

# NEWS

FALL 2001

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## National Academy of Engineering elects Shankar Sastry and Albert Pisano

Five Berkeley professors were elected to the National Academy of Engineering (NAE), the highest professional honor for an American engineer. Two of those honored, Shankar Sastry, and Albert Pisano, are in EECS: Sastry is an EE professor and chair of the EECS Department, and Pisano, jointly a member of the Mechanical Engineering Department and EECS, is director of EECS' Electronics Research Laboratory.

Sastry was elected to the NAE "for pioneering contributions to the design of hybrid and embedded systems." His most recent research includes embedded software and open source software for

computational biology. Past research interests include millirobotics for minimally invasive surgery; automated high-way systems; nonholonomic motion planning for robots; adaptation and learning in biological and artificial systems; control of hybrid systems; air traffic management systems; and software enabled control.

Pisano, who is also FANUC Chair of Mechanical Systems in ME, was elected to the academy "for contributions to the design, fabrication, commercialization, and educational aspects of microelectromechanical systems (MEMS)." His research interests include

*continued on next page*

## CITRIS budget approved

A celebration was held in the Wozniak Lounge of Soda Hall, home to CS, on July 27 to celebrate the signing of the CITRIS budget.

Kari Dohn, policy director and senior advisor to the governor, thanked Rich Newton, the College of Engineering dean and EECS Roy W. Carlson Professor of Engineering for his advocacy for CITRIS. Dohn said, "The Governor is very excited about



*Ruzena Bajcsy  
Executive Director, CITRIS*

this project, and I can tell you personally your calls and letters to the governor REALLY made a difference in a tough budget year. He heard your voices, and appreciates your commitment to CITRIS."

Governor Davis signed the FY 2002 budget with a provision of \$20M for the first year of CITRIS and \$100M commitment for the overall CITRIS project, as

*continued on page 3*

# Dawn Tilbury, EECS doctoral graduate, wins Eckman award

The first woman to win the Eckman Award, Dawn Tilbury, an associate professor at the Mechanical Engineering Department at the University of Michigan, is a graduate of EECS. She did her graduate work in the Intelligent Machines and Robotics Laboratory here.

Tilbury has been selected to receive the award from the American Automatic Control Council (AACC), and was presented her award at the American Control Conference in Washington, DC in June. The award is the top recognition in the country given to a control engineer under 35

years of age. The AACC represents all US professional societies (i.e., ASME, IEEE, AChE, AIAA, etc.) in the field of control engineering.

The Donald P. Eckman Award is given for outstanding accomplishments by

a young engineer in the field of automatic control. It was established in memory of Donald P. Eckman, who made important contributions to control theory and practice in the 1950's and 1960's but who died tragically in an automobile accident in 1962. Nominees must be younger than 35 years at the time of the award. The Eckman Award often is given for key contributions to a single field of research, based on the discovery of a new phenomenon or design method or scientific principle.



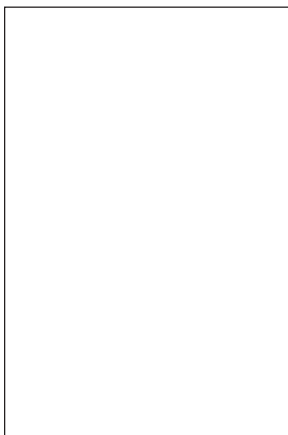
Dawn Tilbury

Tilbury, who was on sabbatical at IBM in NY this summer, is now in Milan, Italy until next summer. She is involved in writing a book on the application of control theory to computer systems. ♦

# Ken Goldberg wins IEEE innovation award

Ken Goldberg, associate professor of Industrial Engineering and Operations Research (IEOR), and Electrical Engineering and Computer Science (EECS), has won the IEEE Major Educational Innovation Award, which "recognizes IEEE members who have distinguished themselves for outstanding innovation in an educational field appropriate to the mission of the IEEE."

Goldberg's interests are in robotics and industrial automation. The citation for his



Ken Goldberg

honor reads, "for his pioneering work on Internet Robotics and the influence that this has had on the education in robotics and advanced technologies at large."

Goldberg went to the University of Pennsylvania for undergraduate work, and received his PhD from the School of Computer Science at Carnegie Mellon. He taught CS at the University of Southern California until 1995, before moving to UC Berkeley. ♦

# NAE elects Sastry and Pisano...

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MEMS for micropower generation, MEMS for drug reconstitution and delivery, MEMS for RF components, MEMS sensors embedded in metal structures, MEMS inertial instruments, and MEMS actuators for disk drives.

With the five newly elected members, Berkeley has a total of 85 NAE members out of a US membership of 2,061 and an additional 154 foreign associates.



Shankar Sastry

Other winners are George H.

Brimhall, professor of earth and planetary science and of materials science and engineering, and director, Earth Resources Center, "for contributions to the advancement of geological modeling and ore deposit exploration"; David Jenkins, profes-



Albert Pisano

sor emeritus of civil and environmental engineering, recognized "for theoretical and practical contributions to improving water quality worldwide through applied research on biological wastewater treatment processes";

Robert O. Ritchie, professor of materials science and engineering, and head, structural materials department, materials science division, Lawrence Berkeley National Laboratory, recognized "for contributions to the understanding of fatigue fracture and the failure of engineering structures." ♦

# Christos H. Papadimitriou wins honor in Greece

At STOCS 2001 in Crete this year, the Greek Information Technology Society and the Greek Computer Science Society bestowed upon Christos Papadimitriou, CS professor and associate chair of CS, a special award for being the most eminent Greek computer scientist in the world today.

This very special award is given on an ad-hoc rather than an annual basis. The award was given on July 9 in Heraklion, Crete.

Papadimitriou received his BA in EE at Athens Polytechnic in 1972, and his MS and PhD at Princeton (MS in EE, 1974, PhD in EECS, 1976). Before coming to Berkeley in 1996, he taught at Harvard, MIT, Athens Polytechnic, Stanford, and UC San Diego. He was also at Berkeley in 1978 as a Miller Fellow.

The Thirty-Third Annual ACM Symposium on Theory of Computing (STOC), sponsored by SIGACT (the ACM Special Interest Group on Algorithms and Computation Theory), was held in Crete, Greece,

July 6-8, 2001, collocated with ICALP 2001 (July 8-12) and SPAA 2001 (July 4-6). STOC 01 was organized by the Computer Technology Institute (CTI).

Christos Papadimitriou was a keynote speaker. His award lecture was titled, "Algorithms, Games, and the Internet."

Other members of the EECS faculty who attended and spoke were Luca Trevisan and Umesh Vazirani.

Among the extensive work Papadimitriou has done are his books, including a novel entitled *Turing* (published recently in Greek as *Turing's Smile*).

