From the Department Head

Dear ECE Alumni, Students, and Friends:

This is the fifth newsletter published by the department of Electrical and Computer Engineering (ECE), at the South Dakota School of Mines and Technology. Due to the high cost of publishing and mailing hard copies, we are attempting to send electronic newsletters via email. Hopefully, in the near future we will have them published online; where alumni will be able to access the latest and perhaps all past versions of the newsletters. Please notify other Alumni that they will not receive newsletters in hard copy and should contact the ECE department or the Alumni Association with their updated email information.

In the last newsletter, I reported that there were approximately 120 freshman students who have been accepted by the university to join the ECE department. Of those students accepted, 80 decided to join the ECE department in the fall of 2013. Though this is lower than the 120 students that have been accepted, it is almost 50% higher than the fall of 2012. We are pleased with the quality of these freshman and we hope that the ECE department growth will continue. We believe that our efforts to contact the prospective freshman class last Spring with our senior class, and a good number of scholarships that were awarded to them were the main reasons for the growth in the freshman class. We had also visited many of the local high schools demonstrating our student projects. We would like to start various programs and opportunities within the department to keep our students busy with interesting projects and productive work related to the EE and CENG programs. This requires resources (specifically space and faculty). Dr. Heather Wilson, the new president of SDSM&T has initiated a process to launch a new capital campaign which we hope will provide us the needed resources.

We have hired a new instructor for our Mechatronics and other lab activities (Mr. Geeth Bagusetty) whose biography is included in this issue. He joined the department at the beginning of the Fall 2013 semester.

We had a very successful Summer Youth Camp called POWER Camp in which high school students spent a week on campus and in the ECE department built 3 projects. We expanded that program to the local high schools during the school year. We call the new program which is held on Saturdays HIGHER STEPS program. We plan to run a similar program during the Spring semester as well.

We also held an international conference on Electro Information Technologies (sponsored by IEEE) which was attended by over 140 scholars and students from all over the world. It was held on the SDSM&T campus during May 2013.

We keep growing in our research productivity, as well as undergraduate and graduate enrollments. These are good times for your ECE department.

This issue of the newsletter, like the ones in the past, brings you the synopsis of activities in the department and tries to keep you in contact with us. Please do not forget to send us an email so that future newsletters can reach you electronically. You can contact us at: ECE@SDSMT.EDU, or call 605-394-1219.

Thank you.

Kazem Sohraby
ECE Department Updates and Events

- Fall ECE Advisory Board (ECE AB) was held 11/8/13. Please contact the Chair of the ECE Advisory Board, Mr. Gary Hansen at Gary.HansenII@wideaopenwest.com for further information.
- 1963 Reunion breakfast, lunch, and dinner on 5/3/13
- IEEE International conference on Electro-Information Technologies was held on SDSM&T campus May 9-11, 2013. Over 140 people attended
- Summer Youth Camp (Power camp in ECE) July 6-12, 2013
- Summer Youth Camp (Power camp in ECE) July 7-12, 2014
- Fall Higher Steps (high school weekend program on Saturdays): October 12 thru November 23, 2013
- Spring Higher Steps (high school weekend program on Saturdays): January 25 thru March 1, 2014
- Fall Commencement: December 21, 2013
- Three Students from IEEE Have received the prestigious IEEE PES scholarships

Faculty Update

Professor Geeth Bagusetty joined the Department of Electrical and Computer Engineering in August 2013 as an instructor to teach courses centered around control systems and mechatronics. He is currently teaching Digital Systems and co-teaching Mechatronics and Sophomore Design. His scope of technical expertise includes hands-on experience in PLCs, microcontrollers, and NI hardware devices, also with profound knowledge in the analog and digital circuits.

Prior to working at SDSM&T he was an instructor for the Instrumentation technology program at Oklahoma State University Institute of Technology for 3 years. He has an MS degree in Mechanical Engineering from Oklahoma State University and BS degree in Electrical and Electronics Engineering from Jawaharlal Nehru Technological University.

SDSM&T Gets A New President

Heather Wilson started her term in June 2013. She is South Dakota School of Mines' 19th and first female president in the schools 128 years.

She earned her Bachelor of Science degree from the U.S. Air Force Academy; her class was the third to include women. She then attended Oxford University, in England, where she was a Rhodes Scholar, for her masters and doctoral degrees in international studies. She is the second president of School of Mines to have graduated from a U.S. Military Academy. She is also the third to serve in the Air Force.

