Computer Science & Engineering

The Department of Computer Science & Engineering offers PhD programs in Computer Science and in Computer Engineering. Computer science research encompasses the fundamentals of software and algorithm design, machine learning and bioinformatics, visual and cyber-physical computing, and human-computer interaction. Computer engineering focuses on the interaction of software and hardware in the design of computing systems and networks. Our research groups have extensive interdisciplinary ties across the university, with collaborations in medicine, science, the humanities and social work. Recent graduates have accepted research and teaching faculty positions as well as research and engineering positions in leading technology companies.

Both PhD programs require a combination of courses, research and teaching. The required courses are often completed early in the program, since students are integrated into research groups during their first year and the program’s emphasis is on creative research. The program has milestones that involve both written and oral components, and these provide structure for the five- to six-year degree. The program considers applicants with either bachelor’s or master’s degrees and has had successful applicants in the past whose backgrounds were outside of the field of computer science.

Phone: 314-935-6132
Email: admissions@cse.wustl.edu
Website: https://cse.wustl.edu/graduate/

Faculty

Chair

Roch Guérin (https://engineering.wustl.edu/Profiles/Pages/Roch-Guerin.aspx)
Harold B. and Adelaide G. Welge Professor of Computer Science
PhD, California Institute of Technology
Computer networks and communication systems

Professors

Sanjoy Baruah (https://engineering.wustl.edu/Profiles/Pages/Sanjoy-Baruah.aspx)
PhD, University of Texas at Austin
Real-time and safety-critical system design, cyber-physical systems, scheduling theory, resource allocation and sharing in distributed computing environments

Aaron Bobick (https://engineering.wustl.edu/Profiles/Pages/Aaron-Bobick.aspx)
James M. McKelvey Professor and Dean
PhD, Massachusetts Institute of Technology
Computer vision, graphics, human-robot collaboration

Michael R. Brent (https://engineering.wustl.edu/Profiles/Pages/Michael-Brent.aspx)
Henry Edwin Sever Professor of Engineering
PhD, Massachusetts Institute of Technology
Systems biology, computational and experimental genomics, mathematical modeling, algorithms for computational biology, bioinformatics

Jeremy Buhler (https://engineering.wustl.edu/Profiles/Pages/Jeremy-Buhler.aspx)
PhD, Washington University
Computational biology, genomics, algorithms for comparing and annotating large biosequences

Roger D. Chamberlain (https://engineering.wustl.edu/Profiles/Pages/Roger-Chamberlain.aspx)
DSc, Washington University
Computer engineering, parallel computation, computer architecture, multiprocessor systems

Yixin Chen (https://engineering.wustl.edu/Profiles/Pages/Yixin-Chen.aspx)
PhD, University of Illinois at Urbana-Champaign
Mathematical optimization, artificial intelligence, planning and scheduling, data mining, learning data warehousing, operations research, data security

Patrick Crowley (https://engineering.wustl.edu/Profiles/Pages/Patrick-Crowley.aspx)
PhD, University of Washington
Computer and network systems, network security

Ron K. Cytron (https://engineering.wustl.edu/Profiles/Pages/Ron-Cytron.aspx)
PhD, University of Illinois at Urbana-Champaign
Programming languages, middleware, real-time systems

Christopher D. Gill (https://engineering.wustl.edu/Profiles/Pages/Christopher-Gill.aspx)
DSc, Washington University
Parallel and distributed real-time embedded systems, cyber-physical systems, concurrency platforms and middleware, formal models and analysis of concurrency and timing

Raj Jain (https://engineering.wustl.edu/Profiles/Pages/Raj-Jain.aspx)
Barbara J. & Jerome R. Cox Jr. Professor of Computer Science
PhD, Harvard University
Network security, blockchains, medical systems security, industrial systems security, wireless networks, unmanned aircraft systems, internet of things, telecommunications networks, traffic management
Assistant Professors

Ayan Chakrabarti (https://engineering.wustl.edu/Profiles/Pages/Ayan-Chakrabarti.aspx)
PhD, Harvard University
Computer vision computational photography, machine learning

Roman Garnett (https://engineering.wustl.edu/Profiles/Pages/Roman-Garnett.aspx)
PhD, University of Oxford
Active learning (especially with atypical objectives), Bayesian optimization, and Bayesian nonparametric analysis

Chien-Ju Ho (https://engineering.wustl.edu/Profiles/Pages/Chien-Ju-Ho.aspx)
PhD, University of California, Los Angeles
Design and analysis of human-in-the-loop systems, with techniques from machine learning, algorithmic economics, and online behavioral social science

