



Students excel in national competitions (see page 8)

A Message from the Dean



S. K. Ramesh, Dean

Dear friends,

I am delighted to share this issue of SPECTRA with you as we welcome a record 3,200 students to the college in the fall semester. These are truly exciting times in the College of Engineering and Computer Science, with sustained growth in all our academic programs, especially when you consider that our enrollments have increased by over 50% from just five years ago. Just as exciting, we are welcoming several new faculty colleagues who have joined us this fall and look forward to recruiting more new faculty to begin in fall 2012. In this issue we feature some of the tremendous accomplishments of our students, faculty and alumni, who exemplify the quality of our academic programs.

In other news, we received word from the U.S. Department of Education in October 2011 that our proposal to recruit and graduate underrepresented minorities in engineering and computer science was selected for a five-year, \$5.5 million award under the Hispanic-Serving Institutions (HSI) STEM Initiative program. Together with our partners from Glendale Community College and the College of the Canyons, this is a great opportunity to make an impact on the graduation of underrepresented minorities in engineering and computer science, with a cohesive and holistic approach that engages all stakeholders. I look forward to sharing our progress on this exciting endeavor in future issues of SPECTRA.

As you read this issue, the campus is preparing for a transition in leadership with President Jolene Koester announcing her retirement at the end of the year. The culture of collaboration and teamwork that exists across the programs in the college, and indeed across the colleges on our campus, is President Koester's enduring legacy to California State University, Northridge. Under her leadership CSUN has grown from strength to strength with "regionally focused, nationally recognized" programs—and she will be greatly missed. We wish her the very best in her retirement.

As the college continues to grow, it is worthwhile noting that over 50% of our undergraduate students are minorities in engineering and computer science, many of whom are the first in their families to attend college. Imagine the possibilities as these students graduate from CSUN, turning "ideas" into "realities." Thank you for your generous support of our students and academic programs, and I wish you the very best in the year ahead!

S. K. Ramesh

Inside this issue...

College receives record grant

It's all just a game for CECS
research fellow

College welcomes four new
faculty members

Medtronic-funded research
projects seek to advance
diabetes treatment

Northrop Grumman executive
exemplifies spirit of Industry
Advisory Board

ALUMNI SPOTLIGHT
Michael Gross

Student competitions

Project Showcase shines
spotlight on seniors

Faculty news

Commencement 2011

College's donor honor roll

In memoriam: Dennis Brodie

College's Industry Advisory
Board (IAB)

College receives record grant

The College of Engineering and Computer Science has been awarded a five-year, \$5.5 million HSI STEM grant by the U.S. Department of Education. The largest grant the college has ever received, it will support efforts to increase the number of low-income, Hispanic and other underrepresented minority students who graduate with engineering and computer science majors.

The project, developed in collaboration with two community college partners, College of the Canyons and Glendale Community College, has been designed to address the academic needs of Hispanic and low-income students. Program components will include proactive academic advisement and tracking, organized tutoring, peer and faculty mentoring, hands-on research opportunities and career advising to facilitate students' eventual transition to the workforce or advanced studies. Some of the funds will be used to underwrite classes at the community colleges to ensure students access to the prerequisites they need to transfer to CSUN in engineering and computer science. Participating students will receive stipends to motivate them and inspire them to succeed.

In addition, the grant will expedite the development of sustainable, seamless transfer agreements between the community colleges and CSUN. Working collaboratively, faculty from the three institutions will develop and team-teach courses and address gaps in the existing articulation agreements.

A unique aspect of the project is the integration of technology to enhance student learning. Through the grant, CSUN will create a mobile digital environment with tablet PCs and software to enhance communication, engagement, collaboration and creativity and provide instant learning assessment for the students in the cohort.

Altogether, the project is expected to facilitate the graduation of 120 Hispanic and low-income students during the grant period.

"It's terrific to engage faculty and students in this exciting project, and we're confident that this program will make a difference in the lives and careers of our students," says CECS dean S. K. Ramesh. ❖

It's all just a game for CECS research fellow



Richard Lorentz
*Professor
Computer Science*

Computer science professor Richard Lorentz takes his games seriously. But you won't find him glued to a PlayStation or engrossed in the latest version of The Sims. In Lorentz's world, games are an outstanding vehicle for testing computer algorithms, and as the college's 2011-12 research fellow, he'll be spending the spring semester studying the merits of different algorithms in computerized versions of three lesser-known board games: Amazons, Havannah and EinStein würfelt nicht.

many random games, and the move that does best across the random games is the one the player—in this case a computer—is "happiest" with.

The difference between the two algorithms is striking. Before the discovery of MCTS about six years ago, someone who had been playing Go for four or five months could beat the best computer games. Using MCTS, however, a computer can play Go at the level of the top club players. "MCTS has revolutionized a lot of games," Lorentz says.

The catch is that no one knows why it performs so well. "Monte Carlo tree search does better than we think it should," he explains.

"This is an ongoing project I've been working on for years and will continue for years," he says.

His project focuses on algorithms called minimax and Monte Carlo tree search (MCTS). In the past, most computer board games relied on minimax, which arrives at the best move by considering the player's possible options, the opponent's possible responses, the player's responses to these responses, and so on, eventually accessing the potential advantage each move will provide the player. While it worked well in games like chess, for complex games like the classic Japanese game Go, it created a hopeless bottleneck. MCTS, by contrast, plays



Photo by Ingo Althöfer

Lorentz (left) discusses abstract game theory with a colleague in Jena, Germany.

Lorentz has been studying variations of the MCTS algorithm for some time, and his Amazons program, a blend of minimax and MCTS, is the current world champion. For his research project, he will expand his investigation to additional games, in collaboration with students, who will learn the algorithms, how to implement them efficiently and modify them for the task at hand—skills they can adapt to the workplace whenever they need to implement an algorithm they are unfamiliar with.

Lorentz's own aim, while less pragmatic, could eventually prove transformative. "My ultimate goal is solving the mystery of why MCTS is working so well," he says. ❖

COLLEGE WELCOMES FOUR NEW FACULTY MEMBERS

For one it's been a homecoming. For another it's meant immersion in a completely new environment. For the others it's been like moving into new digs across town.

CECS's new faculty members have brought diverse backgrounds and areas of expertise to their new jobs, but all agree on one thing: joining the CSUN engineering and computer science faculty has been an excellent career move and promises to be personally and professionally rewarding.



