Biochemical and Biomedical Engineering
• Statistical mechanics
• Microfluidics
• Nanotechnology and biology
• Nanoparticle technology

Chemical Engineering: Leading Research

Paul F. Lobo / Inorganic materials synthesis and characterization; catalysis and kinetics; adsorption and separations.
Babak Talebian / Reaction engineering
Babak Talebian / Process control; modeling and simulation; systems biology; applied statistics.
E. Terry Parascandolo / Synthetic biology and metabolic engineering of microbial systems for biofuels and chemicals production; bioremediation of soil and water; and environmental biotechnology.
Christopher Roberts / Preparation of biological and pharmaceutical molecules and products; protein aggregation and chemical degradation; pharmacokinetic-pharmacodynamic modeling; and the design of gene therapy vectors.
Jingguang G. Chen / Crystallization and crystal growth; reaction engineering; functional materials; single crystal nucleation and growth; and prediction and optimization of small molecule crystal growth.

What they have to say...
“The University of Delaware has been instrumental in my growth as a researcher. Sports and other facilities are also excellent. I am thankful to the department for providing me with all the facilities and support to grow as a scientist.”
—Abdul Rehman

“Graduate Studies and Research are the key to the success of any university. At UD, the research environment is excellent and the infrastructure is well-equipped.”
—Julie N. Lawson

“The University of Delaware has an incredibly diverse chemical engineering program with many supportive faculty and staff. The difficulty lies in finding time to explore everything the program has to offer.”
—Snehal Garge

“University of Delaware has an incredible diversity of chemical engineering program with many supportive faculty and students. I have learned a lot from talking to the young faculty members and the strong emphasis on multidisciplinary research. All faculty and students are very supportive.”
—Carolina Blanco

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The university of Delaware
Graduate Studies and Research
DEAR PROSPECTIVE STUDENT

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ty for expressing interest in the Chemical Engineering graduate program at the University of Delaware. Our department has a long and distinguished history in chemical engineering and is a vigorous and active center of research. Our faculty is talented and diverse, and there is a correspondingly rich range of research projects.

Our range of projects varies tremendously—from bioengineering to catalysis to thermodynamics—and there are important advances being made in each area. As in most research, much work is also done at the interfaces between these fields and is interdisciplinary. At our department, our long tradition of interaction between a large and varied research community and our industry partners is very lively. Our students—especially our Ph.D. students—have access to a wealth of information and resources.

Our hope is that the following pages will provide you with the opportunity to learn more about our graduate program and the possibilities it offers.

The Department of Chemical Engineering

Modern chemical engineering began at the University of Delaware when Alan P. Colburn, a leader in the profession, came to the department in 1935. The faculty and graduate students were very much a family, and the students who became our former teachers and/or supervisors. These letters are a testament to our department's reputation under their guidance. This tradition of excellence has continued throughout the years, with both the undergraduate and graduate programs consistently ranking in the top ten in the country. Our faculty have received numerous honors and awards, including memberships in the National Academy of Engineering. Two world-leading multidisciplinary centers are housed in Colburn Laboratory, the Center for Catalytic Science and Technology and the Center for Molecular and Engineering Thermodynamics. Further, many of our faculty and students are involved in the Center for Composite Materials, the Delaware Biotechnology Institute and the Institute for Energy Conversion, dedicated to research on the fabrication of thin-film electronic devices with photovoltaic applications. The research and teaching facilities of the Chemical Engineering Department at Delaware are currently housed in Colburn Laboratory. The building and upgraded research laboratory facilities are state-of-the-art.

The Chemical Engineering Department presently has 28 full-time faculty. In addition, we profit from the interactions and part-time faculty associates from international universities as well as from several local industries. Our faculty consists of over 100 full-time Ph.D. students, plus part-time and external appointees. The faculty-student ratio of about 5:1 permits a very close interaction between the students and the faculty.

Degree Programs

The departmental graduate program seeks to provide students with the opportunity to develop quantitative engineering skills and the experience required to apply these skills throughout their careers. Students in the graduate program naturally have a broad range of interests, skills, and career objectives, and it is our philosophy to expose students to a range of fundamental and applied problems through both coursework and research. Available thesis topics for both masters and doctoral students cover the full range of the interests of the faculty. In order to become qualified in their own research projects, students in both programs choose thesis topics during their first semester, after which they have the chance to talk with faculty and students about their research interests.

