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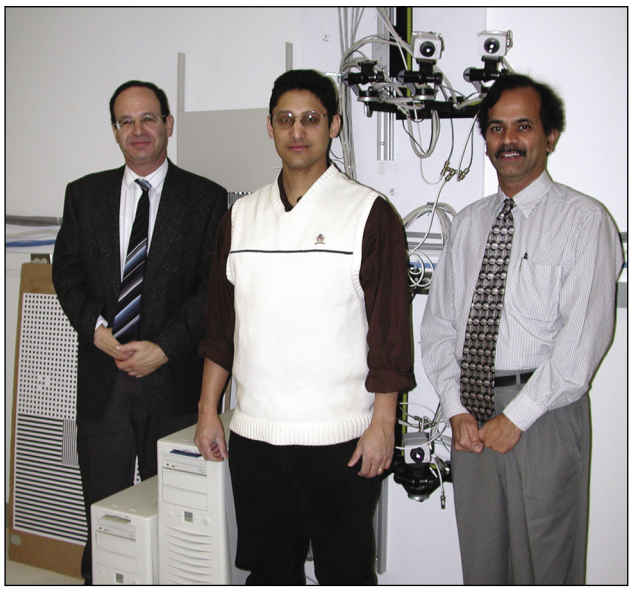
CONNECTIONS

ELECTRICAL AND COMPUTER ENGINEERING

Newsletter of the Department of Electrical and Computer Engineering

INSIDE

Bhattacharyya, Chellappa, Vishkin receive NSF ITR grants



Uzi Vishkin, Shuvra Bhattacharyya and Rama Chellappa

Professors **Rama Chellappa** and **Uzi Vishkin** and Associate Professor **Shuvra Bhattacharyya** are principal investigators for three recent National Science Foundation Information Technology Research grants.

Chellappa received a five-year, $2.56 million grant for his work on the capture, analysis and visualization of human movements. The research program, says Chellappa, who is also director of the Center for Automation Research, will lead the development of the next generation of distributed video sensing systems for understanding human movements.

"By using 3D motion animation of humans," he says, "our research could result in realistic animation and the detection of subtle variations in movement. This will lead to better diagnostic tools and personalized programs for rehabilitation of movement disorders."

Previously, Chellappa and his colleagues had done motion studies of objects such as automobiles and aircraft. "These are rigid objects," says Chellappa. "With humans you have limbs moving."

The project entails a broad spectrum of interests, including biomechanics, computer science and engineering, electrical engineering and kinesiology. Co-principal investigators include Larry S. Davis, chair of the Department of Computer Science; and John Jeka of the Department of Kinesiology, as well as researchers from Stanford and New York University.

Vishkin's PRAM On-Chip research is focused on the possibility of building a breakthrough high-end parallel computer by designing a machine that can look like a PRAM to a programmer. Co-principal investigators are Associate Professors Bruce L. Jacob and Manoj Franklin and Assistant Professors Gang Qu and Rajeev Barua.

"The magnitude of the knowledge base that has been developed for the PRAM algorithmic

See *ITR grants,* page 2

Message from the Chair

Welcome to the latest issue of *Connections*. As always, we are delighted to share our news and accomplishments with our readers. This newsletter is a valuable way of keeping us connected, as its title implies.

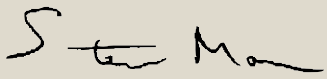
No doubt many of you know **Chi Lee,** who has been with our department since 1968. This past summer, Dr. Lee retired and more recently has been named professor emeritus. We are honored to profile him in this issue of the newsletter. Dr. Lee was an important part of the growth of our engineering program here at the university through his well-respected and well-known research in picosecond phenomena. I'm sure our readers will enjoy learning more about him as a teacher, researcher and scholar in our story on pages 5 and 6.

Last fall, a committee appointed by Clark School Dean **Nariman Farvardin** named Professor **Tony Ephremides** to the new Cynthia Kim Eminent Professorship in Information Technology. This new position is funded by the family of **Jeong H. Kim,** founder of Yurie Systems and currently a professor of the practice in ECE and the Mechanical Engineering Department. In his announcement, Dean Farvardin noted that Dr. Ephremides is one of the pioneers in studying wireless communication networks. We offer a profile of some of Dr. Ephremides' achievements on page 8.

With Dr. Lee, Dr. Ephremides and other faculty members leading the way, we have gone on to acquire some of the best faculty in engineering. Three of those faculty members were recent recipients of prestigious NSF Information Technology Research grants. In our cover story we talk with the recipients, **Rama Chellappa, Uzi Vishkin** and **Shuvra Bhattacharyya**, about the cutting-edge research projects each of them will be pursuing through their grants.

We also can take great pride in the fact that we are training the next generation of teachers and researchers. Several of our recent graduates have gone on to become faculty members at other academic institutions, and they are doing quite well. We highlight some of our "successes" in a story about graduates who have been recent NSF CAREER award recipients. You will have the opportunity to learn about some of our best and brightest minds and the research they are pursuing on pages 6 and 7.

Our department has built on the strength of our early faculty members through the new and exciting research of current faculty members to the future of our profession through our talented students and alums. We hope you enjoy reading about the scope of ECE in this issue of *Connections*.



