



Nelson Sepúlveda

## Small Stuff, Big Impact: Seeking Applications for New “Smart” Material

**N**elson Sepúlveda, assistant professor of electrical and computer engineering, is investigating a phase-changing “smart material,” looking for new ways to move things at the micro level.

Funding for the research comes from three National Science Foundation grants, totaling \$860,000, to advance his work on vanadium dioxide (VO<sub>2</sub>).

Sepúlveda is working to enable VO<sub>2</sub>-based technologies that can allow for the integration of this smart, multifunctional material into micrometer-sized devices.

“My research group works on very small stuff,” Sepúlveda said. “Think about taking the motor of a car and making it fit inside a hair. You want to scale down and integrate all the individual parts so you can make the best use of the fully assembled system.”

“With the help from a very talented group of graduate students, we take an actuator and make it fit within the thickness of two hairs—a device that is about 200 microns. When perfected, it could allow for very precise microsurgery

and help surgeons pinpoint tissue for selective treatment,” he explained. “Other areas that are likely to be impacted by this research include RF circuits (antennas and transceivers), biomedical devices, sensors, actuators, and imagers.”

Sepúlveda said his collaboration with Xiaobo Tan, associate professor of electrical and computer engineering, will be key in advancing the control of VO<sub>2</sub>-based devices. “Any breakthroughs at the micro level will be very impactful.”

An actuator is a type of device for moving or controlling a mechanism or system. It is operated by a source of energy and converts that energy into motion. A microactuator does the same thing on a microscale.

Vanadium dioxide is a complex, strongly correlated “smart” material that experiences solid-to-solid phase transition when induced by temperature, ultrafast optical radiation, or an electric field. It is considered “smart” because it remembers what its previous state was.

Sepúlveda has looked at vanadium dioxide’s mechanical properties across phase transition since 2008. “A good example of a phase change is applying heat to ice. As you know, the physical properties of water are different from the

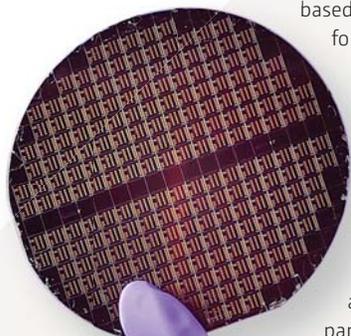
properties of ice,” he said. “The ice begins as a solid and goes through a phase change when temperature is applied and it turns to liquid. We are studying solid-to-solid phase transitions, where a solid becomes another type of solid. The change is very abrupt, fast, and it has hysteresis—which means that it has memory. The National Science Foundation is very interested in this new material.”

To read more on Sepúlveda’s research and VO<sub>2</sub> visit <http://bit.ly/1fpYX4n>.

The first of the NSF grants, valued at \$200,000, is meant to understand how phase-change materials could create wireless, reconfigurable antennas and radio frequency front-end systems to improve reception and provide more channels for transmitting data.

The second grant, for \$360,000, will create a comprehensive research plan for making the technology more applicable by improving its precision, speed, and strength.

The third grant is for \$300,000. Tan, as the principal investigator, and Sepúlveda, as the co-principal investigator, will investigate modeling and control methods for VO<sub>2</sub>-based microactuators to enable robust, precise, and efficient control of the micro devices. ❁



FROM THE CHAIR  
**Timothy Grotjohn**



I am pleased to extend my greetings to the alumni and friends of the Department of Electrical and Computer Engineering here at MSU.

The ECE department continues to grow, experiencing an increase in both faculty and student numbers. Fall semester undergraduate student enrollment was 700, the graduate student enrollment was 250, and the number of faculty members has reached 45.



This fall, Dr. Kalyanmoy Deb was named the Herman and Ruth Koenig Endowed Chair. Endowed chair positions provide the department with the opportunity to recruit top scholars who advance the educational and research programs here at MSU.

Five other faculty members, who joined the department in the past several months, were also welcomed into the department and are introduced in this newsletter.

I invite you to read through this issue to see some of the exciting research being done by the faculty and students. This newsletter focuses on a project that uses “smart” materials and a project that performs nondestructive evaluation to improve the inspection of aircraft. This past fall semester also marked the 10th anniversary of the Fraunhofer USA Center for Coatings and Laser Applications sharing laboratory facilities with department faculty and graduate students on our campus.

