UCLA

Computer Science Department

Annual Report

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MISSION STATEMENT

The Computer Science Department strives for excellence in creating, applying, and imparting

knowledge in computer science and engineering through comprehensive educational programs,

research in collaboration with industry and government, dissemination through scholarly

publications, and service to professional societies, the community, the state, and the nation.

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It is with great pleasure that I share with you the 2008 – 2009 annual report for the Computer Science Department, University of California, Los Angeles.

This has been an especially challenging year for many academic institutions around the world due to severe budget cuts—UCLA being no exception. I am happy to report, however, that through careful planning and a strong commitment by our faculty, staff and students, we have maintained our normal enrollment and graduation rates at both the undergraduate and graduate levels despite these challenges. Moreover, we have increased our research funding expenditures by more than 30% through an expansion of our federal, state and industrial research projects. Four faculty members joined our department during this last year at the tenure-track, joint and adjunct levels, adding a great deal of diversity to our instructional program and deepening our research profiles in the areas of machine learning, computational economics, computational biology, computer security, and software/system engineering.

Another exciting event has been the creation of a new center within our department for domain-specific computing, providing leadership for a consortium that includes other UCLA departments and national institutions. The new center will embark on developing high-performance, energy-efficient and customizable computing that can revolutionize the way computers are used in healthcare and other important applications. This center is an exciting addition to our current set of centers; these span the areas of wireless health, embedded networked sensing, information security, and autonomous intelligent networks and systems.

Our faculty continues to excel in conducting research at the forefront of computer science and engineering. Their achievements and accomplishments have been widely acknowledged through a set of recent high-profile awards and recognitions, including memberships in the National Academy of Engineering, ACM and IEEE, Sloan and Guggenheim fellowships, the IEEE Internet Award and the Aggarwal Prize. The focus of our faculty on research continues to be complimented by a strong commitment to teaching, as evidenced by annual high-profile teaching awards.

As I share with you the department's annual report, I stress our continued commitment to the highest levels of excellence in both teaching and research, and our unyielding mission to further the reach of computer science and engineering as they continue to impact our world in positive and profound ways.

Adnan Darwiche
Chair, Computer Science Department
October, 2009

DEPARTMENT STATISTICS: FALL 2009

Faculty and Staff

Ladder Faculty	35
Joint Faculty	6
Emeriti Faculty	15
Adjunct Faculty	6
Department Staff	15.5

Bachelor's

Applicants	1908
Admits	440
Enrolled	134
BS Degrees Awarded	78
BS Students Enrolled	548

Master's

Applicants	368
Admits	149
Enrolled	67
MS Degrees Awarded	77
MS Students Enrolled	149

Doctorate

Applicants	422
Admits	136
Enrolled	33
PhD Degrees Awarded	27
PhD Students Enrolled	194

Legend: Students Enrolled | Admitted 2007–2008 | New Enrolled
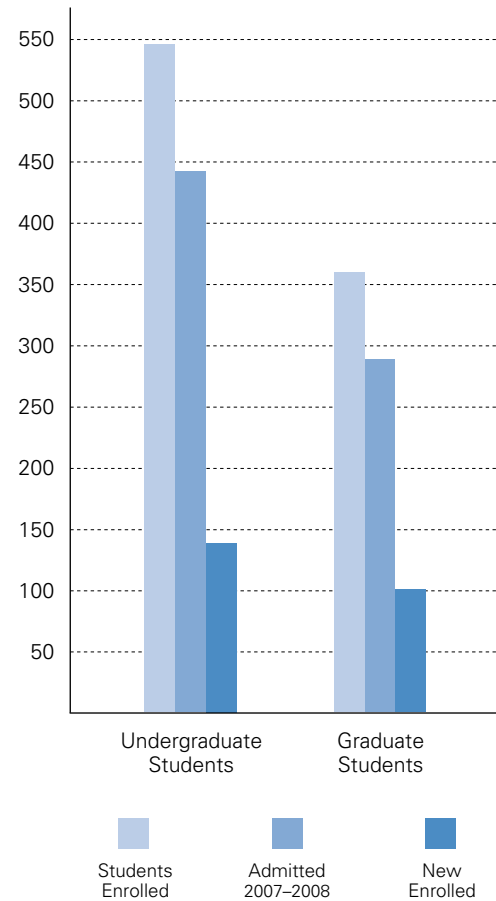
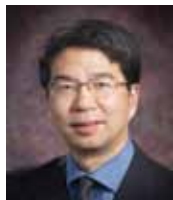**Applicants** = number of applicants for Fall 2009

Admits = number of applicants offered admission for Fall 2009

Enrolled = number of applicants newly enrolled for Fall 2009

Degrees Awarded = number awarded during academic year 2008-2009

Students Enrolled = number enrolled during academic year 2008-2009

AWARDS AND HONORS

Jason Cong

ACM Fellow: 2008 election for contributions to electronic design automation

Jason has been a member of the computer science faculty since 1990, and this year he received an appointment as Chancellor's Professor. He is the co-director of the VLSI/CAD Lab and also director of the newly established Center for Domain-Specific Computing which is supported by NSF's Expedition in Computing program. Jason served as department chair from 2005 to 2008, is a guest professor at Peking University, and an IEEE Fellow. He has authored over 280 papers, led over 30 research efforts and graduated 24 Ph.D. students, many of whom are faculty members at major research universities.

Eleazar Eskin

Sloan Research Fellowship: 2009 award for work in the field of molecular biology
Okawa Foundation Research Grant: 2008 award for efforts in the fields of information and telecommunications

Eleazar joined UCLA in 2006 after spending three years as a faculty member with UCSD. He holds a joint appointment with the Department of Human Genetics, Geffen School of Medicine. As an undergraduate at the University of Chicago, he graduated with triple majors in economics, computer science and mathematics, and then completed his graduate degree in computer science at Columbia University. Eleazar is a competitive swimmer/water polo player, and participates in triathlons.

Deborah Estrin

National Academy of Engineering: 2009 election for the pioneering design and application of heterogeneous wireless sensing systems for environmental monitoring
Doctorate Honoris Causa: 2009 award from the Swiss Federal Institute of Technology, Lausanne.

Deborah joined UCLA in 2000 after 14 years as a faculty member at USC. She has a joint appointment with the EE Department, holds the Jon Postel Chair in Computer Networks, and is founding director of the NSF-funded Center for Embedded Networked Sensing (CENS). Deborah was selected as the first ACM-W Athena Lecturer, is the recipient of the Anita Borg Institute's Women of Vision Award for Innovation, and has been inducted into the Women in Technology International's Hall of Fame. She is also a member of the American Academy of Arts and Sciences and a Fellow of the AAAS, ACM and IEEE.

Alan Kay

ACM Fellow: 2008 election for fundamental contributions to personal computing and object-oriented programming

Alan has been teaching at UCLA for 13 years while continuing to be involved in commercial technology endeavors. He is the creator of the Smalltalk programming language—the inspiration and technical basis for the MacIntosh and subsequent Windows-based systems, and is associated with the early development of object-oriented programming, the laptop computer—and the modern windowing GUI. He is a Fellow of the AAAS, NAE and RSA, and a recipient of the Turing Award and Kyoto Prize. Perhaps Alan's most famous quote is: "The best way to predict the future is to invent it."

David Smallberg

Lockheed Martin Excellence in Teaching Award: 2008 award for teaching

David has been a lecturer with the Computer Science Department since 2001 and teaches first year CS courses and upper-division programming practicum. With a focus on increasing the number of students from underrepresented backgrounds, he leads workshops for high school advanced placement computer science teachers and students. David has coached UCLA teams in the ACM's International Collegiate Programming Contest, leading the team to a world championship. He is also the recipient of the University of California's Engineering Society Professor of the Year award.

Demetri Terzopoulos

Guggenheim Fellowship: 2009 award to individuals who have shown stellar achievement and exceptional promise for continued accomplishment

Demetri joined UCLA in 2005 after serving on CS, EE and math faculties at New York University and the University of Toronto (with which he remains affiliated). He currently holds the title of Chancellor's Professor of Computer Science. His many awards include the inaugural Computer Vision Significant Researcher Award from IEEE and a 2005 Academy Award for Technical Achievement from the Academy of Motion Picture Arts and Sciences for his pioneering work in physics-based computer graphics. Demetri is a Fellow of ACM, IEEE, and Royal Society of Canada, and a member of the European Academy of Sciences.

Zhuowen Tu

NSF CAREER Award: 2009 award for research on holistic 3D brain image parsing

Zhuowen joined the Computer Science Department in 2008, while also holding a joint appointment with the Department of Neurology. In addition to Zuowen's recent award, he is also the recipient of a 2003 Marr Prize. His research interests encompass statistical modeling/computing, computational biology, machine learning, and brain imaging.

Alan Yuille

IEEE Fellow: 2008 election for contributions to computer and biological vision, medical image processing and computational theories of cognition

Alan has been with UCLA since 2002—first as a faculty member with the Department of Statistics and then in joint appointments with the Psychology Department and the Computer Science Department. He received his Ph.D. in theoretical physics from Cambridge, held positions at the University of Texas at Austin, the Institute for Theoretical Physics in Santa Barbara, the Artificial Intelligence Lab at MIT, and was a member of the faculty at Harvard for nearly ten years.

