Department of Chemistry

The Department of Chemistry is dedicated to excellence in education, research, and public service. We strive towards these goals through world-class teaching in the classroom and laboratory, research aimed at solving some of society's most important human health, energy, and environmental problems, fostering an environment of safety, and embracing diversity of communities and ideas to benefit Minnesota, the nation, and the world.

We provide a world-class education through classroom teaching and cutting-edge research. As a central, core discipline in science and engineering, chemistry is critical for solving society’s most important problems and making significant positive impacts on human health, energy, and the environment. We have been a national and international leader throughout our history. A range of companies and academic institutions from across the world hire our graduates and collaborate with us on research. Our alumni have enormous societal impact as academicians, K-12 teachers, scientists and managers in industrial and government laboratories, lawyers, public policy advocates, entrepreneurs, and in a diverse array of other fields.

Honors

Our faculty members have received many prestigious awards. Six members of the department have been members of the National Academy of Sciences and one has received a Nobel Prize. Our award-winning faculty includes recipients of the F. Albert Cotton Award in Synthetic Inorganic Chemistry (John Ellis); Analytical Chemistry Award (Peter Carr); Peter Debye Award in Physical Chemistry (Donald Truhlar); Ralph F. Hirschmann Award in Peptide Chemistry and Murray Goodman Scientific Excellence & Mentorship Award (George Barany); Presidential Early Career Awards for Scientists and Engineers (Erin Carlson); Alfred Bader Award in Bioinorganic or Bioorganic Chemistry and Japan Society of Coordination Chemistry International Award (Lawrence Que Jr.); Ernest Guenther Award in the Chemistry of Natural Products (Thomas Hoye); Bourke Award from the Royal Society of Chemistry (Laura Gagliardi); Royal Society of Chemistry’s Robert Robinson Award (Hoye); Earle K. Plyler Prize for Molecular Spectroscopy and Dynamics (Truhlar); Herman F. Mark Polymer Chemistry Award (Timothy Lodge); and Carl Marvel Award in Creative Polymer Chemistry and McKnight Presidential Endowed Chair (Marc Hillmyer and Theresa Reineke). Three faculty members are Regents Professors (Timothy Lodge, Que and Truhlar); two are members of the National Academy of Sciences and American Academy of Arts & Sciences (Lodge and Truhlar); and 12 are University Distinguished McKnight Professors. Nine faculty members serve as editors for top chemistry journals, playing a key role in the worldwide dissemination of scientific knowledge.

Teaching

As a central science, chemistry courses are required for many majors at the university. Forty-three regular faculty members, 10 affiliate senior graduate faculty, and five temporary lecturers teach more than 40,000 student credit hours per year. There are approximately 278 graduate students and 404 undergraduate students majoring in chemistry. More than 143 bachelor’s degrees, 37 master’s degrees, and 32 doctorates are granted each year.

Fifteen current faculty members have won teaching awards and are members of the University of Minnesota’s Academy of Distinguished Teachers, attesting to the outstanding quality of instruction provided in the department. Forefront instructional methods include online learning, flipped classrooms, problem-based and guided-inquiry laboratories, analytical curriculum and laboratory, and special polymer and advanced chemical biology laboratories.
Research Programs

Our research in the department is collaborative and interdisciplinary. Overarching goals of ongoing research projects include improving human health and the environment, developing nanotechnology and novel advanced materials for a myriad of applications, and unraveling problems associated with devising new, alternative sources of energy. Research performed by graduate and undergraduate students as well as some 72 post-doctoral associates resulted in more than $17.31 million in research expenditures in 2014-2015.

The department houses a number of multi-disciplinary and collaborative research centers including the Center for Metals in Biocatalysis, Center for Sustainable Polymers, Center for Analysis of Biomolecular Signaling, Inorganometallic Catalyst Design Center, Nanoporous Materials Genome Center, and SciDAC Partnership for Charge Transfer and Charge Transport in Photoactivated Systems as well as the director of the National Science Foundation (NSF) Materials Research Science and Engineering Center. Researchers are also participating in the Center for Sustainable Nanotechnology. These centers represent about $83 million in research dollars.

Our Chemistry Summer Research Program is designed to encourage outstanding undergraduate students to learn more about research and provide them with the opportunity to work in a lab under the direction of a faculty member. In addition, the Lando/National Science Foundation summer research program brings in students selected from a national competition.

Outreach

Diverse and dynamic efforts to inform the public about chemistry and its societal significance are critically important for an educated citizenry. We do chemistry demonstrations and discuss chemistry careers in local elementary, junior high, and senior high school classes and local libraries. We participate in events at the Science Museum of Minnesota, local parent-teacher association meetings, the Minnesota State Fair, Math & Science Family Fun Day at the university, the Bell Museum, and University on the Prairie. Some of our graduate students teach chemistry to adult learners in our community.

We bring students to campus for special chemistry camps, workshops, and demonstrations. Students and their parents meet our professors and graduate students, learn about chemistry through hands-on experiments, and see chemistry in action. Through Cool Chemistry, we offer a special day of experiments and demonstrations to middle school girls.

The popular Energy and U show is an interactive presentation that emphasizes the important topic of energy through a choreographed set of demonstrations that integrates physical and chemical principles, energy conversion demonstrations, explosions, audience participation, music, and humor. Last year, more than 13,400 3rd-6th grade students and teachers saw the show. In May 2015, Energy and U embarked on a new collaborative partnership with the Department of Theatre Arts & Dance, and moved to the Rarig Center. This partnership is opening the door to additional possibilities for the show, including a higher level of professionalism and space for more students to attend.

The Department of Chemistry, Department of Chemical Engineering & Materials Science, and Center for Sustainable Polymers created a display for the Eco Experience Building at the Minnesota State Fair, focusing on green chemistry and engineering. The multi-faceted exhibit includes informative displays highlighting the latest research and teaching, and hands-on activities for young people.