

Computer Engineering Annual Report, 2008-2009

Computer Engineering focuses on the design, analysis and application of computers and on their applications as components of systems. The UCSC Department of Computer Engineering sustains and strengthens its teaching and research program to provide students with inspiration and quality education in the theory and practice of computer engineering.

Departmental Mission Statement

Achievements

The past year has seen many achievements within the Department of Computer Engineering.

- We received 2 top awards at the UC Symposium on Bioengineering, for our work in assistive and rehabilitative technology, and our work on biomolecular control. Our work in assistive and rehabilitative technology was also covered in [Popular Science](#).
<http://www.ce.ucsc.edu/news/article?ID=1773>
- We dedicated the Network Management and Operations (NMO) laboratory, a Cisco collaboration that provides real-world experience for undergraduate and graduate majors.
<http://www.ce.ucsc.edu/news/article?ID=1749>
- We generated press coverage of our robotics program.
<http://www.ce.ucsc.edu/news/article?ID=1746>
- We hosted 65 officers and alumni from Northern California in the District 15 Tau Beta Pi conference. <http://www.ce.ucsc.edu/news/article?ID=1739>
- We assumed a leadership role in the Monterey Bay subsection of the IEEE, and hosted many IEEE meetings. <http://www.ce.ucsc.edu/news/article?ID=1703>
- We earned the IEEE Fred W. Ellersick Award for Best Unclassified Paper at the 2008 Milcom conference in San Diego.
<http://www.ce.ucsc.edu/news/article?ID=1698>
- We organized the world's premier conference on mobile computing and networking, Mobicom 2008. <http://www.ce.ucsc.edu/news/article?ID=1672>
- We collaborated to launch a new scholarship program aimed to increase the numbers of financially disadvantaged students, particularly women, who earn undergraduate degrees in computer science, computer engineering, and electrical engineering at UCSC. <http://www.ce.ucsc.edu/news/article?ID=1671>
- We appointed systems expert Dr. David Pease as an Adjunct Assistant Professor, and control expert Dr. Donald Wiberg as a Research Professor of Computer Engineering.
- We proposed a new graduate degree designation in Robotics and Control.
- We received grant and gift income of \$4.9 M, up 14%, and an additional \$2.3M as collaborators, and had research expenditures of \$3.8M, up 19% from 2007-8.
- We educated 240 majors and premajors, up 17% from 2007-8, 76 graduate students, up 26% from 2007-8, and will grow to 312 majors and premajors and 98 graduate students in Fall 2009.
- We grew, with biomolecular engineering, electrical engineering, and molecular, cell & developmental biology, the B.S. in bioengineering 71% to 181 students in Fall 2009.
- We graduated 4 minors, 14 BS, 7 MS, and 4 PhD students.

Goals

The Department of Computer Engineering has goals of excellence in research, undergraduate and graduate teaching, and service. In research, we target four specific areas of research excellence:

- computer system design
- sensing and interaction
- computer networks
- robotics and control.

We have also defined a cross-cutting interdisciplinary emphasis in assistive and rehabilitative technology as a targeted area of opportunity as we seek to train undergraduate and graduate engineers for the future. In teaching, we strive for innovation and excellence in the classroom and in academic programs. In service, we dedicate ourselves to serving the Baskin School, UCSC, and our professional disciplines.

Our goals for 2008-9 were:

- Work with the SOE and departments to implement the recommendations of the external review report, including joint appointments, cross-listing of courses, and a growing collaboration and commonality in graduate programs.
One joint appointment may move forward in Fall 2009, and several courses are cross-listed, but there is still much work to do in collaboration with the other programs and the Dean of Engineering.
- Prepare for a seamless ABET review in Fall 2009.
Completed, with visit scheduled for November.
- Create a comprehensive awareness campaign for our graduate program.
Completed in part with additional outreach underway.
- Propose an undergraduate program in mechatronic engineering and a multi-program graduate emphasis in autonomous systems and control.
Graduate proposal awaits campus approval. Undergraduate curriculum is complete, with submission planned in 2009-10 and launch in 2010-11.

