Department of
Computer Science & Engineering
Bourns College of Engineering
Welcome to Computer Science and Engineering (CSE) at the University of California, Riverside!

Fostering groundbreaking research and producing graduates who are in demand, our department has established itself as a leader in the field of computer science and engineering. In recognition of the quality of our research and educational opportunities, the department has been highly ranked by the National Review Council, the Princeton Review, and U.S. News & World Report.

Our department offers a variety of degrees for undergraduates and graduates in computing-related areas. All degree programs combine the teaching of core principles with hands-on laboratory experience, preparing students for exciting careers in industry and academia. Students at all levels can enrich their educational experience by participating in sponsored research projects and professional student organizations like ACM or IEEE. The majority of our undergraduates go on to work in the computer industry at major companies like Google, Microsoft, or Facebook, while others get involved in start-ups, work for government agencies, or continue their education in graduate school. A number of our graduate students continue into careers in academia.

Our department’s 25 faculty are involved in cutting-edge research in the areas of computer architecture, compilers, embedded systems, algorithms, computational biology, databases, data mining, machine learning, computer networks, distributed processing, artificial intelligence, software engineering, and graphics. Attesting to the quality and impact of the research conducted in our laboratories are the prestigious awards won by our faculty, who include 3 ACM Fellows, five IEEE Fellows, five AAAS Fellows, and nine NSF CAREER awardees. Research projects in our department receive more than $10 million in funding per year from external sources, including federal agencies like NSF, NIH, and DARPA as well as high-tech companies like Google, HP, Intel, AT&T, and Samsung.

Nestled in the foothills of Box Springs Mountains, with its warm and dry climate, the campus offers beautiful scenery and year-round opportunities for outdoor activities. UCR students enjoy the benefits of a smaller campus, a relaxed atmosphere, personal attention and guidance, and opportunities for informal, one-on-one interaction with our faculty and staff. I invite you to learn more about the innovative research and learning taking place at CSE at UCR.

Marek Chrobak
Professor and Chair, CSE Department

The Bourns College of Engineering is the fastest-rising college of engineering in the UC System and ranks first among public schools of engineering of the same size (U.S. News & World Report 2014). BCOE combines the intellectual and material resources of the UC system with a uniquely intimate research environment, facilitating frequent interaction between faculty and students.

www.cs.ucr.edu
The Computer Science and Engineering Department encourages breaking boundaries through integrated, interdisciplinary educational programs as well as innovative research with colleagues from other academic disciplines and in industry. For example:

- Stefano Lonardi has teamed up with the International Barley Sequencing Consortium to develop a draft of the barley genome, a resource that will lead to greater crop yields and disease resistance as well as enhance the nutritional value of one of the world’s most important cereal crops.

- Christian Shelton is working with researchers at the Children’s Hospital Los Angeles, using machine learning to understand data from their pediatric intensive care unit. Among the results of this collaboration is their jointly-authored article, published in the journal Respiratory Care, on their development of algorithms for estimating blood gases in order to optimize the ventilator management of patients.

### Labs and Facilities

The department is located in a state-of-the-art College of Engineering complex. Our facilities host both teaching and research laboratories supported by the department’s technical staff. The department maintains Microsoft Windows, Linux, Unix, and virtualized systems and servers. Remote access from home or while traveling is provided via access to Linux and Windows servers. Low latency and high bandwidth availability provided through redundant connections to Internet core backbones allow our students and faculty uninterrupted access to leading technology; labs are connected to the department’s 10 gigabit-speed network backbone. In addition, our labs have sophisticated equipment and high-performance computing platforms for research.

The department’s major research laboratories are:

- Algorithms and Computational Biology Lab
- Computer Architecture and Embedded Systems Lab (CARES)
- Cybersecurity Lab
- Database Lab
- Networks and Communications Lab
- Riverside Graphics Lab (RGL)
- Riverside Lab for Artificial Intelligence Research
- Riverside Programming Languages and Software Engineering (RIPLE)
- SPRUCE: Smartphone Research Lab
- SuperLab: Supercomputing Lab

### did you know...?

The National Research Council (NRC)’s recent ranking of PhD programs, widely accepted as the gold standard, places CSE in the top echelons of programs nationwide, ranking it highly for its research as well as overall program quality. For more information and to download the data, see the NRC website: [http://sites.nationalacademies.org/pga/Resdoc/](http://sites.nationalacademies.org/pga/Resdoc/)

### Recent Highlights

- The Financial Engineer ranked the M.S. program in Computer Science 37th out of 242 programs in the US. This follows the latest National Research Council high ranking of the CS Ph.D. program, where the program placed in the top 15 in several research and scholarship metrics.

