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## DEPARTMENT OF PATHOLOGY AND LABORATORY MEDICINE

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The Department of Pathology and Laboratory Medicine makes unique educational contributions to medical school and graduate education.

Working in the areas of experimental cellular and molecular pathology, the Department's research faculty provide an interdisciplinary environment for conducting state-of-the-art research on cell and tissue structure and function. Normal and abnormal cellular processes are studied through quantitative analytic methods in morphology, biochemistry, immunology, genetics, and molecular biology. Resources include oligonucleotide synthesizer, multidimensional slit-scan flow cytometry, fluorescence microscopy and image analysis, scanning and transmission electron microscopy, laser capture microdissection, computers, automated clinical chemistry and blood cell analysis, radioimmunoassays, GC mass spectrometry, chromatography and HPLC, hybridoma and tissue culture facilities, molecular cloning facilities, electrophoresis facilities, and a wide range of biochemical and molecular biology equipment.

A specialized program of study leads to the degree of Doctor of Philosophy in experimental cell and molecular pathology. The primary objective of this program is to provide cutting-edge training in experimental molecular and cell biology within a biomedical context of the frontiers in human disease mechanisms. The essentials of modern biological and medical sciences are taught through a perspective of experimental design, scientific method, and the oral and written presentation of scientific data—providing graduates with interesting and long career potential.

During the first two years of the program, students are involved in coursework designed to interface basic science disciplines with disease context. The required courses for graduate students include three core courses: Biochemistry (IND 408), Cell Biology (IND 409), and Molecular Biology and Genetics (IND 410). These courses provide an in-depth coverage of the essential material in biomedical research. Pathology graduate students receive comprehensive training in disease processes through General Pathology (PTH 505) and Molecular Mechanisms of Human Disease (PTH 593). An advanced level of understanding of human physiology, pathology and the unanswered biomedical questions is achieved with a perspective on cell biology and the structure and function of the genome and macromolecules. Laboratory rotations, summer research, and specialized seminar series provide an opportunity for students to explore their own creative abilities, and to design and carry out basic research approaches in a variety of applied medical contexts. Specific instruction is provided in the areas of oral and written presentation of data and in grant writing. A number of outstanding elec-



tives enable students to personalize their program of study along the lines of their specialized interests.

This experience culminates in the selection of a research mentor and a thesis problem which will become the students' primary focus for the duration of their program of study. At the end of the second year, having completed formal coursework, students write a thesis research proposal in NIH grant format as a prerequisite to taking their oral qualifying examination.

After successfully completing this portion of their program, students enroll for full-time research and seminar credits for the duration of their program of study. The final element of the program is the defense and publication of the students' theses.

Students enroll in 16 credit hours of instruction or research per semester. Pathology grand rounds presentations and seminars by international scientists, the University's faculty, and fellow students provide a constant forum for learning new developments and theories and maintaining a sense of career perspective. The duration of each student's program of study will vary; however, it is anticipated that the average length of study will be four to five years.

General pathology for first-year medical students is part of an integrated course, Host Defense, that includes microbiology and immunology. It emphasizes basic pathological disease processes including cell death and injury, inflammation, cardiovascular disorders, and neoplasia. These are taught in relation to microbiological insult and inflammatory response and include morphological and molecular pathology.

The Department offers a year-out fellowship for second- or third-year medical students. The experience may range from clinical medicine to basic research, depending on individual interests.

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The Department is also responsible for the operation of Strong Memorial Hospital laboratories. The Laboratory Medicine Division accessions more than two million specimens each year, while the Anatomic Pathology Division performs about 400 autopsies, and examines 20,000 surgical specimens and 80,000 cytology specimens. Fully approved training programs for residents are offered in anatomic pathology, clinical pathology, combined anatomic/clinical pathology, and neuropathology. A fifth year of residency experience is available. Programs may be tailored to meet specific career objectives, including special emphasis on experimental pathology.

## Courses Offered by the Department of Pathology and Laboratory Medicine

### 495. M.S. Research

Credit—to be arranged

Prerequisite: completion of first two years of medical school or equivalent

The research programs of the medical student fellows are usually directed toward the solution of some problem pertinent to experimental pathology.

### 504. Current Topics in Experimental Pathology

Credit—two hours

Prerequisite: permission of the instructor

Associate Professor Mooney

This course introduces students to the diverse experimental and intellectual approaches to studying disease processes in a seminar format. Investigators from both outside and within the University present their current research into the pathogenesis of a broad spectrum of human diseases. In addition to attending weekly seminars, students gain valuable experience in making oral presentations during weekly class sessions; students present previews of seminar speakers' research areas; and students have the opportunity to present their own research work to the class.

