

COMPUTER SCIENCE - DOCTOR OF PHILOSOPHY (PHD)

As a computer science PhD student at CU Boulder, students take part in tier one research, learning from nationally and internationally recognized faculty.

Computer Science faculty, staff, and students are engaged in cutting edge research projects that address some of the most important challenges facing society today. From harnessing the power of big data to modeling climate change to understanding the role of social media, advances in computer science today will change the world tomorrow. The department offers opportunities in seven main research areas (<https://www.colorado.edu/cs/research/>).

Students select from focus areas in artificial intelligence, robotics, computational biology, human-centered computing, numerical and scientific computing, programming languages, software engineering, systems and networking, security and theory of computing. The PhD program in computer science is available whether a student is entering graduate studies for the first time or if they already have a master's degree. While a master's is not required to enroll, our PhD students will typically earn one on the way to a PhD.

PhD students consult with a faculty advisor throughout the duration of their degree to review their research progress and course selection.

For more information, visit the department's PhD Degree (<http://www.colorado.edu/cs/current-students/graduate-students/phd/>) and Research (<http://www.colorado.edu/cs/research/>) webpages.

Requirements

Course Requirements

- 30 credit hours in courses numbered 5000 or above, including three breadth (<https://www.colorado.edu/cs/academics/graduate-programs/breadth-courses/>), three 1-credit professional development, and six depth courses (3 credits of the depth needs to be CSCI)
- 30 credit hours of dissertation credit.
- A maximum of 21 credit hours of graduate coursework may be transferred from another accredited institution.
- All courses (except MS Thesis hours) taken for the master's degree at the 5000-level or above at CU Boulder may be applied toward the doctoral degree at the university.

Preliminary Examination

The purpose of the area examination is to ensure that the student has sufficient depth to begin research in a selected area. Thus the exam tests knowledge of the general area of computer science that contains the research topic, deeper specialized knowledge of the specific research area that the student will be working in, and intellectual sophistication needed to conduct research in the area.

The area examination contrasts with the comprehensive exam, which is devoted to a focused research theme. It complements the coursework requirement of the preliminary exam, which is meant to build breadth in Computer Science in general and general knowledge of the student's research area.

For more information, visit the department's PhD Area Exams (<https://www.colorado.edu/cs/current-students/graduate-students/phd/requirements/>) information.

Comprehensive Examination

After passing the preliminary examination, the student continues their coursework and prepares a written thesis prospectus within four years of their admission to the program. When ready, the student takes an oral comprehensive examination covering their graduate coursework and thesis prospectus. The oral examination is based primarily on a written proposal for the thesis research provided by the student to committee members in advance. This examination is conducted before the student's doctoral committee of five or more graduate faculty members chosen by the student and approved by the department and the Graduate School.

For more information, visit the "PhD Comprehensive Exam/Proposal" section of the department's PhD Program Requirements (<http://www.colorado.edu/cs/current-students/graduate-students/phd/requirements/>) webpage.

PhD Dissertation

Students must write a dissertation based on original research conducted under the supervision of a graduate faculty member. The dissertation must fulfill all Graduate School requirements. After the dissertation is completed, an oral final examination on the dissertation and related topics is conducted by the student's doctoral committee.

Time Limit

All degree requirements must be completed within six years of the date of commencing coursework.

Learning Outcomes

By the completion of the program, students will be able to:

- Become experts in a subfield of computer science, and make a major research contribution to the subfield.
- Solve technical problems in computer science through writing code, pseudocode, technical writing and/or applying foundational concepts from a variety of subfields.
- Cast large, societal and/or complex problems as computational problems.
- Communicate clearly about their ideas and their research.

Evaluation Methods

1. Peer-reviewed research publications in journals and conference proceedings relevant to the field of study. Formulating a coherent research thesis and successfully defending it against a panel of experts.
2. Completion of departmental PhD milestones: breadth course completion with the required grades; Area Exam, Proposal Defense and Final Defense by departmental defined timeline.