



**SCHOOL OF MEDICINE**

# School of Medicine

Dean: Norman H. Edelman

Vice Deans: Craig C. Malbon, scientific affairs; Peter C. Williams, academic affairs and faculty development

Associate Deans: Thomas Biancaniello, medical affairs; Jack Fuhrer, admissions; Frederick M. Schiavone, medical education; Aldustus Jordan, student and minority affairs; Michael L. Rainey, academic advising; Dorothy S. Lane, continuing medical education; Derinda Pell, administration and finance.

Associate Deans for clinical affiliations: John F. Aloia, Winthrop University Hospital; Edward J.C. Mack, Veterans Affairs Medical Center at Northport; Michael Mastow, Nassau University Medical Center.

Assistant Dean: Grace Agnetti, Marilyn London

Executive Assistant to the Dean: Barbara E. Katz

Assistants to the Dean: Mary Jean Allen, Marilyn DuBritz, Burke Kincaid, Marilyn London, Judy Lum, John Riley

The School of Medicine consists of basic science and clinical departments that have the responsibility for pre-clinical and clinical instruction of students in all the schools of the Health Sciences Center as well as university-wide responsibility to students in other schools on the campus. Basic science departments include the departments of anatomical sciences, biochemistry and cell biology, biomedical engineering, microbiology, neurobiology and behavior, pathology, pharmacological sciences, and physiology and biophysics. Clinical departments include the departments of anesthesiology, dermatology, emergency medicine, family medicine, medicine, neurological surgery, neurology, obstetrics, gynecology and reproductive medicine, ophthalmology, orthopaedics, pediatrics, physical medicine and rehabilitation, preventive medicine, psychiatry and behavioral science, radiation oncology, radiology, surgery, and urology.

In addition to instruction at the undergraduate and professional levels, these departments have major responsibility for graduate, postgraduate, and continuing education. The goal of each of these departments is to:

- 1) integrate as rapidly as possible new scientific knowledge and the advances of basic research into the training of every health professional
- 2) promote input from all university disciplines into education and research in the health sciences
- 3) ensure that every healthcare professional trained in the school is prepared to provide the highest level of patient care. In the basic sciences, these efforts are enhanced by collaboration with colleagues at the biology and medical departments of the Brookhaven National Laboratory, the Cold Spring Harbor Laboratory, and other research institutions in the vicinity. In the clinical departments, these objectives are enhanced by the Medical Center of

the University at Stony Brook as well as by the clinical affiliates of the Nassau University Medical Center, Winthrop University Hospital, the Northport Veterans Affairs Medical Center, and various community clinical facilities integrated under a variety of arrangements.

## Admission to the MD Program

The Medical College Admission Test (MCAT) must be taken no later than the year prior to the year for which the student seeks admission. By law, applicants must have completed a minimum of two years of college before matriculation; however, medical school admissions committees favor applicants with more complete educational preparation. Premedical course requirements include one year each of biology, physics, inorganic chemistry and organic chemistry (all with lab), and one year of English. A basic course in biochemistry is helpful in preparing students for the first year of medical school; however, it is neither a requirement nor a criterion for admission.

The school hopes to acquire a student body representative of a variety of backgrounds, experiences, and interests. The school examines rigorously the preparation and promise for creative work in medicine of all applicants, and asks to meet personally with those in whom it is most seriously interested. Although it is desired that many backgrounds are represented in the student body, the school does not attempt to maintain a quota to fill any one "category" of student. It does, however, want to make clear its commitment to seek a significant representation in its student body from groups who have long remained under-represented in medicine.

Grades, MCAT scores, letters of evaluation, extracurricular and work experiences are carefully and personally examined. Motivational and personal characteristics, as indicated in an individual's application, letters of evaluation, and a personal interview, are also a major part of the admissions assessment\*. Decisions will be influenced by an applicant's scholarship, aptitude, character, personal qualities, and promise of future value to society through the medical profession. There is no discrimination in the admissions review and selection process on the basis of sex, race, religion, national origin, age, marital status, or disability. Residents of New York State constitute the majority of the applicant pool and a great majority of the entrants; however, applications for the MD/PhD program are encouraged from both in-state and out-of-state applicants and from under-represented minorities.

All questions concerning admission should be addressed to:

Office of Admissions, School of Medicine  
Health Science Center, Room 046, Level 4  
Stony Brook University  
Stony Brook, NY 11794-8434.  
Telephone: (631) 444-2113

Applications are available through the American Medical Colleges Application Service (AMCAS).

\*The submission of false or misleading information in the application materials or in connection with the application process shall be grounds for rejection. If such submission is discovered after the rendering of an offer of admission, matriculation in the school, or award of the degree, it shall be grounds for withdrawal of the acceptance offer, for dismissal, or for revocation of degree.

### **Technical Standards for Admission and Retention**

The MD degree is, and must remain, a broad undifferentiated degree attesting to the mastery of general knowledge in all fields requisite for entry into graduate medical education programs (residencies) of diverse types. It follows that graduates must possess the essential knowledge and skills to function in a broad variety of clinical situations, and to render a wide spectrum of patient care in a safe and effective manner.

The School of Medicine faculty has, therefore, specified non-academic criteria, Technical Standards for Admission and Retention, which all applicants/medical students are expected to meet in order to participate in the medical education programs. These criteria include the following five categories: 1) observation; 2) communication; 3) motor skills; 4) intellectual-conceptual, integrative and quantitative abilities; and 5) behavioral and social attributes. A copy of the Technical Standards may be obtained from the Admissions Office.

### **Grading Policy**

The School of Medicine does not assign specific credits to medical student courses. Students must complete the entire curriculum successfully to graduate. Students are graded H (Honors), P (Pass), or F (Fail). Other grades used are I (Incomplete), an interim grade that must be resolved before the beginning of the next academic year; and W (Withdrawal). Although the official transcript lists only the grades above, our internal records list high pass (HP) and low pass (LP) as well.

### **Alpha Omega Alpha**

A chapter of Alpha Omega Alpha, the national honor medical society, was established at the School of Medicine in 1985. The society's purpose is to recognize and perpetuate excellence in the medical profession. Each year member chapters elect outstanding medical students, graduates, faculty and honorary members to its ranks.

### **MD Curriculum**

The MD curriculum in the school is a series of courses offered by individual departments or integrated units that are planned and taught in an interdisciplinary manner by faculty from many departments.

The first year curriculum consists of basic science courses and introductory courses related to patient care. Basic Science courses include: Molecules, Genes and Cells; The Body; Neurosciences; Nutrition; Medical Physiology; and Pathology. Other required courses are Medicine in Contemporary Society, a course that spans all four years and contains components of Social Issues in Medicine, Ethics, Law, and Health Economics; Preventive Medicine, Introduction to Human Behavior; Basic Life Support, including Cardiopulmonary Resuscitation (CPR) leading to certification in CPR; and Introduction to Clinical Medicine, a two-part course, spanning the latter half of both the first and second years, which introduces history taking and physical examination skills.

The second-year curriculum contains the study of organ pathophysiology in the Systems Approach to Medicine course. This course consists of integrated presentations of basic and clinical science. It includes coverage of neurosciences, blood, cardiovascular, endocrine, gastrointestinal, connective tissue, renal, reproductive, and respiratory systems. In addition, Pharmacology and Microbiology courses are included in the second-year curriculum. The Introduction to Clinical Medicine course, in the second year, fosters development of patient interview, examination and correlative skills as the student acquires additional knowledge of physiology, pathology, and the natural history of diseases with the systems course.

The third-year curriculum consists of a twelve-week clerk-

ship in medicine; eight-week clerkships in pediatrics and surgery; six-week clerkships in obstetrics-gynecology, and family medicine; a four-week clerkship in psychiatry and two-week clerkships in radiology and emergency medicine.

The fourth-year curriculum consists of the following requirements:

1. A one month subinternship (medicine, family medicine, pediatric or general surgery)
2. A one-month didactic course (emergency medicine, laboratory medicine, clinical therapeutics or surgical anatomy)
3. A Medicine in Contemporary Society requirement
4. A one-month neurology experience
5. A two-week experience in Psychiatry in Medicine
6. A one-month experience in Surgical Selectives
7. Students must complete three (3) and one half months of electives

During the four years, a student's acquisition of clinical and laboratory skills necessitates attendance and demonstration of competence at patient-contact exercises and laboratories. Passing USMLE Step 1 and Step 2 is required for promotion and graduation.

### **MD/PhD Program**

The MD/PhD program normally requires six to eight years to complete. During the first two years, the MD/PhD curriculum closely follows the MD curriculum, with the addition of basic science tutorials during the first year, and two summers of laboratory research. The next two to four years are spent completing the requirements for the PhD in a basic science. To be awarded the PhD degree, the student must satisfy the Graduate School and Basic Health Science Graduate Studies requirements. At the conclusion of the research period, MD/PhD candidates complete medical school clerkships, selectives and electives required for the awarding of the MD degree.

### **MD With Recognition in Research Program**

Students must complete six months of research during medical school and present their results at a student research seminar in their senior year.

### **MD With Recognition in Medical Humanities**

This program is structured within the four-year medical school framework. During medical school, students in this program complete six months of scholarly activity with the faculty of the Institute for Medicine in Contemporary Society.

### **Scholars for Medicine (BA/MD Program)**

Scholars for Medicine will earn a BA/MD degree with four years of undergraduate course work and four years of medical school. All Scholars of Medicine will be individually counseled on their careers throughout their participation in the program. Benefits include full or partial scholarship funds, help in finding laboratory placements for undergraduate research projects, regular advising from both the Honors College Master and the Premedical Advisor, opportunities to meet faculty in the School of Medicine, seminar participation with invited guest speakers in the Scholars for Medicine Lecture Series, and support and encouragement in the exploration of undergraduate and career opportunities.

Scholars for Medicine positions will be available to select entering freshmen who have been accepted to the Honors College Program. Eligibility criteria are: nomination of high school

seniors by the Honors College; 1350 or above on the SATs; maturity; evidence of social commitment; evidence of interest in science; high moral character; breadth of interests and strong communication skills.

All acceptances to the Scholars of Medicine Program (BA/MD Program) are conditional. Of critical importance will be an ongoing assessment of the candidate's maturity, academic ability and his/her motivation and readiness to pursue a medical education. Scholars must continue to present exemplary academic accomplishments and those personal characteristics that exemplify a Scholar for Medicine. Students must accrue a GPA of 3.4 during the first three undergraduate years. All scholars will be required to take the MCAT no later than spring of their junior year in college. Students need to attain cumulative MCAT scores comparable to the national average of matriculants to medical school. All scholars must attend Scholars for Medicine lectures and seminars, and prepare assignments as required.

Scholars for Medicine accepted into the BA/MD program before matriculating at Stony Brook will have a place reserved in Stony Brook Medical School contingent upon the above criteria. Final acceptance will be placed on the ongoing evaluations by program advisors, letters of evaluation, MCAT performance, and an interview with the Committee on Admissions of the School of Medicine. All students in the BA/MD program must apply for early decision to Stony Brook School of Medicine.

### *Institute for Medicine in Contemporary Society*

The Institute for Medicine in Contemporary Society was established in 1990 at the School of Medicine to develop interdisciplinary programs that explore the relationship of medicine to other dimensions of contemporary culture. Philosophy, law, the arts, social sciences, literature, and religion all have significant roles to play in reflecting on the insights into ourselves which arise from studying the complex experience of being ill and caring for the ill. With a primary interest in connecting the schools of the Health Sciences Center, other departments of the university and the Long Island community, the Institute serves as a catalyst for discussion, educational experiment, and research in the multi-cultural environment of Stony Brook.

### *Academic Standing*

It is the intention of the School of Medicine to assure that students are adequately prepared, both for the practice of medicine and a life in medicine. Such assurance requires both an overall academic performance that goes beyond merely marginal and an unblemished record of professionalism.

Different courses have different requirements, but in all courses, grades are determined by course directors and reported to the Office of Office of Medical Education (OME) and the Committee on Academic Standing, the body charged with oversight of student progress. Students must complete all coursework in one year before proceeding to the next. Moreover, students must pass USMLE, Step 1 before continuing in the third year, and must pass Step 2 to graduate.

The Committee on Academic Standing also evaluates reports of professional misconduct and makes recommendations to the dean. The School of Medicine's policy is to ensure the integrity of its examination process, to promote ethical behavior in academic and clinical situations, and to develop in students a commitment to the integrity of the medical profession. Students have an obligation to refrain from any act that is designed to obtain for themselves or others academic credit, grades, or other recognition which is not properly earned. They also have an obligation to take an active role in ensuring that other students refrain from such acts. Each student therefore has the responsibility to prevent or report acts of academi-

ic dishonesty. There is a discussion of professionalism in the school's Policies and Procedures and students are evaluated for professionalism in their course work using a form that specifies elements of personal responsibility, cultural sensitivity, self-improvement, integrity and altruism. There is also a student honor code created by the students to which all medical students must adhere.

Violations of the student honor code are reviewed by a student committee which reports recommendations to the dean. In cases of academic difficulty or dishonesty, the student is offered an opportunity to appear before the Committee on Academic Standing. Decisions of this committee are reported to and may be appealed to the Dean of Medicine.

Students with learning or other disabilities will be evaluated by the University's Disability Support Services and, in discussion with the dean's office, appropriate accommodations made.

### *Graduate Studies in Basic Health Sciences*

Graduate studies leading to the PhD degree in basic health sciences are offered in the fields of anatomical sciences, molecular microbiology, cellular and molecular pathology, molecular and cellular pharmacology, or physiology and biophysics. The department of oral biology and pathology also offers a Master of Science degree in Basic Health Sciences.

Basic health sciences departments of the School of Medicine also collaborate with the Division of Biological Sciences and other academic units to operate graduate study programs in various areas of the biological sciences, such as molecular biology and biochemistry, cellular and developmental biology, genetics, and neurobiology and behavior.

Each graduate studies program is guided by its own director and executive committee and establishes its own entrance standards and degree requirements, described in detail in the Graduate Bulletin. Inquiries regarding graduate admission to a specific department should be addressed to the director of the department's graduate program. Please see the "Admissions Section" in this Bulletin for more information.

### *Financial Aid*

Inquiries concerning these and other sources of financial aid should be directed to the School of Medicine financial aid officer. For additional financial data, refer to the "Financial Assistance" section at the beginning of this Bulletin.

### *School of Medicine Chairs and Visiting Professorships*

#### *The Edmund D. Pellegrino Professorship of Medicine*

In 1986, the university established a professorship in the School of Medicine to honor Edmund D. Pellegrino, MD, founder of the Health Sciences Center. The endowment specifies that the Edmund D. Pellegrino Professorship of Medicine will be occupied by "an individual who exemplifies the breadth of interests and achievements in education, research, and the practice of medicine that have characterized Dr. Pellegrino's career." The first occupant of that chair was Dr. Pellegrino, who held it for a brief period. Following Dr. Pellegrino's tenure, the chair was occupied by Harry W. Fritts, MD, who is now the Pellegrino Professor Emeritus and former chairman of medicine at Stony Brook. Currently, Benjamin J. Luft MD, professor of medicine, occupies the chair.

#### *The Evelyn Glick Chair in Experimental Medicine*

In 1990, Mrs. Evelyn Grollman Glick of Baltimore, Maryland, created an endowment designed to support a Chair in the Department of Pharmacological Sciences. Income from this fund provides research or salary support for the Chair. The

current occupant of the chair is Arthur P. Grollman, MD, Leading Professor of Pharmacological Sciences and Professor of Medicine.

#### *The Marvin Kuschner Professorship of Pathology*

An endowed chair in the School of Medicine, The Marvin Kuschner Professorship of Pathology was established by the University in 1988 in honor of Marvin Kuschner, MD, dean emeritus of the School of Medicine at Stony Brook. The endowment specifies that the "Marvin Kuschner Professorship of Pathology will be occupied by an individual who exemplifies the breadth of interests and achievements in education, research and the practice of pathology and environmental medicine that have characterized Dr. Kuschner's career." Frederick Miller, MD, professor of pathology, currently occupies this chair.

#### *The Leo and Judy Zickler Visiting Professorship in Pharmacological Sciences*

A Visiting Professorship in Pharmacological Sciences was established in 1988 through a gift from Leo and Judy Zickler of Bethesda, Maryland. Under the terms of this endowment, a distinguished scientist is invited to spend up to five days at the University at Stony Brook, to engage in teaching and discussion with faculty and students. During the visit, the professor delivers a general lecture on a subject of his choice. Zickler Visiting Professors have included Daniel Nathans, Howard Temin, Gobind Khorana, Victor McKusick, Sydney Brenner, Leroy Hood, Dirk Boostma, Sir James Black, Alfred G. Gilman and Joseph L. Goldstein.

#### *Advancement*

The strength of the synergistic relationship between the schools of the Health Sciences Center and the Stony Brook University Hospital is the basis for a new approach being taken toward institutional advancement. The hallmarks of this approach are an emphasis on fundraising, marketing, and communicating with alumni, corporations, private foundations, and the community. The goal for the new office is to obtain philanthropic support that will enable the HSC and SBUH to continue their tradition of excellence in medical care, research, education, and community service.

In addition, the five schools of the Health Sciences are also reaching out to alumni like never before. The Stony Brook Alumni Association works to increase communication, encourage involvement, and expand services for alumni, while building support for the University. A volunteer Board of Directors governs the Stony Brook Alumni Association which represents the 110,000 alumni, including more than 15,000 alumni from the schools in the Health Sciences Center.

There are five alumni chapters in the Health Sciences Center – one for each of the schools. Each chapter has its own elected alumni board of directors, chapter membership, and hosts its own special events, besides participating at those that are university-wide, such as Homecoming and Alumni Weekend.

The alumni chapters strengthen the relationship between the graduates and the schools in the Health Sciences Center by providing ongoing support for alumni career development. In response, this relationship allows the alumni to participate in school and university affairs and to contribute to the financial strength of the university through donation, endowments, and participation at special fundraising events.

For more information about making a contribution to a school

in the Health Sciences Center or the Stony Brook University Hospital, please call 631.444.7916. For more information about alumni activities, please call 631.444.2988, or log onto the website <http://www.hscalumni.stonybrook.edu>.

#### *Grants and Awards*

##### *The Arthur Berken Fellowship*

Dr. Arthur Berken, a long-time member of the clinical faculty at the School of Medicine, always worried about the impact of technology on men and women in medical school. With the advances in diagnostics and treatment made possible through technology, he feared that young doctors might come to see their patients as little more than biochemical machines. And, so when Dr. Berken passed away in the late spring of 1994, his wife Roberta, his family and a number of friends and colleagues decided to endow a fellowship that would encourage would-be physicians to remember that, in the end, it is people who matter most. The Arthur Berken Fellowship has made possible a new addition to the School of Medicine's MD with Recognition Awards, an MD with Recognition in Medical Humanism.

##### *Sir James Black Award for Excellence in Research*

An endowment has been established with a gift from Sir James Black, FRS, Nobel Laureate in Physiology or Medicine, to provide an award to the graduating undergraduate pharmacology major who has achieved the highest scholastic excellence in both course work and a senior research project.

##### *The Catacosinos Cancer Awards*

Dr. and Mrs. William Catacosinos have generously donated funds for annual grants to support cancer research. The Catacosinos Cancer Award recognizes significant contributions to the illumination of the cancer problems of the past and anticipates major advances coming from these investigations. A committee of scientists, appointed by the Dean of Medicine, oversees these awards which are administered by the Stony Brook Foundation.

##### *Jean M. Devlin Achievement Award*

This endowment, created by generous gifts from Richard A. Auhll and Rudi R. Schulte of Santa Barbara, California, matched by the Department of Pharmacological Sciences, honors Jean M. Devlin, founding Director of Stony Brook's undergraduate program in pharmacology. The Jean M. Devlin Award is presented at commencement to the graduating pharmacology major judged to have the greatest potential for making future contributions to the pharmacological sciences.

##### *Radmila and Gabor Inke Anatomical Research Fund*

The Department of Anatomical Sciences at University Medical Center Stony Brook is the beneficiary of a generous testamentary gift from Dr. Gabor Inke. Dr. Inke became the Department's first member in 1969 and served the Medical Center for more than 20 years. Dr. Inke, a recognized expert on the development of the human skull as well as the kidney, dedicated his life to research and teaching. Upon his death the Radmila and Gabor Inke Anatomical Research Endowment Fund was created to support the research mission of the department that he helped to create.

##### *William G. Van der Kloot Awards*

An endowment has been established by Professor Robert Nathans and the Department of Pharmacological Sciences in honor of William G. Van der Kloot, PhD, Professor of Physiology and Pharmacological Sciences, and founding Chair of the

Department of Physiology. The endowment provides awards annually to two students in the molecular and cellular pharmacology graduate program. The Van der Kloot Teaching Award recognizes the most significant teaching contributions to the undergraduate major. The Van der Kloot Research Award recognizes outstanding accomplishments in research.

#### *Emil C. Voll Bequest*

A bequest of more than \$1.7 million from Emil C. Voll was made in 1992 to fund a professorship in cancer research in the School of Medicine. Mr. Voll's wife, Geraldine, died of cancer in 1987. Awards to four faculty investigators enable them to play a major leadership role in the school of Medicine's cancer program.

#### **Continuing Medical Education**

The educational mission of the medical school lies in three areas of physician education. These are the education of medical students, residency training and the continuing education of physicians. This is consonant with the philosophy that education is a continuing process throughout a professional career.

The School of Medicine's continuing education program is accredited by the Accreditation Council for Continuing Medical Education. Some 30,000 physician education hours are provided each year through sponsored and jointly sponsored programs. In addition to the programs prepared for presentation at the Health Sciences Center, faculty also present courses at community hospitals in the bi-county region.

#### **Department of Anatomical Sciences**

*Chair:* Jack T. Stern

*Professors:* Peter R. Brink (joint), Brigitte Demes, Leland H. Edmunds, Jr., John G. Fleagle, Frederick E. Grine (joint), Francoise Jouffroy (adjunct), David W. Krause, William L. Jungers, Susan G. Larson, Lawrence Martin (joint), Russell A. Mittermeier (adjunct), Clinton Rubin (joint), Jack T. Stern, Jr., Randall L. Susman, David L. Williamson, Emeritus

*Associate professors:* Diane Doran (joint), Catherine Forster, Callum Ross

*Assistant professors:* Maureen O'Leary, Scott Sampson (adjunct)

**Post Doctoral Associate:** Kristian Carlson

The department conducts graduate studies leading to the PhD. degree, through its own and interdisciplinary programs. It also provides instruction in the anatomical sciences for students in the Schools of Health Technology and Management, Dental Medicine, Medicine, and Nursing. In addition, the department participates in the teaching of undergraduates in biology, anthropology, and art.

#### **Courses**

##### **HBA 109 Life through Time**

An examination of biodiversity as presented in the fossil record and how it contributes to the understanding of evolution. Species examined include invertebrates, plants, dinosaurs, paleontology, phylogeny reconstruction, and conservation will be discussed.

*3 Credits, Fall, Dr. O'Leary*

##### **HBA 360 Regional Human Anatomy**

An introduction to gross structure of the human head, neck and trunk. Includes neuroanatomy. Lectures and laboratory dissections.

*Prerequisite:* Permission of instructor for non-Health Sciences students.

*Variable credits, 1-2 per term, fall term, staff*

##### **HBA 393, 394 Special Topics from the Anatomical Sciences Literature**

Tutorial readings in anatomical sciences with periodic conferences, reports and examinations arranged with the instructor. Open to junior or senior students.

*Prerequisite:* Permission of instructor.

