

Physics



EMORY
GRADUATE
SCHOOL



The graduate program in Physics offers a comprehensive education in physics and opportunities to engage in experimental and theoretical research with internationally-recognized groups using state-of-the-art techniques and instrumentation. We also offer a collegial, supportive atmosphere, with close interactions among students, faculty and staff that are unique to a “research-1 university.”

Our program awards both a Ph.D. in Physics and a combined Physics Ph.D./Computational Science M.S. degree.

Research Concentrations

The research in the department is focused in the following two principal areas:

MOLECULAR BIOPHYSICS addresses the contributions of molecular structure and dynamics to biological function. Experimental spectroscopic investigations of catalysis in metalloenzymes use steady-state and time-resolved techniques of electron paramagnetic resonance, Mössbauer and transient optical absorption spectroscopies. Experimental approaches to elucidating biomolecular and cellular processes use high-sensitivity fluorescence methods, including fluorescence correlation spectroscopy. Single molecule fluorescence resonance energy transfer and single molecule particle tracking and magnetic tweezers techniques are used to study nucleic acid structure and protein-DNA interactions.

SOFT CONDENSED MATTER PHYSICS addresses the properties of materials that display both fluid and solid behavior. Experimental work examines the connection between microscopic and macroscopic properties of a variety of systems. Microscopy techniques are used to study phase transitions in colloidal systems. Light scattering, rheology, thermal imaging and microfluidics are used to investigate fluid dynamics and multi-phase flow. Dynamical properties of polymers and molecular glasses are examined by spectroscopic techniques. Our theoretical work uses mathematical modeling and computational approaches to address equilibrium and non-equilibrium properties of condensed matter. Surface and growth phenomena, combinatorial optimization, spin glasses and evolutionary dynamics are studied.

Visit our website for links to more information about both groups, at www.physics.emory.edu/graduate.

DISCOVER

the unexpected

Physics researchers at Emory benefit from close interdisciplinary interactions and collaborations with faculty in other graduate programs and research centers at the University. The Department of Mathematics and Computer Science is located with Physics in the Math and Science Center Building, and the Department of Chemistry and the Emerson Center for Scientific Computation are located across the street. Medical and Biological Sciences researchers that are part of Emory's renowned School of Medicine are a short walk away.

Curriculum

Coursework

Students generally satisfy the five core course requirements, and take electives in Physics and in other departments, during the first one-to-two years of study. Molecular Biophysics offers a two-semester sequence that introduces molecular structure and dynamics in protein and nucleic acid systems. For more detailed information about course requirements for the Physics and Physics/Computational Sciences Ph.D. degree programs, please visit the following url: <http://www.physics.emory.edu/graduate/gradstudguide.html>

Research Rotations

The rotation is a twelve-week research project performed under the direction of a student-selected faculty member. Students gain in-depth knowledge and research training and a chance to participate directly in the scientific method, an experience that is not attainable in the classroom. Students participate in two twelve-week research rotations, each with a different faculty member. Each of these rotations culminates with a presentation by the students of their research to the physics faculty and students.

Ph.D. Qualification Process

The Qualifier Proposal assesses the readiness of the student for entry into the final stage of the Ph.D. program (dissertation research). A traditional "Qualifier Exam" is not a part of the Graduate Program in Physics at Emory. The Qualifier Proposal involves the preparation of a research proposal that is conceived, literature-researched and presented by the student in the spirit of a small grant proposal. In addition to its function in determining further progress towards the Ph.D., the Qualifier Proposal is an essential component of our effort to train students in the practical aspects of science.

Dissertation

After passing the Qualifier Proposal and meeting the physics coursework grade requirement (B or higher average), the student formally begins the dissertation phase of the research program. It is recognized that some research work with the dissertation advisor will already have been conducted. A Dissertation Advisory Committee meets yearly to monitor and assist the student over the entire course of progress towards the Ph.D.



Journal Clubs

The Biophysics Journal Club and Soft Condensed Matter Journal Club each meet weekly during the Fall and Spring semesters. The informal atmosphere provides for a lively and informative exchange of critical commentary and ideas. Information about papers and topics covered is available at www.physics.emory.edu/graduate/journalclubs.html.