ITR grants, continued from page 1

model makes it a serious alternative to serial algorithmic theory," says Vishkin, who received a five-year, $750,000 grant. However, "the problem of building a general-purpose parallel computer that is significantly faster than its serial counterpart and at the same time removing the curse of cost-ineffective programmability from parallel computing has been a major open problem for computer science since the inception of the field."

Vishkin has been intrigued by the problem since his Ph.D. thesis more than 20 years ago. "This research," he says, "will provide the backbone in the development of a holistic computation framework called Explicit Multi-Threading—"XMT"—that seeks to solve this long-standing problem. The vision is that some day, possibly as soon as the early 2010s, every high-end general-purpose computer will be built and programmed according to the PRAM On-Chip framework. We hope to get closer to making this vision happen."

Bhattacharyya received $1.68 million for five years to develop new architectures and tools for modern video processing algorithms. The researchers, who also include Chellappa and Wayne H. Wolf of Princeton, will investigate a series of complex smart camera algorithms drawn from surveillance and biometrics applications.

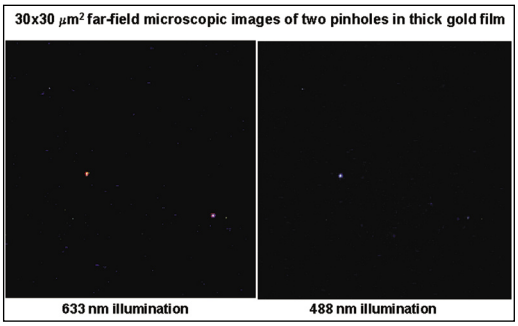
Bhattacharyya says, "We will be investigating efficient implementations of algorithms for self-calibration of distributed cameras, view-synthesis using imaged-based visual hulls and human identification using face and gait."

Bhattacharyya is interested in the complex range of challenges for embedded systems design, including critical requirements for low power operation, distributed computation and fast, real-time processing. He says, "I'm very excited to work on such an interdisciplinary project at the forefront of embedded systems technology."

New grants to ECE faculty

NSF grant: Nanofabricated All-Optical Computing, Switching and Signal Processing Devices Based on Single Photon Tunneling

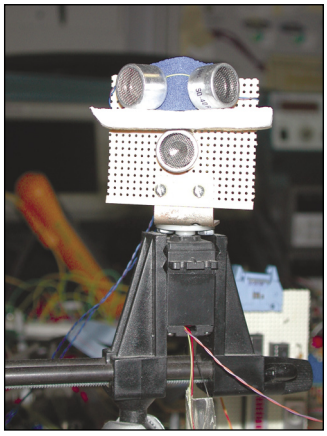
Professor **Christopher Davis** is the principal investigator for a new NSF award, "NIRT: Nanofabricated All-Optical Computing, Switching and Signal Processing Devices Based on Single Photon Tunneling." This is a four-year, $1.2 million award. Co-principal investigators are ECE Professor **John Melngailis** and Assistant Research Scientist **Igor Smolyaninov.** They are joined by co-principal investigators Alexei A. Maradudin from the University of California, Irvine, and Andrei V. Stanishevsky from the University of Alabama at Birmingham.



Spectral properties of random nanopores

NIH grant: Dynamic Sensorimotor Control for Spatial Orientation

ECE Assistant Professor **Timothy Horiuchi** and Professor **Cynthia Moss,** who is affiliated with both the Department of Psychology and the Institute for Systems Research, have received a five-year, $1.6 million grant from the National Institutes of Health's Division of Neuroscience and Basic Behavioral Science, part of the National Institute of Mental Health. The grant is for their work in "Dynamic Sensorimotor Control for Spatial Orientation." The research will advance the understanding of the integration of auditory information with motor programs for spatially guided behavior in mammals. It will also build general understanding of auditory information processing and adaptive motor control for spatial orientation.


A narrowband sonar system that tracks moving targets in real time

Air Force Research Laboratory Digital Data Embedding Technologies Award: A Collusion-Resistant Multimedia Fingerprinting Framework for Information Forensics

Assistant Professor **Min Wu** and Professor **K.J. Ray Liu** are the principal investigators for a new Air Force Research Laboratory Digital Data Embedding Technologies award. The initial one-year grant is for $220,000. Their research, "A Collusion-Resistant Multimedia Fingerprinting Framework for Information Forensics," is focused on designing efficient and effective digital fingerprints for plain text and multimedia content that can withstand collusion attacks.

Honda Initiation Grant: Acoustic-Phonetic Knowledge-Based Continuous Speech Recognition

Associate Professor **Carol Espy-Wilson** has received a one-year, $50,000 Honda Initiation Grant for "Acoustic-Phonetic Knowledge Based Continuous Speech Recognition." The program "discovers and engages Honda's future research partners in academia."

NSF grant: Optical Wireless Sensor Networks for Critical Infrastructure Surveillance (SENSORS)

ECE faculty members are key participants in a new three-year, $1.2 million NSF award. "SENSORS: Optical Wireless Sensor Networks for Critical Infrastructure Surveillance" will extend research in optical wireless and other technologies to provide a robust, advanced sensor-communication network. This will include the development of autonomous, solar-powered optical wireless transceivers that can point and track, handle continuous or bursty data and function in a dynamic, self-configuring environment. The principal investigator is Senior Research Scientist **Stuart Milner** of the Institute for Systems Research. Co-principal investigators are ECE Professors **Christopher Davis** and **Uzi Vishkin,** along with Professor **Gregory B. Baecher,** chair of the Department of Civil and Environmental Engineering, and **Philip J. Tarnoff,** director of the Center for Advanced Transportation Technology.


