maximum) after an initial charge of \$5.00 for the first day ²	\$ 1.00
Graduate qualifying examination fee	\$1.00 to \$ 15.00

Deposits

Breakage deposit, per year	\$ 5.00
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Fee Refunds

Students who withdraw from the graduate studies program and who have complied with the regulations governing withdrawals are entitled to certain refunds of fees paid, depending upon the time of withdrawal. The refund schedule has been established by the Oregon State Board of Higher Education and is on file in the Business Office of the Medical School. Refunds are subject to the following regulations:

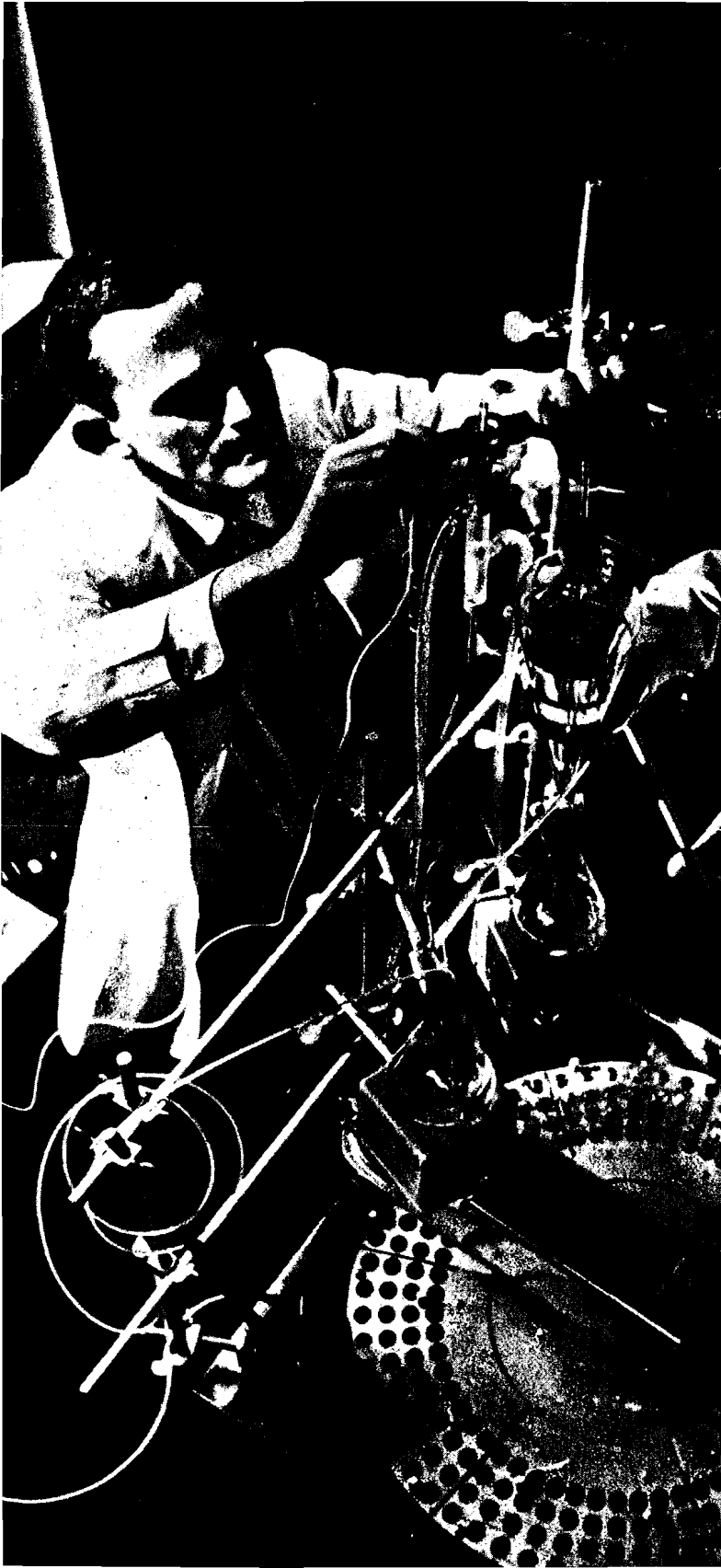
- (1) Any claim for refund must be made in writing before the close of the term in which the claim originated.
- (2) Refunds in all cases are calculated from the date of application for refund and not from the date when the student ceased attending classes, except in unusual cases when formal withdrawal has been delayed through cause largely beyond the control of the student.

Fellowships, Traineeships, Assistantships

Financial assistance of several varieties is available for qualified graduate students. Many departments in the Medical School receive grant funds in support of their research training programs. Traineeships are made available to qualified students at the discretion of the department in which the student is registered. Since both fellowships and traineeships are free of service obligations to the Medical School, the stipends received are not considered as taxable income. Many investigators in the institutions have provisions in their research grants for student help. Graduate students may make arrangements with these investigators to be of service to the research projects and thus acquire financial assistance during their period of study.

¹ There is no nonresident fee for graduate students.

² Registration day is the first day of each term (see Calendar page 7). Registration is not complete until the student pays his tuition and fees. The first penalty day for graduate students is one week after registration day.



2

ADMISSION AND SCHOLASTIC REGULATIONS

ADMISSION AND SCHOLASTIC REGULATIONS

The following paragraphs describe the general operating rules which guide the conduct of the graduate studies program at the University of Oregon Medical School. Requests for further information should be directed to the chairman of the department of interest to the student.

Admission to the Graduate Studies Program

Preparation

For admission to the graduate studies program an applicant must have earned a Bachelor of Arts or a Bachelor of Science degree from an accredited academic institution.

The courses to be taken in undergraduate work in preparation for graduate studies cannot be rigidly specified. In general, advanced work in any of the health-related sciences demands a thorough training and background in the quantitative sciences. Since one of the requirements of the degree of Doctor of Philosophy is an ability to read pertinent scientific literature in one modern foreign language, it is to the applicant's interest to have prepared himself in a foreign language during his undergraduate training. It is also highly desirable that all applicants have completed a course in elementary statistics. Some departments require specific course in preparation for graduate work. Further details concerning recommended preparation are to be found under individual department headings.

Admission

Students desiring admission to the graduate studies program should complete an application form which may be obtained from the Office of the Registrar. As a part of the application the applicant must supply: (1) official transcripts of all previous college and university work, (2) letters of appraisal from former teachers on forms which are furnished as a part of the application, and (3) Graduate Record Examination scores.

The Graduate Record Examination is offered several times a year in many colleges and universities throughout the United States. Information concerning the examination is available at the applicant's institution or from the Educational Testing Service, Princeton, New Jersey or Los Angeles, California 90027. The applicant must furnish scores for Aptitude Tests and for the Advanced Test required by the individual department. In special cases, scores from the Medical College Admission Test or evidence of satisfactory graduate work at another institution may be substituted for the Graduate Record Examination scores.

The completed application form should be returned to the Office of the Registrar with the evaluation fee. When all the data have been assembled, the application is forwarded by the Registrar to the department in which the applicant wishes to study. A preliminary decision about the suitability of the applicant is made at the departmental level. Following approval by the chairman of the department, the application is forwarded to the Graduate Council. The recommendation of the Graduate Council is furnished to the Dean for his final decision and the applicant is informed by the Office of the Registrar concerning the decision.

Recommendations from the Graduate Council to the Dean for admission will take one of three forms:

1. *Graduate Student*: Admission as a graduate student will be afforded selected students whose performance records show evidence of superior abilities and promise and whose application materials are all in order and complete. They

will be expected to take full course loads, will pay regular graduate student fees, and will be entitled to all student benefits.

2. *Provisional Graduate Student*: Admission as a provisional graduate student will be afforded students of two general types :
 - a. Those whose application materials are incomplete in some minor respect but require early notification of their acceptability.
 - b. Those whose records give evidence of promise but involve inconsistencies which appear to justify a trial period before full graduate status is granted.

Transfer from status of Provisional Graduate Student to that of Graduate Student may be recommended by the chairman of the department in which the student is studying, on the basis of superior academic performance, at the end of the first or second term of study. The departmental recommendation will be examined by the Graduate Council and forwarded to the Dean for his action. Failure to achieve this change of status by the end of the second term of study will result in the dismissal of the student. Provisional graduate students are permitted to take full course loads, pay regular graduate student fees and will be entitled to all student benefits.

3. *Non-degree Student*: Admission as a Non-degree Student will be afforded students of two general types :
 - a. Students who are enrolled for graduate credit at other institutions who wish to take courses offered in the graduate studies program at the University of Oregon Medical School for credit to be transferred to their records at their home institutions.
 - b. Students with baccalaureate degrees who are not enrolled in other institutions but wish to take courses offered in the graduate studies program at the University of Oregon Medical School.

Those seeking admission as non-degree students need furnish only the basic application form and original transcripts of college work. The application must be approved by the chairman of the department offering the desired courses and by the Graduate Council. The complete application must be in the hands of the Registrar ten days before registration for the term in which the course is offered. Non-degree students will not be permitted to take full course loads (8 hours or more) nor will they be entitled to student benefits. They will pay course fees on an hourly basis as indicated in the fee schedule.

Only applicants with superior undergraduate records, or presenting other clear evidence that they have a capacity for productive scholarship, will be considered. Acceptance by a student as a graduate student or provisional graduate student is regarded as a declaration of intent to complete a program of graduate study prior to application for enrollment in other Medical School training programs.

Transfer of graduate credits from other institutions is permitted upon recommendation to the Graduate Council by the chairman of the student's major department. It will be to the student's advantage to have all application data in the hands of the Registrar early in June in preparation for fall enrollment.

Registration

Registration for graduate study is required at the beginning of each term and study programs are arranged at this time. Dates for registration and payment of

ADMISSION AND SCHOLASTIC REGULATIONS

fees are given in the Calendar on page 7 of this Catalog. The student is responsible for arranging his course schedule in consultation with the chairman of his major department, his representative, or the professor directing his thesis work. The student must obtain registration forms from the Office of the Registrar, obtain the permission of the faculty member giving the desired course, and return the form to the Office of the Registrar.

Standards of Performance

Superior academic performance is expected of every student in the graduate studies program. Graduate credit is granted only for course work in which grades of *A*, *B*, or *C* are earned. A yearly minimum weighted grade-point average of 3.00 must be maintained in courses in the student's major subject; a minimum grade-point average of 2.00 must be maintained in courses in the student's minor subject. Failure to maintain an adequate grade-point average will result in action by the Graduate Council, after consultation with the chairman of the student's major department.

Any student may be dismissed from the graduate studies program for unacceptable conduct. Such dismissal follows review by the Graduate Council and the Dean.

Grading System

Grades are recorded as *A* (excellent), *B* (good), *C* (average), *D* (barely passing), *E* (failure). Grade points are related to the letter grades in the following manner; *A*—4 points per credit hour; *B*—3 points per credit hour; *C*—2 points per credit hour; *D*—1 point per credit hour; *E*—0 points. Grade-point averages are computed by adding all grade points and dividing by the number of credit hour for which the student is enrolled each term. If the work required in a course is not completed within the allotted time, a notation of Incomplete (Inc) may be entered on the student's record. Incompletes not removed within one year will be automatically graded as Failure (F).

Course Work

The graduate course work to be completed by each student is determined at the departmental level. A normal course load is considered to be 12-15 credit hours per term. Special permission of the Graduate Council is required for a work load in excess of 18 hours per term.

The performance of graduate students in courses which form a part of the regular medical curriculum will be evaluated on the same basis as that of medical students. No courses in the Medical School with identification numbers in the 600 range may be taken for graduate credit except by special permission of the Graduate Council.

Advancement to Candidacy for a Graduate Degree

A student who has been admitted to the graduate studies program may take courses for graduate credit. To obtain a graduate degree the student, after suitable preparation, must be formally admitted to candidacy for the graduate degree. Advancement to candidacy for a graduate degree is granted only after the student has demonstrated knowledge of the fundamentals of his field and the ability to do work of graduate caliber. Two major steps are required to qualify for advancement to candidacy for a graduate degree, (1) language and (2) qualifying examinations.

Language Requirement

A candidate for the degree of Doctor of Philosophy must demonstrate his ability to appreciate the contributions of scientists in other countries by developing a reading knowledge of modern scientific languages. A reading knowledge of one language other than English must be demonstrated through written examination.

Foreign language examinations are taken at the Medical School under the supervision of the chairman of the Graduate Council. The material to be read is selected by a representative of the major department and a representative of the foreign language department of one of the colleges or universities in the State System of Higher Education. The examinations are evaluated by faculty members of the foreign language department; their decision concerning adequacy of preparation is accepted by the Graduate Council. Detailed instructions concerning arrangements for these written examinations should be obtained from the office of the chairman of the Graduate Council.

Qualifying Examination

A written qualifying examination is required of students desiring to become candidates for the degree of Doctor of Philosophy, and may be required, at the discretion of the major department, of students desiring to become candidates for the degree of Master of Science. The qualifying examination is given by the major department in which the student is registered and covers the broad field of his background preparation. Students should plan to take the qualifying examination at the earliest possible date after finishing their basic preparatory course work.

Advancement to candidacy for the degree of Master of Science is granted when the chairman of the student's major department considers the student to be adequately prepared. Although written qualifying and language examinations are not required for the Graduate Council's approval of this recommendation, these examinations may be required at the discretion of the student's major department.

Advancement to candidacy for either graduate degree is determined by the Graduate Council upon recommendation of the chairman of the student's major department. The decision is based upon review of the student's academic record and of the written qualifying examination.

Requirements for Graduate Degrees

Residence

Academic residence is established by registration for credit in the graduate studies program. For the Master of Science degree, a minimum of three academic terms in residence is required. For the Doctor of Philosophy degree, a minimum of six academic terms in residence is required. Interruptions in residence are undesirable but may be permitted by joint agreement of the major department and the Graduate Council.

