Graduate Program in Networked Systems

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http://www.networkedsystems.uci.edu/
Gene Tsudik (Director)
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The graduate program in Networked Systems is administered by faculty from two academic units: the Department of Computer Science (CS) in the Donald Bren School of Information and Computer Sciences, and the Department of Electrical Engineering and Computer Science (EECS) in The Henry Samueli School of Engineering. The program offers M.S. and Ph.D. degrees in Networked Systems.

The Networked Systems program provides education and research opportunities to graduate students in the areas of computer and telecommunication networks. Networked Systems include telephone, cable TV networks, wireless, mobile, ad hoc, and cellular phone networks, as well as the Internet. Networked Systems, as a field, is inherently interdisciplinary since it combines technology in software, hardware, and communications. As a result, it transcends traditional departmental boundaries. Networked Systems draws primarily from Computer Science, Computer Engineering, and Electrical Engineering. At UCI, these areas are housed in two departments: CS and EECS. The Networked Systems program unites the respective strengths of these two departments and provides integrated M.S. and Ph.D. degrees in this area.

Program requirements include core, breadth, and concentration courses. Core courses are taken by all Networked Systems students and form a foundation for networking topics. Breadth courses may be selected from technical courses (including distributed systems, algorithms, data structures, operating systems, databases, random processes, and linear systems) and management and applications of technology (including educational technology, management of information technology, and social impact). Concentration courses may be selected from a long list including courses on networks, performance, middleware, communications, and operations research. Core, breadth, and concentration course lists are available on the Networked Systems Web site (http://www.networkedsystems.uci.edu/) or from the Networked Systems Program Office.

Admission

Prospective graduate students apply directly to the Networked Systems program, specifying M.S. or Ph.D. degree goal. Applicants who do not hold a bachelor's degree in Computer Science, Computer Engineering, or Electrical Engineering may be required to take supplementary course work to obtain and demonstrate sufficient background in the field.

Applicants are evaluated on the basis of prior academic record and potential for creative research and teaching, as demonstrated in their application materials including official university transcripts, letters of recommendation, GRE test scores, and statement of purpose.

Master of Science Program

Students pursuing the M.S. degree may choose either Plan I (Thesis Plan) or Plan II (Comprehensive Examination Plan). Students following Plan I must complete the three core courses, two courses chosen from the breadth course list with at most one chosen from the Management and Applications of Technology list, three courses chosen from the concentration course lists with at least one course chosen from at least two different concentrations, two additional courses chosen with the approval of the advisor, and a thesis. In addition, students pursuing Plan I must enroll in two courses of thesis-related research: COMPSCI 298 or EECS 296.

Students following Plan II must complete the three core courses, three courses chosen from the breadth course list with at most two chosen from the Management and Applications of Technology list, four courses chosen from the concentration course lists with at least one course chosen from at least three different concentrations, and two additional courses chosen with the approval of the advisor. Students pursuing this option must also pass a comprehensive examination which will be administered through NET SYS 295 and will consist of a term paper on a topic relevant to the student's educational program and that term's speakers.

Doctor of Philosophy Program

The Ph.D. degree requires the following 13 courses: three core courses; three courses chosen from the breadth course list, with at most two chosen from the Management and Applications of Technology list; four courses chosen from the concentration course lists, with at least one course chosen from at least three different concentrations; and three additional courses, chosen with the approval of the research advisor. Students must also complete two teaching practicum courses (I&C SCI 399) and a dissertation.

Courses applied to the M.S. degree can also be applied to the Ph.D. degree. Students who have taken similar graduate-level courses at another university may petition to apply these courses to the Ph.D. requirements. Ph.D. students who have served as teaching assistants, readers, or tutors at another university may petition to apply this experience toward the teaching practicum requirement. Normative time for advancement to candidacy is three years (two for students who entered with a master's degree). Normative time for completion of the Ph.D. is six years (five for students who entered with a master's degree), and maximum time permitted is seven years.