Collaborations

The Department will continue its high level of interdepartmental, interdivisional, and inter-campus collaborations. During the past year, these collaborations have included:

- Professor Ferguson served as Provost of Crown College and Chair of the Council of Provosts.
- Professor Mantey chaired the Technology and Information Management program, which also oversees the Information Systems Management degree program.
- Professor Hughey chaired the multi-department Bioengineering B.S. program.
- In the Academic Senate, Professor Elkaim served on Admissions and Financial Aid, Professor Kurniawan served on Affirmative Action and Diversity, Professor Larrabee served on Graduate Council, and Professor Hughey chaired Admissions and Financial Aid and served on the Executive Committee.
- Professor Garcia-Luna-Aceves is chaired MOBICOM 2008, the premier conference on mobile computing and networking. Professor Obraczka is chair of the poster session, and Professor Sadjadpour of registration.
- Professors Mantey and Garcia-Luna-Aceves received continuing recognition of their achievements through reappointment to Baskin Chairs in Computer Engineering.
- Professor Mantey served as director of CITRIS at UCSC.

- Professor Obraczka was the Demo and Poster Chair for ACM CHANTS 2008, Workshop Chair for the IEEE SECON 2009, and co-Chair of the First IEEE International Workshop on Network Science For Communication Networks (NetSciCom) 2009.
- Professor Guthaus served as the SIGDA E-Newsletter Editor , was elected Vice President of the Monterey Bay IEEE.
- Sri Kurniawan was the registration chair and treasurer for ACM ASSETS 2009, the premier conference in Assistive Technology and Accessible Computing.
- Roberto Manduchi was the Co-Chair of the 2008 Workshop on Computer Vision Applications for the Visually Impaired.
- Jacob Rosen was a Chair of the Workshop on Surgical Robotics at Biorob 2008: IEEE/RAS-EMBS International Conference on Biomedical Robotics and Biomechatronics.
- Faculty also served on many program committees, including HotChips 09, MICRO 09, ICCD 09, ICPADS 09, ASP-DAC 09, VLSI-SOC 09, GLSVLSI 09, ACM MobiCom 09, IEEE SECON 09, ACM CHANTS 09, ACM CoNext 09, ACM MobiHoc 09, ACM MobiCom 08, IEEE ICCCN 08, IEEE SECON 08, ISMB 2008, and other conferences.

Advancing diversity

The Department of Computer Engineering will continue to address issues of diversity in manners similar to prior years.

- Professors Ferguson and Larrabee joined with Professors McDowell and Kubby to successfully propose a \$600,000 program to the National Science Foundation featuring the development of a supportive live-and-learn community of engineering students at Crown College especially targeting women, students from other groups underrepresented in engineering or from disadvantaged backgrounds.
- Professors Manduchi, Moulds, Obraczka, and Hughey with Assistant Hangen led an NSF Research Experiences for Undergraduates Site SURF-IT, surf-it.soe.ucsc.edu, a summer research program with a focus on increasing the number of women and underrepresented minorities in engineering.
- CE, CS, and the Baskin School sponsored fellowships to the Grace Hopper Celebration of Women in Computing for 3 students.

2008-9 Graduate Degrees Granted by Computer Engineering

Student	Degree	Advisor	Title
Hu, Xinghua	MS	Garcia-Luna	MS: Interest-Based Multicast Routing Protocol
Mathai, Ghins	MS	Brandwajn	Networks Project Course
Mehta, Saryu	MS	Brandwajn	Networks Project Course
Pease, David	Ph.D	Long/Hughey	Ph.D: Storage Tank: A Storage Area Network File System
Ryder, Geoffrey	Ph.D	Ross/Brandwajn	Ph.D: Routing to Develop Expertise in Customer Contact Centers
Tang, Feng	Ph.D	Tao	Ph.D: Feature Based Representations for Mid and High Level Vision
Trapani, Andrew	MS	Dunbar	MS: Performance Analysis of a Horizontal Separation Assurance Algorithm for Short-Range Conflict Detection and Resolution
Wang, Xin	MS	Garcia-Luna	MS: Channel Access Using Opportunistic Reservations and Virtual MIMO
Wilson, Noah	Ph.D	Dunbar	Ph.D: Electronic Control of DNA Polymerase Binding and Unbinding to Single DNA Molecules Tethered in a Nanopore
Zhang, Gefan	MS	Manduchi	MS: Lifetime Prediction and Synchronization of Visual Sensor Network
Ilstrup, David	MS	Elkaim	MS: Compact Laser Triangulation System Design and Implementation

2008-9 Extramural Research Funding and Gifts

July 2008 through June 2009. Several prior active multiyear awards not included.