*Variable credits, 1-2 per term, fall and spring terms, staff*

##### **HBA 398, 399 Research Projects in Anatomical Sciences**

An independent research project under faculty supervision emphasizes the principles of experimental design, data collection, evaluation of findings, and reporting of results. Project report required. May be repeated.

*Prerequisites:* Laboratory experience and permission of instructor.

*2-4 credits per term, fall and spring terms, staff*

##### **HBA 461 Regional Human Anatomy**

An overview of the gross anatomy of the human body. Studies the limbs in an extra period. Includes neuroanatomy. Lectures and laboratory dissections.

*Prerequisite:* Permission of instructor for non-Health Sciences students.

*5 credits, summer modules, Dr. Demes*

##### **HBA 521 Gross Anatomy of Head, Neck and Trunk**

Tutorial laboratories. Emphasizes dissections of the human head, neck and trunk.

*Prerequisite:* Permission of instructor.

*4 credits, fall modules, Dr. Krause*

##### **HBA 522 Human Embryology for Dental Students**

The development of human structure with emphasis on normal adult anatomy and the more common congenital anomalies, particularly those of the head and neck. Covers the events of early embryonic formation and subsequent organogenesis, excluding that of the urogenitalsystem.

*Prerequisite:* HBA521

*1 credit, fall term, Dr. Krause*

##### **HBA 531 The Body**

A lecture and laboratory with emphasis on dissection of the entire human body. Includes functional and topographic anatomy, embryology, clinical correlations and an introduction to radiology.

*Prerequisite:* Permission of instructor.

*8 credits, fall modules, Dr. Stern*

##### **HBA 536 Biological Clocks**

Considers the temporal dimension of biological organization and of periodic phenomena that are a basic property of living systems. Topics include a survey of circadian rhythms; influence of light, temperature and chemicals; use of the clock for adaptation to diurnal, tidal and lunar cycles, for direction-finding (homing and orientation) and for day-length measurement (photoperiodism); chronopathology and chronopharmacology; aging and life cycle clocks; possible molecular mechanisms of the clock. Cross-listed with BCD 536.

*Prerequisite:* Permission of instructor.

*3 credits, spring term, Dr. Edmunds*

##### **HBA 537 Physiology and Biochemistry of the Cell Cycle**

An integrated view of the cell developmental cycle in prokaryotes and eukaryotes. Topics include cell cycle anatomy; measurements on fixed and living cells; kinetics of cell population growth; theory and methodology of batch, synchronized and continuous cultures; general patterns of nucleic acid synthesis; regulation of enzyme activity during the cell cycle; temporal control of gene expression; development and function of cellular organelles during the cell cycle; and the control of cell division. Cross-listed with BCD 537.

*Prerequisite:* Permission of instructor.

*3 credits, fall term, Dr. Edmunds*

##### **HBA 541 Evolutionary Anatomy**

A lecture and laboratory with emphasis on dissection of the entire human body. Includes functional and comparative anatomy with special emphasis on the musculoskeletal morphology of humans and higher primates.

*Prerequisite:* Permission of instructor

*8 credits, fall term, Dr. Jungers*

**HBA 550 Vertebrate Paleontology**  
Survey of the fossil record of vertebrate evolution. The course emphasizes the origin, phylogeny, comparative and functional morphology, biogeography, and paleontology of vertebrate animals. Laboratory included. The lectures and laboratories will utilize an extensive collection of comparative anatomical material, fossil casts, and slides.

*Prerequisite:* Previous course in human or vertebrate anatomy and permission of instructor.

*4 credits, spring term, alternate years, ABCF grading*

**HBA 560 Advanced Regional Anatomy**  
Advanced human gross anatomy for graduate students or advanced undergraduates in biology, anthropology and other life sciences.

*Prerequisite:* Permission of instructor.

*Variable credits, 3-8 per term, spring term, Dr. Fleagle*

**HBA 563 Aspects of Animal Mechanics**

An introduction to biomechanics. Covers free-body mechanics and kinetics as applied to vertebrate locomotion. Also covers scaling, stress and strain, and muscle physiology as these topics relate to adaptations of the musculoskeletal system.

*Prerequisite:* Introductory physics and biology or permission of instructor.  
*2 credits, spring term, alternate (odd) years, Drs. Stern, Jungers and Demes*

**HBA 564 Primate Evolution**

The taxonomic relationships of the primates and evolutionary history as documented by the fossil record and structural and chemical evidence. Emphasizes primates prior to the origin of the human lineage. Laboratory included. Open to senior undergraduates.

*Prerequisite:* Permission of instructor.

*4 credits, spring term, alternate years, Dr. Fleagle*

**HBA 565 Human Evolution**

Surveys the fossil record of human evolution from the later Tertiary through the Pleistocene with emphasis on the record of morphological evolution including evolution of the skull, teeth and limbs. Includes the ape-human furcation, radiation of the early hominids, the evolution of Homo Erectus, Neanderthal man, later human ancestors, the evolution of the brain and intelligence, bipedalism and other morphological complexes. Utilization of comparative anatomical material, fossil casts, and slide collection. Cross-listed with ANT 565.

*Prerequisite:* Permission of instructor.

*4 credits, fall term, alternate years, Dr. Grine*

**HBA 566 Studies in Functional Morphology**

Introduces the theory and methods of functional morphology. Covers various methods of analysis and the application of experimental techniques such as electromyography or bone strain analysis as they pertain to the understanding of the interaction between form and function. Emphasizes the analysis of human and non-human primate morphology, and its application to the interpretation of fossil evidence for human and non-human primate evolution.

*Prerequisite:* Permission of instructor

*2 credits, spring term, alternate (even) years, Dr. Larson*

**HBA 580 Comparative Anatomy and Evolution of Mammals**

The comparative anatomy, evolutionary history and radiation of fossil and living mammals. A major research project on any aspect of mammalian comparative anatomy is required. Supplemented by lectures on the evolutionary history and radiation of mammals. Comparative osteological and fossil cast collections will be utilized. Lecture series can be taken separately as HBA 581.

*Prerequisites:* Previous course in human or vertebrate anatomy and permission of instructor.

*4 credits, spring term, alternate years, Dr. Krause*

**HBA 581 Evolution of Mammals**

The evolutionary history and radiation of mammals from the Mesozoic to the present from a paleontological and anatomical perspective. Emphasizes the origin of mammals and the origin, evolution and anatomical diversity of modern and extinct orders of mammals.

*Prerequisites:* Previous course in human or vertebrate anatomy and permission of instructor

*2 credits, spring term, alternate years, Dr. Krause*

**HBA 582 Comparative Anatomy of Primates**

Laboratory dissection that emphasizes relating structural diversity to behavior and biometrics.

*Prerequisites:* HBA 564 and previous course in human or vertebrate anatomy and permission of instructor.

*4 credits, alternate spring term, Dr. Fleagle*

**HBA 590 Projects in Anatomical Sciences**

Individual laboratory projects closely supervised by faculty members to be carried out in staff research laboratories.

*Prerequisite:* Permission of instructor.

*1-6 credits per term, fall and spring terms, staff*

**HBA 690 Graduate Seminar**

Seminars by graduate students on current literature in the areas of the anatomical sciences.

*Prerequisite:* Permission of instructor.

*1 credit, fall and spring terms, staff*

**HBA 692 Advanced Topics in Anatomical Sciences Literature**

Tutorial readings in anatomical sciences with periodic conferences, reports and examinations arranged with the instructor.

*Prerequisite:* Permission of instructor.

*Variable and repetitive credits, 1-2 per term, fall and spring terms, staff*

**HBA 695 Practicum in Teaching**

Practical instruction in the teaching of anatomical sciences carried out under faculty supervision.

*Prerequisite:* Permission of instructor.

*Variable and repetitive credits, 1-4 per term, fall and spring terms, staff*

**HBA 699 Dissertation Research**

Original investigation under supervision of thesis adviser and committee.

*Prerequisite:* Permission of thesis adviser.

*Variable and repetitive credits, 1-9 per term, fall and spring terms, staff*

**HBA 800 Full-Time Summer Research**

Full-time laboratory research projects supervised by staff members.

*Prerequisite:* Permission of instructor and full-time graduate student status.

*0 credit, summer term, staff*

## Department of Anesthesiology

*Chair:* Peter S. Glass

*Professors:* Helene Benveniste, Peter S. Glass, Robert I. Katz, Ira Rampil, Stephen A. Vitkun

*Associate professors:* W.W. Backus, James P. Dilger, F. Barry Florence, John S. Gage, Maria L. G. Lagade, Farrokh R. Maneksha, Bharathi H. Scott, Mario J. Rebecchi, Kenneth Rosenfeld, Ellen Steinberg

**Assistant professors:** Rishimani S. Adsumelli, Carole W. Agin, Nelson, Barcelone, Lauren H. Fleischer, Abdel A. Graber, Xiaojun Guo, Anthony Ippolito, Ronald C. Jasiewicz, Roseline Jerome, Ursula Landman, Josette Legaspi-Tamayo, Bo Liu, Irina Lokshina, Daryn Moller, S. Peter Oleszak, Srinivas Pentylala, John A. Petrie, Martin Redmond, Laura J. Reid, Eleanor Romano, Mihai Sadean, Tracie A. Saunders, Joy E. Schabel, Francis Stellaccio, Syed Y. Shah, Andrea K. Voutsas, Paul Willoughby

The department of anesthesiology provides instruction in the clinical science of the specialty, and the physiology, pharmacology, and biochemistry on which it is founded. Emphasis is placed upon the integration of basic and clinical sciences and upon an interdisciplinary approach to attain optimal care of

patients. Instruction is provided to medical and dental students in the second year of training and during their clinical clerkship. All students rotate through anesthesiology for two weeks during their surgery selective month. Those students interested in more advanced training are encouraged to apply for a third year elective or a fourth year sub-internship, during which they will be exposed to all aspects of clinical anesthesia management of surgical and obstetrical patients. They will administer anesthesia under supervision, participate in pre- and post-operative care, and become familiar with specialized aspects, such as intensive care, cardio-pulmonary resuscitation, cardiac and neurosurgical anesthesia, perinatal medicine, and the therapy of acute and chronic pain. Participation in ongoing clinical research projects and all teaching exercises is encouraged.

In its graduate program, the department provides a three-year training program of residents specializing in anesthesiology, following completion of a basic first year of postgraduate training. It offers clinical electives of two- to twelve-month duration to medical and dental house officers in other specialties.

Fellowships in subspecialties and clinical research are available to physicians who have completed the requirements toward specialization.

## Department of Biochemistry and Cell Biology

Chair: William J. Lennarz

Professors: Bernard S. Dudock, Peter Gergen, Masayori Inouye, (adjunct), William Lennarz, Erwin London, Kenneth Marcu, Nisson Schechter, Jakob H. Schmidt, Richard Setlow (adjunct), Sanford R. Simon, Steven Smith, Rolf Sternglanz, F. William Studier (adjunct)

Associate professors: Paul Bingham, Deborah Brown, Vitaly Citovsky, Neta Dean, Nancy Hollingsworth, Dale Deutsch, Robert Haltiwanger, Bernadette Holdener, Harvard Lyman, Gerald Thomsen

Assistant professors: Jen-Chih Hsieh, Aaron Neiman, A. Wali Karzai, Hermann Schindelin

This department offers fundamental courses in biochemistry and cell biology to students in the health professions, as well as to undergraduates and graduates in biochemistry and biology. Its graduate studies are centered on an interdisciplinary program in molecular biology, biochemistry and cell biology, and also a graduate program in structural biology.

### Courses

Refer to the Undergraduate Bulletin (Biological Sciences Section) for a complete listing of undergraduate course offerings.

#### HBC 331 Introductory Biochemistry

An introduction to biochemistry including all aspects of metabolism and the synthesis, structure, and function of DNA, RNA, and protein stresses the medical significance of these aspects of biochemistry.  
3 credits, fall modules, Dr. Schechter

#### HBC 531 Molecules, Genes and Cells

An integrated course covering the important aspects of biochemistry, cell biology, human and molecular genetics, and histology. Includes lectures, small group conferences and laboratories and stresses the clinical relevance of the basic science material.  
8 credits, fall term, Dr. Simon

#### MCB 529 Organelle Development

Covers the development of the mitochondrion and the chloroplast. Includes the biogenesis of these organelles and their relation to the interaction with the nucleus. Emphasizes genetic and biochemical analysis.  
3 credits, fall term, alternate years, Dr. Lyman

#### MCB 656 Cell Biology

Introduces the structural and functional organization of cells and tissues and the way structure relates to function. Emphasizes cell organelle structure and function in specialized cells in tissues. The organization and interaction of cells in tissues also covered. The course is comparative and includes examples of tissues from vertebrates, invertebrates, and plant prokaryotic systems. Cross-listed with HBA 656.  
4 credits, spring term, Dr. Lyman

#### MCB 657 Principles of Development

Covers developing systems at all levels from the morphological to the molecular. Illustrative material from both animal and plant kingdoms are used. Special attention given to gametogenesis, genetic control of early development, transcriptional and translational control of protein synthesis, the role of cell division and cell movements, and cell-to-cell interactions in defining developing systems. Cross-listed with HBA 657.

Prerequisite: BCD 657  
3 credits, fall, Dr. Lyman

#### MCB 500 Directed Readings in Molecular Biology

Directed readings in topics of current interest, under supervision of a faculty sponsor culminating in one or more critical review papers.

Prerequisites: Sponsor and approval of Master's Program Executive Committee  
1-3 credits, yearly, faculty

#### MCB 503 Molecular Genetics

Covers gene structure and regulation in prokaryotic and eukaryotic organisms, mutational analysis and mapping, transposable elements and biological DNA transfer mechanisms. Bacteriophage as well as lower and higher eukaryotic systems, are used to illustrate aspects of molecular genetic structure and function.

(Note: this course jointly listed as HBM 503)  
3 credits, fall term, staff

#### MCB 509, 510 Experimental Biochemistry

An introduction to modern biochemical research techniques. The student spends a half term in the laboratory of each of four different members of the staff selected in consultation with the course director. In each laboratory the student participates in some aspect of the ongoing research pursued by the faculty member.

2 credits each term, variable, fall and spring, faculty

#### MCB 512 Physical Biochemistry

Theoretical principles and experimental methods used in the study of proteins and nucleic acids, e.g., spectroscopy, magnetic resonance and diffraction.

Prerequisites: BMO 520, CHE 301 or 312.  
2 credits, Dr. London

#### MCB 517 Biomembranes

Examines the molecular architecture of membranes; the organization, functions, and assembly of lipids and proteins in biological membranes.

Prerequisite: Permission of instructor.  
1 credit, fall term, Dr. London

#### MCB 520 Graduate Biochemistry I

Several topics in modern biochemistry are treated at an advanced level. Topics covered will include protein structure, enzyme kinetics and mechanisms, and enzyme regulation.

Prerequisite: HBC 331.  
3 credits, fall term, Dr. Schmidt

#### BMO 580 Teaching Honors

Selected students whose performance in the basic required courses for the graduate program is in the top 10 percent conduct tutorials for first-year graduate students in the program and other students taking



graduate courses for credit. The tutors are supervised and graded by program faculty of the graduate program. Successful completion of this course will make the students eligible to receive an "Honors in Teaching" on their transcript.

1 credit, fall and spring terms

**BMO 599 Research**

Original investigation undertaken under the supervision of a member of the staff.

Credit to be arranged, fall and spring terms, faculty

**BMO 601, 602 Colloquium in Molecular Biology**

A weekly series of talks and discussions by visiting scientists covering current research and thinking in various aspects of molecular and cellular biology. Required for all students every term in which they are registered in Graduate Studies in Molecular Biology and Biochemistry. Attendance is mandatory. Visitors welcome.

1 credit each, fall and spring terms, faculty

**BMO 603, 604 Student Seminar in Molecular Biology**

Seminars given by graduate students on the progress of their own thesis research. Required of all students every term in which they are registered in Graduate Studies in Molecular Biology and Biochemistry. Attendance is mandatory. Visitors welcome.

1 credit each, fall and spring terms, faculty

**BSB 685-688 Advanced Seminars**

Topics to be arranged. Visitors are welcome.

1 credit each, fall and spring terms

**BSB 699 Research**

Original investigations undertaken as part of the PhD program under supervision of a research committee.

Prerequisite: Advancement to candidacy.

Credit to be arranged, fall and spring terms, faculty

**BSB 509 Experimental Biochemistry and Structural Biology**

An introduction to modern biochemical research techniques. The student spends a half semester in the laboratory of each of four different members of the faculty. In each laboratory, the student participates in some aspect of the research being pursued by the faculty member.

Fall and spring, 1-4 credits, ABCF grading

May be repeated for credit

**BSB 510 Experimental Biochemistry and Structural Biology**

An introduction to modern biochemical research techniques. The student spends a half semester in the laboratory of each of four different members of the faculty. In each laboratory, the student participates in some aspect of the research being pursued by the faculty member.

Fall and spring, 1-4 credits, ABCF grading

May be repeated for credit

**BSB 515 Computational Methods in Biochemistry and Structural Biology**

Computational methods used in sequence searching and analysis, bioinformatics, graphical analysis of proteins, and nucleic acids.

Fall, 1 credit, S/U grading

**BSB 599 Research**

Original investigation undertaken with the supervision of a faculty member.

Fall and spring, 1 - 12 credits, S/U grading

May be repeated for credit

**BSB 603 Student Seminars in Biochemistry and Structural Biology**

Seminars given by graduate students on the progress of their own thesis research. Required of all students every semester in which they are registered in the Graduate Program in Biochemistry and Structural Biology. Attendance is mandatory. Visitors are welcome.

Fall and spring, 1 credit, S/U grading

**BSB 604 Student Seminars in Biochemistry and Structural Biology**

Seminars given by graduate students on the progress of their own thesis research. Required of all students every semester in which they are registered in the Graduate Program in Biochemistry and Structural Biology. Attendance is mandatory. Visitors are welcome.

Fall and spring, 1 credit, S/U grading

**BSB 699 Dissertation Research**

Original investigations undertaken as part of the Ph.D. program under supervision of a research committee.

Prerequisite: Advancement to candidacy (G5)

Fall, spring, and summer, 1-12 credits, S/U grading

May be repeated for credit

**BSB 800 Summer Research**

0 credits, S/U grading

## Department of Dermatology

Chair: Richard A. F. Clark

Professors: Richard A. F. Clark, Barry Gruber, Marcia Simon, Lome Taichman

Associate professors: Jonathan Garlick, Richard S. Kalish, Marcia G. Tonnesen

Assistant professors: Bernard Berger, Chih-Shan Jason Chen, Paul Chu, David Counts, Scott Flugman, Azim Khan, Peter Klein, David Kriegel, Leonard Kristal, James Krivo, Laurie Levine, Lawrence Lieblich, Ashfaq Marghoob, Steve McClain, Richard Miller, Gavin Moynihan, Antoinette Notaro, Peter O'Neill, Lawrence Pacernick, Peter Reisfield, Xiang-Dong Ren, Lynn Silverstein, Robert Skrokov, Amy Steinberg, Diana Sun, Shyam Verma, Marvin Winston

Adjunct Professors: Frank DeMento, Joel Gordon,

Clinical Instructor: Deborah Deierlein

The Department of Dermatology is committed to providing quality education in cutaneous biology and skin disease to medical students, residents, and fellows. Emphasis is placed on the integration of principles of basic pathophysiology with clinical manifestations and preventive medicine, and on the development of problem solving and diagnostic skills.

In conjunction with the Department of Orthopedics, Department of Pathology, Department of Radiology and Department of Medicine/Divisions of Allergy, Immunology and Rheumatology, the Department of Dermatology participates in the Connective Tissue and Skin Systems Course for second year medical students. The format varies from didactic lectures to workshops and clinical pathologic correlations, including an opportunity for students to interact with patients.

A one-month clinical elective is offered during the fourth year, which provides exposure to the diagnostic and management of cutaneous disorders in both the ambulatory and inpatient setting at University Medical Center, Stony Brook Technology Park and the Northport Veterans Affairs Medical Center.

Dermatology has been integrated into the surgical sub-specialty selective for fourth year medical students. Every two weeks, two students rotate through Dermatology shared with plastic surgery. Students are scheduled in teaching clinics in the ambulatory facility and the Northport Veterans Affairs Medical Center Dermatology clinical sessions. Students with a specific interest in Dermatologic Surgery will be scheduled accordingly.

A three-month research elective provides in-depth exposure to academic dermatology and the application of laboratory science to clinical problems through participation in a laboratory or clinical research project.

A three-year dermatology residency training program provides structured education in basic cutaneous biology and pathophysiology and extensive exposure to patients with skin disorders. The training experience comprises all aspects of ambulatory and inpatient dermatology, including dermatologic surgery, dermatopathology, and phototherapy. Opportunity is provided for involvement in basic science and/or clinical skin research. The Department of Dermatology is actively involved in continuing medical education for staff, community practitioners and healthcare professionals through CME accredited Grand Rounds, conferences, seminars and through participation in local dermatologic societies.

### *Department of Emergency Medicine*

*Chair:* Mark C. Henry

*Vice chair:* Peter Viccellio

*Professors:* Mark C. Henry, Howard C. Mofenson, Frederick M. Schiavone, Adam Singer, Peter Viccellio

*Associate professors:* Thomas R. Caraccio, Lester Kallus, Subir R. Maitra, Henry Thode

*Assistant professors:* Gerald M. Brody, Christopher Carleo, Stuart Chale, David Cohen, David S. Cooling, Kerry Cronin, Richard Dickinson, Robert Ehlers, Daniel R. Ferrara, Thomas Fischer, Laura Fochtman, Gregory P. Garra, Clark S. Homan, Scott Johnson, Lester Kallus, Melina LoGuidice-Khwaja, Cori Ann McKean, Joan L. McInerney, Maria Mortimer, Erika Newton, Theodore Pachy, Edward R. Stapleton, Ioanis Siderias, Victor Tarsia, Andrew Wackett

*Instructors:* Rodrigo T. Del Rosario, William Flader, Eric Niegelberg, David G. Schwartz, John G. Veliath

*Clinical instructors:* Adam Church

The department of emergency medicine provides clinical services for University Hospital, a residency program in emergency medicine, educational programs for the School of Medicine and the community at large, and opportunities in basic science, clinical, and health policy research.

The faculty provides 24-hour staffing in the University Medical Center Emergency Department and supervision and medical direction for the Suffolk County EMS Advanced Life Support System.

The department, in cooperation with the School of Health Technology and Management, initiated the first paramedic training program on Long Island in 1991.

Research opportunities are available for faculty, residents, and students in the medical school and university. The department of emergency medicine has faculty members with expertise in research design and statistics to assist with research projects in basic science, clinical emergency medicine, and health policy. The department has continuing grants for response-wide trauma quality improvements and injury prevention.

Grand Rounds, weekly core curriculum, and case review conferences are available to practitioners outside the university as continuing medical education offerings.

Education programs in emergency medicine for medical stu-

dents include advanced life support training at the end of the second year, a third-year clinical elective, fourth-year sub-internship and clinical elective, and a four-week introduction to emergency medicine (classroom and procedure labs) in the fourth year. A three-year residency in emergency medicine began in July 1990. Residents from other services are offered specialized instruction in clinical topics and procedures during rotations in emergency medicine.