I also want to give special attention to the newsletter section that highlights some of the activities and accomplishments of department alumni. We are proud of our alumni. Lastly, the ECE students continue to rack up accomplishments. This newsletter describes a second-place win in the nation by an ECE Senior Design course team that entered their project in the 2012–13 Texas Instruments Analog Design Contest.

I invite you to stay in contact with us. Your collective ideas can help to continue to build and strengthen the ECE department. ❁

## MSU and Boeing to Use up to \$4 Million to Create New Sensors

MSU’s College of Engineering and the Boeing Company have been awarded a contract worth up to \$4 million from the U.S. Air Force to develop new designs of sensors that will better detect cracks in the second and third layers in airframe structures.

Lalita Udpa, professor of electrical and computer engineering, leads the effort to create a next generation of sensors that will identify aircraft structure that has

been weakened by subsurface cracks and corrosion.

“Airplanes are made of multiple layers of aluminum that are held together by thousands of fasteners,” she said. “Cracks can develop at the fastener sites in areas of high stress.

“Our job is to develop and apply simulation models for the design of a sensor that can reliably detect cracks that are deep into the third layers in the presence

of other complex edges and magnetic materials.”

Udpa said MSU was the Air Force Research Laboratory’s first choice as a research partner to work with Boeing.

“We’ll spend about 18 months designing and testing new sensor concepts and designs in the laboratory. Boeing will then build a portable system integrated with an on-aircraft scanner and validate their performance in the field,” she said. “During this phase, MSU will use the feedback from Boeing to further fine-tune the design.”

Electromagnetic sensor systems that incorporate magnetoresistive, or MR, detectors have been shown to have better capabilities than conventional current sensors for detecting cracks in thick and/or complex metallic airframes.

Udpa said the MR sensors will enable inspections of critical areas of an aircraft, minimizing the need for disassembly of the structure, thus decreasing the maintenance burden to ensure aircraft are structurally sound.

“The sensor packaging will need to be durable and reliable enough for daily on-aircraft inspection processes,” she said.

Udpa is an expert in nondestructive evaluation, or NDE, and has worked in the field for more than 20 years. NDE is similar to biomedical imaging, where x-rays and other methods are used for noninvasively visualizing the interior of organs.

“There aren’t many universities in the country with a long history of NDE experience,” she said. “Michigan State is among the few.” ❁



Xin Junjun and Gerges Dib are among the students who work with Lalita Udpa advancing scholarly activities in the NDE labs.



Doctoral student Shannon Demlow and ECE department chair Tim Grotjohn discuss equipment she uses in her electrical devices research.

## II-VI Funding Empowers MSU Graduate Students

**Shannon Demlow** is working to help create diamond electronic devices that could someday power the world's electrical grids and electric vehicles. **Runruo (Ted) Chen** and **Yunting Liu** are investigating power control systems using wide bandgap devices to increase their efficiency and reliability, leading to improved transmission of electrical energy.

These electrical engineering doctoral students are able to carry out this research because of the II-VI Foundation's Block-Gift Program for Graduate Student Support.

The II-VI Foundation commenced operations in May 2007. Pronounced "two-six," the name refers to columns II and VI on the periodic table of the elements, the two groups of elements that served as the basis for many of the early materials utilized by a publicly traded company of the same name—II-VI Inc. The company—which develops and manufactures optical and optoelectronic devices used in laser and sensor systems, with applications in industry, medicine, aerospace, and the military—and the foundation are unrelated but share the same chairman and technological interests.

"Our society has so many challenges that can be addressed by a highly educated, highly motivated, and creative engineering and scientific community,"

said Rick Purnell, executive director of the II-VI Foundation. "Our focus is on students—enhancing their research capabilities, their problem-solving and critical-thinking skills, and their ability to communicate. We want to help them develop the skill sets they will need to meet these challenges."

"It's clear that the II-VI Foundation is interested not only in the research that is being developed, but in the *students* as they are trained through the foundation's funding," said Demlow. "They genuinely care about every student they fund."

This is the second year of funding for the diamond electronic devices project carried out in the lab of Jes Asmussen, University Distinguished Professor of electrical and computer engineering, and Tim Grotjohn, professor and chair of electrical and computer engineering.