Ph.D. Most students elect to enter the Ph.D. program directly, with the first two courses being required. Although a student is formally considered a Ph.D. candidate only after successfully completing the qualifying examinations, students normally obtain the Ph.D. degree in four to five years. The Ph.D. degree has a course requirement of 26 course credits (eight courses). Of those, 17 credits comprise five required chemical engineering core courses (in thermodynamics, transport phenomena, applied chemical kinetics, and mathematical modeling) and 15 with the remaining nine credits made up of electives from chemical engineering. As an option, two more elective courses can build strength in an area of concentration such as polymers, mathematics, physics, chemistry, materials science, biology, bioengineering, or another engineering discipline. Students also actively participate in the chemical engineering seminar program which gives them the opportunity to sharpen their own presentation skills while exploring some of our current research at Delaware and throughout the world. Formal admission to Ph.D. candidacy is not determined from just a single criterion. Instead, it is based on the student’s overall performance. The formal elements of the qualifying procedures are taken during the first year of graduate school. Currently, admission to our Ph.D. program includes full financial support.

M.S. Our graduate program is a Ph.D. program, with a very limited number of M.S.S.E. students admitted without funding (i.e., Industrial, part-time and external appointees). The M.S.E. program for full-time students involves both thesis research and course work (24 course credits), core courses in thermodynamics, transport phenomena, and applied chemical kinetics, along with other graduate courses in chemical engineering or related areas. Students have the option of choosing their elective courses. The M.S.E. program is completed in four semesters (18 to 22 months). Material should be submitted as soon as possible. It is necessary that we receive all application materials by December 15 (spring semester) and May 15 (fall semester), although earlier applications are encouraged. The deadline for the M.S.E. program is January 15 for all semester.

Admissions Procedures

Chemical Engineering at Delaware attracts truly outstanding students and science students from around the world. Although most of our students have undergraduate engineering degrees in Chemical Engineering, exceptional students with backgrounds in other scientific disciplines are encouraged to apply; however, some remedial courses in chemical engineering science might be necessary. The following application materials should be sent to: Office of Graduate Studies, Hullihen Hall, University of Delaware, Newark, DE 19716-0817 or www.udel.edu/gradoffice/applicants.

1. Complete an on-line application at www.udel.edu/gradoffice/applicants. The application deadlines for the Ph.D. program is March 15 although earlier applications are encouraged. The deadlines for the M.S.E. program are May 15 (fall semester) and December 15 (spring semester). Material should be submitted as soon as possible. It is necessary that we receive all application materials by December 15 (spring semester) and May 15 (fall semester), although earlier applications are encouraged. The deadline for the M.S.E. program is January 15 for all semester.

2. Undergraduates (and where applicable; graduate) transcripts. A minimum GPA of 3.0 in science and engineering courses is required for admission.

3. GRE exams are accepted for all applicants; they are required for applicants with degrees from non-U.S.-accredited chemical engineering programs and for applicants with degrees other than chemical engineering. The Advanced Test in Math is not required. A minimum score of 1100 (verbal plus quantitative) is expected, although most of our students exceed this minimum.

4. TOEFL exams are required for graduate programs in which English is not the native language of instruction. A minimum TOEFL score of 800 is required (250 for the TOEFL) or a minimum IELTS score of 6.0.

5. A minimum of three letters of recommendation from former teachers and / or supervisors. These letters are a critical component of the application process.

Financial Support

Financial support is available to all full-time Ph.D. students in the form of research assistantships. Assistantships currently carry a guaranteed stipend of at least $18,000 per year plus full tuition. Research Assistantships are required to maintain satisfactory progress on thesis research and other degree requirements, including maintenance of a 3.0 grade point average in the graduate courses. In addition, special named fellowships are awarded to a few outstanding students.

LOCATION

The University of Delaware is located in Newark, Delaware, a suburban community of about 30,000 students, approximately half-way between Philadelphia and Baltimore. Newark is an easy train ride (about two hours) from both New York City and Washington, D.C., bringing the Philadelphia historic sites, the Baltimore harbor, the Washington museums and galleries, and the New York theater district all within easy reach of the faculty and students. Delaware beaches, the ski resorts in the Pocono mountains, the Atlantic City resorts, and the Chesapeake Bay are all short drives away. The White Clay Creek Nature Preserve, which extends northeastward from campus, provides unique opportunities for outdoor recreation within walking distance of Campus Lab. The University is within 20 miles of principal research and development facilities for many of the largest U.S. chemical and pharmaceutical companies, including AstraZeneca, DuPont, and Hercules. The Department of Chemical Engineering has benefited greatly from close interactions with its industrial neighbors; practicing engineers, scientists, and corporate leaders often visit the campus to give lectures, discuss research, and recruit prospective employees.