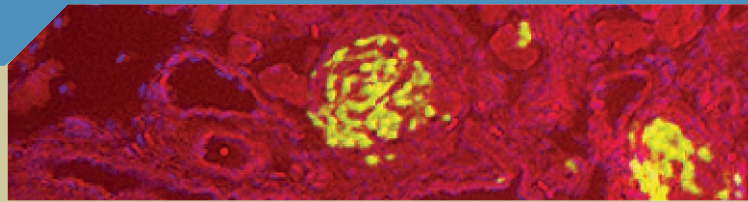


UB Department of Chemical and Biological Engineering (CBE)

BS in Chemical Engineering



CBE researchers engineer insulin-secreting tissues that mimic the pancreas. These studies may lead to improved treatment of diabetes.

WHAT DO CHEMICAL AND BIOLOGICAL ENGINEERS DO?

CBE grads apply chemistry to make things that people can use. This is **PRODUCT ENGINEERING** and examples include:

- Portable water purifiers
- Ozone-safe refrigerants
- A home-use ventilator
- Pacemaker batteries
- Artificial organs
- Energy-efficient windows
- Pollution-preventing ink
- Stain-resistant fabrics
- Drug-delivery patches
- A cure for cancer (really)

CBE grads help to solve the material needs of society, ensuring that there is enough to go around today and in the future. This is **PROCESS ENGINEERING** and contemporary examples include:

- How can we make enough ethanol to meet the growing demand for its use as a fuel?
- A lifesaving drug has been discovered in a tropical plant. How can we make enough of it to satisfy the needs of all people who need this cure?
- A competitor overseas can make a product with less cost because regulations there are not as strict. How can we improve our manufacturing process to remain competitive?
- Flexible display devices can be made by coating organic molecules on a polymer substrate. How can we make enough of these to satisfy demand and keep them affordable?

EMPLOYERS: Any company that is in the business of making some physical product must employ chemical engineers. This includes the obvious companies such as Dow, Dupont and ExxonMobil, as well as ones you may not have expected, such as IBM, Chrysler, Nabisco, Merck, Molson, and so on.

FACTS ABOUT CBE@UB

Full-time faculty: 20

Average BS ChE starting salary: \$65,617

Typical CBE class size: 40

CBE lecture courses taught by teaching assistants: 0

Degrees offered: BS, MS MEng, PhD (all in Chemical Engineering)

A five-year BS in Chemical Engineering + MBA degree is also available

OVERVIEW OF CURRICULUM

Freshman – Sophomore

The first two years build the basic science and mathematics skills that you need for the practice of chemical engineering: four chemistry courses, including organic chemistry and (optionally) biochemistry; two semesters of physics; math through differential equations; and one required course in biology. Chemical engineering courses start in the sophomore year.

Junior

The third year develops the engineering sciences. Here you learn to control the movement of mass and energy, and how to engineer chemical reactions. You learn how to purify things on a large scale. You discover why materials behave as they do, and how to manipulate them. Hands-on laboratories build practical skills from the classroom instruction.

Senior

Study of chemical and biological systems is coupled with practice of design to provide the capstone to the degree. The material you learned in the first three years comes together synergistically. Both product and process design are given equal emphasis.

SPECIALIZATIONS

Students wanting more specialization can follow one of three optional 'tracks':

- The **biological engineering track** prepares students to design biological processes, products, and therapeutics.
- In the **materials engineering track** students learn to design and make the remarkable materials that drive today's advances in technology.
- Students following the **process engineering track** develop strengths needed to solve problems in chemical manufacturing settings.

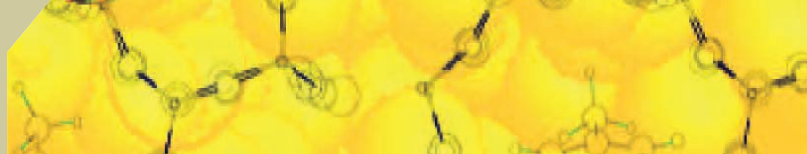
DID YOU KNOW?

A BS in Chemical Engineering is a great pre-med degree. A student following the Biological Engineering track can add one more course in organic chemistry to meet all the requirements for admission to most medical schools. And CBE graduates from UB have gone on to study and succeed at some of the most competitive medical schools in the nation.



DID YOU KNOW?

The U.S. Bureau of Labor Statistics predicts that chemical engineering is expected to have very good employment growth through at least 2014. (Source: www.bls.gov/oco/ocos027.htm.)