Fang Z. Peng, University Distinguished Professor of electrical and computer engineering, has received II-VI Foundation support for four years for research in his power electronics lab.

The research funded by the II-VI Foundation "involves a great deal of knowledge and skills in analog and digital circuit design, power electronic circuits and devices, and control theory," said Chen. "And we use what we learn in class to solve practical problems. The analytical

and hands-on experience combined provides a perfect cornerstone for us to build up our professional careers."

The two MSU projects are among the 21 academic research projects at 19 universities supported by the II-VI Foundation in 2013–14, and the only ones in the state of Michigan. 🌟

Physics PhD student Shreya Nad asks a question of University Distinguished Professor Jes Asmussen in the Fraunhofer facilities on campus.



## Fraunhofer Celebrates 10 Years at MSU

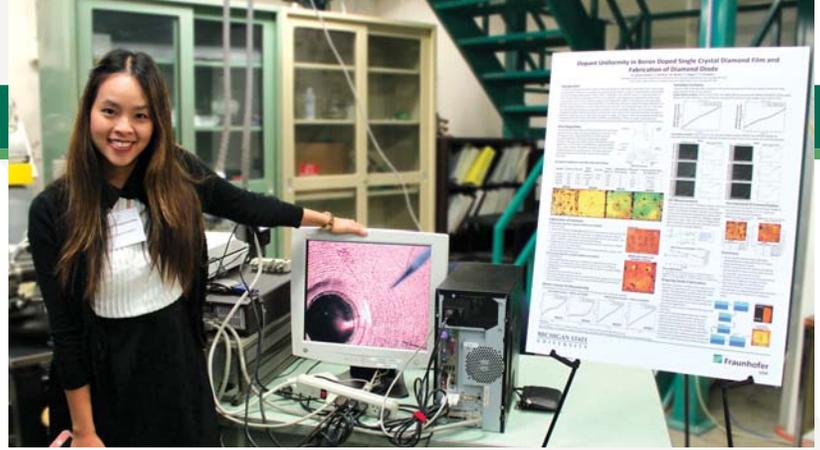
The Fraunhofer Center for Coatings and Laser Applications (CCL) celebrated its 10-year collaboration with research partner Michigan State University during an anniversary event at the Engineering Research Complex Sept. 13.

Fraunhofer CCL focuses its research on laser materials processing, and diamond materials and coatings. Its business is based on industry connections and collaborations.

“The Center for Coatings and Laser Applications is not only mutually beneficial to the partners but also provides applied research services to many companies in Michigan,” said William Hartman, executive vice president of Fraunhofer USA, Inc. “We are proud to be



 Fraunhofer



Nutthamon “Kwan” Suwanmonkha, doctoral student in electrical engineering

contributing to the economic development in Michigan.”

Jes Asmussen, executive director of Fraunhofer USA, Inc. CCL and an MSU University Distinguished Professor of electrical and computer engineering, welcomed guests and spoke on the “Ten Years of Success in Science and Engineering.” Asmussen is an international expert in diamond coatings, plasma system technology, and microwave processing of materials.

MSU President Lou Anna K. Simon

called MSU’s collaboration with Fraunhofer “a smashing success” and thanked the German organization for a decade of helping students learn about real-life problems in real time. “The tribute to Fraunhofer is that this venture is even bigger and stronger than we dreamed of 10 years ago. We are extraordinarily grateful,” she added.

The Fraunhofer-Gesellschaft is the leading organization for applied research in Europe, conducted at 66 Fraunhofer Institutes located throughout Germany. ❁

## Awards & Honors

### Deb Named Koenig Endowed Chair

Professor **Kalyanmoy Deb** was installed as the Herman E. and Ruth J. Koenig Endowed Chair in MSU’s Department of Electrical and Computer Engineering during an investiture ceremony on Nov. 21.

The endowed chair was established in 2001 to recognize Koenig’s scholarly and academic leadership achievements and his progressive contributions to furthering engineering education.

Deb said the position gives him the opportunity to engage in research and development of efficient multi-criterion optimization and decision-making methodologies and promote their application to real-world industrial problems.

“Optimization problems commonly arise in most scientific, business, and engineering problem-solving activities. I plan to take this chair professorship as an opportunity to facilitate their widespread use in both academia and practice through teaching, research, and service,” said Deb. “I have now established the Computational Optimization and Innovation Laboratory (COIN) in the ECE department to provide fundamental research and developmental work in the optimization area and to work on application studies with industry.”