Duration of Candidacy

A student working toward a master's degree must be a candidate for that degree for at least one academic term; a student working toward a doctor's degree must be a candidate for the degree at least three academic terms.

ADMISSION AND SCHOLASTIC REGULATIONS

Hours of Graduate Work Required

For the degree of Master of Science, 30 term hours of graduate credit in the major department and 15 hours of credit in a minor department are required.

For the degree of Doctor of Philosophy, 135 term hours of graduate credit are required. Of this total, a minimum of 100 hours must be credit in the major department. The student must also complete a minimum of 20 hours of credit in a minor field if he wishes to graduate with a single minor. Arrangements may be made for fulfilling the minor credit requirements in more than one field, subject to the approval of the Graduate Council.

For both the M.S. and Ph.D. degrees two term hours of credit are required in an advanced statistics course, dealing with the design of experiments and the analysis and interpretation of experimental data.

Thesis Requirement

The candidate for a graduate degree must present a written description of experimental investigations carried out during the course of graduate study. Ordinarily the thesis for the degree of Master of Science is a report of original experimental work conducted by the student under the close supervision of his major professor. The thesis for the Doctor of Philosophy degree must show evidence of originality on the part of the student in the planning and execution of independent experimental work, and the results must represent a definite contribution to knowledge. General instructions on the preparation of the thesis may be obtained from the office of the chairman of the Graduate Council. The thesis must be approved by the chairman of the major department and by the Graduate Council.

The thesis must be submitted to the Graduate Council on or before the first of May in the year in which the degree is to be granted.

Oral Thesis Examination

An oral thesis examination covering the subject of the thesis is required of all candidates for advanced degrees. The examining committee is appointed by the chairman of the Graduate Council with the advice of the chairman of the major department. The oral thesis examination must take place at least ten days prior to the date of the Commencement exercises at which the degree is to be granted.

Summary of Procedures for Graduate Degrees

For the Master of Science

<i>Procedure</i>	<i>Initiated by</i>	<i>Chronology</i>
Application for admission, transcripts, letters, Graduate Record Examination scores	Student, in correspondence with Office of the Registrar	During senior year in college or university
Admission to graduate studies program	Chairman of department indicated by student, Graduate Council, Dean	Upon acceptance of application
Registration, approval of courses and study program	Student	First day of <i>each</i> term

SUMMARY
OF
PROCEDURES

Advancement to candidacy for graduate degree	Chairman of major department with approval of Graduate Council	At least one academic term before receipt of degree
Submission of thesis	Student, with approval of chairman of major department	On or before May 1 prior to receipt of degree
Oral thesis examination	Graduate Council, with advice of chairman of major department	More than ten days prior to Commencement
Recommendation for degree	Graduate Council to Executive Faculty	More than ten days prior to Commencement
Receipt of degree	Executive Faculty	Commencement exercises

For the Doctor of Philosophy

<i>Procedure</i>	<i>Initiated by</i>	<i>Chronology</i>
Application for admission, transcripts, letters, Graduate Record Examination scores	Student, in correspondence with Office of the Registrar	During senior year in college or university
Admission to graduate studies program	Chairman of department indicated by student, Graduate Council, Dean	Upon acceptance of application
Registration, approval of courses and study program	Student	First day of <i>each</i> term
Language examinations	Student	As soon as possible after admission. Required before advancement to candidacy
Qualifying examination	Major department	Upon completion of preparatory course work
Advancement to candidacy for graduate degree	Chairman of major department with approval of Graduate Council	Following qualifying examination at least three academic terms before receipt of degree
Submission of thesis	Student, with approval of chairman of department	On or before May 1 prior to receipt of degree
Oral thesis examination	Graduate Council, with advice of chairman of major department	More than ten days prior to Commencement
Recommendation for degree	Graduate Council to Executive Faculty	More than ten days prior to Commencement
Receipt of degree	Executive Faculty	Commencement exercises



3

PROGRAMS
OF STUDY

PROGRAMS OF STUDY

The University of Oregon Medical School offers three programs of graduate study leading to postbaccalaureate degrees.

Master of Science

This program requires at least one and more often two years of study. Basic and advanced courses are required, as well as the successful completion of an experimental investigation carried out under faculty supervision. The program is designed to give students a deeper background in the disciplines of their choice and to afford introductory experiences in the conduct of laboratory investigation.

Doctor of Philosophy

This program usually requires three or more years of postbaccalaureate study leading to the highest earned academic degree which can be awarded by an educational institution. It involves course work designed to increase the student's depth and breadth of understanding of the discipline which he has chosen for his studies and the completion of an experimental investigation, conceived and prosecuted by the student operating at a high level of independence. The program leading to the Ph.D. degree is designed to prepare students to develop careers as investigators and teachers in the health-related sciences.

Combined Program Leading to the M.D. and a Graduate Degree

The University of Oregon Medical School for many years has offered to selected medical students a combined program of graduate and medical studies which leads to the degrees of Master of Science and Doctor of Medicine. The purposes and advantages of the program are to afford medical students the opportunity to participate in advanced courses and to receive training in laboratory investigation in a basic science area; to strengthen their preparation in a basic science area through more intimate contact with problems of investigation and teaching in that area; to provide greater insight into their own motivations and potentialities with regard to research and teaching; and to evaluate more realistically the opportunities offered by a career in academic medicine.

To provide training for those medical students who wish to prepare themselves more completely for careers as physician-scientists, a program leading to the combined M.D. and Ph.D. degrees has recently been approved and activated. This course of training may require a total time span of seven years of post-baccalaureate study. It affords opportunity for advanced coursework in the fundamental sciences of mathematics, physics and chemistry, and for advanced coursework in the basic medical sciences that cannot be incorporated into the M.D.-M.S. program.

Each student must provide evidence of sincere motivation and interest coupled with an acceptable performance record. In addition he must complete all the requirements for the graduate degree as outlined earlier on page 14. Credit hours may be earned in advanced courses, reading and conference, and thesis research. The student conducts a research project to be presented as a thesis for the degree. He may hold no outside job while in the program. Medical students wishing to enter this program must be accepted as graduate students by the Graduate Council and the Dean.

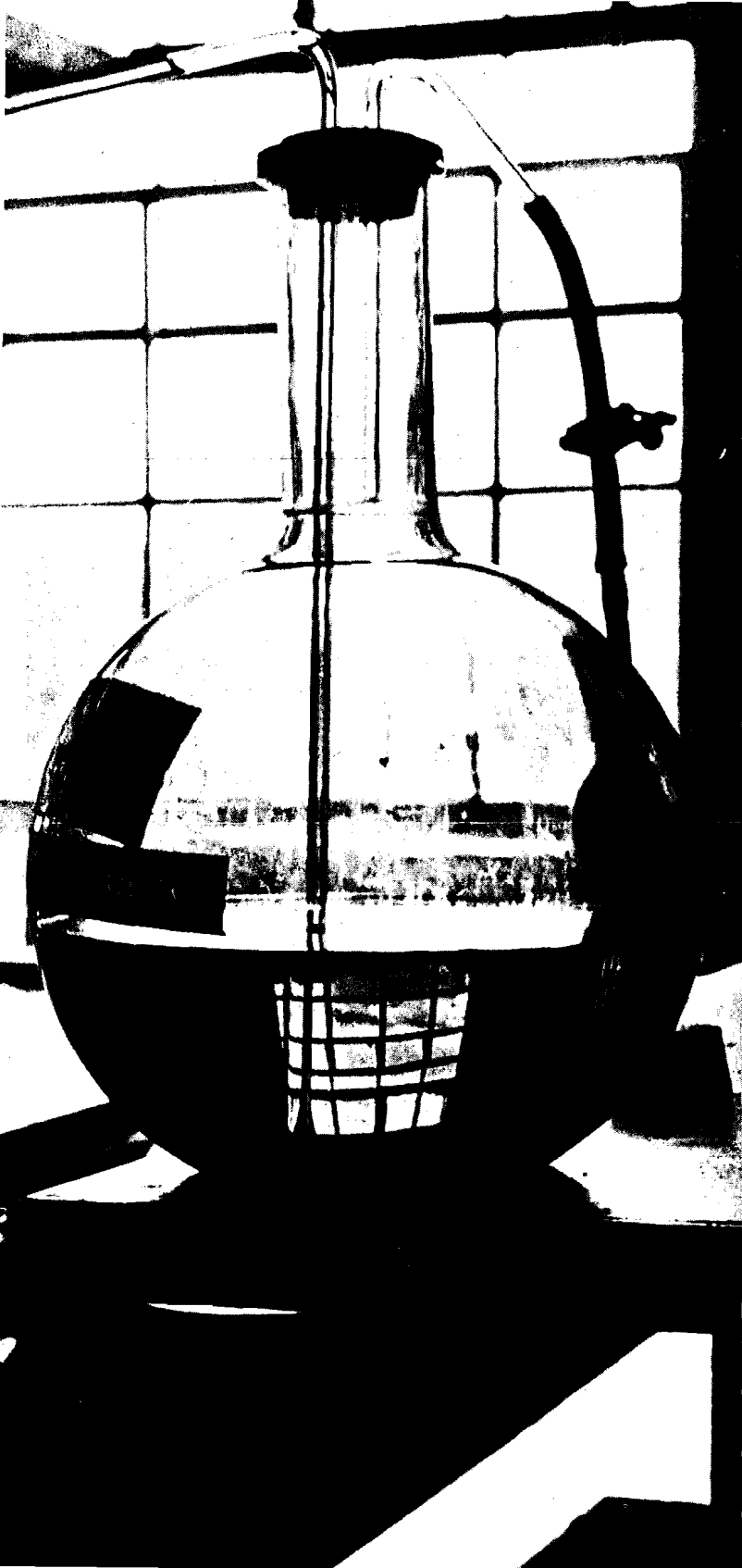
Candidates for the Doctor of Philosophy degree who have already earned the Doctor of Medicine degree may apply a maximum of 45 term hours of credit (one academic year) in the basic medical sciences toward the advanced degree.

Continuing Medical Education

The Medical School also offers courses of postgraduate medical education for physicians, designed to keep them abreast of the changing character of medical science. This program does not lead to a degree and should not be confused with the programs of study identified above.

4

DESCRIPTION OF COURSES



DESCRIPTION OF COURSES

Course Numbering System

Medical School courses are numbered in accordance with the uniform course-numbering system of the Oregon State System of Higher Education. This numbering system, as it applies to the Medical School courses, is as follows:

- 400-499 Upper-division courses primarily for first-year students in medicine but to which graduate students may be admitted on approval of the graduate adviser and the department chairman concerned.
- 500-599 Courses primarily for graduate credit in basic medical sciences.
- 600-699 Courses that are clinical in nature but may count toward a professional degree in medicine, but cannot be applied toward an advanced academic degree (M.S. or Ph.D.) except by the permission of the graduate adviser and the Graduate Council.

Certain numbers are reserved for courses that may be taken through successive terms under the same course number, credit being granted according to the amount of acceptable work done. These course numbers are as follows:

- 501. Research
- 503. Thesis
- 505. Reading and Conference
- 507. Seminar

DEPARTMENT OF ANATOMY

Anthony A. Pearson, *Chairman of Department*

Professors: **Robert L. Bacon**, **David L. Gunberg**, **Anthony A. Pearson**, **William A. Stotler**

Associate Professor: **Archie R. Tunturi**

Assistant Professors: **Richard B. Lyons***, **Robert Quinton-Cox** (Dental School)

Instructors: **Reid S. Connell, Jr.**, **Howard W. Davis**

Research Assistants: **M. Barbara Leighton**, **Patricia Luckerby**, **Ronald W. Sauter**

The Department of Anatomy offers graduate work leading to the Doctor of Philosophy degree. Under certain circumstances a Master of Science program may be arranged. The departmental faculty is qualified to offer opportunities for advanced study and research in the following fields: neuroembryology, functional neuroanatomy, electronic and statistical analysis of central nervous system functions, reproductive endocrinology, experimental teratology, embryonic microcirculation, and biochemistry and electron microscopy of development. Extensive modern facilities are available for the conduct of thesis research in these areas. This program is intended to train students for the teaching of the anatomical sciences and for the carrying out of original scholarly research in one of the above areas. It usually requires at least four years of study.

In addition to meeting the general requirements for admission (see page 20), candidates must have satisfactorily completed courses in: general biology or general

* Leave of absence, July 1, 1966 to July 1, 1969.

zoology (9 term hours including laboratory); general or cellular physiology; genetics or embryology; inorganic chemistry through quantitative analysis (some research fields also require physical chemistry); organic chemistry (with laboratory); mathematics (9 term hours) (some fields require calculus); college physics (with laboratory).

A limited number of deficiencies may be satisfied after admission by course work in local undergraduate institutions.

In addition to aptitude scores on the Graduate Record Examination, the department requires an advanced test score in either biology, chemistry, or physics.

For the degree of Doctor of Philosophy, all students are required to take courses in gross and developmental anatomy, histology, cell biology, and neuroanatomy, and advanced courses in the department appropriate to their areas of investigation. In addition, they must elect one of the following: general biochemistry, human physiology, or general pathology. Requirements for foreign languages and statistics are as indicated on pages 23, 24 of this Catalog as general requirements.

After appropriate preparation, students are required to obtain teaching experiences in the courses in gross anatomy, histology, and neuroanatomy. Qualified students will be appointed as assistants in these courses.

The general requirements for the dissertation are as presented on page 24 of this Catalog. The subject is to be chosen from a field in which the members of the department have some experience. The topic is usually selected during the second year of study.

A limited number of research traineeships are available to qualified students on a competitive basis.

Selected medical students may enter the graduate program in the department of anatomy and work toward a master's degree in the five-year combined M.S.-M.D. program (see page 28).

An 411, 412, 413. **Gross and Developmental Anatomy.** 7 hours fall, 9 hours winter, 3 hours spring.

