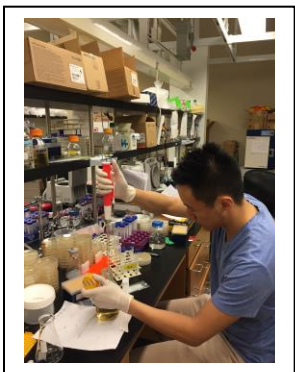


# Physics Undergraduate Degree in Biophysics

## Announcement

Beginning fall 2015 Emory University is awarding an undergraduate degree in Biophysics. The *Bachelor of Science in Biophysics* will provide the students with a rigorous preparation that is an excellent credential for admission to graduate programs in most quantitative sciences, as well as medical and other healthcare related schools.

## Motivation



Physics majors are reported to generally score higher on MCAT and have a higher chance of admission to medical schools compared to other majors. A strong background in biophysics will provide an even greater advantage. Furthermore, physics has always driven some of the major discoveries in biology and biochemistry. Even as recently as in 2014, the Nobel Prize in chemistry was awarded to three physicists for the invention of super-resolution microscopy techniques that are revolutionizing cell and molecular biology.

## Goal

The proposed BS in Biophysics is intended to provide a strong scientific foundation at the crossroad between physics and biology. The BS in Biophysics is interdisciplinary and rigorous; it provides a solid know-how of quantitative methods and a clear understanding of the many ways physical principles underlie biological processes. Ultimately, it provides problem-solving skills that may be useful in a variety of situations, and, for those interested in pursuing a career in research, it provides the tools to conduct discovery-driven quantitative, state-of-the art research.

## Requirements for BS in Biophysics

**Core courses** introduce students to the fundamental concepts of physics, mathematical and computational methods used in biophysics, teaching the physical principles that underlie biological interactions and processes.

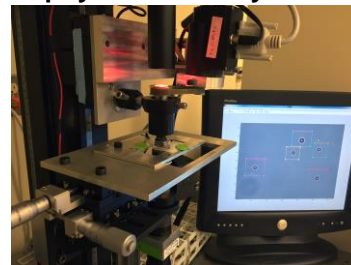
- MATH 111 (Calculus 1), 112 (Calculus 2), 211 (Multivariable Calculus), and 212 (Differential Equations)
- PHYS 151 (Physics 1) and 152 (Physics 2)
- PHYS 212 (Computational Modeling for Scientists and Engineers)
- PHYS 220 (Math for Sci. and Eng.)
- PHYS 253 (Modern Physics)
- PHYS 361 (Classical Mechanics)
- PHYS 365 (Electricity & Magnetism)

- PHYS 421 (Thermodynamics & Statistical Physics)
- PHYS 461 (Quantum Mechanics)
- PHYS 444W (Advanced Lab)

**Required Electives:** the class selection must be approved by an academic adviser before students may register for classes.

- BIO 141 with lab (Foundations of Modern Biology I: Cell Biology and Genetics), or CHEM 150 with lab (Structure and Properties).
- Two of the following electives: PHYS 434 (Biological Physics), PHYS 552 (Biomacromolecules), PHYS 554 (Molecular Biophysics), PHYS 556 (Single Molecule Biophysics), or other science course in the area of quantitative biophysical studies offered in the College as approved by the adviser.
- PHYS 397R (Directed Study, 4 credits), PHYS 499R (Undergraduate Research, 4 credits), or PHYS 495RW (Honors Research, 4 credits). The research/directed studies supervisor need be a physics faculty. Faculty from other University departments may be approved by the student's academic adviser.

## Biophysics at Emory



Classes beyond the introductory level rarely exceed 20 students. All courses are taught by the faculty. Directed studies and research opportunities are offered in any of the following groups, working on exciting problems at the interface between physics and biology:

**Weissman:** “studies biological evolution in order to predict, for example, how long it would take for bacteria to become resistant to a new antibiotic. The strategy is to build and analyze models for evolution, as well as to analyze population genomic data.”

**Warncke:** “focuses on elucidating how protein and solvent structure and dynamics contribute to enzyme function, and applications of the knowledge gained to design and create artificial protein-based catalysts, and to molecular therapeutic approaches.”

**Nemenman:** “studies questions of information processing at the interface between physics and biology. The group focuses on the discovery of principles of information processing that span multiple model systems, from cellular to behavioral and evolutionary.”

**Kim:** “investigates how cells live, function and die using biophysical techniques and mathematical modeling.”

**Finzi:** “seeks to understand the physical principles underlying the regulation of the genetic code transcription using a variety of complementary, high resolution single-molecule approaches.”

## Contact

Please contact Dr. Jed Brody, Director of Undergraduate Studies, if you are interested in studying physics, and/or to arrange an appointment to visit the Department. E-mail him at [jbrody@emory.edu](mailto:jbrody@emory.edu) or call him directly at 404-727-5580.