Physiology and Biophysics

Michael D. Cahalan, Department Chair
Todd C. Holmes, Department Vice Chair
Albert Zlotnik, Departmental Graduate Advisor

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Overview
The Department of Physiology and Biophysics offers research opportunities in the molecular biophysics of membranes and proteins, ion channels and signal transduction, endocrinology, molecular and cell biology, physiological genomics, developmental neurobiology, and exercise physiology.

The Department offers graduate study under the auspices of the School of Medicine and in conjunction with the graduate program in Cellular and Molecular Biosciences (CMB) and the Interdepartmental Neuroscience Program (INP), which are described in the School of Biological Sciences section. Students are eligible to enter the Department program after meeting the specific requirements of the CMB or INP gateway curriculum or by direct application to the Department. The Department program leads to an M.S. or Ph.D. in Biomedical Sciences, awarded after successful completion of all requirements. Students admitted through either gateway program who select a research advisor in the Department begin following the departmental requirements for the Ph.D. at the beginning of their second year.

The faculty conducts quarterly reviews of all continuing students to ensure that they are maintaining satisfactory progress within their particular academic program. Students participate in a literature review course designed to strengthen research techniques and presentation skills, and attend the weekly Department colloquium. Students advance to candidacy during the third year; each student presents a seminar on a topic assigned by the formal candidacy committee. Following the seminar, the committee examines the student’s qualifications for the successful conduct of doctoral dissertation research. Each student must submit a written dissertation on an original research project and successfully defend this dissertation in an oral examination. Interdisciplinary dissertation research involving more than one faculty member is encouraged. The normative time for completion of the Ph.D. is five years, and the maximum time permitted is seven years.

Faculty
Geoffrey W. Abbott, Ph.D. University of London, Professor of Pharmacology; Physiology and Biophysics
Kenneth M. Baldwin, Ph.D. University of Iowa, Professor Emeritus of Physiology and Biophysics
Tallie Z. Baram, M.D. University of Miami, Danette Dee Dee Shepard Chair in Neurological Studies and Professor of Pediatrics; Anatomy and Neurobiology; Neurology; Physiology and Biophysics
Ralph A. Bradshaw, Ph.D. Duke University, Professor Emeritus of Physiology and Biophysics
Michael D. Cahalan, Ph.D. University of Washington, Department Chair and UCI Distinguished Professor of Physiology and Biophysics
Vincent J. Caiozzo, Ph.D. University of California, Irvine, Professor in Residence of Orthopaedic Surgery; Environmental Health Sciences; Physiology and Biophysics
Philip Felgner, Ph.D. Michigan State University, Adjunct Professor of Medicine; Physiology and Biophysics
John Jay Gargus, M.D. Ph.D. Yale University, Director of the Center for Autism Research and Translation and Professor of Physiology and Biophysics; Genetic Counseling; Pediatrics
Alan L. Goldin, M.D. Ph.D. University of Michigan, Professor of Microbiology and Molecular Genetics; Anatomy and Neurobiology; Physiology and Biophysics
Milton Greenberg, Ph.D. University of California, Irvine, Assistant Adjunct Professor of Physiology and Biophysics
Harry T. Haigler, Ph.D. Vanderbilt University, Professor Emeritus of Physiology and Biophysics
James E. Hall, Ph.D. University of California, Riverside, Professor Emeritus of Physiology and Biophysics
Todd Holmes, Ph.D. Massachusetts Institute of Technology, Department Vice Chair and Professor of Physiology and Biophysics
Naoto Hoshi, Ph.D. Kanazawa University, Assistant Professor of Pharmacology; Physiology and Biophysics
Lan Huang, Ph.D. University of Florida, Professor of Physiology and Biophysics; Biological Chemistry
Rongsheng Jin, Ph.D. Columbia University, *Professor of Physiology and Biophysics*

Frances A. Jurnak, Ph.D. University of California, Berkeley, *Professor Emerita of Physiology and Biophysics*

Janos K. Lanyi, Ph.D. Harvard University, *Professor Emeritus of Physiology and Biophysics*

Devon Lawson, Ph.D. University of California, Los Angeles, *Assistant Professor of Physiology and Biophysics*

John C. Longhurst, Ph.D. University of California, Davis, *Susan Samueli Chair in Integrative Medicine and Professor of Medicine; Pharmacology; Physiology and Biophysics*

Kenneth J. Longmuir, Ph.D. University of Oregon, *Professor Emeritus of Physiology and Biophysics*

Hartmut Luecke, Ph.D. William Marsh Rice University, *Professor of Molecular Biology and Biochemistry; Physiology and Biophysics*

Jogeshwar Mukherjee, Ph.D. Jodhpur National University, *Professor in Residence of Radiological Sciences; Biomedical Engineering; Physiology and Biophysics* (preclinical imaging, radiopharmaceutical design and development, PET imaging and quantitation, neuroscience)

Ian Parker, Ph.D. University College London, *Professor of Neurobiology and Behavior; Physiology and Biophysics*

Medha Pathak, Ph.D. University of California, Berkeley, *Assistant Professor of Physiology and Biophysics*

Eric Pearlman, Ph.D. University of Texas Health Sciences Center at San Antonio, *Director of the Institute for Immunology and UCI's Chancellor Professor of Physiology and Biophysics; Ophthalmology*