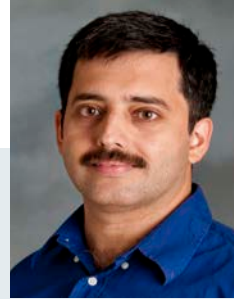
Alireza Kabirian
*Assistant Professor
Manufacturing Systems
Engineering & Management*

Alireza Kabirian, an assistant professor in the Department of Manufacturing Systems Engineering and Management and expert in operations research and applied statistics, has experienced more than his share of culture shock in his career. After earning his undergraduate and master's degrees in industrial engineering in Iran, he came to the U.S. to pursue a doctorate at Iowa State University. Following his Ph.D., he taught at the University of Alaska in Anchorage for two years before abandoning the frigid north for Southern California—a move that pleased his new wife, who was not inclined to endure the harsh arctic winters of the 49th state. While he admits that the region's cultural diversity and recreational opportunities played a part in attracting him to the area, since arriving at CSUN, Kabirian has been especially impressed with how helpful and friendly his colleagues have been. "Everybody here tries to help me as a new faculty member, even if I don't ask for help," he says. He also appreciates working at a teaching university. "CSUN is doing a good job educating our engineers for industry," he observes. "Here students will be more prepared for real-world problem solving. This is what we teach them."



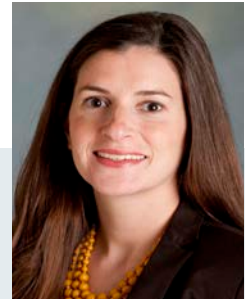
George Youssef
*Assistant Professor
Mechanical Engineering*

By contrast, **George Youssef**, an assistant professor in the Department of Mechanical Engineering, never really left the college. He arrived at CSUN as an undergraduate in 2003, earning his bachelor's degree in 2005. While working at his first job in aerospace, he began to pursue a master's degree and concurrently started teaching part time at CSUN—something he continued when he went on to UCLA for his Ph.D. While he enjoyed working in industry, he was eager to focus on academia because he has a passion for teaching and, he notes, "In teaching you have opportunity to switch focus so many times in your career, you never stop learning." As it happened, there was a job opening at CSUN when he completed his doctorate. He was hired, and now, he says, he feels as if he's back home. He especially enjoys interacting with students—something they have not failed to notice. Once, a student bet some friends \$20 that Youssef would still be in his office at 11 p.m.—a bet that he won. "The students kind of push you as a professor to perform better, through the questions they ask," he says. "I really enjoy that a lot."



Abhijit Mukherjee
*Assistant Professor
Mechanical Engineering*

Abhijit Mukherjee, who earned his bachelor's degree in India and his master's at Villanova University in Pennsylvania, is no stranger to Los Angeles but, he admits, during the five years he spent working on his Ph.D. at UCLA, he rarely crossed into the San Fernando Valley. So when he arrived at CSUN to interview for a job as an assistant professor of mechanical engineering, he was pleasantly surprised by the size and beauty of the campus. Now, as a member of the faculty, he particularly appreciates the student diversity, which he finds striking, and the quality of the campus facilities. "They're the best you can find anywhere," he says. An expert in heat transfer, fuel cell technology and microfluidics, Mukherjee was drawn to Southern California as much for its weather, art, culture and sports as for the excellent job opportunity in the College of Engineering and Computer Science. "LA is a very cosmopolitan place," he says. "I want to be successful in my career as a CSUN faculty member and at the same time enjoy life and give my kids the best possible experience. There is no better place than LA."



Ani Nahapetian
*Assistant Professor
Computer Science*

Ani Nahapetian, assistant professor of computer science, loves travel and photography and especially enjoys combining the two, but when it comes to her career, she hasn't ventured far from home. She grew up in the San Fernando Valley, then earned her bachelor's, master's and doctoral degrees at UCLA. Following her Ph.D., she taught for a year at California State University, Dominguez Hills before returning to UCLA as an adjunct professor and simultaneously working in the wireless health industry. "It was a great opportunity and a springboard for coming to CSUN," she explains. An expert in embedded systems, especially hardware-based system security and sensor systems with health applications, Nahapetian had been keeping an eye on CECS for job openings in computer science. "I knew that I loved to teach and CSUN was a great place to do that," she says. "I also had very positive impressions of faculty members I had met at local conferences." Now, only a few months into her faculty appointment, she hasn't once looked back. She has had very positive experiences with students and appreciates the university's supportive environment. "From all these interactions, I can tell this is where I want to spend the rest of my career," she says. ♦

Medtronic-funded research projects seek to advance diabetes treatment

The unique synergy between CSUN and the medical device company Medtronic Diabetes, located on the northernmost edge of the campus, regularly finds expression in research collaborations, internships and scholarships. Most recently, it has been manifest in research grants that the company (also known as **Medtronic MiniMed**) awarded to five CECS faculty members to fund one-year projects relevant to diverse aspects of diabetes and the company's signature insulin pumps. All projects are involving students as integral members of the research team.

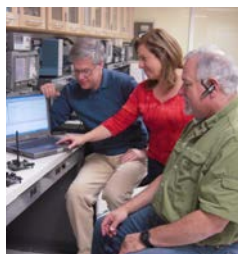
Testing polymers to coat

implantable sensors.



Implanting sensors under the skin to measure blood glucose on a continuing basis has the potential to simplify insulin regulation in diabetic patients, especially when paired with an insulin pump. But the technology is currently less than ideal because while the insulin pumps last five to eight years, the sensors, exposed to body fluids, degrade and have to be replaced every few months, which is expensive, inconvenient and painful. **Behzad Bavarian**, professor of manufacturing systems engineering and management, has received a grant to characterize and test different polymers to determine their suitability as coatings to protect the sensors and their compatibility with the human body.

Developing performance models of multi-device body area networks and body area to off-body networks.