Brendan Juba (https://engineering.wustl.edu/Profiles/Pages/Brendan-Juba.aspx)
PhD, Massachusetts Institute of Technology
Theoretical approaches to artificial intelligence founded on computational complexity theory and theoretical computer science more broadly construed

Ulugbek Kamilov (https://engineering.wustl.edu/Profiles/Pages/Ulugbek-Kamilov.aspx)
PhD, École Polytechnique Fédérale de Lausanne, Switzerland
Computational imaging, image and signal processing, machine learning and optimization

Brian Kocoloski (https://cse.wustl.edu/faculty/Pages/bio-115)
PhD, University of Pittsburgh
Scalable parallel computing, cloud computing, operating systems, virtualization

Angelina Lee (https://engineering.wustl.edu/Profiles/Pages/I-Ting-Angelina-Lee.aspx)
PhD, Massachusetts Institute of Technology
Designing linguistics for parallel programming, developing runtime system support for multithreaded software, and building novel mechanisms in operating systems and hardware to efficiently support parallel abstractions

Alvitta Ottley (https://cse.wustl.edu/faculty/Pages/faculty.aspx?bio=109)
PhD, Tufts University
Designing personalized and adaptive visualization systems, including information visualization, human-computer interaction, visual analytics, individual differences, personality, user modeling and adaptive interfaces
William Yeoh (https://engineering.wustl.edu/Profiles/Pages/William-Yeoh.aspx)  
PhD, University of Southern California  
Artificial intelligence, multi-agent systems, distributed constraint optimization, planning and scheduling

Miaomiao Zhang (https://cse.wustl.edu/faculty/Pages/faculty.aspx?bio=183)  
PhD, University of Utah  
Medical image analysis, statistical modeling, and machine learning

Ning Zhang (https://cse.wustl.edu/faculty/Pages/faculty.aspx?bio=182)  
PhD, Virginia Polytechnic Institute and State University  
System security, software security

Professor of the Practice

Dennis Cosgrove (https://cse.wustl.edu/faculty/Pages/Dennis-Cosgrove.aspx)  
BS, University of Virginia  
Programming environments and parallel programming

Lecturers

Steve Cole, Senior Lecturer  
PhD, Washington University in St. Louis  
Parallel computing, accelerating streaming applications on GPUs

Marion Neumann (https://cse.wustl.edu/faculty/Pages/Marion-Neumann.aspx), Senior Lecturer  
PhD, University of Bonn, Germany  
Machine learning with graphs; solving problems in agriculture and robotics

Jonathan Shidal (https://cse.wustl.edu/faculty/Pages/Jon-Shidal.aspx), Lecturer  
PhD, Washington University  
Computer architecture and memory management

Douglas Shook (https://cse.wustl.edu/faculty/Pages/Doug-Shook.aspx), Lecturer  
MS, Washington University  
Imaging sensor design, compiler design and optimization

William Siever (https://cse.wustl.edu/faculty/Pages/Bill-Siever.aspx), Principal Lecturer  
PhD, Missouri University of Science and Technology  
Computer architecture, organization, and embedded systems

Todd Sproull (https://cse.wustl.edu/faculty/Pages/Todd-Sproull.aspx), Senior Lecturer  
PhD, Washington University  
Computer networking and mobile application development

Senior Professors

Jerome R. Cox Jr.  
ScD, Massachusetts Institute of Technology  
Computer system design, computer networking, biomedical computing

Jonathan S. Turner  
PhD, Northwestern University  
Design and analysis of internet routers and switching systems, networking and communications, algorithms

Professors Emeriti

Takayuki D. Kimura  
PhD, University of Pennsylvania  
Communication and computation, visual programming

Seymour V. Pollack  
MS, Brooklyn Polytechnic Institute  
Intellectual property, information systems

Degree Requirements

PhD in Computer Science or Computer Engineering

Students can choose to pursue a PhD in Computer Science or a PhD in Computer Engineering. The requirements vary for each degree. Here are the core requirements:

• Complete 72 units of regular courses (at least 33 units), seminars (at least 3 units), and research credits (at least 24 units), including 9 units of breadth requirements for both the PhD in Computer Science degree and the PhD in Computer Engineering degree.

• Satisfy fundamental teaching requirements by participating in mentored teaching experiences, pedagogical teaching requirements (by completing a certain number of qualifying pedagogy workshops), and scholarly communication requirements (by participating in the Doctoral Student Research Seminar).

• Pass milestones that demonstrate the ability to understand research literature, to communicate orally and in writing, and to formulate a detailed research plan. These milestones include an oral qualifying examination, a portfolio review for admission to candidacy, and a dissertation proposal defense that culminates in a dissertation defense.

For more information, please refer to the Doctoral Program Guide (https://cse.wustl.edu/graduate/current-students/Pages/phd-students.aspx) on our website.