Greetings from Rolla! We hope that this issue of the Current Transmissions finds you in good health and enjoying life.

Last Fall, on-campus undergraduate student enrollment increased from 391 to 410, and the enrollment in the cooperative program with Missouri State University (MSU) is about the same, so our overall undergraduate enrollment increased, from 428 to 446. We received new funds for a non-tenure track teaching position to specifically transform the sophomore-level laboratory courses to support online students and to further develop blended/online courses in the department at the sophomore level. This effort will also benefit the cooperative program with Missouri State University (MSU) and our transfer institutions.

On-campus graduate student enrollment increased significantly, from 212 to 248 last Fall. Including distance graduate students, there are a total of 279 graduate students. As an incentive to increase the number of CpE PhD students, the department continues to sponsor two-year fellowships for up to three new CpE PhD students. Research expenditures last year decreased to $7.1M from the previous year, which was $8M.

Last summer, the campus completed a year-long strategic planning process to determine clear and compelling strategies to guide our campus toward its 2020 vision. In response to this plan, the University of Missouri system awarded $3.2M in new funding to support the strategic plan. In response to a proposal from the department, we received one new faculty position for a non-tenure track teaching position to specifically transform the sophomore-level laboratory courses to support online students and to further develop blended/online courses in the department.

The department is also working on revising our strategic plan to align it with the campus plan and compelling strategies to guide our campus toward its 2020 vision. In response to this plan, we received one new faculty position for a non-tenure track teaching position to specifically transform the sophomore-level laboratory courses to support online students and to further develop blended/online courses in the department.

The department is also working on revising our strategic plan to align it with the campus plan and expect to complete that by March.

The campus is reorganizing to bring back deans and we will be part of the College of Engineering and Computing. The dean search is just starting and will be concluded this summer or fall.

I will be stepping down as department chair this summer. It has been a fun 12 years as chair, but is time to “pass the torch.” We are conducting a search and expect we will be able to find a capable leader that will further advance the department.

As always, we welcome your input and ideas. I thank each of you for your continuing interest, support, and encouragement. Your support has allowed the department to continue to advance. Please keep in touch!

Kelvin T. Erickson
Chairman and Professor of Electrical & Computer Engineering

2014 Calendar of Events

**SPRING 2014**
- Open House--President’s Day: FEB 17
- Recess--St. Patrick’s: MAR 13-17
- Spring Break: MAR 23-MAR 31
- Open House: APR 18
- May Commencement: MAY 16, 17

**FALL 2014**
- Semester begins: AUG 25
- Labor Day Holiday: SEP 1
- Open House: OCT 4
- Homecoming: OCT 17-18
- Open House: NOV 1
- Thanksgiving Holiday: NOV 22-DEC 1
- December Commencement: DEC 19, 20

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- Dr. Cunningham recognized by HKN
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- 2013 Faculty Achievement Award
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- Eta Kappa Nu
- ASEE ECE Division award to Chancellor
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Academic Scholars

Spring 2013
- Electrical Engineering (101)
- Computer Engineering (57)
Fall 2013
- Electrical Engineering (103)
- Computer Engineering (61)

Contact Current Transmissions

If you would like to contact us for any reason, you can reach us by phone at (573) 341-4543 or by email at ece_alum@mst.edu. Our mailing address is: Electrical & Computer Engineering MISSOURI UNIVERSITY OF SCIENCE AND TECHNOLOGY 144 Emerson Electric Co. Hall 301 W. 16th Street Rolla, MO 65409-0040
ATTN: Current Transmissions
Egemen K. Çetinkaya

Egemen K. Çetinkaya is Assistant Professor of Electrical & Computer Engineering at Missouri University of Science and Technology (formerly known as University of Missouri—Rolla). He received the B.S. degree in Electronics Engineering from Uludağ University (Bursa, Turkey) in 1999, the M.S. degree in Electrical Engineering from University of Missouri—Rolla in 2001, and Ph.D. degree in Electrical Engineering from the University of Kansas in 2013. He held various positions at Sprint as a support, system, and design engineer from 2001 until 2008. His research interests are in resilient networks. He is a member of the IEEE Communications Society, ACM SIGCOMM, and Sigma Xi.