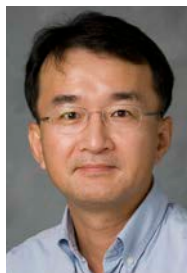


From left, Professors Flynn, Katz, and Schwartz

Someday, in the not-too-distant future, medical devices will use wireless technology to “talk” to each other and monitor such things as blood glucose levels in diabetic patients. Before that scenario can become commonplace, however, developers will need to

characterize a complex set of variables relating to sensor placement on the body and how the dynamics of movement, activity levels, stature, body contours and position affect data transmission between devices on and off the body. Electrical and computer engineering professors **Sharlene Katz**, **James Flynn** and **David Schwartz** have received funding to develop a model of transmission and absorption patterns for the radio waves that will transmit the data wirelessly. “Placing wireless sensors on bodies is a brand-new field,” says Katz. “There’s very little information on it. Wherever you put sensors—on an ankle, for instance—parts of the body may block signal transmission between devices. It’s a very complex problem.” The team

is aiming to develop a set of guidelines for sensor placement, and the model they create may eventually allow Medtronic’s engineers to design systems that can reliably monitor the blood glucose levels of children, for example, and alert a school- or home-based system when there is a problem that needs attention.



Integrating diabetes databases. As the amount of information proliferates, it becomes increasingly challenging to compile and mine relevant data. A team led by computer science professor **George Wang** is laying the groundwork for integrating multiple diabetes-related databases in ways that can benefit clinicians and patients (as well as Medtronic researchers). Under Wang’s direction, a student team made up of graduate student Justin Peckner and senior Ian Maxon, both in computer science, and Kevork Sepetci, an undergraduate in computer engineering, will create a prototype for a comprehensive diabetes database that synthesizes information from internal and external sources, providing “one-stop shopping” for anyone seeking data about diabetes.

Developing a feedback system to alleviate pressure on patients’ soles.



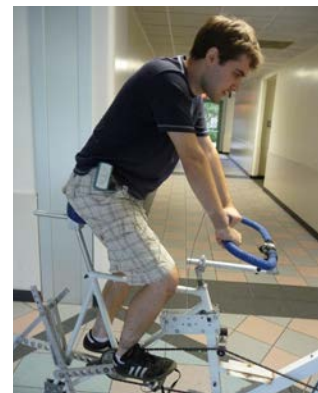
As diabetes progresses, one of the more common—and unfortunate—effects that patients may experience is the development of ulcers on the bottoms of their feet. In time, nerves may be choked off and die, leading to neuropathy; bones may become brittle, and patients’ arches may fall. Because they lack feeling in their soles, patients may not be aware of the problems, and many no longer walk with normal heel-to-toe flexion; the entire bottom of the foot hits the ground at the same time instead. Aksone Neuvong, D.P.M., at Olive View—UCLA Medical Center has been seeking a feedback system for diabetic patients that uses mapping information from the bottoms of their feet to determine pressure points and then stimulates nerves and leg muscles to change their gait, taking pressure off the sore spots and restoring normal flexion. **Ben Mallard**, a lecturer in electrical and computer engineering, is working with graduate students to create an interface between the commercial mapping unit and the nascent CSUN feedback system using Bluetooth protocol. “The patients will have electrodes in their socks or stockings, with sensors placed directly on the skin or proximal to the stimulation point for muscle and passive stimulation,” explains Mallard. “As they walk, the system will automatically stimulate the muscles to change their gait and deflect the pressure.” If successful, the project may also be applicable to other conditions that cause disability.

Factoring patient activity into insulin dosage.



Up to now, the medical device industry has relied on a model for insulin dosage that is predicated on a person’s dietary intake. If a patient monitors his or her current sugar level and anticipates having a large meal, for instance, based on that information, he or she will need to inject a certain amount of insulin. What is lacking in this model, however, is consideration of the patient’s physical activity throughout the day. A highly athletic person’s energy expenditure, for example, isn’t factored into the calculations, even though that activity is fueled by sugars in the body, and that person would consequently need less insulin. Mechanical engineering professor **C.T. Lin**’s project is seeking to develop a mathematical model for measuring

and incorporating patient activity into the equation for insulin dosage, based on information from sensors that patients could wear to determine how much energy has been consumed. While the initial phase of the project is a feasibility study, if it is successful, it could eventually lead to smarter insulin pumps and more accurate insulin dosing. Graduate students Ara Mekhtarian and Craig Euler are assisting Lin with the project. ❖



Student Craig Euler shows the sensor (above right) and how it is attached to a human subject to monitor physical activity. (Photo by student Ara Mekhtarian)

Northrop Grumman executive exemplifies spirit of Industry Advisory Board

About five years ago, C.T. Lin, professor of mechanical engineering, was trying to get a new student project under way. To move forward, his team needed an inertial guidance system, an expensive component used in navigation. Because the system was made by Northrop Grumman, CECS dean S. K. Ramesh approached the college's man on the inside, Charles Volk, to see if he could get it for Lin's team at a discount. Volk, vice president and chief technologist for the company's Navigation Systems Division, did better than that: he arranged for it to be donated. And last summer, using the unit, CSUN's team took first place in the national Intelligent Ground Vehicle competition (see page 8).



Graduate student Garrett Leonard works on the NovAtel IMU-LN200 Inertial Measurement Unit (IMU) donated by Northrop Grumman (Photo by student Ara Mekhtarian)

A longtime member of the CECS Industry Advisory Board, Volk has been a friend, advocate and supporter of the college for many years. Ironically, however, he's not an engineer himself. A self-described "physicist among engineers," he began his career at Litton Industries in 1977 after earning his Ph.D. from Indiana University. After a brief foray to the Aerospace Corporation, he returned to Litton in 1984, taking on increasingly responsible roles until becoming

Litton's vice president of engineering in 1999. When Northrop Grumman acquired Litton in 2001, Volk was named vice president of engineering and manufacturing for the Western region of Northrop Grumman's Electronic Systems Sector. He became chief technologist in 2003.

It was while he was Litton's VP of engineering that Volk joined the college's Industry Advisory Board—a move that he found useful in his work.

"I'm not looking to CSUN to give us technology, but I am looking to the college to provide a workforce that's technologically equipped," he says.

Because he was responsible for personnel as well as technology at the company, he was always on the lookout for talent. Although Litton, and later Northrop Grumman, hired from many universities, the names of employees who had attended CSUN filled five pages.

