

DOCTOR OF PHILOSOPHY IN CHEMISTRY

The Department of Chemistry offers a graduate program leading to a Ph.D. in Chemistry. The faculty-to-graduate student ratio ensures that each student knows every faculty member and has the opportunity to become well acquainted with several areas of chemistry. A customized program of study is set up for each student, whose progress is monitored by a three-member faculty advisory committee.

Emphasis within the program is on developing skills for chemical research, rather than on conforming to a uniform program of study. Course requirements, progress examinations, preparation and defense of research proposals, seminar presentation, and teaching assignments are all designed with this goal in mind.

Interested students are encouraged to visit the websites of individual faculty (<http://wesleyan.edu/chem/people/>) members to explore research areas and opportunities available in the department.

COURSES

Course requirements are intended to achieve two basic goals.

- **Acquisition of background knowledge.** A central core of material is basic for all well-trained chemists. Therefore, graduate students are initially expected to develop or demonstrate knowledge of an appropriate one-semester course in each of the areas of organic chemistry, inorganic chemistry, biochemistry, physical chemistry, and quantum chemistry.
- **Continued scholarly growth.** Graduate students are required to take one course or its equivalent every semester. This may be a regular advanced course in chemistry or a related discipline, a seminar, or a tutorial designed to meet the special needs of an individual student.

All degree-seeking graduate students are required to register for at least one credit in each semester that they are enrolled in the university.

LANGUAGE REQUIREMENT

There is no language requirement associated with this program.

PROGRESS AND QUALIFYING EXAMS

Progress examinations are given multiple times each academic year. These examinations are designed to encourage graduate students to keep up with the latest developments in chemistry and are based on articles in the current literature. In addition, they are a valuable tool for monitoring the expected steady growth of a student's ability to critically read the chemical literature, as well as identifying any areas requiring additional study. Students are required to pass 15 elementary and 7 advanced progress exams, which they usually accomplish by the end of the second or early in the third year of the program.

TEACHING

Completion of at least two semesters as a teaching assistant is generally required for the Ph.D. degree. These assignments are provided as a means of developing

communication and teaching skills. Graduate students may be given more advanced teaching responsibilities if appropriate.

RESEARCH

Research proposal writing is one of the most important parts of the graduate program in chemistry. Writing scientific proposals teaches evaluation of the literature, integration of knowledge from several areas, formulation of scientific questions, design of a research project to answer those questions, scientific writing, and the defense of a project proposal. Two proposals are required: one during the second year related to the student's research plans and a second, in the fourth year, on a novel idea not directly related to the student's current work.

DISSERTATION AND DEFENSE

The thesis research and dissertation—an original contribution worthy of publication—is the single most important requirement. Finally, the candidate defends the dissertation before his/her committee and presents a final seminar to the department and broader community.

CONCENTRATIONS

CHEMICAL PHYSICS

Guiding Committee: Lutz Hüwel, *Physics*; Joseph Knee, *Chemistry*; Stewart E. Novick, *Chemistry*; Brian Stewart, *Physics*

Beginning students in the chemistry or physics graduate programs may petition their department for admission to the interdisciplinary program in chemical physics. The philosophy underlying the program is that the solution to contemporary problems must increasingly be sought not within a single traditional specialty but from the application of different disciplines to particular problems. Students in the program will pursue a course of study and research that will familiarize them with both the Physics and Chemistry departments and, in particular, with those areas of overlapping interest that we broadly categorize as chemical physics.

Students entering the chemical physics program will choose an interdepartmental committee to oversee their progress toward the PhD degree. Students will still receive a Ph.D. in either chemistry or physics. Chemical physics students will be expected to take courses from both departments. The core of the program of courses consists of quantum chemistry (offered by the Chemistry Department), quantum mechanics (offered by either department), electrodynamics (offered by the Physics Department), statistical mechanics (either department), and mathematical physics (Physics Department). For details of the course offerings, see the course listings under chemistry and physics.

Seminars. Students will participate in the weekly chemical physics seminar series and will be expected to present at least one talk per year.

Examinations. Students will follow the examination policy of their sponsoring department. Those chemical physics students pursuing a Ph.D. in chemistry will take periodic progress exams based on the current literature, and in their second year they will take an oral qualifying exam that includes a short written proposal of their future Ph.D. research. A second proposal, external to their research, is submitted in the fourth year. In addition, there is a final oral Ph.D. thesis defense. For details, see the requirements for the PhD in chemistry. For those chemical physics students pursuing a Ph.D. in physics, there are three formal examinations: a written examination at an advanced undergraduate level

(taken in the third semester), an oral Ph.D. candidacy examination (taken no later than the fifth semester), and a final oral Ph.D. thesis defense. For details, see the requirements for the Ph.D. in physics.

Research. Students in chemical physics may do research under the direction of any member of either department. To aid the student in this selection and to sample the flavor of research activities in both departments, students will participate briefly in the research of each department. During the first year, students will rotate among as many as two research groups from each department, spending between four and six weeks in each group. It is anticipated that a student will be able to make a formal choice of a research advisor by the end of the first academic year at Wesleyan.

MOLECULAR BIOPHYSICS

The Chemistry Department participates in an interdisciplinary program of graduate study in molecular biophysics with the departments of Molecular Biology and Biochemistry (MB&B), Biology, and Physics. The program provides a course of study and research that overlaps the disciplinary boundaries of chemistry, physics, biology, and molecular biology and is designed for students with an undergraduate background in any one of these areas. Students in the program are enrolled in one of the participating departments and fulfill canonical requirements of the department. In addition, they take advanced courses in molecular biophysics and pursue dissertation research with one of the faculty in the program. Centerpieces of the program are the weekly interdepartmental journal club in molecular biophysics and an annual off-campus research retreat. Both activities bring together students, research associates, and faculty from all participating departments and foster interdisciplinary collaborative projects.

The program is affiliated with interest groups such as the New York Structural Biology (NYSB) and the New York Bioinformatics and Computational Biology (NYBCB) groups. All students are encouraged to join and attend national meetings of the Biophysical Society.

Students interested in this program may indicate their interest on the application for admission to the Chemistry, MB&B, Physics, or Biology departments. Application forms for these departments are available at: <https://admission.wesleyan.edu/apply/>.

ADDITIONAL INFORMATION