Amount	Researcher(s)	Agency	Grant or Gift Title
1,925,000	Garcia-Luna, Obraczka, Sadjadpour, Smith	US Army/AROD	DAWN: Dynamic Ad-hoc Wireless Networking
80,000	Renau, Jose	NSF	CAREER: Understanding, Estimating, and Reducing Processor Design Complexity
161,000	Dunbar, William	NIH/NHGRI	Feedback control of Biological Polymers in a nanopore
199,000	Erzberger, Dunbar	NASA/Ames	Concepts and Algorithms for Automated Separation Assurance
140,000	Renau, Shakouri, Guthaus	NSF	SMA: Accurate Temperature Measurement Infrastructure and Methodology for Power, Variability and Reliability
16,000	Manduchi, Roberto	NSF	CRI: IAD: Comparative evaluation of assistive Technology Devices and Software for Visually Impaired Persons
110,000	De Alfaro, Luca	NSF	Directed Real-Time Testing
142,000	Varma, Anujan	LGS Innovations	Optical Data Router (ODR) Architecture Design and Evaluation
598,000	McDowell, Ferguson, Harrell, Kubby, Larrabee	NSF	Assisting CS, CE, and EE Student Success (ACCESS)
21,000	Garcia-Luna, J.J	ComputerSciences	P5 RIW MANET Simulation Study
43,000	Mantey, Patrick	UC Discovery	Executive Management Fellowship for Dr. Brad Smith
3,000	Mantey, Patrick	UC Discovery	Executive Management Fellowship for Dr. Brad Smith
30,000	Kurniawan, Massaro	UC/MICRO	Virtual Speech Therapist for Stroke Survivors with Aphasia in Rural Malaysia
17,000	Renau, Jose	UC/MICRO/nVIDIA	Methodologies to Measure GPU Surface Temperature and Power
25,000	Renau, Guthaus	UC/MICRO, Sun	Sun OpenSPARC Center of Excellence at Santa Cruz
1,500,000	Schmidt, Dunbar, Akeson, Deamer, Zhang, Noller	Keck Foundation	W.M. Center for Nanoscale Optofluidics
329,000	Manduchi, Roberto	NSF	Collaborative Research: CDI-Type II: Cyber Enhancement of Spatial Cognition for the Visually Impaired
192,000	De Alfaro, Luca	NSF	CSR_EHCS(CPS), TM: Teleolog: Certified Software for Medical Robotics
400,000	Dunbar, William	NSF	CAREER: Measurement, Modeling and Control of Molecular Motors Above a Nanopore
32,000	Sadjadpour, Garcia-Luna, Smith	L-3 Communications	Scaling Wireless as hoc Networks using MPT and MPR
91,000	Rosen, Jacob	Univ. Washington	Subcontractor: Lightweight Lower Limb Exoskeleton
184,000	Rosen, Jacob	US Army/Misc Bases	The Myoprocessor- Muscle Modeling for Neural control of Upper Limb Powered Prosthetics and Orthotics (Grant Transfer from University Washington)
110,000	Hughey, Manduchi	NSF	REU Site: Summer Undergraduate Research Fellowship in Information Technology at UCSC
160,000	Mantey, Musacchio, Obraczka	US	Reliable Networks for Homeland Security
100,000	Mantey, Patrick	UARC	ARP: Space Traffic Management Research Center
19,500	Obraczka, Katia	Wionics Research	Gift
227,159	Mantey, Smith, Garcia-Luna	Cisco	Network Management and Operations Laboratory
23,495	Renau, Guthaus	Sun	Sun OpenSPARC Center of Excellence at Santa Cruz
75,000	Renau, Guthaus	Sun	Sun OpenSPARC Center of Excellence at Santa Cruz
250,000	Mantey, Smith, Garcia-Luna	Cisco	Network Management and Operations Laboratory
4,950	Computer Engineering	Marc Thorpe	Gift
16532	Computer Engineering	Xilinx	Gift
4,000	Smith, Brad	Metaflows	Gift