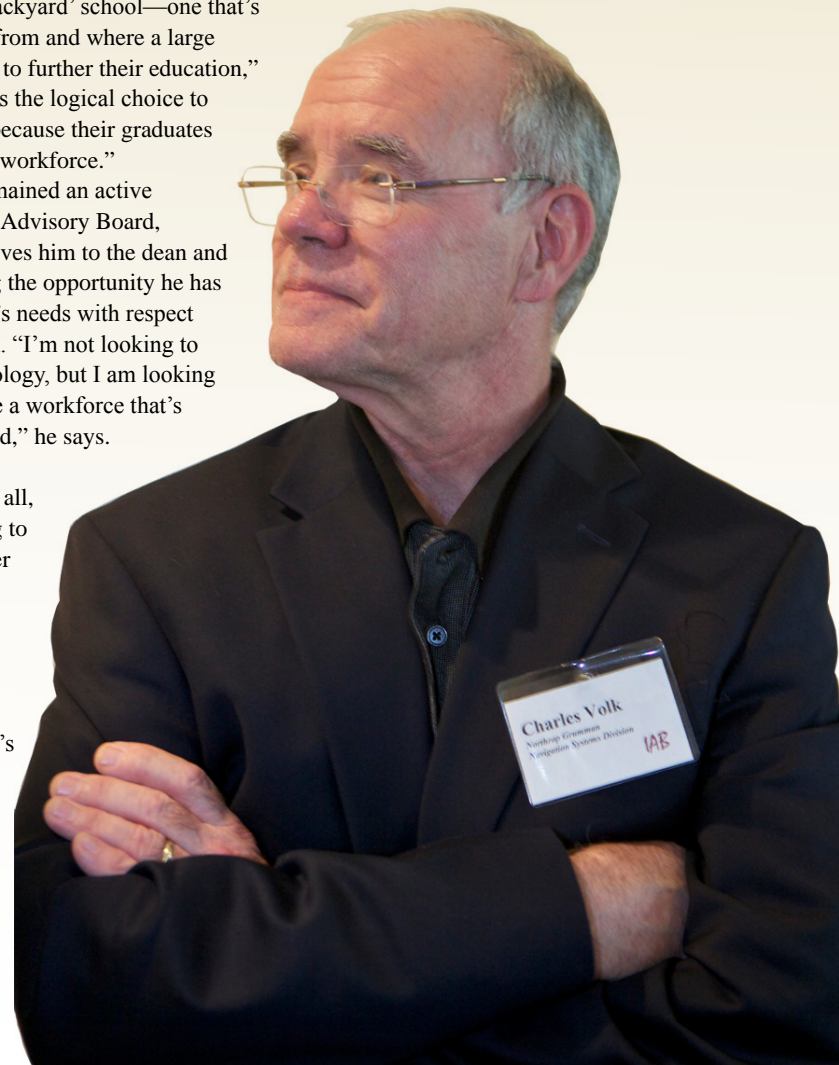
"Every facility has a 'backyard' school—one that's very close that we hire from and where a large number of engineers go to further their education," he explains. "CSUN was the logical choice to become involved with because their graduates were a large part of our workforce." Since then, Volk has remained an active member of the Industry Advisory Board, enjoying the access it gives him to the dean and faculty and appreciating the opportunity he has to express his company's needs with respect to technology education. "I'm not looking to CSUN to give us technology, but I am looking to the college to provide a workforce that's technologically equipped," he says.

What he enjoys most of all, however, is contributing to student projects, whether that means providing funding or equipment. "From an engineering point of view, student projects are the area I value most because that's where people really learn to be engineers," he says. "It also gives us an opportunity to see somebody's

creativity and gauge their potential—whether they can they think on their feet and go beyond the textbook." Not to mention, he adds, if students have worked on Northrop Grumman equipment, as employees they are more valuable because they become productive much sooner.

"I like knowing that I can rely on the university to be responsive to our needs and that they are

a resource for our workforce," he says. "Hiring employees is only the start of their education. It's nice to have an institution nearby that can provide the growth our people will need throughout their careers." ❖



Charles Volk, vice president and chief technologist, Northrop Grumman Navigation Systems Division

ALUMNI SPOTLIGHT



Gross (left) and fellow GRACE team members at the Plesetsk Cosmodrome, Russia

**The sky's the limit for
CECS alumnus**

Michael Gross

Michael Gross has one of the most exciting jobs on—or off—the planet: space exploration. The CECS alumnus (BS '96 summa cum laude, MS '08 with distinction, Electrical Engineering) has spent his entire career developing spacecraft for missions that are shedding new light on the universe and providing a rare view of Earth from outer space.

When Gross first arrived at CSUN, however, he didn't aspire to work for NASA. In fact, engineering was the farthest major from his mind. Not only had he found math challenging in junior high and high school, but his dreams were focused on the ocean depths and marine biology. After realizing the limited job prospects in that field, he decided to become a lawyer and switched his major to political science. It was only after he took a student job in the chemistry lab at the Los Angeles Department of Water and Power that he began to reconsider his options. Although bored by his own work assignments, he noticed that the student engineers working alongside him really seemed to be enjoying theirs. Maybe, he thought, he should give engineering a try.

Back at CSUN, he took an introduction to algorithms course. "It taught me to think and problem-solve, and after that everything made sense," he says. His academic performance took off, and he knew he'd found his niche.

As an engineering student, Gross became a leader, serving as vice president and then president of Tau Beta Pi. "I got to interact with some very dedicated and talented students who went on to become very good engineers," he says. "The camaraderie was very

rewarding." He also sat on committees for the college's ABET accreditation, which gave him a chance to work with faculty on an entirely different level.

About a year and a half before graduating, he learned of an opportunity that would change his life: a part-time job at the Jet Propulsion Laboratory. He applied and was hired and, he says, "I thank God every day for it." He has remained there ever since.

In the intervening years, Gross has held a succession of increasingly responsible and rewarding jobs. "I've worked on several missions that have brought around scientific firsts," he says. "That has been a major thrill."

These have included Project Cassini, which discovered four previously unknown moons of Saturn; GRACE (Gravity Recovery



Gross (left) in control room after the successful landing of the NASA Phoenix Mars Lander, May 25, 2008



Gross (far right) with GRACE team members at the Plesetsk Cosmodrome, Russia



The launch of the Gravity Recovery and Climate Experiment (GRACE), March 17, 2002



Phoenix Mars Lander launch, August 4, 2007

and Climate Experiment), which has documented the ice mass loss of Greenland and water loss in the San Joaquin Valley; NASA's Mars Rovers, which provided empirical proof that water once flowed on the surface of Mars; and NASA's Phoenix Mars Lander, which proved that water still exists on Mars today. Along the way, he was recognized with the NASA Exceptional Service Medal and the NASA Exceptional Achievement Medal.