Lixia Zhang

IEEE Internet Award: 2009 award for contributions toward an understanding of the complex interactions between Internet components and the development of the Internet architecture

Lixia's path has taken her from a farm in northern China to a doctorate at MIT, to Xerox's Palo Alto Research Center, and finally, in 1996, to a faculty position at UCLA. Lixia is an IEEE and ACM Fellow, and is highly active in the Internet community. She served on the Internet Architecture Board from 1994 to 1996, and again from 2005 to 2009. Lixia coined the term "middlebox" for such things as firewalls and network address translators (NAT), the components that were not in the original IP architecture design. Middlebox is now a commonly used term in the Internet community, and was the subject of a 2008 *IEEE Network* special issue, "Implications and Control of Middleboxes in the Internet."
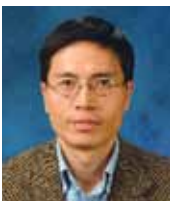
Song-Chun Zhu

J. K. Aggarwal Prize: 2008 prize for fundamental and pioneering contributions to a unified foundation for visual pattern conceptualization, modeling, learning, and inference with applications in computer vision and pattern recognition

Song-Chun joined UCLA in 2002 with joint appointments in the Department of Statistics and the Computer Science Department. He is the director of the UCLA Center for Image and Vision Science (a collaboration of the Statistics, Computer Science, and Psychology departments) whose goal is to pursue a unified computational theory underlying visual perception and learning, and to build highly intelligent computer systems that understand real-world imagery and interact with people and the real environment. Song-Chun is a recipient of the Marr Prize, ONR's Young Investigator Award, NSF's Career Award, and a Sloan Fellowship.

Center for Autonomous Intelligent Networks and Systems (CAINS)

Lead Sponsors
Office of Naval Research (ONR), National Science Foundation (NSF), UCLA

Director
Mario Gerla

Scientific Board
(UCLA) Rajive Bagrodia, Babak Daneshrad, Leonard Kleinrock, Izhak Rubin,
       Mani Srivstava, John Villasenor
(ONR)   Clifford Anderson

http://www.cains.cs.ucla.edu

The Center for Autonomous Intelligent Networks and Systems (CAINS) was established in 2001, with six laboratories in the Computer Science and Electrical Engineering departments of UCLA's Henry Samueli School of Engineering and Applied Science.

The Center's mission is to serve as a forum for intelligent agent researchers and visionaries from academia, industry, and government, with an interdisciplinary focus on such fields as engineering, medicine, biology and the social sciences. Information and technology will be exchanged through symposia, seminars, short courses, and through collaboration in joint research projects sponsored by the government and industry.

Many research projects are underway, including one that involves the development of technologies enabling unmanned autonomous vehicles (UAVs) to communicate and behave in an intelligent, coordinated fashion without direct human interaction. Current laboratory research includes work in the following areas:

- Video network transport
- Vision-based localization
- Ad hoc multi-hop networking

- Vehicular networks
- Dynamic unmanned backbone
- Mobile sensor platforms

- Systolic OFDM radios
- Adaptive transceivers

Collaborations

Biology-inspired systems (USC, Caltech)

Learning systems (SRI)

Autonomous agent-based sys. (Univ. Trento, Italy)

Advanced MIMO systems (Raytheon)

UAV navigation system (UCB, MIT, ACR)

Mobile sensor platforms (Istituto Boella, Torino, Italy)

Large-scale disruption-tolerant wireless networks (Boeing)

Vehicular communications research (Toyota)

Health networks (Politecnico di Milano, Italy)

Mesh networks (Politecnico di Milano, Italy)

Social Networking for Health

P2P Social Network

Neighbor

Patient with Pre-existing conditions

Medical Doctor

In Mall, Bus or Subway

1. Would you help if I have an arrhythmia attack? I am asking because I always see you on this bus at 8AM.

2. Yes, I can help. I noticed you are working at Kaiser. I will also alert my neighbor, a Kaiser doctor.
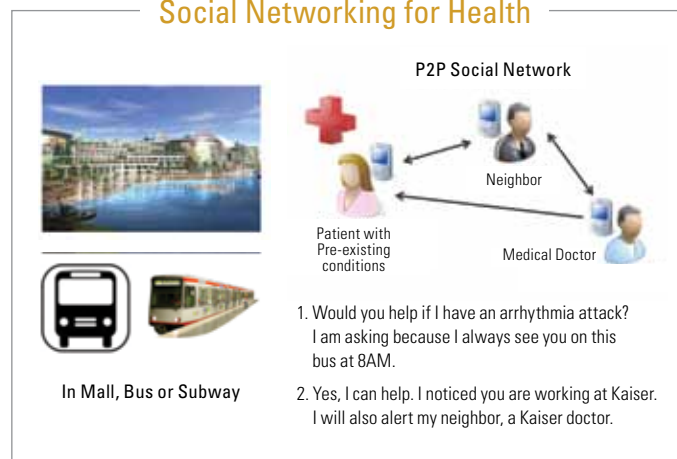
Center for Embedded Networked Sensing (CENS)

Lead Sponsor
National Science Foundation (NSF)

Director
Deborah Estrin (3531H Boelter Hall, UCLA)
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Deputy Director
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Administrative Director
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jgoldman@cens.ucla.edu

http://research.cens.ucla.edu/

Center for **CENS** Embedded Networked Sensing

The Center for Embedded Networked Sensing (CENS)

UCLA's Center for Embedded Networked Sensing (CENS) is a major research enterprise focused on developing wireless sensing systems and applying this revolutionary technology to critical scientific and societal pursuits. In the same way that the development of the Internet transformed our ability to communicate, the ever decreasing size and cost of computing components is setting the stage for detection, processing, and communication technology to be embedded throughout the physical world, thereby fostering both a deeper understanding of the natural and built environment and, ultimately, enhancing our ability to design and control these complex systems.

By investigating fundamental properties of embedded networked sensing systems, developing new technologies, and exploring novel scientific and educational applications, CENS is a world leader in unleashing the tremendous potential these systems hold.

CENS was established in 2002 as a National Science Foundation Science and Technology Center and is a partnership that involves UCLA, UC Riverside, UC Merced, USC, and Caltech. The center's current research portfolio encompasses projects across nine technology and applications areas, including the following examples:

• Developing cameras and image analysis approaches that assist scientists in making biological observations. Together, the camera and analysis systems comprise a new type of biosensor that takes measurements otherwise unobservable to humans.

• Harnessing the technological power of mobile phones and the ubiquitous wireless infrastructure for applications in areas as diverse as public health, environmental protection, urban planning, and cultural expression, each of which is influenced by independent personal behaviors adding up in space and time.

Center for Information & Computation Security (CICS)

Director
Rafail Ostrovsky (rafail@cs.ucla.edu)

Associate Director
Amit Sahai (sahai@cs.ucla.edu)

http://www.cs.ucla.edu/security

The Center for Information & Computation Security (CICS) was founded in UCLA's Henry Samueli School of Engineering and Applied Science in the fall of 2003 under the directorship of Professor Rafail Ostrovsky. In 2004 Professor Amit Sahai joined the leadership team to serve as associate director. Headquartered within the Computer Science Department, the Center's mission is to promote all aspects of research and education in cryptography and computer security. Since its inception, the Center has raised significant amounts of federal, state and private-sector funding, including international collaboration with Israel through multiple BSF grants, and has attracted multiple international visiting scholars.

The Center explores novel techniques for securing both national and private-sector information infrastructures across various network-based and wireless platforms, as well as wide-area networks. The inherent challenge is to provide guarantees of privacy and survivability under malicious and coordinated adversarial attacks. Meeting this challenge is especially complex because solutions must achieve several conflicting goals. While making applications more accessible, ubiquitous, and widespread, any solution must also be resilient against a wide range of both internal and external coordinated attacks, simultaneously providing strong privacy and security guarantees to both individuals and organizations. The Center's research directions include the exploration and development of the following:

- State-of-the-art cryptographic algorithms, definitions, and proofs of security.

- Novel cryptographic applications, such as new electronic voting protocols and identification, encryption, and data-rights management schemes; privacy-preserving data mining, searching on encrypted data, and searching with privacy.

- Security mechanisms underlying a "clean-slate" design for a next-generation secure Internet.

- Novel biometric-based models and tools, such as encryption and identification schemes based on fingerprint scans.

- The interplay of cryptography and security with other fields, including algorithms, complexity theory, networks, communication complexity, machine learning, compiler and language design, operating systems, hardware design, and distributed computing.

The Center promotes both long-term foundational work and short-term applied research to support the development of cryptographic foundations and critical security tools and techniques.

The World of Computing: Ones and Zeros

UCLA Wireless Health Institute (WHI)

Co-Directors
Denise Aberle (Medicine)
Lillian Gelberg (Public Health)
William Kaiser (EE)
Majid Sarrafzadeh (CS)

http://www.wirelesshealth.ucla.edu/

The Wireless Health Institute (WHI), established in 2008, is composed of a community of UCLA experts and innovators from a variety of disciplines — including engineering, medicine, nursing, pharmacology and public health — who are dedicated to improving the timeliness and reach of health care through the development and application of wireless, network-enabled technologies integrated with current and next-generation medical enterprise computing.

News

Dr. Patrick Soon-Shiong, founder and chairman of Abraxis BioScience and executive chairman and CEO of Abraxis Health, has been appointed executive director of the UCLA Wireless Health Institute. "Our team is very excited to work with Dr. Soon-Shiong," said Co-Director Sarafzadeh. "His vision for the future is compelling for all of us in the WHI."

Selected Projects

PAM

The Personal Activity Monitor collects and analyzes daily activity data, and provides a low-cost, end-to-end solution for activity data acquisition, transport, archival and analysis at a remote database. Currently, PAM data analysis tools allow classification of different motion types (standing, walking, running, reclining, climbing, etc.), various posture positions and relative limb angles.

