

Undergraduate Program in **COMPUTER SCIENCE**

Computer Scientists: Transforming Society with Critical Technologies

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

Computer Science (CS) is a systematic study of the concepts, foundations and applications of software, hardware, and intelligent systems. Typical subjects include: programming languages, data structure, algorithms, computer organization, operating systems and machine learning.

Computer scientists are engaged in understanding the algorithmic complexity of problems and the limits of computability, automating human intelligence, providing ubiquitous access to information, or designing secure and effective software, computer, and communication systems. Computer scientists work in every sector of industry, government, and society in general.

Computer scientists use their knowledge to:

- Analyze problems in hardware, software, and systems;
- Design, test, and evaluate network and communications systems;
- Meet an organization's system software and infrastructure needs;
- Work as researchers, or inventors, innovating to solve complex problems, and create or apply new technology. CS research may be multidisciplinary, such as developing and advancing uses of virtual reality, extending human-computer interaction, or designing robots;
- Administrate database management systems software.



Curriculum Overview

Both the BA and BS in Computer Science prepare students well for graduate work or for professional positions in computing and information technology fields. The primary difference is that the BS program provides a more concentrated approach to computer science, while the BA program encourages students to combine computer science with studies in another field.

[FRESHMAN-SOPHOMORE]

The first two years build a strong foundation in object-oriented programming, data structures, and digital systems. During the first two years, CS majors also develop the necessary foundations in calculus, probability/statistics, and discrete mathematics. The student also takes a two-semester sequence in any science discipline during this period.

[JUNIOR]

The junior year is devoted to the study of algorithms, programming languages, computer organization, and theory of computing. These courses continue to provide important core concepts necessary for more advanced study of both hardware and software systems.

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)

[SENIOR]

The first three years prepare students to take a pair of required courses in the senior year: software engineering and operating systems. The final year is devoted to elective courses in topics such as software systems, networking and artificial intelligence.

Careers for UB CSE Grads

Opportunities for computer scientists exist locally, nationally, and internationally. Our degree-holders have joined top companies, including Apple, Amazon, Bloomberg, Cisco, Facebook, General Electric, Google, Hewlett-Packard, IBM, Intel, Kodak, Lockheed Martin, Microsoft, NASA, Nokia, Disney and Xerox.

Did You Know?

- According to the US Bureau of Labor Statistics, employment for computer scientists is projected to increase 20 percent through 2022, much faster than the average for most occupations. Our graduates are aggressively recruited by top companies nationwide.
- CS graduates often receive scholarships to pursue masters and doctoral studies at prestigious institutions.

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.

Internship Opportunities

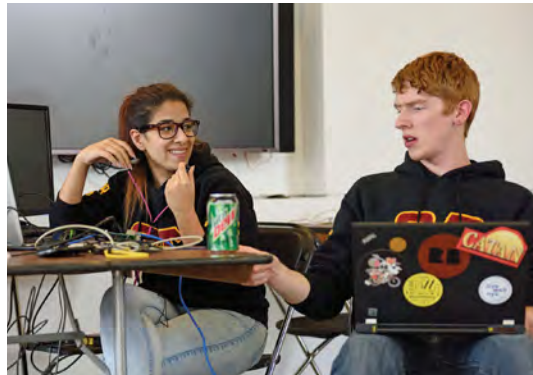
Many of our students gain work experience during their undergraduate studies. Some students find computing-related employment in the summer. Others get experience through internships or co-ops at local companies, national labs and elsewhere, which may offer academic credit. Graduates often state that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

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.

Undergraduate Research

CSE offers undergraduates ample opportunities to engage in creative research, including the Research Experience for Undergraduates (REU) 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.



UB Hacking Competition

Recent Alumni



Nicholas Di Rienzo (BS CS '15) was president of UB ACM and started UB Hacking, worked with faculty on research for four years, and interned every summer in California—twice at Google and once at Optimizely. After graduating in May 2015, he returned to Optimizely as a full-time Software Engineer in San Francisco, CA.

Natasha Sanford (BS CS '15) graduated in 2015 with a double major in computer science and mathematics and a minor in linguistics. She helped found UB Scientista, was president of the Swing Dance Club, worked as a teaching assistant her senior year, and spent one summer each participating in study abroad, research, and interning at FactSet Research Systems Inc., in Norwalk, CT, where she currently works.

To apply, please visit admissions.buffalo.edu

Faculty Profiles



Professor **Rohini Srihari** has worked extensively with government agencies and corporations in developing innovative text and web mining solutions. Her research incorporates multiple disciplines, including information retrieval, natural language processing, machine learning and data science. She combines her academic expertise with her entrepreneurial experience when developing big data solutions based on mining social media and multilingual content. She offers courses and seminars in information retrieval and advanced text mining. She is the founder of Content Savvy Inc. and Cymfony Inc.

CSE Teaching Associate Professor **Carl Alphonc** is active in the computer science education community, including the Association for Computing



Machinery's Special Interest Group on Computer Science Education (SIGCSE) and the Western New York chapter of the Computer Science Teachers Association (WNY-CSTA). He has served often on the committee of SIGCSE's Technical Symposium on Computer Science Education, including as Program co-Chair in 2015 and Symposium co-Chair in 2016, and he is a founding member and current president of the WNY-CSTA.

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