- The U.S. Department of Education awarded $885,834 to the Department of Computer Science and Engineering (PI: Vassilis Tsotras; Co-PIs: Eamonn Keogh and TAMAR SHINAR) as part of the GAANN Program (Graduate Assistance in Areas of National Need). This grant provides support for eight fellowships (6 from the Department of Education plus two more from UCR’s Graduate Division).

- Dr. Eamonn Keogh, Dr. Christian Shelton and Dr. Anpanman Dahanukar (Entomology) have won an NSF award for $1,100,000 to study “Machine Learning for Agricultural and Medical Entomology.” The four-year project will enable a team of computer scientists and entomologists at the UC Riverside to develop sensors and software that will allow the classification of flying insects. The ability to automatically and accurately classify flying insects has the potential to have significant impact on human affairs.

- CSE is very happy to welcome three new faculty to the department: Professors Michalis Faloutsos, Jiasi Chen and Zhijia Zhao. Professor Faloutsos returns to UCR after two years as department chair at the University of New Mexico; his research interests include Internet protocols and measurements, peer-to-peer networks, social networks, network security, and ad-hoc networks. Assistant Professor Chen joins UCR after earning a Ph.D. from Princeton University. Her research interests include Internet video streaming, wireless and mobile networks, network economics, and sensor networks. Assistant Professor Zhao earned a Ph.D. from the College of William and Mary. His research spans programming systems and run-times for parallel computing, big data, and mobile computing.

- A paper by CSE’s Ph.D. student Sai Charan Koduru with CSE Professors Rajiv Gupta and Iulian Neamtiu received the ‘Best Student Paper’ award at the 28th International Workshop on Languages and Compilers for Parallel Computing (LCPC) 2015. The winning submission is entitled ‘Size Oblivious Programming with Infinifile’ and was funded in part by a Google Research Award to Professor Gupta.

- Alex Edgcomb (Ph.D., CSE in 2014) and Professor Frank Vahid’s paper won a best paper award at the American Society of Engineering Education (ASEE 2015) conference. The paper reported on a multi-university, cross-semester analysis of student performance before and after the adoption of an interactive textbook to replace a traditional textbook.
Areas of Research

The department focuses on interrelated high-impact areas of research. It prides itself on its highly productive and visible faculty, many of whom serve on international journal editorial boards and national technology boards.

Algorithms, Bioinformatics

Design and analysis of algorithms • Approximation algorithms • Combinatorial optimization • Complexity • Computational molecular biology • Bioinformatics • Data compression • Data mining • Mathematical programming • Online algorithms

Marek Chrobak
Tao Jiang
Stefano Lonardi
Neal Young

Architecture, Compilers, Embedded Systems

Computer architecture • Embedded systems and software • Verification • Compilers • Network processors • Parallel architectures and computing

Nael Abu-Ghazaleh
Laxmi Bhuyan
Philip Brisk
Zizhong Chen
Rajiv Gupta
Walid Najjar
Frank Vahid

Cybersecurity

Internet, mobile, and system security • Security analysis on Internet and cellular networks • TCP/IP security • Android security • Side channel attacks and defenses • Vulnerability discovery and assessment

Nael Abu-Ghazaleh
Srikanth Krishnamurthy
Chinya Ravishankar

Adjunct Faculty

Gianfranco Ciardo, Professor
Ph.D. (Computer Science) Duke University

Harsha Madhyastha, Assistant Professor
Ph.D. (Computer Science) University of Washington

Ian Neamtiu, Associate Professor
Ph.D. (Computer Science) University of Maryland-College Park

Victor Zordan, Associate Professor
Ph.D. (Computer Science) Georgia Tech

www.cs.ucr.edu/people/faculty/
Databases, Data Mining, AI
Big data • Spatial and temporal databases • Indexing • Semistructured data management • Knowledge discovery • Text mining • Search • Machine learning • Reasoning under uncertainty • Decision making • Time series analysis
Evangelos Christidis  
Eamonn Keogh  
Michael Pazzani  
Chinya Ravishankar  
Christian Shelton  
Vassilis Tsotras

High-Performance Computing, Graphics
Scientific computing • Computational fluid mechanics • Numerical algorithms and software • Large-scale computer simulations • Parallel and distributed computing • Multiprocessor scheduling • Compilers and architectures for high-performance systems • Power-aware algorithms and software • Grid and cloud computing • Graphics modeling and techniques • Computer animation programming
Laxmi Bhuyan  
Zizhong Chen  
Rajiv Gupta  
Walid Najjar  
Tamar Shinar

Programming Languages and Software Engineering
Programming and compiler support for parallel systems • Software tools for profiling, slicing, and debugging • Static and dynamic analysis • Type systems • Dynamic software updating • Software evolution • Smartphone analysis and testing
Rajiv Gupta  
Zhijia Zhao