### *Department of Family Medicine*

*Chair:* Jeffrey S. Trilling

*Associate professors:* Lisa Baker, Stanley E. Blyskal, Robert S. Bobrow, Richard Bonanno, Clive Caplan, Frederick Caston, Marius Chagoury, Alan Cooper, Christine Delgaizo, Susan Donleavy-Johnston, Edward L. Feldman, Kenneth Feldman, Jerry Reed Frank, Genine Francis, John Franco, Francis Gleason, David Goldman, Gerald Green (Emeritus), Maury Greenberg, Susan Groh, Raja Jaber, Arnold Jaffe, Leslie Johnson, Scott D. Kirsch, Marc Lewandoski, Joseph Liodice, Mian Long, Antoun Mitromaras, Christopher Ng, Lynn-Marie Nitti, Andrea Nomberg, Russell W. Porter, Ronald Roth, Samuel Sandowski, Jill Sisselman, Johnny Slade, Jay Slotkin, Samuel Smith, Farzad Tabibzadeh, Waleska Tulier-Pastewski, Richard Vickers, Michelle Young

*Assistant professors:* Sergio Abramoff, Marsha Alger, T. David Annear, Carlo Annese, Jill Baron, Alfred Belding, William Bennett, Joseph Calandrino, Cynthia Carlson, Rosalie Castillo, Michael J. Confusione, Josephine Connolly-Schoonen, Francine Cormier, Susan DeBevoise, James Dragone, George F. Dunn, Raymond Ebarb, Michael M. Fishkin, Melanie Frank, Rollin Gallagher, John Gil, Peter E. Goldstein, Louis Greenblatt, Anthony Guida, Hassan Hito, Mark Jagust, Sabrina Johnson, Gerard Kelly, Daniele Kenny, Donald Kiaer, Ahtaran Khan, Colin P. Kopes-Kerr, Carl Korpi, Michael Ladinsky, Richard S. Litman, Nicholas Livrieri, Frank LoBacz, Kumar Mandal, Ashfaq Marghoob, Donna Meltzer, Richard Murdocco, Jeanine Morelli, Alan J. Nelson, Robert S. Nissan, Anthony Pesce, Annette Racaniello, Michael Randall, Lesley Rechter, Anne Robbins, William Robbins, Deborah Schaefer, William H. Sher, Eric Shoenfeld, Meryl Solomon, Robert E. Sterling, Gwendolyn Stretch, Howard Sussman, Paul Tchao, Joseph Venezia, Louis T. Verardo, Joseph C. White, Catherine Wightman, William Wright, Edward Yambo, Ephraim K. Zackson

*Instructors:* Sandra Leonard

The Department of Family Medicine emphasizes teaching, clinical practice and research in the practice of continuing, comprehensive and family-oriented care to patients. The many educational missions of Family Medicine include management of common illnesses, health promotion and disease prevention, family practice obstetrics, behavioral medicine and accessibility to care.

The department's role in the medical school curriculum includes directorship of Introduction to Clinical Medicine (years 1 and 2), Introduction to Human Behavior (year 1), a required Clerkship in Primary Care (year 3), and a subinternship and elective (year 4). An elective Summer Preceptorship in Family Medicine (year 1) is available with limited enrollment. In postgraduate education, the Family Medicine Residency Program provides 21 residents with comprehensive training in the discipline. It also directs a consortium of residency programs at Southside Hospital, South Nassau Community Hos-

pital, and Community Hospital at Glen Cove.

The Department of Family Medicine has demonstrated a commitment to the community through its outreach programs and primary care initiatives. These programs are coupled with teaching and clinical responsibilities in the ambulatory and inpatient services of University Medical Center as well as at community based sites throughout Suffolk County. The Department of Family Medicine coordinates and delivers continuing medical education programs to the medical community and conducts healthcare and service research.

## Department of Medicine

*Chair:* Benjamin J. Luft

*Vice chair, Clinical and Hospital Affairs:* Leonard Arbeit

*Vice chair, Academic Affairs:* Roy Steigbigel

*Director of Inpatient Programs:* Richard Barnett

*Director of Education:* David Tompkins

*Medical Director, LI State Veterans Home:* Frank Cervo

*Affiliation chairs:* Steven Walerstein, Nassau University Medical Center; Michael Niederman, Winthrop-University Hospital; Mark Graber, Veterans Affairs Medical Center, Northport

*Professors:* John F. Aloia, Reese Aslop, Wadie Bahou, William Benjamin, Michael Berelowitz, Jesse M. Berkowitz, Victor P. Bond, Douglas Brand, Robert Burakoff, Harold Carlson, Christos Carvounis, Wen-Tien Chen, Richard Clark, Ira Cohen, Peter F. Cohn, Stanton H. Cohn, Barry Coller (Adjunct), John Coulehan, Eugene P. Cronkite, Burke Cunha, Raymond Dattwyler, Norman Edelman, Alan M. Fein, Donald A. Feinfeld, Susan Forlenza, Harry W. Fritts, Jr., Edmund D. Pellegrino Professor of Medicine, (Emeritus), Pierce Gardner, Marie Gelato, Berhane Ghebrehiwet, Michael Goligorsky, Peter Gorevic, John Gottdiener, Mark Graber, Robert Greenwald (Adjunct), Arthur P. Grollman, Barry Gruber, Mae Hultin, Jolyon Jesty Alan Kaell, Farouque Khan, George J. Kaloyanides, John Kovach, William Lawson, Joseph Letteri, Martin R. Liebowitz, Benjamin J. Luft, Stefan Madajewicz, John Maesaka, Thomas Manis, Amitabha Mazumder, Edward Meilman, Leonard E. Meiselas (Emeritus), Morton Meyers, Larry Nathanson, Michael Niederman, Edward Nord, Robert Olson (Emeritus), David Parkinson, Edmund D. Pellegrino, Ira Rezak, John R. Sachs, Sami Said, Lawrence Shapiro, Walton Shreeve, Gerald Smaldone, Roy Steigbigel, Richard Steingart, Kingsley Stevens (Emeritus), William Van Nostrand, James Veh, Michael Viola, Steven Vitkun, Stephen Vlay, Stephen Weinstein, James Yeh, David W. Westring, Mohammad Zarrabi, Stanley Zucker

*Associate professors:* Leonard Arbeit, Syed Asad, Michael Balkin, Richard Barnett, Najma Begum Rachel Bergeson, Steven Carsons, Joseph Chernilas, Todd Cohen, Donald Coppock, Mark J. Corapi, George Coritsidis, Alfred M. Darrow, John Dervan, Troy Dixon, Michael Dubin, Peter Ellis, Gerald Ente, Edmund F. Fallon, Steven Feffer, Suzanne Fields, John Fiore, Steven Fishbane, Hussain Foda, Luz Fonacier, Susan Forlenza, Israel Freeman, Marianne Frieri, Howard Frucht, Jack Fuhrer, Dennis Galanakis, Aaron Glatt, David Goddard, Edward Goffried, Irving Gomolin, Howard Gottfried, William H. Greene, Louis Heller, Adam Hurewitz, Joanne Holland, Junichi Iwai, Victor Jiminez, Ernesto Jonas, Anoop Kapoor, Ashok Karnik, Jordan

Katz, Robert J. Kramer, Walter Noah Kromholz, Gerond Lake-Bakaar, Erich Mackow, George Mallis, Augustus Mantia, Edward Mack, Robert Marcus, John Maresca, Robert J. Michtom, Sidonie A. Morrison, Sriram Naidu, Howard Novotny, Thomas O'Riordan, Roman Pachulski, Sanford Pariser, Enrique Pastoriza-Munoz, Crescens Pellecchia, Agit Penja, Melvin Praissman, Florence Prigent, Earnst Raeder, Linga Raju, Suhail Raoof, Martin S. Roginsky, Bernard Rosof, Frances Santiago-Schwartz, Richard Schwarz, Robert Shaw, Joel E. Sherlock, Tsiporah Shore, Michael Silverberg, Susan Simandl, E. Marvin Sokol, Harry Staszewski, Sorel Sulimovici, Herbert Susskind, Charles Steinman, Marcia Tonnesen, David Volkman, Nand Wadhwa, Shing-Shing Yeh, Stephen Zeldis, Michael Zema, Myron Zitt.

*Assistant professors:* Shadab Ahmed, Zvi Alpern, Michael Ammazalorso, Joseph Anderson, Eugene M. Aronow, Jeffrey R. Ashkin, Evangelia Augoustiniatos, Louis Auvento, Quaiser Bakht, Wendy Balopole, Leah Balsam, Richard A. Balter, Bhaskar Banerjee, Daniel Baram, John Bateman, Najma Begum, Donald J. Behr, Elise Belilos, Ronald Bennett, Evan Berger, Jeffery Berger, Richard E. Berman, David Bernstein, Mark Bernstein, Ronald S. Bertcher, Leonard M. Birch, John Birk, Charles Blecher, Niranjan Bookanakere, Akron Boutros, Edward Bosler, Akram Boutros, Pierre Brutus, Bernard Brennan, B. Lawrence Brennan, Edward Brown, John Bruno, Peter Bruno, Patricia Burns, Jian Cao, Linda Carmosino, Rocco Caruso, Hugh Cassiere, Thomas C. Catalano, Eugenio Cersosimo, Joseph Cervia, Frank A. Cervo, Michael Cesa, Stuart Chale, Elizabeth Chau, Edward Cheng, Howard Citrin, Diane Clausen, Gail Cohan, Sandra Cohen, William J. Cohn, Stephen Cokinos, Michael J. Connolly, Arnold Conrad, David Cooling, Donald Coppock, George Coritsidis, Lisa D. Cupit, Noshir DaCosta, Ralph Delaratta, Joseph Dell'Orfano, Ralph Della Ratta, Michael R. Delman, Frank J. DeMento, Oscar A. Devera, Kathleen Dickman, Mark DiBenedetto, Joan Dobbs, Philip Domenico, Susan Donelan, Glen Egelman, Thomas J. Ekkers, David Farr, Norbert Felber, Getachew Feleke, Alan Fetterman, Albert F. Finn Jr., Nick Fitterman, Bradley Flansbaum, Philip R. Fleishman, Cornelius J. Foley, Kenneth Freese, Phyllis D. Fried, Steven P. Friedling, Gary Friedman, Stephen W. Furst, Anthony Gambino, Liziamma George, Jody Greenfield, Gino L. Giorgini, Jr., Avram Gold, Richard L. Golden, Steven Golub, Mark A. Goodman, David Goodrich, Margaret M. Grant, Michael N. Greenblatt, Rocco Grella, Seymour Greenwald, Frank Gress, Maritz Groth, Edgar Grunwaldt, Marwan Habeeb, Carylann Hadjyane, Nabil Hagag, Max I. Hamburger, Aaron Harrison, Janet Hearing, Elaine Hearney, Donna Heinemann, Eugene Heller, Alexander Hindenburg, Herbert Hirsch, Dennis Hoffman, Melvin Holden, Ingolf Holm-Andersen, Rosalind Hopmeier, Richard Horowitz, John Hui, Stanley Hyman, Chul Soo Hyun, Bassiema Ibrahim, Jonathan Ilowite, Louis J. Imbriano, Scott Ingber, John Ippolito, Gary R. Joachim, Regina Jablonski, Alan Jacobson, Diane Johnson, Robert Johnson, Sara Johnson, Richard S. Joseph, Hosam Kamel, Ali Karakurum, Jeffrey Kaszaz, Inderjit Katyal, Darren S. Kaufman, Robert Kazenoff, Juffrey Kazzaz, Eugene M. Kern, Leonard Kertzner, Hossein Keyvan, Jung-Yong Kim, Diane L. Klein-Ritter, Natalie Klein, Robert Klein, Myron Kleiner, Kavita Kongora, Giridhar Korlipapa, Edward Kowalski, Walter N. Kromholz, Lawrence S. Kryle, Gamesh Kumar, Harvey Kuschner, James P.G. Kwee, Reuben Leass, Alice Lee, Tai-Ping Lee, Lloyd Lense, Harvey L. Lerner, Younghee Limb, David Lin, Zeena Lobo, Maria London, Paul A. Lusman, David T. Lyon, Gregory Macina, Lucy Macina, Edward Mack, Vincent V. Madonia, Robert Malacoff, Harish Malhotra, Lucy Malisan, Abeera Mansur,

Philip A. Mantia, Rajkumar Mariwalla, Dwight W. Martin, Kevin Marzo, Christopher Matkovic, Evangelos Mavrogeorgis, Daniel Mayer, Frank Mazzola, Joan McInerney, William McKean, Alan Mensch, Marco Michelson, Dennis Mihalatos, Mageda Mikhail, Tanveer Mir, Felix A. Monaco, Howard D. Morgenbesser, Robert Mormando, Tahin Mufti, Dennis Mynarcik, Ian Newmark, Bookanakere Niranjan, Patricia Nolan, Laurence I. Novick, Edwin Oberstein, Daniel J. O'Hearn, Olukayode Ojutiku, John Oppenheimer, Abuzafar Osman, Stanley Ostrow, Tobia Palma, Lucy Palmer, Asit Panja, Frederick Paolo, Leo G. Parmer, Rose Marie Pasantier, Shenyi Peng, William Percy, Susan Platkin, Lester N. Ploss, Martin D. Podgainsy, Bonnie Pollack, Anand Prachi, Vincent W. Prestly, Ronald A. Primis, Soma Pulipati, Robert J. Rabinowitz, Louis Ragolia, Frank Raio, Frederick Reindl, John Reitano, Thomas Ribaud, Albert Riccio, William Rifkin, Seymour D. Ritter, Mohammed Rizvan, John Rodrigues, Rosario Romano, Victor Romanov, Michael Rosenban, David S. Rosenthal, Stuart W. Rosner, Peter Rumore, Sharona Sachs, Edward Samuel, Harold S. Sandhaus, Arnold E. Sands, Mitchell Saunders, Frances Santiago-Schwarz, Ira H. Scheinerman, Joseph Schepis, Frederick Schiavone, Jeffrey Schneider, Mrudula Shah, Michael Shepley, Nancy Lee Shinowara, Herbert I. Silverberg, Susan Smandl, Jay Slotkin, Richard Smith, Philip Spadafora, Jacob Sokol, Alan Spielberg, Subramaniam Srinivasan, Thomas Stavola, Michelle Steffers, Leonard Stein, Alan Steinberg, Lisa Strano-Paul, Jaishree Subramani, Heswck Suh, Krishnamurthy Suresh, Anthony Szema, Yoshiko Takeshita, Dennis Tansiongco, Shirley Tansiongco, Wen-Wei Tchou, Hebbalmath Thippeswamy, Robin Thompson, Louis H. Tiger, Allan H. Toffler, Steven Tollin, Adrian Torres, Joseph Tripedi, David Tompkins, Anil Vaidian, Ashok N. Vaswani, Janice Verley, Peter Viccellio, Stanley M. Vickers, Stephen Vitkun, Kathleen Rene-Walsh, Laurie Ward, Rosalind Watanman, Jed Weinberg, Michael Weinstein, Edward Weissman, William Wertheim, Jonathan Whittaker, William Worthheim, Evelyn Wolf, Ching-Hui Wu, Li-Cheng Xu, Owen Yen, Melvin W. Young, Qamar M. Zaman, Athena Zias, William Zirker, Jerome Zisfein, Sheldon Zuckerman

*Instructors:* Mark Adler, Lynn Adams, Qazi Afzal, Poonam Alaigh, Seymour Alter, Chandri Anand, Charles Annunziato, Vincent Avila, Bagdig Baghdassarian, Robert Baranowsky, Nicholas Barberi, Peter R. Barra, Michele Becker-Hamou, Esenbike Bek, Norman Bennett, Nicholas Berbari, Marion J. Bergman, Elena R. Berkowitz, Paul Bermanski, Gary Bernstein, Stephen Bernstein, Raman Bhasin, Harcharan Bhati, Vikas Bhushan, Colleen Bianco, Stuart Bitterman, Mark Borek, Robert Boswell, Howard Brand, Paul K. Brodsky, Samuel Brody, Patricia Burns, Douglas Byrnes, Michele Caccavani, Anthony Calio, Michael Camardi, Scott Capustin, Michael Carl, Maria Carney, Sandeep Chandra, Joseph Chandrankunnel, Aileen Chang, Opkar Chawla, Judith A. Chown, Howard L. Cohen, Christine Colacino, Eugene Coman, Susan Conaty, Marilyn Connor, Margaret Costello, Stephen Cusumano, Diane Cyerman, Robin DaCosta, Denise D'Ambrosia, Vijay K. Das, Colleen DeFalco, Mark DiBenedetto, Robert DiNapoli, Cindy DiPalo, Patricia Dobbins, Kathleen Donnelly, Elliott Dreznick, Yasser-El-Hennawy, Davis Franco, Thomas Fischer, Kenneth I. Fishberger, Theodore Flamm, Monica Flanagan, John Folan, Nancy Foley, Michael Fried, Christine Furth, Franco Gallo, Jyoti Ganguly, Karen Garland, Michael Garrison, Brian Geller, Carmel V. Genovese, Robert C. Giacobbe, Tracy Gillan, Barry Gimbel, Morton Glaser, Dmitri Gnatenko, Richard Gold, Ilene Goldstein, Shirley Goodman, Perry Gould, Meeta Govindarajan, Marie Gray, Ronald Greenberg, Theresa Grimes, Robert Grossman, Sudheer Gurrin, Urbanp Guarin, Patricia Guercio,

Sudhar Gurman, Isaak Halegoua, Lisa Hammer, Shirley Hanna, Maureen Haralabatos, Alan I. Harris, Laura Harrington, Edmund Hayes, Marc Hazan, Ronald M. Henry, Patricia Hentschel, Kevin Ho, Carrie Hofer, Eric Hoffman, Bruce Horowitz, David M. Horowitz, Mohammed S. Hossain, Zita K. Hsia, John Hsueh, Patricia Hubbard, Kenneth S. Hurst, Ashfar Hussain, Hamid Hussain, Jeanie Huysman, Paul M. Hyman, Diala Jaber, Rajer Jaubar, Daniel Jeran, Shashi B. Jhamb, Robert C. Johnson, Sudha Kamath, Wei Kao, Hacik Karabedian, Nagorao Karhade, Frank Karpowicz, Shyamala Karuvannur, Danny Kass, Gail Kellner, Rita Kelly, Howard Keschner, Shahriar Khalili, Mina Khorshidi, Junkop Kim, Arthur Klein, David Klein, Jasjit Kochar, Giridhar Korlipara, Harry Kousourov, Theresa Kramer, Norbert Kremer, Jonathan Krohn, David Kugler, Karen Ann Lacey, Corradino Lalli, Susan Lane, Edward F. Lanigan, John Lanzone, Jason Lazar, Steven Lederman, Grace Lee, Susan Lee, Renee Lefland, Agim Leka, Lloyd Lense, Jeffrey Leonardis, Heather Lewis, William LiPera, Joanne Lopez, Mark Davis-Lorton, Arthur Lowey, Alan Lucks, Lynne Maher, Brian Margolis, Michael Matilsky, Thomas McBrearty, Maryanne McCoy, Phyllis Migdal, Jacqueline Milch, Nancy Miller, Marlena Mirca, Anne Marie Mirski, Katherine Mitchell, Angela Mitrani-Schwartz, Ralph Modica, Arun Mohile, Miguel Molina, Steve Montana, Patricia Montes, Harvey Mossman, Hachiro Nakamura, Sheila Natbony, Arain M. Nawaz, Mary Nekola, David Nevins, Maria Noya, Dennis S. O'Brien, Kevin Olson, Linda Olson-Vlay, Linda Ording-Bauer, Hadassah Orenstein, John A. Ostuni, Lawrence Pacernick, Bruce Paul, Bernadette Pavlis, Rohan Perera, Bala Hari Pillai, April Plank, Josephine Posillico, Marie Pottanat, Rajendra Prasad, Sami Qazi, Alfred Raciti, Ramona A. Rajapakse, Louise Raminford, Michael Rechheimer, Indira M. Reddy, Thomas Reisman, John Ricciardelli, Michael Richheimer, Gary Rosenblum, Glen Rosett, William Ross, Paul Rossano, Victoria Rourke, Dennis Russo, Richard Sabinsky, David Sacknoff, Francis J. Safina, Ellen McCarty-Santora, Steven Satnick, Majeed Ahmed Sayeed, Judith Scheppler, Schmelzer, Arnold W. Schreiber, Paul Schulman, James Schmertzides, Marisa Shapiro, Sa Njiv Sharma, Paul Shulman, Gary Schwartz, John J. Scomillio, Anuja Shah, Shahin Shaikh, Sheldon C. Simon, Stephan Simons, Stephen Sisselman, Prema Siva, Kenneth F. Solinsky, Mark Solomon, Anthony Spadaro, Gregory Spisak, Julie Stack-Fried, Barbara Starke, Theresa Stavola, Philip Stein, Mary Straw, Elizabeth Strum, Michael Sussman, Shirley Sussman, Jean Swartz, Kathleen Taibi, William Taibi, Mandar Tak, Mark Tan, Emily Tanel, Mandar Tank, Marilyn Temkin, Babu Thallur, Michael E. Theodorakis, Jill Thorton, Djin Y. Tjioe, Mary Varughese, Vadigiri Venkatesh, Andrew Weber, Marc A. Weinberg, Tchou Wen-Wie, Craig Wexler, Nancy Wichtendahl, Barbara Wilk, Ranvic Yadav, Patricia Yankus, Daniel Yellon, Michelle Young, Shug-Hong Young, Athena Zias-DiLena, Ronald Zielinski, Demetrius Zodiatis, Rana Zoeb

The Department of Medicine encompasses eleven divisions: Allergy & Clinical Immunology, Cardiology, Endocrinology, Gastroenterology, General Internal Medicine and Geriatrics, Hematology, Infectious Diseases, Nephrology, Medical Oncology/ Neoplastic Diseases, Pulmonary and Critical Care Medicine, and Rheumatology at Stony Brook as well as its clinical affiliates listed above. The combined faculties of these institutions are charged with the responsibility for the following:

- 1) running and teaching the Introduction to Clinical Medicine program
- 2) planning and teaching the curriculum of Systems;
- 3) directing the Clerkship and Sub-Internship in Medicine
- 4) developing curriculum and supervising electives in the

medical subspecialties

5) training 104 house officers and 60 fellows

6) providing Continuing Education in Medicine.

These efforts are coordinated by an Executive Committee composed of faculty from Stony Brook and all of the clinical affiliates.

The Department of Medicine education program is designed to provide medical students, residents and fellows with a solid foundation in general internal medicine and its subspecialties, including quality patient care and research. This goal is exemplified in the design of the medical clerkship. Under the tutelage of full-time faculty and community preceptors, students learn the arts, skills, and modes of reasoning in making diagnoses and managing patients. In addition, students become a part of the medical staff by delivering patient care. These educational activities are supplemented by conferences, a comprehensive lecture series of topics identified as a target "Core Curriculum," the Chairman's lecture series, small group sessions with the Program Director, and multi-departmental clinical pathology conferences. The study of the patient as the keystone to learning medicine is stressed throughout the inpatient and ambulatory experience.

The Post Graduate program offers training in research. Postdoctoral traineeships are available in both applied and basic research for senior house officers planning careers in academic medicine. Senior students and residents may take electives in general medicine and the medical subspecialties.

In keeping with the goals of our education program, continuing education is provided at various hospitals through regularly scheduled rounds and conferences. These activities, aimed at not only the members of the medical staff but for all healthcare professionals, emphasize the importance of interdisciplinary approaches in analyzing problems, whether at the bedside or in the laboratory.