Faculty

Animashree Anandkumar, Ph.D. Cornell University, Assistant Professor of Electrical Engineering and Computer Science (statistical signal processing, information theory, and networking with a focus on graphical models)

Ender Ayanoglu, Ph.D. Stanford University, Director of Networked Systems and Professor of Electrical Engineering and Computer Science (next generation wireless, broadband, and optical communications)

Pai Chou, Ph.D. University of Washington, Professor of Electrical Engineering and Computer Science (hardware and software co-design, power-aware and adaptive embedded systems, system synthesis, and embedded instruments)

Magda El Zarki, Ph.D. Columbia University, Professor of Computer Science, Informatics, and Electrical Engineering and Computer Science (telecommunications, networks, wireless communication, video transmission)

Hamid Jafarkhani, Ph.D. University of Maryland, UCI Chancellor's Professor of Electrical Engineering and Computer Science (communication theory, coding, wireless networks, multimedia networking)
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Scott Jordan, Ph.D. University of California, Berkeley, Professor of Computer Science and of Electrical Engineering and Computer Science (pricing and differentiated services in the Internet, resource allocation in wireless multimedia networks, and telecommunications policy)

Athina Markopoulou, Ph.D. Stanford University, Associate Professor of Electrical Engineering and Computer Science (network, reliability, security, multimedia networking, measurement and control)

Amelia Regan, Ph.D. University of Texas, Austin, Professor of Computer Science (operations research, network optimization, data mining)

Gene Tsudik, Ph.D. University of Southern California, Director of Networked Systems and Professor of Computer Science (security and applied cryptography, mobile/ad-hoc networks and distributed systems)

Nalini Venkatasubramanian, Ph.D. University of Illinois at Urbana-Champaign, Professor of Computer Science (parallel and distributed systems, multimedia, internetworking, high-performance architectures, resource management)

Courses

NET SYS 201. Computer and Communication Networks. 4 Units.
Prerequisite: EECS 148 or COMPSCI 132.
Same as COMPSCI 232, EECS 248A.
Restriction: Graduate students only.

NET SYS 202. Networking Laboratory. 4 Units.
A laboratory-based introduction to basic networking concepts such as addressing, sub-netting, bridging, ARP, and routing. Network simulation and design. Structured around weekly readings and laboratory assignments.
Prerequisite: EECS 148 or COMPSCI 132.
Same as COMPSCI 233.

NET SYS 210. Advanced Networks. 4 Units.
Design principles of networked systems, advanced routing and congestion control algorithms, network algorithms, network measurement, management, security, Internet economics, and emerging networks.
Prerequisite: NET SYS 201 or COMPSCI 232 OR EECS 248A.
Same as COMPSCI 234.

NET SYS 230. Wireless and Mobile Networking. 4 Units.
Introduction to wireless networking. The focus is on layers 2 and 3 of the OSI reference model, design, performance analysis, and protocols. Topics covered include: an introduction to wireless networking, digital cellular, next generation cellular, wireless LANs, and mobile IP.
Prerequisite: EECS 148 or COMPSCI 132.
Same as COMPSCI 236.

NET SYS 240. Network and Distributed Systems Security. 4 Units.
Modern computer and networks security: attacks and countermeasures, authentication, identification, data secrecy, data integrity, authorization, access control, computer viruses, network security. Group communication and multicast security techniques. Covers secure e-commerce and applications of public key methods, digital certificates, and credentials.
Prerequisite: EECS 148 or COMPSCI 132.
Same as COMPSCI 203.

NET SYS 256. Network Coding: Theory and Applications. 4 Units.
Prerequisite: EECS 248A or NET SYS 201 or COMPSCI 232.
Same as EECS 246.
Restriction: Graduate students only.

NET SYS 260. Middleware for Networked and Distributed Systems. 4 Units.
Discusses concepts, techniques, and issues in developing distributed systems middleware that provides high performance and Quality of Service for emerging applications. Also covers existing standards (e.g., CORBA, DCOM, Jini, Espeak) and their relative advantages and shortcomings.
Prerequisite: An undergraduate-level course in operating systems and networks.
Same as COMPSCI 237.

NET SYS 261. Distributed Computer Systems. 4 Units.
Design and analysis techniques for decentralized computer architectures, communication protocols, and hardware-software interface. Performance and reliability considerations. Design tools.
Prerequisite: EECS 211 and EECS 213.
Same as EECS 218.
Restriction: Graduate students only.

NET SYS 270. Topics in Networked Systems. 4 Units.
Study of Networked concepts.
Repeatability: Unlimited as topics vary.

NET SYS 295. Networked Systems Seminar. 1 Unit.
Current research in networked systems. Includes talks by UCI faculty, visiting researchers, and Networked Systems graduate students.
Grading Option: Satisfactory/unsatisfactory only.
Repeatability: May be repeated for credit unlimited times.