SmartShoe

Hermes is a lightweight smart shoe aimed at extending fall risk analysis and human balance monitoring outside of a lab environment. The goal is to combine embedded sensing, signal processing, and balance modeling techniques to create this scientific tool capable of accurately determining fall risk assessment and walking behavior patterns.

Health Guardian

Health Guardian is a personal wellness platform. The need for new health monitoring technology that exploits cross-cutting interactions has inspired a community of over 60 researchers at UCLA in the disciplines of medicine, engineering, science, and other fields. All are dedicated to harnessing the now ubiquitous availability of wireless network access with computer and engineering principles to enable wireless health. The proposed Health Guardian serves this community in each aspect, as well as the needs of the larger UCLA health care provider network, which is seeking an initiative in this area for member assistance (with Professor Mario Gerla).

Center for Domain-Specific Computing (CDSC)

Director
Jason Cong (Computer Science, UCLA)

Associate Director
Vivek Sarkar (Computer Science, Rice University)

Team Members

Denise Aberle (David Geffen School of Medicine, UCLA)

Richard Baraniuk (Electrical & Computer Engineering, Rice University)

Alex Bui (Radiological Sciences, UCLA)

M.C. Frank Chang (Electrical Engineering, UCLA)

Tim Cheng (Electrical & Computer Engineering, UCSB)

Jens Palsberg (Computer Science, UCLA)

Miodrag Potkonjak (Computer Science, UCLA)

Glenn Reinman (Computer Science, UCLA)

Saday Sadayappan (Computer Science & Engineering, Ohio State University)

Luminita Aura Vese (Mathematics, UCLA)

This significant award is another testament to the world-class faculty here at UCLA who continue to push the envelope to solve society's most pressing issues. We are grateful to the NSF, which has repeatedly provided crucial funding to our faculty, helping to place the university among the nation's top five in research funding. — *UCLA Chancellor Gene Block*

UCLA has been awarded a $10 million grant by the National Science Foundation's Expeditions in Computing program to develop high-performance, energy-efficient, customizable computing that can revolutionize the way computers are used in health care and other important applications.

In response to this award, the Computer Science Department has established a Center for Domain-Specific Computing (CDSC) — a collaborative effort between the university's computer science, electrical engineering, mathematics, and radiological sciences departments, as well as the computer science and engineering departments of Rice University, UC Santa Barbara, and Ohio State University.

In describing this new research program, CDSC director Jason Cong explains that the computing industry has entered an "era of parallelization" in order to meet the ever-increasing computing needs in various fields. In this era, tens of thousands of computer servers are connected in warehouse-scale data centers. But these parallel, general-purpose computing systems still face serious challenges in terms of performance, energy, space and cost.

These challenges are addressed by domain-specific computing. While general-purpose computing relies on computer architecture and languages aimed at any type of application, domain-specific computing uses a customizable architecture and custom-oriented, high-level computer languages tailored to a particular application domain. For our team of researchers, that domain is health care — especially because of its significant impact on issues of national economy and quality of life. Specifically, our focus will be on medical imaging and hemodynamic modeling. In these areas, domain-specific computing will provide more cost-effective and convenient solutions for preventive, diagnostic and therapeutic procedures and dramatically improve healthcare quality, efficiency and patient outcomes.

As described by Professor Cong: "In regard to medical imaging and hemodynamic modeling, we will, for example, be able to see inside the brain and facilitate

September 18, 2009—Domain-Specific Computing Kickoff Meeting

Bottom row: Robert Peccei, vice chancellor of research; Vijay Dhir, dean HSSEAS; Joseph Rudnick, dean of physical sciences; Jason Cong, director of CDSC; Vivek Sarkar, associate director of CDSC (Rice University); Saday Sadayappan (Ohio State University) / Middle row: Glenn Reinman, Jens Palsberg, Denise Aberle, Sankar Basu (NSF), Alex Bui / Top row: Mitra Basu (NSF), Luminita Vese, Tim Cheng (UCSB) (unless otherwise noted, affiliation is UCLA)

real-time surgery. Also, doctors will be able to perform preventative procedures much faster with automatic analysis and diagnosis of MRI and CT scan images. In other words, much of today's work relies on people and may take hours or days to complete with existing computing technology, but with the domain-specific customizable technique, this work can be done in minutes."

Professor Cong and his colleagues recognize that to achieve broad and lasting success, it will be necessary to train a new generation of students who are prepared for customized computing and can effectively apply such techniques to many areas of society, thus furthering the digital revolution. To accomplish this, the

CDSC will integrate research with education, exposing graduate, undergraduate and high school students to the new concepts and research developed under this project through several new courses jointly developed and shared by researchers from all four universities. Additionally, summer research fellowship programs will be created to support high school and undergraduate students, and a special effort will be made to attract underrepresented students at all levels through partnerships with campus organizations focused on diversity, such as the UCLA Center for Excellence in Engineering Diversity.

Peter S. Pao

Adjunct Professor

Ph.D. (University of Michigan, 1975)

Joint Appointment with Anderson School of Management

Peter Pao recently joined the Computer Science Department's faculty after a 26-year career in the electronics and aerospace industry (he also holds a joint appointment with UCLA's Anderson School of Management). Prior to his retirement from Raytheon Company, Peter was both a corporate vice president and Raytheon's chief technology officer.

Peter believes that technology is key to the competitive edge of the United States, and the transformation of this technology into innovative solutions creates success. At Raytheon, he focused on knowledge management and technology networking. These initiatives integrated the seven Raytheon components, and encouraged the free flow of knowledge and information exchange. Further, he built strategic alliances with selected companies and universities to further expand the company's technology base. Peter emphasized the link between technology and business, and made product and technology roadmaps an integral part of his business strategy.

During his career at Raytheon (formerly Hughes Aircraft Company), Peter also held positions as engineering vice president of Raytheon Electronic Systems, general manager of the highly successful and profitable F-15 radar programs, and he also spent a year with Raytheon Commercial Ventures, gaining experience working with venture capital firms, technology licensing, and fundraising for startup companies. Prior to joining Hughes, Peter was an assistant professor of mathematics at the University of Georgia and also a member of the Institute for Advanced Study at Princeton.

Peter has been on the board of directors for several companies: HRL Laboratories (a renowned research institution) and ThinKom Solutions and TelASIC (two startup telecommunication companies). He is the recipient of many awards, including LEAP Leadership (1988), Raytheon Hero (1999), Asian American Engineer of the Year (2003), Organization of Chinese American Image (2003), and Chinese American Engineering Achievement (2004).

Here in the Computer Science Department, Peter will focus on our system engineering program, one of the university's on-line programs. Because of the exponential growth in complexity, system engineering is now one of the most in-demand fields in industry. He is also working with UCLA's Anderson School of Management on joint business-engineering programs. Expertise in both engineering and business is crucial for the business leaders of this 21st century.

Christopher Lee

Professor

Ph.D. (Stanford 1993)

Joint Appointment with the Chemistry and Biochemistry Department

Christopher Lee joined the faculty of the Computer Science Department this year under a joint appointment with the Chemistry and Biochemistry Department. After receiving his undergraduate degree (summa cum laude) in biochemistry and molecular biology in 1988 from Harvard, and his Ph.D. in structural biology from Stanford in 1993, he co-founded the bioinformatics company, Molecular Applications Group (later part of Affymetrix and Celera), serving as vice president for research until 1998. Following a postdoctoral fellowship in the Department of Chemistry at Stanford, Christopher joined the UCLA faculty in 1998.

Christopher's current research interests are focused on several areas: 1) information metrics for statistical inference; 2) bioinformatics analysis of high throughput genomics data such as deep sequencing; 3) graph databases for bioinformatics and genomics—for solving fundamental problems such as multiple genome alignment query and protein interaction network analysis; 4) the scalability principles of scientific data sharing, integration, and mining; 5) computational analysis of genome evolution mechanisms and protein evolutionary pathways—for example, methods to decode the evolutionary pathways by which HIV evolves drug resistance.

During his professional and academic career, Christopher received many awards. Among these are the Harvard Detur Prize, MIT Technology Review TR100 Award, UCLA Apple Workgroup Cluster for Bioinformatics Award, UCLA Seaborg Award, Camille and Henry Dreyfus New Faculty Award, Camille and Henry Dreyfus Teacher-Scholar Award, Harvard's Thomas Hoopes Prize for Undergraduate Thesis Research, Phi Beta Kappa Junior Twelve, Searle Scholar Award, American Cancer Society Postdoctoral Fellowship, and the Howard Hughes Medical Institute Predoctoral Fellowship.

Christopher envisions a world of disinformation-resistant information networks based on mathematical definitions of information vs. disinformation and a thorough understanding of how the different types of disinformation attacks work. On a more personal-goal level, he envisions being part of the team that builds a "Liberty School," whose only goal is to teach children how to think for themselves. Christopher would like to build the software tools that are an essential part of such a school.

Carey Nachenberg

Adjunct Assistant Professor

M.S. (UCLA 1995)

Carey Nachenberg, Fellow and vice president at Symantec Corporation, has recently accepted an appointment as an adjunct professor with the Computer Science Department. Carey is, however, already a familiar face to many of us: he has been an undergraduate lecturer with the department since 2001 and currently serves on the department's Alumni Advisory Board.

Carey received his bachelor's and master's degrees in computer science from UCLA in 1995 and then joined Symantec Corp., makers of the popular Norton AntiVirus product line. Over the next fourteen years at Symantec, he served in both product development and research capacities, prototyping and developing many of the company's core security technologies, including the antivirus and intrusion detection technology at the heart of the company's flagship Norton line of products.