## Department of Molecular Genetics and Microbiology

Chair: Daphna Bar-Sagi

*Professors:* Carl W. Anderson (adjunct), Dafna Bar-Sagi, William R. Bauer, Jorge Benach, James B. Bliska, Carol A. Carter, Nicholas Delilhas, John J. Dunn (adjunct), Paul Freimuth (adjunct), Michael J. Hayman, Patrick Hearing, Winship Herr (adjunct), Eugene R. Katz, Wayne C. Koff (adjunct), Kenneth B. Marcu, Jane K. Setlow (adjunct), Roy Steigbigel, Bruce W. Stillman (adjunct), Eckard Wimmer

*Associate professors:* A. Bruce Futcher, Christine Ginocchio (adjunct) James B. Konopka, Janet Leatherwood,

*Assistant professors:* Janet C. Hearing, Huilin Li (adjunct), Aniko Paul, David Thanassi

*Research assistant professors:* Sangeet Honey, mena Ostapchuk

*Instructors:* PhiloGeorge Burton

The department provides instruction in the biology of microorganisms and microbe-host relationships to students in all of the health professions. It also offers undergraduate and graduate courses that are needed for majors in the health-related professions as well as the basic sciences.

Department and interdisciplinary programs in graduate study and research are directed towards viral and cellular oncology as well as the molecular mechanisms of bacterial and viral pathogenesis. The department has particularly close rela-

tionships with the College of Arts and Sciences, other departments in the School of Medicine, the Cold Spring Harbor Laboratory, and the Brookhaven National Laboratory.

### Courses

#### HBM 320 General Microbiology

A study of the molecular structure, functional anatomy, growth, genetics, and pathogenic mechanisms of microbial agents with an emphasis on bacteria and viruses. Non-specific and specific host defenses and the control of microorganisms will also be covered. Satisfies the microbiology requirements for admission to most allied health, nursing, optometry, and veterinary medicine professional schools.

*Prerequisites:* BIO 202; CHE 112 or 132

3 credits, spring term, Dr. G. Burton

#### HBM 321 General Microbiology Laboratory

Complementing the lecture material of HBM 320, this optional laboratory covers basic and applied microbiological methods. Students are introduced to methods for isolating pure cultures, microscopy and staining, quantitation of bacteria and determination of sensitivity to antimicrobial agents. This laboratory is limited to pre-veterinary, and pre-health professional students.

*Corequisite:* HBM 320.

1 credit, spring term, Staff

#### HBM 393, 394 Special Topics from the Microbiology Literature

Directed readings in molecular genetics and microbiology with periodic conferences, reports, and examinations arranged with the instructors in the Department, culminating in a final paper reviewing the literature.

*Prerequisite:* Permission of instructor.

1-2 credits per term, fall and spring terms, staff

#### HBM 398, 399 Research Project in Microbiology

An independent research project under faculty supervision, with emphasis on the principles of experimental design, data collection, evaluation of findings and reporting of results. Project report required. May be repeated.

*Prerequisites:* Laboratory experience and permission of the supervising instructor.

2-4 credits per term, fall and spring terms, staff

#### HBM 503 Molecular Genetics

Introduces the classical work and current developments in lower and higher genetic systems. Covers gene structure and regulation in prokaryotic and eukaryotic organisms, mutational analysis and mapping, transposable elements, and biological DNA transfer mechanisms. Bacteriophage and lower and higher eukaryotic systems are used to illustrate aspects of molecular genetic structure and function. Cross listed with BM0503.

*Prerequisite:* Permission of instructor.

3 credits, fall term, Drs. Futcher and Sternglanz

#### HBM 509, 510 Experimental Microbiology

Introduces modern microbiological research. Students rotate through two professors' laboratories spending approximately one-half term in each. Laboratory selection made in consultation with the student's advisory committee. By taking part in ongoing projects the student will learn experimental procedures and techniques and become acquainted with research opportunities in the department.

*Prerequisites:* Matriculation in a graduate program and permission of the program director and the lab director.

Variable credits, 1-8 credits per term, fall and spring terms, staff

#### HBM 511 Introduction to Biophysical Chemistry

Introduces the chemical principles and techniques needed for the study of biological macromolecules. Topics to be covered include solution chemistry, chemical thermodynamic, binding and dissociation equilibrium, denaturation phenomena, spectroscopy, and hydrodynamics. This course is intended to prepare non-chemistry majors for more advanced work in biophysics. Cross-listed with HBY 511.

*Prerequisite:* Permission of instructor.

3 credits, fall term, even years

**HBM 522 Biology of Cancer**

Short course emphasizes cancer as a disease of man. Addresses human cancer as seen by the clinician and as basic research relates to human disease. Provides a link between courses in cell and molecular biology and the application of this basic information to tumor management.

1 credit, spring term, even years, Drs. Hayman and Hagag

**HBM 531 Medical Microbiology**

Presents information derived from molecular genetics and cellular biology of microorganisms to provide a foundation for understanding basic mechanisms underlying pathogenicity of viruses, bacteria, fungi and protozoa. Laboratory experiments demonstrate techniques to identify and quantify bacteria.

1-4 credits, fall module, Dr. Benach

**HBM 599 Graduate Research**

Original investigations under faculty supervision.

Prerequisite: Permission of instructor.

Variable credits, 1-9 per term, fall and spring terms, staff

**HBM 640 Molecular Mechanisms of Microbial Pathogenesis**

This course covers the principles and molecular mechanisms of pathogenesis of a selected group of the best understood viral and bacterial pathogens. A major focus of the course relates to pathogen modification of host extracellular and intracellular signalling events, as well as pathogen-host interactions pertaining to the innate, humoral and cellular responses to infection. The material is presented by invited lecturers who are leaders in their fields. This course is directed to graduate students, post-doctorate and medical fellows, and advanced medical students who are contemplating careers in infectious disease research.

Prerequisite: HBM/BMO 503 and BMO 520

3 credits, fall term, Drs. Hearing and Bliska

**HBM 690 Microbiology Seminar**

A weekly meeting for discussion of current research in department. Enrolled students present seminars each week throughout the term.

Prerequisite: Permission of instructor.

1 credit each term, repetitive, fall and spring terms, staff

**HBM 691 Readings in Microbiology Literature**

Readings in microbiology literature covering areas of molecular biology and genetics.

Prerequisite: Permission of instructor.

1 credit, fall term, staff

**HBM 699 Thesis Research in Microbiology**

For the student who has been advanced to candidacy. Original research under the supervision of the thesis adviser and advisory committee.

Prerequisite: Permission of thesis adviser.

Variable credits, 1-9 credits per term, fall and spring terms, staff

**HBM 800 Full-time Summer Research**

Full-time laboratory research projects supervised by staff members.

Prerequisites: Permission of instructor and full-time graduate student status.

0 credit, summer term, staff

**Department of Neurobiology and Behavior**

Chair: Lorne M. Mendell

Professors: Paul R. Adams, Paul Brehm, John B. Cabot, L. Craig Evinger, Joseph Fetcho, Simon Halegoua, Joel M. Levine, Gail Mandel, Gary G. Matthews, Lorne M. Mendell, S. Murray Sherman, Stephen Yazulla

Associate professors: William F. Collins III, James Gnad, David McKinnon, Mary Kritzer, Maurice Kernan

Assistant professors: Howard Sirotkin, Lonnie Wollmuth

This department offers fundamental courses in neurobiology to

students in the health professions as well as to undergraduates and graduates in biology. Its graduate studies are centered around the program in neurobiology.

**Courses****BIO 203 Cellular and Organ Physiology**

The fundamentals of cell and organ physiology in mammalian and non-mammalian organisms. The structure and function of cell membranes and the physiology of cell to cell signaling, cellular respiration, and homeostasis of organs and organisms are examined with an emphasis on the comparative physiology of vertebrates and invertebrates. Three hours of lecture and one three-hour laboratory per week.

Prerequisite: Bio 150

Pre-or Co-requisite: CHE 111 or 121 or 131 or 141; MAT 125 or higher (or the discontinued MAT 124)

4 credits

**BIO 208 Cell, Brain, Mind**

The human brain allows movement, thought and emotion. As an electrochemical computer, it is the target of diseases, drugs and psychological disturbances. Explores these topics through a knowledge of basic cell neurobiology and considers the implications of brain science for human behavior in society. For students not majoring in the biological sciences. A core course satisfying natural sciences category B.

Prerequisites: High school chemistry or CHE 111; BIO 101 or 150.

3 credits, fall term, faculty

**BIO 210 Human Physiology**

The basic principles of human physiology. The subject matter covered includes presentations on the anatomical organization and physiological functions of central and peripheral nervous systems; skeletal and smooth muscles; cardiovascular, respiratory, and renal systems; and endocrine and reproductive systems. The course is designed for pre-nursing students. May not be taken for credit by biology majors. Three hours of lecture, one hour recitation, and one three-hour laboratory per week. Not for credit in addition to BIO 203.

Prerequisite: BIO 150, Advisory prerequisite: ANP300

5 credits

**BIO 307 Computer Modeling of Biological Systems**

Tools for visualizing and modeling biological systems. Tools include graphics programs, spread sheets, software for modeling dynamical systems and instruments for real-time data collection and data analysis including image acquisition and analysis. Study of models of population growth, ecology, and neuron and other biological systems.

Prerequisites: BIO 201 or 202 or 203; CHE 132; MAT 125 or higher

3 credits, spring term, faculty

**BIO 317 Principles of Cellular Signaling**

Basic principles of cellular signaling and maintenance of cellular and organismic homeostasis through intra and intercellular signaling mechanisms. Emphasizes relationships between nuclear events and ongoing processes of the cell. The roles of membrane receptors and second-messenger pathways in mediating such diverse events as bacterial chemotaxis, protozoan locomotion, and secretion are discussed.

Prerequisites: BIO 202 or 203

3 credits, fall term, faculty

**BIO 328 Mammalian Physiology**

The basic principles of human physiology. Includes circulation, respiration, nutrition, excretion (and their control by the nervous and endocrine systems), and sensation and coordination. May not be taken for credit in addition to HBY 350.

Prerequisites: BIO 203

3 credits, fall term, faculty

**BIO 334 Principles of Neurobiology**

Discusses the ionic basis of nerve potentials, the physiology of synapses, sense organs and effectors, and the integrative action of the nervous system.

Prerequisites: BIO 203; CHE 131 or 141

3 credits, fall term, faculty

**BIO 335 Animal Physiology Laboratory**  
Laboratory exercises illustrate principles learned in BIO 328. Topics include muscles and hormones, physiological activities of nerves, circulation, respiration, excretion, digestion, sensory function, and central processes of coordination. One hour of lecture, one hour of recitation and one three-hour laboratory per week.

*Prerequisites:* BIO 328; CHE 132 or 133  
3 credits, fall term, faculty

**BIO 338 Self-organization of the Brain**  
Exploration of basic neural and synaptic mechanism and the operation of representative brain circuits, using both theoretical approaches and experimental evidence. Particular attention is given to Hebb's Rule, its cellular basis, its consequences for circuit self-organization, and its limits. A solid background in a mathematical, physical, or biological science is desirable, but most relevant background material is covered in the course.

*Prerequisite:* BIO 203 or CHE 132 or PHY 122  
*Advisory Prerequisite:* BIO 334  
3 credits, fall term, faculty

**BIO 339 Molecular Development of the Nervous System**  
An introduction to the molecular events that underlie development and plasticity of both the peripheral and central nervous systems, with a focus on neuronal mechanisms. Molecular and genetic approaches to the analysis of neural induction, neuronal differentiation, neuronal death and survival, neurotrophic factors, synapse formation and plasticity are presented.

*Prerequisite:* BIO 202  
*Advisory Prerequisite:* BIO 203 or 325  
3 credits, spring term, faculty

**BNB 446 Readings in Neurobiology and Behavior**

Tutorial studies on recent advances in neurobiology.  
1 credit, fall and spring term, faculty

**BNB 486 Research in Neurobiology and Behavior**

1-4 credits, fall and spring terms, faculty

**BNB 547 Readings in Neurophysiology**

Discusses and evaluates neurophysiological research published in biological journals. Provides critical analyses of techniques, methodology and conclusions of such research.

1-3 credits, fall and spring terms, faculty

**BNB 552 Neurobiological Techniques**

A series of laboratory exercises and lectures to give students "hands on" experience in the basic laboratory techniques of contemporary neuroscience. Includes intracellular and extracellular recording, neuronal tissue culture, neuroanatomical techniques, and integrative physiology.

2 credits, fall term, faculty

**BNB 555 Neuropharmacology**

Develops an advanced understanding of neuropharmacology and research. Introduces the nerve cell structure, synaptic and chemical transmission, and develops three themes of receptors-receptors as channels, and G-protein-coupled receptors. Recent advances in cell and molecular biology provide the framework for instruction and discussion. Cross listed HBH 555.

*Prerequisite:* Faculty approval.  
3 credits, fall term, faculty

**BNB 560 Laboratory in Neuroanatomy**

This course consists of a series of laboratory exercises and supplemental lectures providing an overview of the structural organization of the nervous system. The mammalian nervous system and its sensory, motor and cognitive components are emphasized. Laboratories include examination of whole brains and histological sections, and some hands-on experience with basic neuroanatomical techniques. Computer programs illustrating the three-dimensional and circuit organization of the human brain are also used.

*Prerequisites:* BIO 334 or equivalent and permission of instructor  
2 credits, fall term, faculty

**BNB 561 Neurobiological Basis of Vision**

This course introduces students to the basic principals of neurobiology from a cellular perspective. Topics covered include the ionic basis of electrical excitability, the biophysics and molecular biology of ion channels, and synaptic transmission. Additional topics include the molecular regulation of key development events such as the emergence of the neuronal phenotype, patterning of the nervous system, and axon growth and path finding. The motor system is studied as an example of how molecular and cellular properties intermesh. This course is the first of a two semester sequence of courses intended to provide a broad and comprehensive basis for advanced study of the nervous system. This course is primarily for graduate students.

*Prerequisite:* BIO 334 or equivalent and permission of instructor  
4 credits, fall term, faculty

**BNB 562 Motion: Motor Control and the Reflex Pathway**

The physiology, development and molecular biology of motor systems will be described. Basic aspects of the nervous system including reflex arcs, ion channels, gene expression and nerve growth are described in the context of the spinal cord.

4 credits, spring term, faculty

**BNB 599 Research**

Original investigation undertaken with supervision of a member of the staff.

Variable credit, fall and spring terms, faculty

**BNB 697 Advanced Neurobiology and Behavior Seminar**

Seminar presentations delivered by faculty, associates, students and visiting speakers.

1 credit, fall and spring terms, faculty

**BNB 699 Dissertation Research**

Original investigations undertaken as part of the PhD program under the supervision of the dissertation committee.

Credits to be arranged, fall and spring terms

## Department of Neurological Surgery

*Chair:* Raphael P. Davis (acting)

*Professors:* Joseph D. Fenstermacher (Emeritus), George W. Tyson, Harvey Wachsman

*Associate professors:* Raphael P. Davis, Michael Egnor, James V. Manzione

*Assistant professors:* Robert Galler, Jack Greenwood, Frederick B. Gutman, Clemente T. Roque, Craig Rosenberg, Arthur Rosiello, Robert G. Roth, Michael O. Sauter

*Instructors:* Donna Andricopoulos, Marilyn Higgins, Mary Lane, Jacqueline Paveling, Elaine Sepe, Nancy Strong, Patricia Westgate

The Department of Neurological Surgery is an important clinical component of the neurosciences program at Stony Brook. The objectives of the department are to provide the best possible patient care while integrating a commitment to teaching and neuroscience research in the study of the etiology and prevention of nervous system diseases.

The clinical faculty provide care to both adult and pediatric patients who require surgical treatment for a wide variety of neurologic diseases. Selected residents from neurology and surgery programs serve on the neurological surgery service for intensive exposure to the surgical management of neurologic disease, in particular trauma and more complex neurosurgical problems peculiar to an academic neurosurgical practice.

Medical students receive lectures on a regular basis and are instructed on processes relating to the nervous system. Period-

ic pre-clerkship lectures are given with emphasis on craniospinal trauma, cranial pressure dynamics, central nervous system tumors, and cerebrovascular disease. Sponsorship is also provided to qualified graduate students in the basic sciences.

### **Department of Neurology**

*Chair:* Patricia K. Coyle, acting

*Professors:* Mary R. Andriola, Anita Belman, Patricia K. Coyle, Lauren B. Krupp, Nicholas J. Lenn

*Associate professors:* Norman Chernik, Joel Delfiner, Michael Egor, Oded Gerber, Mark A. Kaufman, Gary McAbee, Suparana Rajam

*Assistant professors:* Francis Antonawich, David Besser, Anthony K. Bolton, Suranganee deLanerolle, Malcolm H. Gottesman, Jack Greenwood, Mark Gudesblatt, Frederick Mendelsohn, Samson Mebrahtu, Henry Moreta, Richard A. Pearl, Patrick Poole, Thomas E. Preston, Howard Reiser, Syed Rizvi, Steven A. Rosen, Todd Rosenzweig, Joanna Smiroldo, Frances Taylor, Philippe D. Vaillancourt, Mark J. Zuckerman

*Instructors:* Ann Marie Byers, Susan Vitale

The Department of Neurology includes Divisions of Pediatric Neurology, Clinical Neurophysiology and Neuropsychology, as well as sections in Stroke, Multiple Sclerosis/Neuroimmunology, EEG, and Neuromuscular Diseases. The objectives of the Department of Neurology are three-fold. The department provides basic and clinical training in neurological science to medical students, fellows and house staff. The intent of this training is to provide a basis for scientific neurology and practical instruction in patient care. The department carries on a broad program of research in neurological science and contributes to the understanding of the structure, function and diseases of the nervous system. The clinical faculty provide tertiary, as well as basic, level clinical care in neurology, carried out within the context of medical student and house staff training.

Instruction is provided at all levels of medical education. Members of the department participate in the teaching of basic neuroscience to medical students in pre-clinical years. A clinical clerkship and a selective (elective) in neurology are offered during the clinical years. The clinical clerkship consists of an intensive two-week inpatient experience in neurology during the third year. The intent is to provide the student with the background to take a neurological history and carry out a neurological examination in order to evaluate patients with neurological disease in an appropriate and logical manner. A selective (elective) in neurology is available to fourth year students and consists of an intensive experience in the evaluation and care of outpatients and inpatients in the active consultation services and specialty clinics such as those in pediatric neurology, multiple sclerosis, epilepsy and neuromuscular disease that are carried on by the department. The emphasis in this experience is on improving clinical diagnostic skills and the ability to formulate a plan of care for patients with neurological disease. Attention is also directed to learning the techniques and interpretation of electroencephalography, electromyography and neuroradiological procedures, including tomography. Students are expected to participate in all aspects of the clinical activities of the department.

In addition to instruction of medical students, a three-year residency program is offered to prepare postgraduate

physicians for board certification in neurology. The residency training program provides a firm background in basic neuroscience disciplines and extensive exposure to clinical neurology. Residents complete separate rotations in neuropathology, neuroradiology, child neurology and psychiatry and are encouraged to become involved in clinical and/or basic neuroscience research. Special postgraduate fellowship programs are available in areas such as clinical neurophysiology and pediatric neurology.

The faculty also maintains a strong commitment to clinical neurology through operation of the neurology service at University Hospital and at the Northport Veterans Affairs Medical Center. Faculty research programs complement the clinical and academic functions of the department. Research in the department of neurology covers a wide spectrum of activities in basic and clinical neuroscience, ranging from basic neuroanatomical, neurochemical and neurophysiological studies to basic and clinical research in neuroimmunology, neurotoxicology, epilepsy, neuroophthalmology and developmental neurobiology.

### **Department of Obstetrics, Gynecology and Reproductive Medicine**

*Chair:* J. Gerald Quirk

*Professors:* J. Andrew Fantl, David A. Baker, Anzzej Lysikiewicz, Paul L. Ogburn Jr., Dev Maulik, Boris Pertrikovskiy, J. Gerald Quirk, Martin L. Stone (Emeritus), Siamek Tabibzadeh, Linda Tseng

*Associate professors:* Victor Alinovi, Frank Bonura, Richard A. Bronson, Eva Chalas, John Chumas, George Farmakides, Reinaldo Figueroa, Mark I. Funt, Magdalen Hull, Cynthia Kaplan, Daniel Kenigsberg, Alan Monheit, Alan Santos, Ellen Steinberg, Patrick F. Vetere, Robert R. Weiss, Yu-Kang Ying

*Assistant professors:* Michael Arato, Melvin Berlin, Lauri Budnick, Ann Buhl, Kristen Cain, Kent Chan, Maiguel Carrasco, Christine Conway, Valerie Cucco, Deborah M. Davenport, Ann Doerfler, James N. Droesch, Kathleen E. Droesch, Anuradha Dua, Kristi Egner, Andrew Elimian, David Garry, Theodore L. Goldberg, Mitchell B. Goldman, Vinette Greenland, Todd Griffin, Abraham Halfen, Robert Hock, John Hunt, Robert Kaplan, Elana Kastner, Steven A. Klein, David Kreiner, Mary Kriner, Douglas S. Lee, Gary Levine, Michael Lydic, Philip J. Makowski, Charles T. Mann, Patrick McManus, Steven Milim, Noel O. Mohammed, Seymour J. Molinoff, Teresa Mular, Michelle Murphy, Hitesh Narain, Jerry Ninia, Robert O'Keefe, John Pallotta, Hiramani R. Pardanani, Michael Pearl, G. Michael Peters, Antonia Pinney, Jeffrey A. Porte, David Reavis, Steven I. Ross, Emanuel J. Rubin, Traci Saunders, Gabriel San Roman, Joy Schabel, David M. Shobin, Genevieve Sicuranza, Lawrence H. Tydings, Fidel Valea, Ian VanPraag, Robert N. VanSon, Malathy Varanasi, Christian Westermann, Jerry Wider

*Instructors:* Susan Altman, Maureen Barbara, Eliot Birnbaum, Theodore Blaszczyk, Robin Bliss, Dana Brenner, Karen Coburn, Vivien Diaz-Barrios, Karen Dillinger, Eleanor Dunham, Lance Edwards, Thomas Erhart, Gloria Escamilla, Margaret Fischer, Susan Fish, Marie Frey, Sally Gambill, Michael Gentileco, Stephen Golub, Jennifer Griffin, Richard L. Halpert, Valerie Infranco, Hamid Javidi, Arlene Kaelber, Debra Kittilsen, Nicholas Kleopoulos, Christina Kocis, Robert H. Kramer, Laura Lesch, Paul Lograno, Morisa Marin, Linda Mahler, Jennifer Marshak, Careen Mauro, Michelle Mayer, Dayna McCauley, Brian McKenna, Dreux Patton, John Petraco, Gerardo San Roman, Gustavo San Roman, Philip Schoenfeld, Vera Seltzer,



Mindy L. Shaffran, Keith Sommers, Maxine Spicer, Karen Stampf, James Stelling, Susan Sterlacci, Dennis Strittmatter, Doris Weisman, Dina Weiss, Julie Welischar, Joseph Xerri

The Department of Obstetrics, Gynecology and Reproductive Medicine is organized into the following divisions, each with its own chief: Gynecology and General Obstetrics, Gynecologic Oncology, Maternal-Fetal Medicine, Reproductive Endocrinology and Infertility, and Nurse Midwifery.

The department is responsible for instruction of medical students in each phase of their development.

During the second-year curriculum, the department participates in the Introduction to Clinical Medicine course. Students are taught male and female genitourinary physical examinations in a program using prepared "professional patients." Following the study of exam techniques utilizing audiovisual aids and pelvic models, small groups of students spend one session with a physician instructor and specially trained professional patients who assist the individual student in conducting the exam.

The objective of the program is to provide an experience for students to perform non-traumatic genital exams to minimize the initial technical and psychological difficulties of the exam, and to introduce to them the importance of communication with their patients.