Pourya Shamsi

Pourya Shamsi joined the electrical and computer engineering department as an assistant professor in August 2013. He received his BSc from the University of Tehran, Iran in 2007 and Ph.D. degree in electrical engineering from the University of Texas at Dallas, Richardson in 2012. His Ph.D. dissertation was focused on stability assessment of a hybrid micro grid. Prior to starting his Ph.D. studies, Pourya was working as the R&D director of the Power Supply Production Co. (PSP), Iran. His research interests are power electronics, smart grids, motor drives, reliability and stability assessment, and control.

Missouri S&T Chancellor Cheryl B. Schrader named IEEE Fellow

Dr. Cheryl B. Schrader, chancellor of Missouri University of Science and Technology, has been named an IEEE Fellow in recognition of her leadership and contributions in engineering education. The honor is the highest grade of membership in the organization. The IEEE (formerly known as the Institute of Electrical and Electronics Engineers) confers the grade of fellow upon those with an outstanding record of accomplishments in any of the IEEE fields of interest. The total number selected in any one year cannot exceed one-tenth of 1 percent of the total voting membership.

Schrader is a past president of the IEEE Control Systems Society, which has more than 10,000 members worldwide. She represents IEEE on the ABET Engineering Accreditation Commission, which is dedicated to providing world leadership in stimulating innovation and excellence in engineering. Schrader was a former IEEE director of the American Automatic Control Council and has served the IEEE at the institutional, technical and regional levels. In 1984, Schrader earned a bachelor of science degree in electrical engineering from Valparaiso University in Valparaiso, Ind. She earned master of science and Ph.D. degrees in electrical engineering from the University of Notre Dame in 1987 and 1991, respectively. Her research background is in the area of systems and control. Schrader has received several best paper awards, authored 100 publications, delivered more than 100 invited presentations and keynote addresses, and secured grant and contract funding in excess of $11 million.

Prior to joining Missouri S&T, Schrader served as associate vice president for strategic research initiatives and dean of engineering at Boise State University. While dean, the college’s undergraduate engineering enrollment increased by 60 percent, graduate enrollment increased by 36 percent, and funding for research grants and contracts in the college more than tripled.

Schrader began her teaching and research career at the University of Notre Dame while undertaking internships and consulting work with McDonnell Douglas Astronautics Co. in the early 1980s and Chimera Research in the early 1990s. Following a brief period as an adjunct assistant professor at Rice University in 1991, Schrader moved to the University of Texas at San Antonio, where she rose to professor of electrical engineering and associate dean at both a college of sciences and a college of engineering. She then joined Boise State in 2003.

A passion for STEM Passionate about increasing interest in STEM (science, technology, engineering and mathematics) education, Schrader’s current research interests focus on creating and assessing innovative learning methods to help students of all ages succeed in the STEM areas. Schrader’s impact on engineering education, technology and society has been recognized by the IEEE Education Society Hewlett-Packard/Harriett B. Rigas Award for “significant contributions to electrical engineering education through excellence in teaching, enhanced student learning, increased participation of women and demonstrated research.” Schrader’s Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring from George W. Bush lauded her accomplishments in encouraging and supporting underrepresented groups. She also received the IEEE Control Systems Society’s Distinguished Member Award and the Distinguished Educator Award from the Electrical and Computer Engineering division of the American Society for Engineering Education.

The IEEE is the world’s leading professional association for advancing technology for humanity. Through its 400,000 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.

Dedicated to the advancement of technology, the IEEE publishes 30 percent of the world’s literature in the electrical and electronics engineering and computer science fields, and has developed more than 900 active industry standards. The association also sponsors or co-sponsors nearly 400 international technical conferences each year. If you would like to learn more about IEEE or the IEEE Fellow Program, please visit www.ieee.org.
As I look back over the last 12 years that I have been department chairman, the following stand out:

Cooperative program with MSU  The effort to start cooperative programs in electrical engineering and civil engineering with Missouri State University started in 2005. Funding from the state legislature was delayed and we did not officially start admitting freshman students until Fall 2008 and had our first graduates in Spring 2012. Last year, they moved to new facilities with sorely needed increased classroom and laboratory space. In order to support the program, ECE started teaching undergraduate courses, including laboratories, by distance to the students at Springfield. This semester, we will be teaching one section of the required electronics course to the Rolla students from MSU. And this trend will continue, as a way to relieve the teaching load of the faculty at Rolla.