Carey's many innovations have garnered him 35 United States patents, and in 1995 he became a Symantec Fellow, the company's highest technical distinction. He now serves as the chief architect of Symantec's Security Technology and Response Division, which is responsible for delivering all of Symantec's core security technology and security content.

Carey's current area of research is focused on leveraging the "wisdom of the crowds" to automatically identify new/unknown malicious software based on the anonymous, opt-in usage patterns of Symantec's tens of millions of customers. Just as an Amazon.com computes product ratings (1 star – 5 stars) based on reviews of other Amazon customers, this new technology automatically computes reputation ratings for every software application known to Symantec's millions of customers. These ratings are then leveraged to automatically identify and block new malicious software, and to provide users with actionable information on the software they download and use. This new approach, code-named Quorum, is shipping Symantec's latest generation of Norton products, and promises to provide drastically improved protection over traditional antivirus approaches.

As a lecturer, Carey is known for his unorthodox but rigorous teaching style. He likes to encourage (bribe?) students with Pop Tarts and other edible goodies, offers prizes to students who have the best final project, and also delivers highly animated PowerPoint presentations to simplify the complex computer science theories covered in his courses. Carey currently teaches Computer Science 32, Introduction to Computer Science II, every winter quarter.

Jennifer Wortman Vaughan

Assistant Professor

Ph.D. (University of Pennsylvania, 2009)

We are pleased to welcome Jennifer Wortman Vaughan to the Computer Science Department. She will join us in the fall of 2010 after spending a year as a Computing Innovation Fellow at Harvard University.

Jenn's research interests are in machine learning, computational economics, social network theory, and algorithms, all of which she studies using techniques from theoretical computer science. Many of her favorite problems have involved developing new models of learning, or examining old models from a new perspective. Her doctoral dissertation, Learning from Collective Preferences, Behavior, and Beliefs, introduced a series of new learning models and algorithms designed to address the problems commonly faced when aggregating local information across large populations.

After completing a master's in computer science at Stanford (where she got her first taste of research working with the Multiagent Group), Jenn went on to the University of Pennsylvania where she received her Ph.D. in computer and information science in 2009. During her time at Penn, she earned several best student paper awards, and spent two exciting summers interning in New York—first with the Machine Learning and Microeconomics groups at Yahoo! Research, and then with a research group at Google. For her dissertation, she was awarded the University of Pennsylvania's 2009 Rubinoff award for innovative applications of computer technology.

While in graduate school, Jenn co-founded the Annual Workshop for Women in Machine Learning. This workshop, now being held for the fourth time, was designed to give female students in machine learning a unique chance to meet and exchange ideas with other women who have research interests, as well as an opportunity to present their work in a friendly environment.

Mouse Association Studies

A Novel Approach for Discovering Genes Involved in Disease

As the most widely used mammalian experimental organism, the laboratory mouse forms part of the bedrock of modern biomedical research and drug development. Mice are capable of suffering from many diseases common in humans, such as hypertension, diabetes and cancer, and thus can serve as experimental models of these human diseases. Despite being quite physically dissimilar, humans and mice, both mammals, share approximately 90% of their genomes and have nearly identical genes. Due to this similarity, it is likely that many of the genes involved in disease in mice, also are involved in human disease.

Professor Eleazar Eskin and his team of researchers are currently using mice to understand the relationship between human variation and human disease. These researchers attempt to understand the genetic basis of human disease by identifying which mouse genes contribute to disease traits. Their research works toward developing genetic, genomic and computational resources that allow the use of these mice to gain insights into human disease.

Eskin's group, along with co-researchers at Perlegen Sciences and the Broad Institute of MIT and Harvard, are involved in developing a major new resource which characterizes the genetic variation in laboratory mice. The genomes of four wild-derived and eleven inbred laboratory mouse strains were resequenced to create a comprehensive resource of DNA variation. The group's findings (30 August 2007 issue of *Nature*) identified about 8.3 million single base-pair differences, known as single nucleotide polymorphisms (SNPs), in mouse strains. Eskin's group developed a technique to predict the ancient ancestral origin of each segment of the mouse genome for each laboratory mouse strain and estimate the overall genetic contribution of the ancient subspecies of mouse.

More recently, taking advantage of this resource, Eskin's group developed computational techniques to correlate genetic variation and disease traits in a set of collected mice. This type of approach is called an association study. The discovered correlated variation may point to genes that affect disease-related traits. These new methods are more accurate and more efficient than previous methods.
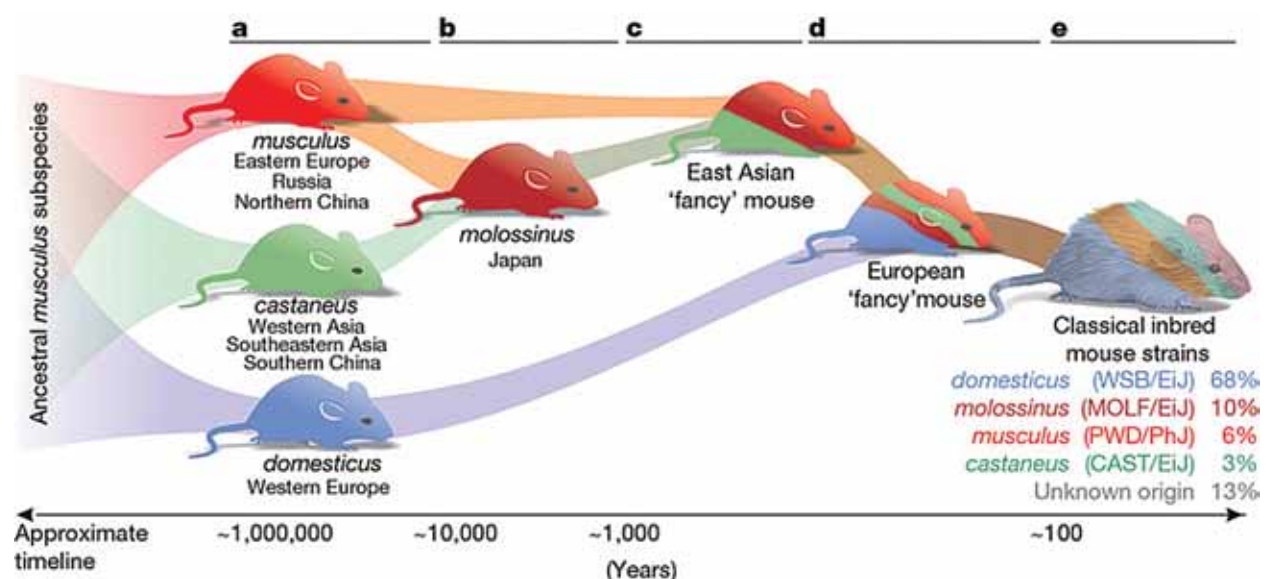
Nature Magazine, August 30, 2007

CENS high school scholars use mobile phones for data collection

Engaging High School Students in Authentic Research Experiences

UCLA's Center for Embedded Networked Sensing (CENS), situated in the Computer Science Department and headed up by Professor Deborah Estrin, is a multidisciplinary NSF-funded research enterprise focused on developing wireless sensing systems and applying this revolutionary technology to critical scientific and societal pursuits. An intrinsic part of CENS is its educational component, which fosters many exciting programs for high school and undergraduate students. One example of this is the CENS High School Scholars Program.

The High School Scholars Program is an eight-week summer internship program that engages fifteen high school students in authentic hands-on computer science research under the guidance of faculty, graduate, and undergraduate mentors. The CENS education staff, together with program mentors, has implemented a comprehensive program that links the scholars' research experience to their future educational career goals. Research projects are directly related to societal applications that are within the context of broader topics in computer science. Most recently, the summer's carefully designed research projects featured CENS mobile-to-web sensing technologies, specifically focused on engaging people in data collection campaigns using mobile phones. Projects focused on designing applications for documenting the health of local beaches, incidents of wasted water, and interesting locales on the UCLA campus, among other things. Teams of high school students led the effort on writing code and programming mobile and web applications. Because of their participation in this program, CENS High School Scholars became part of an active computer science research community and gained first-hand experience in a university setting, working in teams composed of other high school students, undergraduates, graduate students, and faculty.

ER Lab and Medical Imaging

The Computer Science Department's Embedded and Reconfigurable System's Lab is headed up by Professor Majid Sarrafzadeh. The lab's fifteen graduate students are engaged in research on methodologies, design, and tools for embedded and reconfigurable computing systems, including work on the selected projects described below.


Interval Training

We model an individual's heart rate response, taking into consideration several factors such as fatigue level and heart rate thresholds. Through guidance and exercise protocols, our systems help users exercise safely and efficiently in the minimum amount of time.

Personalized UV Monitoring

With the increase in skin cancer due to overexposure to the sun, there is a potential demand for a personalized UV monitoring system that provides measurements of UV radiation intensities. The need for such a device becomes even more vital when in some locations (e.g., on snowy mountains) where the UV exposure is doubled, and an individual is often largely unaware of this.