Second year medical students also have an intensive three-week course in Reproductive Pathophysiology. Building on and expanding the students' knowledge of the basic sciences, this course covers every aspect of human reproduction and the normal and abnormal conditions of the male and female reproductive systems.

The Clinical Clerkship in Obstetrics and Gynecology is a six-week core curriculum presentation for students to become intimately involved with the ambulatory and hospital care of female patients with pregnancy and/or diseases of the reproductive tract. Educational objectives are attained through didactic lectures, seminars, rounds, and clinical exposure - the latter essentially by integration into the service as a subintern. In addition to gaining experience with examination, diagnosis, and principles of treatment, opportunities are provided for exposure to the preventive medicine aspects of the discipline, including family planning, adolescent guidance, cancer screening, patient education and detection and prenatal health.

For students already career oriented in obstetrics and gynecology, and for those who desire greater depths than permitted by the core curriculum, fourth year electives are offered in maternal-fetal medicine (high-risk pregnancy), reproductive endocrinology and infertility, gynecologic oncology and general gynecology and obstetrics. Participation in faculty research projects as well as in independent student research projects, utilizing the department's laboratory facilities in endocrinology, immunology, fetal physiology, and virology.

The principal goal of the department is to train physicians who will maintain and improve the highest standards in women's healthcare.

### **Residency**

The department offers an accredited four-year residency which includes training in all aspects of obstetrics and gynecology. The program provides a structured educational experience that is planned in continuity with undergraduate and continuing medical education. Participants are afforded structured, sequentially-developed exposures using a continuity of care model in the ambulatory and inpatient setting. This includes primary medical management and a variety of surgical experiences appropriate to the level of training.

## **Department of Ophthalmology**

*Chair:* Patrick A. Sibony

*Professors:* Craig Evinger, M. Cristina Leske, Nisson Schechter, Patrick Sibony

*Associate professors:* Fadi El Baba, Stuart B. Fourman, Marcelle Morcos, Elsa K. Rahn, Elinor Schoenfeld

*Assistant professors:* Joseph Bacotti, Alfred J. Cossari, Marc Dinowitz, Barry Golub, Robert A. Honkanen, William Kasaper, Richard Koty, Maury A. Marmor, Eric Roberts, Gideon Schneck, Gerald S. Stoller, Pamela Weber, John Wittpenn

*Instructors:* Philip Bonanno, James F. Collins, Stephen Greenberg, Nancy Kwon, Jeffery Martin, Sidney Martin, John Romanelli, Scott Sheren, Eric T. Vinokur, Michael Weiner, Geoffrey Weisman, Lawrence Zweibel

The Department of Ophthalmology provides instruction/training to both medical students and residents. Its faculty constitutes the only multi-specialty group practice on Long Island, offering the full range of ophthalmic subspecialties. Using the most current diagnostic and therapeutic modalities in primary and subspecialty ophthalmology, the department represents a complete clinical center for the testing/treatment of the gamut of ophthalmic disorders. Medical students and residents are thus given the opportunity to gain the necessary depth and breadth of education in ophthalmology.

The department provides the following clinical services that reflect the faculty's specialized expertise:

- General ophthalmology service
- Neuro-ophthalmology service
- Vitreoretinal service
- Cornea and anterior segment service
- Glaucoma service
- Oculoplastics and reconstructive surgery service
- Pediatric ophthalmology and adult strabismus service
- Optometric service

These busy services are directed by members of the full-time faculty, all of whom are board certified and fellowship trained.

The faculty play an active role in the teaching of medical students, contributing to several of the organized teaching blocks. They participate in the first-year neuroscience course, in the second-year rheumatology block, and in the third-year surgical rotation. In addition, the department offers a two-to-four-week clinical clerkship in ophthalmology.

The faculty participate in a fully accredited three-year joint residency with the Nassau University Medical Center. This training program has 12 residents, four of whom rotate at both University Medical Center and the Northport Veterans Affairs Medical Center, and also contribute to the education of medical students.

The faculty contribute to the training of residents from other departments of the School of Medicine as well, including the Department of Family Medicine, Department of Maxillofacial Surgery, and Department of Emergency Medicine. In addition, neurology residents may elect to do a two-to-four week rotation on the department's neuro-ophthalmology service.

To enhance the experience of ophthalmology residents and to serve as an educational resource for Stony Brook's medical students and residents, the department offers a series of open lectures in ophthalmology.

Research participation within the department adds a valuable dimension to its educational programs, demonstrating the faculty's commitment to scholarly activity and the advancement of ophthalmic knowledge and patient care.

Among the research programs in which members of the faculty have recently been involved are: a multi-center clinical trial for supplemental oxygen treatment for retinopathy of prematurity; ultrasoniclysis of retinovascular thrombosis; a preliminary trial of pirlfenidone in the treatment of proliferative vitreo-retinopathy; the establishment of a human eyelid movement laboratory; HIV-related studies; an evaluation of cataract extraction in the Third World; a project involving corneal amyloidosis; and a national study on ocular hypertension.

## Department of Orthopaedics

*Chair:* Lawrence C. Hurst

*Professors:* Marie A. Badalamente, Roger Dee, Martin A. Gruber, Lawrence C. Hurst, Clinton Rubin

*Affiliated professors:* Peter C. Altner, Kenneth J. McLeod, Bruce Meinhard, Leon Sokoloff (Emeritus), Jack T. Stern

*Associate professors:* Hormozan Aprin, Steven P. Sampson, William T. Stillwell

*Assistant professors:* Nestor Blyznak, Wesley V. Carrion, Mauro Cataletto, Jorge S. Cerruti, Weiliam Chen, Stuart Cherney, Nicholas Divaris, Ernest Chisena, Frank DiMaio, Thomas J. Dowling, Eric N. Dubrow, Jerry Ellstein, Joseph E. Farrell, Leonard J. Figelman, A. Philip Fontanetta, Michael J. Fracchia, Robert Garroway, Kenneth Glass, P. Warwick Green, James P. Gurtowski, Susan Haralabatos, N. Pierre Helou, Richard O. Hindes, Frank Hudak, Bert Horwitz, Salvatore Inserra, Partap Khalsa, Stephen Kottmeier, Neil Kurtz, John Labiak, Paul C. Lehmuller, John J. Leppard, Paul E. Levin, Jimmy Uy Lim, Enrico Mango, Robert Michaels, Mohammed Ather Mirza, Carlos F. Montero, Jeffrey S. Muhrad, Craig B. Ordway, Seth Paul, James Penna, Stuart B. Polinsner, M. Pierre Rafiy, Richard Rogachefsky, Louis Romeo, Paul M. Ross, Mark Stephen, Yan-Qun Sun, Glenn Teplitz, Jay Wagner, Edward Wang, Carl Weiss, Leonard S. Weiss, Paul Yerys

*Instructors:* Robert Biaggi, Jeffrey A. Bonneville, Noah S. Finkel, A. Philip Fontanetta, Mark Goldberg, Bruce S. Goodman, Marshall Katz, Warren Kent, Martin Mandelbaum, Ross Mittiga, Andrew H. Meyers

Orthopaedics is concerned with the pathology and physiology of the musculoskeletal system. Clinical divisions include children's orthopaedics, hand surgery, foot surgery, micro surgery, joint replacement and reconstruction, spine surgery, sports medicine and trauma. Research divisions include laboratories for the study of neuromuscular biology.

Lectures in orthopaedic surgery and elective rotations are provided for students in the School of Medicine. The department supports a fully accredited residency program in orthopaedic surgery, and post-residency fellowships in hand surgery.

The research divisions provide training on an elective basis for students and orthopaedic residents in the School of Medicine.

## Department of Pathology

*Chair:* Jay L. Bock, ND, Acting Chair

*Professors:* Jorge Benach, Jay L. Bock, Arland L. Carsten, Eloy Caracuel, Marianne Frieri, Berhane Ghebrehiwet, Dimitry Goldgaber, Martha Furie, Gail S. Habicht, Mae Hultin, Jolyon Jesty, Darrel D. Joel, Marc Golightly, Bernard P. Lane, Leslie Lukash, Kenneth Marcu, Frederick Miller (Marvin Kuschner Professor), Ute M. Moll, Lucien Nockomovitz, Nancy Peress (Emeritus), Mildred E. Phillips (Emeritus), Nancy Reich, Sanford Simon, Leon Sokoloff (Emeritus), Roy Steigbigel, Charles Wetli

*Associate professors:* Richard Bronson, John C. Chumas, Thomas S. Cottrell, Virginia Donovan, Howard Fleit, Dennis Galanakis, Alan Heimann, Philip B. Kane, Cynthia Kaplan, Jen H. Lin, Stanley Lipper (Emeritus), Sergey Lyubsky, Roberta Seidman, Eric Spitzer, Gary Zieve

*Assistant professors:* Gary Clarke, Nolan Core, Stuart Dawson, David Durand, William Engellener, Andrea Fleider, Mala Gupta, Youjun Hu, Laura Katona, Richard Kew, Ahmed Khapra, Poonam Khullar, Sharon X. Liang, Jingxuan Liu, Edward Klein, Joseph Lanman, James S. Magidson, Prahba Pai, Peter Perrotta, Kanokporn Rithidech, Alan Schuss, Sylvia Spitzer, Katarina Szabo, Robert Trotta, George Turi, James Wilson, Beverly Wyrick

*Instructors:* Joseph Chiofalo, Michael DeMartino, Steven Drexler, Lester Freedman, Stephanie Horowitz, Maria Plummer, Patricia Schiller

The department is concerned with the pathogenesis of disease, as well as with its manifestations of diagnosis. The department serves as a bridge between the pre-clinical and clinical sciences for students, clinicians and non-clinicians at all stages of training. It has responsibility for teaching students in each school of the Health Sciences Center, in the College of Arts and Sciences, and in the Graduate School, and has responsibility for the post-graduate and continuing education of residing physicians, house staff and practitioners. In addition to its teaching responsibilities, the department operates the hospital laboratories. At the graduate level, programs leading to the PhD degree are developed within the department and in cooperation with other departments.

## Courses

### HBP 310 Pathology

Studies the basic mechanisms of disease and the pathophysiology of the important illnesses of man. Primarily for Health Sciences students; others admitted with special permission.

*Prerequisites:* Permission of instructor, BIO 151 and 152.  
3 credits, fall modules 3-6, Dr. Furie

### HBP 390 Basic Mechanisms in Pathology

Molecular mechanisms underlying human diseases. Includes inflammation, coagulation mechanisms, fibrinolysis, immunological defenses, viruses, oncogenes, and cancer.

*Prerequisites:* BIO 361 or BIO 362 required. Cell Biology and Genetics recommended.  
3 credits, spring term, Dr. Fliet

### HBP 393, 394 Special Topics from the Pathology Literature

Tutorial readings in pathology, with periodic conferences, reports, and examinations arranged with the instructor.

*Prerequisite:* Permission of supervising instructor.  
1-2 credits per term, fall and spring terms, staff

**HBP 398, 399 Research Project in Pathology**

An independent research project under faculty supervision, that emphasizes the principles of experimental design, data collection, evaluation of findings, and reporting of results. Project report required. May be repeated.

*Prerequisites:* Laboratory experience and permission of the supervising instructor.

*0-4 credits per term, fall and spring terms, staff*

**HBP 401 Applied Immunology**

Introduces the principles of immunology for allied health professions students. Emphasizes applications of immunological principles to clinical and laboratory immunology.

*Prerequisite:* Biology or Pre-Med major, or enrollment in School of Health Technology and Management.

*3 credits, spring modules 5 and 6, Dr. Golightly*

**HBP 411 Applied Pathology**

For physician assistants, advanced nursing students and other allied health profession students who are concurrently registered in HBP 310 or who have demonstrated mastery of that material. Extends the range and depth of HBP 310 with emphasis on clinical application. Limited enrollment with permission of the dean.

*1 credit, fall modules 3-6, Dr. Galanakis*

**HBP 511 Pathobiology**

For graduate students who have obtained primary healthcare baccalaureate degrees through the case study approach. Covers the underlying principles of modern experimental pathology. Focuses on the clinical aspects of the body system, including relevant underlying biochemistry, structure, or pathophysiology at the organ, tissue, cell or molecular level.

*Prerequisites:* Undergraduate degree, healthcare experience, biochemistry or cell biology, anatomy and microbiology.

*3 credits, fall modules 3-6, Dr. Galanakis*

**HBP 531 General Pathology**

Introduces the nature and causes of disease, death, reaction to injury, and repair. Analyzes associated structural changes in cells and tissues, with reference to their functional correlates.

*Prerequisites:* Histology, gross anatomy, physiology and biochemistry, prior or concurrent microbiology or permission of instructor.

*3-6 credits with lab, 3 credits without lab, spring modules 5-8, course coordinator: Dr. Fleit*

**HBP 532 Medical Immunology**

Introduces the principles of immunology for professional students, including definition of antigens and antibodies, description of cellular events in the immune response, theories of antibody formation, mechanism of inflammation, hypersensitivity states, and diseases associated with responsiveness of the immune system.

*Prerequisites:* Advanced course in biology, biochemistry, genetics and histology or taken concurrently and permission of the instructor.

*2 credits, spring modules 5-6, course coordinator: Dr. Miller*

**HBP 533 Immunology**

Principles of immunology for graduate students in the biological sciences, including definition of antigens and antibodies, specificity of the immune response, immunoglobulin structure, the genetics of immunoglobulin synthesis, cellular cooperation in the immune response, hypersensitivity, tolerance immunogenetics. Open to advanced undergraduates.

*Prerequisites:* Advanced courses in biology and biochemistry, and permission of instructor.

*3 credits, fall term, course coordinators: Drs. Fleit and Habicht*

**HBP 546 Human Disease: Mechanism in Therapy**

Human disease will be studied at biochemical and molecular cell lines. Aspects of mechanism will be considered with particular attention to pathogenesis and therapeutic intervention. Cross-listed with HBH 546 and BMO 546.

*Prerequisites:* Approval of instructor

*3 credits, spring term, staff*

**HBP 553 Pathology of Neoplasia**

Studies the nature and behavior of neoplastic tissue, the etiologies of cancer, the effect of tumors upon the host. Includes laboratories to acquaint the student lacking a background in histology or physiology with the appearance and behavior of cancer on the tissue and organ level.

*Prerequisite:* Permission of instructor.

*2 credits, spring module 8, course coordinator: Dr. Miller*

**HBP 554 Advanced Immunology**

Selected topics in immunology are discussed using original research literature as the central focus. Students present and discuss the literature in a seminar format.

*Prerequisite:* HBP 531 or 533 and permission of instructor

*2 credits, spring term, Drs. Fleit, Habicht and Miller*

**HBP 556 Laboratory Medicine**

A four-week full-time (6 hr/day) course dealing with clinical laboratory decision making and the basis for the laboratory evaluation of human evaluation of human disease. Didactic and practical presentations by interdepartmental faculty. Intended principally for senior medical students, but also for advanced microbiology or biochemistry students interested in clinical applications.

*Prerequisite:* Permission of instructor.

*6 credits, spring module 5, Dr. Bock*

**HBP 561 Electron Microscopy for Experimental Pathologists**

Uses electron microscope (EM), alone and in conjunction with other methodologies in studies of biological dysfunction. Special techniques include histochemistry, enzyme histochemistry, immunohistochemistry, diffraction, stereo-EM and scanning EM. Design of protocols, preparation and interpretation of data.

*Prerequisite:* Permission of instructor.

*Variable credits, 2-6 per term, fall and spring terms, Dr. Lane*

**HBP 580 Teaching Honors**

Selected students whose performance in the basic required courses for the graduate program is in the top 10 percent conduct tutorials for first-year graduate students in the program and other students taking graduate courses for credit. The tutors are supervised and graded by program faculty of the graduate program. Successful completion of this course will make the students eligible to receive an "Honors in Teaching" on their transcript.

*Prerequisite:* Permission of instructor.

*1 credit, fall and spring terms, graduate program faculty*

**HBP 590 Seminars in Immunology**

A series of monthly seminars focusing on research in progress by the participants, current journal articles in the field of immunobiology, and prepared reviews of specified areas in the general field.

*Prerequisite:* MCB Graduate Students

*1 credit per term, fall and spring terms, staff; course coordinator: Dr. Fleit*

**HBP 622 Clinical Pathologic Correlations: Gross Pathology**

Correlative exercises in clinical pathology and human gross anatomic pathology including surgical biopsy material. Open to students in medical sciences.

*Prerequisites:* Systems pathology and general pathology course. Permission of instructor.

*Variable credits, 1-3, fall term, course directors: Drs. Kane and Miller*

**HBP 691 Journal Club in Pathology**

Provides students with a forum for acquiring skills involved in the critical analysis and presentation of scientific data by active participation in seminars of major topics in cellular and molecular pathology, and critical discussion of selected topics with presentation of papers from the literature.

*Prerequisite:* MCB graduate students

*1 credit, fall and spring terms, Dr. Kew*

**HBP 966 Hematology Conference**

Teaches a given aspect of hematology, oncology or immunology. Staff from medicine, pathology, and nuclear medicine participate, and usual

ly presents a case to introduce the subject. Various teaching aids, such as review of pathological material, are used. Primarily for health sciences professionals.

*Prerequisite:* Permission of instructor.

*Variable credits, 1-2, fall, spring and summer terms 1 and 11, staff (medicine, pathology and nuclear medicine)*

**HBP 967 Tumor Conference**

Considers problems in the management of patients with a malignancy and recommendations for a course of therapy for each patient including a review of a particular aspect of cancer treatment or natural history in depth. Functions as the link between the hospital and the Eastern Oncology Cooperative Group. Primarily for health science professionals.

*Prerequisite:* Permission of instructor.

*Variable credits, 1-3, fall, spring and summer terms 1 and 11, staff*

**HBP 968 Advanced Clinical Pathologic Correlations: Gross Pathology**

Postgraduate correlative exercises in human gross pathologic anatomy that emphasize the gross pathologic basis for altered function and clinical manifestations of disease. Open to physicians and others with advanced degrees in medical sciences.

*Prerequisite:* Permission of instructor.

*Variable credits, 1-3, fall and spring terms, Dr. Kane*

**HBP 969 Anatomical and Surgical Pathology for Residents in Pathology**

To provide practical and clinical experience in tissue pathology. During the four week elective the student is given the opportunity to participate in all aspects of autopsies as well as gross and microscopic examination of surgical specimens. There is ongoing review of general and organ system pathology to reinforce structural-functional correlations. This elective is selected by students who plan a career in pathology as a "hands-on" introduction to the specialty. The elective is also chosen by others, particularly individuals who will enter radiology, and who seek to correlate radiographic and pathologic anatomy. Students who are sufficiently interested and motivated may become involved in relatively independent work-up of selected cases. Primarily for health sciences professionals.

*Prerequisite:* Permission of instructor.

*Variable credits, 1-3, fall, spring, summer terms, Dr. Kane*

**HBP 970 Gross Neuropathology**

This elective is intended to expose the student to what it means to be a neuropathologist and to allow the student to read and directly study major diseases of the brain, spinal cord, nerve and skeletal muscle. The focus of such study will be individualized. Available to the student will be (1) attendance at two weekly neuropathology autopsy brain clinical correlation conferences held at University Hospital and at the Suffolk County Medical Examiner's Office in Hauppauge (2) individual autopsy brain case assignment with attending student review and case sign-out. (3) Neurosurgical, neuropathological rotation to include: review of films and patient data, participation in frozen section diagnosis and final neurosurgical sign out (at University Hospital only). (4) focus on peripheral nerve and skeletal muscle to include independent review of: clinical findings, muscle histochemistry, routine microscopy, electron microscopy, teased fiber preparations and immunofluorescence to be followed by participation at final case review and sign-out with neuropathology attending (at University Hospital only). (5) independent study of study sets, which include Kodachrome sets and microscope slide sets by topic (at University Hospital only).

*Prerequisite:* Permission of instructor.

*Variable credits, 1-3, fall, spring, summer terms, Dr. Seidman*

**HBP 971 Renal Clinicopathologic Correlations**

Acase-oriented, postgraduate course in renal biopsy interpretation and its relationship to patient management.

*Prerequisites:* MD or PhD degree and clinical experience.

*1 credit, fall, spring and summer terms, Dr. Miller*

## Department of Pediatrics

*Chair:* Richard N. Fine

*Professors:* David Annunziata, Stephen Baumgart, Thomas M. Biancaniello, Janet E. Fischel, Marion Castro-Magano, Jonathan Davis, Gabrielle Carlson, Richard N. Fine, Hossein Ghadimi, Joseph Greensher, Donald Gromisch, Martin Gruber, Avinash C. Jerath, Nicholas Lenn, Ronald V. Marino, Howard C. Mofenson, Margaret M. Parker, Robert I. Parker, Cedric J. Priebe, Warren N. Rosenfeld, Leonard Rosenzweig, Alan Spitzer, Grover J. Whitehurst, Thomas Wiswell

*Associate professors:* Walter Backus, Eleni Bacola, Anita Belman, Alma Bicknese, John B. Branche, Mary Cataletto, Latha Chandran, Anupama Chawla, Mariano Lev Chernobilsky, Peter Ciminera, Joseph D. DeCristofaro, Leo Dvorken, Marian J. Evinger, Fred Ferguson, Hershel H. Glatt, Cynthia Kaplan, Stephen Katz, Harvey Kolker, Marion L. Koomey, Haesoon Lee, Boris Lustik, V. T. Maddaiah, Steven A. Maitinsky, Leonard Marino, Seymour B. Musiker, Sharon A. Nachman, Pramod Narula, Michael Nussbaum, Stephen Parles, John C. Pomeroy, Leslie Quinn, Irwin L. Schwartz, Jack Sherman, Thomas Smith, Richard Sosulski, Peter S. Tolins, Rita P. Verma, David Volkman, Robert Wasnick, Thomas A. Wilson

*Assistant professors:* Renu R. Aggawal, Milton Agulnek, Arie Aloni, Richard Ancona, Jane Aronson, Viswanathan Balachandrar, Howard Balbi, Alexander Benitt, Rachel A. Bergeson, Harvey Bernstein, William H. Bikoff, Robyn Blair, Denise Blumberg, John F. Bisocco, Harriet S. Boxer, Ivy I. Boydston, William Bryson-Brockman, Jose Canas, Shang Yao Chen, Thulasi Cheruvanky, Cathy Coleman, John A. Colucci, Rebekah B. Conroy, Hema Dalal, Christopher DeSanto, Mehmet Yilmaz Dincsoy, Charles J. Dunn, Michael Egnor, Nelson S. Erhart, Juan Espinoza, Stanley Everett, Kimberley Fenton, Robert Festa, Mayte Figueroa, Damian Forletti, Patricia Galvin-Parton, Blanca R. Gamboa, Polina S.Gelfer, Lynda L. Geller, Mohammad Ghofrani, Louis M. Goldblum, Abby J. Greenberg, Susan Gunduz, Susan Guralnick, Gerald R. Hartman, Martin Hauptman, David Hyman, Sharon L. Inkeles, George M. Johnson, Ivan Kalina, Martin P. Kaplan, Eileen Kelly, Scott M. Klein, Mitchell Kleinberg, Sujatha Kosuri, Leonard Kristal, Mark J. Kropf, Andrew H. Lane, Edward Langenback, Betty Chi-mei Lee Kuo, Marvin A. Lieber, Mark S. Lowenheim, Boris Lustik, Susan Mangiameli, Daniel Mayer, Carolyn Milana, Peter Morelli, Lisa Mueller, Richard Nickerson, Divna Nikolic-Djolic, Bettina Niederer, Patricia Nolan, Ellen Oppenheimer, Jagan N. Pahuja, Anil G. Palekar, James Parles, Kalpana Patel, Ammukutty Paulose, Paul H. Penzer, Lucy Pontrelli, Devina Prakash, Prasanthi Reddy, Frederick J. Reindl, Carolyn Robbins, Irina Rubin, Dominick Sabatino, Richard Salo, Arnold W. Scherz, Howard Schreiber, Arthur J.Schwager, Michelle Seitz, Jila harif, Saroja Siddharth, Robbyn Sockolow, Yosef Soleymani, Daniel E. Sloniewsky, Neelkamal S. Soares, Alfred I. Spieler, Shanthi Sridhar, Raphael Strauss, Behzad Talebian, Catherine E. Tayag-Kier, David H. Tegay, Liliana Tique, Joseph Thomas, Janice Valmassoi, Nora E. Wecker, Dilys A. Whyte, Santiago A. Wong, Janaki Yadlapalli, Barbara Young, Rose Marie Young

*Instructors:* Albert Adler, Farzana Ahsan, Keith Ancona, Taik Yong Ban, Lena Baram, Donna Baranek, Laura Bennett, Stuart Berman, Jennifer Byrne, Teresa Carney, Siobhan Cassidy, Lisa Clark, Jennifer Clark-Natasi, William W. Colden, Jean Connor, Zenaída Cruz, Michell Davi, Traci Downs, Agboola O. Fatiregun, Ada Fenick, Jay A. Freed, Laurence J. Galinkin, Ilene Goldstein, Jeanne Greenfield, Jack M. Greenwood, Deborah

Guigliano, Celso Licelar Hofillna Jr., Mohinder K. Guram, Jennifer Haimowitz, Darius Holmes, Harriet Hellman, Claudia Herbert, Debra Hickey, Celso Hofelena, Roy Horowitz, Kenneth G. Huml, Kerry Gallagher- Walsh, Gail Kaden, Susan Katz, Mitsu A. Kee, Michele Kelly, Nikhat S. Khan, Jason Kronberg, Bernard Lau, George V. LoVece, Rosemary Mahan, Richard E. Manners, Phyllis Marion, Paul Martinez, Kumar Mecheri-Madom, Patricia Mele, Maria Mineo, Pamela Minett, Stephan Nagler, Jeanmarie A. Napolitano, Tulika Narain, Roberta Nataloni, Magalena Oleszak, Fernando Ordonez, Marc Ovadia, Linda H. Perangelo, Mihailo Petrovic, Linda H. Ponzner, Shahina Qureshi, Sarala Radhakrishnan, Youchan Rhee, Carlos J. Rivera, Anne Rohan, Lisa Romard, Dov Rosen, Debra Sansoucie, Despina Scheyer, Anna Schwartz, Patricia Schwarz, Barbara Seifert, Reid Selden, Marjorie Serotoff, Foqzia Siddiq, Arlene Smaldone, Tracey L. Spinnato, Michael P. Stein, Karen Sulitzer, Rohit Talwar, Alexander A. Tocher, Geraldo Tolentino, Robert Trepel, Decerina Uy, Mona Vani, Barbara Wieder, Ian Winkler, Maicie M. Wong, Catherine Zillmann

The Department of Pediatrics provides medical students with a number of educational offerings. In the preclinical educational years, we participate in the first year course providing students with an introduction to clinical medicine, and faculty participate in second year course teaching. In the third year of undergraduate medical education, pediatrics is among the required rotations, and students participate in the clinical evaluation and care of patients from birth through adolescence. Senior year rotations may be selected from an array of offerings in the pediatric subspecialties as well as general pediatric medicine in the format of subinternship and elective month-long courses.