She is a former member of congress having served New Mexico’s first congressional district in the US House of Representatives, for 11 years. She was on the House Energy and Commerce committee and she was the chair of the House Subcommittee on Technical and Tactical Intelligence.
Dr. Dimitris Anagnostou was the Principal Investigator of the proposal titled: “Collaborative Research: Enabling a New Technology for Reconfigurable RF Front-Ends and Antenna Array Systems Through Phase-Change Materials.” It is a multi-university collaboration with Professor Nelson Sepulveda at MSU. The goal of the project is to understand how phase-change materials can provide unique properties that will lead to new RF front-end systems, filters, transmission lines and antenna array topologies with multi-reconfigurable characteristics. The research approach used in this proposal is not designed to achieve product enhancement, nor consists on the integration of well known techniques—these methodologies typically result in only incremental changes. Instead, the research to be undertaken presents a game-changing idea that will enable new paradigms in reconfigurable RF front-ends and antenna arrays.

Dr. Yanxiao Zhao was the Principal Investigator of the proposal titled: “Collaborative Research: Optimal Joint Spectrum Allocation and Scheduling for Cognitive Radio Networks”. The National Science Foundation (NSF) has awarded it $153,464. The objective of this project is to improve the spectrum utilization via conducting optimal or near-optimal joint spectrum allocation and scheduling in cognitive radio networks. It focuses on: considering the unique challenges such as dynamic traffic demands and pattern, unpredictable primary user activity, wireless interferences and coexistence among cognitive radio networks; investigating multi-hop cognitive radio networks. This can be solved by optimizing the network performance in the framework of restless multi-armed bandit process; setting up testbed and evaluating the designed methodologies, algorithm and protocols. This research contributes fundamental knowledge and understanding of cognitive radio networks including concepts, analytical tool and test-bed development, and hence sheds light on efficient spectrum access in wireless communication systems.
The ECE Department under faculty member, Joel Kimball, is offering a non-credit PLC workshop for our students. This evening class, which consists of approximately 8 hours of instructional time spread over 4 weeks, involves both a lecture and a laboratory component.

For the first half of the course, the students will gain experience in the rudiments of ladder logic programming. They will then finish out this introductory course by programming and implementing some simple tasks with a very user friendly and easy to use Triangle Research PLC.

There are presently about 30 students enrolled in this workshop. After completion, there will be additional one on one time available with the instructor for those students who wish additional training. This will be focused on any expanded training needed to continue working with PLCs in departmental projects, e.g. senior projects.

The SDSM&T’s Moonrockers Team will be competing in the 5th Annual NASA Robotics Mining Competition at the Kennedy Space Center in Florida on May 2014. The Moonrockers have competed in the 1st, 2nd, and 3rd Annual Lunabotics Mining Competitions in previous years. NASA’s Robotics Mining competition is designed to promote the development of interest in space activities and STEM (Science, Technology, Engineering, and Mathematics) fields. Each team is required to design and build a robotic vehicle that can collect as much regolith as possible within 10 minutes while still incorporating design, efficiency, and practicality.

Electrical engineers on senior design projects are in charge of providing power to the system, integrating sensors with the system, and controlling all actuation. In controlling the power systems they are required to monitor the power draw. One of the challenges of the competition they take part in, requires that the robot draws as little power as possible. With controlling all actuation and integrating sensors with the system, as an electrical engineer, they need to make certain that everything the team purchases will work together. They also need to ensure that everything is compatible for integration. As part of our competition everything also needs to be designed for a space environment with no human interaction.

By:
Laton Felton
2014 Graduate Students

Left to Right:

First Row: Rafida Zaman, Jems Pradhan, Dr. Kazem Sohraby (Dept. Head), Ankit Sharma, and Md. Akther Hossan

Photo 1 – September 23, 2013 (not complete photo of all EE Graduate Students)

Left to Right:

First Row: Kalpana Kunwar, Abu Numan-Al-Mobin, Dr. Kazem Sohraby (Dept. Head), Reidar Hauge, and Praveen Devakota
Back Row: Roshan Shrestha, Tarron Teeslin, and James Haiston

Photo 2 – October 1, 2013
School Of Mines Amateur Radio Club

The ECE Department has been home to the School of Mines Amateur Radio Club for over 60 years. The club’s membership consists of students who are licensed amateur radio operators, and others interested in electronics and communication. The club maintains an up-to-date radio station, lab and library on the 3rd floor of the Electrical Engineering / Physics building. The club’s membership has averaged approximately 15 students over recent years, and is a part of the CAMP organization on campus.