Books he has written in his field include: *Elements of the Theory of Computation* (with Harry Lewis, second edition September 1997); *Combinatorial Optimization: Algorithms and Complexity* (with Ken Steiglitz, second edition by Dover, 1998); *The Theory of Database Concurrency Control* (1988); and *Computational Complexity* (1994). ♦



Christos Papadimitriou

# CITRIS...

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originally budgeted.

The Center for Information Technology Research in the Interest of Society (CITRIS) will create information technology to tackle society's most critical needs. CITRIS research will focus initially on the areas of energy efficiency, transportation, seismic safety, education, health care, and environmental monitoring. Check out the website: [www.citris.berkeley.edu](http://www.citris.berkeley.edu).

Newton said, "We must now move quickly to demonstrate how the College of Engineering at Berkeley, along with our colleagues throughout the campus and at UCSC, UC Davis, and UC Merced, working closely with industry and government, can really deliver on the promises we have made—to use information technology to help improve the quality of people's lives throughout California, the nation, and the world."

"We have never seen a single opportunity like this in the history of the College. This is truly about 're-engineering engineering,' and it is now up to our faculty and students, working shoulder-to-shoulder with our industrial partners and supporters, to truly make this vision a reality." ♦

# TSMC Appoints Chenming Hu Chief Technology Officer

TSMC announced that Professor Chenming Hu will be their CTO. He has taken leave from Berkeley this year to fill this position in Hsin-chu, Taiwan. Hu will continue to be involved in graduate student supervision and plans to come back frequently.

EECS chair Shankar Sastry said, "Chenming has been a devoted professor and an active participant in the affairs of the department, including most recently co-chair of the recruiting committee for two years. We wish Chenming a lot of success in this new position and look forward to his return to our faculty with a great deal of new ideas and experiences to share with us."

Hu was appointed the first CTO in TSMC's history, effective June 1. He is

responsible for formulating TSMC technology strategy, including system-on-chip development, and will also develop advanced technology.

Hu was appointed as the first TSMC Distinguished Professor of Electrical Engineering and Computer Sciences here in 2000. The TSMC Distinguished Professorship was endowed by TSMC with the goal of recognizing excellence in teaching and research in the field of microelectronics. Before 2000, Hu held the Chancellor's Professor Chair here.

Hu has held many distinguished positions and holds many honors. Hu's accomplishments in the field of semiconductors are widely recognized. He is a member of the US National Academy of Engineering,

a Fellow of IEEE, and a Life Honorary Professor of the Chinese Academy of Science. Among the many awards he has received is the IEEE Jack Morton Award for solid state devices and technology. In the past few years he has led the development of advanced technologies that set world records in transistor size and performance and the first international standard transistor model for IC design. His publications include five books and over 700 research articles. He has been granted fifteen patents.

In addition to his extraordinary work in the field of EECS, Hu is also an accomplished painter. ♦

# Thomas Kalil takes post at UC Berkeley

One of former President Clinton's key technology advisors, Thomas A. Kalil, took a similar post this month at the University of California, Berkeley, to help develop new research initiatives and increase UC Berkeley's role in shaping the national agenda.

Kalil served under Clinton for eight years, eventually becoming deputy assistant to the President for technology and economic policy and deputy director of the National Economic Council. He was the "point person" on a wide range of science, technology and telecommunications issues, including the National Nanotechnology Initiative, the Next Generation Internet, and efforts to expand funding for the physical sciences and engineering.

"For eight years, Tom was the center of the Internet revolution," said Eric Schmidt, chair of Google, Inc. and of Novell, Inc. "He convinced the US government to use Internet e-mail, to put all its services online, and to leave the Internet alone to grow and prosper. Once done, he set out to fund and build Internet II through universities. Working for the government, he made the government work for the Internet. He's a wonderful addition to UC Berkeley."

As assistant to the chancellor for science and technology, Kalil will help faculty members develop research and education initiatives that respond to national priorities and that build strong partnerships with government agencies, the private sector and community-based organizations.

"The depth and breadth of Berkeley's excellence in research and teaching is amazing," Kalil said, "as is the strong commitment of the faculty, the students and administrators to public service."

Kalil, who arrived July 10, will primarily work with researchers in the two California Institutes for Science and Innovation in which UC Berkeley plays a lead role. The California Institute for Bioengineering, Biotechnology and Quantitative Biomedical Research, called QB3, and the Center for Information Technology Research in the Interest of Society (CITRIS) are innovative initiatives by Gov. Davis to help advance the state's scientific and economic prowess.

Kalil's interest in promoting the public interest dimensions of the Information

Revolution dovetails with the intent of CITRIS—to create and harness information technology to tackle society's most critical needs. Kalil was instrumental in Clinton's efforts to connect school classrooms to the Internet, train teachers to use technology to improve student performance, make information technology accessible to people with disabilities and create digital libraries for math and science education.

With deep Silicon Valley connections, Kalil has worked with CEOs on initiatives such as NetDay and Clinton's efforts to bridge the "digital divide." He helped increase high-tech exports by over \$30 billion by reforming Cold War era export controls on computers and telecommunications equipment and helped allocate the airwaves for new wireless services. Before joining Clinton, he was a trade specialist at the Washington offices of Dewey Ballantine, where he represented the Semiconductor Industry Association on US-Japan trade issues, intellectual property rights and funding for advanced microelectronics research.

"It is a unique opportunity for UC Berkeley to have Tom Kalil work with us in the development of the new California Institutes," said Mary Beth Burnside, vice chancellor for research at UC Berkeley and a professor of cell and developmental biology. "His breadth of experience and perspective will be an invaluable resource. I look forward to working with him to get groups of faculty together to think and talk about new research directions and how we might best foster interdisciplinary research on the Berkeley campus."

"Tom's outstanding achievements in Washington demonstrate his remarkable ability to strengthen UC Berkeley's position in the world of higher education and to reinforce our pre-eminence as the most distinguished research university in the country," added Donald McQuade, vice chancellor for university relations and professor of English at UC Berkeley.

At UC Berkeley, Kalil hopes to educate scientists about how to ignite Congressional and public support for research.

"The biomedical research community really organized around the idea of doubling the NIH budget, and it worked," he said, referring to a successful Congressional effort to boost biomedical funding

for the National Institutes of Health. "But we need to keep a balanced research portfolio, supporting research in the physical sciences, engineering and social sciences as well. Scientists have to do a better job of articulating what the potential outcomes of research will be, where the research may ultimately lead, so that Congress and the public will support it."

As NIH's budget increased dramatically, Kalil pushed for and got a 15 percent increase for the National Science Foundation in the fiscal year 2001 budget. He also helped Congress and the public understand the potential benefits of nanotechnology, resulting in more than a 50 percent increase in nanotechnology research and development funding in one year. Some of these gains are at risk in the current administration's budget, as Kalil wrote in recent op-ed pieces for the San Jose Mercury News and the Seattle Times.