Deb holds joint appointments in two



Roger Koenig, Kalyanmoy Deb, and Satish Udpa

other departments within the college—computer science and engineering, and mechanical engineering—and contributes to research at the BEACON Center for the Study of Evolution in Action, an NSF Science and Technology Center headquartered at Michigan State University.

Prior to joining MSU, Deb was a professor of mechanical engineering and the Deva Raj Endowed Chair and Gurmukh and Veena Mehta Endowed Chair at the Indian Institute of Technology (IIT) Kanpur, as well as director of the Kanpur Genetic Algorithms Laboratory (KanGAL), which he established in 1997.

“The Koenig Endowed Chair title brings honor to my position. I feel that this title will constantly guide me to be more responsible and work under the ideolo-

gies of Professor Herman Koenig. I accept the honor to be part of the engineering faculty at MSU and occupy the Koenig Endowed Chair. My family members and I are thrilled to be a part of the MSU community.”

The Herman E. and Ruth J. Koenig Endowed Chair was established in 2001 by their son Roger Koenig, who earned an electrical engineering degree at MSU in 1976, and his wife, Nancy Pierce. The endowed chair recognizes Herman’s scholarly and academic leadership achievements, and honors Herman and Ruth’s long-term devotion to MSU and their progressive contributions to furthering engineering education.

Read more on the Koenig Chair at <http://bit.ly/MzEBvD>. ❁

## New Faculty

**John Albrecht** joined the ECE department as an associate professor in November 2012. He has a joint appointment in the Department of Chemical Engineering and Materials Science. His research focuses on multi-scale transport phenomena in semiconductor materials and devices operating under high electric field and thermal stress conditions. Before coming to MSU he was a program manager with the Defense Advanced Research Projects Agency in the Microsystem Technology Office from 2009 to 2012 and developed programs in wide bandgap semiconductor power amplifiers, ultraviolet diode lasers, sub-millimeter wave electronics, and vacuum electronics. He held prior positions at the Naval Research Laboratory in the electronic materials branch, the Los Alamos National Laboratory in the theoretical physics division, and the Air Force Research Laboratory's sensors directorate. He received his PhD in electrical engineering from the University of Minnesota in 1999.

**Andrew Christlieb** joined the ECE department as an associate professor in August 2013. He joined the MSU mathematics faculty in 2006 and currently holds a joint appointment in the Department of Mathematics. His research focuses on numerical analysis, scientific computing, and mathematical modeling for temporal and spatial multi-scale problems in physics and engineering. Before coming to MSU, he was an assistant professor of mathematics at the University of Michigan. He received a BS in engineering mathematics, a BSE in electrical engineering, and a BS in mathematics, all with honors, from the University of Michigan—



John Albrecht



Andrew Christlieb



Mark Iwen



Daniel Morris



Chuan Wang

Dearborn in 1996. He also earned an MS in applied mathematics in 1998, and a PhD in mathematics and computers in engineering in 2001 from the University of Wisconsin, Madison.

**Mark Iwen** joined the ECE department as an assistant professor in August 2013. He has a joint appointment with the Department of Mathematics. His research interests include signal processing, computational harmonic analysis, and algorithms for the analysis of large and high dimensional data sets. Before coming to MSU, Iwen was a visiting assistant professor at Duke University. Prior to that, he was a postdoctoral fellow at the Institute for Mathematics and its Applications (IMA). He received his BS in computer science and mathematics from the University of Wisconsin, Milwaukee, in 2002; and his PhD in applied and interdisciplinary mathematics from the University of Michigan in 2008.

**Daniel Morris** joined the ECE department as an associate professor in August 2013. His research focus is 3D computer vision, multi-sensor target tracking and pose estimation, LIDAR and range sensing, and object detection and categorization. Prior to joining the ECE faculty, Morris was a senior engineering specialist at Caterpillar's Pittsburgh Automation Center where

he developed sensor fusion algorithms for large mining equipment. Before that, he worked at General Dynamics Robotic Systems as a principal investigator for the Army Research Laboratory's Robotics Collaborative Technology Alliance. His research there included multi-sensor target detection, categorization, and tracking for unmanned ground and water vehicles. He received his BSE in mechanical and aerospace engineering at Princeton University in 1994 and his PhD in robotics from Carnegie Mellon University in 2001.