An agile transceiver with a high-performance motor.

Chi Lee named professor emeritus

Shortly after arriving on campus in 1968, **Chi Lee** established a research laboratory for the study of picosecond optics. At that time, his research lab was one of only a handful that existed in the department. "The department's faculty numbered 18 to today's 85 and there was not so much emphasis on graduate education and research here," he recalls.

Dr. Chi Lee speaks at his retirement dinner

That would all change. And Lee, who recently retired and has been named a professor emeritus, would play an integral part in the transformation. In the decades to come, as Lee's work in picosecond phenomena was recognized around the world, the engineering program was becoming a world-class leader as well.

William Destler, senior vice president for academic affairs and provost and former dean of the A. James Clark School of Engineering, says, "Dr. Lee was a key factor in the transformation of the Clark School from primarily an instructional-focused school to one with a strong focus on both research and education. He is a wonderful example of a faculty member building an exceptional research program, bringing in funding and supporting graduate students. He was one of the first in the department to conduct a nationally ranked and eminently funded program."

Dr. and Mrs. Lee with Clark School Dean Nariman Farvardin at Dr. Lee's retirement dinner

Herbert Rabin, associate dean for research and director of the Maryland Technology Enterprise Institute, has known Lee since before he came to the university. "His groundbreaking research and his international reputation have contributed to the overall standing of the university—from the Clark School to the Department of Electrical and Computer Engineering," Rabin says.

Lee's research includes picosecond optical electronics, lasers and nonlinear optics, millimeter-wave technology and ultrafast phenomena. He has been funded by the National Science Foundation, the U.S. Army Research Laboratory, the Office of Naval Research, the National Security Agency, the Defense Advanced Research Projects Agency and industry.

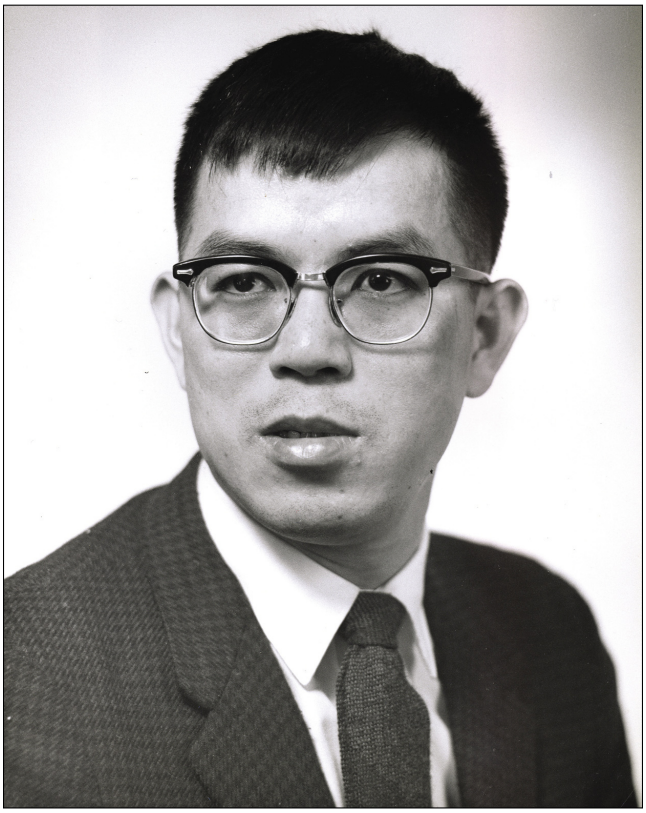
His research has involved all aspects of picosecond lasers, from generation, characterization and measurements, to a wide range of applications. He is considered a pioneer in developing synchronously mode-locked dye lasers and in the study of the picosecond photoconductivity effect in semiconductors.

A member of the Institute for Research in Electronics and Applied Physics (IREAP), Lee oversees the Ultrafast Optoelectronics Lab. He is also a Fellow of IEEE, the Photonic Society of Chinese-Americans and the Optical Society of America. He chaired the technical committee on lightwave technology in the IEEE Microwave Theory and Techniques Society and the technical committee on microwave photonics of the Laser and Electro-Optics Society of IEEE.

> **"Dr. Lee was a key factor in the transformation of the Clark School from primarily an instructional-focused school to one with a strong focus on both research and education."**
>
> —William Destler, senior vice president for academic affairs and provost, University of Maryland

"Chi Lee is a highly intelligent person who is very motivated and committed to research," says Rabin. "These factors work together to promote his success."

A quiet and insightful man, Lee discovered an interest in science and technology, especially math and physics, as a



Dr. Lee's first faculty photo, 1969

young student living in mainland China. That interest would take him to National Taiwan University, where he decided to study electrical engineering. He did so, though, with an eye towards eventually going to the United States.

At that time, he says, "If you wanted the best education you had to come to the U.S. for graduate studies." After receiving his bachelor's degree, he went to Harvard on a fellowship. "Otherwise," he says, "I could not have gone. Our country was very poor at that time. I was very fortunate to be able to go there."