Enrollment  Overall, the student enrollment is more than in 2002. On-campus ECE student enrollment consistently decreased from 2002 to 2009 and has been steadily increasing since then, nearly reaching the enrollment we had in 2002. The enrollment of distance and MSU students has steadily increased and is the reason for the overall enrollment increase since 2002.

Research  Research expenditures are more than in 2002, though not a steady increase. We reached a peak of $9M in 2010, but the loss of two very productive faculty members to other institutions has hurt the overall numbers.

Distance education  The number of distance courses taught by the department is increasing. It has been a slow process, though accelerating as more faculty embrace this change. Needing to teach a class with an accompanying laboratory for the cooperative program motivated me to teach a distance class and it now has been 4 years since I have used a chalkboard/whiteboard for lectures in any class.

Accreditation  We had an accreditation visit my first year as department chair, when I was an interim chair. We had another since then and are preparing for a third visit that will happen this fall. We have passed all of these visits with “flying colors” due to the hard work of the faculty and the associate department chairs. The faculty are passionate about the undergraduate program and the credit largely goes to them.

Course number change  I was part of a small group of department chairs that advocated this change in 2009. We needed a numbering system that clearly showed the course level (1st year, 2nd year, etc.) and we needed more digits, as ECE was exhausting the available numbers at the graduate level. The Provost finally approved the change last spring and starting with the Fall 2014 semester, all course numbers will be a 4-digit number. So, many of the course numbers you may have fondly (or not so fondly) remembered will be changing. We defined the course number mappings last summer and the Registrar’s office is working through the changes to their systems.

Reorganization  I am going through the second reorganization of the upper levels of campus administration since 2002. I served on committees that outlined aspects of the last reorganization and am doing so this time. That is what happens when you have been around a long time.

Future Plans  I will be returning to the faculty, resume my research that was set aside when I became department chair and continuing my teaching in factory automation.

Awards, Patents and Publications News


In 2013 US Patent No. 8,482,602, entitled “Non-Destructive Rotary Imaging. (R. Zoughi, M.T. Ghasr and D. Pommerenke)” was issued to Missouri University of Science and Technology.


Dr. Mehdi Ferdowsi - S&T’s Solar Village to house microgrid project

Missouri S&T is integrating a variety of energy generation, storage, and management technologies into a campus microgrid. The microgrid will be located within the Missouri S&T Solar Village, optimizing energy within four student-built and inhabited solar homes. The photovoltaic (PV) arrays on the solar village homes are designed to generate a total of approximately 25 kW of power. A123 Systems, Inc. (now Wanxiang Group) has donated lithium ion battery racks that will provide 60 kWh of energy storage for the microgrid. Also, Milbank in Kansas City, MO has donated their intelligent switchgears. A recent grant award from the American Public Power Association (APPA), through City Utilities of Springfield, will fund the installation of the battery array and graduate student research in community energy storage.

St. Louis-based utility company Ameren has also contributed funding to the project and plans to provide and install a residential fuel cell and heat recovery demonstration unit in the Solar Village as an additional microgrid component. Future expansion of the microgrid will include an electric vehicle, bidirectional inverter and electric vehicle charging infrastructure. Angela Rolufs, Tony Arnold, and Cory Brennan from the Missouri S&T Office of Sustainable Energy and Environmental Engagement (OSE3) manage the S&T Solar Village and are responsible for coordinating all research, education, and outreach activities within the village. Dr. Mehdi Ferdowsi and Dr. Pourya Shamsi from the Electrical and Computer Engineering department oversee the research and technical aspects of the project. Photos by B.A. Rupert

Dr. Jagannathan Sarangapani develops ‘feedback system’ for robots

A researcher at Missouri University of Science and Technology has developed a new feedback system to remotely control mobile robots. This innovative research will allow robots to operate with minimal supervision and could eventually lead to a robot that can learn or even become autonomous.

