

# Alumni Newsletter

Electrical and Computer Engineering Department  
South Dakota School of Mines and Technology  
ECE@SDSMT.edu

Spring 2013

## From the Department Head

Dear Alumni,

This is the fourth newsletter published by the department of Electrical and Computer Engineering (ECE) at the South Dakota School of Mines and Technology. I would like to encourage you to contact the department via email at [ECE@SDSMT.EDU](mailto:ECE@SDSMT.EDU) with your email address so that we can send you an electronic version of the future newsletters. As I am sure you are aware, printing and mailing the newsletters cost the department as much as a typical student scholarship; therefore, saving that expenditure can benefit at least two students each year. In addition, with electronic newsletters we can reach you with more frequent publications. The intent of these newsletters is to update you about the department activities and highlight major accomplishment of the ECE department faculty and students. I am pleased that many of our alumni have already forwarded their email addresses to us; however, we need more of you to do so.

Currently there are 120 freshman students who have been accepted by the university to join the ECE department in the Fall 2013. We have asked a number of senior students to pick up the phones and contact these prospective students and try to answer any questions about the department and the school. Most questions are usually about job opportunities after graduation and internship/co-op opportunities while at school. The ECE department's placement rate over the last several years despite the economy has been hovering around 98% (graduates who join the job market or graduate schools). Also, ECE's internship / co-op rate is around 70%. This and other information that is relevant to the prospects are shared by the senior classmates doing these phone calls.

Over the 2012 calendar year, the ECE department has received total of over \$400,000 in donated equipment for its labs, upgraded many of the educational labs, and continues to do so. The research expenditure in the department for 2012 (1/1/2012 thru 12/31/2012) was over \$677,000, a record. This is also an increase over last year's expenditure of about \$450,000. Also in 2012, faculty in ECE department published 37 papers, and had three patents filed. These are outstanding records of accomplishment for any academic department of our size and bound to improve over the future years. Starting with the Spring 2013 semester, ECE had three new faculty members

This issue of the newsletter, like the ones in the past, brings you a synopsis of activities in the department in order 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 may contact us at: [ECE@SDSMT.EDU](mailto:ECE@SDSMT.EDU), call 605-394-1219, or 605-394-2451.

Thank you.

Kazem Sohraby

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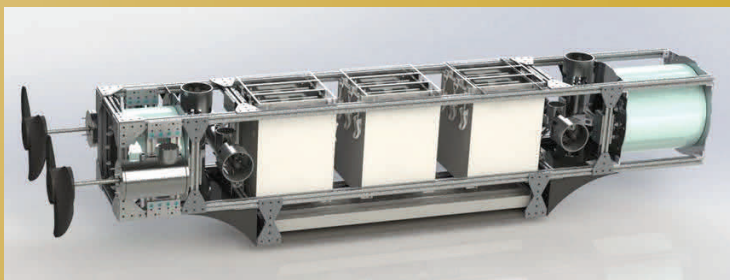
## ECE Department Updates and Events

- Spring meeting of ECE Advisory Board (ECE AB) will be held on April 16th in conjunction with the SDSM&T Design Fair. We are trying to schedule this meeting during the week (rather than weekends as in the past) so that Advisory Board Members can meet most faculty and also visit student projects.
- ECE Department faculty, staff and students visited Rapid City Area High Schools during the fall semester and will continue to do so during the Spring semester.
- Eight Students from ECE have received the prestigious IEEE PES (Power and Energy Society) scholarships. These are highly competitive national awards. SDSMT is now among the top 10 universities in the United States in terms of number of awards received in this field.
- ECE department research expenditure during calendar year 2012 (1/1/2012 – 12/31/2012) was a record \$677,000.
- Spring commencement, Saturday, May 4, 2013.
- Go-To-Mines on Saturday April 20, 2013.
- ECE Department hired three new faculty members in 2012. They are in the areas of power, wireless communications, and computer engineering.
- IEEE International Electro/Information Technology (IEEE EIT 2013) conference will be held on the SDSMT campus during May 9-11, 2013. Surbeck and King center will be utilized for most activities. Student paper presentations and presentations by major researchers from around the world highlight this conference. Over 140 papers were submitted and over 100 attendees are expected.
- ECE department plans to offer “summer youth” programs for the high school age. The ECE camp is called “POWER CAMP: Electronics and Computers in your hands.” July 7-12, 2013, cost \$975. Contact: 605-394-2693.