The pediatric teaching program is a three-year program designed to provide a solid foundation for clinical practice or for further study in the pediatric specialties, including pediatric research.

The program emphasizes basic principles of scientific medicine and reasoning and treats pediatrics as an organic continuum in which the individual pediatrician must function to coordinate complex systems of disease prevention as well as treatment. Special emphasis is placed on community and ambulatory practice.

The program is based at University Hospital, which provides 40 pediatric beds, 10 Pediatric Intensive Care (PICU) beds, 40 newborn intensive care beds, 30 bassinets and active ambulatory care, including the Urgent Care Center. In addition, the service operates in the Coram Health Center, an ambulatory care center of Suffolk County; in the University Health Service, for adolescent medicine; and in satellite affiliates in Central Islip, East Moriches, East Setauket, Patchogue, Southold, and the Cody Center for Autism & Developmental Disabilities, which together provide for 65,000 ambulatory encounters per year.

Elective experiences are available in all fields of pediatrics, either at University Hospital or at affiliated programs at Nassau University Medical Center or Winthrop University Hospital.

## Department of Pharmacological Sciences

Chair: Jeffrey E. Pessin

*Distinguished professors:* Seymour Cohen (Emeritus), Arthur P. Grollman, William vander Kloot (Emeritus), Edward Reich

*Professors:* Paul R. Adams, Daniel Bogenhagen, Moises Eisenberg, Paul Fisher, Francis Johnson, Craig C. Malbon, Roy Steigbigel, Joel Sussman, Masaru Takeshita (Emeritus), Stephen Vitkun, David L. Williams

*Associate professors:* Miguel Berrios, Laura Fochtmann, Michael A. Frohman, Charles Iden, Caroline Kisker, Masaaki Moriya, Sidonie A. Morrison, Joav Prives, Shinya Shibutani

*Assistant professors:* Roger Cameron, Margery Connelly, Howard Crawford, Carlos de los Santos, Dax Fu, Holly Miller, Thomas Rosenquist, Styliani-Anna Tsirka

*Adjunct professors:* Rodney Bednar, Richard Miksicek, Fernando Salles, Sidney Strickland

*Instructor:* Kimberly Conlon, Daryl Henderson, FAYANNE THORNGATE

Pharmacology is an interdisciplinary science that deals with the effects of chemicals on biological systems. Faculty research interests emphasize the molecular mechanisms of the action of drugs, hormones, and toxins. Teaching is directed towards an understanding of the basic principles underlying the therapeutic and toxic actions of drugs and chemicals.

The department provides instruction for professional students in the schools of the Health Sciences Center and offers graduate and upper-division courses in pharmacology, toxicology, and therapeutics. An undergraduate pharmacology program is provided through the College of Arts and Sciences.

### Courses

#### **HBH 330 Fundamentals of Pharmacology I**

Covers the basic principles that underlie the action of drugs on physiological processes. These principles are applied to the specific action of drugs on the autonomic nervous system. In addition, the pharmacology of cardiovascular drugs are covered in detail.

2 credits, module 3, Dr. Prives

#### **HBH 331 Fundamentals of Pharmacology II**

A continuation of HBH 330. Covers the action of drugs on individual systems as well as drug-drug interactions emphasizing the mechanisms of drug action. Surveys therapeutic applications and adverse drug reactions.

Prerequisite: HBH 330

3 credits, modules 4-6, Dr. Prives

#### **HBH 332 Pharmacology in Cardiorespiratory Sciences**

Includes the basic principles of drug actions and covers drug applications in the autonomic, cardiovascular and respiratory systems. For cardiorespiratory sciences students enrolled in the School of Health Technology and Management.

3 credits, modules 3, 4, not offered all semesters, Dr. Prives

#### **HBH 393, 394, Topics in Pharmacology\***

Tutorial readings in pharmacology with the periodic conferences, reports and examinations arranged with the instructor. Open to third and fourth year students.

Prerequisite: Permission of the instructor.

1-5 credits per term, fall and spring terms, staff

#### **HBH 396, 398, 399 Research Project in Pharmacology\*\***

Independent research under faculty supervision, emphasizing principles of experimental design, data collection, evaluation of findings and reporting of results. Project report required. May be repeated.

Prerequisites: Laboratory experience and permission of supervising instructor.

1-6 credits per term, summer, fall and spring terms, staff

\*\*Arts and Sciences students may receive no more than a total of six credits in one term of any combination of courses numbered HBH 393 through 399.

\*Joint Appointment, Cold Spring Harbor Laboratory

**HBH 531 Principles of Medical Pharmacology**  
Basic principles that underlie actions of drugs on physiological processes with particular reference to their therapeutic and toxic actions. Primarily for medical, dental and graduate students.

*Prerequisites:* Physiology, biochemistry, and permission of instructor.  
5 credits, modules 4-6, Dr. Frohman and staff

**HBH 545 Biochemical Laboratory Techniques**  
Introduces theoretical principles and experimental techniques used in modern biochemical research. Lectures and demonstrations present topics in laboratory computers, chromatography, nuclear magnetic resonance, mass spectrometry, protein sequencing, cloning technology, sedimentation, electrophoresis, and ligand binding. Includes procedures for the safe handling of toxic chemicals and radioisotopes.

*Prerequisite:* Permission of instructor.  
3 credits, fall term, Dr. Bogenhagen and staff

**HBH 553 Signal Transduction**  
The course will emphasize fundamental concepts in signal transduction (e.g. membrane-protein and protein-protein interactions, amplification signals) and individual lectures will apply these concepts at each stage of cell signaling from the cell surface to the nucleus, where signal transduction leads to specific gene expression. Crosslisted with HBY 533. ABCF grading.

3 credits, spring term / odd years, staff

**HBH 580 Selected Topics in Pharmacology**  
Student seminars and readings on topics arranged through consultation with staff.

*Prerequisite:* Permission of instructor.  
Variable and repetitive credits, 1-8 per term, fall and spring terms, staff

**HBH 590 Pharmacology Seminars**  
Advanced research seminars by staff and visiting lecturers.

*Prerequisite:* Permission of instructor.  
1 credit, repetitive, fall and spring terms

**HBH 599 Graduate Research in Pharmacological Sciences**  
Original research projects under faculty supervision.

*Prerequisite:* Permission of instructor.  
Variable credits, 1-12 per term, fall, spring and summer terms, staff

**HBH 601 Practicum in Teaching Pharmacology**  
Practical experience and instruction in the teaching of pharmacology carried out under faculty orientation and supervision.

*Prerequisite:* Permission of instructor and full-time graduate status  
1 credit, fall and spring term

**HBH 631 Principles of Drug Action**  
This course is designed to provide a quantitative understanding of the basic principles by which drugs interact with living systems at the cellular and organismal levels. Topics include the mechanisms of drug transport through membranes, interaction of drugs with receptors and binding proteins, drug distribution, biotransformation of drugs, enzymes of stage I and stage II metabolism, cytochrome p450 gene families and regulation of p450 gene expression, mechanisms of renal excretion of drugs and metabolites, pharmacokinetics of constant drug infusions and intermittent dosing regimens, and application of pharmacokinetic principles to protein and mRNA induction and turnover. Students apply pharmacological principles in a series of problem-solving exercises.

*Prerequisite:* Permission of instructor, Dr. Williams  
Fall semester, 1 credit, ABCF grading

**HBH 632 Molecular Interactions of Drug Structures**  
This course provides an overview of the most current approaches to analyze and understand the interactions between a drug and its target and how this information is used for the design and development of new drugs. The individual lectures will cover the use of microarray technology for broad gene expression analysis and to analyze differential gene expression for therapeutic gene target identification. Bioinformatics will be used as a tool for homology searches, especially in light of the genome projects. The detailed structural analysis of drug

target interactions by X-ray crystallography and NMR spectroscopy as a basis for the design of new drugs will be discussed on the basis of very recent examples. Advanced computer simulation techniques will be discussed and will include the use of molecular mechanics energy functions to optimize biomolecular structures, predict ligand binding modes and energetics.

*Prerequisite:* Permission of instructor, Dr. Kisker  
Fall semester, 1 credit, ABCF grading

**HBH 633 Physiological Action of Drugs**  
Selected applications of drugs used in clinical medicine, illustrating current concepts and problems at the intersection of pharmacological basic science and therapeutic treatment. Settings to include the management of obesity, psychiatric disease and cardiac disease.

*Prerequisite:* Permission of instructor, Dr. Frohman  
Fall semester, 1 credit, ABCF grading

**HBH 634 Chemical Manipulation of DNA Metabolism**  
This course will focus on drugs that act by inhibiting DNA synthesis, including inhibition of precursor synthesis. The course will include original research papers on biochemical mechanisms and clinical applications of antiviral and anti-cancer therapeutic agents.

*Prerequisite:* Permission of instructor, Dr. Fisher  
Spring semester, 1 credit, ABCF grading

**HBH 635 New Concepts in Chemotherapy**  
This course compares mechanisms of action of drugs used for antibacterial and anti-cancer chemotherapy. The lecture material stresses how selective toxicity is achieved to obtain cytostatic or cytotoxic effects. Original research papers are discussed on drug-induced apoptosis, mechanisms whereby cells develop resistance to chemotherapy and novel strategies to overcome this resistance.

*Prerequisite:* Permission of instructor, Dr. Bogenhagen  
Spring semester, 1 credit, ABCF grading

**HBH 636 Drug Discovery and Toxicity**  
Drug Discovery and Toxicity will present methods used to identify new drug candidates and how these substances may be modified chemically to construct active drugs with excellent pharmacodynamic and pharmacokinetic properties. Toxicity of drugs and new drug compounds will be explored using studies of specific drugs. Toxic responses that appeared in the general population and mechanisms leading to toxicity will be discussed.

*Prerequisite:* Permission of instructor, Dr. Iden  
Spring semester, 1 credit, ABCF grading

**HBH 655 Neuropharmacology**  
An advanced course for graduate students interested in developing an understanding of neuropharmacology and research on this topic. Following a general introduction to the nerve cell structure, synaptic and chemical transmission, three themes receptors, receptors as channels and G-protein-coupled receptors are developed. Recent advances in cell and molecular biology provide the framework for instruction and discussion. Crosslisted with BNB 655.

*Prerequisite:* Permission of instructor  
3 credits, fall term, Dr. Morris

**HBH 660 Research Proposals in Regulatory Biology**

A special topics course in which faculty present current research proposals for discussion and critical review. Students develop short research proposals for their midterm evaluation and present a full research proposal for the final evaluation. The goal of this course is to help students develop the skills required to design, present and defend a focused research plan. Since proposals developed during this course form the basis of a student's Qualifying Exam, registration is limited to students in the Graduate Program in Molecular and Cellular Pharmacology.

*Prerequisite:* Graduate biochemistry, molecular genetics, cell biology. Previous or concurrent registration in Principles of Pharmacology I and II.

3 credits, spring term

**HBH 686 Minicourse: Advanced Seminars in Pharmacological Sciences**

A series of five to six lectures by members of the Stony Brook faculty in conjunction with distinguished outside speakers on topics of current importance in pharmacology and related areas of biochemistry, molecular biology, and cell biology.

1-2 credits, fall and spring term

**HBH 669 Thesis Research in Pharmacology**

Original investigation undertaken as part of the Ph.D., program under supervision of thesis adviser and committee.

Prerequisite: Permission of thesis adviser.

Variable and repetitive credits, 1-12 per term, fall and spring terms

**HBH 699 Dissertation Research on Campus**

Original investigation undertaken as part of the Ph.D., program under supervision of thesis adviser and committee on site, where major portion of their research will take place on Stony Brook University Campus, Cold Spring Harbor or Brookhaven National Laboratory

Prerequisite: Permission of thesis adviser.

Variable and repetitive credits, 1-12 per term, fall and spring terms

**HBH 700 Dissertation Research in Pharmacology off Campus - Domestic**

Original Investigation undertaken as part of the Ph.D., program under supervision of thesis adviser and committee off site, and is to be registered for when a major portion of the student's research will take place off-campus but in the United States and or United States provinces.

Prerequisite: Permission of thesis adviser.

Variable and repetitive credits, 1-12 per term, fall and spring terms

**HBH 701 Dissertation Research Off Campus - International**

Original Investigation undertaken as part of the Ph.D., program under supervision of thesis adviser and committee off site, and is to be registered for when a major portion or research will take place outside of the United States and or United States provinces.

Prerequisite: Permission of thesis adviser.

Variable and repetitive credits, 1-12 per term, fall and spring terms

**HBH 800 Full-time Summer Research**

Full-time laboratory research projects supervised by staff members.

Prerequisites: Permission of instructor and full-time graduate student status.

0 credit, summer term, staff

**HM 800 Clinical Pharmacology**

This course is designed to provide fourth-year medical students with practical information about therapeutics. Using a case-oriented approach, students are taught to develop a systematic approach to specific, more common, therapeutic interventions. Basic principles of clinical pharmacology are emphasized with the goal of having students understand drug interactions, dosing schedules, alterations needed in treating the elderly and patients with renal or hepatic dysfunction. Restricted to fourth-year students only.

Prerequisite: Permission of Instructor

Drs. Grollman, and Steigbigel

For the undergraduate pharmacology program offerings in the College of Arts and Sciences, please refer to the Undergraduate Bulletin.

**BCP 394 Environmental Toxicology and Public Health**

Principles of toxicology will be presented and problems associated with major classes of toxic chemicals to human and environmental health examined. Case studies dealing with current waste management issues will also be discussed. Students will be required to integrate basic information on the chemistry and biology of toxic compounds and apply this knowledge in a multidisciplinary context.

Prerequisite: BIO 201 (or the discontinued BIO 151) CHEM 131 (or equivalent) or permission.

This course fulfills an upperdivision DEC requirement in Category H.

**BCP 400 Writing in Pharmacology**

See requirements for the major in pharmacology, upper-division writing requirement. Satisfactory/Unsatisfactory grading only.

Prerequisites: Pharmacology major; upper-division standing  
Fall and spring, 0 credits

**BCP 401 Principles of Pharmacology**

Basic principles and mechanisms of drug distribution, absorption, metabolism, and elimination. Principles of chemical carcinogenesis and tumor promotion. Autonomic, smooth-muscle, and CNS pharmacology. Pharmacology of specific drugs of historical interest including alcohol, antibiotics, aspirin, nicotine, and morphine. Review of anticoagulants and thrombolytic agents, antiparasitics, and drugs for the treatment of allergic conditions and gout.

Prerequisites: BIO 362; CHE 322 and 327; a G.P.A. of 3.0 or higher in these courses and their prerequisites

Corequisite: BCP 403

Fall, 3 credits

**BCP 402 Advanced Pharmacology**

Advanced concepts of drug metabolism, pharmacokinetics, biochemical and molecular mechanisms of drug action, and drug resistance in human disease states. Toxicological agents and environmental pollutants. The pharmacology of autotoxins, anti-inflammatories, immunosuppressants, and antiasthmatics. Rational drug design and drug receptor interactions using computer molecular modeling techniques.

Prerequisites: BCP 401 and 403

Corequisite: BCP 404

Spring, 3 credits

**BCP 403 Principles of Pharmacology Laboratory**

The use of computer software for data collection and analysis. Illustrations of the principles of drug absorption, distribution, metabolism, and elimination. In vitro assays that demonstrate dose response relationships. Principles of bioassays. Determination of drug potency using isolated tissue preparations. Determination of the affinity of an antagonist for an agonist at a receptor site. Evaluation of potencies of anesthetics, analgesics, and anticonvulsant agents.

Corequisite: BCP 401

Fall, 2 credits

**BCP 404 Advanced Pharmacology Laboratory**

The use of molecular modeling software for the understanding of structure activity relationships. In vivo studies to demonstrate the pharmacological mechanism of action of drugs acting on the autonomic, cardiovascular, and renal systems. Pharmacokinetic studies, using HPLC, to determine the rate of absorption, distribution, and excretion of therapeutic agents. Radio- and enzyme-immunoassays for the detection of circulating hormones. Cell culture techniques for drug determination and evaluation.

Prerequisites: BCP 401 and 403

Corequisite: BCP402

Spring, 2 credits

**BCP 406 Pharmacology Colloquium**

Research Seminars in Pharmacology and toxicology presented by faculty and distinguished scientists from academic and industrial institutions. A one-hour Journal Club/Discussion Session precedes seminar to review a reference paper relevant to the research concepts to be presented. Students are expected to develop an understanding of the scientific principles given in the colloquium. Speakers meet with the students after the seminar to discuss research concepts and to answer questions. May be repeated.

Prerequisites: BIO 202 and 203; CHE 322; g.p.a. of 3.0 required in these courses and their prerequisites; permission of department  
Spring, 2 credits.

**BCP 475 Undergraduate Teaching Practicum in Pharmacology**

Prerequisites: Pharmacology Major; U-4 standing; s/u grading; permission of department  
3 credits - S / U grading

**BCP 487 Research in Pharmacology**

Completion of an individual student research project under the super-

vision of a faculty member. Previously acquired laboratory course techniques and new procedures are utilized. Experimental results must be submitted to the department for grade evaluation in the format of a research report. Not for credit in addition to HBH 396, 398, and 399. May be repeated.

*Prerequisites:* BIO 202 and 203 ( or the discontinued BIO 152); CHE 322 and 327; a G.P.A. of 3.0 in these courses and their prerequisites; permission of instructor and department

*Fall and spring, 0 to 3 credits*

#### **BCP 488 Internship**

Research participation in off-campus laboratories, the pharmaceutical industry, and other academic and public agencies. Students are required to submit to the department a proposal at the time of registration and a report at the end of the semester. Satisfactory/Unsatisfactory grading only.

*Prerequisites:* BIO 361; CHE 322; G.P.A. of 3.0 or higher in these courses and their prerequisites; permission of department and Office of Undergraduate Studies

*Summer, 3 to 6 credits*

### **Department of Physical Medicine and Rehabilitation**

*Acting Chair:* Jennifer Semel-Carlos Concepcion (St. Charles)

*Associate Professor:* Lyn Weiss (NUMC)

*Assistant professors:* Ernesto S. Capulong, Magda Fahmy (VA), Walter Gaudino, Harvey Goldberg, Adam Isaacson, Dae-Song Kim, Thomnas Pobre (NUMC), Ajendra Sohal, Susan Stickevers (VA), Jay Weiss

*Instructors:* S. Pani Akuthota, Sandra Barrett

*Attendings:* Adam Carter, Alan Ng, Wing NG, Yu-Jen Lai

The department of Physical Medicine and Rehabilitation provides an educational experience for fourth year students who are interested in the specialty. Students will gain exposure to the field of rehabilitation medicine in a variety of settings including inpatient, outpatient and electromyography. Students will learn the psychiatric approach to patient care, and the roles of the various rehabilitation team members. The elective is based at St. Charles Hospital Rehabilitation Center.

Students may contact Craig H. Rosenberg, MD, program Director of the University Physical Medicine and Rehabilitation Residency training program, at (631) 474-6879 or at [Craig.Rosenberg@stcharles.org](mailto:Craig.Rosenberg@stcharles.org)

### **Department of Physiology and Biophysics**

*Chair:* Peter R. Brink

*Professors:* Nada Abumrad, William B. Benjamin, Peter R. Brink, John B. Cabot, Carol Carter, Ira S. Cohen, Norman H. Edelman, Emelia Entcheva, Jack Fajer, Michael Goligorsky, Roger A. Johnson, Irvin B. Krukenkamp, Richard T. Mathias, Stuart G.A. McLaughlin, Lorne Mendell, Leon C. Moore, Michael R. Rosen, John Sacks, Sami Said, Gerald Smaldone, Steven O. Smith, George Stephano, John C. Sutherland, William VanderKloot (Emeritus)

*Associate professors:* Ki H. Chon, Chris Clausen, James P. Dilger, Raafat El- Maghrabi, Yaacov Hod, James B. Konopki, David McKinnon, W. Todd Miller, Suzanne Scarlata, Irene C. Solomon, Ilan Spector, Hsien-Yu Wang

*Assistant professors:* George Baldo, Roger Cameron, John Flanagan, Mary Frame, Junyuan Gao, Scott Lowe, Nicholas Nassar, Srinivas Pentyala, S.V. Ramanan, Mario Rebecchi, Michael Sampson, Ramakrishna Seethala, Kulandiaappan Varadaraj, Thomas White

The department of physiology and biophysics offers a program of study leading to the Doctor of Philosophy degree. Physiology and biophysics has responsibility for teaching in the schools of the Health Sciences Center and for graduate studies. Molecular, cellular, organ physiology and biophysics are the principle areas of teaching and research specialization. The department's focus of interest is in three general areas:

- 1) Hormonal regulation of cell function and metabolism, with special emphasis on intercellular and intracellular signalling mechanisms
  - 2) Biophysical studies of membranes and proteins
  - 3) Cellular physiology and electrophysiology
  - 4) Preconditioning and arrhythmia prevention
- Studies are conducted at the molecular, sub-cellular, cellular, organ and intact animal levels.