Systems, Networks
Internet technologies • Broadband networks • Theoretical foundations of networking • Wireless cellular networks • Ad hoc and sensor networks • Satellite networks • Queuing theory and performance evaluation • Protocol design • Router design • Experimentation of wired and wireless networks • Operating systems • Distributed systems
Laxmi Bhuyan  
Jiasi Chen  
Michalis Faloutsos  
Srikanth Krishnamurthy  
Mart Molle  
Chinya Ravishankar
Undergraduate Programs

Our B.S. in Computer Science program has been accredited by the Computing Accreditation Commission of ABET and our B.S. in Computer Engineering program has been accredited by the Engineering Accreditation Commission of ABET (http://www.abet.org).

Undergraduate students receive personal attention throughout their careers and are continually offered numerous resources such as academic assistance, study and time management workshops, career guidance, and professional development opportunities. Incoming students are enrolled in an Engineering First-Year Learning Community, in which they are matched with a cohort of peers and take the same math, engineering and science courses together to foster their academic and career development and provide them with support networks. Our unique Professional Development Milestones program helps students stay on track as they move toward careers or graduate school by charting their progress and encouraging planning. Undergraduate research, a hallmark of the Bourns College of Engineering, allows students to work with faculty on cutting-edge research projects. Three of the College’s research centers, CE-CERT, CRIS, and CNSE, also employ students in working labs, bringing to life subjects discussed in classes.

UCR student chapters of professional engineering organizations related to CSE include:

- Association for Computing Machinery (ACM)
- American Indian Science & Engineering Society (AISES)
- Biomedical Engineering Society (BMES)
- Computer Science Graduate Student Association (Comp. Sci. GSA)
- Institute of Electrical and Electronics Engineers (IEEE)
- Linux Users Group
- National Society of Black Engineers (NSBE)
- Optical Society of America
- Society of Hispanic Professional Engineers (SHPE)
- Society of Women Engineers (SWE)
- Tau Beta Pi Honor Society

The Project in Computer Science, required for graduation, gives undergraduates a workplace experience to encourage creativity and stimulate analytical skills and mastery of synthesizing principles as well as techniques from engineering, mathematics, engineering planning, and project management.
did you know…?

Our recent graduates have found careers at companies including Google, Cisco, Facebook, Yahoo!, Hewlett-Packard, IBM, Intel, Microsoft, Oracle, Samsung, Amazon, and eBay, and faculty positions at UC Irvine, the University of Massachusetts, Boston University, George Mason University, the University of Florida, the University of Arizona, the University of New Mexico, and Northeastern University. Some of our Ph.D. graduates have already received NSF CAREER awards. See our website for a list of our graduate student placement.

Graduate Programs

We are a young graduate program offering research and educational opportunities with an established tradition of close collegial relations between graduate students and faculty that is rare at other universities. We graduated our first Ph.D. student in 1998 and are now graduating more than 20 Ph.D. students annually.

The CSE graduate program emphasizes the following areas:

- Algorithms, Bioinformatics, and Theory of Computation
- Artificial Intelligence and Machine Learning
- Compilers, Programming Languages, Software Engineering, and Verification
- Computer Architecture, Embedded Systems, and CAD
- Computer Networks and Distributed Systems
- Databases, Data Mining, and Information Retrieval
- High Performance and Parallel Computing
- Reconfigurable Computing
- Smartphones Research
- Cyber Security

did you know…?

Graduate students in CSE are able to perform innovative research in various projects within the college and campus because of our collaborative faculty and labs. Our faculty’s extensive collaborations with industry result in many summer internships for our graduate students, which lead to successful industry positions after graduating.
UC Riverside is a scenic, 1200-acre campus located between Los Angeles, Palm Springs, and San Diego. Riverside is uniquely situated so that the Ontario International Airport, desert resorts, snow-capped mountains, the Pacific Ocean, and Southern California attractions are within driving distance. The city is well-known for its Mediterranean climate, affordable housing and the landmark Mission Inn. Riverside has evolved into a hub of higher education, technology, commerce, law, finance, and cultural attractions, including a symphony orchestra, a ballet company, and a variety of museums.

Board of Advisors

This group of senior executives with backgrounds related to the Department’s areas of emphasis meets annually to provide industry perspectives on our activities and programs. Throughout the year, its members offer support ranging from advocacy to facilitating job and internship placements for our students. For a complete list of our Board of Advisors, please visit www.cs.ucr.edu/.

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Department of Computer Science & Engineering
Winston Chung Hall, 351
Bourns College of Engineering
University of California, Riverside
Riverside, CA 92521-0425
(951) 827-5639
www.cs.ucr.edu