Kalil believes UC Berkeley can play a prominent role in steering the national research agenda. He said he will seek out innovations bubbling up from campus laboratories, faculty and students that could be the foundations for future national research initiatives.

"In a world increasingly driven by deep technical issues, it is difficult for policy makers to make objective decisions in the best interests of all stakeholders. UC Berkeley and other research universities have a responsibility to help inform policy makers as best we can," said A. Richard Newton, dean of the College of Engineering at UC Berkeley. "To do this, we need resources to do the research that will help in making those decisions. Tom can play a key role in coupling us better into that give-and-take between research, education and policy."

Kalil, the son of professors Ronald and Katherine Kalil at the University of Wisconsin Medical School in Madison, received a BA in political science and international economics from that university and completed graduate work at the Fletcher School of Law and Diplomacy. He is a member of the Association for Computing Machinery, the Internet Society and the Institute for Electrical and Electronics Engineers. He has relocated to the Bay Area with his wife and daughter.

—By Robert Sanders,  
Media Relations, UC Berkeley,  
July 31, 2001 ♦

# Kevin Bowers wins American Physical Society award

Kevin Bowers, a recent EECS student of Ned Birdsall, won the APS Outstanding Doctoral Thesis Award from the Division of Plasma Physics, American Physical Society in May. Shortly before winning the award, Bowers won the best thesis award in EECS here at Berkeley in March, the David J. Sakrison Memorial Prize, awarded annually to a student who has completed what is deemed by an EECS faculty committee to be a truly outstanding piece of research.

Bowers received his MS in 1998, and his PhD in February 2001. His thesis is titled, "High Frequency Electron Resonances and Surface Waves in Unmagnetized Bounded Plasmas." The APS Plasma Physics Award is given "to provide recognition to exceptional young scientists who have performed original thesis work of outstanding scientific quality and achievement in the area of plasma physics."

Bowers' research interests include quantum and optical electronics, electromagnetics and plasma physics, and scientific computing and signal processing.

Ned Birdsall said of the APS award, "We are, of course, very pleased. Kevin was with us for about three years, very helpful to our group, and very productive on his own. And, of course, he writes extremely well. He is a very bright person, and fun to be around, intellectually and otherwise."

Bowers' thesis capped a decade of research on electron series resonant (ESR) diodes and ESR surface wave plasmas (SWPs), with ES and EM linear theories and simulations, then driving them with RF to make resonant (resistive) dis-

charges, with a distinct lock-on and stability. He added distributed slow-wave excitation, for applications requiring uniform plasma sheaths over very large areas.

Other EECS faculty response was from Mike Lieberman, who

said: "The thesis is truly spectacular. I expect it will have a big impact in designing future materials processing discharges. It is clearly the best description of surface waves in bounded plasma that has even been done."

Birdsall said, "All of us here think that his most significant contribution will turn out to be his resonant Landau heating scheme, both for processing plasmas and maybe for lamps as well."

Bowers is now currently doing modeling and simulation of optoelectronic and semiconductor devices and fabrication at Agere Systems (formerly the Lucent Bell Labs Microelectronics Corporation). Bowers is in the Opto-Electro-Mechanical Integration Group in the Semiconductor Research Division of Bell Labs Physical Science Research. ♦



*Kevin Bowers and Ned Birdsall*

# Carnegie Mellon makes progress in Silicon Valley

James Morris, head of the Computer Science Department at Carnegie Mellon, is continuing to establish a branch campus in Silicon Valley.

Although CMU might be considered competition for Stanford and UC Berkeley, Morris said, "Stanford's presence is so rich and powerful that we constitute no threat to them." Morris also said that CMU's approach to computer science is based on software engineering and e-commerce, while Stanford and Berkeley are more devoted to the math and engineering of computer hardware systems.

CMU hopes to begin a pilot education program, the MSIT, in January 2002 with about 20 students increasing to 100-200 students for fall 2002. CMU submitted a proposal to NASA for funding in High Dependability Computing. Carnegie Mellon wants to have a presence in SV to tap into the high-tech core and promote CMU in Pittsburgh.

Dr. Raj Reddy, the Herbert A. Simon University Professor of Computer Science and Robotics in the School of Computer Science at Carnegie Mellon, is the director of the program. His primary goal will be to establish a new MS program in information technology. He will live in Silicon Valley for a major part of his time for the next few years.

Brian Reid, another Carnegie Mellon faculty member, will be leading the research effort in high dependability computing. Other faculty will include Glen Trewitt, Virgil Champlin, and Barbara Hussein.

NASA Ames and Moffett Field contain 2,000-acres in Mountain View and offered the land as CMU's new campus.

The first student internship project at Ames was underway this last summer under the direction of Professor Bonnie John. Five Human-Computer Interaction MS students are pursuing a project in NASA's Human Performance Lab. ♦

# Mark Weiser honored by ACM

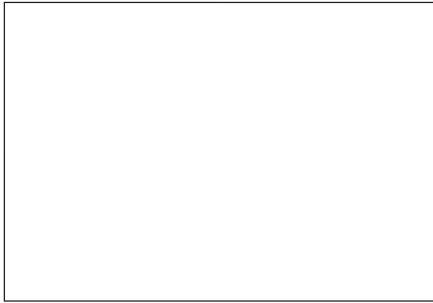
Mark Weiser, father of ubiquitous computing and great friend of the department who died suddenly two years ago, has been honored by ACM.

The ACM's Special Interest Group on Operating Systems (SIGOPS) created a new award in memory of Mark Weiser.

The new award will be given annually to an individual who has demonstrated creativity and innovation in operating systems research. Details about requirements and the nomination process can be found at: <http://www.acm.org/sigops/announce/weiser.html>. ♦

# Student Awards

The Demetri Angelakos Memorial Achievement Award honors graduate students who both excel in their work, and also help other students generously. **Julius Kusuma** was praised for “fostering an un-



*Sheila Humphreys and Johnathan Reason*

selfish and family atmosphere” in his research group, as well as his active involvement in faculty interviews, mentoring and tutoring undergraduates, “tirelessly helping with the graduate student recruitment process,” “serving as a focal point in multi-disciplinary projects,” and generally “giving unselfishly of his time and capabilities far beyond the call of duty.” **Kevin Yang** was commended for “voluntarily, cheerfully, and over an extended period of time” managing the Device and Metrology Lab, working to renovate the lab, and assisting “several dozens of students in their research.” His “enthusiasm, innovation, and quality in research” were noted, and one professor feels “his assistance may have made the difference between success and failure of many a project.”