Regional dissection of the human body. Each two students dissect the lateral half of a body. The student is furnished with a loan collection of disarticulated bones for the study of osteology. Demonstrations include surface and radiological anatomy. Lectures, demonstrations, and laboratory include the reproductive cycle, fertilization, normal and abnormal human embryological development. Fall: lectures, demonstrations, and quizzes, 3 hours a week; laboratory, 12 hours a week. Winter: lectures, demonstrations, and quizzes, 4 hours a week; laboratory, 15 hours a week. Spring: lectures, demonstrations, and quizzes, 2 hours a week; laboratory, 3 hours a week: 468 hours.

An 415. **Histology and Organology.** 6 hours fall.

Systematic study of the microscopic anatomy of normal human tissues and organs. Lectures and laboratory exercises furnish an introduction to the manner in which cells contribute to tissue and organ function and how the organs are assembled from tissues. Lectures and quizzes, 3 hours a week; laboratory, 9 hours a week: 144 hours.

An 416. **Microscopic Technique.** 2 hours spring.

The theory and practice of preparing animal tissue for histological study. Limited to 4 students, registration only after consultation with instructor. Laboratory, 6 hours a week: 72 hours.

An 501. **Research.** Any term, hours to be arranged.

An 505. **Reading and Conference.** Any term, hours to be arranged.

DESCRIPTION OF COURSES

An 507. **Seminar.** Any term, hours to be arranged.

Journal Club.
History of Medicine.

An 511. **Neurology and Organs of Special Senses.** 4 hours spring.

Study of the structure and function of the organs of special senses and of the central nervous system, through gross dissections and stained sections of the human brain, spinal cord, and organs of special senses. Pathological conditions illustrating lesions of the nervous system are demonstrated. Prerequisites: An 411, 412, 413, An 415. Lectures, 2 hours a week; laboratory, 6 hours a week: 96 hours.

An 512. **Analytical Embryology.** 4 hours spring.

Lectures, assigned reading, and term paper on cytology and physiology of gametes, gamete transport, fertilization, cleavage and cell division, and on cell, tissue and organ interaction in embryonic systems. Prerequisites: An 511 or consent of instructor. Lectures, 2 hours a week: 24 hours.

An 513. **Analytical Histology.** 4 hours spring.

Lectures on the theory of fixation and staining; survey of physical and chemical techniques employed in modern histology. Practical experience with some of these techniques provided by laboratory exercises. Lectures and quizzes 2 hours a week; laboratory, 6 hours a week. Prerequisites: An 415, 416 (microscopic technique), BCh 411, 412 or equivalent. Limited to 10 students.

An 514. **Special Dissections.** Term and hours to be arranged.

Human anatomical material dissected and certain parts of the body studied more thoroughly. Conferences and quizzes arranged with the instructor. Registration limited by available material. Prerequisites: An 411, 412, 413.

An 515. **Advanced Neuroanatomy and Computer Techniques.** Any term, hours to be arranged.

Neuroanatomy as an advanced quantitative science. Introduction to the use of the stationary time series, probability theory, and information theory in the investigation of the nervous system. Identification of variables in the nervous system which can be measured; statistical procedures on these variables. Methods for data acquisition and computer solution of problems.

An 516. **Computer Programming.** Any term, hours to be arranged.

An introduction to what a computer can do. The characteristics of the IBM 1410: uses of Fortran (formula translation) and Autocoder; elements of programming and examples of programs.

An 517. **Embryology.** 4 hours spring.

Lectures on reproductive cycle, fertilization, normal and abnormal human development, correlated with detailed laboratory study of pig, mouse, and human embryos and fetuses. Primarily for graduate students. Lectures, 2 hours a week; laboratory, 6 hours a week: 96 hours. Limited to 10 students.

An 518. **Mammalian and Human Cytogenetics.** 3 hours, winter.

Methods of chromosomal study; chromosomal structure; chromosomal function in meiosis and mitosis; genetic activity and inactivity; use of chromosomes in the study of genetics; gene mapping; sex determination; spontaneous and induced chromosome aberrations; chromosomal evolution. Student recitations on special topics such as the X-chromosome, chromosomal variation, and cytogenetic studies in leukemia. Prerequisite: General genetics, or equivalent, and the consent of the instructor. Enrollment limited to ten.

DEPARTMENT OF BIOCHEMISTRY

Richard T. Jones, *Chairman of Department*

Professor Emeritus: Edward S. West

Professors: Antonio E. Colas, Jack H. Fellman, A. Wesley Horton, Richard

T. Jones, George W. Kittinger (Primate Center), **Howard S. Mason, Oscar W. Portman** (Primate Center), **Demetrios A. Rigas, Wilbert R. Todd, John T. Van Bruggen**

Associate Professors: **Clarissa H. Beatty** (Primate Center), **Marvin C. Hines, Michael Litt, Geoffrey V. F. Seaman**

Assistant Professors: **J. Peter Bentley, John L. Black, Rose Mary Bocek** (Primate Center), **Dale D. Hoskins** (Primate Center), **Charles F. Howard, Jr.** (Primate Center), **Anne M. Perley** (Primate Center)

Instructors: **Thomas Fujita, Russell L. Jolley**

Research Associates: **Bernadine Brimhall, Marie Duerst, K. Ganapathy, Yoshio Imai, Paul McMahill, Susan Oldham, Esther Roth, Milon Tichy, Virginia Tisdale**

Research Assistants: **Nancy Ann Evedovich, Charlotte Head, Kazuko Imai, Lester Laastuen, Rita Nelson, James Robinson, James Salyards, Jean Scott, Joanne Van Dolah**

The Department of Biochemistry offers graduate work leading to the Master of Science and Doctor of Philosophy degrees. The purpose of the departmental curriculum is to inculcate firm grounding in modern knowledge of the chemical and physical basis of life, and to develop mastery of contemporary techniques of biochemical research.

For admission to the department as a graduate student, the applicant should have completed standard courses in general, organic, physical, and quantitative analytical chemistry, general physics, mathematics through calculus, and general biology or zoology. Opportunity to make up deficiencies may be given to the applicant who is otherwise acceptable. The Graduate Record Examination must include scores in the special test area of chemistry. Although not required, advanced courses in chemistry, biology, mathematics, and electronics will be found to be valuable.

Requirements for the degrees of Master of Science and Doctor of Philosophy in the major field of biochemistry include experimental research leading to a thesis, courses in general medical biochemistry (BCh 411, 412), and advanced courses in biochemistry sufficient to provide training in breadth and depth, to meet credit requirements (see general requirements), and to pass the qualifying examination. The thesis for the Ph.D. degree is expected to represent a positive contribution to biochemical knowledge publishable in a standard journal. Graduate students must take a seminar (BCh 507) throughout the period of residence. Qualified students may proceed directly to the Ph.D. degree without first obtaining the master's degree.

Students requiring financial assistance should ask for information regarding support available in the department. The departmental graduate program is partially supported by a U.S. Public Health Service training grant. Research assistantships supported by research grant funds are also generally available. Stipends are consistent with the national levels for predoctoral fellowships and include dependency allowances. In general, stipends for students working toward the Ph.D. degree range from \$2,500 to \$4,000 depending on the number of dependents.

Two years are generally necessary for completion of requirements for the M.S. degree, and four years for the Ph.D. degree; however, the programs may be completed in less time under some circumstances.

The faculty of the Department of Biochemistry includes authorities in a number of active fields of modern biochemistry, including carbohydrate, lipid, and protein biochemistry, biological oxidation-reduction, adaptive enzymology, the biochemistry of hormone action, biochemical genetics, chemical carcinogenesis, and bio-

DESCRIPTION OF COURSES

physical chemistry. As soon as possible, the student should select, with the advice of the chairman of the department, a faculty preceptor, a subject for his thesis research in accordance with his interests. The student will have opportunity for intensive training in modern physical, biophysical, and biochemical instrumentation, and the research philosophies which guide the effective use of this instrumentation.

Qualified medical students may also undertake graduate work in biochemistry. Upon successful completion of an experimental thesis, they may qualify for the combined M.S.-M.D. degree in the five-year program of the Medical School (See page 28.)

BCh 411, 412. General Medical Biochemistry. 6 hours fall, 7 hours winter.

Organic and physical chemistry pertaining to biochemistry; the composition of tissues; enzymes, digestion, and absorption; detoxication; the chemistry of blood and respiration; hormones; metabolism; nutrition; the excretions. Fall: lectures, 4 hours a week laboratory, 6 hours a week. Winter: lectures, 4 hours a week; laboratory, 9 hours a week: 276 hours.

BCh 501. Biochemistry Research. Any term, hours to be arranged.

BCh 505. Reading and Conference. Any term, hours to be arranged.

BCh 507. Seminar. Any term, hours to be arranged.

BCh 511. Biological Information Transfer. 2 hours.

The biochemistry of heredity, growth, aging, and differentiation, and its relationship to disease. The biochemistry and biosynthesis of nucleic acids and their components; protein biosynthesis.

BCh 512. Biological Energy Transformations. 2 hours.

Bioenergetics, energy transductions: oxidative phosphorylation, biological oxidation-reduction, active transport, muscle contraction, nerve conduction, biosynthesis from the energy viewpoint.

BCh 513. Advanced Intermediary Metabolism. 2 hours.

Nutrition, advanced aspects of the metabolism of lipids, sterols, carbohydrates, amino acids and proteins, tissues.

BCh 514. Enzymology. 3 hours.

The physical and chemical properties of enzymes and the reactions they catalyze.

BCh 515. Biophysical Chemistry of Macromolecules. 2 hours.

The principles and methods employed in determining the size, shape, charge, and thermodynamic properties of biological macromolecules; physical aspects of their interaction, and of the relationship of structure to function.

BCh 516. Biochemical Techniques and Instrumentation. 4 hours.

Preparation and characterization of substances of biochemical importance; the study of biochemical processes; theory and use of radioisotopes as tracers; instrumentation theory and practice. Lectures and laboratory.

DIVISION OF EXPERIMENTAL BIOLOGY

William Montagna, Head of Division

Professor: **William Montagna**

Associate Professors: **J. Peter Bentley**, **Robert M. Brenner** (Primate Center),
Wolf H. Fahrenbach (Primate Center)

Assistant Professor: **Mary Bell** (Primate Center)

This division, which is a new addition to the graduate studies program, offers courses intended to complement the work of students enrolled in other graduate

disciplines. Credits obtained in Experimental Biology may be used to fulfill the minor requirements for advanced degrees.

Areas of specialized study in which research may be carried out include neuroendocrinology, protein and carbohydrate metabolism, enzyme histochemistry, and ultrastructure research. The division has very modern facilities and equipment and offers access to subhuman primates at the Oregon Regional Primate Research Center of which the divisional chairman is director.

EB 501. **Research.** Any term, hours to be arranged.

EB 505. **Reading and Conference.** Any term, hours to be arranged.

EB 507. **Seminar.** Any term, hours to be arranged.

EB 510. **Biological Ultrastructure.** 2 hours, term to be arranged.

A detailed presentation of the fine structure of cells, their organelles and inclusions with emphasis on the correlation of ultrastructural specialization and function. Lectures, 2 hours a week: 24 hours.

EB 511. **Comparative Neuroendocrinology.** 2 hours, term to be arranged.

A course in comparative endocrinology with emphasis on neuroendocrine control systems in both vertebrates and invertebrates. The various lines of physiological, biochemical and morphological evidence including electron microscopy which support the neurohemal theory will be presented in detail. Metamorphosis in insects, ovulation in mammals, lactation in mammals and adrenocortical secretion in vertebrates will be covered.

EB 512. **Connective Tissue.** 2 hours, term to be arranged.

This course will cover the structure, function and metabolism of connective tissues in general. Their major constituents, collagen, elastin, and mucopolysaccharides, will be covered in detail. The structure of these constituents will be discussed at various levels of organization with emphasis placed upon their molecular architecture, cellular origin, and biosynthetic mechanisms. Specialized areas, such as bone formation and mineralization, and wound healing will also be analyzed.

DEPARTMENT OF MEDICAL PSYCHOLOGY

Joseph D. Matarazzo, Chairman of Department

Professors: **Robert D. Boyd, F. Robert Brush, Ann M. Garner, Robert W. Goy** (Primate Center), **Joseph D. Matarazzo, Ruth G. Matarazzo, Charles H. Phoenix** (Primate Center), **Jack A. Vernon, Arthur N. Wiens**

Associate Professors: **Robert D. Fitzgerald, Constance Hanf, Norman Henderson, James E. Lindemann, David S. Phillips**

Assistant Professors: **Bruce K. Alexander** (Primate Center), **Bruce V. Butler, Steven G. Goldstein, Russell Jackson, James H. O'Brien, Leif G. Terdal**

Lecturers: **Jeanne A. Goldstein, Wallace D. Joslyn, Martin S. Levine, Frank B. Strange**

Resident: **Marvin L. Kumler**

The Department of Medical Psychology offers graduate training leading to the Doctor of Philosophy degree. Broadly viewed, the Department's program stresses general experimental psychology with specialization in (1) physiological psychology, (2) learning and motivation, or (3) experimental personality. Regardless of the student's field of concentration he is expected to become well trained in

DESCRIPTION OF COURSES

statistics, research design, history, learning, motivation, physiological psychology, individual differences, personality, sensory processes, and laboratory techniques. Because the other basic medical science departments provide an environment particularly suited to the education of experimentally and physiologically oriented psychologists, students will be expected to enrich their programs of study with courses in physiology, biochemistry, neuroanatomy, and pharmacology. Minor courses of study in one or more of these allied fields provide a unique doctoral-training experience.