At Harvard he received both a master's degree and a Ph.D. in applied physics. His thesis advisor was Professor Nicolaas Bloembergen, the 1981 recipient of the Nobel Prize in physics and a pioneer in the development of laser spectroscopy.

After leaving Harvard, Lee went to work for IBM as a researcher. During that time, he recalls, "My mentor at IBM was interested in investigating picosecond optical self-focusing phenomena. Picosecond optics was a very new research area with very broad applications. This field would take off in the next 40 years."

While he had discovered his research niche, Lee knew he did not want to remain in the corporate world. After his postdoctoral work, he decided on a career as an academic. "I could have stayed at IBM. But I always wanted to work in an academic environment. I felt I would have more freedom," he says.

He found that freedom at the University of Maryland, where he was recruited by the chair of the then-EE department. The university wasn't the only institution courting him at that time. Rabin, then with the Naval Research Laboratory (NRL) before joining the university himself in 1983, attempted, unsuccessfully, to recruit Lee. "He wanted an academic career, and I could understand that," Rabin says.

Rabin and Lee would have the opportunity to work together anyway. As a Maryland faculty member, Lee consulted for NRL for a number of years before the two became colleagues at the university.

Lee has no regrets when he looks back over his career. "If I'd had regrets, I would not have been doing this for so long!" he says. "With research, you are exploring new frontiers. You find a new result and understand the physics about it and publish those results in a paper for others to see and learn from. You feel that you have accomplished something then."

He finds the same is true in working with students. "You have a graduate student who comes to you knowing nothing and then earns a Ph.D. and becomes a kind of expert in the field," he says.

Lee has had many such students who have gone on to careers of their own in places as far away as his native China to the United States where he has made his home. He and his wife have a grown son and daughter and two granddaughters.

While he is retired, he will not stop working. In fact, he plans to continue his funded research in what has now evolved into the even faster femtosecond phenomena while focusing on integrated polymers for photonic devices. "I will continue working with graduate students and research scientists," he says. "As long as they want me, I will stay."

Lee should plan on being around for quite a while.

Dr. Lee in 1980

ECE alums receive NSF CAREER Awards

Among the department's 'best and brightest'

National Science Foundation (NSF) CAREER Awards are designed "to foster the career development of outstanding junior faculty, by combining the support of research and education of the highest quality and in the broadest sense."

So, it is not surprising that many former students of the ECE program have gone on to receive NSF CAREER awards at academic institutions across the country. "These are some of our best and brightest minds," says ECE Chair **Steve Marcus.** "We take great pride in their accomplishments. They are taking the tools and knowledge they have learned here and pursuing successful careers of their own."


Hesham El-Gamal

Hesham El-Gamal, now on the faculty of Ohio State, is the recipient of a 2004 CAREER Award. His Ph.D. advisor was **Evaggelos Geraniotis. Mingyan Liu** at the University of Michigan and **Saswati Sarkar** of the University of Pennsylvania received CAREER Awards in 2003. **Hamid Jafarkhani,** now with the University of California, Irvine, received a 2002 NSF CAREER Award.


David Bader

Radha Poovendran at the University of Washington, Seattle, and **David Bader** at the University of New Mexico, received the award in 2001. Bader's Ph.D. advisor was **Joseph JáJá.**

"We prepared them well," says Marcus.


Radha Poovendran

Radha Poovendran agrees. "I was very fortunate to be at ECE," says Poovendran, who received his Ph.D. in 1999 and was advised by John Baras. "So many of the faculty members are committed to student learning and development. It's an intense place. But if you know what you want, ECE is the place to be."

Poovendran received his CAREER award for his work on secure multicast communication for Internet applications. "I am interested in developing new techniques for key management in environments where illegal collaboration among current or past users is possible," he says. "Fundamental understanding of the problem and limitations of the techniques is critical, followed by an effort for a unified framework that will make it reasonable to study this area and develop solutions based on constraints."

Poovendran's research also is funded by a Young Investigator Award from the Army Research Office, the Army Research Laboratory and Boeing. For Poovendran, winning the CAREER award helped significantly to establish a new security center at the University of Washington. Besides his Network Security Laboratory, Poovendran is a founding member and the associate director for research of the University of Washington Center for Information Assurance and Cybersecurity.

Poovendran had spent six years in the working world before deciding to pursue his Ph.D. at ECE. Once in the ECE program, "I wanted to choose an area where I had no prior expertise and learn so that I would be challenged," he recalls. He initially thought that area would be ATM networking. "But then I took a course from Virgil Gligor in the first semester of my study. That made it clear that security had the right mix of discrete math and communication theory. At some point I realized ATM was no longer in the picture," says Poovendran. Given his accomplishments since, it was a wise decision.

Poovendran is grateful to the ECE faculty. "They helped me to grow in many ways during my Ph.D. program," he says. Now Poovendran finds himself in the role of teacher and mentor and finds great satisfaction in it. "Of the many rewards of this profession are the students who are doing well and ready to move on," he says. Poovendran has already earned both his department's Outstanding Teaching Award and Outstanding Graduate Advisor Award.


Hamid Jafarkhani

Hamid Jafarkhani received his award for work on coding for multiple-input/multiple-output channels. He earned master's and Ph.D. degrees from ECE in 1994 and 1997 and was advised by **Nariman Farvardin.** Jafarkhani is studying the existence and design of new classes of codes that provide "full-diversity, high-rate, small-complexity, high-performance and mathematically interesting structures."

