

Aims and Scopes of the Chemistry Graduate Program

The Caltech Chemistry option offers a program of graduate study leading to the Ph.D. degree, with the goal of preparing students for a lifetime of independent research and scientific leadership in the chemical sciences, through careers in academia, industry or government. Modern chemistry strives to achieve a molecular-level understanding of the natural world and thus forms the basis for much of modern science, including biology, medicine, materials, nanotechnology, energy and environment. The program of study, while anchored in the traditional areas of organic chemistry, inorganic chemistry, chemical biology, biochemistry and biophysics, chemical physics and theoretical chemistry, is flexible and highly interdisciplinary.

The graduate program in chemistry emphasizes research. This emphasis reflects the Institute's traditional leadership in chemical research and the conviction that has permeated the Division of Chemistry and Chemical Engineering from its founding, that participation in original research is the best way to awaken, develop, and give direction to creativity.

Soon after a new graduate student arrives in the laboratories, he or she attends a series of orientation seminars that introduce students to the active research interests of the staff. Students then talk in detail with each of several faculty members whose fields attract them, eventually settle upon the outlines of a research problem that interests them, and begin research upon it early in the first year. Students can elect to do research that crosses the boundaries of traditionally separate areas of chemistry, for in this relatively compact division, they are encouraged to go where their scientific curiosity drives them. A thesis that involves more than one advisers not uncommon, and interdisciplinary programs with biology, physics, geology, chemical engineering, and environmental science and engineering science are open and encouraged.

An extensive program of seminars will enable students to hear and discuss notable work in chemical physics, organic chemistry, inorganic chemistry and electrochemistry, organometallic chemistry, and biochemistry and molecular biophysics. Graduate students are also encouraged to attend seminars in other divisions.

Learning Outcomes

Students upon whom are conferred the Ph.D. degree have provided evidence of independent scholarship and scientific creativity through the performance of original research, which is described in their doctoral thesis and defended orally. Students must also demonstrate an ability to conceive new research directions by preparing and defending a set of written research propositions.