Now serving as the flight system manager for the GRACE Follow-On project, he credits his outstanding CSUN education and mentoring for his success. "CSUN, being a teaching institution, gives you access to professors who teach you how to think and bring out the best in you," he says. "They taught me how to apply the subject matter, which made me useful from the very beginning. I owe almost everything I am to my mentors at Cal State Northridge and my father."

Gross maintains his connections to CECS by serving on the college's and electrical engineering department's Industry Advisory Boards. He delivered the 2011 commencement address and the alumnus speech the previous year. He has participated in TechFest and given keynote addresses to Tau Beta Pi and the college's IEEE student chapter. "Anytime they ask me to help, I help," he says.

After working with engineers and computer scientists trained at the world's top universities, he is convinced that a CSUN engineering education rivals that offered by any of them.

"I get to work with some of the best and brightest engineers in the world, but some of the best and brightest I've ever worked with came from CSUN," he says. "They're everywhere, and they should be proud of the school they went to because it is giving them the tools they need to succeed." ❖

STUDENT COMPETITIONS

2011 student competitions: A spring and summer of success

Looking back, 2011 may well go down as a record year in the annals of College of Engineering and Computer Science student competitions. CSUN teams won, placed and showed in a variety of local, national and international contests, capturing championships, awards and recognition from Long Beach to Copenhagen. The following are highlights of an unforgettable season.



Intelligent Ground Vehicle Competition

CSUN's Red RAVEN (for Robotic Autonomous Vehicle Engineered in Northridge) took the grand prize in the Intelligent Ground Vehicle Competition, which is cosponsored annually by the Association for Unmanned Vehicle Systems International (AUVSI) and the U.S. Army's Tank Automotive Research, Development and Engineering Center (TARDEC). The CECS entry beat out 47 other robots in the June contest, which was held at Oakland University in Michigan, including vehicles entered by U.S. teams representing Georgia Tech, Virginia Tech and Princeton and international teams from Canada, Japan, China, India, Jordan and the United Arab Emirates. It was the sixth time CSUN had entered the competition and the first time in the 19-year history of the event that a team from the West Coast took first place overall. Red RAVEN was a senior design project, and according to C.T. Lin, the mechanical



engineering professor who supervised the project, one of the advantages the 2011 team had was assistance from some very enthusiastic IGV alumni, who volunteered their time to advise the seniors. In the individual categories, Red RAVEN placed first in the design competition and first in the navigation challenge and fourth in the autonomous challenge, scores that earned it the top spot. The victorious team was made up of project manager Nicholas Robert Keyawa, along with Mohammed Alhadlaq, Omar Alshahrani, Peichun Chen, Rodney Cheong Ye Yeu, Mike Cowhick, Alfie Gil, Amiel Hartman, Manuel Hernandez, Joseph Horvath, Rome Kenmepol, Andrew Lee, Garrett Leonard, Ara Mekhtarian, Jimmy Mohan, David Prince, Michael Staudenmeir, Steve Valadez, and Po-Jen Wang. ❖



Human Powered Vehicle Challenge

For more than 30 years, the American Society of Mechanical Engineers (ASME) has challenged students to design and race vehicles that are powered by nothing more than old-fashioned muscle. At the 2011 Human Powered Vehicle Challenge (HPVC), held May 14 at Montana State University in Bozeman, the CSUN team raised the bar for future CECS contestants by placing higher than any previous team from the university. Designing the vehicle as a senior design project, the CSUN team, which built the frame

and faring from scratch, finished first in design, second in the sprint, second in the endurance race and second overall in the speed class. Members of the high-scoring team included Osvaldo Arvizu, Elie Attarian, Jesshaim Bradshaw, Joseph Brinson, Michael Capellan, Steve Chenevert, Michael Dahme, David Frye, Armando Gonzalez, Elizabeth Hernandez, Mitchell Johnson, Siavash Kademi, Kaitlin Kirk, Justin Larson, Michael Lusk, Mohamed Mohsen, Bryan Pavell, John Pinpin, Maria Segura and Nicholas Silveri. ❖

STUDENT COMPETITIONS



AUVSI Unmanned Air Systems Competition

A team of CSUN students saw their senior design project take flight June 15-18 at the 2011 Unmanned Air Systems Competition, held at the PAX River Naval Air Station in Eastern Maryland. It was CSUN's fourth year of competing but only its second year actually attending the competition, which is sponsored annually by the Association for Unmanned Vehicle Systems International (AUVSI). Each team is expected to demonstrate autonomous waypoint navigation through preprogrammed GPS points and then conduct an aerial search for objects on the ground before returning to base. The CSUN plane, dubbed the Flying Fox, placed sixth out of 26 teams—a significant jump from last year's

17th place finish. It was designed and built by a multidisciplinary team made up of 12 seniors, several junior volunteers and a number of graduate student advisors, supervised by mechanical engineering professor Tim Fox. Members included Ahmad Alromeadheen, Hakim Bachmid, Jose Bechara, Daniel Bliman, Anton Bouckaert, Ryan Carpenter, Narongphon Changkaochai, Hooman Fathinejad, Aaron Ferber, Mahdi Ghalami, Edwin Leyva, Fidel Lopez, Brian Nakamura, Mario Olguin, Ryan Schaafsma and Giovanni Tello from mechanical engineering; Pete Peña, James Brook and Shea Smith from electrical and computer engineering; and Sydney Dixon from computer science. ❖



CDIO Academy and Rethink City Competition

One could argue that CSUN, located in one of the world's great megacities, had an advantage over other entrants when it came to the 2011 CDIO Rethink City competition. The two-part competition, sponsored by the Conceive-Design-Implement-Operate (CDIO) Initiative—an innovative educational framework for producing the next generation of engineers—solicited ideas from students from around the world for reimagining and reengineering megacities. More than 400 responded last spring; at CSUN alone, teams of students submitted 40 ideas. But ultimately, it was engineering prowess that won the day. The CSUN students behind two of those concepts—a highly efficient single-seat-width car and a plan to generate electricity by capturing energy from human physical activity—were selected to participate in the second part of the competition, the Rethink City Innovation Camp. Six students—Jonathan Yeager (biology), John-Luke Laue (computer science), Shaunt Avanesian (mechanical engineering), Richard Walker (mechanical engineering), Kristoffer Larson (mechanical engineering) and Justin Larson (senior, mechanical engineering)—traveled to Copenhagen for the four-day camp, which took place June 19-23 at the Technical University of Denmark. They were accompanied by mechanical engineering professor Nhut Ho, who coadvised the teams along with ME graduate coordinator Mike Kabo. At the camp, the students further developed and refined their ideas with help from top international scholars on such topics as market analysis, securing venture capital, planning and development and identification of target audiences to develop specific marketing strategies. Along with peers from India, Asia, England, Europe and Australia, they enjoyed the multicultural aspects of the experience, attending classes, sightseeing, participating in impromptu sports, and taking part in other group activities. "They only slept about four hours a night because they were having too much fun," says Ho. In the end, the CSUN car team won the Best Pitch award, receiving a cash award and international recognition. ❖



