

## The Passion

It is difficult, maybe even impossible, to imagine contemporary civilization without computing machines and the software that brings them to life. Computers are everywhere—in science, medicine, engineering, commerce, music, and the arts. Computer science majors are also everywhere—designing software for business and industry, implementing the next generation of video games, using computation to unravel the mysteries of the gene and human intelligence, and building increasingly sophisticated computers.

## The Program

The School of Engineering and Applied Science offers a Bachelor of Science (B.S.) in Computer Science. Computer Science is the study of software in all of its forms, from the software that controls your web browser to the kind that lets you download music and videos—and the software that makes digital music even possible. Graduates of computer science programs typically work as software engineers, computer scientists, and computational scientists, though many go on to careers in business and law as well.

Software engineers are responsible for the design, development, and maintenance of the software that makes computing possible. It was a team of software engineers who designed and developed the operating system on your computer. It was a team of software engineers who designed and developed the many applications stored on your cell phone. It was a team of software engineers who designed and developed the air traffic control systems that coordinate air travel around the world. And it was also a team of software engineers who designed and developed the software that lets you buy books and music online. So it is no exaggeration to say that without the contributions of software engineers, our contemporary way of life would not exist. Software engineers usually have bachelor's degrees in computer science.

Computer scientists are responsible for the theoretical breakthroughs that make modern computing possible. You find computer scientists in academic, government, and private sector research labs developing new techniques for speech recognition, new ways to approach machine learning, novel approaches to networks of sensor devices, new cryptographic algorithms, and new programming languages. Computer scientists typically have

advanced degrees in computer science.

Computational scientists bring the richness of computational power to the complex problems that arise in science, engineering, and the social sciences. According to a recent report from the President's Information Technology Advisory Committee, "computational science is now indispensable to the solution of complex problems in every sector, from traditional science and engineering domains to such key areas as national security, public health, and economic innovation." The most spectacular recent example is the decoding of the human genome, an enterprise unthinkable without computers, software, and the computational scientists who harnessed them. Computational scientists usually have training both in computer science and in an application discipline like biology.

Built on a foundation of science, mathematics, intensive programming, and computer architecture, the Computer Science major at Gonzaga offers a broad range of advanced computer science topics. These include artificial intelligence, computer graphics, robotics, computer networks, database management systems, cryptography, computer security, and computational linguistics. All students study software engineering in their senior year, working in groups to develop a substantial system under the guidance of a computer industry engineer. In addition, exceptional undergraduates have the opportunity to assist faculty in their research on sensor networks, speech recognition, robotics, and mathematical modeling.



## The Equipment

The Department of Computer Science operates three labs and a mainframe computer:

- The Intel Corporation Computational Science Laboratory, consisting of a 512 node cluster that is available for compute-intensive research
- The Sensor Networks and Robotics Laboratory available for research in sensors, computer vision, and robotics
- The General Computing Lab contains 30 machines running both Linux and Windows
- The Senior Lab whose Windows and Linux machines are used for senior software engineering projects
- An HP Proliant running Redhat EL5 and capable of handling 50 users concurrently.

All three labs and the mainframe, of course, are connected to the University fiber optic backbone and from there to the Internet.

## The Potential

Graduates in computer science may go directly to the computer industry or to further study in business, law, another scientific discipline, or computer science itself. Those going on to graduate programs in computer science are usually fully-supported. The Bureau of Labor Statistics expects demand for software engineers to grow by 32 percent by 2018; this is much faster than the average increase for all occupations. The BLS says that “this occupation will see a large number of new jobs, with more than 295,000 created between 2008 and 2018... As a result of rapid employment growth over the 2008 to 2018 decade, job prospects for computer software engineers should be excellent.” The median salary for a software engineer ranges from \$85,000 to \$92,000, with those in the top 10 percent earning from \$129,000 to \$136,000. The average starting salary in 2009 for a new graduate with a degree in computer science was \$61,000 (retrieved 2/17/2011 from [www.bls.gov](http://www.bls.gov)).

## The People

The Computer Science faculty are committed both to teaching and to advancing the state of the discipline. All faculty members teach a full range of courses, from freshman to senior level. All maintain posted office hours, advising sessions, and a commitment to student success.

Several of the faculty have years of industry experience with some of the best-known firms in computing. Several others have research programs in robotics, speech recognition, genetic algorithms, database management systems, computer networks, and computer modeling that employ students as research assistants.

The Department of Computer Science is a joint participant, along with Mathematics and Civil Engineering, in the Gonzaga University Center for Evolutionary Algorithms. GUCEA has presented student-assisted research at international conferences in Europe and the United States.

## Faculty Contacts and Specialties:

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