### 505. General Pathology

Credit—four hours

Prerequisite: biochemistry, e.g., IND 408 or equivalent, a course in mammalian physiology, or permission of the instructor

Associate Professor Baggs

A course for graduate students with primary interests in biomedical fields who are seeking a background in basic principles of mammalian pathology. The first three weeks are devoted to a survey of histology. Afterwards, the following topics are studied: cell and tissue injury; edema, hemorrhage, shock; thrombosis, embolism, infarction; inflammation; introductory immunopathology; pathology of infectious diseases; neoplasia. The course is conducted by means of lectures, laboratory exercises, demonstrations, and discussions. The laboratory exercises consist of gross and

microscopic studies and discussions of lesions that illustrate the lecture material. Two three-hour sessions per week. Spring.

### 507. Cancer Biology

Credit—two hours

Professor Chang

The course objective is to introduce the basic and clinical aspects of cancer. The emphasis is on cancer endocrinology, cancer immunology, radiation biology, cancer therapy, tumor oncogenes and growth regulation, and cancer genetics. The principles involve molecular endocrinology, cell cycle and cell subpopulation analysis, chromosomal aberrations, molecular biology of oncogene/antioncogene, control of DNA replication and transcription, signal transduction, cancer vaccines, chemotherapy and radiation therapy, and techniques currently in use as research and diagnostic tools. Fifteen lectures (90 minutes/lecture) are offered every fall semester. One essay/grant proposal on any topic covered during the semester and one final examination are required.

### 593. Molecular Mechanisms of Human Disease

Credit—four hours

Prerequisite: permission of instructor

Assistant Professor Schwarz

The focus is to cover our current knowledge of the underlying cellular processes and molecular events that cause human disease. The first semester consists of a series of lectures by the faculty, who discuss the history, etiology, presentation, standards treatments, and outcomes for specific human disease (e.g., diabetes, osteoporosis, arthritis). A significant emphasis is placed on defining the limit of our understanding and the design of future experimentation which will lead to breakthrough discoveries and cures. The second semester is built around seminars where students choose a human disease and present background information using two to four current research articles exploring the molecular mechanism of the disease. A faculty member with expertise in the field is assigned as a discussant. Fall.

### 595. Ph.D. Research

Credit—to be arranged

Staff

Ph.D. research is done under the direction of a member of the staff.

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## Faculty of the Department of Pathology and Laboratory Medicine

**Steven Spitalnik**. . . *Professor of Pathology and Laboratory Medicine and Chair*. A.B. Princeton, 1974; M.D. Chicago, 1978. Intern and Assistant Resident in Pathology, Strong Memorial Hospital, 1978–80; Postdoctoral Genetics Fellowship, NIH, 1980–81; Chief Resident in Pathology, Strong Memorial Hospital, 1981–82; Instructor in Pathology, Strong Memorial Hospital, 1982–83; Biochemical Pharmacology Fellowship, NIH, 1983–85; Assistant Professor of Pathology and Laboratory Medicine, University of Pennsylvania, 1985–91; Associate Professor, 1991–96; Professor, 1996–98; Professor of Pathology and Laboratory Medicine, University of Rochester School of Medicine and Dentistry, 1998– ; Chair, 1998– .

### Professors

**Dean A. Arvan**. B.S. Wilkes-Barre College, 1955; M.D. Hahnemann, 1959.

**John M. Bennett**, and *Medicine* (Oncology). A.B. Harvard, 1955; M.D. Boston, 1959.

**Neil Blumberg**. B.S. Yale, 1970; M.D. 1975.

**Brendan Boyce**, and Orthopaedics. M.B. Ch.B. University of Glasgow (Scotland), 1972; M.R.C. Royal College of Pathologists (U.K.) 1979.

**Chawnshang Chang**. *George Hoyt Whipple Professor of Pathology and Laboratory Medicine*, and Oncology and Urology. B.S. National Taiwan University, 1978; Ph.D. Chicago, 1988.

**P. Anthony di Sant'Agnese**, and Oncology. B.A. Amherst, 1971; M.D. Columbia, 1975.

**Charles W. Francis**, and *Medicine*. B.A. Johns Hopkins, 1969; M.D. Pittsburgh, 1973.

**Robert C. Griggs**, and *Neurology*, and *Medicine*, and *Pediatrics*. B.A. Delaware, 1960; M.D. University of Pennsylvania, 1964.

**Tai C. Kwong**. B.Sc. McMaster, 1969; Ph.D. Toronto, 1973.

**Lowell W. Lapham**, Emeritus. A.B. Oberlin, 1943; M.D. Harvard, 1948.

**Marilyn A. Menegus**, and *Microbiology and Immunology*, and *Pediatrics*. B.S. College of St. Elizabeth, 1965; Ph.D. Cornell, 1972.