#### **Courses**

##### **HBY 350 Physiology**

The normal functioning of human tissues and organs and their regulation and integration by the nervous and endocrine systems. Emphasizes physiological control systems and the preservation of the constancy of the internal environment.

*Prerequisites:* College courses in biology and chemistry and some background in physical sciences or permission of the instructor. Primarily intended for students in the SHTM Program and Pharmacology majors. 4 credits, fall term, Mod G, Dr. Clausen and staff

##### **HBY 393, 394 Special Topics from Physiology and Biophysics Literature**

Tutorial readings in physiology and biophysics with periodic conferences, reports and examinations arranged with the instructor. Open to junior and senior students.

*Prerequisite:* Permission of instructor.

*Variable credits, 1-2 each, fall and spring terms, staff*

##### **HBY 398, 399 Research Project in Physiology and Biophysics**

An independent research project under faculty supervision, that emphasizes the principles of experimental design, data collection, evaluation of findings, and reporting of results. Project report required. May be repeated.

*Prerequisites:* Laboratory experience and permission of the supervising instructor.

*2-4 credits per term, fall and spring terms, staff*

##### **HBY 501 Physiology**

Introduces normal function of human tissues and organs and their regulation by nervous and endocrine systems. Emphasizes the organization and function of physiological control systems and the maintenance of a constant internal environment. Enrollment restricted to fully matriculated graduate students, with permission of instructor.

*4 credits, fall term, staff*

##### **HBY 502 Medical Physiology**

A graduate level approach to the physiology of the organ systems is addressed in a lecture format with the emphasis on problem-solving. Relevant clinical correlations are addressed at the end of each block insofar as they illustrate how symptoms and signs of disease result from disordered physiology. Organ Systems addresses the structure and function of the cardiovascular, respiratory, renal, gastrointestinal, endocrine, skeletal, reproductive and integumentary systems.

*Prerequisite:* permission of instructor

*4 credits, spring term, ABCF grading, staff*

##### **HBY 511 Introduction to Biophysical Chemistry**

Introduces the chemical principles and techniques needed for the study



of biological macromolecules. Topics covered include solution chemistry, chemical thermodynamics, binding and dissociation equilibria, denaturation phenomena, spectroscopy, and hydrodynamics. This course is intended to prepare non-chemistry majors for more advanced work in biophysics. Crosslisted with HBM 511.

*Prerequisite:* Permission of instructor.  
2 credits, fall term

**HBY 530 Cellular Physiology and Biophysics**

Cellular structure and function. Topics include ion channels, excitability, transport, energetics and metabolism, contraction, secretion, and communication within and between cells. Emphasizes quantitative analysis of cellular processes.

*Prerequisite:* Undergraduate physics, physical chemistry, biology, calculus, or permission of instructor.  
4 credits, fall term

**HBY 531 Medical Physiology**

A graduate-level introduction to the physiology of the organ systems with ultrastructural correlations. Ultrastructural correlations are demonstrated in a laboratory setting using histological preparations in conjunction with electron micrographs illustrating the relevant ultrastructure needed to understand the normal functioning of tissues and organs. The physiology of the major organ systems is addressed in a lecture format with the emphasis on problem solving. Relevant clinical correlations are addressed at the end of each block in so far as they illustrate how symptoms and signs of disease result from disordered physiology. Organ Systems addresses the structure and function of the cardiovascular, respiratory, renal, gastrointestinal, endocrine, skeletal, reproductive, and integumentary systems.

*Prerequisites:* Admission to medical or dental school and permission of instructor.  
8 credits, spring modules, Dr. Cameron

**HBY 552 Physiology of Excitable Membranes**

Covers the resting potential, the basis of the action potential, linear cable properties and synaptic transmission. Studies squid axon, the neuromuscular junction and the cardiac Purkinje fiber model systems.

*Prerequisite:* Physics, physical chemistry and calculus.  
3 credits, spring term, even years, Drs. Cohen and Mathias

**HBY 553 Signal Transduction**

The course will emphasize fundamental concepts in signal transduction (e.g. membrane-protein and protein-protein interactions, amplification of signals), and individual lectures will apply these concepts at each stage of cell signalling from the cell surface to the nucleus, where signal transduction leads to specific gene expression.

3 credits, spring term, odd years, ABCF grading, staff

**HBY 554 Principles of Neuroscience**

The aim of this course is to highlight and create an understanding as to how the human nervous system operates.

*Prerequisite:* Undergraduate biochemistry, biology and chemistry. Permission of instructor.  
2 credit, fall term

**HBY 561 Statistical Analysis of Physiological Data**

1 credit, fall term

**HBY 562 Model-based Analysis of Physiological Data**

1 credit, fall term

**HBY 563 Measurement and Analysis in Physiological Research**

1 credit, spring term

These courses are designed to introduce the principles of experimental design relevant to modern physiological research. Emphasis will be placed on data acquisition, signal processing and statistical analyses associated with the basic experimental approaches currently used in physiological research.

*Prerequisites:* Introductory statistics and permission of instructor.  
1 credit each, fall and spring terms, ABCF grading

**HBY 557 Advanced Physiology**

This course is designed to introduce students to integrative approaches in biomedical research. Emphasis will be placed on the primary physiological concepts of control, communication, signal processing, metabolism and replication.

*Prerequisites:* Systems Physiology, Biochemistry, an permission of instructor  
3 credits, fall term

**HBY 570 Student Journal Club**

Graduate student presentation on a selected topic with faculty consultation.

*Prerequisite:* Limited to students of the Physiology and Biophysics program.

1 credit each semester, repetitive, fall and spring term

**HBY 590 Special Topics in Physiology and Biophysics**

Students seminars on topics to be arranged through consultation with faculty members.

*Prerequisite:* Permission of instructor.

Variable and repetitive credits, 1-2 per term, fall and spring terms, staff

**HBY 591 Physiology and Biophysics Research**

Original investigation under the supervision of a staff member.

*Prerequisite:* Permission of instructor.

Variable and repetitive credits, 1-12 per term, fall and spring terms, staff

**HBY 690 Seminar in Physiology and Biophysics**

Seminars and discussions on major topics in physiology and biophysics by students, staff and visiting scientists.

*Prerequisite:* Permission of thesis adviser

Variable and repetitive credits, 1 per term, fall and spring terms, staff

**HBY 695 Practicum in Teaching in Physiology and Biophysics**

Practical experience and instruction in the teaching of physiology and biophysics carried out under faculty orientation and supervision.

*Prerequisite:* Permission of instructor.

Variable and repetitive credits, 1 per term, fall and spring terms, staff

**HBY 800 Full-time Summer Research**

Full-time laboratory research projects supervised by staff members.

*Prerequisite:* Permission of instructor and full-time graduate status.  
0 credit, summer term, staff

## Department of Preventive Medicine

*Chair:* John S. Kovach

*Distinguished Professor:* M. Cristina Leske

*Distinguished Service Professor:* Dorothy S. Lane

*Professors:* Evelyn Bromet, John Coulehan, Wajdy Hailoo, David Harris, Steven Jonas, Dorothy S. Lane, M. Cristina Leske, Nancy R. Mendell, Andre O. Varma (Emeritus), Peter C. Williams

*Associate professors:* Clare Bradley, Steven Finch, Roger Grimson, Anselm J. Hennis, Mary Hibberd, Leslie Hyman, Eugene J. Mitacek, Elinor Schoenfeld

*Assistant professors:* Catherine Belling, Mary Cavanagh, John Chen, David G. Graham, Iris Granek, Abby Greenberg, Eugene Komaroff, Martin Mayer, Sara L. Mendesohn, Catherine Messina, Barbara G. Nemesure, Daniel New, Michael L. Rainey, Henry Thode, Suh-Yuh Wu

*Lecturers:* Oliver C. Schepers, Eugene Theissen, Mahfouz H. Zaki

*Instructors:* Leo DeBobes, Lynette Dias, Brian Harper, John Marchese, Linda Mermelstein, Shibani Ray-Mazumder, Hector Sepulveda, Anthony Shih, Bette Taylor, Lucille Weinstein

The department has three divisions-the division of epidemiolo-

gy, which also includes biostatistics; the division of occupational and environmental medicine; and the division of medicine in society, which includes the Institute of Medicine in Contemporary Society.

The department applies these skills and activities toward three major goals:

1. teaching of the discipline
2. conduct of research therein
3. clinical practice of occupational and preventive medicine

A major emphasis of the division of epidemiology is on the epidemiology of eye diseases, cancer, and Lyme disease; a major emphasis for the division of occupational and environmental medicine is diagnosis, treatment and prevention of work and environmental illnesses. Disciplines also included in the department are healthcare delivery systems analysis and the study of ethical and legal issues in healthcare. In its clinical aspects, the department involves the planning, operating, and evaluation of disease prevention, healthcare and maintenance programs, employee health services, and the practice of applied epidemiology and biostatistics and clinical ethics.

The department has teaching responsibilities at each stage of medical education. The department offers a required Introduction to Preventive Medicine course to medical students in the first year. This course presents basic epidemiological and statistical concepts used to study health and disease in populations and describes their application in primary, secondary and tertiary prevention. The department also offers a coordinated, four-year course titled Medicine in Contemporary Society. This series of courses deals with ethics, law, economics, history and other social aspects of medicine. Teaching of social issues in medicine continues into the clinical and postgraduate years. A broad range of electives—from clinical experience in a neighborhood health center to basic research in epidemiology, injury control, computing, occupational medicine and health services systems—is offered in the fourth year.

In addition to teaching medical students, the department offers academic and field training for residents in preventive medicine. Residents can take one-third of the course requirements for the Master's in Public Health degree offered by Columbia University, within the department of preventive medicine at Stony Brook. Residents can also complete the master's degree requirement in a joint program offered by the department and the W. Averell Harriman School for Management and Policy.

The department offers several elective and crosslisted courses for other health professional and pre-professional students.

### Courses

#### **HMC 200 Medicine and Society**

Examines traditional concerns of the humanities and social sciences as they interface with healthcare and its delivery. Clinical cases are presented by practicing physicians or other health professionals to introduce such topics as confidentiality, experimentation, death and dying, allocation of scarce resources, etc. Focus on the social, historical, ethical, and humanistic import of the cases.

3 credits, Dr. Williams and staff

#### **HMC 331 Legal and Ethical Issues in Health Care**

Introduces some of the major ethical and legal doctrines that affect healthcare professionals. Addresses specific problem situations, including the right to refuse medical, mental and social care; the right to life and its limits (e.g., suicide, euthanasia, abortion); the right to receive care access to and evaluation of healthcare delivery. Emphasizes sensitizing students to legal and ethical issues.

3 credits, Dr. Williams

#### **HMC 361-G Literature and Medicine**

Explores major themes of medical care and illness as presented in works of poetry, prose, and drama. Includes personal and ethical dilemmas confronted by doctors; special characteristics and discourse of the medical setting; the experience of being ill; philosophical, social, and spiritual dimensions of the clinical encounter; and the search for meanings in medical events.

Prerequisite: One course in literature or HMC/SOC 200

3 credits, Dr. Coulehan

#### **HMC 486 Practicum in Health and Society**

Observation and seminar of readings in humanities and social sciences. Primarily for upper-division students, especially those completing a minor in Health and Society.

Prerequisite: Permission of instructor

3 credits, Dr. Williams

### **Department of Psychiatry and Behavioral Science**

Chair: Mark J. Sedler

Professors: Sheila Blume, Evelyn Bromet, Gabrielle A. Carlson, Thomas Craig, Max Fink (Emeritus), Kenneth Gadow, Marvin R. Goldfried, Dimitry Goldgaber, Fritz Henn, Robert J. Hitzemann, Thomas Horvath, Daniel Klein, Jan Loney (Emeritus), Alan Miller, Lawrence Morin, Charles Rich, Nisson Schechter, Arthur Stone, William J. Turner (Emeritus), Nora Volkow, Rex Wang

Associate professors: Linda Chang, Steven Cole, Judith Crowell, Laura Fochtman, Andrew Francis, Gregory Ficchione, Krishnareddy Gujavarty, Gila Hertz, Marta Maczaj, David Meyerhoff, George Nicklin, Sanford Oxenhorn, Harold Pass, Joseph Schwartz, Michael Schwartz, Mark J. Sedler, Joyce Sprafkin, Jeffrey Sverd, Vasantkumar Tanna, James N. Weisberg

Assistant professors: Ashraf Abaza, Susan Abbott, Thomas Aronson, Varsenik Arvanian, Murty Ayyala, Aaron Balasny, Charlene Baldwin, Joseph Blader, Lory Bright-Long, Darla Broberg, Joan Broderick, Paul Brody, Christopher Burke, Patrick Carone, Robert Castell, Arvind Chopra, Shelly Cohen, Eduardo Constantino, Frank Dowling, Shelley Epstein, June Feldman, Erik Fink, Jennifer Flynn-Campbell, Fred Friedberg, Jerry Friedman, Veena Garyali, Yakov Greenstein, Zinovi Gutkovich, Peter Halperin, Jeffrey Hammerman, Jay Harris, Angela Hegarty, Seth Horowitz, Kamil Jaghab, Marsha Tanenberg-Karant, Joel King, Charles Korrol, Beatrice Kovasznay, Ganesan Krishnamoorthy, Richard Krugley, Kerstin Kupfermann, Daniel Legrange, Tsu Teng Loo, John Luke, Gerald Lutzer, Deborah Majerovitz, Douglas Marcus, Richard Mattison, Chang Min, Lilianne Mujica-Parodi, Jacob Ninan, Tadao Ogura, Donna Osikowicz, William Packard, Elias Pasol, Selwyn Pereira, Steven Prenzlaue, Horacio Preval, Wolfgang Quitschke, Matthew Romanelli, Bruce Rosen, Joan Rubinstein, E. Victoria Rundberg-Rivera, Magery Satish, David Schlager, Mark Schoenberg, Irving Shelsky, Sashi Shukla, Michael W. Slome, Edward Sodaro, Alan Steinberg, Robert Vincent, Sheldon Weintraub, Deborah Weisbrot, James Weissburg, R. Michael Woznicki

Instructors: Shashi Berdia, Dominick Candido, Antoinette Foster, Rita Gal-Vetrano, Marlene Gralnick, Michael Greenberg, Kevin Kelly, Maureen Largan, Judith Lutzer, Carrie-Ann Miller, Alexander G. Oei, Etalee Pass, Mona Ramjas, Chitra Shenoy, Robert Southard, Linda Winter

The Department of Psychiatry and Behavioral Science provides a complete range of instruction from beginning medical education through post-residency fellowships. Members of the department are involved in teaching in psychology, neurobiol-

ogy, and pharmacology, as well as psychiatry.

The Department is organized into three divisions: Adult Psychiatry, Child Psychiatry and Developmental Disabilities. Services in these divisions may be provided at Stony Brook University Hospital, at Northport Veterans Affairs Medical Center, and Eastern Long Island Hospital. University Hospital services provide 30 adult care beds, adult dayhospital facilities, 10 children's beds, a comprehensive psychiatric emergency program, a consultation-liaison service and out patient clinics for adults and children. Northport Veterans Affairs Medical Center provides a 50-bed acute in-patient service and a 50-bed chronic care service. Eastern Long Island Hospital provides an 18-bed and adult inpatient service.

The faculty within the department are dedicated to research related to an understanding of psychiatric disorders, ranging from basic neurobiological research to applied clinical studies.

Through joint appointments with other departments many faculty supervise and support graduate and post-doctoral students in related disciplines.

### *Medical Student Education*

The department is committed to an interdisciplinary approach to mental health throughout its curricular activities. Within the curriculum of the medical school, the department offers

- Active involvement in teaching year 1 and year 2 medical students in the Introduction to Human Behavior course
- Active involvement in the year 2 Neuroscience/Psychopathology course
- Atwo-week required clinical clerkship in Behavioral Medicine (fourth year)
- A four-week required clinical clerkship in Clinical Psychiatry (third year)
- A psychiatry sub-internship available to students in their third and fourth years on an elective basis. This track is designed for students who are interested in a career in psychiatry
- Electives within the department include research and clinical opportunities in a wide variety of settings

### *Residency Program*

The Department of Psychiatry and Behavioral Science offers a four-year residency program in psychiatry with the first year designed as a categorical postgraduate-1 "mixed" clinical experience. The residency program provides a broad variety of situations, subjects and settings from which residents and students may select their learning experiences. The program goal is to train a physician who specializes in the treatment and understanding of diseases and abnormalities that manifest themselves in behavioral change. Such a physician should be well grounded in diagnostics, psychopharmacological interventions and behavioral management techniques. The training program pays particular attention to the neurobiological foundations of psychiatry, while at the same time providing training in psychotherapeutics and other skills necessary to the general practice of psychiatry. The opportunities for research are large and varied.

### *Fellowship Training*

The Department offers several fellowships including clinical fellowships in child psychiatry, consult-liaison psychiatry, Sleep Disorder and Geriatric Psychiatry. The child psychiatry fellowship is a complete two-year accredited program leading to board eligibility in child psychiatry.

## *Department of Radiation Oncology*

*Chair:* Allen G. Meek

*Professor:* Allen G. Meek, Lawrence E. Reinstein

*Associate professors:* Wyman A. Bethune, Tae L. Park

*Assistant professors:* Leon Forman, Jonathon Hass, Alan Katz, Bong S. Kim, Magdy S. Shady, Edward S. Valentine, Tamara E. Weiss

*Instructors:* Edward Glenn, Herman Treitel

The Department of Radiation Oncology, which functions at the Health Sciences Center at Stony Brook and at a satellite facility at Brookhaven National Laboratory, is organized to develop and teach the disciplines of radiation physics, radiation biology and therapeutic radiology as applied to the treatment of malignancies and selected benign disorders. Active basic and clinical research programs operate in conjunction with other medical school departments and the Brookhaven National Laboratory. Undergraduate and graduate as well as medical students interested in research collaboration or the clinical oncology of solid tumors are encouraged to apply for elective rotations.

### *Courses*

#### **HBI 398/399 Research Projects in Radiation Oncology Medical Physics**

An independent research project under faculty supervision. Emphasizes the principles of experimental design, data collection, evaluation of findings and reporting of results. Project report required. May be repeated.

*Prerequisite:* Laboratory experience and permission of the supervising instructor and URECA coordinator. Completion of 57 credits in the College of Arts and Sciences.

*2-4 credits, fall and spring terms, staff*

#### **HBI 599 Graduate Research in Radiation Oncology Medical Physics**

Original research projects under the faculty supervision in areas of medical physics relating to radiation oncology and computer science.

*Prerequisites:* Bachelors of Science in Physical Science or Engineering; permission of instructor.

*1-8 credits, fall and spring terms, staff*

## *Department of Radiology*

*Chair:* Donald P. Harrington

*Professors:* Harold L. Atkins, Jack S. Deitch, Sidney Glanz, Burton Gold, Donald P. Harrington, Gerald Irwin, Arie Kaufman, Morton A. Meyers, Zvi H. Oster, Robert Peyster, Mathew D. Rifkin, Stephen Shapiro, Prantika Som, Charles Springer, Suresh Srivastava

*Associate professors:* Roger S. Baim, Rashmikan Baxi, Harold Chiat, Paul Fisher, John Ferretti, Gene Gindi, Jerome Liang, James Manzione, Paul Moh, Anita Price, Donald Price, Clemente T. Roque, Thomas Smith, Gene J. Wang, William G. Wolff

*Assistant professors:* Robert Blake, Terry Button, Cora Cabahug, Paul Cayea, Bruce Chernofsky, Jeane Choi, Avraham F. Dilmanian, Ivy A. Engel, Heywood Y. Epstein, Kathleen Finzel, Seng-hau Fong, Arthur Fruaff, Susana Fuchs, Karen Gadol, Brad Gluck, Lori Goffner, Allan G. Goldman, Matthew T. Higgins, Robert J. Hochstim, Man Hon, Wei Huang, Margaret Johnstone,

Carol E. Kaplan, William Kainzbaur, Douglas Katz, Hsin Min Kuan, Ira J. Langer, Steven Lev, Haifang Li, Richard Losada, Ruimei Ma, Darius Melisaratos, Leslie Miller, Klaus Mueller, George Newman, Orlando Ortiz, Roxanne Palermo, David Panasci, Harold Parnes, Mozaffer Partowmah, Eric Perlmutter, Erica Posniak, Joel Reiter, Nand K. Relan, Patricia Roche, Leonard M. Rosenstein, Sandra Russo, Raymond L. Saperstein, Bruce I. Saxe, Sol Spector, Sharon Taylor, G. Lucy van de Vegte, Natarajan Venkataramanan, Patrice Vorwerk, Nandita Wadhwa, Barbara Wajsbrot-Kandel, Mark Wax, David Weltman, Paul Zamora, Wei Zhao

*Instructors:* Susan Aiello, Dinko Franceschi

Radiology, including the multiple imaging modalities of conventional diagnostic radiology, magnetic resonance imaging, computed tomography, ultrasonography, and nuclear medicine, is not only a clinical discipline in itself, but is supportive in the essential applications of several of the basic sciences and most of the other clinical specialties.

Radiographic Anatomy is taught as part of the first-year curriculum to complement the dissectional displays of regional human anatomy, and radiology is further useful within Introduction to Clinical Medicine. Diagnostic imaging plays an important role in the core curriculum of the second year, in the knowledge of pathophysiology of the various systems. A detailed course in Clinical Radiology is presented throughout the third year, and a selective course in Diagnostic Imaging is given in the fourth year.

In addition, radiology provides support throughout the clinical curriculum in the diagnosis and management of patients. An increasing choice of electives is offered in the radiological subspecialties.

#### *Residency Program*

The Department of Radiology offers a four-year residency in diagnostic radiology. The residency includes experience in all aspects of general radiology, as well as, ultrasonography, computed tomography/neuroradiology, nuclear medicine and special procedures. Emphasis is placed on clinical radiology and clinically oriented research. Fellowships in Body Section Imaging, including Computed Tomography, Ultrasonography and Magnetic Resonance Imaging, Neuroradiology, Interventional Radiology, and Nuclear Radiology are also offered.

### *Department of Surgery*

*Chair:* John J. Ricotta

*Professors:* Thomas Bilfinger, Peter Garlick, Arnold E. Katz, Irvin Krukenkamp, Cedric J. Priebe, Jr., Harry S. Soroff

*Associate professors:* Martyn W. Burk, Collin E.M. Brathwaite, Enrique Criado, Alexander Dagum, Martin Karpeh, Margaret McNurlan, Eugene Mohan, Frank C. Seifert, Maisie Shindo, Eric Smouha, Joseph Sorrento

*Assistant professors:* Arif Ahmad, Balvantray Arora, Robert Barraco, John S. Brebbia, Antonios Gasparis, Steven M. Katz, Thomas Lee, Allison McLarty, Louis T. Merriam, Denise C. Monte, Brian J. O'Hea, David Rivadeneira, Ghassan Samara, Richard Scriven, Paul van Bemmelen, James Vosswinkel

*Instructors:* Vimala Sivaraman

The Department of Surgery is organized into a series of divi-

sions, each with its own chief. These sections include general, cardiothoracic, pediatric, plastic, transplantation, otolaryngology, oncology, trauma and vascular surgery.

