

COMPUTER SCIENCE, PH.D.

Students in Saint Louis University's Ph.D. program in computer science conduct independent, innovative research under the guidance of a member of our graduate faculty. The program prepares students for rewarding careers in industry or academia that leverage the power of computers, algorithms, and data to impact the world in a positive way.

Program Highlights

Our research groups regularly publish in top-ranked journals and conference proceedings and present results at national and international professional meetings. Research projects are often supported by government and industry grants.

Curriculum Overview

SLU's Ph.D. in computer science requires a minimum of 41 post-baccalaureate credits, with at least 29 credits of coursework and 12 credits of dissertation research.

Fieldwork and Research Opportunities

With our location in the midtown area of St. Louis, our students have access to a strong technology community, with operations for many Fortune 500 companies and a vibrant startup community. This provides outstanding opportunities for summer internships, for part-time work during the academic year, and for future jobs after graduation.

Employers in St. Louis who show great interest in computer science students include Boeing, Centene, Citi, Deloitte, Enterprise, Express Scripts, KPMG, Maritz, MasterCard, Microsoft, Bayer and World Wide Technologies. Other students have worked for smaller companies or even started their own companies.

Our campus is within walking distance of the Cortex Innovation Community (<https://cortexstl.com/>), a vibrant 200-acre (and growing) innovation hub and technology district. Cortex is home to SLU's Research Innovation Group (<https://www.slu.edu/research/faculty-resources/research-innovation-group/>), which works on technology transfer and commercial partnerships. Cortex is also home to the weekly Venture Cafe (<https://venturecafestl.org/>), which is a great place for students to connect with members of the tech community in a friendly and informal setting. Also in downtown St. Louis is the T-REX Technology Entrepreneur Center (<http://www.downtowntrex.org/>), a co-working space and technology incubator.

Careers

Careers related to computer science are routinely found on various "best jobs" lists because of their wonderful combination of excellent pay, satisfying work-life balance, and personal reward in seeing the great impact that computing can have throughout society. As a sample of such listings:

- U.S. News 100 Best Jobs list for 2021 (<https://money.usnews.com/careers/best-jobs/rankings/the-100-best-jobs/>) named software developer as #2. The top 100 also included data scientist (#8), IT manager (#12), information security analyst (#15), computer systems analyst (#47), computer network architect (#51), database administrator (#55), web developer (#59), computer systems administrator (#86).
- Glassdoor's 50 Best Jobs in America list for 2021 (https://www.glassdoor.com/List/Best-Jobs-in-America-LST_KQ0,20.htm)

named java developer as #1 and data scientist as #2, and many other technology positions appear within the top 25: enterprise architect (#4), devops engineer (#5), information security engineer (#6), mobile engineer (#8), software engineer (#9), front end engineer (#11), back end engineer (#16), machine learning engineer (#17), cloud engineer (#23), UX designer (#24).

- Indeed.com's Best Jobs of 2020 (<https://www.indeed.com/lead/best-jobs-2020/>) named software architect as #1 and full stack developer as #2. Also included in the top 25 were java developer (#7), data scientist (#8), IT security specialist (#9), data engineer (#12) and cloud engineer (#20).

Admission Requirements

A bachelor's or master's degree in computer science or a closely related field is required. Most successful applicants have an undergraduate grade point average of 3.50 or better on a 4.00 scale.

Application Requirements

- Transcript(s) for all previous education
- Two letters of recommendation are required; more are optional
- Résumé
- Statement of professional goals
- GRE general scores recommended

Requirements for International Students

All admission policies and requirements for domestic students apply to international students along with the following:

- Demonstrate English Language Proficiency
- Proof of financial support must include:
 - A letter of financial support from the person(s) or sponsoring agency funding the time at Saint Louis University
 - A letter from the sponsor's bank verifying that the funds are available and will be so for the duration of study at the University
- Academic records, in English translation, of students who have undertaken postsecondary studies outside the United States must include the courses taken and/or lectures attended, practical laboratory work, the maximum and minimum grades attainable, the grades earned or the results of all end-of-term examinations, and any honors or degrees received. WES and ECE transcripts are accepted.

Application Deadlines

Applications for January admission must be completed by the preceding Nov. 1, while applications for August admission must be completed by June 1. Applicants seeking scholarships or graduate assistantships are encouraged to apply earlier.

Review Process

Applications will be reviewed as they are completed. A panel of faculty members from the Department of Computer Science will decide on acceptance, and all applicants will be evaluated for potential scholarships or assistantships.

Scholarships, Assistantships and Financial Aid

The computer science department offers several forms of merit-based financial support for graduate students. These include possible tuition scholarships, and graduate assistantships that may include full or partial tuition, health insurance, and a stipend for living expenses in exchange

for the assistant's contributions to the teaching or research mission of the department. Students may also seek their own scholarships from a variety of independent organizations that support graduate education in STEM fields.

