

# Computer Science, MS, PhD, MCS

**Department:** Computer Science Department

**College:** College of Engineering

## Overview

### About This Degree

This department offers graduate students an extensive education in many areas in computer science. Its faculty members are engaged in research and cutting-edge advancements in computer science, and they teach a high percentage of courses in the department, giving graduate students individual attention. Students who graduate with advanced degrees in computer science have high job placement, and as computers are so crucial to nearly every industry, continued growth in computer science careers is expected in the future. Additionally, the MS in computer science at USU is the only graduate degree in computer science offered via distance education and available through evening classes, allowing working professionals to obtain a master's degree.

There are four areas of research focus for graduate students and faculty within the department:

- **Artificial Intelligence:** A complicated and broad field in computer science, AI deals with the development of systems (hardware and/or software) that in some way exhibit intelligent behavior. The four main categories of AI research are: systems that can think like humans; systems that can act like humans; systems that can think rationally; and systems that can act rationally.
- **Bioinformatics:** Bioinformatics utilizes computers and computer-based algorithms to aid in the analysis of biological information. Research in this area involves the development of machine learning algorithms to solve specific bioinformatics problems, including identification of protein functional sites, gene finding, and more.
- **Distributed, Parallel, and Concurrent Computing:** This area deals with the development of multiple processors and computers to achieve fast and efficient applications. Multiple processors are used in projects such as coordinating space shuttles and other major operations.
- **Software Systems:** This is a broad area of computer science that covers every aspect of software development, with the goal to create more sophisticated, reliable, and secure software.

The **Master of Computer Science (MCS)** is a terminal degree with coursework requirements similar to the PhD, but lacking the PhD's requirement for original research.

### Distance Education

The MS in computer science is available through USU's [Regional Campuses](#).

## Career Options

Careers in computer science can be categorized into the following four areas:

### **Software development** (software systems)

- Business applications
- Game development
- Web programming
- Scientific computing

### **Finding and creating new uses for computers** (AI, parallel computing, or bioinformatics)

- Searching for cancer and other disease treatments
- Automating medical images such as mammograms
- Autonomous vehicles for use in agriculture and more

### **Solving computer problems** (AI, parallel computing, or bioinformatics)

- Research in computer theory
- Creating more effective algorithms

### **Managing computer systems** (software systems or parallel computing specializations)

- This can be done for a wide variety of industries and companies

Additionally, PhD graduates are qualified to pursue academia or research positions with government or private labs.

## What it takes

### Admissions Requirements

Students from any undergraduate background are welcome to apply; however, to be considered, applicants must have extensive experience in computing, programming experience in C++, and a course in data structures and algorithms, as well as a working grasp of calculus and statistics.

#### Application Requirements:

- Complete the [online application](#)
- Pay the \$55 application fee
- Score at or above the 80th percentile on the quantitative section of the GRE
- Have a 3.0 or higher GPA on your last 60 semester or 90 quarter credits
- Provide transcripts of all college/university credits
- Provide three contacts for letters of recommendation

International students have [additional admissions requirements](#).

### Admissions Deadlines

The department has the following deadlines:

Doctoral degree:

- Fall semester – February 1

Master's degree:

- Fall semester – June 15
- Spring semester – October 15
- Summer semester – March 15

### Master's Degree Plan Options

Students can receive the MS by pursuing one of three options:

- In the **Plan A** option, students complete graduate-level coursework and must write a thesis.
- The **Plan B** option requires the production of a paper or creative work of art and is expected to reflect equivalent scholarship standards as a thesis.
- A third option, **Plan C**, does not involve a thesis or a defense meeting and is comprised of coursework only.

### Financial Assistance

The department offers a limited number of [assistantships](#), both teaching and research, each year. These are competitive assistantships awarded to highly qualified students.

A variety of funding opportunities are available, including [fellowships](#), [scholarships](#), [tuition awards](#), and [travel support](#). Additionally, students may be eligible for subsidized [health insurance](#) through qualifying assistantships.

### Program Requirements

[Click here](#) to see course requirements for the **Master of Science**.

[Click here](#) to see course requirements for the **Doctor of Philosophy**.