SS12: Code for a Cause Competition

A team of CSUN computer science students took first place in the SS12: Code for a Cause competition finals on March 19 at the Center on Disabilities International Conference in San Diego. The event was sponsored by Project Possibility, a nonprofit organization dedicated to creating open-source software for persons with disabilities and educating students about accessibility and universal design concepts. The CSUN team, advised by Robert Lingard and made up of Victor Perez, Hung Quoc Nguyen, Chris Cederstrom, and Barack Karavani, had qualified the previous month at a local competition held at the university; other local competitions were held at USC and UCLA. The San Diego finals pitted the winning teams from

the three local competitions against one another as they made presentations and demonstrated their applications. A panel of judges consisting of representatives from Microsoft's Accessible Technology Group, Accessible Twitter, RIM, the WebAxe podcast, Johannes Kepler University Linz, the International Conference on Computers Helping People with Special Needs (ICCHP) and the Paciello Group evaluated their performance. Although CSUN's team faced stiff competition from the other teams, which included master's-level students, their project on flashcards for hearing and visually impaired users that can be used on computers and mobile devices carried the day, and they were awarded the top prize. ❖



IEEE Region 6 Southern Area Student Paper Contest

Electrical and computer engineering students Matthew Keyawa, Alex Darejeh and Ivan Ivakhniouk won first place in the IEEE Region 6 Southern Area Student Paper contest in Long Beach on May 7 for their paper titled "Design of a High Frequency Software Defined Radio Transceiver: Linux Embedded System Installation and HF Power Amplifier Protection and Control." In presenting their paper, which was based on their group senior design project, the trio competed against teams from ten Western states. Their win qualified them to go on to the regional competition in August in San Francisco, where they placed an impressive third against top students from the other four regions. Professors Sharlene Katz, James Flynn and David Schwartz supervised the ECE senior design projects and advised the team. ❖



From left, Russell Hunter, IEEE Southern Area chair, with students Matthew Keyawa and Alex Darejeh



Project Showcase shines spotlight on seniors

The breadth, creativity and expertise of the college's seniors were on full display April 29 at the second annual CECS Senior Design Projects Showcase. The half-day event, which featured oral presentations as well as an exhibition, was an opportunity for engineering and computer science seniors to demonstrate their mastery of their disciplines through the capstone projects that most had been working on for the entire year.

Projects ran the gamut from plans for transforming a drab parking lot into a sustainable park (Civil Engineering and Applied Mechanics) to a folding pickup truck bed extender (Manufacturing and Systems Engineering and Management); from an intelligent ground vehicle and human-powered vehicle (Mechanical Engineering) to a remote sensor network using software-defined radio on board an unmanned aerial vehicle (Electrical and Computer Engineering). Computer science teams weighed in with Web-based flash cards for students with cognitive and learning disabilities; an Android phone application to track courses and assignments; and a 3D update of a shareware video game. Construction management students prepared bid documents for a four-story, 28-unit apartment building.

Evaluating the projects were industry professionals, charged with determining which teams would be awarded the \$3200 in prizes, some of which were generously contributed by Anheuser Busch and Digital Energy, Inc. Faculty members served as moderators.

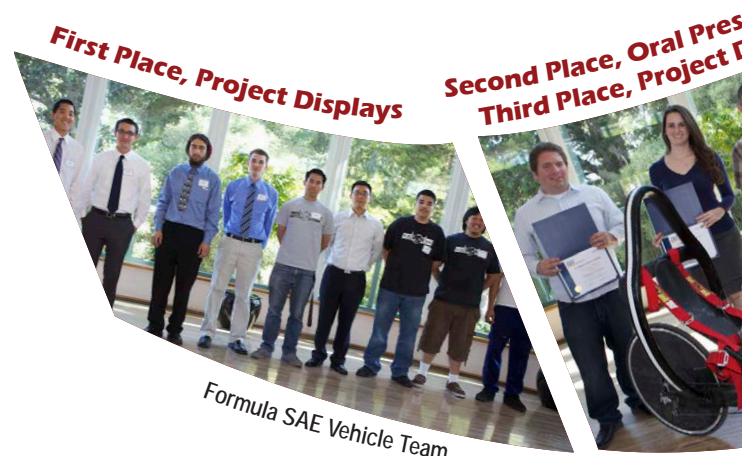
"The projects are getting more sophisticated," observes CECS dean S. K. Ramesh, "and people who happened to come to the Student Union that day were amazed."

Next year, plans call for expanding industry sponsorship, recognizing the top teams in each discipline and growing attendance.

"The showcase is a way to demonstrate the outstanding programs we have in the college," says Ramesh, "and to show that we educate problem solvers." ❖



Design of a Sustainable Green Space—Team 2



Formula SAE Vehicle Team

Human

Autonomous Aircraft for Aerial Observation Team



Matthew Keyawa's Oral Presentation: Protection and Control Circuitry in a High-Frequency Power Amplifier

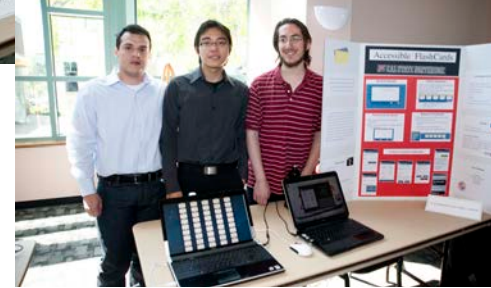
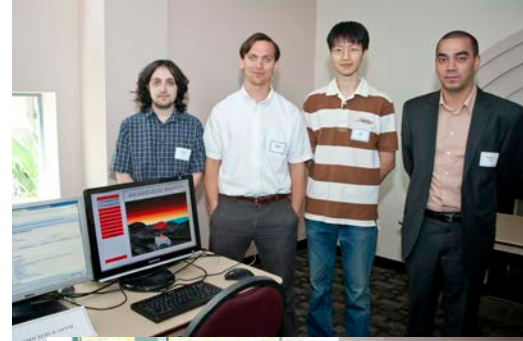




The Regent Lofts team with judges.