**Edward M. Messing**, and *Urology* and *Oncology*. A.B. Chicago, 1968; M.D. New York, 1972.

**Moon H. Nahm**, and *Pediatrics*, *Medicine*, *Microbiology* and *Immunology*, and *Oncology*. A.B. Washington University, 1970; M.D. 1974.

**J. Lowell Orbison**, Emeritus, and Dean Emeritus. A.B. Ottawa, 1937; M.S. Michigan State, 1939; M.D. Northwestern, 1944.

**Bernard J. Panner**, Emeritus. A.B. Case Western, 1949; M.D. 1953.

**David P. Penney**, and *Oncology*, Emeritus. A.B. Eastern Nazarene, 1956; M.A. Boston, 1957; Ph.D. 1962.

**Carl Pinkert**. B.S. Colorado State, 1975; M.S. Southern Illinois, 1977; Ph.D. Georgia, 1983.

**James M. Powers**, and *Neurology*. B.S. Manhattan College, 1965; M.D. Medical University of Southern Carolina, 1969.

**Goetz W. Richter**, Emeritus. B.A. Williams, 1943; M.D. Johns Hopkins, 1948.

**Daniel H. Ryan**. B.S. Notre Dame, 1971; M.D. Johns Hopkins, 1975.

**Charles E. Sparks**. B.S. Massachusetts Institute of Technology, 1963; M.D. Jefferson, 1968.

**Nancy Wang**, and *Pediatrics*, and *Genetics*. B.S. Taiwan, 1966; M.S. Minnesota, 1968; Ph.D. 1978.

**Leon L. Wheeless, Jr.**, Emeritus. B.S. Massachusetts Institute of Technology, 1958; M.S. Rochester, 1962; Ph.D. 1965.

### Clinical Professors

**Thomas A. Bonfiglio**. B.S. St. John Fisher, 1964; M.D. Rochester, 1969.

**Theodor Mayer**. B.S. Cornell, 1964; M.D. Northwestern, 1975; Ph.D. 1980.

**Steven S. Searl**, and *Ophthalmology*. B.A. Amherst, 1967; M.D. Columbia, 1972.

### Adjunct Professor

**Reid Heffner**. B.A. New York University, 1961; M.D. Yale, 1965.

### Associate Professors

**Raymond B. Baggs**, and *Laboratory Animal Medicine*, and *Environmental Medicine*. B.A. Reed, 1964; B.S. Washington State, 1965; D.V.M. University of California (Davis), 1969; Ph.D. Massachusetts Institute of Technology, 1972.

**James P. Corsetti**. B.S. Rhode Island, 1969; M.A. Harvard, 1971; Ph.D. 1980; M.D. Brown, 1982.

**Janet L. Dehoff-Sparks**. B.A., B.S. University of Pennsylvania, 1972; Ph.D. 1980.

**Patricia J. Simpson-Haidaris**, and *Medicine*, and *Microbiology* and *Immunology*. B.A. Indiana, 1973; M.S. Notre Dame, 1980; Ph.D. 1981.

**Dwight J. Hardy**, and *Microbiology and Immunology*. B.S. Southwestern Louisiana, 1973; M.S. Louisiana State, 1979; Ph.D. 1983.

**Scott A. Kirkley**. B.S. Syracuse, 1977; M.D. SUNY (Upstate), 1981.

**Leon A. Metlay**. B.A. Swarthmore, 1973; M.D. Pittsburgh, 1977.

**Robert A. Mooney**. B.S. Rensselaer, 1971; M.A. Johns Hopkins, 1973; Ph.D. 1980.

**Tibor Nadasdy**. M.D. Medical University of Szeged (Hungary), 1981; Ph.D. 1991.

**Eric Richfield**, and *Neurology*. B.S. Wisconsin, 1975; M.D., 1980.

**Charlotte K. Ryan**. B.A. Hofstra, 1971; M.D. Johns Hopkins, 1975.

**Glynis A. Scott**, and *Dermatology*, and *Pediatrics*. M.D. Albany Medical, 1983.

**Harold C. Smith**, and *Oncology*, and *Biochemistry and Biophysics*. B.S. Purdue, 1975; M.S. 1978; M.A. SUNY (Buffalo), 1980; Ph.D. 1982.