## Senior Design Spotlight Autonomous Underwater Vehicle

The Autonomous Underwater Vehicle (AUV) is a submarine for underwater exploration of diverse marine environments. This autonomous system has no pressure vessels to withstand extreme depth and will be capable of temperature swings between 20F and 200F. In order to purge all air from the sub, the inside will be filled with non-conductive oil which surrounds the electronics and systems being designed by multiple senior design groups. The systems currently being developed include a smart DC power system, sonar, propulsion, head node, tail node, magnetic field navigation sensor, Kinect vision system, and flotation. The AUV will have a six hour autonomous mission, in which it will map marine environments and record data, eventually taking samples. These samples will be preserved at their captured temperature and pressure for examination. The end goal of the AUV team is exploration of Europa (a moon of Jupiter). This moon is known to have geothermal vents under its oceans; on earth these vents can host micro-organisms. If the same is occurring on Europa, it would prove the existence of life beyond earth.

The members of the smart power system team are **Chester Schlosser (EE' 13)** and **Rachel Joseph (EE' 13)**. Due to the long mission time, the power system consists a total of nine 80Ah 12V LiFePO4 batteries. Each of these batteries will be contained in a waterproof container with an Arduino Nano. This microcontroller will measure voltage, current, and coulombs. This data will be communicated using I2C protocol to the head node for mission calculations. The AUV will spend its mission underwater in remote areas, so a very diverse system is required. This includes redundant controllers and smart switching of batteries to prevent current overloading and blackouts. In order to promote efficiency, this system will include intelligent use of batteries through methods currently under research. If you would like to keep up with the latest news of the AUV team, please visit <http://freya.sdsmt.edu/auv/>



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## Faculty Update



**Prof. Joel Kimball** comes to the School of Mines from the beautiful wilderness of far northern Michigan, where he taught at Michigan Technological University for the past six years. Recently married, he joins us with his wife and his teenage son.

Mr. Kimball's background is in both physics and electrical engineering. In the area of electrical engineering, Prof. Kimball works in the design of instrumentation and control systems and hardware, intelligent systems and automation, signal and image processing and computer vision, and VLSI design of custom integrated circuit chips. In the area of physics, he has worked in the simulation of physical systems and fields, and in the design of instrumentation for research in physics and astronomy. He also presents astronomy viewing programs for the public at the state parks in the Upper Peninsula of Michigan.

Mr. Kimball's hobbies include camping, golf, astronomy, remote control toys, competing in weightlifting events, and working as a performing musician.



**Dr. Yanxiao Zhao** joined the Department of ECE as an Assistant Professor in Aug. 2012. Dr. Zhao' teaching interests are centered on communications and networking. In Fall 2012, she taught the graduate level course in Wireless Communications and is currently teaching Communications. Her research interests include, but are not limited to: Communications system (Telecom, mobile, Internet, etc); Wireless Networking including cognitive radio networks, vehicular networks, wireless autonomous networks, wireless sensor networks, etc; protocol design, performance evaluation and experimental implementation in various communication and networking systems. She has published over 15 papers in prestigious journals and conferences such as IEEE wireless communications, IEEE INFOCOM, SECON, ICC, etc. and received the Best Paper Award in WASA 2009.

Dr. Zhao is currently serving as an Editor for International Journal of Research and Reviews in Ad Hoc Networks (IJRRAN), a TPC member for several International Conferences such as ICCCN, WiCOM and ICNC. She is also a technical reviewer for many international journals and conferences. In addition, she is actively pursuing external founding and collaborating with colleagues both in and out of the School of Mines.