The Leon O. Chua Award is given to a student or recent alumnus for outstanding achievement in an area of nonlinear science. **Jie Liu** wins the 2001 award. One professor called Jie “one of the best graduate students I’ve had in my 16 years on the faculty,” and said “he is fearless about tackling difficult tasks that would seem impossibly daunting to anyone else. And he produces.” Another professor feels Jie was “an excellent problem solver and software engineer” and “is probably the key student member of the current Ptolemy team.”

The Departmental Citation recognizes distinguished undergraduate accomplishment in EECS, and for 2001 it goes to **Byron Yu**. Byron has received 18 A+

grades, in physics, math, and EECS courses, has a 4.0 GPA, and is an EECS Honors Program student. As an intern Byron “excelled at the job and achieved a nice breakthrough” on his project. Professors say he was “clearly the best student in a class of about 130 students...his performance on the assignments was as close to perfect as I have seen,” and “he is likely to be the top student in the graduating class of the EE department this year.”

Awarded to the graduating senior whose engineering design accomplishments are the most outstanding, the Warren Y. Dere Design Award for 2001 goes to **Jeffrey Heer**. One professor said Jeff “is the best of the undergraduates I have had perform research with me here at Berkeley” and that “a student like this comes along once in a decade.” Jeff “maintained a 3.98 GPA with 13 A+s while performing research and taking on leadership roles in several student organizations.” He was praised for the human-computer interaction work he did as an intern, leading to a conference publication and a continuing position, as well as his key contributions to the WebQuilt project.

The Fong Award is given to students just completing their junior year who have demonstrated both high scholastic achievement and financial need. There are two winners of the 2001 award, and they are **Tony Lee** and **Wing Zin Low**. Tony, who is actively involved in assisting



*Jessica Britt (with flowers), her parents (on left), and Brian Barsky*

students with disabilities, has a 4.0 GPA at Berkeley. Wing Zin, who is active in student organizations, has a 3.95 GPA.

The Arthur M. Hopkin Award is in memory of EECS Professor Hopkin, who died in 2000, the Hopkin Award honors an

outstanding EE undergraduate who demonstrates seriousness of purpose and high academic achievement while confronting financial limitations. The 2001 award-winner is **Ming Tang**. Ming is an EECS Honors Program student, a double major, and a tutor for the Minority Engineering Program.

Awarded to a graduate student or recent alumnus for outstanding achievement in systems, communications, control, or signal processing research, the Eliahu Jury Award is named for Professor Emeritus Jury. **Sandeep Pradhan** receives the 2001 award for his “outstanding research in the area of signal processing and communication and information system theory.” Sandeep is called “easily the most intellectually gifted student that I have had” and praised for his work, which “leads to radi-



*Aaron Brown and David Patterson*

cally new architectures and system philosophies...bridging the gap between information theory and multimedia signal processing.”

In memory of Professor Lawler, who died in 1994, the Eugene L. Lawler Scholarship Award is for a CS graduate, undergraduate, or reentry student who has surmounted unusual difficulties in pursuing his or her degree, in addition to demonstrating academic achievement. There are four winners of the 2001 Lawler Award.

**Eli Bingham** has received several A+ grades and taken a heavy load of technical classes while recovering from being hit by a car, struggling through family tragedies, and overcoming financial difficulties. **Jessica Britt** perseveres in her studies and participates in student organizations, remaining “constantly cheerful” despite regular dialysis and heart surgery to combat a serious health condition. **Karen**

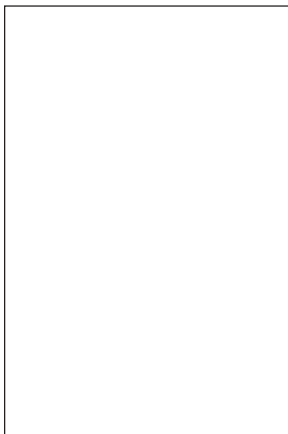
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# Jim Gray elected to National Academy of Science

Jim Gray, the first person to get a Berkeley PhD in Computer Science (under Michael Harrison), and who is already a member of the National Academy of Engineering and a winner of the Turing Award, was elected to the National Academy of Science this summer. ♦

## Faculty Awards and Honors

**Richard Karp** has received an honorary PhD from the University of Central Florida.



*Richard Karp*

search Beth Burnside wished “hearty congratulations to the faculty who have received recognition.” Papadimitriou’s research interests are in the theory of algorithms and complexity and its applications to databases, optimization, artificial intelligence, and game theory. ♦

**Christos Papadimitriou**, C. Lester Hogan Professor of Electrical Engineering and Computer Sciences, was named a fellow of the American Academy of Arts and Sciences in July. Vice Chancellor of Re-

## New class offered this fall: Optical Networks

Connie Chang-Hasnain, professor in EECS, and Dr. John Strand are teaching a new course this fall called, “Optical Networks: From Components to Services.”

Optical networking is a critical and exciting research area with particular challenges, according to Connie Chang-Hasnain: “to do the tradeoffs needed to design the components needed by systems designers, who in turn must design the systems needed by optical transport network architects, who must provide the service functionality needed by data networks. Needs and requirements percolate down this hierarchy and proposed solutions flow up.”

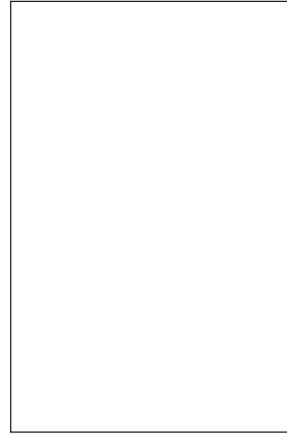
Students in the course will study each link in this chain, starting from components, to systems, to transport and networks. Specific applications, such as ultra-long-haul all-optical transport, will be used as a focus to initiate a holistic discussion. Alternative approaches to getting reconfigurability, reliability, low total cost, scalability, and other desirable functionality will be explored. Instructors will be using VPI application modules to illustrate system and application related design problems and solutions. ♦

## CREW program funded

A proposal headed by Kathy Yelick, associate professor in CS, was funded recently. The new project, called Collaborative Research Environment for Women in Undergraduate Computer Science and Engineering, was judged to be “one of the best 18 of the 32 projects that were submitted for consideration this year” according to Sheila Castaneda and Joan Francioni, CREW project co-directors.

The CREW Program is sponsored by the Computing Research Association Committee on the Status of Women in Computing Research (CRA-W). Funding for this project is sponsored by NSF’s Partnership for Advanced Computational Infrastructure’s Education, Outreach and Training program and USENIX, the Advanced Computing Systems Association.