The department focuses upon the training of students committed to obtaining the Ph.D. degree and, therefore, individuals seeking only the M.S. degree will not be admitted to graduate standing. However, all doctoral candidates in psychology must complete the course of study leading to the M.S. degree, including the writing of an acceptable research thesis. This work is designed to assist the student during the planning and execution of his doctoral research project and the writing of his dissertation. The M.S. degree is also awarded to medical students enrolled in the five-year combined M.D.-M.S. program who satisfy Graduate Council and departmental regulations. (See page 28.) With rare exceptions, four years of academic work will be required to fulfill all requirements of the Ph.D. program. Financial support for students is available in the form of part-time research assistantships that are competitive with those awarded by other graduate departments of psychology. Unusually competent students may also be able to qualify for traineeships from a departmental training grant (National Institute of General Medical Sciences).

Current research training in the physiological area stresses analyses of the relations between central nervous system activity and behavior in a variety of species, especially as reflected in electrophysiological studies of cortex and associated structures and in neuroendocrinological and neuro-biochemical analyses of behavior. In the fields of learning-motivation and experimental personality there are active research programs in classical conditioning, avoidance learning, discrimination, conflict, punishment, comparative social behavior, verbal behavior and communication. Supporting facilities for these activities are provided by an animal care department, animal surgery, histology laboratory, mechanical and electronic shop, soundproof rooms, laboratories for personality research, electrophysiological and behavioral research equipment and an electronic digital computer.

Students desiring admission to the program in Medical Psychology must arrange to take the Graduate Record Examination and to have their test scores forwarded to the Registrar. No specific number of undergraduate courses in psychology is required and training in the biological and physical sciences is given special emphasis in evaluating applicants.

During his first year the student must take the courses numbered 511 and 514 through 521 below. These comprise the basic core program for all students. The additional courses (Med Ps 512 and 513) and seminars (Med Ps 507), selected by the student in consultation with his academic adviser and the Doctoral Studies Committee, are taken during the second, third, and fourth years. A large portion of the student's effort will be devoted to training in research.

Med Ps 411, 412. Introduction to Medical Psychology. 2 hours each term, winter and spring.

An introductory course, including lectures, student discussion, and clinical and experimental demonstrations designed to familiarize the student with psychology as one of the behavioral sciences. 2 hours a week: 48 hours.

Med Ps 501. Research. Any term, hours to be arranged.

Med Ps 505. Reading and Conference. Any term, hours to be arranged.

Med Ps 507. **Seminar.** Any term, hours to be arranged.

Neurophysiology of Motivation	Punishment
Neurophysiology of Learning	Learning and Motivation
Sensory Processes	Developmental Psychology
Psychopharmacology	Verbal Behavior
Hormones and Behavior	Social Psychology
Neurological Basis of Reproduction	Social Process Applications
Comparative Psychology	Individual Behavior Modification
Sensory Development	Abnormal Psychology
Human Learning	Quantitative Methods
Conditioning	Laboratory Methods
Cognitive Processes	Computer Methods

Med Ps 511. **Statistics.** 3 hours fall.

Survey of elementary statistical methods necessary for research, including measurement, central tendency, variability, probability, sampling, inference, large sample theory, t , χ^2 , F , and nonparametric technique.

Med Ps 512. **Research Design.** 3 hours winter (even numbered years).

Survey of applications of analysis of variance technique to problems of experimental design, including independent and repeated measures, latin square, trend analysis, orthogonal polynomials, and more general topics of experimental design.

Med Ps 513. **Advanced Statistics.** 3 hours spring (odd numbered years).

Analysis of the foundations of measurement, quantitative methods, correlation and regression theory, factor analysis, basis of psychophysical methods, set theory, and special topics.

Med Ps 514. **Sensation and Perception.** 3 hours winter.

Review of the basic psychophysical and neurological mechanisms of audition, somatic senses, vision, olfaction, and gustation.

Med Ps 515. **Learning and Conditioning.** 3 hours fall.

A critical examination of evidence relating to basic learning phenomena in both classical and instrumental conditioning.

Med Ps 516. **Motivation.** 3 hours spring.

A critical examination of motivation as an explanatory construct in behavior theory, together with a review of experiential and physiological determinants of motivational phenomena.

Med Ps 517. **History of Psychology.** 3 hours fall.

History of psychology from the times of the early Greek philosophers to the contemporary period; special emphasis on such prominent historical developments in psychology as structuralism, functionalism, associationism, behaviorism, Gestalt psychology, and psychoanalysis.

Med Ps 518. **Physiological Psychology.** 3 hours spring.

Survey of the basic literature in the field, with emphasis on the role of the central nervous system in behavior; fundamentals of neuroanatomy and neurophysiology basic to physiological psychology.

Med Ps 519. **Theories of Personality.** 3 hours spring.

Critical review of the major theories of personality, including current behavioral approaches, and empirical evidence supporting these theories.

Med Ps 520. **Individual Differences.** 3 hours winter.

Introduction to individual differences in humans, their distribution in the general population, and methods of measuring such differences in intelligence, personality, aptitudes, interests, and other traits; characteristics of good tests, and their uses and limitations.

Med Ps 521. **Theories of Learning.** 3 hours winter.

Analysis and comparison of the major theories of learning, covering their logical and systematic properties as well as their empirical foundations.

DESCRIPTION
OF COURSES

MEDICAL TECHNOLOGY (DEPARTMENT OF
CLINICAL PATHOLOGY)

Tyra T. Hutchens, Chairman of Department of Clinical Pathology; Director
Medical Technology Program

Professor: **Tyra T. Hutchens**

Associate Professors: **James L. Bramhall, Martha L. Hamilton, Victor C
Marquardt, C. Evans Roberts**

Assistant Professors: **Margaret E. Berroth, James E. Haines**

Senior Instructors: **Mary E. Baptist, John D. Koontz**

Instructors (Medical Technology): **Patricia A. Chadwick, Rose M. Parker,
James A. Wilkinson**

The Master of Science degree in Medical Technology is designed to provide superior medical technologists with Bachelor's degrees advanced study and training in a medical technology subspecialty of their choice as the basis of their future involvement in clinical laboratory personnel instructional programs or in clinical laboratory supervision. The work is arranged to meet the institutional requirements for the degree of Master of Science (see page 23). The program consists of 30 term hours of graduate credit in the major department and 15 hours of graduate credit in a minor department. The 30 major credit hours include credit given for research to enable the candidate to meet the requirements of a written thesis. In addition, two term hours of credit are required in an advanced statistics course dealing with the design of experiments and the analysis and interpretation of experimental data. A program of course work and research activity is developed by consultation with the student's faculty advisor in his area of specialization.

A minimum of three academic terms in residence is required; however, since a thesis based on an original research project is mandatory for the Master of Science degree, it is more usual to spend six academic terms in residence.

In addition to the general requirements for admission to graduate study (see page 20), it is recommended that undergraduate work include a basic course in statistics, physics and the recommended college courses to qualify for the Registry examination of Medical Technologists of the American Society of Clinical Pathologists.

In addition to providing all routine clinical laboratory services to the Medical School Hospitals and Clinics, the Department of Clinical Pathology has modern facilities with specialized equipment for research and study.

Trainee stipends are available for qualified students.

CP 501. **Research.** Any term, hours to be arranged.

CP 511. **Introduction to Clinical Pathology.** 5 hours spring.

Lectures, demonstrations and laboratory work dealing with the application of laboratory measurement to the practice of medicine. Lectures, 3 hours a week; laboratory, 6 hours a week: 108 hours.

CP 520, 521. **Radioisotope Techniques.** 1 hour each term fall and winter.

Lectures and demonstrations concerning the theoretical application of radioisotope techniques to medicine. 1 hour a week: 24 hours.

CP 522. **Radioisotope Laboratory.** Any term, hours to be arranged.

Laboratory experience used in radioisotope work.

MT 505. **Reading and Conference.** Any term, hours to be arranged.

MT 507. **Seminar.** Any term, hours to be arranged.

DEPARTMENT OF MICROBIOLOGY

Arthur W. Frisch, *Chairman of Department*

Professors: **Arthur W. Frisch**, **Evelyn L. Oginsky**, **Lyle Veazie** (Parasitology)

Associate Professor: **Ernest A. Meyer**

Assistant Professors: **Wallace Iglewski**, **Terence M. Joys**, **Arthur Malley** (Primate Center), **Marvin B. Rittenberg**

Instructors: **Nancy B. Gerhardt**, **Barbara Iglewski**

Research Assistant: **Linda Klote**

Microbiology is of importance not only in the study of infectious disease and host-pathogen interactions but also has come to serve as a primary source of model systems for the exploration and understanding of the basic properties of all living systems at the molecular level. The Department of Microbiology offers graduate training, leading to the Master of Science and Doctor of Philosophy degrees, designed to provide a broad background in the experimental and theoretical aspects of microbiological science, in preparation for professional careers in research and teaching.

In addition to the general requirements for admission to graduate study (see page 23), it is recommended that undergraduate work include the following courses: microbiology or bacteriology; general biology; genetics; general chemistry, quantitative analysis, organic chemistry, physical chemistry, and biochemistry; one year of college mathematics; elementary statistics. Reading knowledge of French, Spanish, or German is also recommended. Satisfactory Graduate Record Examination scores must be obtained in both the verbal and quantitative aptitude tests, and in either the biology or chemistry field tests.

The program of study for the M.S. and Ph.D. degrees consists of advanced courses and seminars, and of independent investigation leading to the completion of a thesis.

Selection of appropriate course work is made in consultation with the student's faculty adviser in his area of research specialization. All candidates for either the M.S. or Ph.D. degree must complete the following courses: Mb 413 and 414; the interdisciplinary course in cell biology, Basic Medical Science 511, 512, and 513; two credit hours each in Mb 505 and 507; all of the relevant advanced courses offered by the department during the student's period of residence. The courses to be completed in other basic medical sciences are not rigidly specified, but rather are selected for the purpose of broadening and strengthening the student's training and knowledge.

Areas of specialized study in which the thesis research may be carried out include the following: immunology, immunochemistry, virology, parasitology, mycology, microbial physiology, microbial genetics, pathogenesis, ecology, and taxonomy. The student is allowed a wide choice in the subject of his research, and receives guidance and training from members of the Department of Microbiology as well as faculty of other departments. Current areas of research interest of the departmental faculty are: immunosuppression, tolerance; physical and chemical structure

DESCRIPTION OF COURSES

and regulation in immunological systems; interrelationships between enteric bacteria; genetic control and chemical structure of bacterial flagella; characterization and regulation of metabolic systems in bacteria; physiology and nutritional requirements of pathogenic protozoa; biophysical and biochemical characterization of viruses.

Although the minimum residence requirement for the M.S. degree is three academic terms, it is customary to spend two years in residence. Well qualified students may proceed directly to the Ph.D. degree without the M.S. degree after a usual residence of three to four years. Relevant course work completed during study for the M.S. degree, at this institution or elsewhere, may be applied with special permission towards fulfillment of the course work requirements for the Ph.D. degree.

Traineeships are awarded on a competitive basis to highly qualified students for either the M.S. or Ph.D. degrees; these include stipends exempt from federal tax, allowance for dependents, and funds to cover the cost of tuition and research supplies.

Mb 413, 414. Medical Microbiology and Immunology. 5 hours each term, fall and winter.

The material covered includes basic bacteriology, immunology, and pathogenic microbiology. Bacterial, viral, rickettsial, and fungal disease are presented during the first 19 weeks. The last five weeks are devoted to the study of protozoan and helminthic parasites of man. Lectures and recitations, 3 hours a week; laboratory, 6 hours a week: 216 hours.

Mb 501. Research. Any term, hours to be arranged.

Mb 505. Reading and Conference. Any term, hours to be arranged.

Mb 507. Seminar. 1 hour any term.

Mb 508. Advanced Virology. 4 hours, term to be arranged.

Biochemical and biophysical nature of viruses, mechanisms of viral infection, enumeration and statistical interpretation of the infectious unit, virus, antibody reactions, biochemical consequences of infection, viral genetics, and interference phenomena. The major emphasis is on animal viruses. Lectures and laboratories. Open to a limited number of students with consent of instructor. Prerequisites: either BCh 411, 412 or BMS 511, 512, 513, and Mb 413.

Mb 509. Bacterial Physiology. 4 hours, term to be arranged.

Cytochemistry and ultrastructure, patterns of growth, metabolic pathways of degradation and synthesis, energy mechanisms, genetic controls and their regulation, physiological mechanisms for environmental adaptation. Lectures and laboratories. Open to a limited number of students with consent of instructor. Prerequisites: either Mb 413, 414 and BCh 411, 412 or BMS 511, 512, 513.

Mb 510. Microbial Genetics. 4 hours, term to be arranged.

The molecular basis of heredity. The genetic control of biochemical activities in bacteria. Systems of recombination in bacteria, bacteriophage, actinomycetes, and fungi. The theory and practice of genetic mapping and fine structure analysis. Population genetics as applied to micro-organisms. Lecture and laboratories. Prerequisites: either BMS 511, 512, and 513, or consent of instructor.

Mb 511. Immunology. 4 hours, term to be arranged.

Nature and current concepts of immune mechanisms: antibody formation, antigenicity, tolerance, hypersensitivity, transplantation immunity. Lectures and laboratories. Prerequisites: either BCh 411, 412 or BMS 511, 512, 513, and Mb 413, 414.

Mb 512. Immunochemistry. 4 hours, term to be arranged.

Chemical and physical nature of antigen, antibody, antigen-antibody com-

plexes; physical and kinetic measurements of antigen-antibody interaction; current methods of antibody isolation. Immunochemical techniques; quantitative precipitation, gel-diffusion, immunoelectrophoresis, ultracentrifugation, equilibrium dialysis, and column chromatography. Lectures and laboratories. Open to a limited number of students with consent of instructor. Prerequisites: elementary physical chemistry and biochemistry.

Mb 513. Advanced Microbiology and Immunology. Term and hours to be arranged.

Study of selected areas of microbiology with emphasis on contemporary concepts of the basic nature of microbial and host systems and their interactions. Open to a limited number of students with consent of instructor. Prerequisites: Mb 413, 414.