**Dr. Zhang** joined the Department of Electrical and Computer Engineering, South Dakota School of Mines and Technology, as an Assistant Professor in January 2013. Before that, he was a Research Assistant Professor in Electrical Engineering Department, University of South Carolina and the leader of USC baseline team in Electric Ship R&D Consortium (ESRDC).

His research interests focus on grid-connected power electronics; control, protection and transient analysis of power systems; smart grid and renewable energy resources; electric ship system modeling and analysis. His teaching interests are the general areas of power electronics and power systems.

Dr. Zhang was awarded a research project on Power Factor Correction (PFC) technology, sponsored by Glacial Energy Holdings, Inc. in 2011. Also, he participated in the research projects in power systems and power electronics sponsored by NSF and ONR. He is Member of the Institute of Electrical and Electronics Engineers (IEEE); Member of IEEE Power & Energy Society (PES); Member of IEEE Power Electronics Society (PELS); Member of the Electric Ship R&D Consortium (ESRDC) and serves as reviewer for multiple IEEE Transactions and international conferences. He has authored and coauthored tens of journal and conference papers in power engineering.

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## SDSM&T IEEE Update

The SDSM&T IEEE Student Branch is doing well with high attendance at both regular technical meetings and ECE Freshman Activity Nights. We've had many professors within the department along with engineers in the industry give informative presentations. Our branch is growing with many new excited freshmen.

The Region 5 conference is approaching and we have a few students entering the paper competitions this year. Along with the SDSM&T Robotics team, who are gearing up to compete with their underclassmen in the IEEE Robotics Competition.

To keep up with SDSM&T IEEE news, please visit [IEEE.SDSMT.edu](http://IEEE.SDSMT.edu).



## ECE Internships and Co-ops

By the time they graduate, around 70% of our ECE students have had an internship or co-op experience. Below you will hear from some ECE upperclassmen about their experiences.

**Matthew Bon (EE'14):** This previous summer, I was offered a coop position with Cooper Nuclear Station, an 800 megawatt boiling water reactor that is owned and operated by the Nebraska Public Power District. While I was there, I held of the position of engineering coop for the Instrumentation and Control Group of the Design Engineering department. Some of my duties included updating plant records, as-building existing plant equipment, creating drawing change notices and creating a wiring diagram for a plant modification.

**Sean Bestgen (EE'13):** Last summer I worked for Caterpillar in Peoria, IL. My group wrote software for system diagnostics on machines Caterpillar builds. Being an EE in a software group, I was in charge of learning how to use a new piece of testing equipment they had bought. After constructing and incorporating the new setup over the summer, my group connected real ECMs to it and now can automatically validate software changes.

**Laton Felton (EE'14):** This summer I worked for a company called Spectec Sensors, which makes magnetic speed sensors, hall effect sensors, and RF pickups. Spectec is located in Emigrant, Montana. While working this summer, I used a manual pick and place to produce the surface mount soldered boards and then did most of the testing and troubleshooting of the sensors.

**Josh Sherman (EE'13):** This previous summer, I worked for LyondellBasell Industries in Morris, Illinois as a Reliability Engineer Intern. My role was to support the power distribution in the plant. In one of my projects to promote safety, I worked on installing remote switches and break to prevent the need for technicians to be in the immediate vicinity during medium and high voltage switching.

**Chester Schlosser (EE'13):** This summer I worked for Dow Chemical in Midland, MI. I was an Electrical Engineering Intern in the Diesel Particulate Filters plant. On my internship, I worked with Fanuc robotics and Siemens PLCs and HMIs. I worked to improve the process and troubleshoot issues in production.

**Richard Banks (EE'13):** I accepted an internship with Digi-Key corporation at their Thief River Falls, MN location for the summer of 2012. I was hired as an Applications Engineer Intern, and I mainly worked on Fixed Programmable Gate Array circuit design. I also received valuable microprocessor-based circuit design training from vendors to include Atmel, STMicro, and Ledit, among others.