This project highlights the development of a wireless and portable embedded system for personalized UV monitoring. In the proposed system, a user's cell phone is responsible for data analysis and storage.
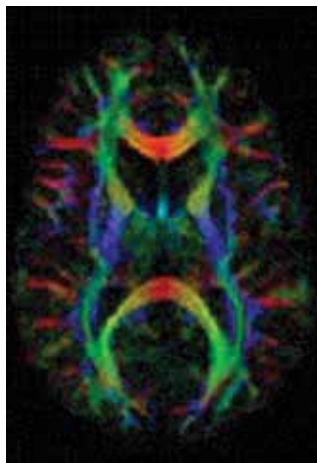
Revolutionizing Medical Imaging by Hardware Acceleration

We are focusing on medical imaging and video processing applications as part of our goal to increase the quality of health care. With the introduction of inexpensive, single-chip, massively parallel platforms such as the new generation of graphics processors, it is now possible for many medical imaging applications to achieve sufficiently high performance on a single desktop machine. This increase in computational performance creates the opportunity to use medical imaging in new applications, such as home care, that may have been impossible before. We are currently investigating opportunities in ubiquitous medical imaging applications as part of our mission to provide new health management and health care delivery methods. In collaboration with the UCLA Department of Radiological Sciences, we are designing novel high-performance medical imaging algorithms for these massively parallel systems.

Finding Objects in Images

In Professor Stefano Soatto's Vision Lab, researchers are in engaged in understanding the fundamentals of visual information processing, i.e., how images can be used to infer properties of the physical world such as shape, motion, location and material properties of objects. Such research has numerous applications, including vehicle navigation, analyzing the effects of climate change by studying the behavior of animals and plants, monitoring the human body for diagnostic and intervention purposes, and finding ways to search collections of images.

With the evolution of smaller and cheaper cameras, digital images have become ubiquitous, and photo sharing and social networking sites have exploded in popularity. In 2008 alone, one billion images were uploaded to flickr, and Facebook members added two terabytes of photos to the service every day. In fact, our ability to capture images has far outpaced our ability to label and sort them.

In the Computer Science Department's Vision Lab, Professor Stefano Soatto and Ph.D. candidate Brian Fulkerson, together with recent graduate student Andrea Vedaldi (now at Oxford University), are creating a system to help us understand the content of images by detecting, localizing, categorizing and recognizing generic objects in images.

To facilitate this labeling and sorting, Soatto, Fulkerson and Vedaldi have developed software that actually "learns" a number of common image categories—such as people, cars, bicycles, chairs, trains, dogs and cats—from images taken from flickr, and uses what it has learned to label new images. The software goes beyond tagging a photo with one or more words; it provides both the label and the part of the image that contains the label. Soon, we may be able to search image collections for things like an image that contains a person sitting on a couch.
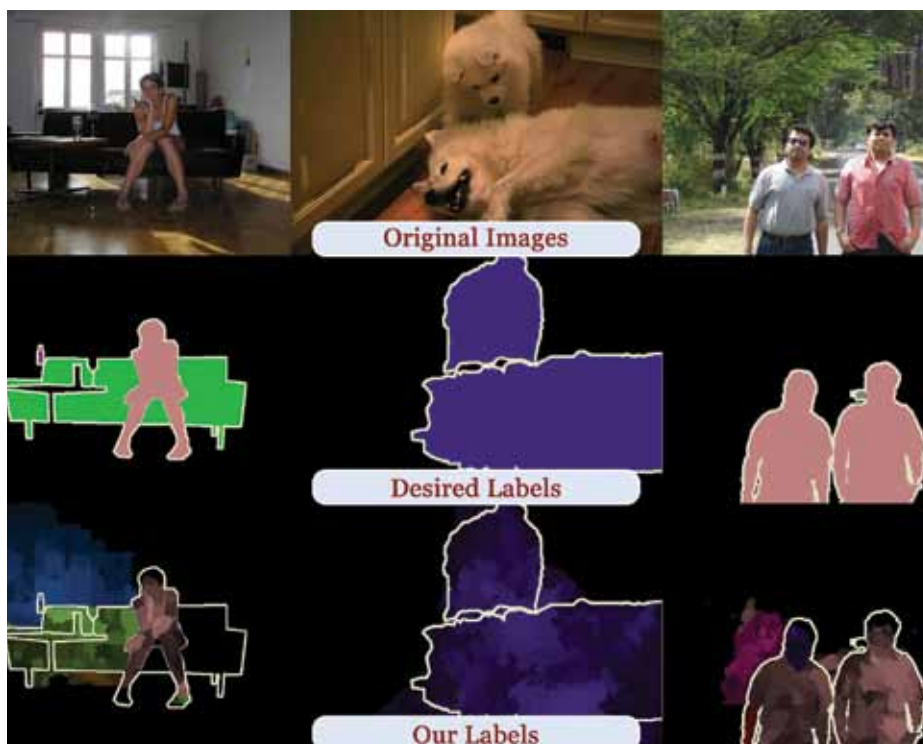
Three examples of output produced by our image-recognition software:

Top: Images from flickr

Middle: Their desired labels, color-coded by category

Bottom: Labels produced by our software that are brightest when the system is most confident in its choice

Artificial Intelligence

The computational study of intelligent behavior—including research in logical and probabilistic reasoning, causality, heuristic search and combinatorial optimization, natural language processing, neural networks, and artificial life.

Adnan Darwiche
Professor, Ph.D.
(Stanford 1993)

Probabilistic and logical reasoning and its applications, including diagnosis, planning, and system design and analysis.

Richard Korf
Professor, Ph.D.
(Carnegie Mellon Univ. 1983)

Problem-solving, heuristic search, planning and parallel processing in artificial intelligence.

Michael Dyer
Professor, Ph.D.
(Yale 1982)

Processing and acquisition of natural language through symbolic, connectionist and genetic algorithm techniques.

Judea Pearl
Emeritus Professor, Ph.D.
(Polytechnic Institute of Brooklyn 1965)

Artificial intelligence and knowledge representation, probabilistic and causal reasoning, nonstandard logics, and learning strategies.

Photo: UCLA Photography

UCLA's scenic campus environment

Computer System Architecture & CAD

The study of the structure and behavior of computer systems; development of new algorithms and computing structures to be implemented in hardware, firmware, and software; and development of tools to enable system designers to describe, model, fabricate, and test highly complex computer systems.

Jason (Jingsheng) Cong
Chancellor's Professor, Ph.D.
(UI at Urbana Champaign 1990)

Computer-aided design of VLSI circuits, computer architecture and reconfigurable systems, fault-tolerant designs of VLSI systems, design and analysis of algorithms.

Glenn Reinman
Associate Professor, Ph.D.
(UC San Diego 2001)

Processor architecture design and optimization, speculative execution, profile-guided optimizations, techniques to find and exploit instruction-level parallelism.

Milos Ercegovac
Professor, Ph.D.
(UI at Urbana Champaign1975)

Computer arithmetic and hardware-oriented algorithms, design of digital and reconfigurable systems.

Majid Sarrafzadeh
Professor, Ph.D.
(UI at Urbana Champaign 1987)

Embedded and reconfigurable computing, VLSI CAD, and design and analysis of algorithms.

Miodrag Potkonjak
Professor, Ph.D.
(UC Berkeley 1991)

Complex distributed systems, including embedded systems, communication designs, computer-aided design, ad hoc sensor networks, comutational security, electronic commerce, and intellectual property protection.

Yuval Tamir
Associate Professor, Ph.D.
(UC Berkeley 1985)

Computer systems, parallel and distributed systems, software systems, computer architecture, dependable systems, virtualization, cluster computing, multicore architectures, interconnection networks and switches, transactional memory.

Computational Systems Biology

An integrative approach to understanding biological systems, with research areas that span systems biology, bioinformatics, genomics, computational biology, and biomedical engineering.

Joseph DiStefano III
Distinguished Professor, Ph.D.
(UC Los Angeles 1966)
(Also Prof. of Medicine and
Biomedical Engineering)

Integrative, data-driven systems biology. Multi-level dynamic biosystems modeling. Focus on disease (cancer, HCV, diabetes, neuroendocrine) process dynamics and optimal therapies. Internet-based intelligent software for life sciences research.

Boris Kogan
Adjunct Professor, Ph.D.
(Moscow Institute of Automation
and Telemechanics 1945)

Mathematical modeling and computer simulation of engineering and biological dynamic systems (particularly cardiac electrophysiology and processes) using parallel super computers.

Eleazar Eskin
Associate Professor, Ph.D.
(Columbia 2002)

Computational biology and bioinformatics, and specifically, analysis of human variation and its relation to complex disease.

D. Stott Parker
Professor, Ph.D.
(UI at Urbana Champaign 1978)

Knowledge-based modeling and databases, stream processing, logic programming, rewriting, and systems for constraint processing.

Christopher Lee
Professor, Ph.D.
(Stanford 1993)

Information metrics for statistical inference, bioinformatics analysis of high throughput genomics data, graph databases for bioinformatics and genomics, scalability principles of scientific data sharing, integration and mining. (Joint appointment with Chemistry and Biochemistry Departments)

Zhuowen Tu
Assistant Professor, Ph.D.
(Ohio State Univ. 2002)

Statistical modeling/computing, computational biology, machine learning, and brain imaging. (Joint appointment with Department of Neurology)

Graphics & Vision

The synthesis and analysis of images by computer. Graphics—rendering, motion capture, and geometric, physics-based and artificial life modeling/animation for the movie and game industries. Vision—texture, shape, motion and illumination, 3D reconstruction from images, object recognition, real-time vision/control for autonomous vehicles, visual sensor networks and surveillance, and medical image analysis.

Petros Faloutsos
Assistant Professor, Ph.D.
(Univ. of Toronto, Canada 2002)

Computer graphics, physics-based animation, robotics, and biomechanics.

Demetri Terzopoulos
Chancellor's Professor, Ph.D.
(MIT 1984)

Computer graphics, computer vision, medical image analysis, computer-aided design, artificial intelligence/life.