**Chuan Wang** joined the ECE department as an assistant professor in August 2013. His current focus areas of research include flexible electronics, stretchable electronics, roll-to-roll printed electronics, and RF electronics using various types of nanomaterials including carbon nanotubes, graphene, 2D III-V nanomembranes, and layered transition metal dichalcogenides. Prior to coming to MSU, he worked as a postdoctoral scholar in the Department of Electrical Engineering and Computer Sciences at the University of California, Berkeley, with a joint appointment in the Materials Sciences Division at Lawrence Berkeley National Laboratory. Wang received his BS in microelectronics from Peking University in 2005 and his PhD in electrical engineering from the University of Southern California in 2011. 🌟

## Peng Receives University Distinguished Professor Honor



**Fang Zheng Peng**, professor and director of the MSU Power Electronics and Motor Drives Laboratory, was among nine MSU professors to earn

the title of University Distinguished Professor in 2013. This title is among the highest honors bestowed on faculty members by the university. Those selected for the title have been recognized nationally and internationally for the importance of their teaching, research, and outreach achievements. The honor was recommended by President Lou Anna K. Simon and

approved by the Board of Trustees in June.

Peng's principal scholarly interests include power electronics, motor drives, hybrid electric vehicles, and renewable energy interface systems. His work focuses on advanced R&D on power conversion technology and motor control for renewable energy, utility, and transportation applications.

## Verboncoeur Elevated to IEEE Fellow



**John Verboncoeur**, professor, was elevated to IEEE fellow level in 2013 in recognition of his contribution to computational plasma physics and

plasma device applications.

Conferred by the board of directors, IEEE fellow is the highest grade of membership and is recognized by the technical community as a prestigious honor and an important career achievement. The total number of fellows selected in any one year cannot exceed one-tenth of one percent of the total voting membership.

IEEE is the world's leading professional organization for advancing technology for humanity. Through its 450,000 members in 160 countries, the IEEE is a leading authority on a wide variety of areas—ranging from aerospace systems, computers, and telecommunications to biomedical engineering, electric power, and consumer electronics. 🌟

Timothy A. Adcock and Tim Grotjohn



### 2013 John D. Ryder ECE Alumni Award

**Timothy A. Adcock** (BS '85) received the 2013 John D. Ryder Electrical and Computer Engineering Alumni Award at the annual College of Engineering Alumni Awards Banquet in May. Established in 2004, this award commemorates the outstanding professional contributions of John D. Ryder, former dean of the College of Engineering and a professor in the department. The award is given on the basis of contributions in furthering the mission of the department.

Adcock has more than 25 years' experience in application and systems engineering. A significant amount of his career was spent at Texas Instruments, working to successfully implement, launch, and support embedded processing and digital signal processing products worldwide.

He has served as director of Texas Instrument's Motor Lab in the Kilby Advanced Research and Development facility in Dallas, Texas, since early 2011. Previous to that, he held various engineering and engineering management positions at Texas Instruments, including positions in imaging and audio products, storage products group, wireless handsets, and sales and marketing field application engineering.

He began his career at TI as an applications engineer in Los Angeles, where he was responsible for the design of automotive electric subsystems and hard disk drives. He then took on responsibility for creating and managing the first dedicated hard disk drive field applications team and later managed all of the system engineering activity for TI's storage products group. After that he moved to the wireless areas as director of North American wireless

field applications engineering, which also included five regional ASIC design centers dedicated to creating specific ICs for TI's wireless handset customers.

After moving to Texas from San Jose in 2001, he took on management of worldwide system engineering activity for TI's new imaging and audio products group. He managed engineering and software development teams in Japan, India, and North America, focused on development of camera and audio system ICs. He and his team were responsible for system-level IC verification, hardware system design, software development, and successful launch of several camera and audio SOC products. He also worked to implement TI's first web-based software repository, which enabled customers to purchase and download specific applications code. After that he managed the regional digital applications engineering team for the southern United States, focused on designing radio, communication, entertainment, video, and metering systems.

Prior to joining Texas Instruments in 1990, Adcock worked at both McDonnell Douglas and Northrop Corporation in Los Angeles.