The CREW Program is designed to provide collaborative research experiences for groups of two to three undergraduate



*Kathy Yelick*

women during the 2001-2002 academic year. Students for this project are: Ellen Tsai, 4th year EECS; Carrie Fei, 3rd year EECS; and Szu-Huey Chuang, 3rd year CS.

The research group will develop

software using the Titanium language and compiler, starting with an application framework for fluid flow in biological systems known as the “immersed boundary method.” “We may use reference implementations of the applications that were written in FORTRAN, but are not designed for parallel machines. We will also perform extensive analysis on both the performance of the program and the quality of the resulting simulation,” Szu-Huey Chuang said.

The students will work with Kathy Yelick on their project; each student will receive a stipend of \$1000. At the end of the project, the students will submit a one-page summary of their work. ♦

# EECS Week brings industry to campus

EECS Week took place the third week in September this year, despite the September 11 terror on the east coast. "It was hard to decide to continue with the conference, with events of the last week," said Shankar Sastry, department chair. "But we decided to go ahead with some measure of normalcy and try to continue with our lives." An American flag waved on the large white screen behind him.

EECS Week was a series of events highlighting research in the EECS department and demonstrating the scope of the department's involvement—its impact, partners, and future directions. The week consisted of day-long events organized



around specific groups of leaders, with each day targeting a specific audience.

Networking Day was on Monday and included talks and panel discussions. On Wednesday, EECS held their first-ever



IBM Day, which included faculty, students, staff, and IBM technical executives. Thursday was Labs Day, including faculty, students, and representatives of companies interested in creating labs. On Friday, the final day of EECS Week, a conference entitled "Berkeley EECS: From Vision to Impact" was held by invitation only.

Networking Day held talks and panel discussions on a variety of the research projects in EECS. The purpose of the day was to create a forum for existing research Labs in the Berkeley area and to expose other companies to the ideas that led to the

establishment of the existing labs, to see whether the creation of some new labs made sense.

One of the biggest news items for EECS was CITRIS. The Center for Information Technology Research in the Interest of Society will create information technology to tackle society's most critical needs. CITRIS research will focus initially on the areas of energy efficiency, transportation, seismic safety, education, health care, and environmental monitoring. Sastry said it's "a huge project in the service of society. We bring to bear the best technology on the problems of California today. Check out the CITRIS website



at: <http://www.citris.berkeley.edu>.

Jean Walrand, EE professor, talked about BITS, Berkeley Informational Technology and Systems. "Our mission," he said, "is to advance the frontiers of science and

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## Students offer help

Miriam Walker, of Auckland, New Zealand, doesn't know many people from New York City. But that didn't prevent her from springing into action to help her fellow human beings after the September 11 terrorist assault on the World Trade Center. When Walker, a graduate student in computer science at Berkeley, witnessed her roommates encountering jammed phone lines as they attempted to reach friends and family near Ground Zero, Walker thought about how the Web could be used to help. Walker conceived a Web site that fellow graduate student Ka-Ping Yee programmed, with assistance from staff programmer Eric Fraser and Professor Jennifer Mankoff. The site (<http://safe.millennium.berkeley.edu>) was

launched on the UC Berkeley Millennium Computer Cluster just hours after news of the attack reached Berkeley. Over 47,000 entries were posted in the week following



Miriam Walker

the tragedy. For the most part, people used the site to search for missing loved ones, or to report that someone was safe. The site also provided quick links to hospitals, relief agencies, and volunteer efforts throughout the country. While the

site's usefulness may be waning, Walker says that it proved effective during the most critical time and helped gather information that official resources couldn't. She also discovered that its users were drawn in for a more communal reason, that it provided a conduit for people to communicate their feelings.

Walker says simply, "We had the resources to help." And so they did.

—from the electronic newsletter of the Graduate Division, University of California, Berkeley. *eGrad* is produced by the Graduate Division Publications Office, delivered to departments by email, and archived on the Web (<http://www.grad.berkeley.edu/publications>). Lisa Harrington, editor. ♦

# Student Awards...

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**Rayment** overcame adversities in her family and a weak math and science background, joining the Navy to gain technical experience, then excelling while catching up in her studies. **Johnathan Reason** is a devoted single father who has mentored many students, participated in student organizations, and helped in recruiting admitted minority students while completing his doctoral degree.

The Tong Leong Lim Predoctoral Prize recognizes outstanding performance in the predoctoral examination. It has been given since 1987 in memory of Lim, who ranked at the top for his prelims. **Westley Weimer** and **Pablo Anigstein** are the winners for 2001. Westley

received an A+ in two breadth requirements and has a 4.0 grade point average. Pablo also has a 4.0 grade point average and received an A+ in both breadth courses.

The Nokia Wireless Future Scholarship is for two undergraduates and two graduate students in Electrical Engineering, Computer Engineering, Computer Science, Mechanical Engineering, Industrial Engineering, Telecommunications, or Operations Research. Two of this year's winners are from EECS. **Daniel Reiter Horn** was praised for his academic performance, his contributions at his summer job, and was called "about as talented a young student as one is likely to find." **Ankur Luthra** was commended for excelling in his studies, his involvement with the community, and was described as "an extremely accomplished and enthusiastic student."

The Outstanding Teaching Assistant Awards are selected by the national honor society, Eta Kappa Nu (HKN), and the IEEE Student Branch Chapter, in recognition of Graduate Student Instructor excellence. There are six winners for 2001, recognized by their students for their outstanding contributions. **Eric Chi** was called "very dedicated to his students" and

"very helpful and available outside of office hours." **Brenda Liu's** students found her "very helpful and understanding" and "awesome, very clear and friendly."

**Peimin Chi** was "very organized and prepared" and "really helpful." **Joseph Suh** was called "the best TA I've ever had in the department" and "very accessible, sensitive to student needs, and understand-

ing." **Nancy Chang** was "very friendly and very helpful" and "definitely the best CS TA I have had." **Chris Umans** was called "an extremely effective TA" and "very friendly, helpful, and informative."

*Jason Hill and David Culler*

The Marian Wojciech Para Memorial Award is for a graduate or undergraduate student for achievement in the face of adversity. Adversity is broadly defined as any condition, be it economical, physical, or otherwise, that has disadvantaged the student in his or her attainment of academic achievement. **Karen**

**Rayment** is the winner of the Para Award for 2001. Karen came from a difficult childhood which limited her high school education and overcame several obstacles to pursue her degree. Other students feel Karen's "attitude towards work, teaching, and learning

is what academia strives to accomplish" and "truly admire her spirit." Karen is admired for her "unyielding self-determination and her clear, solid vision to achieve success."

