

Computer Engineering at the University of Illinois

Prof. Steven S. Lumetta, steve@crhc.uiuc.edu

Prof. Sanjay J. Patel, sjp@crhc.uiuc.edu

- Computer engineering provides the fundamental knowledge, practical skills, professional attitude, and experience necessary to design, implement, and deploy computer hardware, software, and networks.
- Two roles:
 - 1) Undergraduate Degree Program (ranked number 2)
 - 2) Computer Engineering Specialization in EE
- **Faculty Members:** Narendra Ahuja, Donna J. Brown, Marie-Christine Brunet, Nicholas Carter, Seth Hutchinson, Wen-Mei Hwu, Ravi Iyer, Michael C. Loui, Steven S. Lumetta, Sanjay J. Patel, Janak H. Patel, Constantine Polychronopoulos, Elizabeth Rudnick, William H. Sanders, Ricardo Uribe, Bharghavan Vaduvur, and Benjamin Wah.

Computer Engineering Required Upperclass Courses

- CS 225: Data Structures and Software Principles
- ECE 229: Introduction to Electromagnetic Fields
- ECE 249: Digital Systems Laboratory
- ECE 291: Computer Engineering, II
- ECE 312: Computer Organization and Design
- ECE 340: Solid State Electronic Devices

Computer Engineering Technical Electives

- The list of allowable technical electives is very broad, and should be planned carefully with your advisor, depending on your interests.
- Allowable Technical Electives:
 - ECE: All non-required 200- and 300-level courses except ECE 205, 206, and 216.
 - CS: All non-required 200- and 300-level courses except CS 231, 232, 300, 301, 302, 303, and 304.
- Get an advisor who shares (and is knowledgeable about) your interests.

Selected Electives - Computer Architecture/Digital Design

- **ECE 311: Microcomputer Lab.** Integrates topics from core courses. Extensive microprogramming, hardware design and debugging, interfacing experience.
- **ECE 325: Introduction to VLSI System Design.** Interactive graphics design of MOS VLSI circuit layouts. Electronics background unnecessary.
- **ECE/CS 362: Logic Design.** Advanced techniques for design of combinational and sequential logic circuits.
- **ECE 344: Theory and Fabrication of Integrated Circuit Devices.** IC fabrication with intensive laboratory.
- **ECE 382: Large Scale Integrated Circuit Design.** Emphasizes MOS LSI. Complements ECE 325.
- **CS 333: Computer System Organization.**
- **ECE 371ER: Microprocessor Design, Verification, and Test.**

Selected Electives - Computer Networks/Distributed Systems

- **ECE/CS 338: Communication Networks for Computers.**
Design of protocols for data and computer communications.
Complements ECE/CS 328.
- **ECE/CS 328: Computer Networks and Distributed Systems.**
Concepts and techniques for design of distributed operating and database systems. Complements ECE/CS 338.
- **ECE 371BW: Computer Networking Laboratory.**
- **ECE 371BH: Design and Performance of Wireless Communication Networks.**

Selected Electives - Computer Systems/Software

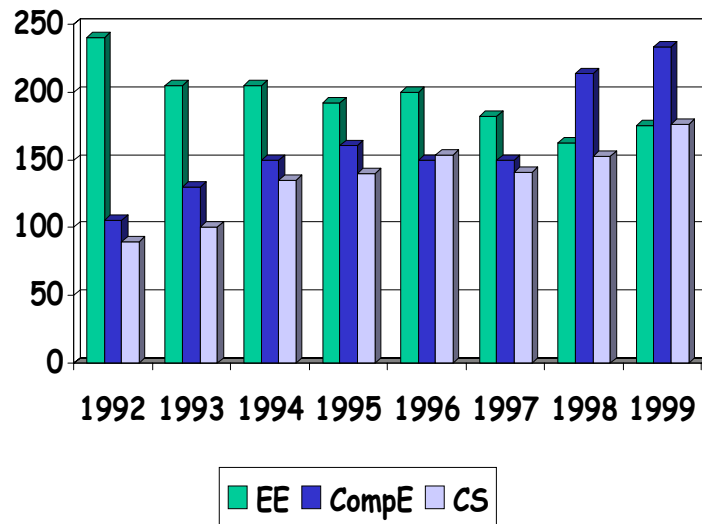
- **CS 323: Operating System Design.** Fundamental introduction to operating systems. Extensive programming.
- **CS 321: Programming Languages and Compilers.**
- **CS 325: Programming Language Principles.** Organizations of imperative and applicative languages, including object-oriented, functional, and logic programming languages. Programming in several languages.
- **CS 326: Compiler Construction.** Comprehensive treatment of lexical analysis, syntax-directed parsing, and code generation and optimization. Follows CS 325.
- **CS 311: Database Systems.**
- **CS 327: Software Engineering.**