For more information, visit the student financial services office online at <http://www.slu.edu/financial-aid> (http://www.slu.edu/financial-aid/?_ga=2.205299920.138898634.1579963676-1812546081.1398952562).

Learning Outcomes

1. Graduates will be able to demonstrate the use of computing systems, theory and software engineering to solve theoretical and applied problems.
2. Graduates will be able to utilize state-of-the-art techniques in their research area to solve open problems.
3. Graduates will be able to conduct independent, high quality, innovative research in computer science.
4. Graduates will be able to communicate computer science research results effectively in both publication formats and professional presentations.
5. Graduates will be able to recognize professional responsibilities and make informed judgements in computing practice based on legal and ethical principles.

Requirements

Code	Title	Credits
CSCI 5030	Principles of Software Development	3
CSCI 5050	Computing and Society	3
CSCI 5090	Computer Science Colloquium (Taken over multiple semesters)	2
CSCI 5100-5199	Theory Elective	3
CSCI 5300-5399	Software Engineering Elective	3
CSCI 5500-5599	Systems Elective	3
CSCI 5000-5899	Additional Computer Science Courses	12
CSCI 6990	Dissertation Research (Taken over multiple semesters)	12
Total Credits		41

Non-Course Requirements

- By the end of their third semester, the student must select a research area and Ph.D. advisor. This selection is formalized in a graduate mentoring agreement to be signed by the student, advisor and graduate director.
- By the end of their second year in the program, the student will complete a preliminary examination that has both a written and oral component. The student is allowed up to two attempts, the final attempt no later than the end of their third year in the program.
- By the end of their fourth year in the program, the student must select a thesis committee, and make an oral presentation of their proposed thesis topic to the committee.
- A student is required to gain some experience in teaching while in the Ph.D. program. Ideally, this will be satisfied while serving as TA or instructor for a course, but in the case of a student who is an RA, this requirement can also be satisfied by other activities with the approval of the graduate director.

- Students must register for Computer Science Colloquium each semester in the program, though only two of those semesters need to be taken for credit with a required presentation.
- The student must write a dissertation that makes an original and independent research contribution in computer science. The dissertation must be formatted in accordance with the regulations of graduate education.
- After all committee members have approved the dissertation, the student must complete a public oral presentation and defense of the dissertation.

Continuation Standards

Students must maintain a cumulative grade point average (GPA) of 3.00 in all graduate/professional courses.

Roadmap

Roadmaps are recommended semester-by-semester plans of study for programs and assume full-time enrollment unless otherwise noted.

Courses and milestones designated as critical (marked with !) must be completed in the semester listed to ensure a timely graduation. Transfer credit may change the roadmap.

This roadmap should not be used in the place of regular academic advising appointments. All students are encouraged to meet with their advisor/mentor each semester. Requirements, course availability and sequencing are subject to change.

Course	Title	Credits
Year One		
Fall		
CSCI 5030	Principles of Software Development	3
CSCI 5090	Computer Science Colloquium	0
CSCI 51xx	Theory Elective	3
CSCI 55xx	Systems elective	3
Credits		9
Spring		
CSCI 53xx	Software Engineering elective	3
CSCIxxxx	Computer Science Elective	3
CSCIxxxx	Computer Science Elective	3
CSCI 5090	Computer Science Colloquium	0
Credits		9
Year Two		
Fall		
CSCI 5050	Computing and Society	3
CSCI 5090	Computer Science Colloquium	0
CSCIxxxx	Computer Science Elective	3
! Graduate Mentoring Agreement Signed by Student, Advisor, Graduate Coordinator		
Credits		6
Spring		
CSCI 5090	Computer Science Colloquium	1
CSCIxxxx	Computer Science Elective	3
! Completion of Preliminary Exams		
Credits		4

Year Three**Fall**

CSCI 5090	Computer Science Colloquium	1
CSCI 6990	Dissertation Research	3
Credits		4

Spring

CSCI 5090	Computer Science Colloquium	0
CSCI 6990	Dissertation Research	3
Credits		3

Year Four**Fall**

CSCI 5090	Computer Science Colloquium	0
CSCI 6990	Dissertation Research	3
Credits		3

Spring

CSCI 5090	Computer Science Colloquium	0
CSCI 6990	Dissertation Research	3

! Oral presentation of proposed thesis topic

Credits		3
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Year Five**Fall**

CSCI 5090	Computer Science Colloquium	0
CSCI 6990	Dissertation Research	0
Credits		0

Spring

CSCI 5090	Computer Science Colloquium	0
CSCI 6990	Dissertation Research	0

! Thesis presentation and defense

Credits		0
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Total Credits		41
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