## **BIOPHYSICS PROGRAM**

*Emeritus:* Harden M. McConnell (Chemistry) *Chair:* William Weis

- Professors: Richard W. Aldrich (Molecular and Cellular Physiology), Steve Block (Applied Physics), Steven Boxer (Chemistry), Axel Brunger (Molecular and Cellular Physiology), Douglas Brutlag (Biochemistry), Steven Chu (Applied Physics), Mark Davis (Microbiology, Immunology), Sebastian Doniach (Applied Physics), Philip C. Hanawalt (Biological Sciences), Keith O. Hodgson (Chemistry), Wray H. Huestis (Chemistry), Eric Kool (Chemistry), Ron Kopito (Biological Sciences), Roger D. Kornberg (Structural Biology), Michael Levitt (Structural Biology), David B. McKay (Structural Biology), W. E. Moerner (Chemistry), Norbert Pelc (Radiology), Howard Schulman (Neurobiology), Ed Solomon (Chemistry), James A. Spudich (Biochemistry, Developmental Biology), James Swartz (Chemical Engineering), Helmut Wiedemann (Synchrotron, Applied Physics)
- Associate Professors: Russ Altman (Medical Informatics, General Medicine), Gilbert Chu (Oncology), James Ferrell (Molecular Pharmacology), David Heeger (Psychology), Daniel Herschlag (Biochemistry), Tobias Meyer (Molecular Pharmacology) Jody Puglisi (Structural Biology), William Weis (Structural Biology)

Associate Professor (Research): Chang-Ming Ma (Radiation Oncology),

Assistant Professors: Judith Frydman (Biological Sciences), Kenan C. Garcia (Microbiology and Immunology), Pehr Harbury (Biochemistry), Peter Jackson (Pathology), Peter Kuhn (SLAC), Merritt Maduke (Molecular and Cellular Biology), Vijay Pande (Chemistry), Julie Theriot (Biochemistry)

The Biophysics Program offers instruction and research opportunities leading to the Ph.D. in Biophysics. Students admitted to the program may perform their graduate research in any appropriate department.

## **GRADUATE PROGRAM**

For information on the University's basic requirements for the Ph.D. degree, see the "Graduate Degrees" section of this bulletin.

A small number of highly qualified applicants are admitted to the program each year. Applicants should present strong undergraduate backgrounds in the physical sciences and mathematics. The graduate course program, beyond the stated requirements, is worked out for each student individually with the help of appropriate advisers from the Committee on Biophysics. The requirements and recommendations for the Ph.D. degree include:

- 1. Training in physics or chemistry equivalent to that of an undergraduate physics or chemistry major at Stanford.
- 2. Completion of the following courses (or their equivalents): a) Biophysics 250
  - b) Biochemistry 200, 201
  - c) Chemistry 131, 171, 173, and 175
  - d) Structural Biology 241 and 242
  - e) Medicine 255
  - f) Additional courses as required for the individually tailored program
- Proficiency in one or more foreign languages and/or a computer language may be required at the discretion of the major professor.
- 4. Opportunities for teaching are available during the first nine quarters, at the discretion of the advising committee.
- 5. The student must prepare a Dissertation Proposal defining the research to be undertaken, including methods of procedure. This proposal should be submitted by Winter Quarter of the third year, and it must be approved by a committee of at least three members including the principal research adviser and at least one member from the Committee on Biophysics. The candidate must defend the dissertation proposal in an oral examination. The Dissertation Reading Committee normally evolves from the Dissertation Proposal Review Committee.

- 6. The student must present a Ph.D. dissertation as the result of independent investigation and expressing a contribution to knowledge in the field of biophysics.
- 7. The student must pass the University oral examination, taken only after the student has substantially completed the research. The examination is preceded by a public seminar in which the research is presented by the candidate.

## COURSES

**205. DNA Repair and Mutagenesis**—(Enroll in Biological Sciences 205.)

3 units, not given 2001-02

**210.** Advanced Topics in Membrane Biochemistry—(Enroll in Biochemistry 210.)

4 units (Pfeffer) not given 2001-02

**210A. Principles of Cell Physiology**—(Enroll in Molecular and Cellular Physiology 210.)

4 units, Spr (Aldrich, Lewis)

**211. Biophysics of Sensory Transduction**—(Enroll in Biological Sciences 211.)

4 units, Spr(S. Block)

**225. Molecular Motor Proteins and the Cytoskeleton**—(Enroll in Biochemistry 225.)

3 units (Fuller, Spudich) not given 2001-02

**228.** Protein and Nucleic Acid Structure, Dynamics, and Engineering—(Enroll in Structural Biology 228.)

3 units (Levitt) alternate years, given 2002-03

**241. Biological Macromolecules**—(Enroll in Structural Biology 241.) *3 units, Aut (Weis, Aldrich, Ferrell, Herschlag, Lewis, Puglisi)* 

**242. Methods in Molecular Biophysics**—(Enroll in Biochemistry 242 or Structural Biology 242.)

3 units (McKay, Puglisi) alternate years, given 2002-03

**250. Seminar in Biophysics**—All graduate students in Biophysics must participate. Presentation of current research projects and results by all faculty in the Biophysics Program.

1 unit, Aut, Win (Staff)

**255. The Responsible Conduct of Research**—(Enroll in Medicine 255.) All graduate students must complete. (*Staff*)

**289. Biophysical Chemistry**—(Enroll in Chemistry 289.) *3 units (Staff) not given 2001-02* 

- **291. Biophysical Chemistry**—(Enroll in Chemistry 291.) *3 units (Staff) not given 2001-02*
- **297. Bio-Inorganic Chemistry**—(Enroll in Chemistry 297.) *3 units (Solomon) alternate years, given 2002-03*

## 300. Research

(Staff)

**450. Introduction to Biotechnology**—(Enroll in Biochemistry 450, Biological Sciences 237, Chemical Engineering 450, Civil and Environmental Engineering 237, Structural Biology 450.)

3 units, Spr (Robertson, Swartz)

459. Frontiers in Interdisciplinary Biosciences-(Cross-listed in multiple departments in the schools of Humanities and Sciences, Engineering, and Medicine; students should enroll directly through their affiliated department, otherwise enroll in ChE 459.) An introduction to cutting-edge research involving interdisciplinary approaches to bioscience and biotechnology; for specialists and non-specialists. Organized and sponsored by the Stanford BioX Program. Three seminars each quarter address a broad set of scientific and technical themes related to interdisciplinary approaches to important issues in bioengineering, medicine, and the chemical, physical, and biological sciences. Leading investigators from Stanford and throughout the world present the latest breakthroughs and endeavors that cut broadly across many core disciplines. Pre-seminars introduce basic concepts and provide background for non-experts. Registered students attend all pre-seminars in advance of the primary seminars, others welcome. Prerequisite: keen interest in all of science, engineering, and medicine with particular interest in life itself. Recommended: basic knowledge of mathematics, biology, chemistry, and physics.

1 unit, Aut, Win, Spr (Robertson)

Other biophysics courses in related departments: Chemistry 251, Molecular and Cellular Physiology 216 Other recommended courses:

Biological Sciences 230; Biochemistry 200; Chemistry 271, 273, 275; Physics 170, 171, 230, 231

This file has been excerpted from the *Stanford Bulletin*, 2001-02, pages 284-285. Every effort has been made to ensure accuracy; late changes (after print publication of the bulletin) may have been made here. Contact the editor of the *Stanford Bulletin* via email at arod@stanford.edu with changes, corrections, updates, etc.