DEPARTMENT OF PATHOLOGY

Sefton R. Wellings, Chairman of Department

Professors Emeritus: **Warren C. Hunter, Frank R. Menne**

Professors: **George C. Buchan, Robert A. Cooper, Jr., Peter J. Dawson, Nelson R. Niles, Benjamin V. Siegel, Sefton R. Wellings**

Clinical Professor: **Vinton D. Sneed**

Associate Professors: **Thelma N. Fisher, Richard T. Gourley, Adam Lis, Wilbur P. McNulty (Primate Center), Virginia L. Weimar**

Associate Clinical Professors: **Russell C. Henry, Sheldon A. Jacobson, E. Colton Meek, Jr., Joseph E. Nohlgren, James L. Palotay**

Assistant Professors: **Patricia C. Baker, Robert E. Brooks, Richard T. Gourley, James R. Orendurff (Veterans Hospital)**

Assistant Clinical Professors: **Clarence L. Chester, Terence H. Cochran, Otto R. Emig, John W. Hoffman, William L. Lidbeck, Albert A. Oyama, John C. Smith, II, Grier F. Starr**

Senior Clinical Instructor: **Norman H. Rickles**

Instructors: **Virginia L. Jentoft, James deWitt Rankin (Cytology), Florence E. Woodworth (Cytology)**

Lecturers: **Laurence M. Ashley, John E. Halver**

Residents: **Thomas J. McNamara, David A. Mauer, Harold C. Sexton, John L. Wallin**

Pathology is the science which concerns itself with the etiology and pathogenesis and with the effects of disease—structural, chemical, and functional. The Department of Pathology is devoted to presenting pathology as a dynamic discipline of medical science, as a means of imparting to the student scientific insight into the nature of disease, and through research to contribute new perspectives and new concepts to the important end of complete understanding of disease.

The department offers graduate work leading to the Master of Science and Doctor of Philosophy degrees in experimental pathology. Basic undergraduate work in biology, chemistry, and physics with advanced course work in one of these areas is required for admission to the graduate studies program in the department. The Graduate Record Examination taken by the student must include one of the advanced tests in biology, chemistry, or physics, in addition to the aptitude test.

Course requirements for the M.S. degree include histology and organology (An 415); statistics and research design (Med Ps 511, 512), and general pathology

DESCRIPTION OF COURSES

(Pth 511). The Ph.D. requirements include, in addition, medical biochemistry (BCh 411, 412).

Candidates for the M.S. degree are required to take a total of 30 term hours in pathology and 15 hours in a minor: anatomy, bacteriology, biochemistry, pharmacology, or physiology. For the Ph.D. degree, a minimum of 100 term hours must be completed in the Department of Pathology and a minimum of 20 hours in a single minor if he wishes to graduate with a single minor. Arrangements may be made for fulfilling the minor credit requirements in more than one field, subject to the approval of the Graduate Council. Students should plan to spend two years in training for the M.S. or a total of four years in training for the Ph.D. Qualified students may proceed directly to the Ph.D. without the master's degree. The M.S.-M.D. program is also offered to medical students enrolled in the combined M.S.-M.D. program who satisfy Graduate Council and departmental requirements. (See page 28.)

Current research interests in the department include: ultrastructural studies of mouse lung tumors, of milk secretion in the mouse mammary gland, of human tumors including Hodgkin's disease, of mammary dysplasia; hormonal studies of breast tissue in organ culture; structural biochemistry of nucleic acids; studies of metabolic pathways in virus-infected cell systems; natural history and ecology of neoplastic disease in marine fishes; studies of morphogenetic movements in amphibian gastrulation; embryology of marine Hydrozoa; comparative pathology of invertebrates; ultrastructural and chemical studies of crown gall disease; nutritional biochemistry, aflatoxicosis and physiology of Salmonid fishes; basic mechanisms controlling antibody production; viral etiology of cancer. The department has well equipped laboratories for viral oncology, fish biology, embryology, electron microscopy, tissue culture, and radiobiological studies.

Financial support is available in the form of trainee stipends, part-time graduate assistantships, and, for unusually qualified students, predoctoral fellowships from Federal agencies.

Pth 501. **Research.** Any term, hours to be arranged.

Pth 505. **Reading and Conference.** Any term, hours to be arranged.

Pth 507. **Seminar.** Spring, hours to be arranged.

Pth 511. **General and Systemic Pathology.** 5 hours fall, 5 hours winter, 3 hours spring.

Fall: general principles of disease; study of prepared slides supplemented by experiments and study of selected autopsies by all students; fresh and museum specimens; Kodachrome slides and Scopicon orientation. Winter and spring: continuation of the study of disease states of the various body systems. Fall: lectures and recitations, 3 hours a week; laboratory, 6 hours a week. Winter: lectures, 3 hours a week; laboratory, 6 hours a week. Spring: lectures, 2 hours a week; laboratory, 4 hours a week: 288 hours.

Pth 516. **Advanced Systemic Pathology.** Any term, hours to be arranged. Study of the detached pathology of one system.

Pth 517. **Advanced Pathological Histology.** Any term, hours to be arranged. Systematic study of microscopic sections of autopsy tissues. Open to students who have had at least one term's work in pathology.

Pth 518. **Special Pathology of Heart and Circulation.** Hours to be arranged. Systematic and inclusive study of the pathologic states affecting the circulatory system, illustrated by sections and gross materials.

Pth 519. **Introduction to Electron Microscopy.** 2 hours fall.

An introductory course including illustrated lectures and demonstrations dealing with the electron microscope, its technical operations, and broad applications in biological studies and research. Offered alternate years.

Ph 520. **Principles and Techniques of Tissue Culture.** 2 hours fall.

Lectures, demonstrations, and conferences dealing with techniques of cell and tissue culture; designed to provide a background of general information on cultured cells and instruction in application of the method to problems in current areas of research in cell biology. Offered alternate years.

Ph 521. **Biology of Cancer.** 1 hour spring.

Lectures and discussions on the natural history of cancer, geographic and ethnologic aspects, tumor genetics, and etiologic concepts and mechanisms of carcinogenesis.

Ph 522. **Viral Oncology.** 2 hours, term to be arranged.

Systematic study of viruses in relation to cancer in animals and man. Biological aspects of tumor induction by viruses, intracellular and extracellular factors in neoplasia; biochemical and biophysical properties of tumor viruses.

Ph 523. **Biochemical Pathology.** 2 hours, term to be arranged.

This course deals with the biochemical abnormalities characteristic of selected examples of both genetic and nongenetic diseases. Particular emphasis is placed on the role of nucleic acids in the processes involved. A short series of introductory lectures reviews nucleic acid biochemistry and metabolism, and is followed by a group of lectures dealing with our current knowledge of biochemical abnormalities related to chromosomal diseases, blood proteins, urinary products, storage diseases, viral infections, neoplasia, irradiation, and aging.

DEPARTMENT OF PHARMACOLOGY

Norman A. David, Chairman of Department

Professors: **Norman A. David**, **Elton L. McCawley**

Associate Professor: **John D. Gabourel**

Associate Clinical Professor: **H. Lenox H. Dick**

Assistant Professors: **Robert E. Brummett**, **Kaye E. Fox**, **David Gowing**,
John C. Roth

Assistant Clinical Professor: **Anton C. Kirchhof**

Clinical Instructors: **William A. Fisher**, **Michael Henry**, **Melvin M. Reeves**

The Department of Pharmacology offers graduate training leading to the Ph.D. degree to a limited number of well qualified students. The program usually requires four years of post-baccalaureate study but this is variable and depends upon the preparation of the student and the nature of the dissertation problem. A combined M.S.-M.D. program is also offered to regularly enrolled medical students. (See page 28.) This program requires a minimum of five years of study. Application should be made on the completion of the first year of medical studies.

Preparation for graduate study in pharmacology consists of a bachelor's degree in one of the physical or natural sciences, or a B.S. degree in pharmacy. Although course requirements for entrance as a graduate student are not rigidly defined, a strong undergraduate background in chemistry (both physical and organic) and mathematics (through calculus) is recommended. Courses in biology, statistics and German and/or French are also desirable. Minor deficiencies in preparation can be made up through course work in neighboring institutions after entering the program.

The requirements for the Ph.D. degree are outlined in the general requirements section of this bulletin. (See page 23.) Courses in medical biochemistry, physiology

DESCRIPTION OF COURSES

and pharmacology are usually required for all pharmacology graduate students. In addition, a planned course of study is worked out for each student to provide a sound basis in general pharmacology as well as a foundation for further pursuit of a particular field of interest.

Current research interests of the pharmacology faculty include biochemical and cellular pharmacology (effects of drugs and hormones on the growth and metabolism of mammalian and bacterial cells), drug metabolism and cardiovascular pharmacology.

Predocctoral fellowships are available and will be awarded on a competitive basis. Prospective students are urged to have their applications completed by mid-February for admission in July or September of that year. More detailed information can be obtained by writing to the department chairman.

Phc 501. Research. Any term, hours to be arranged.

Students who are properly qualified and who can devote an adequate amount of time to the work are encouraged to pursue original investigations.

Phc 505. Reading and Conference. Term and hours to be arranged.

General Principles of Pharmacology.
Drug Metabolism.
Molecular Pharmacology.
Pharmacogenetics.
Advanced Cardiovascular Pharmacology.

Phc 507. Seminar. 2 hours fall, winter and spring.

Phc 511, 512. Systematic Pharmacology. 5 hours each term, winter and spring.

A series of lectures and laboratory exercises on the basic principles of pharmacology, mechanism of drug action and therapeutic use of drugs. Emphasis is placed on the important therapeutic drugs listed in the U. S. Pharmacopoeia and those newer drugs described in New Drugs. Lectures, 4 hours a week; laboratory, 3 hours a week: 168 hours.

Phc 514. Factors Modifying Drug Action. 2 hours, term to be arranged.

Lectures on drug metabolism, distribution and excretion, drug-protein interaction, pharmacogenetics, and drug allergy and idiosyncrasy. Prerequisite: consent of instructor.

Phc 515. Pharmacological Control of Biological Information Transfer. 2 hours, term to be arranged.

Lectures on the basic mechanisms for nucleic acid and protein biosynthesis, mechanisms of repression and depression, and the effect of hormones and other drugs on these systems. Applications to chemotherapy will also be discussed. Prerequisite: consent of instructor.

Phc 516. Receptor Therapy and Conformational Analysis. 2 hours, term to be arranged.

Lectures on modern receptor therapy, kinetics of drug-receptor interactions, drug antagonism, allosteric receptor concept, and conformational analysis of receptor sites. Prerequisite: consent of instructor.

DEPARTMENT OF PHYSIOLOGY

John M. Brookhart, Chairman of Department

Professors: **John M. Brookhart, Benjamin B. Ross**

Associate Professors: **Alfred J. Rampone,* Robert E. Swanson, Joseph B. Trainer**

Assistant Professors: J. Job Faber, John A. Resko (Primate Center)

Instructor: Donald A. McAfee

Clinical Research Associates: J. David Bristow, Miles J. Edwards, Monte Greer, Donald G. Kassebaum, James Metcalfe, William A. Neill, George A. Porter

The program of graduate study in the Department of Physiology leading to the Doctor of Philosophy degree is designed to prepare students for careers as teachers and investigators in the area of organ and system functions, and in the underlying mechanisms and control of those functions. Primary emphasis is placed on studies of mammalian systems, although other life forms are utilized when appropriate. Training for the degree of Master of Science is permitted to be undertaken only under special circumstances. It is expected that students completing the Ph.D. program will be qualified to accept positions in departments of physiology at the university or medical school level.

Undergraduate preparation for the program is not rigidly specified. The "state of the art" in physiological investigation demands a thorough foundation in mathematics (through calculus and preferably, differential equations), chemistry (including physical chemistry), biology (through comparative anatomy), and physics. Minor deficits in preparation can be made up through course work in neighboring institutions after entering the program. Graduate Record Examination scores on both aptitude tests and on one of the advanced tests in biology, chemistry, or physics are required as a part of the application for admission.

The program of study involves courses in introductory and advanced physiology, as well as courses in other disciplines which are regarded as essential to the broad preparation of the student for his thesis research. The program also involves the conduct of an experimental project described in a written thesis. The time required to complete the program of study and research is four to five calendar years. However, individual circumstances have an important influence on the duration of training. A maximum number of 60 credit hours of thesis research may be applied toward the requirements for the degree.

Choice of thesis topic is made by the student in conformity with his own interests, limited only by the capabilities of the staff members to offer the student adequate guidance and supervision. A thesis committee of several faculty members is available to the student for advice on topic selection, experimental design, methodology and performance. The areas of competence currently represented on the faculty include neurophysiology, respiratory physiology, renal physiology, gastrointestinal physiology, cardiovascular physiology, and endocrine physiology. Space and modern instrumentation are available for student research in any of these areas. Provisions are made for the acquisition of teaching experience as a part of the training program.

The graduate studies program in physiology is partially supported by a grant-in-aid from the National Institutes of Health. This grant affords tax-free training stipends, dependency allowances, and funds for tuition, equipment, supplies, and travel. The basic stipend rate is initially \$2,400 per calendar year, \$2,600 during intermediate years and \$2,800 in the terminal year of training. The dependency allotment is \$500 for each dependent. Trainee appointments are made on a competitive basis only to the best qualified applicants. Prospective students are urged to have their applications for graduate admission completed by April.

Phy 411. Human Physiology. 8 hours spring.

Lectures, laboratory exercises, and conferences devoted to mammalian physiology, with special application to the human. Consideration is given to the fundamental properties of cellular membranes, the basic elements of nerve and

DESCRIPTION OF COURSES

muscle activity, and general information essential to the understanding of the respiratory, cardiovascular, renal, gastrointestinal, and endocrine systems. Lectures, 5 hours a week; laboratory, 9 hours a week: 168 hours.