"I hope to propose new structures for space-time coding over multiple-input/multiple-output channels that provide the best trade-offs in terms of diversity, bandwidth and complexity," he says.

Jafarkhani became interested in this area while working at AT&T Labs-Research as a senior technical staff member shortly after completing his Ph.D. While at AT&T, Jafarkhani and his colleagues invented space-time block coding, which has become an active area of research and is widely used in practice. "Naturally," says Jafarkhani, who joined the University of California, Irvine, in 2001, "I have been continuing that effort."

Jafarkhani is the deputy director of the Center for Pervasive Communications and Computing at the University of California, Irvine. Before coming to the U.S., he ranked first in the nationwide entrance examination of Iranian universities in 1984. While an ECE student he was a co-recipient of the American Division Award of the 1995 Texas Instruments DSP Solutions Challenge. He is also a senior member of IEEE.

Still, he says he was surprised when he learned about the CAREER award. "The NSF budget was very tight," he says. "In fact, that year, only two to three faculty members in the field of communications received the award."

Jafarkhani says the challenge of research inspires him. "The nice thing about research is the innovation behind it. It is very challenging to solve a problem for the first time, and it is very rewarding when you solve it before others."

2003 NSF CAREER Award recipients Mingyan Liu and Saswati Sarkar, who both received ECE Ph.D.s in 2000, have developed well-established research programs at their respective universities.

Liu, whose Ph.D. advisor was **John Baras,** investigates networking issues related to the energy efficient design of large-scale, data-gathering wireless sensor networks. There will be two focii in her CAREER award research: characterizing the fundamental performance limits of the network under different assumptions and designing network mechanisms that approach such performance limits.


Mingyan Liu

Liu says, "We hope to obtain a solid understanding of a large class of data-gathering sensor networks; to develop an optimization framework that will help us derive fundamental properties of energy-efficient network mechanisms; and to apply such understanding in developing specific algorithms."

The CAREER award is just one of three NSF grants supporting Liu's research in this area. As a result of the research, a wireless sensor network test bed will be developed in collaboration with the University of Michigan's Center for Wireless Integrated Microsystems (WIMS). Liu is an affiliate with both WIMS and the Center for Wireless Communications Research.

"This is an exciting emerging area that combines integrated sensing, processing and wireless communication," she says. "Many aspects of this area remain wide open, providing great opportunities for innovation and creativity."

Sarkar was advised by **Leandros Tassiulas.** Her research is focused on developing networking solutions for ubiquitous computing. "This has the promise to open up many new applications leading to an overall improvement of productivity at our homes and offices," says Sarkar. "The networking challenge is to design seamless, high-quality wireless ad hoc communication among a large number of small inexpensive computers."


Saswati Sarkar

Sarkar will design an optimal distributed control framework that uses local observations and practical information of the resource requirements and availabilities at other nodes to attain efficiency. She became interested in this area shortly after arriving at the University of Pennsylvania. "The resulting protocols," she says, "are expected to be robust to variations in networking traffic and dynamic topological changes on account of mobility."

"This is an exciting topic with many applications and research problems," Sarkar says. "The challenge interested me."

Recently both Liu and Sarkar returned to ECE to participate in the 2003 ECEGSA Academic Roundtable on academic careers. Both had much to offer and were glad to do so. "I had a good experience here," says Sarkar. "This was a good program with wonderful faculty. I thought it would be great to come back and share my experiences with students who are deciding on their careers. Hopefully, they found it helpful."

Liu adds, "Having joined a university as a faculty member, I feel that I could have benefited a lot from such knowledge. The academic career roundtable was an excellent way to bring such information to graduate students. I was happy to share my two cents."

Perhaps Liu and Sarkar's experiences will inspire yet the next generation of researchers, teachers and scholars.

Ephremides named Cynthia Kim Professor; gives invited talks

Last fall, a committee appointed by Clark School Dean **Nariman Farvardin** named Professor **Tony Ephremides** to the Cynthia H. Kim Eminent Professorship in Information Technology. This new professorship is endowed by **Jeong H. Kim** and his family. Dr. Kim is the founder of Yurie Systems and currently a professor of the practice in ECE and the Mechanical Engineering Department.

In his announcement, Dean Farvardin noted that Dr. Ephremides is one of the pioneers in studying wireless communication networks.

"He was the first to propose and study ad hoc multihop wireless networks in 1979 and has made sustained major contributions in that field continuously since then," the dean said. "He was also the first to identify the role of higher layer protocols in conserving energy and the need to exploit the coupling between layers in the design of wireless networks. His work has literally initiated new tracks of research that by now have become standard components of all journals and conferences in wireless networking."

Farvardin also noted that Ephremides is considered the father of self-organizing algorithm research for mobile ad hoc networks and has performed pioneering research in most aspects of that field.

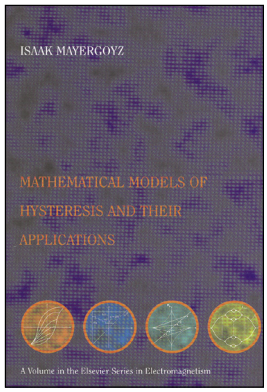
Ephremides has impressed upon the networking community the importance of the physical layer link and has promoted within the information theory community the extension of that powerful and elegant theory to the field of networking. In addition, Ephremides has made seminal contributions in a variety of focused topics in classical communication theory, stochastic systems, and in several application areas.