Stanley Osher
Professor, Ph.D.
(New York Univ. 1966)

Image science, scientific computing, level set methods. (Joint appointment with Mathematics Department)

Alan Yuille
Professor, Ph.D.
(Cambridge 1976)

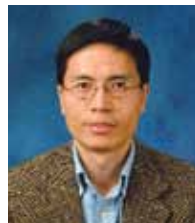Computer vision, Bayesian statistics, and pattern recognition. (Joint appointment with Statistics and Psychology Deaprtments)

Stefano Soatto
Professor, Ph.D.
(Caltech 1996)

Computer vision, non-linear estimation, control theory.

Song-Chun Zhu
Professor, Ph.D.
(Harvard 1996)

Computer vision, statistical modeling and computing, machine learning. (Joint appointment with Department of Statistics)

Information & Data Management

The development of models, techniques and tools to improve the functionality, performance, and usability of database management and Web systems that provide enabling technology for our information society—including Web search engines, digital libraries, data mining, distributed databases, data stream management systems, and information systems for medicine and science.

Alfonso Cárdenas
Professor, Ph.D.
*(UC Los Angeles 1969)*

Database management, distributed heterogeneous and multimedia (text, image/picture, voice) systems, information systems planning and development methodologies, medical informatics, legal and intellectual property issues, and software engineering.

Richard Muntz
Professor, Ph.D.
(Princeton 1969)

Distributed and parallel database systems, temporal data models and query processing, knowledge discovery in database systems, and computer performance evaluation.
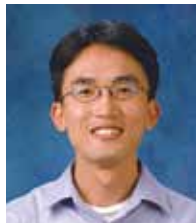
Junghoo (John) Cho
Associate Professor, Ph.D.
(Stanford 2002)

Internet search engines, database systems, information management systems, and digital libraries. Development of new algorithms and techniques to manage large-scale data on the Internet.

Carlo Zaniolo
Professor, Ph.D.
(UC Los Angeles 1976)

Knowledge-based systems, database systems, non-monotonic reasoning, spatio/temporal reasoning, and scientific databases.

Wesley Chu
Distinguished Professor Emeritus, Ph.D. (Stanford 1966)

Distributed processing and distributed database systems, and intelligent information systems.

Photo: UCLA Photography

Aerial view of campus

Network Systems

The study and design of distributed and often mobile systems—including computers, vehicles, people, and sensors interconnected by a communications network—and also the applications that run on these systems and protocols that make the various network components work together and perform well; and to optimize performance, a study of the wired or wireless network itself.

Deborah Estrin
Professor, Ph.D.
(MIT 1985)

Wireless sensing systems, Internet architecture and protocols, with particular applications to environmental sensing applications.

Peter Reiher
Adjunct Professor, Ph.D.
(UC Los Angeles 1987)

Network security, operating system security, distributed systems, and file systems.

Mario Gerla
Professor, Ph.D.
(UC Los Angeles 1973)

Performance evaluation, design and control of distributed computer communication systems, and high-speed computer networks (B-ISDN and optical).

M. Y. "Medy" Sanadidi
Adjunct Professor, Ph.D.
(UC Los Angeles 1982)

Congestion control and adaptive multimedia streaming in heterogeneous networks; analytic modeling of computer and communications systems.

Leonard Kleinrock
Distinguished Professor Emeritus,
Ph.D. (MIT 1963)

Queueing theory, networking (including packet switching, packet radio, local area (LAN), broadband, and peer-to-peer), nomadic computing and intelligent agents.

Mani B. Srivastava
Professor, Ph.D.
(UC Berkeley 1992)

Low-power and energy-aware embedded systems, wireless sensor and actuator networks, mobile and wireless computing and networking, pervasive computing. (Joint appointment with Electrical Engineering Department)

Songwu Lu
Associate Professor, Ph.D.
(UI at Urbana Champaign 1999)

Wireless networking, mobile computing, network security, sensor networks, network middleware.

Lixia Zhang
Professor, Ph.D.
(MIT 1989)

Internet architecture, principles in network protocol designs, security and resiliency in global scale systems.

Software Systems

A broad array of ongoing research that spans the entire spectrum of software systems—including programming language design and implementation, software engineering, operating systems, and embedded systems.

Rajive Bagrodia
Emeritus Professor, Ph.D.
(Univ. Texas, Austin 1987)

Wireless networks, mobile computing and communications, network simulation and analysis, parallel and distributed computing.

Rupak Majumdar
Associate Professor, Ph.D.
(UC Berkeley 2003)

Formal verification and control of reactive, real-time, hybrid, and probabilistic systems; software verification and programming languages; game theoretic problems in verification; logic and automata theory.

Paul Eggert
SOE Lecturer, Ph.D.
(UC Los Angeles 1980)

Software design and engineering, programming language design and implementation, and software internationalization.

Carey Nachenberg
Adjunct Assistant Professor, M.S.
(UC Los Angeles 1995)

Anti-virus and intrusion detection technology. Automatic identification of new/unknown malicious software.

Alan Kay
Adjunct Professor, Ph.D.
(Univ. of Utah 1969)

Object-oriented programming, personal computing, graphical user interfaces.

Peter S. Pao
Adjunct Professor, Ph.D.
(Univ. of Michigan 1975)

System engineering, knowledge management and technology networking. (Joint appointment with Anderson School of Management)

Eddie Kohler
Associate Professor, Ph.D.
(MIT 2001)

Operating systems, software architecture, network measurement, network protocol design, and programming language techniques for improving systems software.

Jens Palsberg
Professor, Ph.D.
(Univ. of Aarhus, Denmark 1992)

Compilers, embedded systems, programming languages, software engineering, and information security.

Todd Millstein
Associate Professor, Ph.D.
(Univ. Washington 2003)

Programming languages and language design, compilation, software model checking, formal methods, and database systems.

David Smallberg
SOE Lecturer, M.S.
(UC Los Angeles 1978)

Computer science education, programming languages, generic programming, student software analysis.

Computer Science Theory

The use of simple and concise mathematical models to investigate computational questions and issues—including research in centralized, parallel and distributed models of computation; optimal, approximate and randomized online algorithms; complexity, cryptography, games, auctions and mechanism design theory.

Eliezer Gafni
Professor, Ph.D.
(MIT 1982)

Distributed algorithms, mathematical programming with application to distributed routing and control of data networks, and computer science theory.

Rafail Ostrovsky
Professor, Ph.D.
(MIT 1992)

All aspects of theory of computation, especially cryptography and security, distributed algorithms, high-dimensional search, and routing and flow control in communication networks.

Sheila Greibach
Professor, Ph.D.
(Harvard 1963)

Algorithms and computational complexity, complex program schemes and semantics, formal languages and automata theory and computability.

Amit Sahai
Associate Professor, Ph.D.
(MIT 2000)

Theoretical computer science, primarily foundations of cryptography and computer security.

Adam Meyerson
Assistant Professor, Ph.D.
(Stanford 2002)

Approximation algorithms, randomized algorithms, online algorithms, theoretical problems in networks and databases.

Emeriti Faculty

Algirdas Avizienis	Wesley Chu	Allen Klinger	Judea Pearl
Rajive Bagrodia	Gerald Estrin	Leon Levine	David Rennels
Bertram Bussell	Thelma Estrin	Lawrence McNamee	Jacques Vidal
Jack Carlyle	Leonard Kleinrock	Michel Melkanoff	

Government Contracts and Grants

AGENCY	TITLE	FACULTY
UC Discovery Grant	Electron Manufacturing & New Material: Hardware Acceleration Electronic Design and Manufacturing	Jason Cong
UC Discovery Grant	Seamless Content Delivery: Modeling, Design and Implementation of P2P IPTV	Mario Gerla
UC Micro	Microelectronics Innovation & Computer Research: Synthesis & Optimization for Application-Specific Computing	Jason Cong
National Science Foundation	Certification of Medical Device Software	Jens Palsberg/ Majid Sarrafzadeh
National Science Foundation	Data Tethers: Preventing Sensitive Data from Loss and Theft	Peter Reiher
National Science Foundation	An In-Depth Study of Homomorphic Encryption in Cryptography	Rafail Ostrovsky/ Amit Sahai
National Science Foundation	NECO: A Proposal To Fund Student Travel Grants to Attend MOBICOM 2008	Giovanni Pau
National Science Foundation	The Health Guardian: A Gateway to Network Wellness	Mario Gerla/ Majid Sarrafzadeh
National Science Foundation	NSF Workshop: Electronic Design Automation — Past, Present, and Future	Jason Cong
National Science Foundation	Synthesis and Mapping for Application-Specific Processor Networks	Jason Cong
National Institute of Health	NIDA QUIT Program for Patient Guidance	Majid Sarrafzadeh
NIH/Nat'l Library of Medicine	Medical Informatics	Majid Sarrafzadeh
NIH/Perlegen Science Inc.	DNA Variation Detection in Multiple Mouse Strains	Eleazar Eskin
DoD/Advanced Research Projects Agency	Computer Science Study Group Phase II	Todd Millstein
U.S. Army Research Office	The Campus Vehicular Testbed: Validating Propagation, Mobility, and Dissemination Models	Mario Gerla
Office of Naval Research	Computational Foundations for Fusing Observations and Interpretations	Judea Pearl
ONR-MURI/Caltech	Learning to Recognize for Visual Surveillance	Stefano Soatto
NASA/Jet Population Lab	Verifiable Transient Fault Tolerance for High-Performance On-Board Computing Systems	Yuval Tamir
NASA/Univ. Space Research	ISWHM: Tools and Techniques for Software and System Health Management	Adnan Darwiche