Phy 412. Human Physiology. 6 hours fall.

Continuation of Phy 411. The general and special senses and the physiology of the central nervous system are discussed. Special attention is given to the functional integration of organ systems previously considered separately. Nutrition, energy exchange and responses to environmental changes are some of the additional topics included in the lecture series. Lectures, 4 hours a week; laboratory, 6 hours a week: 120 hours. Prerequisite: Phy 411.

Phy 501. Research. Any term, hours to be arranged.

Prerequisite: Phy 411, 412.

Phy 505. Reading and Conference. Any term, hours to be arranged.

Prerequisite: Phy 411, 412.

Phy 507. Seminar. Any term, hours to be arranged.

Prerequisite: Phy 411, 412.

Phy 514. History of Physiology. 1 hour winter.

One hour a week: 12 hours.

Phy 515, 516. Physiological Instrumentation and Techniques. 4 hours each term to be arranged.

Lectures and laboratory work covering basic principles of measurement: transducers, physiological signals, signal processing and display, and applications to specific problems of physiological measurements. Basic lectures and laboratory work in electronics are included. Lectures and conferences, 2 hours a week; laboratory, 6 hours a week: 96 hours.

Phy 517. Advanced Cardiovascular Physiology. 4 hours, term to be arranged.

The course consists of laboratory work on instrumentation and surgical methods used in experimental cardiovascular physiology and of lectures and conferences on the mechanical function of the cardiovascular system and some current topics of research. Lectures and conferences, 2 hours a week; laboratory, 6 hours a week: 96 hours.

Phy 518. Biological Transport Processes with Special Reference to the Kidney. 4 hours, term to be arranged.

Topics include: Fick's law of diffusion; membrane effects (diffusion of ions through an electrical field, molecular sieving, carrier-mediated diffusion, active transport, osmosis through "leaky" membranes); irreversible thermodynamic treatment of diffusion processes. Pertinent examples from the literature of artificial membranes, frog skin, muscle capillaries, and the renal tubule. Reading from monographs and original literature. Conference, 3 hours a week; laboratory, 6-hour periods on alternate weeks: 72 hours. Prerequisites: Phy 411, 412, calculus, physical chemistry.

Phy 519. Advanced Neurophysiology. 4 hours, term to be arranged.

A study of principles of investigation, observation, and inference and an extensive review in depth of the integrative functions of the central nervous system. Conference, 2 hours a week; laboratory, 6 hours a week: 96 hours. Prerequisites: Phy 411, 412, An 511.

Phy 520. Energy Exchange. 3 hours, term to be arranged.

Intestinal absorption processes with emphasis on nutrient materials. Modern methods and techniques of investigation, dynamics of intestinal transport, the specialized functions of the gastrointestinal system in the assimilation of dietary nutrients. Conference, 2 hours a week; laboratory, 3 hours a week: 60 hours. Prerequisites: Phy 411, 412, BCh 411, 412.

Phy 521. Respiratory Gas Transport. 3 hours, term to be arranged.

Dynamics of transport of respiratory gases, with emphasis on graphical analysis of pulmonary and circulatory phases of transport. Ventilation-per-

*BASIC
MEDICAL
SCIENCE*

fusion relationships, unsteady state, gas stores of the body, and exchange and equilibrium of inert gases. Conference, 2 hours a week; laboratory, 3 hours a week: 60 hours. Prerequisite: Phy 411, 412.

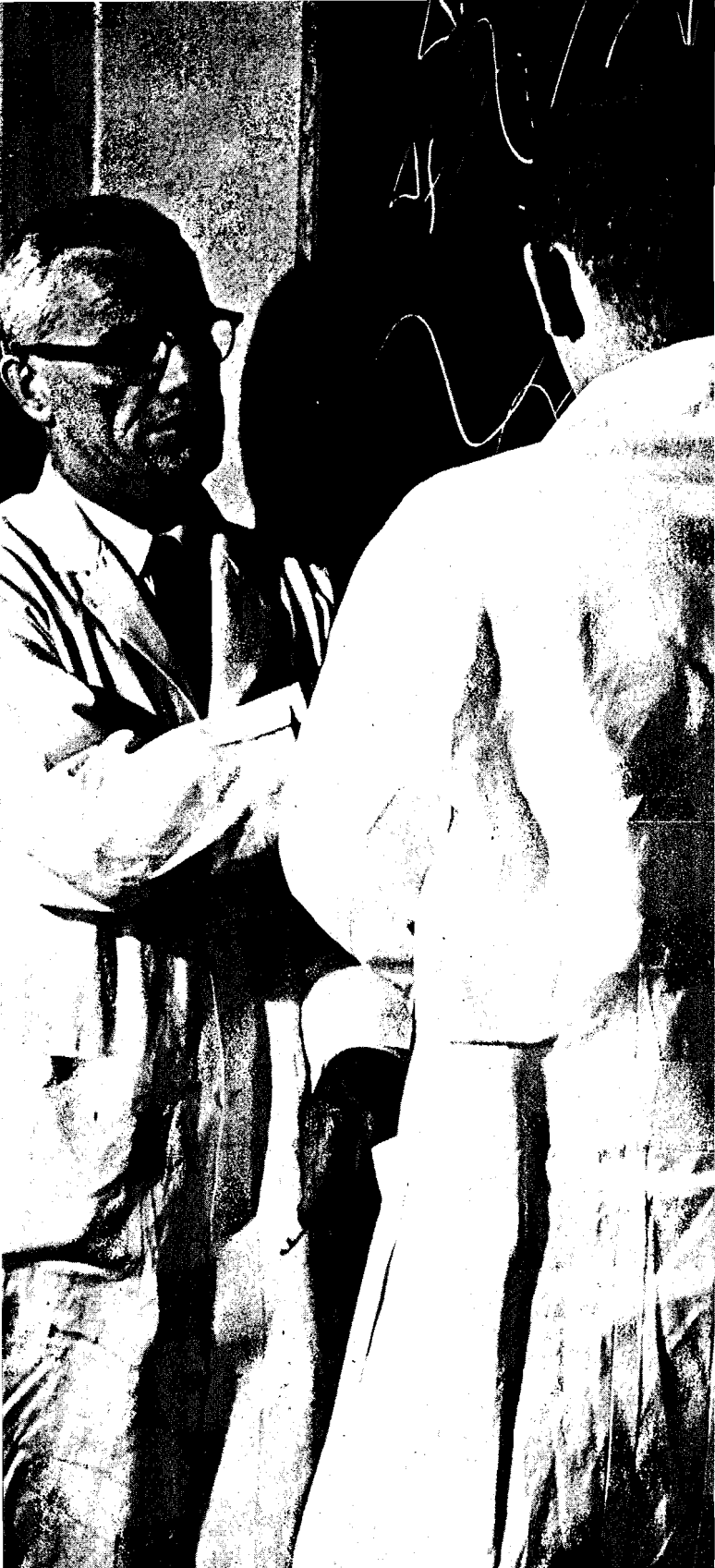
Phy 522. **Fetal and Neonatal Physiology.** 3 hours, spring.

Special physiology of the in utero state and of the transition to an independent existence. Placental gas exchange; acid-base homeostasis; fetal and neonatal circulation, anoxia tolerance, thermal homeostasis, and renal functions. Conference, 2 hours a week; laboratory, 3 hours a week: 60 hours. Prerequisites: Phy 411, 412, BCh 411, 412.

CONJOINT COURSE—BASIC MEDICAL SCIENCE

Basic Medical Science 511, 512, 513. **Cell Biology.** 5 hours each term, fall, winter and spring.

An integrated course presenting fundamental concepts, processes, and methods in the following areas of cell biology: macromolecules, cell structure, transport, biochemical functions, genetics, immunology, development and differentiation, organ physiology, inflammation neoplasia, and conditioning and learning. 4 lectures and 1 laboratory period. Conjoint course presented by the faculty of the basic medical science departments. Open to all graduate students.



5

GRADUATE FACULTY

GRADUATE FACULTY

Executive Faculty

David W. E. Baird, Dean of the Medical School, Joseph J. Adams, Clifford V. Allen, Ralph C. Benson, John M. Brookhart, Norman A. David, David DeWeese, Charles T. Dotter, Arthur W. Frisch, Jarvis Gould, Hance Haney, Frederick P. Haugen, Charles N. Holman, Tyra T. Hutchens, Richard T. Jones, Robert D. Koler, William W. Krippaehne, Howard P. Lewis, Walter C. Lobitz, Jr., Joseph D. Matarazzo, Richard W. Olmsted, Edwin E. Osgood, Harold T. Osterud, Anthony A. Pearson, George Saslow, Richard L. Sleeter, Kenneth C. Swan, Sefton R. Wellings, William A. Zimmerman

STANDING COMMITTEES OF THE FACULTY

(The following standing committees of the Medical School faculty, appointed by the Dean, are pertinent to the Graduate Studies program.)

Animal Care—James Metcalfe (chairman), William S. Fletcher, M. Ronald Parelius, Alfred J. Rampone, Allan L. Rogers, Roy L. Swank, William R. Todd, Sefton R. Wellings, William A. Zimmerman

Curriculum and Schedule—William W. Krippaehne (chairman), Joseph Adams, John A. Benson, Jr., Paul H. Blachly, Robert A. Cooper, Jr., Richard L. Dobson, Raphael B. Durfee, Richard T. Jones, Harold T. Osterud, Anthony A. Pearson, Richard L. Sleeter, William E. Snider, Joseph D. Matarazzo (ad hoc)

Graduate Council—John M. Brookhart (chairman), Robert L. Bacon, John Gabourel, Howard S. Mason, Joseph D. Matarazzo, Evelyn L. Oginska, Sefton R. Wellings, Joseph J. Adams (ex officio)

Patent—William A. Zimmerman (chairman), George I. Johnston, M. Ronald Parelius, Bernard Pirofsky, Benjamin B. Ross, Roy L. Swank, John Van Bruggen

Planning Council—Joseph J. Adams (chairman), Jean E. Boyle, John M. Brookhart, A. J. Clemons, M. Roberts Grover, Jr., Tyra T. Hutchens, William W. Krippaehne, Donald C. Lowe, Harold T. Osterud, Richard L. Sleeter, William A. Zimmerman

Radioisotope Committee—Tyra T. Hutchens (chairman), Clifford V. Allen, Edwin E. Osgood, Demetrios A. Rigas, Harry Shaich

Research—Walter C. Lobitz, Jr. (chairman), J. Peter Bentley, William S. Fletcher, Robert D. Koler, James Metcalfe, Alfred J. Rampone, James A. Vernon, M. Ronald Parelius (ex officio)

Emeritus Graduate Faculty

Warren C. Hunter, M.D., Professor Emeritus of Pathology.

B.A. (1920), Albany College (Lewis and Clark); M.D. (1924), Oregon; M.A. (1925), Michigan.

Frank R. Menne, M.D., Professor Emeritus of Pathology.

B.S. (1913), Wisconsin; M.D. (1915), Rush (University of Chicago).

Edward S. West, Ph.D., Professor Emeritus of Biochemistry.

A.B. (1917), Randolph-Macon; M.S. (1920), Kansas State; Ph.D. (1923), Chicago.

*Graduate Faculty**

- Royce K. Alexander**, Ph.D., Assistant Professor of Medical Psychology (Primate Center) (1967).
A.B. (1961), Miami; M.S., Ph.D. (1966), Wisconsin.
- Laurence M. Ashley**, Ph.D., Lecturer in Pathology (1966).
B.S. (1930), Michigan State; M.A. (1932), Michigan; Ph.D. (1945), Southern California.
- Robert L. Bacon**, Ph.D., Professor of Anatomy (1955).
B.S. (1940), Hamilton; Ph.D. (1944), Yale.
- Patricia C. Baker**, Ph.D., Assistant Professor of Pathology (1967).
B.A. (1960), Hawaii; Ph.D. (1964), California.
- Harry E. Baptist**, B.A., Senior Instructor in Medical Technology (1950).
B.A. (1944), Montana State University.
- Marissa H. Beatty**, Ph.D., Associate Professor of Biochemistry (Primate Center) (1953).
B.A. (1941), Sarah Lawrence; M.S. (1942), Ph.D. (1945), Columbia.
- Henry Bell**, A.B., Instructor in Experimental Biology (Primate Center) (1964).
A.B. (1958), Brown.
- Peter Bentley**, Ph.D., Assistant Professor of Biochemistry and Associate Professor of Experimental Biology (1964).
B.Sc. (1952), Royal College of Technology, England; M.S. (1961), Ph.D. (1963), Oregon.
- Margaret E. Berroth**, M.D., Assistant Professor of Clinical Pathology (1966).
Abitur (1947), Griefswald Lyceum; M.D. (1954), Heidelberg.
- John L. Black**, Ph.D., Assistant Professor of Biochemistry (1968).
B.Sc. (1961), Ph.D. (1964), Glasgow.
- Rose Mary Bocek**, Ph.D., Assistant Professor of Biochemistry (Primate Center) (1957).
B.S. (1946), Marylhurst; M.S. (1954), Ph.D. (1964), Oregon.
- Robert D. Boyd**, Ph.D., Professor of Medical Psychology (1964).
B.A. (1938), Linfield; M.A. (1941), Southern California; M.A. (1947), Ph.D. (1953), Michigan.
- James L. Bramhall**, M.B., Associate Professor of Clinical Pathology (1962).
M.B., Ch.B. (1951), Victoria University of Manchester Medical School, England.
- Robert M. Brenner**, Ph.D., Associate Professor of Experimental Biology (Primate Center) (1964).
A.B. (1950), A.M. (1951), Ph.D. (1955), Boston.
- John M. Brookhart**, Ph.D., Professor of Physiology; Chairman of Department (1949).
B.S. (1935), M.S. (1936), Ph.D. (1939), Michigan.
- Robert E. Brooks**, Ph.D., Assistant Professor of Pathology (1960).
B.S. (1948), California; Ph.D. (1967), Oregon.
- Robert E. Brummett**, Ph.D., Assistant Professor of Otolaryngology and Pharmacology (1964).
B.S. (1949), M.S. (1960), Oregon State; Ph.D. (1964), Oregon.
- Robert Brush**, Ph.D., Professor of Medical Psychology (1965).
B.A. (1951), Princeton; M.A. (1953), Ph.D. (1956), Harvard.
- George C. Buchan**, M.D., Professor of Pathology (1965).
M.D. (1958), McGill.
- George V. Butler**, Ph.D., Professor of Medical Psychology (1960).
B.A. (1954), Ph.D., (1960), California.