The C. V. Ramamoorthy Award is given to a CS graduate student for outstanding contributions to a new research area in computer science and engineering. **Jason Hill** is the 2001 winner for his

research contributions in networked sensors. One faculty member says "Jason is quite early in his studies, but his work has had a tremendous impact and has been recognized nationally," and feels "his work is excellent and he is clearly a rising star. I am in awe of his abilities." Another professor calls him "an absolute gem of a student." Others feel "his contributions promise to make UC Berkeley a world-class center for networked sensors and actuators."

The David J. Sakrison Memorial Prize is given to a student who has completed an exceptional documented piece of research in the department. The winner for 2001 is **Kevin Bowers**. Compared to other theses he has read at Berkeley, Kevin's advisor feels "none had the breadth and depth of Bowers' thesis." Faculty feel Kevin's thesis "is truly exceptional" and "is a creative and original piece of work." They also say, "I expect it will have a big impact in designing future materials processing discharges" and "is clearly the best description of surface waves in bounded plasmas that has ever been done."

The Samuel Silver Memorial Scholarship Award recognizes the combination of intellectual achievement in science and engineering, and in humanistic and cultural interests. The award for 2001 goes to **Aaron Brown**. Aaron's professors feel "as a PhD student, he is nothing short of spectacular." Aaron has a 4.0 GPA, and won the Lim Prize

for best performance in prelims in 1999. Members of the orchestra in which he is concertmaster think he is "an exceptionally fine violinist and a gifted musician, one of the best ever to play with our group" and say, "for all his musical gifts, he is modest, down-to-earth, friendly, and always encouraging to the other violin players." ♦

—Cassie Dunn

# EECS Week...

*continued from page 8*

technology in networking.” Challenges for the project include energy efficiency, monitoring healthcare, transportation planning, education (there will be a new UC in Merced, which EECS will help bootstrap), land and environment, seismic safety, and emergency response.

The BITS program is interdisciplinary, with EECS faculty, ICSI and SIMS people, plus students, postdocs, and visitors. Other participants include BWRC, the Berkeley Photonics group, WebTP, PATH, and Berkeley’s School of Information and Management Systems. Collaboration with labs in Berkeley include Cadence, STB Labs, Hughes Research, many more.

Dan Pitt, of Nortel Networks, of whom Sastry said, “We couldn’t have gotten CITRIS on the road without him,” spoke. Pitt said he hoped to “prompt [EECS] to consider higher endeavors, consider social impact. I would like to see Berkeley reverse the direction of the pendulum. You do worthy research, but also, I urge you to escape and create new technology.”

Pitt said the pendulum is swinging “from short-term research to long-term research.” He questioned the sacrifice in long-term research, said that processing needed to catch up. Other pendulum points he mentioned were: from intra-disciplinary to inter-disciplinary work; from losing grad students to retaining them; from speed to control; from large to small (e.g., Smart Dust); from central to distributed systems.”

On IBM Day, Richard Newton, dean of the college and professor in EECS, said, “IBM is the most significant recruiter of

our grads” (though he wanted to check figures to be sure).



“IBM Day is very significant,” he continued, “we’ve never done a day for a company before. This is a testimonial to the importance of our relationship with IBM. IBM is a founding corporate member of CITRIS.”

Newton discussed the state of EECS and the CS Division. “CS over the last 25 years has developed so that it doesn’t have to justify its own existence anymore,” he said.

He asked the IBM participants about what else EECS can do, for example, in bioinformatics. He wanted to know about doing “problems others aren’t working on. That have to do with the quality of life in the world.”

The large new collaborative effort, CITRIS, Newton said, is all about bringing together industry and the university in new ways, and giving an opportunity for companies to work together.

Robert Morris of Autonomic Systems said his company is “very interested in global issues. I thought about last week—how to respond, how to help the US government. We are united in trying to save civilization. The biggest barrier we create,” he said, “is technical complexity—one can see evidence in information technology business dominated by the human, manual cost. It’s 40-50%. We all need to think outside the box. The paradox is the use of more complex systems to

create simple systems. That’s okay until something goes wrong. This is not just an academic or industry research or products problem. It requires collaboration, government policies, the need to work together. No one company can do it alone.”

On Friday, a CITRIS panel was assembled, which included Patrick Scaglia of HP, Uli Ramacher of Infinion, Dan Pitt of Nortel, Alan Kramer of STMicroelectronics, James Demmel of EECS, Albert Yu of Intel, and Beth Burnside, Vice Chancellor of Research, UC Berkeley. General questions included: Why is industry working with the university? What should we expect? What

should we look out for? What is the best outcome for industry and for the university? How do we measure success?

Alan Kramer said, “Large corporations have poor track records for innovation. The uni-

versity should be looking for breakthrough research. ST gets new technologies after they have taken off. CITRIS gives us the potential to look for a more efficient way

to bring innovations to impact workplace. EECS should,” he said, “make links to corporate development activities.” He observed, “The academic culture doesn’t especially like commercial links; this needs to be addressed. The startup is the next step after the lab.”

Nortel’s Dan Pitt said, “There is a new role for Berkeley: to introduce industrial partners to each other, especially different parts of the food chain, especially customers and suppliers. The challenge is to sustain relationships,”

*continued on next page*



# EECS Week...

*continued from previous page*

he said. "I want Nortel to have a relationship with Berkeley that outlasts my career." Pitt said the department needs to cultivate corporate or industrial people who are not local, and involve non-tech execs, getting them to understand how the work changes. "You need to know people who aren't comfortable at the university, don't have degrees, but run businesses."

Speaking about the CITRIS project, Uli Ramacher of Infinion said, "We admire the courage it took to brew up such a project. We have no equivalent project in Europe, or in Germany. We joined CITRIS because of the bundling of all applications and getting architecture of future networks. CITRIS is the ship that will lead up to a new continent," he declared.

Patrick Scaglia of Hewlett-Packard said HP's motive for joining CITRIS is the greater intersection of vision. "Vision needs to be in agreement between the university and industry. We can't be isolated in the world. We need interglobal work and the collaboration of many."

Intel's Albert Yu said, "All my professional career, I have been surrounded by Berkeley people. We have hired more Berkeley people at Intel than any other school. Intel is a product company; it has leading edge products. We didn't used to think about research much. But now it's different. Products take 2-3 years. We need to collaborate on further out stuff that takes longer, 6-7 years."

Beth Burnside commented last: "I am interested in what kinds of things foster research. What can we do here that would foster productivity among researchers? I have heard how the university impedes research. How can we do different? What are the obstacles to faculty interactions?"

Patrick Scaglia replied, "Offer innovation. Permission to innovate. CITRIS

can give more freedom, a big bag of money without the restriction [on innovation, creativity in research]. IP policy at the university sends a subtle message to each research person that you better work alone. That's a great motivator, but doesn't bring cooperation."

Alan Kramer noted that local labs were very positive, a buffer zone between individuals and university.

