Computer Science

It is difficult, maybe even impossible, to imagine contemporary civilization without computing machines and the software that brings them to life. From science to medicine, engineering to commerce, and music to reading—digital devices are everywhere. 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 genes and human intelligence, and building increasingly sophisticated computers and other digital devices. At Gonzaga, computer science students gain the skills to innovate with these technologies, while also expanding their capacities for critical thinking and ethical reflection in the Jesuit tradition.

THE PROGRAM

The School of Engineering and Applied Science offers a **Bachelor of Science (B.S.) in Computer Science**. The Computer Science major at Gonzaga is built on a foundation of courses in science, mathematics, intensive programming, software development and engineering, and computer architecture. The program offers a broad range of advanced computer science topics, including:

- artificial intelligence
- computer graphics
- computer networks
- database management systems
- cryptography
- computer security
- speech and natural language processing

All seniors participate in a large software engineering project, completed under the guidance of a faculty advisor and a project sponsor. Gonzaga University also offers an 18-credit minor in Computer Science. Students who are considering a business, science or humanities career will benefit from this option. The minor consists of two required courses (Computer Science I and Computer Science II) and 12 credits of computer science electives. Students may use the 12 credits of electives to focus on an area of particular interest, including artificial intelligence, data management, computer graphics, or computer security.

The **B.A. in Computer Science and Computational Thinking** is built upon a foundation of computer science and the liberal arts. The curriculum provides all majors with a foundation in Computer Science through 21 credits in Mathematics and Computer Science courses. Students interested in the B.A. in Computer Science and Computational Thinking select a Discipline for Computational Thinking (DCT), or track, consisting of at least 12 credits in one other discipline in the College of Arts and Sciences. In consultation with their advisor, students also choose an additional 21 credits in Computer Science courses, including Computer Science courses related to each track. Each student's track will be overseen by a **DCT Committee** consisting of the Program Director, the Chair of the Computer Science Department, and the Chair (or Chair's designate) of the department selected by the student as the DCT. Students are encouraged to complete the courses in the DCT and the Computer Science courses specific to that DCT before the senior year. All seniors participate in a large software engineering project, completed under the guidance of a faculty member and a project sponsor.

THE EQUIPMENT

The Department of Computer Science operates the following labs:
- The Intel Corporation Computational Science Laboratory consists of a computing cluster that provide the computational presence for both faculty and undergraduate students to use in classes and for research.
- The Computer Science Research Lab consists of computers and project space for students interested in pursuing research projects.
- The General Computing Lab consists of 32 machines running both virtual Linux and Windows.
- The Senior Lab consists of computers running a mix of Windows, Linux, and Mac OS and project space for senior software engineering projects.

RESEARCH OPPORTUNITIES

Promising undergraduates have the opportunity to assist faculty in their research. Faculty research interests include remote sensor networks, wireless mobile networks, genetic algorithms, speech recognition, mathematical modeling, data mining, data visualization, scientific data management and database systems, and computer security. Many of our students involved in research projects have

gonzaga.edu/computer-science

GONZAGA UNIVERSITY | School of Engineering & Applied Science

presented their results at regional, national, and international conferences. Computer Science majors can also participate in research through the departmental honors program. In particular, students can graduate with departmental honors if they fulfill all computer science degree requirements, achieve a grade point average of at least 3.50 in their CPSC courses needed for a major in Computer Science, write a senior thesis under the supervision of a Computer Science faculty member, and successfully complete CPSC 495 and 496 in their senior year.

OUTCOMES

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. A major in Computer Science at Gonzaga can lead you immediately into a software engineering career. Graduates also go on to fully-funded graduate work in computer science. When finished with their studies, they work as computer scientists in academic, government, and industrial research labs.

Computer scientists are responsible for the theoretical breakthroughs that make modern computing possible. In recent years, computer scientists have developed new techniques for speech recognition programs, machine learning, networks of sensor devices, cryptographic algorithms, and programming languages, among many others.

Computational scientists bring the richness of computational power to the complex problems that arise in science, engineering, and the social sciences. One of the most spectacular examples 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, chemistry, climate science, or physics.

Computer Science graduates from Gonzaga often go directly to the computer industry or to further study in business, law, another scientific discipline, or computer science itself. To prepare for these opportunities, many Gonzaga Computer Science students pursue summer research or internships. Many of our students intern in the computer industry, some with companies that regularly work with our department. Others secure summer research funding through the National Science Foundation-sponsored Research Experience for Undergraduates program. Our graduates frequently begin their careers in software engineering at some of the best-known firms in computing including Apple, Microsoft, Amazon, and Boeing. Those going on to graduate programs in computer science usually receive a full stipend that covers their graduate tuition, fees, and living expenses.

THE PEOPLE

The Computer Science faculty are committed both to teaching and 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 and research experience.

FACULTY CONTACT AND SPECIALTIES

Shawn Bowers | Dept. Chair
Ph.D., OGI School of Science and Engineering, Oregon Health & Science University
data management, conceptual modeling, workflow systems
bowers@gonzaga.edu

Robert Bryant
M.S., Washington State University
computer science
bryant@gonzaga.edu

Paul De Palma
Ph.D., University of New Mexico
speech recognition, genetic algorithms
depalma@gonzaga.edu

David Schroeder
Ph.D., University of Minnesota
computer visualization, iterative design processes
schroederd@gonzaga.edu

Gina Sprint
Ph.D., Washington State University
wearable computing, sensor data mining, machine learning, technology applications for healthcare
sprint@gonzaga.edu

Kathie Yerion
Ph.D., University of Montana
computational modeling of non-linear systems, differential equations, graph theory, and computer science education
yerion@gonzaga.edu

Yanping Zhang
Ph.D., University of Alabama
computer networks, wireless sensors and actuator networks, telemedicine, e-Health, visualization technology, hardware/software design
zhangy@gonzaga.edu

GONZAGA
UNIVERSITY