Quantum mechanical modeling supplements experiment to reduce the need for hazardous chemicals in industrial processes.

STUDENT EXCELLENCE



Andrew Paluch received a prestigious 2007 Barry M. Goldwater Scholarship, awarded to sophomores and juniors who intend to pursue advanced degrees in science and engineering. Andrew is completing a double major in Chemical Engineering and Mathematics with a minor in Chemistry.

"The department at UB is like a family. All of the professors know their students on a first name basis and have a vested interest in their success. I have studied at smaller and larger institutions, but am glad to call UB my home."

WORK OPPORTUNITIES

Many of our students gain industrial experience during their undergraduate studies. Some students find engineering-related employment in the summer. Others get experience through 3-credit internships, through a co-op, or by participating in UB Engineering's unique Engineering Career Institute (ECI). Many graduates claim that these experiences gave them a leg up on the job search and let them hit the ground running when they started working.

"UB's Chemical Engineering program allowed me to expand my horizons with activities such as Chem-E Car Team and the ECI internship/co-op course. With these opportunities, on top of a vast curriculum, I was able to participate in a student-led team, experience chemical engineering conferences, compete with other schools, and receive on-the-job training which ultimately led to a full-time job after graduation."

Lindsay Mroz (BS ChE '06)

UNDERGRADUATE RESEARCH



In addition to being a terrific undergraduate university, UB is also a great research institution. Research opportunities abound in CBE, and our faculty are at the frontiers of knowledge in diverse areas, including nanotechnology, biomedical engineering, genetic engineering, energy, environment, polymers, molecular modeling, and more. CBE faculty are happy to involve motivated and capable students in their research.

Imagine that: you can get course credit while having a world-class research experience!

DID YOU KNOW?

You can get paid to go to graduate school. About 15% of our graduates go on to pursue advanced study toward a PhD. Some choose to continue their studies here, while others go to study at other elite graduate programs nationwide (e.g., Princeton, MIT, Carnegie Mellon, Cornell, Minnesota, Michigan...). Students admitted to the PhD program at any of these schools receive not just full tuition scholarships, but also a modest stipend to support their study (about \$20,000/year; enough to live on, but not enough for a fancy car).

STUDENT CLUBS AND ACTIVITIES

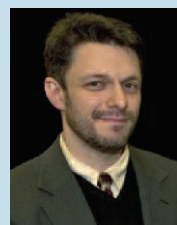
UB's student chapter of the American Institute of Chemical Engineers focuses the energy of an outstanding group of our students toward a wide variety of educational and fun activities. Each class seems bent on outdoing the class that preceded it. If you want a chance to exercise your leadership skills, or just get involved in a lot of worthwhile activities, you can find a way to do it with this group.

"The AIChE has been making a strong impact at UB with ChemE-Car competitions, factory and industrial tours of local companies, guest speakers from various industries, research fairs, and student-faculty activities. Last year we were proud to add one of the first national sections of the Society of Biological Engineers for students with more of a biology or medical focus."

Christina Yacoob, AIChE President, 2007-08



SUCCESSFUL ALUMNI



Don Visco (BS, 1992, PhD 1999) received a Presidential Early Career Award for Scientists and Engineers (PECASE) from the Department of Energy. This award is the highest honor bestowed by the US on early-career scientists and engineers, and it was presented to Don in a White House ceremony in 2005. Don is currently an Associate Dean for Undergraduate Studies at the University of Akron.

AWARD-WINNING FACULTY

The CBE@UB faculty are recognized locally, nationally and worldwide for their teaching and research accomplishments. Altogether the faculty have received more than fifty major awards from various organizations in the US and abroad. This includes at least ten distinctions recognizing teaching excellence.



(L to R): CBE Distinguished Professor Eli Ruckenstein received the National Medal of Science (1999), and **CBE and EE Distinguished Professor Esther Takeuchi** was awarded the National Medal of Technology and Innovation (2009). These medals represent the highest honors bestowed by the U.S. for scientific, engineering, and technological achievement.

To apply, please visit admissions.buffalo.edu.

CONTACT INFORMATION

David A. Kofke,
Chair
(716) 645-1173
kofke@buffalo.edu

Jeffrey R. Errington,
Director of Undergraduate Studies
(716) 645-1184
jerring@buffalo.edu

Department of Chemical and Biological Engineering
303 Furnas Hall
University at Buffalo, The State University of New York
Buffalo, NY 14260-4200