Industry Contracts and Grants

AGENCY	TITLE	FACULTY
Mentor Graphics Corporation	Hardware Acceleration Electronic Design and Manufacturing	Jason Cong
NVIDIA Corporation	Hardware Acceleration Electronic Design and Manufacturing	Jason Cong
Semiconductor Research Corporation	Network-On-Chip Design: RF Interconnects for Future Chip Multiprocessors	Glenn D. Reinman
Semiconductor Research Corporation	Power-Efficient High-Level Synthesis	Jason Cong
STMicroelectronics	Seamless Content Delivery: Modeling, Design and Implementation of P2P IPTV	Mario Gerla
Altera Corporation	Synthesis and Optimization for Applications-Specific Computing	Jason Cong
Magma Design Automation	Synthesis and Optimization for Applications-Specific Computing	Jason Cong
IBM Corporation	Titans: Team for International Technology Alliance in Network Centric Systems	Mario Gerla/ Lixia Zhang
Bruin Biometrics	Biometric Techniques	Majid Sarrafzadeh
Bruin Biometrics	Biometric Devices and Systems	Majid Sarrafzadeh
Lockheed Martin	Information Assurance and Operations Resilient Against Insider Attacks: From Theory to Practice	Rafail Ostrovsky
Qualcomm	Engineering Pipeline for Wireless Health	Majid Sarrafzadeh
Intel	Research and Education in Wireless Health	Majid Sarrafzadeh
Alfred P. Sloan Foundation	Sloan Foundation Research Fellowship	Eleazar Eskin
IBM Corporation	2008 IBM Faculty Award	Todd Millstein
Okawa Foundation	Research Support	Eleazar Eskin
Utopia Compression	Research Support	Mario Gerla
Microsoft	Research Support	Todd Millstein
Toyota	Gift: Recognizing Past Acomplishments & Contributions to Future Discoveries	Mario Gerla
Toyota	Supporting Mobility in Global Scale: Connecting Automobiles to Infrastructure	Lixia Zhang

Graduate Student Life

UCLA is situated in Westwood—one of the nicest areas of Los Angeles. Boelter Hall (which houses the Computer Science Department) is conveniently located near Ackerman Student Union and the John Wooden Fitness Center in the heart of UCLA's beautiful campus. Most students live in Westwood Village, which is a mile radius around UCLA, either in student housing or apartment buildings. Westwood Village sports many shops, restaurants, bars, theaters, and a bustling nightlife. Some students live in nearby communities such as Culver City or Santa Monica, and others commute from other areas of Los Angeles or beyond. Public transportation and ample parking on campus provide many options for getting to and from school. Finally, UCLA is just six miles from the ocean, so if you need a temporary change of scenery, you can easily catch a bus to the beach and watch the waves roll in.

Graduate students at UCLA have easy access to a friendly, cooperative, vibrant community in the Computer Science Department, the Henry Samueli School of Engineering and Applied Science, and in the greater UCLA community. The student-run Computer Science

Graduate Student Committee (CSGSC) organizes regular events within the department, including a popular weekly "Tea Time" with an ever-changing menu of gourmet food and informal conversation. There are also many active student groups, including professional organizations such as the ACM and IEEE, and student-life groups like intramural sports, hobby and special interest groups, social service, religious organizations, etc.

There are many funding opportunities for graduate students at UCLA. Ph.D. students typically receive funding through their advisors or the department, often in teaching assistant or graduate student research positions. These positions include a salary, healthcare, and tuition remission. Students are encouraged to build relationships with faculty before coming to UCLA, but it's very common to find a project and advisor once a student has arrived and settled in. Our open, approachable faculty and our close-knit and cooperative student body will help students find a place that is a good fit for their interests and abilities.

The UCLA computer science community provides a great resource for graduate students. Because of the community's academic and industrial affiliations, the relationships formed here promote opportunities for internships, postdoctoral research, professorships, and jobs at some of the most exciting technology companies.

Graduate students Peter Peterson, Kirill Minkovich, Michael Shindler and Alexander Shkapsky

Photo: Ran Gelles

Annual fall picnic

Undergraduate Student Life

Each year, the Computer Science Department enrolls over 500 new undergraduates. While computer science has a strong academic foundation, there are also opportunities for undergraduates to interact with the department in unique ways to balance their academic quest. Student members of the ACM (Association for Computing Machinery) explore their interests on campus and work on projects related to their pursuits. These students conduct info-sessions and are considering tutoring sessions for fellow undergrads this year. UPE (Upsilon Pi Epsilon) is the international honor society for the computing and information disciplines. The UCLA chapter provides information on company internships and offers opportunities for graduate school workshops—and even an environment in which to unwind after midterms and finals.

Additionally, the Digital Design Project Laboratory (CS152B) is an opportunity for students to design digital systems for real-world applications. Students must first arrive at an idea for a real application, then design, build, debug, demonstrate and report on the system. While this course is orchestrated to provide valuable experience for future careers, it covers a broad range of materials and is very challenging. The course begins with a few lectures and tutorials covering state-of-the-art CAD tools and programmable devices, and after some preliminary project assignments, students will propose their own final project topics, which are usually defined around image and video processing principles. Remote Medical Observer, Computerized Music Teacher, and iChess are examples of recently completed projects.

Photo: Cassandra Franklin

Open house for undergraduate students

The Center for Embedded Networked Sensing (CENS) has a proven approach for engaging undergraduates in hands-on research experiences, with a focus on increasing the number of women and underrepresented students in science and engineering. The CENS SRC URO Scholars Program involves UCLA undergraduates in information technology research during the academic year. These research programs provide undergraduates with a first-hand experience of "life as a graduate student" and are grounded in real-world problems in science and society. In February 2009, *Wired* magazine recognized the CENS summer residential research program as one of "10 Awesome Summer Internships for Science Students."

Laurie Leyden, Undergrad Student Affairs Officer
Alireza Vahdatpour, CS Ph.D student
Karen Kim, CENS Education Director

UNDERGRADUATE EDUCATION OBJECTIVES

The Computer Science Department offers a bachelor of science degree in both computer science (CS) and computer science and engineering (CS&E). The key difference between the CS and CS&E degrees is that the latter is designed to accommodate those students who desire a strong foundation in computer science, but who also have a strong interest in computer system hardware. Both majors are approved by the Accreditation Board for Engineering and Technology (ABET).

The educational objectives, both for the computer science and the computer science and engineering majors, are nearly identical:

- For CS — make valuable contributions to design, development, and production in the practice of computer science and related engineering or application areas, particularly in software systems and algorithmic methods.
- For CS&E — make valuable contributions to design, development and production in the practice of computer science and computer engineering in related engineering areas or application areas, and at the interface of computers and physical systems.
- Demonstrate strong communication skills and the ability to function effectively as part of a team.
- Demonstrate a sense of societal and ethical responsibility in all professional endeavors.
- Engage in professional development or post-graduate education to pursue flexible career paths amid future technological changes.

Members of the Undergraduate Program Advisory Board for Engineering and Technology are comprised of representatives from industry, academia, alumni and our student body. The board meets twice a year to review the computer science program and refine the department's goals.

Board Members

Leon Alkalai
JPL & UCLA CS Dept

Joseph Bannister
USC, ISI

Peter Blankenship
Northrop Grumman

Doug Caldwell
Boeing

Jon Canon
Microsoft MSN Direct

Jason Cong
UCLA CS Dept

Paul Eggert
UCLA CS Dept

Michael Erlinger
Harvey Mudd College

Beayna Grigorian
UCLA CS Undergraduate

Ryan Kastner
UCSB

Pekka Kostamma
Teradata

Sky Lin
UCLA CS Undergrduate

Richard Muntz
UCLA CS Dept

Ross Stewart Niebergall
Raytheon

Nima Nikzad
UCLA CS Undergraduate

Joseph Ou-Yang
IBM

David Rennels
UCLA CS Dept

John Rosati
Cleo Consulting Partners

Mike Sievers
Time Logic, Inc.

David Smallberg
UCLA CS Dept

Mike Todd
Google

Ben Zaman
Yahoo!

DOCTORAL STUDENT PLACEMENT

STUDENT NAME	ACADEMIA/INDUSTRY	TITLE	ADVISOR
James Edmond Clune, III	Jane Street Capital	Quantitative Researcher	Richard Korf
David Cummings	Kelly Computing, Inc.	Executive Vice President	David Rennels
Foad Dabiri	NetSeer Inc	Senior Engineer/Scientist	Majid Sarrafzadeh
Petros Efstathopoulos	Symantec Research Labs	Principal Software Engineer	Eddie Kohler
Jeffrey Fischer	Self-Employed	Independent Consultant/ Entrepreneur	Rupak Majumdar
Jared Fox	Center for Disease Control	Computer Scientist	Stott Parker
Eagle Jones	McKinsey & Company	Associate	Stefano Soatto
Adam Kaplan	UCLA Extension / Perceptive Development	Instructor Programmer	Glenn Reinman
Sung Hee Lee	Honda Research Institute	Postdoctoral Researcher	Demetri Terzopoulos
Uichin Lee	Bell Labs, Alcatel-Lucent	Research Staff Member	Mario Gerla
Insong Lin	SOA Software	Senior Software Architect	Rajive Bagrodia
Nikitas Liogkas	Knight Capital Group	Financial Software Engineer	Eddie Kohler
Tammara Massey	Applied Physics Lab, Johns Hopkins University	Senior Systems Engineer	Majid Sarrafzadeh
Hyun Jin Moon	NEC Labs America, Data Management Group	Research Staff Member	Carlo Zaniolo
Nam Tuan Nguyen	University of Science (Vietnam)	Professor	Peter Reiher
Soon Young Oh	Network Research Lab, UCLA	Post-Doctoral Researcher	Mario Gerla
Ricardo Oliveira	Internet Research Lab, UCLA	Post-Doctoral Researcher	Lixia Zhang
Raymond Pon	Microsoft, Bing Search	Research Software Development Engineer	Alfonso Cardenas
Fernando Quintao Pereira	Federal University of Minas Gerais (Brazil)	Assistant Professor	Jens Palsberg
Venkatraman Ramakrishna	Microsoft	Software Development Engineer	Peter Reiher
Ka Cheung Sia	Microsoft (Bing Division)	Software Development Engineer	Junghoo Cho
Hetal Thakkar	Oracle Corp.	Software Developer	Carlo Zaniolo
Alessandro Warth	Viewpoints Research Institute	Computer Scientist	Todd Millstein

DEPARTMENTAL DIVERSITY PROGRAM

The Computer Science Department and its faculty members strive for diversity within the department's student population. We do this by engaging in a number of outreach activities in order to attract a greater number of women and members of underrepresented groups to our undergraduate and graduate programs, and by further providing excellent opportunities once these students join the department. Some of these diversity activities are described below.