The club’s activities include:

- Support of other CAMP teams that need wireless communication for control or telemetry/data capture
- Maintenance of the club’s HF and VHF station equipment, and the associated antennas
- Design of antennas and equipment for satellite communication
- Maintenance of a wireless VHF / computer / internet communications node (Echolink) in cooperation with the NOAA Weather Service office in Rapid City
- Participation in national amateur radio contests – The club has either won or placed in the top tier in the nation the past several years for HF stations operated by schools in the ARRL November Sweepstakes event
- Design of direction finding antennas used for transmitter hunting
- As ARRL volunteer examiners, participate in, and host, testing sessions for those interested in obtaining an amateur radio license

The club raises funds to support its activities through the sale of a snacks for students in the ECE Department, and the sale of donated equipment at the annual Black Hills area amateur radio equipment auction.

SDSM&T IEEE Update

SDSM&T IEEE Student Branch is doing great this semester. We’ve had many freshmen attend our regular meetings, and a large turnout at our ECE Activity Nights. Our student branch just recently celebrated national IEEE day with root beer floats! There is a T-shirt design competition in place for our student members as we round up funds. With so many freshmen our branch has been able to expand our committees, including the fundraising and website committee. This year we’ve asked students to present at our meetings to expand on technical projects they’ve done at school along with internship and co-op experiences. This has been a great way to show students how they can get involved in engineering before graduation. Our latest outing was attending the Black Hills IEEE Subsection meeting, where fifteen students attended to learn about Black Hills Power’s experience with the Chevy Volt. Overall this has been a start to a great year with a large amount of student involvement.
ECE Camps

The Electrical engineering department offers a variety of camps suitable for all ages. In the summer, we offer a Power Camp, in which high school students work with electronics and build robots. This is a fantastic camp with a limited class size that allows for personalized time with instructors, with a focus on team building and interpersonal skills. In the fall we offer Higher Steps, which is also for high school students. The Higher Steps program takes place in the Electrical Engineering Department every Saturday. Students perform hands on activities. They learn to solder, program, and build a working radio. This gives students a working knowledge of what Electrical and Computer Engineers do. It also allows them to see some of the opportunities that come with a degree from our ECE Department.

ECE Fall 2013 Higher Steps

Fall 2013 Higher Steps began on October 12 and ran every Saturday thru November 23, 2013. Ten area high school students engaged with SDSM&T Electrical and Computer faculty, staff, and students and worked on various projects. On November 23, 2013, the last day of the youth program, the students presented and demonstrated their projects to their families.

Group photo of SDSM&T faculty, staff, and students with the high school students.

Students working on projects

Steve Lawler demonstrating on a project.
Hello! My name is Jessica Tye, I am a sophomore Electrical Engineering student from Custer, SD. Prior to attending SDSM&T, I was involved in managing cross country, volleyball, basketball, and track. I volunteered for the Custer County Library, Rotary International, the Custer YMCA, and the Wedgewood Senior Center. I am a member of SWE and IEEE. I am also on the CAMP UAV Team.

Assisting with this newsletter is Dalton Simmerman, a freshman Computer Engineering student from Ogallala, Nebraska.

Dalton is interested in computers and electronics. He enjoys the outdoors, running, and socializing with friends and making new ones. He wants to be a computer engineer so he can control the world of computers that everyone uses but that no one understands. On campus Dalton is involved with IEEE and the Robotics Club. He volunteers for many department activities including Go To Mines and the ECE department’s Higher Steps youth program.

Alumni Update

We would like to hear from YOU!!!! We welcome any news from our students and alumni! Have you received a promotion, started a new job, got married, recently welcomed a new addition to the family or retired? We want to hear about it!

Remember if you are in the Black Hills area please drop by the department to see what is happening first hand!

Donations for scholarships, lab equipment, student projects or organizations, etc. are always welcome!

Please email any news you would like to be published in the next newsletter to ECE@SDSMT.edu or if you have any questions please call Deb Tompkins, Senior Secretary, at 605-394-2451. She would be happy to assist you.