**Rabi Tawil**, and *Neurology*. B.S. Emory, 1979; M.S. American University of Beirut (Lebanon), 1981; M.D. 1985.

**Lisa Teot**. B.A. Williams, 1982; M.D. George Washington, 1986.

### Research Associate Professor

**Paul R. Reynolds**. B.S. Rensselaer Polytechnic Institute, 1973; Ph.D. Virginia, 1980.

### Clinical Associate Professors

**Bruce S. Brown**. B.A. Syracuse, 1959; M.D. Rochester, 1963.

**John W. Burch**. B.S. University of Michigan, 1967; M.D. Harvard, 1971.

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**John P. D'Souza.** M.B.Ch.B. Makerere University (Uganda), 1966.  
**Nicholas T. Forbes.** M.B.Ch.B. University of Capetown, 1972.  
**William Allen Fricke.** A.B. Washington University, 1971; M.D. 1979.  
**David G. Hicks,** and Orthopaedics. B.A. Canisius, 1979; M.D. Rochester, 1984.  
**Chi Whan Kim.** M.D. Yonsei University College (Korea), 1965; M.S. 1967; D.Sc. 1971.  
**David C. Wilbur.** B.A. Johns Hopkins, 1975; M.D. Rochester, 1980.

#### **Assistant Professors**

**Lois Arend.** B.S. Michigan State, 1981; Ph.D. 1987; M.D. 1992.  
**Gerard Domanowski,** and Dentistry and Surgery (Otolaryngology). A.B. Hunter, 1976; M.D. SUNY (Downstate), 1983.  
**Raymond E. Felgar.** B.S. Pennsylvania, 1985; Ph.D. Pittsburgh, 1990; M.D. 1992.  
**Fadi Hatem.** M.D. St. Joseph University (Lebanon), 1986.  
**Jiaoti Huang.** M.D. Anhui Medical University (China), 1983; Ph.D. New York University, 1991.  
**Philip Katzman.** B.A. Brandeis, 1985; M.D. Vermont, 1992.  
**Zhi-Wei Ma.** M.D. Shanghai (China), 1984; Ph.D. Mt. Sinai, 1994.  
**Linda McHugh.** B.S. Rochester, 1988; M.D. Albany, 1992.  
**Ming Qi.** M.D./Ph.D. Shanghai Second Medical, 1995.

#### **Research Assistant Professors**

**Dong K. Lee.** B.S., Seoul University (Korea), 1982; M.D., 1984; Ph.D. Wyoming, 1990.  
**Jay E. Reeder,** and Urology. B.A. SUNY (Binghamton), 1980; M.S. Rochester, 1992; Ph.D. 1997.  
**Boguslaw Wojczyk.** M.Sc. Jagiellonian (Poland), 1982; Ph.D. 1990.  
**Guan Wu,** and *Urology* and *Oncology*. M.D. Beijing (China), 1983; Ph.D. 1989.  
**Lianping Xing.** M.D. Fourth Military Medical University (China), 1977; M.S. 1985; Ph.D. Pennsylvania State, 1994.

#### **Clinical Assistant Professors**

**Eduardo E. Avila.** B.S. University of Puerto Rico, 1973; M.D. 1977.  
**Jeanne M. Beno.** B.A. Cornell, 1974; M.S. Rochester, 1977; Ph.D. 1981.  
**\*Mark Berenson.** M.D. Chernovtsy State Medical Institute (Ukraine), 1972.  
**Stewart F. Cramer.** A.B. Cornell, 1969; M.D. Washington University, 1973.  
**\*Joseph R. Eastman.** A.B. Indiana, 1979; M.D. 1984.  
**David C. Hohnadel.** B.S. Antioch, 1963; Ph.D. Case Western, 1970.  
**JoAnn S. Janas.** B.A. Mount Holyoke, 1968; M.D. Rochester, 1974.  
**Walter Markowitch, Jr.,** and *Dermatology*. A.B. University of Pennsylvania, 1966; M.D. Rochester, 1971.  
**Dawn K. Riedy.** B.A. Stanford, 1979; M.D. Rochester, 1984.  
**Ana Rubio,** and *Neurology*. M.D. University of Navarra (Spain), 1980; Ph.D. 1990.  
**Lucy A. Sheils.** A.B. Harvard, 1984; M.D. Vanderbilt, 1989.  
**Sarah S. Singal.** B.A. Wellesley, 1968; M.D. Duke, 1972.  
**Thomas D. Smith.** B.S. Pittsburgh, 1964; M.D. New York University, 1969.

#### **Associates**

**Karen L. Jensen,** part-time, and *Ophthalmology*, part-time. B.S. Rochester, 1982; M.S. 1984.  
**Gyongyi Nadasdy.** M.D. Medical University of Szeged (Hungary), 1980.

#### **Senior Instructor**

**Patrice F. Spitalnik,** and *Neurobiology and Anatomy*. B.A. Skidmore, 1974; M.D. Pritzker, 1978.

#### **Clinical Instructors**

**Cholpady P. Kamath.** M.B.B.S. Jawaharlal Institute (India), 1970.  
**Michael K. Schvimer.** B.S. Pennsylvania, 1981; M.D. Tel Aviv (Israel), 1990.

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\*Geographic Full-Time.