Autonomous Helicopter Team



Above: Scorched Earth Team
Below: Accessible FlashCards Team

**First Place, Oral Presentations
Second Place, Project Displays**



Powered Vehicle Team



Intelligent Ground Vehicle: Red RAVEN

Third Place, Oral Presentations



The Extender Team

Third Place, Oral Presentations



Design of a Sustainable Green Space - Team 1

The Regent Team



Wireless, Remote Micro-Powered Sensor Network Using Software-Defined Radio Team, Oral Presentation



Dean Ramesh (left) and associate dean Nagwa Bekir (far right) with Project Showcase judges Paul Gill (P&W Rocketdyne), Balaji Iyer (U.S. Navy), Bill James (Avery James), Imad Aboujawdah (Civil Design & Drafting), Lily Shraibati (MWD), Linda Friedman (Northrop Grumman), Neal Gaborno (Raytheon), Tony Magee (P&W Rocketdyne), and Carlos Rodriguez (LA Dept. of Transportation)



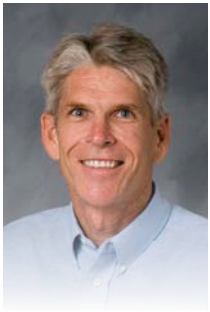
Classmate Team Droid



Intelligent Ground Vehicle Team



Faculty News



Robert Dale Conner is the coauthor of a paper titled "Effect of processing on Charpy impact toughness of metallic glass matrix composites" that was published in the *Journal of Materials Research*. In the study reported on in the paper, Charpy impact testing was used to investigate the effect of processing history and dendrite morphology of bulk metallic glass matrix composites (BMGMCs) on impact toughness. Composite samples were fabricated via suction casting and semisolid forging, and the results

were compared with crystalline alloys in the same geometry. A strong dependence on processing was observed, with samples exhibiting up to a 30-fold increase in impact toughness depending on processing and microstructure. Provided that attention is paid to processing techniques, BMGMCs are shown to have properties that equal or surpass some conventionally used crystalline alloys. These properties invite further exploration of these materials in structural applications.

Conner was also jointly issued a patent last May for a process for joining materials using bulk metallic glasses. The patent covers methods and compositions for a novel metal-to-metal or material-to-material joining technique using bulk metallic glasses. The method makes it possible to join a variety of materials at a much lower temperature than typical ranges used for soldering, brazing or welding.



Ileana Costea became the new MSEM department chair in August 2011. Costea is a professor of engineering automation/MSE and has been at CSUN since 1979.



Kaveh Houshmand Azad has been appointed to the 2011 Board of Examiners for the Malcolm Baldrige National Quality Award. The award, created by public law in 1987, is the highest level of national recognition for performance excellence that a U.S. organization can receive. The board is composed of approximately 500 leading experts selected from industry, professional and trade organizations, education and health care organizations, nonprofits

and government. As an examiner, Kaveh is responsible for reviewing and evaluating applications submitted for the Baldrige Award, which may be given annually in each of six categories: manufacturing, service, small business, education, health care and nonprofit.



Bruno Osorno is working with the University of Minnesota as part of a three-year project titled "A Nationwide Consortium of Universities to Revitalize Electric Power Engineering Education by State-of-the-Art Laboratories."

Now in its second year, the consortium is making excellent progress. CSUN's contribution will be a power electronics laboratory in CECS, with state-of-the-art equipment. Most of the equipment has been purchased and is in the testing phase; it will be ready for teaching by fall

2012. At the consortium's annual conference, at the University of Minnesota, in August of 2011, Osorno gave a poster presentation about the CSUN laboratory. He would like to acknowledge the continuing support of his department chair, Ali Amini, and the dean of the college, S. K. Ramesh, in this ongoing effort.

Osorno also secured \$5,000 from the campus IRA program to design and build a solar charging station for electric bicycles. This project will be carried out during the 2011-12 academic year.



Mark Rajai



Ahmad Sarfaraz

In fall 2009, engineering management professors **Ahmad Sarfaraz** and **Mark Rajai** participated in a joint project involving faculty and students from CSUN and the University of Louisville, based on integrating two culminating experience courses. This collaboration resulted in a paper co-authored by Feysal Montazeri, an EM/MSEM graduate student, and professors Sarfaraz and Rajai, that was recently published in the highly selective print and online journal International Journal of Technology Interface. This type of project benefits students as well as faculty and enhances the reputation of the CECS engineering management graduate program. In March 2010, Sarfaraz and Rajai started discussions to establish a collaboration between EM/MSEM and the Grenoble Ecole de Management University in France to offer CSUN students the opportunity to obtain a Ph.D. in engineering management.

Sembiam Rengarajan was appointed a distinguished lecturer by the IEEE Antennas and Propagation Society for 2010-12. He is one of nine distinguished lecturers appointed worldwide for this triennium. (For details, please see the CSUN press release issued June 8, 2011: [http://blogs.csun.edu/news/page/4/.](http://blogs.csun.edu/news/page/4/))



Rengarajan also received four awards from the National Aeronautics and Space Administration (NASA) for contributions to the development of scientific or technical innovations. These include 1) "Coupling between Waveguide-Fed Slot Arrays"; 2) "Scanning and Defocusing Properties of Microstrip Reflectarray"; 3) "Design, Analysis, and Development of a Large Ka-Band Slot Array for Digital Beam-Forming Application"; and 4) "Excitation of a Parallel Plate Waveguide by an Array of Rectangular Waveguides."

In addition, Rengarajan made a number of presentations at conferences. At the IEEE International Antennas and Propagation and USNC URSI Radio Science Meeting in Spokane, WA, in July 2011, he presented a co-authored paper titled "Ka band slot array antenna for interferometric synthetic aperture radar topographic mapping mission" and presented an invited paper in a special session on reflectarrays and transmit arrays titled "Investigation of Microstrip Reflectarrays for Non Broadside Beams."

