

Computer Science and Engineering



Senior Design and Research

Undergraduate seniors undertake a comprehensive and intensive capstone project known as the senior design project. In-depth application of the skills learned during the preceding years, from initial concept development through analysis, design, and report writing, replicates the process demanded of engineers in practice. For recent projects, students have worked on the control systems of SCU's entry in the U.S. Department of Energy's Solar Decathlon competition, on integrating and configuring multiple software tools to enable a weather station in Alaska, and on improving the storage, retrieval, and processing of video for an on-demand system, to name just a few. A highlight of the academic year, the Senior Design Conference affords students an opportunity to present their projects before a panel of alumni and other invited industry judges.

Co-op and Internship Programs

Situated in the heart of Silicon Valley, a mecca of innovation and entrepreneurship, SCU offers computer science and engineering students unsurpassed opportunities for corporate internships and cooperative education. Working with an industry partner in a business setting provides an invaluable range of experiences, and allows students to put their academic prowess to work.

Study Abroad

Studying in a foreign country provides an unmatched experience that engineering undergraduates can readily enjoy. Sample plans for freshmen and sophomores make it easy to prepare for this tremendous opportunity. Students can spend one or more terms abroad, complete their coursework, and graduate within four years.

After Graduation

SCU's mix of practical and theoretical experiences and our commitment to academic and ethical excellence cultivates outstanding engineers who are highly sought-after candidates for higher education and employment. Our students are well prepared to enter graduate computer engineering programs at SCU or any school across the country. Employers in Silicon Valley and globally provide a wealth of opportunities for SCU computer science and engineering graduates in a variety of career paths.

Faculty

Darren Atkinson, associate professor, Ph.D., UC San Diego. *Interests:* Software engineering, compilers, static analysis tools, data structures, programming languages

Ronald Danielson, associate professor, Vice Provost, and Chief Information Officer, Ph.D., University of Illinois at Urbana-Champaign. *Interests:* Impact of information technology on organizations, Web-based educational tools, human-computer interaction

Ruth Davis, professor and associate dean for undergraduate studies, Ph.D., UC Santa Cruz. *Interests:* Formal methods in software engineering, programming languages, improving diversity in engineering

Silvia Figueira, associate professor, Ph.D., UC San Diego. *Interests:* Parallel and grid computing, middleware, performance modeling, resource scheduling

JoAnne Holliday, associate professor, Ph.D., UC Santa Barbara. *Interests:* Distributed systems, mobile computing, wireless networks, replicated databases

Daniel Lewis, associate professor, Ph.D., Syracuse University. *Interests:* embedded systems

Qiang Li, associate professor, Ph.D., Florida International University. *Interests:* Networked storage systems, parallel and distributed processing, operating systems

Nam Ling, professor and associate dean for research and faculty development, Ph.D., University of Louisiana at Lafayette, IEEE Fellow. *Interests:* Video and image coding, architecture, video communications

Rani Mikkilineni, lecturer, Ph.D., Santa Clara University. *Interests:* Object-oriented design methodologies, software engineering, database systems

Thomas Schwarz, S.J., associate professor, Ph.D., UC San Diego. *Interests:* Scalable distributed data structures, large scale storage systems, high availability, erasure correcting codes

Weijia Shang, associate professor, Ph.D., Purdue University. *Interests:* Parallel processing, computer architecture, algorithm theory, nonlinear programming

For further information, please contact

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The Jesuit university in Silicon Valley

Computer Science and Engineering



Computer Science and Engineering focuses on the theoretical and practical aspects of computing.

Combining features of both computer science and computer engineering, this field of study concerns the design and construction of both software and hardware systems. The discipline spans areas such as networking and the World Wide Web, embedded programming, software engineering, digital hardware systems, information assurance, robotics, and game development.

Our students design and implement software and hardware, devise new ways to use computers, and develop effective methods for solving the world's problems. Our program has a strong engineering flavor, emphasizing the design, implementation, testing, and utilization of software and systems to optimize performance, reliability, and cost.

Computer science and engineering graduates find fulfilling careers in a number of exciting fields. Robotics, game development, computer security, and Web technologies are just a few of the avenues open to them.

Our Program

Located in the Department of Computer Engineering at SCU, the Computer Science and Engineering Program offers a comprehensive education for bachelor's, master's, and Ph.D. students. Our outstanding faculty, emphasis on values-based education, and focus on collaborative learning create an excellent environment for academic and personal growth that prepares our graduates to meet the challenges of an increasingly complex, digital world.

Students work with engaged, passionate faculty members who are leaders in their fields. A solid theoretical foundation, hands-on laboratory experience, and a curriculum that challenges students to think and act ethically, help prepare our graduates to either continue with advanced study or enter the workforce, where they are ready to make real contributions to society.

In this program, students have access to all the tools they need to be successful, including uncommonly accessible mentors who truly enjoy teaching, small classes, state-of-the-art computer laboratory facilities, interdisciplinary projects in which graduate and undergraduate students collaborate, and research opportunities available to all students, from freshmen to Ph.D. candidates.

Many students opt to participate in our combined B.S./M.S. program to earn both a bachelor's and a master's degree in as little as five years.

Program Educational Objectives

The computer engineering department has a comprehensive set of educational objectives for bachelor's, master's, and Ph.D. degree graduates.

Undergraduate objectives

- Our graduates will achieve success in their professional endeavors, equipped with the liberal education and technical expertise required for the creative practice or advanced study of computing; will be motivated to communicate and work effectively in diverse personal and professional settings; and will demonstrate an appreciation of lifelong learning through continued personal and professional development.
- Our graduates will understand their personal and professional ethical responsibilities, and will observe and promote the highest ethical standards.
- Our graduates, equipped with their knowledge of science and engineering, will engage in activities that contribute to the benefit of society.

Curriculum

The computer engineering department takes the University's mission to "educate the whole person" seriously. Our curriculum is design-oriented and laboratory-intensive, with an emphasis on hands-on experience and teamwork that is crucial to success in a competitive workplace. In addition to providing an outstanding engineering education, we also prepare students to communicate effectively and work in a global economy.

At SCU, the core curriculum and our department's educational enrichment experience complement our comprehensive computer science and engineering courses with studies providing the knowledge, habits of mind, and ethical reflection that prepare students for meaningful engagement with the world. Our program offers the flexibility for undergraduates to take twelve or more units, selected in consultation with their academic advisor, that are tailored to their own interests. Students wishing to round out their education by studying abroad, learning a foreign language, or taking graphic arts courses can easily do so through our program.

Undergraduate and graduate courses in computer science and engineering

- operating systems
- artificial intelligence
- Web programming
- embedded systems
- software engineering
- computer architecture
- computer networks
- computer forensics
- databases
- graphics

B.S. specialization tracks

- Web technologies
- information assurance
- robotics
- game development

M.S. specialization tracks

- information assurance
- software engineering
- multimedia processing
- computer networks
- architecture and systems