Farvardin said that Ephremides has shown leadership in education by pioneering innovative industry-academic cooperation programs and mentoring many graduate students who are now distinguished researchers and professors around the world. Dr. Ephremides is a Fellow of the IEEE, past chair of the International Symposium on Information Theory and past chair of Infocom.

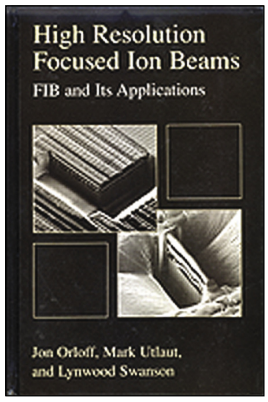
Invited talks

Ephremides gave invited talks at Yale University in October and at the University of Pennsylvania in November. He was also a recent participant in two NSF workshops in Chicago for the definition of future research directions. The first was on information theory and computer science. The second was on the use of so-called ultra wide band (wireless) transmission at multiple gigabytes per second. Ephremides says, "This is an emerging technology that has a great deal of interest to vendors and service providers in addition to the research community."

Books



Professor **Isaak Mayergoyz** has written an expanded, revised and extensively updated version of his book on hysteresis. *Mathematical Models of Hysteresis and Their Applications* places a unique emphasis on the development of universal mathematical models of hysteresis that are applicable to the direction of hysteresis phenomena in science, technology and economics. The book is part of the Elsevier series in electromagnetism, of which Mayergoyz is the editor.



Professor **Jon Orloff's** book, *High Resolution Focused Ion Beams: FIB and Its Applications* received an excellent and comprehensive review from Alfred Wagner at IBM in the January 2004 issue of *Physics Today.* The book is a theory and applications reference on high-resolution focused ion beams (FIBs) and is useful for the user and the designer of FIB instrumentation. Co-authors with Orloff are Lynwood Swanson of FEI Co. in Hillsboro, Ore., and Mark Utlaut of the University of Portland, Ore.

Patent

Professor **Christopher Davis,** Assistant Research Scientist **Igor I. Smolyaninov**, former post-docs **Saeed Pilevar** and **Klaus Edinger** and former Ph.D. student **Walid Atia** have been issued U.S. Patent 6,633,711 for "Focused Ion-Beam

Fabrication of Fiber Probes for Use in Near Field Scanning Optical Microscopy." This is a method of forming a fiber probe with an aperture for use in near-field scanning optical microscopy.

O'Shea elected IEEE Fellow

Professor **Patrick O'Shea** has been elected a Fellow of IEEE "for contributions to charged particle accelerators and free-electron lasers." O'Shea is the director of the Institute for Research in Electronics and Applied Physics.

Chellappa is Distinguished Scholar-Teacher

Professor **Rama Chellappa** spoke on "Machine Perception of Humans and Their Activities: Opportunities and Challenges," during his Distinguished Scholar-Teacher lecture in November. The Distinguished Scholar-Teacher Program honors University of Maryland faculty members who have demonstrated outstanding scholarly achievement along with equally outstanding accomplishments as teachers.

Kim elected to National Academy of Engineering

ECE Professor of the Practice **Jeong H. Kim** has been elected to the National Academy of Engineering for his contributions to national defense and security through better battlefield communication.

Academy membership is among the highest professional distinctions an engineer can attain. It honors those who have made important contributions to engineering theory and practice and those who have demonstrated accomplishment in pioneering new fields of engineering, making major advancements in traditional fields of engineering, or developing/implementing innovative approaches to engineering education.

Best paper awards

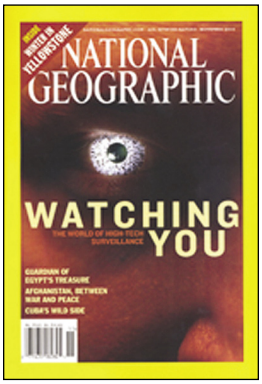
Two ECE faculty members and a Ph.D. student are among the authors of "A New Pedagogy in Electrical and Computer Engineering: An Experimental and Conceptual Approach." The paper won the Benjamin J. Dasher Best Paper Award at the IEEE Frontiers in Education conference in November. The paper's authors are Professor **Neil Goldsman**; Ph.D. student **Zeynep Dili; Lee Harper**, coordinator of education programs for the Institute of Systems Research; **Janet Schmidt,** the university's director of Engineering Student Research; and ECE Chair **Steve Marcus**.

Associate Professor **Manoj Franklin** and 2003 Ph.D. student **Mohamed Zahran** won the best paper award at the International Conference on Computer Design held recently in San Jose, Calif. The conference is sponsored by the IEEE Computer Society and provides a technical program for computer systems design, processor architecture, logic and circuits, tools and methodology and verification and testing. Franklin and Zahran won for their paper on "Dynamic Thread Resizing for Speculative Multithreaded Processors."

Faculty in the media

The November issue of *IEEE Spectrum*, which was devoted to microwave weapons, mentions the work of Professor **Victor Granatstein** on the effects of microwave pulses on integrated electronics.