* The year in parentheses following the name of each faculty member indicates the date of original appointment to the faculty.

† Volunteer.

‡ Part-time.

GRADUATE
FACULTY

Patricia A. Chadwick, B.S., Instructor in Clinical Pathology (1966).
B.S. (1950), Massachusetts.

†**Clarence L. Chester**, M.D., Assistant Clinical Professor of Pathology (1966).
B.S. (1937), M.D. (1940), Vermont.

†**Terence H. Cochran**, M.D., Assistant Clinical Professor of Pathology (1966).
B.S. (1939), Oregon State; M.D. (1941), Oregon.

Antonio E. Colás, M.D., Ph.D., Professor of Biochemistry and Obstetrics and Gynecology (1962).
M.D. (1953), Madrid; Ph.D. (1955), Edinburgh.

Reid S. Connell, Jr., Ph.D., Instructor in Anatomy and Neurology (1966).
B.S. (1959), M.S. (1962), Oregon State; Ph.D. (1967), Oregon.

Robert A. Cooper, Jr., M.D., Professor of Pathology (1962).
A.B. (1954), Pennsylvania; M.D. (1958), Jefferson.

Norman A. David, M.D., Professor of Pharmacology; Chairman of Department (1937).
A.B. (1925), M.D. (1931), California.

Howard W. Davis, M.S., Instructor in Anatomy (1966).
B.S. (1956), M.S. (1959), Oregon.

Peter J. Dawson, M.D., Professor of Pathology (1964).
B.A. (1949), Selwyn, England; M.B., B.Chir. (1952), St. George's; M.A. (1955), Cambridge; D.C.P. (1955), Postgraduate Medical School, London; M.D. (1960), Cambridge.

‡**H. Lenox H. Dick**, M.D., Associate Clinical Professor of Pharmacology (1957).
A.B. (1941), Pennsylvania; M.D. (1944), Jefferson.

†**Otto R. Emig**, M.D., Assistant Clinical Professor of Pathology (1957).
B.S. (1943), Portland; M.D. (1944), Oregon.

‡**J. Job Faber**, Ph.D., Assistant Professor of Physiology (1966).
M.B. (1960), Amsterdam; Ph.D. (1963), Western Ontario.

†**Wolf H. Fahrenbach**, Ph.D., Associate Professor of Experimental Biology (Primate Center) (1963).
B.A. (1954), California; Ph.D. (1961), University of Washington.

Jack H. Fellman, Ph.D., Professor of Biochemistry and Neurology (Neurochemistry) (1955).
B.A. (1948), M.A. (1952), Ph.D. (1954), Kansas.

Thelma N. Fisher, Ph.D., Associate Professor of Pathology (1966).
A.B. (1942), Missouri; M.A. (1948), Kansas; Ph.D. (1953), Southern California.

†**William A. Fisher**, M.D., Clinical Instructor in Pharmacology (1968).
B.S. (1948), M.D. (1949), Oregon.

Robert D. Fitzgerald, Ph.D., Associate Professor of Medical Psychology (1966).
B.A. (1958), M.A. (1959), South Dakota; Ph.D. (1962), Indiana.

Kaye E. Fox, Ph.D., Assistant Professor of Pharmacology (1964).
B.S. (1954), Michigan; Ph.D. (1964), Stanford.

Arthur W. Frisch, M.D., Ph.D., Professor of Microbiology; Chairman of Department (1946).
B.A. (1931), M.A. (1933), Ph.D. (1935), M.D. (1937), Wisconsin.

† Volunteer.

‡ Part-time.

- Thomas S. Fujita**, M.S., Instructor in Biochemistry and Neurology (Neurochemistry) (1963).
B.S. (1956), Reed; M.S. (1959), University of Washington.
- John D. Gabourel**, Ph.D., Associate Professor of Pharmacology (1964).
B.S. (1950), California; M.S. (1951), San Francisco; Ph.D. (1957), Rochester.
- Ann M. Garner**, Ph.D., Professor, Crippled Children's Division; Professor of Medical Psychology (1968).
A.B. (1936), Carleton; A.M. (1938), Radcliffe; Ph.D. (1941), Stanford.
- Nancy B. Gerhardt**, B.S., Instructor in Microbiology (1966).
B.S. (1950), Oregon State.
- Jeanne A. Goldstein**, Ph.D., Lecturer in Medical Psychology (1968).
B.S. (1960), Butler; M.S. (1964), Ph.D. (1967), Purdue.
- Steven G. Goldstein**, Ph.D., Assistant Professor of Medical Psychology (1968).
B.A. (1962), Fairleigh Dickinson; M.S. (1964), Ph.D. (1967), Purdue.
- Richard T. Gourley**, M.D., Associate Professor of Pathology (1967).
B.A. (1958), Reed; M.D. (1963), Oregon.
- David Gowing**, M.D., Assistant Professor of Anesthesiology and Pharmacology (1962).
A.B. (1958), Boston; M.D. (1959), Yale.
- Robert W. Goy**, Ph.D., Professor of Medical Psychology (Primate Center) (1965).
B.S. (1947), Michigan; Ph.D. (1953), Chicago.
- David L. Gunberg**, Ph.D., Professor of Anatomy (1955).
B.A. (1949), Redlands; M.A. (1952), Ph.D. (1954), California.
- James E. Haines**, M.D., Assistant Professor of Clinical Pathology (1966).
B.S. (1950), M.D. (1955), Stanford.
- John E. Halver**, Ph.D., Lecturer in Pathology (1966).
B.S. (1944), M.S. (1948), Washington State; Ph.D. (1953), University of Washington.
- Martha L. Hamilton**, M.D., Associate Professor of Clinical Pathology (1957).
B.S. (1945), Texas Wesleyan; M.D. (1952), Texas.
- Constance Hanf**, Ph.D., Associate Professor of Medical Psychology; Associate Professor, Crippled Children's Division (1963).
B.A. (1938), M.A. (1943), New York University; M.A. (1952), College of City of New York; Ph.D. (1961), Pennsylvania State.
- Norman Henderson**, Ph.D., Associate Professor of Medical Psychology (1967).
B.A. (1938), Fresno State; M.A. (1948), Occidental; Ph.D. (1953), U.C.L.A.
- Russell C. Henry**, M.D., Associate Clinical Professor of Pathology (1963).
B.S. (1934), M.D. (1940), Oklahoma.
- Michael Henry**, M.B., Clinical Instructor in Pharmacology (1968).
M.B. (1950), National University of Ireland.
- Marvin C. Hines**, Ph.D., Associate Professor of Biochemistry and Ophthalmology (1962).
B.A. (1954), Linfield; M.S. (1956), University of Washington; Ph.D. (1959), Oregon.
- John W. Hoffman**, M.D., Assistant Clinical Professor of Pathology (1966).
D.M.D. (1948), M.D. (1950), Harvard.
- A. Wesley Horton**, Ph.D., Professor of Biochemistry and Environmental Medicine (1962).
B.S. (1940), Wisconsin; M.S. (1947), Ph.D. (1949), Yale.

† Volunteer.
‡ Part-time.

*GRADUATE
FACULTY*

- Dale D. Hoskins**, Ph.D., Assistant Professor of Biochemistry (Primate Center (1963)).
B.S. (1953), M.S. (1955), Oregon State; Ph.D. (1960), Colorado.
- †**Charles F. Howard, Jr.**, Ph.D., Assistant Professor of Biochemistry (Primate Center) (1965).
B.A. (1954), Colorado State College of Education; M.A. (1958), Colorado State; M.S. (1961), Ph.D. (1963), Wisconsin.
- Tyra T. Hutchens**, M.D., Professor of Clinical Pathology and Radiation Therapy (Radioisotopes); Chairman of Department of Clinical Pathology (1953).
B.S. (1943), M.D. (1945), Oregon.
- Barbara Iglewski**, Ph.D., Instructor in Microbiology (1968).
B.S. (1960), Allegheny; M.S. (1962), Ph.D. (1964), Pennsylvania State.
- Wallace Iglewski**, Ph.D., Assistant Professor of Microbiology (1968).
B.A. (1961), Western Reserve; B.S. (1963), Ph.D. (1965), Pennsylvania State.
- Russell Jackson**, Ph.D., Assistant Professor of Medical Psychology (1968).
B.S. (1963), M.S. (1964), Brigham Young; Ph.D. (1968), Ohio State.
- †**Sheldon A. Jacobson**, M.D., Associate Clinical Professor of Pathology (1950).
A.B. (1922), College of City of New York; M.D. (1928), Yale.
- Russell L. Jolley**, Ph.D., Instructor in Biochemistry (1968).
B.S. (1943), Texas A & M; M.S. (1954), Ph.D. (1958), Oregon State.
- Richard T. Jones**, M.D., Ph.D., Professor of Biochemistry; Chairman of Department (1961).
B.S. (1953), M.S., M.D. (1956), Oregon; Ph.D. (1961), California Institute of Technology.
- Virginia L. Jentoft**, B.S., Instructor in Pathology (1965).
B.S. (1951), University of Washington.
- †**Wallace D. Joslyn**, Ph.D., Lecturer in Medical Psychology (1968).
B.A. (1961), Virginia; M.S. (1965), Ph.D. (1967), Wisconsin.
- Terence M. Joys**, Ph.D., Assistant Professor of Microbiology (1965).
B.Sc. (1957), Leeds, England; Ph.D. (1961), Lister Institute of University of London.
- †**Anton C. Kirchhof**, M.D., Clinical Instructor in Pharmacology (1965).
B.A. (1941), M.S., M.D. (1943), Oregon.
- †**George W. Kittinger**, Ph.D., Professor of Biochemistry (Primate Center (1965)).
B.S. (1948), M.S. (1950), Northwestern; Ph.D. (1953), Oregon.
- John D. Koontz**, B.S., Senior Instructor in Clinical Pathology (1963).
B.S. (1954), Oregon.
- †**Martin S. Levine**, Ph.D., Lecturer in Medical Psychology (1965).
B.A. (1939), New York; M.A. (1941), Columbia; Ph.D. (1954), M.P.H. (1960), California.
- †**William L. Lidbeck**, M.D., Assistant Clinical Professor of Pathology (1941).
B.S. (1932), Wisconsin; M.D. (1934), Marquette.
- James E. Lindemann**, Ph.D., Associate Professor of Medical Psychology (1963).
B.S. (1950), M.S. (1951), Ph.D. (1954), Pennsylvania State.

- Adam W. Lis**, Ph.D., Associate Professor of Pathology (1965).
 B.S. (1949), Arkansas; B.A. (1954), Ph.D. (1960), California.
- Michael Litt**, Ph.D., Associate Professor of Biochemistry and Medicine (1967).
 B.A. (1954), Oberlin; Ph.D. (1958), Harvard.
- Richard B. Lyons**, M.D., Assistant Professor of Anatomy and Experimental Medicine (1961).
 B.S. (1957), M.S., M.D. (1960), Oregon.
- Donald A. McAfee**, Ph.D., Instructor in Physiology (1968).
 B.S. (1963), Chicago; Ph.D. (1968), Oregon.
- Elton L. McCawley**, Ph.D., Professor of Pharmacology (1949).
 A.B. (1938), M.S. (1939), Ph.D. (1942), California.
- Wilbur P. McNulty**, M.D., Associate Professor of Pathology (Primate Center) (1964).
 B.S. (1947), Michigan; M.D. (1952), Yale.
- Arthur Malley**, Ph.D., Assistant Professor of Microbiology (Primate Center) (1964).
 B.A. (1953), B.S. (1957), San Francisco State; Ph.D. (1961), Oregon State.
- Victor C. Marquardt, Jr.**, M.D., Associate Professor of Clinical Pathology (1964).
 B.A. (1953), Wesleyan; M.D. (1957), Nebraska.
- Howard S. Mason**, Ph.D., Professor of Biochemistry (1952).
 B.S. (1935), M.S. (1936), Ph.D. (1939), Massachusetts Institute of Technology.
- Joseph D. Matarazzo**, Ph.D., Professor of Medical Psychology; Chairman of Department (1957).
 B.A. (1946), Brown; M.S. (1950), Ph.D. (1952), Northwestern.
- Ruth G. Matarazzo**, Ph.D., Professor of Medical Psychology (1957).
 B.A. (1948), Brown; M.S. (1952), Ph.D. (1955), Washington University.
- E. Colton Meek, Jr.**, M.D., Associate Clinical Professor of Pathology (1953).
 B.S. (1941), Oregon State; M.D. (1944), Johns Hopkins.
- Ernest A. Meyer**, Sc.D., Associate Professor of Microbiology (1958).
 A.B. (1949), California; M.S. (1953), Purdue; Sc.D. (1958), Johns Hopkins.
- William Montagna**, Ph.D., D.Sc., Professor of Experimental Biology; Head of Division (Director, Oregon Regional Primate Center) (1963).
 B.A. (1936), Ph.D. (1944), Cornell; D.Sc. (1960), Bethany.
- Nelson R. Niles**, M.D., Professor of Pathology (1952).
 M.D. (1947), Cornell.
- Joseph E. Nohlgren**, M.D., Associate Clinical Professor of Pathology (1949).
 B.S. (1935), South Dakota State; M.D. (1943), Oregon.
- James H. O'Brien**, Ph.D., Assistant Professor of Medical Psychology (1968).
 B.A. (1959), M.A. (1963), Ph.D. (1967), Michigan.
- Sylvyn L. Oginsky**, Ph.D., Professor of Microbiology (1957).
 B.A. (1938), Cornell; M.S. (1939), Chicago; Ph.D. (1946), Maryland.
- James R. Orendurff**, M.D., Assistant Professor of Pathology (Veterans Hospital) (1964).
 B.A. (1950), M.A. (1954), M.D. (1959), Oregon.

|| Leave of absence, July 1, 1966 to July 1, 1969.