Selected Electives - Theory

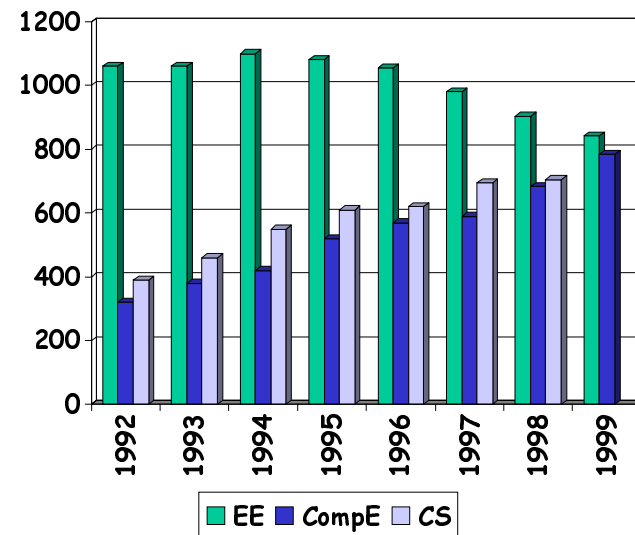
- **Math/CS 313: Combinatorial Mathematics.** Advanced study of discrete mathematics beyond ECE/Math 213 (formerly ECE/Math 319).
- **CS/Math 373: Combinatorial Algorithms.** Analysis and design of nonnumerical algorithms. Follows CS 225.
- **CS/Math 375: Automata, Formal Languages, and Computational Complexity.** Computational models and foundations of programming languages. Useful background for CS 326.

Computer Engineering is a Growing Field!

- Over half of the incoming freshmen in ECE this year are computer engineers!



Freshmen Enrollment Trends



Total Enrollment Trends

Graduate Study is Also Important (UI Computer Engineering Ranked #2 in the Nation!)

Research Areas in Computer Engineering at UI:

- Computer Architecture
- Compilers & Operating Systems
- VLSI Design & Testing
- Computer-Aided Design
- Algorithms & Complexity
- Performance Evaluation
- Reliable Computing
- Parallel Processing
- Distributed Systems
- Computer Networks
- Mobile Computing
- Computer Vision
- Robotics

ECE ILLINOIS **COMPUTER ENGINEERING**
in the Department of Electrical and Computer Engineering
www.ece.uiuc.edu

The fastest growing engineering specialties thrive at Illinois. Both an ECE department and our computer engineering specialty rank among the very best in the nation because of our excellent students, distinguished and accessible faculty, and state-of-the-art facilities.

Computer engineering faculty and graduate students at Illinois carry out, involving work in a department that attracts \$22 million each year to support research such as: IMPACT, Paradise 2, and PRODIG advanced computer technologies; DEFCNO, UltraSAR, and FTAPZ environments for remote system design; TIMELY mobile computing and networking; HITSD and IGATE advanced test automation; OMNIDAM encompassing panoramic cameras; PROTOBOT biological inspired walking robot; TEACHER learning tool; and MALLARD Web-based instruction system. Our graduates become leaders in academic, government, and industry. Our faculty receive top honors from IEEE, ACM, and NSF.

Research is also supported by world-class facilities and programs for interdisciplinary work, including one of two NSF supercomputing research and education centers nationwide (NSERC) and the Beckman Institute for Advanced Science and Technology.

Opportunities for Graduate Study
For more information or to obtain an application, visit our Web site or send email to applied@ece.uiuc.edu. Or write to:
Graduate Coordinator
ECE Department, 156-Suarez Lab,
1408 W. Green, Urbana, IL 61801

Opportunities for Faculty
Visit our Web site for more information about openings for outstanding faculty and how it research areas such as those listed at right.

Research Areas

- Computer Architecture
- Compilers & Operating Systems
- VLSI Design & Testing
- Computer-Aided Design
- Algorithms & Complexity
- Performance Evaluation
- Reliable Computing
- Parallel Processing
- Distributed Systems
- Computer Networks
- Mobile Computing
- Computer Vision
- Robotics

UNIVERSITY of ILLINOIS at URBANA-CHAMPAIGN
The University of Illinois is an equal opportunity and affirmative action institution.