The conference on Friday brought the week-long event to a close. Shankar Sastry opened the day-long conference with a technical history of the department, from Berkeley UNIX and SPICE to current projects like CITRIS, Smart Dust, and the networking research center BITS.

Sastry presented two EECS graduates Distinguished Alumni Awards for 2001. Dr. Ming J. Chien, PhD 1975, established First International Computer, Inc. (FIC) in 1980, an industry leader in the design and production of motherboards, PC systems, servers and notebooks.

Dean Steve Sung-Mo Kang, PhD 1975, who is a Professor Emeritus of the Department of Electrical and Computer Engineering at the University of Illinois at Urbana-Champaign, is now Dean at the Baskin School of Engineering at the University of California, Santa Cruz.



On Friday afternoon, a panel discussion moderated by Alberto Sangiovanni-Vincentelli took place. Eric Schmidt, chair from Google, Ray Bingham, CEO of Cadence Design Systems, and Roger Siboni, CEO of e-Piphany spoke.

Bingham commented that "all of Cadence was founded from people from here

[at Berkeley]." The creation of Cadence Berkeley Labs, he said, started with the relationship of ILP at EECS and Cadence.



"Cadence Berkeley Lab has 28 researchers on campus working to distill ideas that might be useful in industry," he said.

In analyzing the success of the week of activities, Rich Newton said, "I thought the panel discussion with our industrial partners was a real confirmation of our vision, why they back us, and the HUGE potential (way beyond even where we are today) from the right sorts of collaboration. It was also very good for our new Vice Chancellor of Research, Beth Burnside, to hear the strong testimonials from Albert Yu, Dan Pitt, Uli Ramacher, Patrick Scaglia, and Alan Kramer for an open IP policy."

The sessions, Sastry said, "were wonderful, and the panel discussions were especially illuminating, both in the morning and in the afternoon."

David Culler, CS professor, commented, "each of the talks were truly inspiring. It was the kind of thing that makes you say, 'That's why I want to be at Berkeley.'"

Jan Rabaey, associate chair, Electrical Engineering, said that an interesting result came out of the lab panel on Thursday. "lab representatives proposed forming BARC (Berkeley Area Research Council), a roundtable of the different labs, that will meet quarterly to coordinate and exchange information and look at ways to increase the bonds with with each other and the department." ♦

# CS grad becomes first science dean at Radcliffe

Drew Faust, Dean of the Radcliffe Institute for Advanced Study at Harvard University, announced that Barbara Grosz, Berkeley CS PhD, will be the first dean of science at Radcliffe:

I am delighted to announce that Barbara Grosz has agreed to become the first Dean of Science at the Radcliffe Institute for Advanced Study. Beginning in September 2001, Professor Grosz will divide her time between Radcliffe and the Faculty of Arts and Sciences, where she is Gordon McKay Professor of Computer Science. At Radcliffe, her responsibilities will be to build a program that enables the Institute to make significant contributions to the advancement of scientific knowledge and to the enhancement of the position of women within a field in which they have been especially underrepresented. Barbara's intellectual and professional stature as well as her long commitment to issues concerning women and science make her the ideal person to take on the challenges we face.

Before joining the Harvard faculty in 1986, Barbara worked as a senior staff scientist in the Artificial Intelligence Center at SRI International and as a founder and principal investigator at the Center for the Study of Language and Information. She received a BA in Mathematics from

Cornell and an MA and PhD in Computer Science from the Electrical Engineering and Computer Science Department at the University of California at Berkeley.

Barbara's research addresses fundamental problems in modeling collaborative activity, developing systems to collaborate with each other and their users, and constructing collaborative, multimodal systems for human-computer communication. She



Barbara Grosz

is also trying to identify the basic structure and processes by which people use natural languages to communicate, focusing in particular on the mechanisms involved in dialogue and spontaneous speech. She has developed a theory of discourse structure that specifies how discourse interpretation

depends on interactions among speaker intentions, attentional state and linguistic form. She has published extensively in these topics.

As chair of the Standing Committee on the Status of Women at Harvard, Barbara produced the 1991 "Report on Women in the Sciences at Harvard," and she has remained actively engaged in the ongoing effort to increase the numbers of women science faculty. Her efforts on behalf of the science program at Radcliffe will enrich science activities at the Institute and across Harvard by bringing outstanding scientists, especially outstanding women, to the university. The Radcliffe Institute will contribute to scientific scholarship by helping to increase the number of women engaged in science and by providing a stimulating environment in which leading scientists are supported in conducting their research and in interacting across disciplinary boundaries.

I greatly look forward to working with her and hope you will join me in welcoming her to Radcliffe.

—Drew Faust, Dean, Radcliffe Institute for Advanced Study, Harvard University ♦

# Anant Sahai will return to Berkeley as an EECS faculty member

Anant Sahai, who received his MS and PhD from MIT, and his BS from EECS here, has chosen to come back here to join the faculty in January. He had offers from Stanford, MIT, and Berkeley.

He said that "Berkeley, Stanford, and MIT are all spectacularly great universities and I am certain that I would be very happy at any of them. If I had had an offer from only one of them, I would have chosen it in a heartbeat. The faculty at each place were very accessible and I talked to many people at length at each before making my difficult decision."

"While my home will be in EECS at Berkeley, I hope to have fruitful research

collaborations and frequent visits with my colleagues at both MIT and Stanford in the years to come."



Anant Sahai

Award, MIT EECS, 1996; the Certificate

of Distinction (Finalist for University Medal), UC Berkeley, 1994; our own Department Citation (Best Graduating Student in EECS), UC Berkeley 1994; Department of Defense Fellowship, Office of Naval Research 1994-1998; NSF Graduate Fellowship (awarded for 94-97, but declined in favor of ONR); Henry Ford Scholarship (Best Academic Standing in College of Engineering), UC Berkeley, 1993.

Sahai received numerous awards during his years as a student, among them, the Ernst Guillemin Best Masters Thesis

Award, MIT EECS, 1996; the Certificate

The department looks forward to Sahai's arrival in January. ♦

# Berkeley Autonomous Vehicles Day: cars that drive by themselves and robots that chase each other

Joel Moldenhauer, of PATH, filled 40 spots for demonstrations of vehicles for July's Berkeley Autonomous Vehicles Day.

The annual BAVD presents networks of vehicles in action on land, in water, and in the air. Vehicles form teams and cooperate to autonomously do dynamic station keeping in heavy seas, pursue and catch an evader robot, and swiftly merge on our reduced-scale highway while you take a ride. There were a variety of wireless protocols in action that enabled computers to discover each other on the fly and form networks that moved multimedia information or real-time control data.