The department has the following responsibilities:

- 1) provision of consultations and operative surgery for patients
- 2) provision of surgical aspects of diagnosis in the core curriculum in the pre-clinical years
- 3) supervision of a residency program in general surgery (five-year duration)
- 4) organization and supervision of clinical clerkships
- 5) offering of electives in the final year
- 6) preparation of individuals who choose the specific branches of surgery
- 7) investigation of relevant problems of surgical sciences.

### *Department of Urology*

*Chair:* Wayne C. Waltzer

*Professors:* Zelik I. Frischer, Sardar Ali Khan, Wayne C. Waltzer, Robert J. Wasnick

*Associate professors:* Yefim Sheynkin

*Assistant professors:* Howard L. Adler, Jamil U. Rehman, David A. Schulsinger

*Instructors:* Maryanne Frank, Yvonne Kwok, Jeanne Martin, Kathleen Kelly-Lyons, Ann Klassert,

The department provides care for a wide variety of both general and tertiary urological problems. Subspecialty services include cryoablation of the prostate, female urology, human papilloma virus disease, infertility and microsurgery, kidney stone disease and lithotripsy, laser surgery, neuro-urology, pediatric urology, reconstructive urology, sexual dysfunction, kidney transplantation, and urological oncology. The faculty of the department of urology provide comprehensive general and tertiary urological care.

#### *Residency Program*

The department of urology offers an accredited four-year residency that includes training in all aspects of urology in all the above disciplines.

### *School of Medicine Interdepartmental Courses*

#### **HBI 398/399 Research Projects in Biomedical Sciences**

An independent research project under faculty supervision. Emphasizes the principles of experimental design, data collection, evaluation of findings and reporting of results. Project report required. May be repeated.

*Prerequisite:* Laboratory experience and permission of the supervising instructor and of URECA coordinator. Students should have completed 57 credits in the College of Arts and Sciences.

*2-4 credits, fall and spring terms, staff*

#### **HBI 599 Graduate Research in Radiation Oncology Medical Physics**

Original research projects under faculty supervision in areas of medical physics relating to radiation oncology and computer science.

*Prerequisites:* Bachelor of Science in Physical Science or Engineering; permission of instructor

*1-8 credits, fall and spring terms, staff*

## Department of Biomedical Engineering

Chair: Clinton T. Rubin

Assistant to Chair: Partap Khalsa

Graduate Program Director: Partap Khalsa

Undergraduate Program Director: Danny Bluestein

**Professors:** Christopher Berndt, Fu-Pen Chiang, Benjamin Chu, Richard Clark, Yuefan Deng, Peter Djuric, Joanna Fowler, Fred Grine, Donald P. Harrington, Benjamin Hsiao, Lawrence C. Hurst, Chris Jacobsen, Jolyon Jesty, Arie E. Kaufman, Janos Kirz, Irvin Krukenkamp, Jerome Liang, Serge Luryi, Harold Metcalf, Miriam Rafailovich, Nathaniel Reichel, Clinton T. Rubin, Edward Schlissel, Charles Springer

**Associate Professors:** Danny Bluestein, Ki Chon, Avraham Dilmanian, Petar Djuric, Gene Gindi, Vera Gorfinkel, Michael Hadjiargyrou, Chris Jacobsen, Partap Khalsa, Yi-Xian Qin, Jahangir Rastegar, John Reinitz, Lawrence E. Reinstein, Callum F. Ross, Steven Skiena, Lincoln Stein, Peter Williams, Ilya Vakser

**Assistant Professors:** Janet Anderson, Terry Button, Weiliam Chen, Anil Dhundale, Emilia Entcheva, Mary Frame, John Gately, Rita Goldstein, Wei Huang, Stefan Judex, Kathryn Kolsky, Lisa Miller, Michiko Miura, Klaus Mueller, Andrew Neuwald, Yingtian Pan, Bill Rooney, David Schlyer, Robert Shorr, Helmut Strey, Lilianne Strey, Peter Thanos, Paul Vaska, Mark Wagshul, Yi Wang, Stanislaus Wong, Kenny Ye, Micahel Q. Zhang, Wei Zhao, Wei Zhu

The Program in Biomedical Engineering trains individuals with baccalaureate degrees in engineering, applied mathematics, and the sciences to provide them with the synthesis, design, and analysis skills necessary to contribute effectively to the advancement of science and technology in health and medical care.

Graduate degree programs are offered at the Master's (MS) and Doctoral (PhD) levels. These programs provide two distinct avenues of graduate study in biomedical engineering - the doctoral level directed toward the student interested in a research or academic career, and the master's level for those primarily interested in the application of biomedical engineering concepts in the development of advanced technology in biomedical products and processes. A third option is the Advanced Graduate Certificate program that is specifically designed to provide graduate students and engineering professionals with the knowledge and skills necessary to transfer recent developments in the basic sciences into commercially viable products and processes. The department's goal of actively promoting the development of a creative, versatile biomedical engineer is accomplished by exposing the individual to the biology, engineering, and business concepts critical to succeeding in the biomedical research and development environment.

To provide the permanent foundation on which to build a career in biomedical engineering, an integrated core set of biomedical engineering courses have been implemented. These provide our biomedical engineering students with the underlying engineering principles required to understand how biological organisms are formed and how they respond to their environment. Students will attain a credible level of sophistication in their understanding of cell, tissue, and organ physiology. The student is then able to complement this background with additional engineering courses either within the Program in biomedical engineering (PIBE), or in the other disciplines of engineering.

The graduate program relies on the core set of courses to provide our biomedical engineering students with an overview of the biophysical principles involved in cell, tissue, and organ biology. The progression of the four PIBE core courses requires three resident terms to complete. In addition to these four courses, a seminar series providing exposure to the breadth of bioengineering research and development activities both within the University as well as throughout the scientific/industrial community, is required of all PIBE students through their first two years of study. Finally, each course has a component of independent study to nurture the student's abilities to pursue a topic specialized interest.

### Curriculum Requirements

**Master's Degree Curriculum:** thirty graduate credits are required to earn the Master of Science or Master of engineering degrees in biomedical Engineering (BME). Thirteen credits must consist of the five core BME courses, and six credits from business, Technology, and Engineering Policy courses. The student has the option of earning the Master of Science degree in BME on either a thesis or non-thesis track. If non-thesis, the student undertakes elective graduate coursework to complete the 30 credits. In the thesis option, the student must complete two research rotations and at least 6 credits of thesis research, and submit and defend a written thesis. A grade of B or better must be attained in each of the core BME courses taken, and an overall grade point average of 3.0 out of 4.0 must be maintained overall.

**Doctoral Degree Curriculum:** A minimum of fifteen graduate credits, beyond the Master's in BME level, are required for completion of the Doctor of Philosophy degree in BME. There are no course requirements per se, though certain courses may be required to fill any gaps in the student's knowledge. Following completion of a qualifying exam, and independent basic research program will be undertaken. One semester of teaching practicum must be satisfactorily performed. Completion of this research program will culminate in the submission and oral defense of a dissertation. The University required at least two consecutive semesters of full-time graduate study. All requirements for the PhD must be completed within seven years after completing 24 credits of graduate study.

**Certificate Curriculum:** To obtain the Advanced Graduate Certificate in Biomedical engineering, students will be required to complete the five core courses (BME 501, 502, 503, 504, and 505/506) and maintain a 3.0 to 4.0 grade point average. In addition, six credits of elective coursework selected from business, technology, and engineering policy courses ensure that the students attain a reasonable level of sophistication in the business concepts which will provide the graduate with the ability and confidence to succeed in the field of biomedical engineering.

### Undergraduate Biomedical Engineering Program

To provide the permanent foundation on which to build a career in biomedical engineering, an integrated, core set of biomedical engineering courses have been implemented. These provide our biomedical engineering students with the underlying engineering principles required to understand how biological organisms are formed and how they respond to their environment. As well, the students will attain a credible level of sophistication in their understanding of cell, tissue, and organ physiology. The student is then able to complement this background with additional engineering courses either within BME, or in the other disciplines of engineering.

The Department of Biomedical Engineering offers several pathways for undergraduate students to obtain an understand-

ing of Biomedical Engineering:

- Minor program for Arts and Sciences majors
- Biomedical Engineering Track for Life Sciences majors
- Bachelor of Science (B.S.) in Biomedical Engineering

### Graduate Biomedical Engineering Program

The graduate program relies on the core set of courses to provide our biomedical engineering students with an overview of the biophysical principles involved in cell, tissue, and organ biology. The progression of the four BME core courses requires three resident terms to complete. In addition to these four courses, a seminar series providing exposure to the breadth of Biomedical Engineering research and development activities both within the University as well as throughout the scientific/industrial community, is required of all BME students through their first two years of study. Finally, each course has a component of independent study to nurture the student's abilities to pursue a topic of specialized interest. Certificates and degrees available through this program include the following:

- Advanced Graduate Certificate in Biomedical Engineering
- Master of Science (M.S.)
- Master of Philosophy (M.Phil) in Biomedical Engineering
- Doctor of Philosophy (Ph.D.) in Biomedical Engineering

### The First Year

For MS and Certificate students, the first year of study includes core courses, electives, and attending the PIBE seminars. Students in the MS research track are required to identify a research advisor by the end of their first Spring semester in the program. For doctoral students, the first year includes preparation for the qualifying examination, taking any classes as directed by their Dissertation Defense Committee, and initiation of independent research. Most Doctoral students will take their qualifying examination within the first year. Some international students may be required to take remedial English courses, depending upon their mastery of the language. Students who are being financially supported by teaching assistantships will assist designated faculty in instructing undergraduate students.

### The Second Year and Beyond

In the second year, most students will finish any remaining core and elective courses. MS research track students will have begun their research projects under a faculty member's supervision. Once Ph.D. students have successfully passed their qualifying examination, they have no further requirements except the completion and defense of an original dissertation. To improve scientific communication skills, all students participate in the weekly program laboratory seminars where faculty, postdocs, and graduate students present the latest research from their laboratories. These intimate, yet informal meetings allow students to learn by watching and presenting research in a friendly and critical environment.

### Graduate Course Offering

#### BME 501 Engineering Principles in Molecular and Cell Biology

Course Director - D. Bluestein

Course content is directed towards describing the microscopic physical interactions between cells and their environment as electro-mechano-chemical processes occurring at surfaces. This is provided in the context of basic molecular biology and cell physiology concepts. Emphasis is placed on developing an understanding of the critical role of non-linear dynamics, physical chemistry of adsorption and desorption processes, self assembly in cellular automata, and how complexity arises within simple physical systems.

Three Credits - Fall semester.

Course Outline:

Part 1. Biological Building Blocks and the Dynamics of Living Systems Water and ionic balance, small molecules/energy balance Non-linear continuum, discrete, and stochastic processes.  
Part 2. Cell Structures and Self Assembly Proteins, lipids, cytoskeleton, and intracellular organelles Colloids, long range forces, colloidal stability, adsorption from solution.  
Part 3. Cell Physiology and Adaptive Processes Genetic mechanisms, cell division, cell signaling, cell-cell contacts Cellular automata, Boolean networks, complexity, non-linear time series analysis.

#### BME 502 Engineering Principles in Tissue and Organ Systems

Course Director - D. Bluestein

Course content is directed toward describing the macroscopic physical interactions within tissues as an extension of the engineering concepts learned in BME-501, i.e. the consequence of self-organized aggregates of cells and matrix macro-molecules functioning as non-equilibrium systems. Fuzzy logic theory, neural network theory and genetic algorithms will be developed to provide insight into physiologic behavior ranging from homeostasis to cognition, while providing a fundamental overview of tissue structure and function and organ physiology.

Three Credits - Spring semester.

Course Outline:

Part 1. Overview of Tissue Physiology (Structure and Function) Cell-cell & cell-matrix interactions, autocrine/paracrine effects, homeostasis Control theory, fuzzy logic, fuzzy control Application of fuzzy control to tissue adaptation in connective tissue, kidney, liver, heart.  
Part 2. Simple Networks in Living Tissue Nerve conduction, synaptic transmission Neural networks, supervised and unsupervised learning.  
Part 3. Complex Networks Reflex arcs, locomotion, sensory systems (visual, auditory, tactile) Multilayer networks, mapping issues, application of NN to central nervous system.  
Part 4. Evolution in Networked Systems Immune system physiology and pathology Neural-fuzzy nets, Genetic algorithms.

#### BME 503 Cell & Molecular Imaging

Course Director - Emilia Entcheva

This course will cover basics of optics, microscopy, spectroscopy and fluorescence in the context of imaging at the cellular and molecular level. Recently developed advanced imaging techniques for probing protein interactions and live cell functions will also be discussed. The course is organized in 3 modules:

- Optics and Spectroscopy (e.g., Properties of light, polarization, diffraction, spectra).
- Fundamentals of Fluorescence and Applications to Molecular and Cellular Measurements (e.g., Jablonsky diagram, Stokes' shift, emission, excitation spectra, fluorescence anisotropy).
- Signal Processing, Image Analysis Techniques and Scientific Visualization (e.g., temporal and spatial filters, 1D and 2D Fast Fourier transform, spectral analysis, cross-correlation). Theory will be complemented by extensive use of Matlab and its Image Processing Toolbox.

Three Credits - Fall Semester

#### BME 504 Biomaterials Science and Analysis

Course Director - Partap Khalsa

Course content is directed toward providing an introductory treatment of the engineering issues implicit in understanding living tissue interactions with processed materials. Emphasis on identifying and eliminating surface contamination, corrosion, and optimizing material surface properties and compatibility.

Three Credits - Spring semester.

Course Outline:

- Applications - prostheses, coatings and adhesives, implants, biosensors, drug delivery
- Biocompatibility
- Biofilm contamination, bacteria, viruses, yeast, fungi
- Immunity and inflammation
- Metallo-biochemistry
- Interface Considerations - surface energy, adsorption, permeability
- Surface contamination (inorganic and organic)
- Electro-chemical interactions
- Biomaterials and processing - metal alloys, polymeric, ceramic, reinforced materials, surface modified materials, structural property considerations
- Tissue engineering - use of biology and biological substrates in biomaterials

**BME 505 (Fall) & 506 (Spring) Principles and Practice in Biomedical Engineering**

**Course Directors - C. Rubin & Y-X. Qin**

Introduces first year graduate students to the basic and clinical research at the cutting edge of biomedical engineering. The course has two key components: the first is a seminar series presented by internationally renowned bioengineers. An interactive discussion of topic-specific scientific literature precedes the formal presentation. The second component of the course is teaming up with a physician, in rounds, the operating theatre, clinics, etc., to get exposure to the real-life problems which face the medical community. It is hoped that the mix of science and clinic will move students towards determining how they can make contributions to health and society.

*Two Credits - Fall and Spring semesters.*

**BME 507 Fundamentals of Biomedical Engineering Management**

**Course Director - Rob Shorr, Ph.D., D.I.C., Director for Business Development**

This course exposes the engineering student to the responsibilities that focus on the management issues in biomedical engineering. Management functions are explored and the students learn how to integrate these functions with engineering responsibilities.

**BME 508 Molecular and Cellular Biomechanics**

**Course Director: Stefan Judex**

Course content revolves around the effects and interactions of mechanical forces at the cellular and molecular level. The topics will range from describing the molecular and cellular basis of the adaptation of tissues to physical signals, to prescribing specific mechanical environments for improved tissue engineering, to delineating relevant molecular, cellular, and biomechanical techniques, all the way to issues involved in the development and approval of diagnostics and therapeutics in molecular engineering. For a deeper understanding of the course material as well as to allow students to apply their newly gained knowledge, this course will contain a module on the design and analysis of experiments (i.e., applied biostatistics) and incorporate practical exercises in both laboratory (e.g., a real time PCR experiment) or simulated computer settings (e.g., modeling of cell behavior).

**BME 517 Radiation Physics**

**Course Director: Terry Button**

This graduate offering provides an initial physical background required for the study of the Medical Physics. Sources of ionizing radiation including radioactivity (natural and manmade) and x-ray producing devices are studied as well as sources of non-ionizing radiations such as radiofrequency and ultrasound. The physical aspects of these radiations are characterized by their interaction with matter and methods for their detection.

**BME 518 Radiobiology**

**Course Director - Terry Button**

The biological consequences of irradiation (ionizing, ultrasound, laser, RF etc.) will be examined. Interaction mechanisms will first be examined followed by examination of the of the radiation impact at the molecular and cellular level. The use of radiation for therapeutic gain will be considered. As well, models will be developed for risk estimates. Topics to be covered will include: target theory, biological response, NSD and risk estimates.

**BME 520 Lab Rotation I**

The first of two required semester-long research rotations in BME Faculty laboratories. Students learn and perform new research skills with the aim of completing a research project that would be suitable for presentation at a national BME research conference.

**BME 521 Lab Rotation II**

The second of two required semester-long research rotations in BME Faculty laboratories. Students learn and perform new research skills with the aim of completing a research project that would be suitable for presentation at a national BME research conference.

**BME 531 Biosensing and Bioimaging**

This graduate course will teach graduate students in biomedical engineering current techniques used biosensing and bioimaging with an emphasis in optical methodology. It will start with a brief introduction to a simplified version of optics (ray optics, fiber optics, scattering & absorption, fluorescence, lasers and optoelectronics), followed by an in-depth discussion about fiber-optic sensors, advanced microscopy (confocal and multi-photon excitation microscopy), NIR absorption and fluorescence spectroscopy, optical coherence tomography, photo-acoustic imaging, and time-of-flight and frequency-modulation photon migration imaging. For cellular and molecular imaging, it will discuss the principles of Q-dots, molecular beacons for bio labeling and bioMEMS

for minimally invasive biosensor readout. Experiments may include fluorescence microscopy of multi-labeling of cellular components, optical coherence tomography of tissue micromorphology.

**BME 532 Time Series Based Modeling of Biological Data**

A unified mathematical/time series framework for modeling and mining biological data. Applications range from cardio-respiratory, renal blood pressure/flow and sequence (DNA, RNA, proteins) to gene expression data. Tools of data analysis include neural networks, time-invariant and time-varying spectral methods, fractal and nonlinear dynamics techniques, hidden markov model, clustering analysis, and various system identification techniques.

**BME 557 Computational Biology**

This course focuses on current problems in computational biology and bioinformatics. Our emphasis will be algorithmic, on discovering appropriate combinatorial algorithm problems and the techniques to solve them. Primary topics will include DNA sequence assembly, DNA/protein sequence assembly, DNA/protein sequence comparison, hybridization array analysis, RNA and protein folding, and phylogenetic trees. (cross-listed as CSE 549).

**BME 559 Biomolecular Modeling**

This course addresses the basic principles of biomolecular modeling and the algorithmical aspects of existing and emerging methodologies. A special emphasis is on modeling of proteins and on structural aspects of bioinformatics. The course focuses on methodologies, which are practically applicable to real biomedical problems. The course is directed to students interested in the development of modeling methods. (cross-listed as AMS 691)

**BME 599 Biomedical Engineering Research**

Research to be supervised by a faculty member of the Program in Biomedical Engineering. Students must have permission of instructor and enroll in appropriate section. Faculty to be identified by the student.

**BME 601 Cardiovascular Fluid Mechanics**

The course will cover the application of fluid mechanics principles to the analysis of blood flow in the cardiovascular system under normal and pathological conditions. It will follow an historical time line by beginning with the most basic models of arterial blood flow, and proceed to the most advanced theories related to physiology and pathology flow phenomena, including an examination of the most up to date research in the area and the development of devices and implants.

**BME 602 Topics in Biomedical Applications of Neural Networks**

This is a project based course which includes weekly seminars discussing advanced topics in fuzzy logic and neural networks and their applications, in biomedical devices. Applications include drug delivery, diagnostics, management information handling. Students utilize simulation software to develop algorithms to deal successfully with training data sets of their own choosing.

**BME 604 Finite Element Modeling in Biology and Medicine**

**Course Director - Y-X. Qin**

Both finite difference and FEM are applied to solve the equations of incompressible and compressible fluid flow in porous media with emphasis on flows in skeletal tissues, i.e., bone and cartilage. Steady-state, transient flow, permeability and surface boundary conditions are discussed. Practical and recent studies in the field are also discussed. Programming using FORTRAN or C languages will be required. The student is also introduced to commercially available software packages.

**BME 605 Biomechanics of Tactile Sensory Systems**

Detailed study of the biomechanics of tactile neurophysiology for engineers entering the field of haptics and robotics manipulations. Anatomy and electrophysiology of transducer cells and neurons starting at the fingertips and extending to the somatosensory cortex. Characteristics of the external stimulus and its peripheral transformation. Relations of these topics to perceptual and/or behavioral responses.

**BME 606 Drug Gene Delivery**

**Course Director - Weiliam Chen**

Applications of biodegradable and biocompatible polymers in the design of drug and gene delivery systems for site-specific applications. A broad overview on the origin and development of controlled release therapeutic devices will be provided. Existing and proven commercial products will be examined. The second half of the course will be devoted to the use of DNAs as a therapeutic entity and issues relevant to DNA delivery will be explored. An assessment of the most up-to-date DNA delivery technologies will be presented. Students are required to write a term paper on a drug or gene delivery topics of their choice. Students are also expected to give presentations on drug delivery and gene therapy related topics during the course.

**BME 610 Magnetic Resonance**  
**Course Director – Mark Wagshul**

This course provides a comprehensive study of magnetic resonance and its applications in medical imaging. An introduction of NMR is followed with development of the hardware and processing aspects required for MR image formation. An overview of basic and advanced MR imaging techniques is provided. Each student will select a topic in MR imaging for presentation at the conclusion of the course.

**BME 612 Biomedical Engineering Aspects for the Use of Radiation in Medicine**

This course provides a comprehensive study of the use of radiation in medicine. Physical aspects of the interaction of radiation with matter and for the radiation production are initially considered. The underlying principles of current radiation based medical imaging is considered next. Topics include radiography, fluoroscopy, radionuclide imaging and computed tomography. The use of radiation for the treatment of malignancy is considered with the focus on required technology. Finally advanced applications of radiation are considered with focus on imaging and treatment. Each student will select a topic examining the engineering or technical application of radiation in medicine for presentation at the conclusion of the course.

**BME 666 Advanced Cardiac Electrophysiology**

This course deals with the inherent electrical properties of cardiac tissue. It presents a comprehensive quantitative treatment of ion channels, transmembrane and intracellular ion fluxes and other bioelectricity-related events on the molecular and cellular level. The course will present a balanced experimental and theoretical overview of cardiac bioelectricity. Approximately half of the course is dedicated to the review of state-of-the-art experimental measurement techniques and data analysis tools used in cardiac electrophysiology today. The other half of the course deals with modeling approaches in cardiac electrophysiology, from the nano- to the mesoscale. Clinical importance of the discussed phenomena is emphasized and the acquired knowledge is put into perspective.

**BME 698 Practicum in Teaching**

Undergraduate teaching to be supervised by a faculty member of the Program in Biomedical Engineering. Course to be identified by the student and graduate studies director.

**BME 699 Biomedical Engineering Dissertation Research**

Research to be supervised by a faculty member of the Program.  
*Prerequisite:* Students must be advanced to candidacy (G5); permission of instructor and enroll in appropriate section.