Undergraduate Program in
COMPUTER ENGINEERING

Computer Engineers Design and Develop Practical Systems

Computer and information technologies are critical to the nation's technological infrastructure and competitive advantage in the knowledge-based global economy of the 21st century. These technologies have enabled discoveries and inventions in diverse fields of study, and have transformed society and our daily lives in dramatic ways.

Computer engineers are engaged in designing a wide range of devices, systems, software, and services. They design the control systems for automated production lines in industry, create software for digital telephone switching systems, and develop the installation of a local area network (LAN). Thus, computer engineers work in every sector of industry, government, and society in general.

Computer Engineers use their knowledge to:

- Analyze users' needs, and then design, test, develop, and maintain software or specialized utility programs to meet those needs;
- Design, develop, test, and evaluate hardware and systems that make computers work, including computer games, business applications, operating systems and network distribution, and compilers, which convert programs to machine language for execution on a computer;
- Use different programming languages, including C, C++, Java, and Python;
- Work as part of a team that designs new hardware, software, and systems.

Curriculum Overview

[FRESHMAN–SOPHOMORE]

The first two years build a strong foundation in object-oriented programming, data structures, and digital systems. During this period, students also develop the necessary foundations in calculus, differential equations, discrete mathematics, and linear algebra. Basic science (physics and chemistry) and electronic circuits are included.

[JUNIOR]

The junior year covers the study of applied probability, computer organization, embedded and real-time operating systems, and microprocessors. Circuits, signals and electronics are also studied during the junior year. These courses provide core concepts necessary for more advanced study of both hardware and software systems.

[SENIOR]

The required courses of the first three years serve as preparation for a pair of important courses in the senior year: software engineering and hardware/software integrated systems design. This year is also devoted to the study of elective courses on a variety of topics in hardware and software systems such as computer architecture, networks, database, and VLSI systems.

Careers for UB Computer Engineering Grads

Opportunities for computer engineers exist locally, nationally and internationally. Computer engineering graduates from the CSE department have joined some of the best companies in the field, including Apple, Amazon, Bloomberg, Cisco, Facebook, General Electric, Google, Hewlett-Packard, IBM, Intel, Kodak, Lockheed Martin, Microsoft, NASA, Nokia, Disney and Xerox.

Facts About CSE@UB

- Full-time faculty: 46
- Starting salary for undergraduate degree holders: **$69,000–$100,920**

CSE Degrees Offered

- BA, BS in Computer Science
- BS in Computer Engineering
- MS, PhD in Computer Science and Engineering
- BS in Bioinformatics with CSE concentration
- BS/MS Computer Science (Dual degree)

Did You Know?

- According to the US Bureau of Labor Statistics, employment for computer systems and network engineers is projected to increase by 20 percent through 2022. Our graduates are aggressively recruited by top companies nationwide.
- Graduates from the CSE department also go on to pursue graduate studies and often receive scholarships for Masters and doctoral studies at prestigious institutions.

Internship Opportunities

Many of our students gain work experience during their undergraduate studies. Some students find computing-related employment in the summer. Others get experience through internships or co-ops at local companies, national labs and elsewhere, which may offer academic credit. Graduates often state that these experiences gave them a competitive advantage during their job search and facilitated a smoother transition to full-time employment.

World-Class Faculty

CSE faculty members:

- have received outstanding teaching awards, including the SUNY Chancellor's Award for Teaching Excellence, the Milton Plesur Award for Teaching Excellence, and the UB Alumni Association's Richard T. Sarkin Award for Excellence in Teaching.
- are recognized internationally for their research. Faculty members include fellows of major professional computing societies (including ACM and IEEE) and editorial board members of prestigious journals.
- have collaborative research ties with major computing companies, including IBM, Microsoft, Google, Intel, Cisco, Nokia, Oracle, Kodak, and Xerox.

Undergraduate Research

CSE offers undergraduates ample opportunities to engage in creative research, including the Research Experience for Undergraduates (REUs) program of the National Science Foundation (NSF). Undergraduates may obtain academic course credit while acquiring valuable research experience under world-class faculty. CSE faculty are at the forefront of their chosen fields of expertise, and students may engage in research on a variety of topics: pattern-recognition, high-performance computing, algorithms and complexity, artificial intelligence, medical image processing, multimedia systems, optical, wireless and sensor networks, computer security and information assurance, software systems and languages, computer architecture and Very Large Scale Integrated (VLSI) systems.
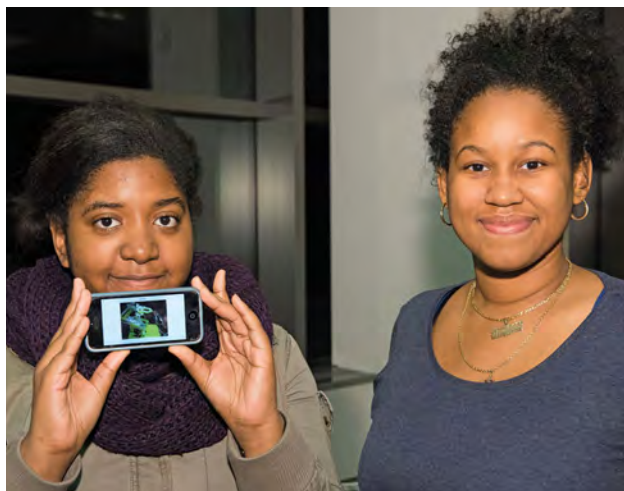
Faculty Profiles

The research work of **Karthik Dantu** and **Nils Napp** focuses on designing the robotic systems of tomorrow. Robotics technology is currently revolutionizing many aspects of automation, manufacturing, and everyday chores with the goal of creating a more efficient and safer world. However, certain aspects of this technology are not well understood. Within UB CSE, the research questions focus on better sensing, planning, and coordination both between machines and between machines and people.

CSE Teaching Associate Professor **Bina Ramamurthy's** computer systems research currently focuses on data science with an emphasis on predictive analytics and visualization. Her other interests include embedded and real-time systems and learning environments. She has been the principal investigator on National Science Foundation funded projects for teaching grid computing, embedded systems, and data-intensive computing and evolutional biology, an interdisciplinary project with Biological Sciences. She is the director of a SUNY undergraduate certificate program in Data-Intensive Computing for UB undergraduates.

Student Clubs and Activities

Many of our undergraduates join the university's Student Chapter of the Association for Computing Machinery (ACM) and Scientista. These clubs provide opportunities for students to interact with other students, faculty, and community members who share similar interests and career goals. They also sponsor a number of events, including programming contests such as the UB hacking competition, guest speakers, and social events.

To apply, please visit **admissions.buffalo.edu**

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