Assistant Professor **Min Wu** was featured in the December 2003 issue of MIT's *Technology Review* magazine. The story spotlights her work in digital watermarking for black and white text documents, which someday could be used in commercial document-verification systems.



The face recognition work of the Center for Automation Research, as well as other high-tech surveillance methods, was profiled in the November 2003 issue of *National Geographic Magazine*. The online preview at National Geographic's web site included a video on face recognition in both RealMedia and Windows MediaPlayer formats. Professor **Rama Chellappa** is the director of the Center for Automation Research.

Faculty featured at Bioscience Day

The University of Maryland's Bioscience Research and Technology Review Day, held in November, featured a neuroscience symposium with Professor **Shihab Shamma** and Assistant Professor **Timothy Horiuchi,** as well as representatives from NIH and MIT. Horiuchi spoke on "Neuromorphic VLSI and Modeling of the Bat Echolocation System." Shamma's topic was "Behavior and Plasticity in the Auditory Cortex." A symposium on "The Dynamic Brain: Linking Neural Activity

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Faculty news, continued from page 9

and Behavior" was presented by Horiuchi and Professor Cynthia Moss, who is affiliated with both the Department of Psychology and the Institute for Systems Research.

Liu on IEEE Signal Processing Board of Governors

Professor **K. J. Ray Liu** has been elected a member-at-large of the IEEE Signal Processing Society Board of Governors for 2004-2006.

Five faculty receive MIPS awards

Professors **John Baras, Neil Goldsman, John Melngailis, Steven Tretter** and **K. J. Ray Liu** have received contract awards from the Maryland Industrial Partnerships (MIPS) program.

The MIPS program provides matching funding for university-based research projects that help companies develop new products. Any company with operations in Maryland is eligible, as are faculty from any of the University System of Maryland's 13 institutions. Projects must deal with innovative technological or scientific concepts and have direct commercial applications.

Liu is working with InTank, Inc., of Laurel, Md., on the "Ultrasonic Nondestructive Inspection of Tanks" project. He will develop an effective and efficient ultrasonic testing system for use in robots that inspect commercial storage tanks such as gasoline, fuel, oil and chemicals.

Melngailis is working with Mad Dog Control, Inc., of Frederick, Md., on a focused ion beam bar coding microelectronics project. This firm seeks to develop a low-cost, highly efficient method for writing the identity of a radio frequency tag chip in devices for inventory control, as well as for products such as car door locks, smart cards and cell phones.

Baras is working on a Phase II MIPS project with Hughes Network Systems (HNS) on "Broadband Internet Applications over Satellite," which will develop new and innovative Internet applications exploiting the increased bandwidth of forthcoming high-data-rate satellite constellations for HNS's DIRECWAY product.

Tretter will work with TeleContinuity, Inc., of Rockville, Md. to create a seamless, low-cost, network-level solution to restore telephone service to users within minutes of a catastrophic event, PBX failure, fiber cut, fire, flood, or similar circumstance. The solution will integrate Voice over IP (VoIP) with Public Switched Telephone Network technology to create a "hot" stand-by telephone service.

Goldsman is working with TRX Systems, Inc., Lanham, Md. on indoor location and emergency alerting technology. He will design and develop technology that will wirelessly track the location of firefighters, police, and other public personnel inside buildings and structures.

studentNEWS

Jesse Clark and Dr. Bunny Tjaden

Graduating Computer Engineering senior **Jesse Clark** recently published an article in the Winter 2004 *Cryptolog*, a magazine for U.S. Naval cryptologic veterans. The article is titled "The Enigma Machine Goes Hi-Tech: Implementing an Enigma Machine in a Computer Science Course." Jesse co-authored the paper with **Dr. Bunny Tjaden** of the Computer Science Department while interning for Dr. Tjaden. The paper describes his research of the Enigma and his participation in the design and implementation of the code for a sequence of four projects for CMSC214 in the winter of 2003.

Students win awards

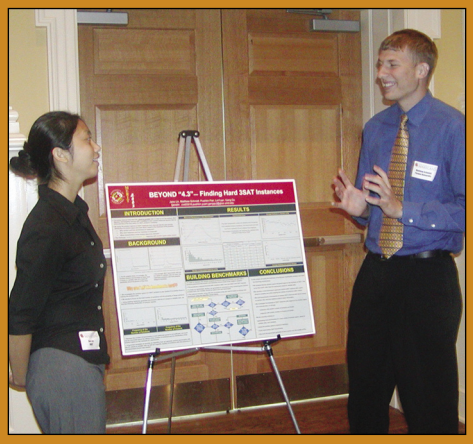
Ph.D. students **Tony DeMarco** and **Hasina Ali** won awards at the International Semiconductor Device Research Symposium in Washington, D.C., in December. DeMarco won the best student presentation award in the devices category. His submission was titled, "Maskless Fabrication of JFETs via Focused Ion Beams." He is advised by Professor **John Melngailis.** Ali won the best student poster award in the materials category for her poster, "Study of ZnO Nanocluster Formation within Styrene-Acrylic Acid and Styrene-Methacrylic Acid Diblock Copolymers on Si and SiO2 Surfaces." She is advised by Professor **Agis Iliadis.**

Marcel Pruessner, a graduate student in the MEMS Sensors and Actuators Laboratory, received a $15,000 (Achievement Rewards for College Scientists) ARCS Scholarship in a ceremony at the U.S. Supreme Court. He joined two other Clark School of Engineering students, 15 other winners from area universities, University of Maryland President **Dan Mote** and Clark School professors in meeting Justice Anthony Kennedy, their host for the evening. The awards are sponsored by the Metropolitan Washington Chapter of the ARCS Foundation, Inc. Pruessner's research focuses on optical switching and III-V MEMS. He is advised by Assistant Professor **Reza Ghodssi,** who also attended.