**Dan Friendshuh (EE'13):** I spent the summer working for Burns & McDonnell at their Denver facility as an Electrical Engineer Intern. I was involved in the design process of substations. Helping create drawings for projects for substation design for new substations and additions to existing ones. Calculations such as lightning protection on substations, relay and breaker fail design etc.

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# ECE MAY 2013 Graduating Class

This May 2013, there will be 23 EE seniors graduating along with four CENG seniors. Additionally, there will be three Masters students graduating. Bellow are the post-college plans for some of our graduates.

**Richard Banks, B.S. EE**  
 Hometown: Charleston, SC  
 Working for Garmin in Kansas City, KS

**Alex Weidenbach, B.S. EE**  
 Hometown: Brandon, SD  
 Raven Industries

**Sean Bestgen, B.S. EE**  
 Hometown: Sturgis, SD  
 Working for Caterpillar in Tucson, AZ

**Alex Brech, M.S. EE**  
 Hometown: Currie, MN  
 Working for Raytheon Missile Systems in Tucson, AZ

**Ian Carlson, B.S. CENG**  
 Hometown: Gerretson, SD  
 Attending Graduate school for Computational Sciences And Robotics Program at SDSM&T

**Travis Clark, B.S. EE**  
 Hometown: Sioux Falls, SD  
 Currently seeking employment

**Daniel Friendshuh, B.S. EE**  
 Hometown: Hot Springs, SD  
 Working for Burns and McDonnell in Denver, CO

**Jimmy Higgins, B.S. EE**  
 Hometown: Rapid City, SD  
 Working for Burns and McDonnell in Virginia Beach, VA

**Ryan Hopfinger, B.S. EE**  
 Hometown: Aberdeen, SD  
 Working for Cargill in Blair, NE

**Rachel Joseph, B.S. EE**  
 Hometown: Inver Grove Heights, MN  
 Working for 3M in Brookings, SD

**Garrett Kirkpatrick, B.S. EE**  
 Hometown: Chamberlain, SD  
 Working for Burns and McDonnell in Kansas City, MO

**Megan Mahowald, B.S. EE**  
 Hometown: Bismarck, ND  
 Working for Archer Daniels Midland in Decatur, IL

**Jordan Miller, B.S. EE**  
 Hometown: Belle Fourche, SD  
 Currently seeking employment

# ECE Starting Salaries on the Rise

The engineering field is widely considered a good area to go into due to it being a well-paying industry. The same can be said for the Electrical and Computer engineering field. At SDSM&T, the average salary for Computer engineers, right out of college, is \$61,167 per year; electrical engineers, right out of college, earn an average of \$57,332 per year. Comparatively, ten years ago for Computer and Electrical engineers, right out of college, the average salary was about \$51,000 per year. These numbers are very good considering the average salary offer at SDSM&T, taking into account all majors, is \$56,723. The whole University has a 97% placement rating within six months of graduation, while the ECE department has consistently been around 98%.



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## SDSM&T Eta Kappa Nu Update

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Eta Kappa Nu is the electrical and computer engineering honor society of the IEEE. ECE students who are in the top quarter of their junior class or top third of their senior class are invited to join. The SDSM&T Chapter of Eta Kappa Nu recently inducted nine new members this semester.

In order to assist the department, HKN has decided to help with recruiting high school students for the ECE department at Mines. We will be created a short presentation to give at local high schools' math and science classes. Additionally, we will be putting together welcome packets to send to students who get accepted into Mines and plan on pursuing electrical or computer engineering. With our efforts, we hope to see an increase in enrollment for the ECE Department.



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## Alumni Update

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**Have you received a promotion, started a new job, got married, or recently welcomed a new baby into the family? We want to hear about it! Please email any news you would like to be published in the next newsletter to [ECE@SDSMT.edu](mailto:ECE@SDSMT.edu)**