The research, developed by Dr. Jagannathan Sarangapani, William-Rutledge Distinguished Professor of Electrical Engineering, makes use of current formation moving robots and introduces a fault-tolerant control design to improve the probability of completing a set task. The new feedback system, funded in part by the National Science Foundation, will allow a “follower” robot to take over as the “leader” robot if the original leader has a system or mechanical failure. The innovative research can be applied to robotic security surveillance, mining and even aerial maneuvering. Sarangapani believes that the research is most important for aerial vehicles. When a helicopter is in flight, faults can now be detected and accommodated. This means that instead of a catastrophic failure resulting in a potentially fatal crash, the system can allow for a better chance for an emergency landing instead. The fault-tolerant control system would notice a problem and essentially shut down that malfunctioning part while maintaining slight control of the overall vehicle.

REU Site: Technologies for Renewable Energy Generation and Management

In 2013, the department hosted the first cohort of a Research Experience for Undergraduates program in renewable energy. Funded by the National Science Foundation, the site is led by Jonathan Kimball, with the participation of Mehdi Ferdowsi, Joel Burken (environmental engineering), Stuart Baur (architectural engineering), and Curt Elmore (geological engineering). The overall objectives of the site are twofold: development of new renewable energy technologies, and introduction of undergraduates to a research environment. The first cohort included eight undergraduates from around the nation. The new site builds on the success of the FREEDM program, which again hosted three undergraduates this past summer.

The participants met regularly with their faculty and graduate student mentors, and also presented their work to the group biweekly to foster collaboration between the undergraduates. Each student had an independent project, ranging from embedded programming to monitoring a green roof to building a wind-driven pump. The summer culminated in a symposium, a poster session at the Havener Center where the students presented their work to the campus community. Also, one student, Evan Reznicek, presented his work at a conference sponsored by the Council on Undergraduate Research in Arlington, VA, in October 2013. Additional presentations and publications are pending.

In addition to the research, participants had the opportunity to visit interesting sites around Missouri, such as Anheuser-Busch’s biomass facility. At the beginning of the summer, they were trained in some of the basic skills expected of engineering researchers, and throughout the summer, they learned about some of the interesting projects happening on campus. This coming summer, we will build on our successful experience and host a second cohort of approximately ten new undergraduates.

S&T Alumnus Receives National IEEE-USA Recognition

Amy K. (Perrey) Jones was selected as the 2014 IEEE-USA New Face of Engineering. She is currently a Product Engineer at John Deere in Dubuque, IA and she received a BS (electrical engineering) from Missouri S&T in 2008. The New Faces of Engineering program is part of Engineers Week 2014 activities and recognizes young engineers under the age of thirty for their early accomplishments. Twelve young engineers were recognized from various technical societies in 2014 and were featured in USA Today. She was nominated by Dr. Steve E. Watkins.
The Gamma Theta Chapter of IEEE-HKN continues to be active. Among the highlights of 2013 were hosting a successful company banquet the evening before the career fair, earning another Outstanding Chapter Activities Award, and reinstalling a Bridge monument on campus. In honor of the anniversary of the founding of the HKN organization on October 28, 1904, the chapter dedicated a reinstalled Bridge monument and a new granite marker with the help of Chancellor Cheryl Schrader on HKN Founders Day. The chapter thanks its supporters, especially Burns and McDonnell, Garmin, Arcelor Mittal, and Dynetics for sponsoring tables at the company banquet. Also, we appreciate Dr. J. Derald Morgan, former department chair and current IEEE R5 Director, for speaking at the Fall Initiation.
Garmin Scholarships

Ten electrical and computer engineering undergraduate students are receiving scholarships and training opportunities thanks to an initiative created by the Kao Family Foundation and Garmin International Inc. The 2013-2014 recipients are: Stephen Andrew, William Busch, Kevin Flaker, Paul Henny, Emily Hernandez, Benjamin Latimer, Noel McDaniel, Samuel Purcell, Jordan Sparling and Nathan Viehmann. These Missouri S&T electrical and computer engineering undergraduate students were collectively awarded $80,000 in Garmin scholarships.

