Overview

Experimental Biophysics Program

Department of Physics         Emory University
EXPERIMENTAL BIOPHYSICS GROUP AT EMORY UNIVERSITY

The common aim of the members of the Experimental Biophysics Group is to understand how structure and dynamics at the molecular level contributes to the observed function of macromolecules, and the role that individual macromolecules and macromolecular assemblies play in the function of biological cells.

Summary of our General Approach:
Keith Berland
Associate Professor, Director of Undergraduate Studies
U. Illinois, 1995

Laura Finzi
Associate Professor
U. New Mexico, 1990

Ivan Rasnik
Assistant Professor
Campinas (Brazil) 2000

Kurt Warncke
Professor, Chair
U. Pennsylvania, 1990

Faculty Members
Experimental Biophysics Program

Faculty Research Areas

and Principal Techniques

Keith Berland
Protein dynamics; protein-protein binding in cells
Fluorescence correlation spectroscopy & imaging

Laura Finzi
DNA structure & dynamics; DNA-Protein interactions
Single molecule methods: Light Microscopy, Atomic Force Microscopy
Magnetic Tweezers

Ivan Rasnik
Protein dynamics; DNA-protein interactions
Single molecule methods: Light Microscopy, Fluorescence resonant energy transfer

Kurt Warncke
Metalloenzyme catalysis; β-Amyloid; Photosynthesis
Time-resolved and steady-state EPR and optical spectroscopies
Experimental Biophysics Group

Current Graduate Students

Haitham Ahmed  Neil Anthony  Adonis Bovell  Hanlin Chen  Julie Coats

Yue Ding  Meghan Kohne  Xinxian Shao

Haowei Wang  Neslihan Uncuncuoglu  Suleyman Uncuncuoglu  Yan Yan  Shengming Zhang
Experimental Biophysics Group

Postdocs

Kaya Erbil
Sachin Goyal
William Gunderson
Yuyen Lin
Sunil Naik
Wesley Robertson
Li Sun
Students who desire a PhD in the area of Experimental Biophysics enroll in the Graduate Program in Physics, which is part of the Laney Graduate School at Emory. The organization and requirements of the Graduate Program in Physics are described on the “Graduate” pages of the Department of Physics web site, at the following url: www.physics.emory.edu/graduate

The Experimental Biophysics track integrates the following features with the Graduate Program:

- **Coursework**: A sequence of elective graduate courses, designed to introduce fundamentals and advanced topics in biophysics, is offered.

- **Research Training**: Graduate students engage in two one-semester research projects in faculty members' laboratories.

- **Current Topics**: New systems and techniques in molecular biophysics are presented for group discussion at the Biophysics Journal Club each week.

- **Colloquium Series**: External speakers are invited to present their work in Biophysics. Each semester, graduate students select and host a speaker.

These features of the Experimental Biophysics Program are briefly summarized on the following pages...
Experimental Biophysics Coursework

Biophysics is an intensely interdisciplinary area. We offer elective courses that efficiently integrate learning about the fundamental physical properties (structure, dynamics) of biomacromolecules (proteins, nucleic acids) with an understanding of biochemical and chemical features that are necessary for meaningful interpretation of the results of physical measurements. Physical techniques and several systems that are paradigms for biophysical inquiry are addressed.

**Phys 552: Biomacromolecules**
This course is aimed at providing the basic tools for the understanding of the biochemical and biophysical behavior of macromolecules as a function of their environment.

**Phys 554: Molecular Biophysics**
The course focuses on how structure and dynamics at the molecular level contribute to the observed function, with a specific emphasis on proteins.

**Phys 556: Single Molecule Biophysics**
This course covers the fundamental single-molecule techniques and illustrates how they are used in biophysics.

**Phys 558: Biomolecular Spectroscopy** (under development)
Principles and applications of electric dipole and magnetic resonance spectroscopies to biological systems.
Experimental Biophysics Program

Graduate Research Rotations

As part of the requirements for the Graduate Program in Physics, students complete two “Research Rotations”, which are 12-14 week research projects performed in a faculty member’s laboratory. The faculty supervisor is selected by the student. Students obtain advanced research training in experimental biophysics, gain in-depth understanding of a sub-area of biophysics, and are able to assess the match between their interests and the faculty member’s research for possible future dissertation work. At the end of a rotation, the students present their work in the Rotation Presentation Session, which is attended by all faculty and students. This has become a highly-anticipated tri-annual Department event!
The Biophysics Journal Club meets weekly at lunchtime during the semesters and into the summer. A student or faculty member selects a paper for reading by the group, and then leads a discussion of the work. The informal atmosphere provides for a lively and informative exchange of critical commentary and ideas.
For more information about the Graduate Program in Physics...

...visit the Graduate web pages: www.physics.emory.edu/graduate

...contact: Dr. Stefan Boettcher, Director of Graduate Studies: stb@physics.emory.edu

...contact: Mr. Calvin Jackson, Graduate Coordinator: calvin.jackson@physics.emory.edu