[Click here](#) to see course requirements for the **Master of Computer Science**.

**PhD Qualifying Exams:**

PhD students must successfully complete a three-part qualifying process:

- As the first step, students must write a publishable paper and present it to their committee. There is no set time for completion, but it is recommended that it be completed sometime within the student's first year.
- Within one year of the paper production and presentation, students must pass an oral assessment of critical review skills. The committee will assign a series of scholarly articles the student must read and study, and the assessment will consist of a discussion of these articles.
- Candidates are required to pass a preliminary exam in which they present the topic for their dissertation. This must be completed before students are allowed to proceed with their dissertations.

## Contact

### Advisor(s)

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## Get Involved

### Professional Organizations, Honor Societies, and Clubs

**Association for Computing Machinery:** ACM, the world's largest educational and scientific computing society, delivers resources that advance computing as a science and a profession. ACM provides the computing field's premier digital library and serves its members and the computing profession with leading-edge publications, conferences, and career resources.

**Association for Computing Machinery for Women:** ACMW at Utah State University is a group of women in the department who are interested in encouraging women to enter this area of study and to join the ranks of women in the computer science field. In present years, the number of women in the field has declined. Through the establishment of a support system which includes activities and projects that aim to improve the working and learning environments for women in computing, ACMW strives to end this decline.

**Free Software and Linux Club:** The FSLC is a community of users that enjoy learning, teaching, and promoting Linux and other free software. FSLC holds weekly meetings, monthly workshops, and a yearly forum, all with useful tutorials and introductions to a wide variety of free software topics.

### Labs, Centers, Research

**AggieAir Flying Circus:** AggieAir Flying Circus provides high-resolution, multispectral aerial imagery using a small, unmanned aerial system. The system is able to map small areas quicker, more frequently, at greater resolution, and at a smaller cost than conventional remote sensing. Some applications for AggieAir include monitoring of soil moisture and evapotranspiration in agriculture, riparian habitat mapping, road and highway surface monitoring, wetland mapping, and fish and wildlife tracking.

**Center for Active Sensing and Imaging:** CASI uses radar-like, laser-based LIDAR technology to measure distances instead of radio waves for a variety of industrial applications, including siting wind farms, controlling emissions, and rapid replacement of bridges, runways, and other infrastructure.

**Center for Atmospheric and Space Sciences:** CASS is recognized nationally and internationally as a progressive research center with advanced space and upper atmospheric research programs. CASS scientists are tackling the adverse consequences of space weather. Undergraduate and graduate students are involved in numerous research projects in CASS that provide opportunities to program computers, analyze data, and build instrumentation.

**Center for High Performance Computing:** HPC at USU is a research service center that serves and expands the computational needs of the USU community. HPC at USU houses a 256-processor cluster called "Uinta," with three networks.

**Center for Self-Organizing and Intelligent Systems:** CSOIS is a multi-disciplinary research group at USU that focuses on the design, development, and implementation of intelligent, autonomous mechatronic systems, with a focus on ground vehicles and robotics.

**Center for Space Engineering:** CSE is a multi-disciplinary group of faculty at USU involved in space technology,

systems, and science. The center brings together academics, industry, and government to advance the understanding of the space environment and to train the next generation.

**Environmental Management Research Group:** EMRG is a research unit of the Utah Water Research Laboratory focused on integrated watershed management and systems analysis of environmental problems. EMRG provides software development, watershed and water quality modeling, and GIS data analysis service to internal and external entities directed at solving integrated watershed and environmental management-related problems of a variety of scales.

**Rocky Mountain NASA Space Grant Consortium:** RMNSGC is one of 52 National Space Grant Consortia in the United States. As a member of the consortium, USU has awarded more than 100 fellowships to students interested in aerospace-related education and careers. The majority of Space Grant student awards include a mentored research experience with university faculty and NASA scientists, engineers, and technologists.

**Space Dynamics Laboratory:** SDL is known for sending 500+ successful experiments into space and brings in \$54 million per year in revenue, the majority coming from grants, contracts, and appropriations. SDL's expertise in the development of sensors and calibration, small satellites and real-time intelligence has made it an internationally known organization in the space arena.