Thomas L. Poulos, Ph.D. University of California, San Diego, *UCI Chancellor's Professor of Molecular Biology and Biochemistry; Chemistry; Pharmaceutical Sciences; Physiology and Biophysics* (chemical biology)

Hamid M. Said, Ph.D. Aston University, *Professor of Medicine; Physiology and Biophysics*

Francesco Tombola, Ph.D. University of Padua, *Associate Professor of Physiology and Biophysics*

Bruce Tromberg, Ph.D. University of Tennessee, *Director of Beckman Laser Institute and Professor of Surgery; Biomedical Engineering; Physiology and Biophysics* (photon migration, diffuse optical imaging, non-linear optical microscopy, photodynamic therapy)

Nosratola D. Vaziri, M.D. University of Tehran, *Professor Emeritus of Medicine; Physiology and Biophysics*

S. Armando Villalta, Ph.D. University of California, Los Angeles, *Assistant Professor of Physiology and Biophysics*

Ping H. Wang, M.D. Harvard University, *Professor of Medicine; Physiology and Biophysics*

Stephen H. White, Ph.D. University of Washington, *Professor Emeritus of Physiology and Biophysics*

Qin Yang, M.D. Ph.D. Nanjing University of Chinese Medicine, Osaka University, *Assistant Professor of Medicine; Physiology and Biophysics*

Albert Zlotnik, Ph.D. University of Colorado Health Sciences Center, *Department Graduate Faculty Advisor and UCI Chancellor's Professor of Physiology and Biophysics*

**Courses**

**PHYSIO 200. Research in Physiology and Biophysics. 2-12 Units.**
Individual research directed toward doctoral dissertation and supervised by a particular professor.

Repeatability: May be repeated for credit unlimited times.

**PHYSIO 200R. Research in Physiology and Biophysics for First-Year Students. 2-12 Units.**
Independent research within the laboratories of graduate training faculty in the Department of Physiology and Biophysics for first-year Ph.D. students.

Grading Option: Satisfactory/unsatisfactory only.

Repeatability: May be taken for credit 3 times.

**PHYSIO 201. Introduction to Physiology Research. 1-4 Units.**
Introduction to research in physiology and related sciences. Concentrates on techniques emphasized in the various laboratories of the Department of Physiology and Biophysics.

Repeatability: May be repeated for credit unlimited times.
PHYSIO 204. Concepts of Biophysics. 3 Units.
Principles of crystallography; introduction to time-resolved absorption and fluorescence spectroscopy; the concepts of kinetic order and kinetic rate theory.
Restriction: Graduate students only.

PHYSIO 205. Electronics for Biologists. 4 Units.
Basic principles of electricity; properties and use of discrete components and integrated circuits; circuit analysis and design. Intended for advanced students in the life sciences.
Same as NEURBIO 249.

PHYSIO 206A. Introduction to Medical Physiology. 5 Units.
Vertebrate physiology with emphasis on humans and on the relationship between the function of normal tissues and the processes of disease. Fundamental principles of physiology and the interrelationships which control organ function.
Prerequisite: A biochemistry course.
Restriction: Graduate students only.

PHYSIO 206B. Introduction to Medical Physiology. 6 Units.
Vertebrate physiology with emphasis on humans and on the relationship between the function of normal tissues and the processes of disease. Fundamental principles of physiology and the interrelationships which control organ function.
Prerequisite: PHYSIO 206A
Restriction: Graduate students only.

PHYSIO 232. The Physiology of Ion Channels. 4 Units.
Discusses how ion channels work (molecular/structural biophysics level) and what ion channels do in diverse cell types (cell physiology level).
Restriction: Graduate students only.

PHYSIO 252. Introduction to Proteomics. 4 Units.
Introduces students to concepts and methods of proteomics including protein identification, expression proteomics, and protein-protein interactions.
Repeatability: May be taken for credit 2 times.

PHYSIO 290. Topics in Physiology. 3 Units.
Contemporary research problems in physiology. Students review papers in the current literature and present ideas contained therein to other students. Students present results of their own research and attend presentations given by other students and departmental researchers.
Grading Option: Satisfactory/unsatisfactory only.
Repeatability: May be repeated for credit unlimited times.

PHYSIO 292A. Scientific Communication. 2 Units.
Small group meetings for graduate students to practice scientific writing, debate, and presentation skills.
Grading Option: Satisfactory/unsatisfactory only.
Repeatability: May be repeated for credit unlimited times.

PHYSIO 292B. Scientific Communication. 2 Units.
Small group meetings for graduate students to practice scientific writing, debate, and presentation skills.
Grading Option: Satisfactory/unsatisfactory only.
Repeatability: May be repeated for credit unlimited times.

PHYSIO 292C. Scientific Communication. 2 Units.
Small group meetings for graduate students to practice scientific writing, debate, and presentation skills.
Grading Option: Satisfactory/unsatisfactory only.
Repeatability: May be repeated for credit unlimited times.
PHYSIO 299. Dissertation in Physiology and Biophysics. 2-12 Units.
Preparation and completion of the dissertation required for the Ph.D. or Master of Science degree.

Grading Option: Satisfactory/unsatisfactory only.

Repeatability: May be repeated for credit unlimited times.

Restriction: Graduate students only.