

CHEMICAL & BIOLOGICAL ENGINEERING

COLLEGE OF ENGINEERING | MONTANA STATE UNIVERSITY

ABOUT CHEMICAL AND BIOLOGICAL ENGINEERING

Both chemical and biological engineering are all about transforming molecules to create useful materials. Those molecules might be new drugs, alternative fuels, biopolymers, or new materials to improve food production and water quality in developing areas. The solutions to many of the problems facing modern societies will be developed by the next generation of biological and chemical engineers. If you would like to be a part of this exciting field, a degree from Chemical and Biological Engineering at Montana State University is the place to start.

◀ *Chemical Engineers and Biological Engineers Will Design Our Future* ▶

Today's ChBE graduates work in a variety of areas to develop technologies, materials, and products to meet needs:

- creating bio-based, biodegradable polymers
- designing new equipment and materials for health care
- developing innovative materials for better fuel cell performance
- designing water systems for developing countries
- improving refining technology for better fuels
- developing enhanced technologies for production of silicon for photovoltaics
- improving drug delivery systems
- starting a company to commercialize bioengineering research

These and many other rewarding careers are within your grasp when you study chemical engineering or biological engineering!

ABOUT MONTANA STATE UNIVERSITY

Mountains and Minds.

Montana State University is a comprehensive land-grant university in a spectacular mountain setting at the headwaters of the Missouri River in Bozeman, Montana. MSU, a Carnegie Foundation Research University (very high research activity list), is the academic home of 15,000 students in more than 70 different majors. Students participate in a vibrant campus community with special attention to hands-on research and creative experience.

Bozeman (regional population 92,000) is routinely listed among the top communities in the United States for year-round outdoor recreation and superior quality of life. Bozeman is minutes from public trails and blue ribbon trout streams, less than an hour from Big Sky and Bridger Bowl ski resorts, and just 90 miles from Yellowstone National Park. It is also home to more than 100 small high-tech businesses and 650 non-profit organizations.

For additional information, contact:

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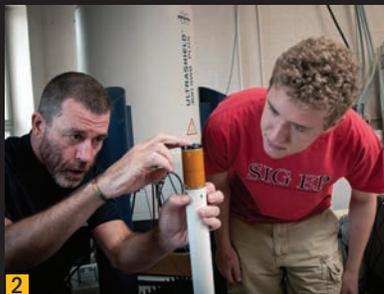
Tel: 406-994-2221

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www.chbe.montana.edu



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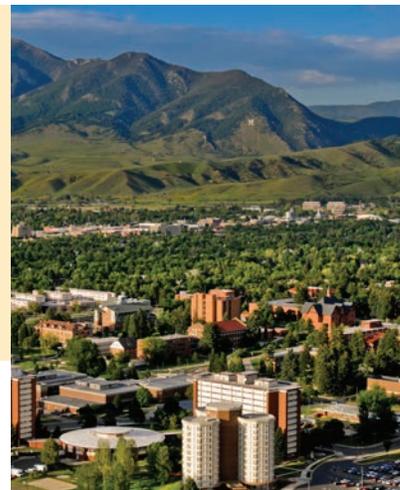
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1 The experience that students gain by working in highly productive research labs sets them apart from others when they compete for internships and jobs. 2 Faculty mentors help students connect their research to real-world challenges. 3 The Center for Biofilm Engineering is a global leader in biofilm research that spans a wide array of topics, such as biofuels, medical treatments, and environmental clean-up.

Specialty Areas

Chemical engineering has traditionally had many specialty areas, but opportunities, especially in biological engineering, continue to expand. Following are some of the specialty areas.

- Pharmaceuticals
- Enzyme Development
- Biomedicine
- Biofuels
- Environmental Restoration
- Bioreactor Design
- Novel Separation Processes
- Polymers and Biopolymers
- Magnetic Resonance Imaging
- Fluid Dynamics
- Wind Turbine Design and Optimization
- Fuel Cell Development
- Silicon Reactor Development
- Computer Modeling



Degree Programs

The Department of Chemical and Biological Engineering offers two undergraduate degree programs and five graduate degree programs:

- Bachelor of Science in Chemical Engineering
- Bachelor of Science in Biological Engineering
- Master of Science in Chemical Engineering
- Master of Science in Environmental Engineering
- Master of Engineering in Chemical Engineering
- Master of Engineering in Bioengineering
- Doctor of Philosophy in Engineering

Courses include

- Advanced Composite Materials
- Bioengineering Transport
- Bioprocess Engineering
- Downstream Processing
- Failure of Materials
- Fluid Dynamics
- Graduate Thermodynamics
- Heat Transfer Analysis
- Mass Transfer and Separations
- Material and Energy Balances
- Materials Science
- Numerical Solutions to Engineering Problems
- Principles of Biomedical Engineering
- Process Dynamics and Control
- Reaction Kinetics and Reactor Design
- Theory of Magnetic Resonance Imaging
- Thermodynamics
- Transport Analysis

4 Many research projects that occupy researchers in the Chemical and Biological Engineering Department are related to environmental concerns, such as energy, pollution, and water systems.

CHBE CURRICULA

The Department of Chemical and Biological Engineering offers two undergraduate degree programs:

- Bachelor of Science in Chemical Engineering
- Bachelor of Science in Biological Engineering

Both of these degree programs integrate chemistry, biochemistry, physics, and mathematics along with oral and written communications courses, and CORE courses in the humanities and social sciences. The biological engineering program adds a significant exposure to biological science in addition to the chemistry core. The chemical engineering and biological engineering programs are fundamentally similar in that both are focused on the transformation of molecules, but the methods and equipment used for biotransformation and separation are quite different from those used for chemical transformations. The curricula accommodate the unique characteristics of each discipline.

Each ChBE student participates in a capstone senior design team project that provides an opportunity to pull together the knowledge and skills learned in earlier courses to solve a real world problem.

SCHOLARSHIPS

Montana State University's Office of Financial Aid coordinates a wide variety of scholarship opportunities. Many scholarships for freshmen (both resident and non-resident) are awarded automatically, without a separate application form, based on the ACT or SAT scores you submit with your application for admission.

www.montana.edu/admissions/scholarships/

The College of Engineering and the ChBE Department also offer scholarships to qualified applicants on a competitive basis. The ChBE scholarships (both need-based and non-need-based) range from \$500 to more than \$3,000 per academic year. Students interested in being considered for COE and ChBE scholarships must submit a special COE scholarship application form prior to February 1 for the following academic year.

www.coe.montana.edu/scholarships.asp

ADMISSIONS

Applications are accepted from in-state, out-of-state, and international students. Eligible undergraduate students may attend full-time or part-time. Applications for admission to undergraduate programs are processed by the Office of Admissions, Montana State University, P.O. Box 172190, Bozeman, MT 59717-2190 (+1 406-994-2452 or 1-888-MSU-CATS).

www.montana.edu/admissions/