There were four sets of demonstrations:

## Helicopters and Robots

A group of three robots teamed up to catch a fourth robot. The pursuing team was equipped with sensors and the ability to fuse their sensor information, choose the fastest route to catch the evader, and divide the pursuit amongst themselves. A wireless network supported the team. Audience participation included driving the evader robot to get a feel for the intelligence of the pursuit team. In addition, a helicopter landed itself autonomously on a landing platform using a vision sensor. The helicopter used the vision sensor data to autonomously navigate and land itself.

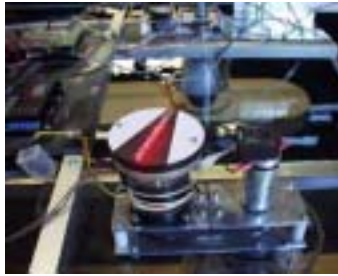
## Mobile Offshore Base

A group of three floating platforms (reduced order aircraft carriers) in a tank teamed up to form a continuous runway.



*Mobile Offshore Base modules float in a PATH test tank.*

At life-size, this platform would be long enough to land a transport plane in the ocean. The platforms teamed up and maneuvered themselves to create a stable



*Mobile Offshore Base thruster*

runway. Distributed networked controllers managed this heavy and ponderous system.

## Automated Cars

Again, audience participation was offered to ride in one of the automated Buicks. Two cars drove automatically on their test track spaced very close to each other. A third car suddenly swept in from a merging lane into the tight space between the two cars. A human would be startled, but your automated car would not be. The cars coordinated their movements very precisely over a wireless network while they were all in motion, ensuring a safe automated merge.

## Ad-hoc wireless protocols

The full range of protocols required to enable multi-vehicle cooperation over wireless networks was demonstrated. A medium access protocol enabled several agents to get real-time data through a shared medium on time while people watched a streaming movie, a routing protocol that works continuously to find and maintain the best routes, even though the radios keep moving, a transport protocol that beats TCP for real-time control data going over wireless, and the latest protocols in action to form and repair networks of agents providing services to one another. ♦

## Intel supports EECS

CS professor Robert Wilensky announced this summer that Intel had agreed to support the proposed renewal of EECS instructional facilities.

Intel will provide 67 workstations (well-configured Pentium 4s with 21" monitors). These will be used for a new EECS 150 lab, and allow EECS to retire a portion of the older Intel equipment. Intel will also provide two new servers, with disk expansion towers, which should make course file systems significantly more reliable. ♦

# ERL memoranda

The following reports are recent publications of the UC Berkeley Electronics Research Laboratory. Copies may be ordered from Jeff Wilkinson, ERL Publications, 253 Cory Hall, UC Berkeley, Berkeley, CA 94720-1774. Prices are indicated. You may order up to six reports at one time. For each order, please include \$5.00 to cover postage and handling. Send a check or money order in US currency payable to the Regents of the University of California. Information can also be found at: <http://www.eecs.berkeley.edu/~erl/publication.html>.

**M01/11:** E. A. Lee, C. Hylands, J. Janneck, J. Davis II, J. Liu, X. Liu, S. Neuendorffer, S. Sachs, M. Stewart, K. Vissers, P. Whitaker, and Y. Xiong, *Overview of the Ptolemy Project*, March 2001, \$2.80.

**M01/12:** Not available.

**M01/13:** T. D. Burd, *Energy-Efficient Processor System Design*, March 2001, \$21.60.

**M01/14:** Not available.

**M01/15:** Not available.

**M01/16:** A. Abnous, *Low-Power Domain-Specific Processors for Digital Signal Processing*, April 2001, \$21.00.

**M01/17:** D. G.-W. Yee, *A Design Methodology for Highly-Integrated Low-Power Receivers for Wireless Communications*, May 2001, \$27.60.

**M01/18:** A. Nilim, *Design and Verification of the Aircraft Conflict Prediction and Resolution Algorithms*, January 2001, \$6.00.

**M01/19:** T. V. Pistor, *Electromagnetic Simulation and Modeling with Applications in Lithography*, May 2001, \$18.00.

**M01/20:** P. Whitaker, *The Simulation of Synchronous Reactive Systems in Ptolemy II*, May 2001, \$5.40.

**M01/21:** J. T. Kedzierski, *Complementary Silicide Thin-Body Silicon-on-Insulator CMOS Devices*, March 2001, \$13.60.

**M01/22:** P. Jula, *The Economic Impact of Metrology Methods in Semiconductor Manufacturing*, May 2001, \$6.20.

**M01/23:** R. Chang, *Full Profile Chemical Mechanical Polishing (CMP) Metrology*, May 2001, \$6.40.

**M01/24:** P. Anigstein and V. Anantharam, *Iterative Construction of Optimal Signature Sequences for CDMA*, February 2001, \$4.20.

**M01/25:** E. Terrovitis, *Analysis and Design of Current-Communicating CMOS Mixers*, May 2001, \$27.20.

**M01/26:** E. A. Lee, *Embedded Software*, July 2001, \$3.40.

**M01/27:** C. L. Taylor, *Punctured Convolutional Coding Scheme for Multi-Carrier Multi-Antenna Wireless Systems*, July 2001, \$7.80.

**M01/28:** M. Nikraves and B. Azvine, *FLINT 2001—New Directions in Enhancing the Power of Internet—Proceedings of the 2001 BISC International Workshop on Fuzzy Logic and the Internet*, August 2001, \$12.20.

**M01/29:** Not available.

**M01/30:** E. Polak and M. Wetter, *Generalized Pattern Search Algorithms with Adaptive Precision Function Evaluations*, September 2001, \$2.40.

# CS publications

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**CSD-01-1139:** H. Weatherspoon, C. Wells, P. R. Eaton, B. Y. Zhao, and J. D. Kubiawicz, *Silverback: A Global-Scale Archival System*, April 2001, \$6.00.

**CSD-01-1140:** A. V. Deshpande and J. M. Hellerstein, *Decoupled Query Optimization for Federated Database Systems*, May 2001, \$9.00.

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**CSD-01-1142:** A. Konrad, A. D. Joseph, R. Ludwig, and B. Y. Zhao, *A Markov-based Channel Model Algorithm for Wireless Networks*, May 2001, \$6.00.

**CSD-01-1143:** S. P. Rahul and G. C. Necula, *Proof Optimization Using Lemma Extraction*, May 2001, \$9.00.

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**CSD-01-1145:** I. Mavroidis, *A Low Power 200 MHz Multiported Register File for the Vector-IRAM Chip*, July 2001, \$11.00.

**CSD-01-1146:** Not available.

**CSD-01-1147:** Not available.

**CSD-01-1148:** M. A. Paskin, *Cubic-Time Parsing and Learning Algorithms for Grammatical Bigram Models*, June 2001, \$7.00.

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