### Shanahan Steps Down as Society of Women Engineers Director, CEO



**Betty Shanahan** (BS '78) has stepped down as executive director and CEO of the Society of Women Engineers (SWE) after more than 11 years leading the premiere organization for women engineers.

"It's hard to imagine SWE without Betty's enthusiasm, passion, and drive. Her continued dedication to the missions and ideals of our organization are an inspiration for everyone she meets," said Stacey DelVecchio, SWE's president. "Betty has taken the society to new heights and has done much to move us forward into increasing spheres of influence."

Under Shanahan's leadership, the organization has grown considerably in a number of ways to address the changing needs of women in engineering. She is credited with founding numerous partnerships between SWE and other professional engineering organizations as well as positioning SWE to be the voice on public policy issues that impact the advancement of women in engineering. SWE has grown its membership from 15,000 to more than 25,000 members while also doubling attendance at its annual conference during her tenure.

Shanahan joined SWE in the '70s and volunteered extensively on committees and as a leader. She invested 24 years in development, engineering management, and marketing for the electronics and software industries.

Shanahan serves on a number of advisory boards and committees and has been awarded myriad accolades for her contributions to the engineering industry. She was the first woman to receive the Claud R. Erickson Distinguished Alumni Award from MSU's College of Engineering and was named one of STEMConnector's "100 Women Leaders in STEM."

"I am grateful for the opportunity to lead SWE for the last 11 years. While I expect SWE to continue with strong growth and increasing impact in the profession, I personally feel that it is time for me to begin a new chapter in my career. I am proud of the HQ [headquarters] team that I built and led and expect they will take SWE to even greater accomplishments," Shanahan said.

In addition to her BS in electrical engineering from MSU, Shanahan holds a master's in software engineering from the Wang Institute of Graduate Studies and an MBA in strategic management from the University of Chicago Booth School of Business. She was recently awarded an honorary PhD from the University of Connecticut.

Shanahan stepped down on Dec. 31, 2013, but will continue to assist SWE during early 2014 as the organization's leadership transitions into its new roles. Karen Horting, the organization's current deputy executive director, will assume the role of CEO and executive director. ❁



## Class Notes

**Robert Fredericks** (BS '67, MS '68, PHD '71) has joined the iSchool at Drexel University in Philadelphia, Pa., as an adjunct professor. He teaches software engineering, information technology, and information systems courses. He previously spent 30 years at Bell Labs/Bellcore/Telcordia Technologies and 10 years teaching in the Department of Computer Science and Software Engineering at Monmouth University in New Jersey.

**John Law** (BS '87) was recently named to the newly created position of vice president, Enterprise Product Strategy, at ProQuest's headquarters in Ann Arbor, Mich. He will lead initiatives that enable coordination among ProQuest's business areas, leveraging the company's breadth of expertise and assets to create product and service innovations.

Credited with the invention of the Summon service, Law—as vice president of Discovery Services at Serials Solutions—has spent the past five years guiding it from initial development through its most recent advances. Prior to leading Discovery Services, Law managed the ProQuest

platform, with responsibility for strategic planning, user research, and definition of new features.

**Joanne M. Maguire** (BS '75) was appointed to the board of directors of Freescale Semiconductor, Ltd., in November. She brings a wealth of experience associated with large-scale, technology-related businesses and her experience in the aerospace and defense industry spans three decades.

Maguire joined Lockheed Martin in 2003 and served as executive vice president of Lockheed Martin Space Systems Company from 2006 until she retired in May 2013.

In 2010 she was the first woman to receive the International von Kármán Wings Award, which has been presented annually since 1985 to an aerospace pioneer by the California Institute of Technology's Aerospace Historical Society. In 2011 she was elected to the National Academy of Engineering, and in 2012 she received the distinguished Peter B. Teets Award from the National Defense Industrial Association.

Maguire is a fellow of the American Institute of Aeronautics and Astronautics and currently sits on the board of the Charles Stark Draper Laboratory, an independent not-for-profit research and development laboratory.

In addition to her BS degree, she earned an MS degree from the University of California, Los Angeles.

**Saurav Shrestha** (BS '10) said he is "Proud to be an American!" He became a U.S. citizen on May 10, 2013, after living here for more than 12 years. His parents attended the ceremony, which was held in Dearborn, Mich.