- We are working with the Graduate School of Education & Information Studies and the Los Angeles Unified School District (LAUSD) to increase the number of women and underrepresented students in computer science. For example, as part of a program sponsored by the AP Computer Science Institute, LAUSD teachers have participated in weeklong exchanges with UCLA professors and researchers to find ways to more actively engage young people, (especially woman and minorities) in pursuit of an education in computer science.

- Faculty members Alfonso Cardenas and David Smallberg co-lead in collaboration with the School's Center for Early Education and Development (CEED) on the NSF-funded program FOCUS (Frontier Opportunities in Computing for Underrepresented Students). FOCUS encourages and fosters current and potential community college transfer students to pursue computer science through summer courses, bridge programs, school-year seminars, and support programs. (*http://goliath.cs.ucla.edu/focus/index.html*)

- We have supported a number of women and underrepresented graduate students under the DOE-sponsored GAANN fellowship program and the National GEM Consortium. Additionally, we have set aside funding to support selected undergraduate and graduate students to attend the annual Grace Hopper Women in Computing conference.

- Several of the department's "Centers" have received funding for programs and partnerships that focus on increasing diversity in the field of computer science. One of those centers, the Center for Embedded Networked Sensing (CENS), has a large women and minority educational component that includes undergraduate and graduate research programs and recruitment efforts, grants from NSF for "Gender Diversity in Science, Technology, Engineering, and Mathematics," and the "Women@CENS," an educational grant.

Photo: Matthew Chin

UCLA's diversity programs attract pre-college students

ALUMNI ADVISORY BOARD

MISSION STATEMENT: To promote the communication, growth, and shared activities of the UCLA Computer Science Department alumni, faculty and students.

The Board has represented several generations of the department's alumni since its inception in the fall of 1969. Composed of leaders in education and industry, it also reflects the major fields of computer science.

The Board meets on a quarterly basis and, in keeping with its mission, is involved in a number of activities—including the department's Annual Research Review, the career panel and job interview workshop for graduating students, the Rose Bowl pre-game tailgate party for UCLA's homecoming football game, and other activities that are posted on the department's alumni website (*http://www.cs.ucla.edu/csd/people/alumni*).

Alumni Advisory Board Members

Alfonso Cardenas (Faculty Chair)
Professor, UCLA Computer Science Department

Milos Ercegovac
Professor, UCLA Computer Science Department

Mike Erlinger
Professor & Chair Computer Science,
Harvey Mudd College

Braulio Estrada
Analyst, Accenture

William Goodin
Manager, Short Course Program, UCLA Extension

Nader Karimi
(No current affiliation)

Anil Kripalani
President, WirefreeCom

Andrew Louie (Alumni Chair)
VP of Information Technology, Iris International

Carey Nachenberg
Fellow and Vice President, Symantec Corporation
Adjunct Assistant Prof., UCLA Computer Science
Department

Frank Pearce
Executive Vice President Product Development
Blizzard Entertainment, Inc.

Maria H. (Lolo) Penedo
NGMS Technical Fellow, Northrop Grumman Corp.

Ric Pozo
VP and General Manager, L3 Communications

John Rosati
Founder and Managing Director, THR Associates

David Smallberg
Lecturer, UCLA Computer Science Department

James Winchester
Owner, Avionic Products, Inc.

Behzad Zamanzadeh (Alumni Vice-Chair)
VP of Engineering, LeadPoint Inc.

Jon Postel Distinguished Lecturer Series

The Jon Postel Distinguished Lecturer Series is dedicated to the memory of Dr. Jon Postel—an alumnus of UCLA's Computer Science Department, a quiet and gentle man, a brilliant and dedicated scientist who made many key contributions to the formative days of the ARPANET. Each year the Computer Science Department hosts a series of lectures by world renowned scientists in academia and industry, covering a broad range of topics that are timely and relevant to today's high-technology world.

2009 to 2010 Lecturers

Donald Jones
Qualcomm/West Wireless Health Institute
Every Body on the Net
November 5, 2009

Katherine Yelick
NERSC/LBNL and UC Berkeley
Programming Models for Petascale to Exascale
December 3, 2009

Norman Jouppi
HP Labs
System Implications of Integrated Photonics
January 7, 2010

Geoffrey Hinton
University of Toronto
Recent Developments in Deep Belief Nets
March 4, 2010

Harry Shum*
Microsoft Corporation
Bing: Knowledge, Intent and Decision Engine
April 22, 2010

*Normal E. Friedmann Distinguished Lecture

Annual Technology Forum

Each spring, the Computer Science Department participates in the Annual Technical Forum—an event sponsored by the Henry Samueli School of Engineering and Applied Science that showcases the research results from all seven of the departments within the engineering school.

In addition to the many technical presentations and panel discussions by faculty and distinguished guests, a significant portion of each year's review is devoted to a very large and successful poster session that attracts many enthusiastic visitors. Here, our emerging Ph.D. students have an opportunity to describe their research results to faculty and classmates, as well as to industrial guests who are often scouting for talented researchers who desire careers in industry. *(http://www.engineer.ucla.edu/techforum)*

Industrial Affiliate Program

The Computer Science Department is committed to maintaining strong ties to industry, collaborating on state-of-the-art research, and engaging in a mutually beneficial exchange of information regarding advances in technology. The department's Industrial Affiliate Program facilitates these goals, while also providing many benefits to its Affiliates through memberships.

Basic Membership Benefits

- A faculty member assigned to serve as a liaison for the program (through mutual agreement between the Affiliate member and the department).

- Customized assistance to member recruiting needs, including graduate student listings and resumes, on-site job interviews, and one technical talk per year at our seminar series to highlight the member's research and technology.

- Interaction with faculty members in areas of interest to facilitate research collaboration, summer internships, and consulting.

- Invitation to the Annual Research Review (with up to five free admissions), a venue where students and faculty showcase current research and exchange ideas with Affiliate members.

- Invitation to the department's John Postel Distinguished Lecture series.

- Access to in-house research reports and technical publications, as available and on request.

Gold Membership Benefits

- All of the benefits provided under the Basic membership.

- Close ties with a specified research laboratory or research center, including frequent visits to facilitate exchange of technology, research results, etc.

- Departmental visitor status for up to 12 months for one representative from the member company, to include office space and full access to computer facilities, libraries, classes and lectures.

- Position on the department's Advisory Board, providing valuable input and receiving feedback.

- Participation in the undergraduate senior-year project program, in which member companies propose projects for teams of three to four students (under supervision of faculty advisor).

Our Thanks to Affiliate Members for Their Support

Amgen

Nokia

Blizzard Entertainment

Northrop Grumman MS-DSD

Cisco Systems

Northrop Grumman MS-ISR

Google

Sun Microsystems Labs, Inc.

Lockheed Martin

Symantec

Mauro Sentinelli

Teradata Corporation

Mentor Graphics

Yahoo!

Mitsubishi Heavy Industries

Qualcomm

40th Anniversary of the Internet

Forty years ago, on October 29, 1969, a team led by UCLA Professor Leonard Kleinrock sent the first message over the Internet (then the ARPANET). This event revolutionized communication, education, business and entertainment, and led to dramatic changes in our social, political and economic lives.

This year, UCLA and the Henry Samueli School of Engineering and Applied Sciences hosted the 40th anniversary of the Internet. This event not only commemorated those 40 years, it offered valuable insights from Internet leaders, activists, and analysts on the opportunities and pitfalls that lie ahead. Our list of speakers was impressive:

John Perry Barlow
Electronic Frontier Foundation

Mark Bregman
Symantic

Gary Bridge
Cisco

Vijay Dhir
UCLA

Regina Dugan
DARPA

Chris Dominguez
Getback.com

Thomas Gewecke
Warner Bros.

Josh Green
Mohr Davidow Ventures

Arianna Huffington
The Huntington Post

Kevin Kimberlin
Spencer Trask & Co.

Leonard Kleinrock
UCLA

Sam Lessin
drop.io

Sol Lipman
12seconds.tv

Isaac Mao
Social Brain Foundation

Mike Morhaime
Blizzard Entertainment

Nicholas Negroponte
One Laptop Per Child

Frank Pearce
Blizzard Entertainment

Shiva Shivakumar
Google

John Taylor
Duran Duran

John Vig
IEEE

Scott Waugh
UCLA

Leonard Kleinrock and the Interface Message Processor (the machine that sent the first message over the Internet)