He also chaired a technical session on Slotted, Guided and Leaky-Wave Antennas at the IEEE APS/URSI Symposium; presented an invited presentation titled "Innovations in Antenna Design" at the IEEE New Technology Conference at Boeing Corporation in Seal Beach, CA, in August 2011 and the same month presented a paper titled "Theory of a Traveling Wave Feed for a Planar Slot Array Antenna" at the XXX triennial International Union of Radio Science (URSI) General Assembly and Scientific Symposium in Istanbul, Turkey. ❖



COMMENCEMENT 2011



CSUN President
Jolene Koester



Commencement keynote speaker Michael Gross, B.S. '96 (Summa Cum Laude) and M.S. '08 (with Distinction) Electrical Engineering, member of the college's Industry Advisory Board



Dean S. K. Ramesh





Associate Dean Nagwa Bekir



Alumni speaker Nicholas Timinskas, BS '09 Computer Science



Dean Ramesh presenting the 2010-2011 Distinguished College of Engineering and Computer Science Graduating Scholar award to top graduating seniors Nicholas and Matthew Keyawa. Nicholas (right) graduated with a BS in Mechanical Engineering and a minor in Electrical Engineering, and his twin brother, Matthew (left), graduated with a BS in Electrical Engineering.



Student speaker Peter Beal (BS Computer Engineering)



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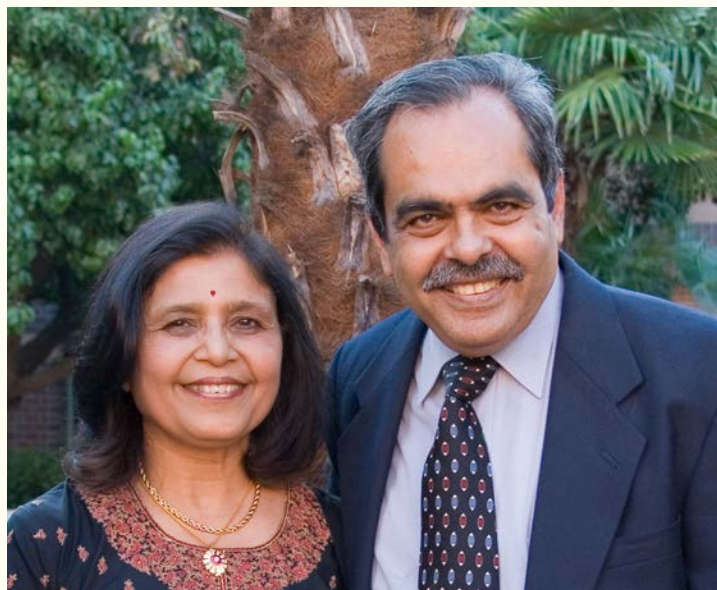
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* For gifts received July 2010 to August 2011.



Peter Leonhardt established the Peter M. Leonhardt Engineering or Computer Science Scholarship Endowment in 2007 to support working students with financial need. He has recently provided a substantial planned gift to supplement his endowment, which will benefit students in perpetuity.

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In memoriam:

DENNIS BRODIE



The College of Engineering and Computer Science lost a close friend when Dennis Brodie, chief operating officer of ResMed, Inc., passed away on August 31 at the age of 54. A CSUN alumnus twice over, he earned a B.S. in mechanical engineering in 1980 and an MBA in 1985, making Dean's List four times. Despite a demanding job and major professional responsibilities, he retained close ties to the university, contributing money

and time. According to his wife, Tina, he wanted to give something back to the university and was always proud to help CSUN students. He made sure that ResMed engaged engineering and computer science students through internships and career opportunities, and he was instrumental in the development of the master's degree program in assistive technology. From early 2008 on, he was part of the program's planning team, regularly attending meetings and helping to map out the curriculum. He then went on to teach a seminar series in the program. He was honored with a Volunteer Service Award by the university in 2008.

"He was an amazing person and played a vital role in building our new Assistive Technology program. This is a huge loss to the college and to me personally."

"I met Dennis when I first came to the university, and he has been a constant supporter of the college and our students over the past five years," says CECS dean S. K. Ramesh. "He was an amazing person and played a vital role in building our new Assistive Technology program. This is a huge loss to the college and to me personally."

"I was very fortunate to work with a person who had such great personality, always with a beaming smile," adds mechanical engineering professor C.T. Lin, who worked closely with Brodie for more than three years in planning and implementing the assistive technology master's program. "He made you feel comfortable working with him. Students from his classes had high praise for his devotion, enthusiasm for teaching and his approachability and availability. His passing has left a big void in the program. Personally, I have lost a great colleague and a close friend."

Brodie's wife, Tina, and his daughters, Jennifer and Nicole, sent a message thanking CSUN for "fulfilling his dream." ❖

COLLEGE INDUSTRY ADVISORY BOARD (IAB)

October 21, 2011 Meeting

The Industry Advisory Board of the College (<http://www.ecs.csun.edu/iab/>) meets regularly with the dean and the college leadership team. The Board advises the College on the relevancy and completeness of the engineering and computer science programs at CSUN; and assists in organizing joint activities which offer learning experiences involving both local industry and the College. This includes activities such as the Honors Co-Op Program, joint research projects, design clinics, and the organization of short courses, seminars, colloquia, and conferences through the College's Centers.



Dean emeritus Rick Ratcliffe and Dean Ramesh



IAB Chair,
Vaughn Cable,
Caltech-JPL



Gerry Picus received an award for his years of service to the college



Celebrating Dean emeritus Rick Ratcliffe's 83rd birthday.

Below, IAB members from left, Scott Smith (Edison), Mickey Brown (Edwards AFB), Charles Volk (Northrop Grumman), Felix Rabinovich (Amgen), Perry Solomon (Aleratec), Jack Coe (retired), Jack Buhn (Canoga Perkins), Carole Morton (Salt Interprises), Dutch Schultz (HAZMED), Chris Erickson (Pratt & Whitney Rocketdyne), Gary Mallaley (Northrop), Rick Ratcliffe (CECS Dean emeritus), Vaughn Cable (Caltech-JPL), Gerry Picus (retired), Neal Gaborno (Raytheon), and Dean Ramesh. Not pictured: Rory DeJohn (Turner Construction), Manish Gajjar (Intel), Darren Ghanayem (WellPoint), Mike Gross (JPL), Louis Hebert (retired), Balaji Iyer (Naval Air Warfare Center), Theresa Jester (SunPower), Peggy Nelson (Northrop), and Marilee Wheaton (The Aerospace Corp.)



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