Colloquia

The weekly Department of Physics Colloquium hosts a distinguished group of speakers each semester. A list of past and future speakers is available at <http://www.physics.emory.edu/colloquia>.

Teaching

Participation in Emory's Teaching Assistant Training and Teaching Opportunity (TATTO) Program for three semesters introduces students to current pedagogical techniques and practices. Students gain first-hand experience by being instructors for one of our undergraduate laboratory courses, and by working closely with a faculty member as a co-teacher for one semester in a Physics lecture course. Prestigious teaching opportunities are available through a selection process such as the ORDER teacher/scholar fellowship (http://www.emory.edu/GSOAS/PDF/ORDER_intro.pdf) and the PRISM fellowship (<http://www.cse.emory.edu/prism/index.cfm>).

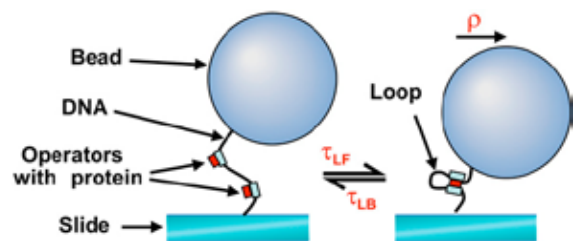
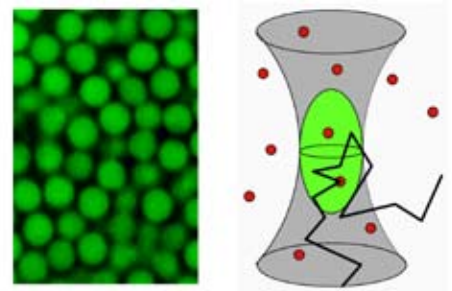
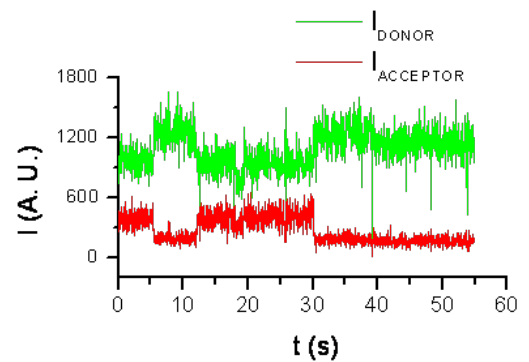
Students

Our program currently has 25 graduate students who come from around the world. We have 10 domestic and 15 international students, among whom are 8 female and 17 male students. The graduate student offices and work spaces in the department are exceptional, and each student receives a computer for their desk. The Physics graduate-student-run Young Emory Physicists Club organizes department get-togethers, as well as Physics student events on campus and around the Atlanta area. In addition to the research opportunities in Physics and Emory's outstanding academic reputation, students are attracted by the multitude of cultural and recreational activities offered in Atlanta.

Graduate students receive full funding, including a tuition waiver, competitive stipend (\$20,500 for 12 months), a partial health insurance supplement, and support for travel to meetings to present research results. These awards are renewed each year, contingent upon satisfactory academic performance. Eligible applicants are nominated for the George W. Woodruff Fellowship or the Emory Graduate Diversity Fellowship, two school-wide fellowships that recognize outstanding candidates for admission.

Faculty

The Department of Physics faculty is composed of 16 members at the three professorial ranks and 3 lecturers. Five faculty compose the Molecular Biophysics group (Berland, Finzi, Huynh, Rasnik, Warncke)



and there are 6 faculty in the Soft Condensed Matter group (Boettcher, Family, Hentschel, Roth, Segre, Weeks).

Our website has a complete list of faculty members, with links to their individual pages containing information about teaching, research and more. Visit <http://www.physics.emory.edu/faculty>.

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For information on how to apply, visit: http://www.emory.edu/GSOAS/departments_programs/degrees/26/



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Requests for Additional Information:

RECRUITMENT AND ADMISSIONS

Emory Graduate School
209 Administration Building
Mailstop 1000-001-1AF
201 Dowman Drive
Atlanta, GA 30322

404-727-6028 or
800-727-6028 (domestic only)
(ask for the Physics program)
Fax: 404-727-4990

<http://www.graduateschool.emory.edu>
<http://www.physics.emory.edu>