

SCHOOL OF BIOMEDICAL AND CHEMICAL ENGINEERING



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The School of Biomedical and Chemical Engineering (SBCE) stands on a foundation of strong faculty and research programs from four CSU colleges: the Walter Scott, Jr. College of Engineering, and the Colleges of Health and Human Sciences, Natural Sciences, and Veterinary Medicine & Biomedical Sciences. The unique structure of the School involves over 70 faculty members representing 14 departments to provide an interdisciplinary focus on improving health, fighting disease, and aiding persons with disabilities. Academic excellence across diverse fields converges into three primary areas of research: (1) regenerative and rehabilitative medicine, (2) imaging and diagnostics, and (3) medical devices and therapeutics.

At the undergraduate level, SBCE offers unique five-year dual degree programs (<https://catalog.colostate.edu/general-catalog/colleges/engineering/biomedical-chemical-engineering/dual-degree-programs/>) where graduates receive two B.S. degrees: one in Biomedical Engineering and the other in one of four traditional engineering areas - Chemical & Biological Engineering, Computer Engineering, Electrical Engineering, or Mechanical Engineering. An undergraduate Biomedical Engineering Interdisciplinary Minor (<https://catalog.colostate.edu/general-catalog/university-wide-programs/interdisciplinary-studies/biomedical-engineering-interdisciplinary-minor/>) and an undergraduate Certificate in Global Biomedical Engineering (<https://catalog.colostate.edu/general-catalog/colleges/engineering/biomedical-chemical-engineering/global-biomedical-engineering-certificate/>) are also offered.

SBCE also offers an undergraduate degree in Chemical and Biological Engineering. For a broad overview of the field, students can choose to major in the 'standalone' Major in Chemical and Biological Engineering (<https://catalog.colostate.edu/general-catalog/colleges/engineering/biomedical-chemical-engineering/chemical-biological-engineering-major/>), or they can specialize in one of four available concentrations: Advanced Materials, Biomanufacturing, Molecular Medicine, or Sustainable Engineering.

At the graduate level, SBCE offers Master of Science and Ph.D. programs in Bioengineering or Chemical Engineering, Master of Engineering programs with specializations in Biomedical Engineering (<https://catalog.colostate.edu/general-catalog/colleges/engineering/me-biomedical-engineering-specialization/>) or Chemical Engineering (<https://catalog.colostate.edu/general-catalog/colleges/engineering/me-chemical-engineering-specialization/>), a Professional Science Master's in Biomanufacturing and Biotechnology (<https://catalog.colostate.edu/general-catalog/colleges/engineering/biomedical-chemical-engineering/psm-biomanufacturing-biotechnology/>), and two Graduate Certificates: Biomaterials and Tissue Engineering (<https://catalog.colostate.edu/general-catalog/colleges/engineering/biomedical-chemical-engineering/biomaterials-tissue-engineering-graduate-certificate/>), and Bioprocess Engineering (<https://catalog.colostate.edu/general-catalog/colleges/engineering/biomedical-chemical-engineering/graduate-certificate-bioprocess-engineering/>).

Biomedical and chemical engineering lies at the interface of engineering, biology, medicine, and sustainability. With over 40 state-of-the-art biomedical and chemical engineering research labs, including the world-renowned Veterinary Teaching Hospital and Animal Cancer Center, we offer hands-on experience for undergraduate and graduate students to work alongside leading researchers. CSU provides a rich environment for interdisciplinary research and day-to-day collaborations and is positioned to offer unique bioengineering degree programs due to our faculty expertise, the interdisciplinary nature of the SBCE, and the highly-ranked veterinary program. Our programs integrate biological, chemical, physical, and mathematical sciences with engineering principles and clinical studies, and our graduates are well prepared for careers in research, education, veterinary or human medicine, and industry.

Biomedical and chemical engineers are involved in a wide variety of activities on a daily basis. Practical applications of biomedical and chemical engineering include development, design, production, research, and/or teaching in areas such as:

- Designing biomedical materials, medical devices, instrumentation and equipment (software/firmware/hardware) for therapeutics such as pacemakers, assistive devices, joint replacement materials, prosthetics, surgical tools.
- Developing or improving therapies for fighting cancer, tuberculosis, or other illnesses and diseases (e.g., nanoscaffolding for localized chemotherapy delivery, telemetric sensors to determine healing rates in bone fractures or to detect key chemicals in live tissue with high temporal and spatial resolution).
- Finding better ways to image and/or diagnose illnesses (e.g., using laser-based imaging to detect viruses, developing ways to increase electrical signals to detect threats to food safety and security, designing biosensors to diagnose cancer cells, developing software to determine toxic pesticide levels in people).
- Designing and improving manufacturing processes for chemicals, fuels, food, pharmaceuticals, and other products, while also ensuring safety, efficiency, and sustainability.
- Designing processes for the production of alternative energy sources and waste prevention.