The Kao Family Foundation, established by Dr. Min H. Kao, co-founder and CEO of Garmin, launched the Garmin Electrical and Computer Engineering Initiative in 2007 to encourage students to study these high-demand areas of engineering. The students selected will also be given first consideration for one of more than 75 annual paid internships with Garmin International.

The Grainger Power Engineering Awards

Eleven electrical engineering seniors and recent graduates each received a $5,000 Grainger Power Engineering Award from the electrical engineering department at Missouri University of Science and Technology this spring. The awards were presented as a reward for academic excellence. The Power Engineering Awards are funded by a $1.3 million endowment from The Grainger Foundation of Chicago. Missouri S&T is recognized by Grainger for its ability to attract top students and educate quality engineers and is one of only six universities in the nation chosen to receive such funding. Each spring, the Grainger Power Engineering Award is typically presented to up to 13 electrical engineering graduate and undergraduate students who plan to pursue careers in power engineering. Selection of recipients is based on academic performance, exhibited interest in power engineering and extra-curricular activities.

To be eligible for this year's award, students must have graduated with degrees in electrical engineering in August or December of 2012 or May 2013 and have emphasized their course work in power engineering.

All of the recipients had significant power engineering experience, either through company internships, research projects or design projects.

Recipients of the 2013 Power Engineering Awards are:

- Christopher Crance, Lee’s Summit, MO - 2013 EE
- Jesse Hamilton, Smithville, MO - 2013 EE
- Jeremy Johnson, Pittsburg, KS - 2013 EE
- Zach Kirby, Kansas City, MO - 2013 EE
- Ian Kreher, Warrensburg, MO - 2012 EE
- Will McCord, Kingman, AZ - 2013 EE
- Jackson Meyer, McFarland, WI - 2012 EE
- Samantha Mollet, Grain Valley, MO - 2013 EE
- Chris Oleksiw, Wildwood, MO - 2013 EE
- Elijah Thomas, Lee’s Summit, MO - 2012 EE
- Jack Watts, Fordland, MO - 2013 EE

Accompanied by Dr. Mariesa Crow, Dr. Mehdi Ferdowsi and Dr. Jonathan Kimball of ECE Faculty/Power Group.

Thanks For Your Generosity

Electrical and Computer Engineering alumni pledged $73,890.00 in gifts during the 2012-2013 fiscal year. Thank you for your generosity! We used your support last year to fund undergraduate student travel to conferences, scholarships to undergraduate students, senior design projects, and new faculty equipment and travel. “The students are the real beneficiaries of your phonathon gifts,” says Dr. Kelvin Erickson, Chair of Electrical and Computer Engineering. “Your support makes a big difference on my ability to say yes to the students.”

This year, we will begin calling our alumni on March 23rd. When the phone rings, please take a moment to share some of your Rolla experiences with a current student, and say “Yes” when asked for a pledge. Taxpayer support accounts for less than 30 percent of the university's revenue, making your contribution a vital ingredient in the revenue pie.

Your gift continues to matter very much.....Private funding helps distinguish Missouri S&T from other universities, increasing the value of your education. Any amount you give will be appreciated, and most importantly, your participation will help make S&T a leader in alumni giving among public universities.
CURRENT TRANSMISSIONS

ELECTRICAL & COMPUTER ENGINEERING - MISSOURI UNIVERSITY OF SCIENCE AND TECHNOLOGY

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We enjoy keeping you informed about ELECTRICAL & COMPUTER ENGINEERING at MISSOURI S&T. We'd like to hear from you too! Let us know where you are and what you are doing. If you have received an award, promotion, or have family or professional news you would like to share, please complete this form and mail to: ELECTRICAL & COMPUTER ENGINEERING, MISSOURI UNIVERSITY OF SCIENCE AND TECHNOLOGY, 144 EECH, 301 W. 16th Street, Rolla MO 65409-0040 or email ece_alum@mst.edu.

Name: ___________________________ Phone: _________________________
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