† Volunteer.

‡ Part-time.

GRADUATE
FACULTY

- †**Albert A. Oyama**, M.D., Assistant Clinical Professor of Pathology and Clinical Pathology (1959).
B.S. (1951), M.D. (1953), Oregon.
- †**James L. Palotay**, D.V.M., Associate Clinical Professor of Pathology (1968).
D.V.M. (1950), Kansas State; M.S. (1958), Colorado State.
- Rose Marie Parker**, A.R.T., Instructor in Medical Technology (1967).
- Anthony A. Pearson**, Ph.D., Professor of Anatomy; Chairman of Department (1946).
B.S. (1928), Furman; M.A. (1930), Ph.D. (1933), Michigan.
- †**Anne M. Perley**, M.A., Assistant Professor of Biochemistry (Primate Center) (1951).
B.A. (1927), Grinnell; M.A. (1929), Nebraska.
- Walter A. Petersen**, M.S., Assistant Professor of Physiology (1968).
B.S. (1957), California Institute of Technology; M.S. (1965), Oregon State; M.S. (1968), Portland State.
- David S. Phillips**, Ph.D., Associate Professor of Medical Psychology (1963).
A.B. (1958), Wabash; M.S. (1960), Ph.D. (1962), Purdue.
- ‡**Charles H. Phoenix**, Ph.D., Professor of Medical Psychology (Primate Center) (1965).
B.A. (1945), Connecticut; M.A. (1950), Ph.D. (1954), Boston.
- †**Oscar W. Portman**, M.D., Professor of Biochemistry (Primate Center) (1965).
B.S. (1945), U.S. Military Academy; M.D. (1954), Harvard.
- †**Robert Quinton-Cox**, Ph.D., Assistant Professor of Anatomy (Dental School) (1968).
Int. B.S. (1956), Woolwich Poly (London); Ph.D. (1963), Emory.
- ||**Alfred J. Rampone**, Ph.D., Associate Professor of Physiology (1955).
B.A. (1947), M.A. (1950), British Columbia; Ph.D. (1954), Northwestern.
- James deWitt Rankin**, B.S., Instructor in Pathology (Cytotechnology) (1959).
B.S. (1951), Portland.
- †**Melvin M. Reeves**, M.D., Clinical Instructor in Pharmacology and Surgery (1957).
B.S. (1943), Hamline; B.M. (1946), M.D. (1947), M.S. (1957), Minnesota.
- †**John Allen Resko**, Ph.D., Assistant Professor of Physiology (Primate Center) (1965).
B.A. (1955), St. Charles Seminary; M.S. (1960), Marquette; Ph.D. (1963), Illinois.
- †**Norman H. Rickles**, D.D.S. Senior Clinical Instructor in Pathology and Clinical Professor of Dental and Oral Medicine (1957).
D.D.S. (1947), Washington University; M.S. (1951), California.
- Demetrios A. Rigas**, Ph.D., Professor of Biochemistry and Medicine (1953).
Ch.E. (1941), Ph.D. (1943), National University of Engineering Science, Athens, Greece.
- Marvin B. Rittenberg**, Ph.D., Assistant Professor of Microbiology and Medicine (1966).
B.A. (1954), M.A. (1959), Ph.D. (1961), California.
- C. Evans Roberts**, M.D., Associate Professor of Clinical Pathology and Medicine (1966).
B.A. (1953), Haverford; M.D. (1957), Columbia.
- Benjamin B. Ross**, Ph.D., Professor of Physiology (1954).
B.S. (1949), Union; Ph.D. (1954), Rochester.

† Volunteer.

‡ Part-time.

|| Leave of absence, July 1, 1968 to June 30, 1969.

- John C. Roth, M.D.**, Associate Professor of Anesthesiology and Assistant Professor of Pharmacology (1957).
 A.B. (1947), Wichita; M.D. (1950), Kansas.
- Geoffrey V. F. Seaman, Ph.D.**, Associate Professor of Biochemistry and Neurology (Neurochemistry) (1966).
 B.Sc. (1955), Royal College of Science, London; Ph.D. (1959), Cambridge.
- Benjamin V. Siegel, Ph.D.**, Professor of Pathology (1961).
 B.S. (1934), Georgia; M.A. (1937), Columbia; Ph.D. (1950), Stanford.
- John C. Smith, II, M.D.**, Assistant Clinical Professor of Pathology (1960).
 B.S. (1950), Oklahoma; M.D. (1954), Johns Hopkins.
- Vinton D. Sneed, M.D.**, Clinical Professor of Pathology (1939).
 B.A. (1932), Linfield; M.D. (1936), Oregon.
- Frank B. Strange, Ph.D.**, Lecturer in Medical Psychology (1968).
 A.B. (1949), M.A. (1950), Portland; Ph.D. (1953), Washington University.
- Grier F. Starr, M.D.**, Assistant Clinical Professor of Pathology (1959).
 B.S. (1947), Jamestown; M.D. (1951), Northwestern.
- William A. Stotler, Ph.D.**, Professor of Anatomy (1946).
 A.B. (1935), Westminster; M.S. (1937), St. Louis; Ph.D. (1942), Cornell.
- Robert E. Swanson, Ph.D.**, Associate Professor of Physiology (1961).
 B.A. (1949), Ph.D. (1953), Minnesota.
- Leif G. Terdal, Ph.D.**, Assistant Professor of Medical Psychology (1965).
 B.A. (1959), Taylor; M.A. (1961), Ph.D. (1965), Michigan State.
- Vilbert R. Todd, Ph.D.**, Professor of Biochemistry (1936).
 B.S. (1925), Ph.D. (1933), Wisconsin.
- Joseph B. Trainer, M.D.**, Associate Professor of Physiology and Medicine (1949).
 B.S. (1939), M.S. (1941), University of Washington; M.D. (1946), Oregon.
- Archie R. Tunturi, M.D., Ph.D.**, Associate Professor of Anatomy (1945).
 B.A. (1939), Reed; M.S. (1943), Ph.D., M.D. (1944), Oregon.
- John T. Van Bruggen, Ph.D.**, Professor of Biochemistry (1947).
 B.A. (1937), Linfield; M.A. (1939), Oregon; Ph.D. (1944), St. Louis.
- Wyle Veazie, Ph.D.**, Professor of Microbiology (Parasitology) (1942).
 B.A. (1928), M.A. (1930), Ph.D. (1947), Oregon.
- Jack A. Vernon, Ph.D.**, Professor of Otolaryngology and Medical Psychology (1966).
 A.B. (1948), M.A. (1950), Ph.D. (1952), Virginia.
- Virginia L. Weimar, Ph.D.**, Associate Professor of Ophthalmology and Pathology (1962).
 B.S. (1944), M.S. (1947), Oregon State; Ph.D. (1951), Pennsylvania.
- Jeffton Robert Wellings, M.D., Ph.D.**, Professor of Pathology; Chairman of Department (1961).
 B.S. (1951), M.D. (1953), University of Washington; Ph.D. (1960), California.
- Arthur N. Wiens, Ph.D.**, Professor of Medical Psychology (1958).
 B.A. (1948), M.A. (1952), Kansas; Ph.D. (1956), Portland.
- James A. Wilkinson, B.S.**, Instructor in Clinical Pathology and Medical Technology (1966).
 B.S. (1963), Oregon.
- Dolorence E. Woodworth, B.S.**, Instructor in Pathology (Cytology) (1967).
 B.S. (1957), Oregon.

Oregon State System of Higher Education

Roy E. Lieuallen, Ed.D., L.H.D., Chancellor

James H. Jensen, Ph.D.
President, Oregon State University

Charles E. Johnson
Acting President, University of Oregon

Leonard W. Rice, Ph.D.
President, Oregon College of Education

David W. E. Baird, M.D., LL.D.
Dean, University of Oregon Medical School

Averno M. Rempel, Ph.D.
President, Eastern Oregon College

Louis G. Terkla, D.M.D.
Dean, University of Oregon Dental School

Elmo N. Stevenson, Ed.D.
President, Southern Oregon College

Gregory B. Wolfe, Ph.D.
President, Portland State College

Winston D. Purvine, A.B., LL.D.
President, Oregon Technical Institute

Richard L. Collins, M.A., C.P.A.....Secretary, Board of Higher Education; Budget Director

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Miles C. Romney, Ph.D.....Vice Chancellor for Academic Affairs

James W. Sherburne, Ph.D.....Vice Chancellor for Continuing Education

Donald R. Larson, B.A.....Assistant Chancellor; Director of Public Service

Carl W. Hintz, Ph.D.....Director of Libraries

Jack V. Edling, Ph.D.....Director of Teaching Research

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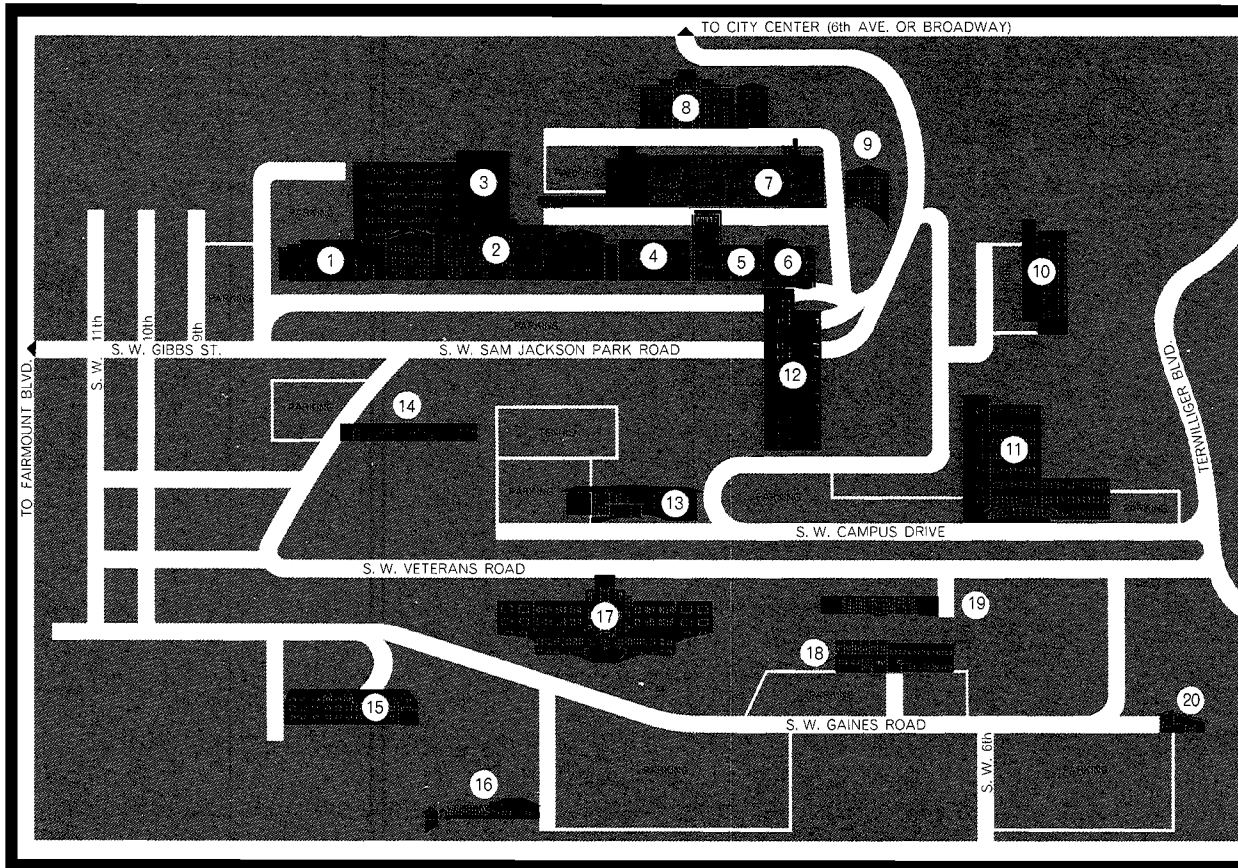
William J. Kerr, D.Sc., LL.D..... 1932-1935

Frederick M. Hunter, Ed.D., LL.D..... 1935-1946

Paul C. Packer, Ph.D., LL.D..... 1946-1950

Charles D. Byrne, Ed.D..... 1950-1955

John R. Richards, Ph.D..... 1955-1961



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Area Code: 503 Tel: 228-9181

- 1 Library and Auditorium
- 2 Medical Science building
- 3 Medical Research building
- 4 Laboratory and Administration building
- 5 Clinic Laboratories building
- 6 Outpatient Clinic
- 7 Multnomah Hospital
- 8 Emma Jones Hall (women's residence)
- 9 Katherine Hall (women's residence, laundry, maintenance and heating plant for Multnomah Hospital)
- 10 Women's Residence
- 11 University of Oregon Dental School
- 12 University of Oregon Medical School Hospital and Doernbecher Memorial Hospital for Children
- 13 Student Activities building
- 14 Physical plant building (shop, warehouse), and general services unit (printing, personnel, planning, instructional aids)
- 15 Gaines Hall
- 16 Greenhouse
- 17 University State Tuberculosis Hospital
- 18 Crippled Children's Division
- 19 Portland Center for Hearing and Speech
- 20 Portland Fire Station No. 2