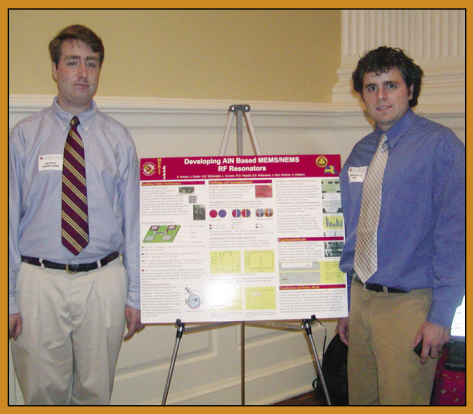
Thirty-four students participate in most recent MERIT program

Maryland Engineering Research Internship Teams (MERIT) is part of an 11-week summer research program for undergraduates administered by ECE and supported by the National Science Foundation and the Army Research Laboratory. Last year, 34 students from colleges and universities across the country participated.

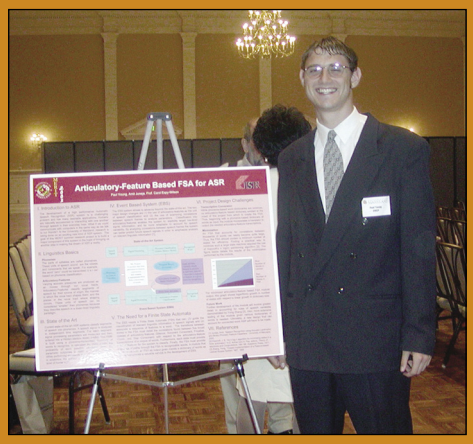
MERIT combines cutting-edge, team-based research with technical and educational seminars, visits to local industry and government organizations and meetings with leaders in the field. The three technical focuses within the program include Internships in Computer Engineering (ICE), Power and Energy Electronics Research (PEER) and Research Internships in Telecommunications Engineering (RITE). At the end of each program, a MERIT Fair is held to showcase the research conducted during the summer. Winners are determined in each technical focus area. This year's winners are highlighted at right.



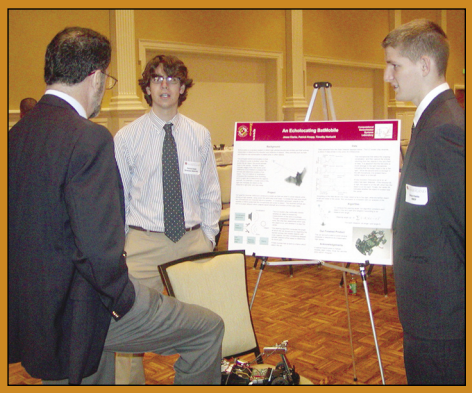
ICE Program – Jane Lin from the University of Maryland and Matthew Schmidt from Purdue University for their project, "Building Hard Random SAT Benchmarks." Their faculty advisor was Assistant Professor **Gang Qu.**



PEER Program – Andrew Herson from the University of Maryland and John Koster from Bowdoin College for their project, "Developing AlN Based MEMS/NEMS RF Resonators." Their faculty advisor was Assistant Research Scientist **R.D. Vispute.**



RITE Program – Two winners: First, **Paul Young** from the University of Maryland for his project, "Creating Articulatory Feature-Based Finite State Automata for Speech Recognition." His faculty advisor was Associate Professor **Carol Espy-Wilson.**



Second, Patrick Knapp from Syracuse University and **Jesse Clark** from the University of Maryland for their project, "An Echolocating BatMobile." Their faculty advisor was Assistant Professor **Timothy Horiuchi.**

Connections is published twice yearly for alumni and friends of the Department of Electrical and Computer Engineering at the University of Maryland.

Your alumni news and comments are welcome. Please send them to: Editor, Department of Electrical and Computer Engineering, A.V. Williams Building, College Park, MD, 20742.

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Sony Music's Philip Wiser participates in lecture series; ECE Advisory Council

Philip T. Wiser, Sony Music Entertainment's (SME) chief technology officer and senior vice president for digital services, spoke last fall at the Clark School on "Facing the Music: An Inside Look at the Dramatic Changes Facing the Global Music Industry." He was a participant in the Whiting-Turner Lecture Series, which is sponsored by the Whiting-Turner Contracting Company. Wiser is a member of the ECE Advisory Council.

An ECE alum, Wiser oversees the direction of SME's digital media initiatives, including electronic music distribution (EMD) systems and the development and implementation of new digital media technologies. Prior to joining SME, Wiser, who graduated summa cum laude and went on to receive a master's degree in electrical engineering from Stanford, was director and chief technology officer of Liquid Audio. At Liquid Audio he pioneered one of the first commercially released digital rights management and EMD systems.

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