"As a Spartan through and through, I wore my Michigan State University tie to show my gratitude to MSU for its role in helping make this day possible," Shrestha said.

Shrestha also received a second degree in mathematics. During his undergraduate years at MSU, he held a co-op position at Toyota in Erlanger, Ky. He then worked for ArcelorMittal in Indiana Harbor, Ind. In 2011, he accepted a job with Toyota in Ann Arbor, Mich. ❁

## student networks

### Student Team Places Second in Texas Instruments Competition

A team of ECE students took second place at the 2012–13 Texas Instruments (TI) Analog Design Contest in Dallas in August 2013.

**Chaoli Ang, Justin Bohr, Xie He, Nate Kesto, Yuan Mei, and Mike Mock** won \$7,500 for their success with an Electrocardiogram (ECG) Demonstration Board. Mock and Bohr graduated in May and now work for TI in Dallas in analog applications.

Mock said the team worked together on the portable ECG for months. Their challenge was to measure and display a reliable and low-noise ECG signal.

"The basic idea was to create a portable demonstration board that users can interact with at trade shows and tech shows to allow them to display their actual personal ECG signal," Mock explained. "We designed an analog front end board that interfaced with a Stellaris microcontroller running an oscilloscope application."

Texas Instruments sponsors the TI Analog Design Contest each year as a

way to inspire engineering students and foster tomorrow's innovators. During the 2012–13 school year, 450 students from 47 accredited engineering colleges and universities participated.

Rochester Institute of Technology took first prize and the University of Puerto Rico at Mayaguez finished third.

### MasterCard Foundation Scholars Program: Leading Change through Education

MSU and The MasterCard Foundation are partners on a scholars program, which provides full tuition scholarships to undergraduate and master's degree students from Sub-Saharan Africa who have demonstrated academic talent, are economically disadvantaged, and have a personal commitment to give back to their countries. Four freshmen in the ECE department are among the 26 scholars selected for the fall 2013 cohort.

**Simbarashe Chidyagwai** of Zimbabwe plans to pursue graduate studies,

eventually earning a PhD. His hope is to develop new methods for providing sustainable energy in his home country, which could lead to the revival of the industrial sector, which has collapsed due to the 2008 economic crisis. **Heather Kerubo** of Kenya hopes to develop projects that will help people come out of poverty or at least live above the poverty line. She plans to help more children gain access to education. **Arnold Cornellius Mutayoba** of Tanzania has a passion to help his home country further develop its information technology system. He believes that Tanzania has the potential to grow exponentially—both economically and socially—due to vast economic development, including the mining of gas and oil along the Mtwara region coast. **Mohamed Warsame** of Somalia was born and raised in Mogadishu where he was "afraid to go to school because of bombs in the road." He said: "I am looking forward to making my dream come true—to help develop my country." ❁



**Simbarashe Chidyagwai**, one of four fall 2013 MasterCard Foundation Scholars

# keeping in touch

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## Construction Begins on Bio Engineering Facility

Construction began June 19 on a new 130,000-square-foot, four-story Bio Engineering building where scientists will collaborate on innovative research in the human health areas, nanotechnology, robotics, tissue engineering, and imaging. The \$60.8 million facility is planned to open August 2015 and is located between the Life Science and Clinical Center buildings on the south side of campus.

The project was authorized by the Board of Trustees in April 2013 to bring together research teams from the Colleges of Engineering, Human Medicine, and Natural Science to promote the development of bio engineering and engineering health sciences. "By housing faculty from several colleges in this facility—with complementary research talent—we will be able to make great strides in medical technology through daily collaboration," said Leo Kempel, acting dean of the College of Engineering. "This not only benefits the research enterprise, but it also will provide new learning opportunities for our students."

The engineering focus will be on translational technologies in home healthcare, out-patient, and hospital use. Examples of research projects include body-worn sensors to detect biometric details of a patient's home-based physical activity to help nurse practitioners in their delivery of health care; devices designed to aid physicians in re-training a patient's nervous system to overcome physical limitations; and research in patient physical manipulation to avoid pressure ulcer formation (bed sores).

The increase in space facilitates the hiring of new faculty for the College of Engineering—about 30 faculty members can be housed in the new building. 