Dr. Kazem Sohraby Accepts ECE Department Head

We are pleased to announce that Dr. Sohraby will be joining the SDSM&T Electrical and Computer Engineering Department. Dr. Sohraby was a professor of Electrical Engineering at the University of Arkansas, and also served as head of Department of Computer Science and Computer Engineering. Before joining University of Arkansas, he served as the director of Interdisciplinary Telecommunications Management at Stevens Institute of Technology. He was with the Mathematical Sciences Research Center, Mathematics of Networks and Systems, and with the Performance Analysis Departments (Advanced Communications Technologies) at Bell Labs. He is a Principal Consultant with industry and on Defense Information Systems Agency (DISA) projects. His areas of interest include computer networking, signaling, switching, performance analysis, and traffic theory. He has over 20 pending and granted patents on computer protocols, wireless and optical systems, circuit and packet switched computer networks, and Optical Internet. He has over 60 publications and book chapter contributions, and is co-author of two books; one on the performance and control of computer communications networks, and another on wireless sensor networks. He served as an IEEE Communications Society Director and as its president's representative on Committee on Communications and Information Policy (CCIP), and was a Distinguished Lecturer of that Society. He served as chair of several conferences in both ACM and IEEE. He also served on the education committee of the IEEE Communications Society, is on the editorial boards of several publications, and panelist and reviewer with the National Science Foundation, US Army, and Natural Sciences and Engineering Research Council of Canada. He received PhD, MS, and BS (high honors) all in Electrical Engineering, and MBA from the Wharton School, University of Pennsylvania.

Dr. Randy Hoover Accepts ECE Faculty Position

Randy Hoover has accepted the position of Assistant Professor in the ECE Department at the South Dakota School of Mines and Technology. Dr. Hoover is originally from Blackfoot Idaho, graduated from Blackfoot High School in 1993. Randy is married to Barbara who is a PharmD and they have two children (a boy, Cody, 3 years and a girl, Lyla, 7 months). Randy Hoover received the B.S. degree in Electrical Engineering and the M.S. degree in Measurement and Control Engineering from Idaho State University in 2002 and 2004, respectively. He completed his Ph.D. degree in Electrical Engineering from Colorado State University in 2009. He was a National Science Foundation Fellow from 2003-2004. His research interests are in the areas of computer vision, robotics, and control theory. He has published 7 papers in the past 5 years. His hobbies include: Rock climbing, back country skiing, hiking, and camping.
The SDSM&T campus celebrated its 33rd year of a successful Engineers Week (E-Week) from February 14-20, 2010. Many activities were enjoyed by the campus, community, and surrounding schools. Activities included the South Dakota Engineering Society Forum, Cardboard Bridge Beam Contest, Rube Goldberg Machine Contest, Order of the Engineer Initiation, Day at Mines Department Tours, Chemistry Magic Show, Kid’s Block Contest, and MathCounts.

One of the largest ceremonies for the Order of Engineer initiated 146 individuals including undergraduate and graduate students, faculty and professional engineers into the Order. The Order fosters a spirit of responsibility and pride in the profession of engineering. The initiates were presented the traditional stainless steel ring and a certificate of members.

A note to members, if you have lost your ring you may replace it for $15 and contact Deb Tompkins at (605) 394-2451 or deb.tompkins@sdsmt.edu.

The highlight of the event was the introduction of the outstanding recent graduates. Included in this group were two Electrical Engineering graduates, Jade Kizer (Windsor, CO), and Tricia Schwaller (Aurora, CO) and also two Computer Engineering graduates, Brian Butterfield (Rapid City, SD) and Chris Ahlers (Fargo, ND).

2010 Honors Convocation and Awards

The 2010 Honor’s Convocation honored several Electrical and Computer undergraduate students. Student Achievement Awards included: EE Junior, David Hughes (Java, SD), Mark Olson (Hazen, SD); EE Soph., David DeHaai (Mitchell, SD); EE Freshman, Sean Bestgen (Whitewood, SD), Mason Cover (Alliance, NE), Zachary King (Yankton, SD), Cody Lundie (Hill City, SD), Hayden Waisanen (Deadwood, SD) and CENG Freshman, Ian Carlson (Garretson, SD).

Departmental Awards for Electrical and Computer Engineering Department for the Ronald J. Schmitz Awards were Mark Olson and Andrew Smith; William J. Hixson Award, D’Ann Barker; Outstanding Computer Engineering Junior, Richard Murtland Senior was Clayton Hammock.

The Electrical and Computer Engineering Department would like to congratulate all recipients of these awards for their outstanding achievements.

ECE Industrial Advisory Board and Design Fair

The ECE Industrial Advisory Board met in conjunction with the 2010 all campus Design Fair on Tuesday, April 20, 2010. The ECE Industrial Advisory members are: Robert Case (Black Hills Power), Jon Titus (Freelance technical writer), Jacqueline Sargent (Black Hills Corporation), and Herschel Smartt (Idaho National Laboratory). The group and new incoming members will be meeting in the Fall of 2010 to continue to their collaborations with the ECE Department.

The Design Fair was held on Tuesday, April 20 in the Surbeck Center Ballroom. The event featured nearly 50 projects and included over 200 students from various fields of engineering and science. This event was an opportunity for the community, middle and high school students to see the results of SDSM&T students engineering, design, and research efforts first hand. Some of the projects are sponsored by private industry and government agencies.

ECE Seniors: Joel Lankutis, Andy Berg, and Dr. Richard Gowen, former SDSM&T President
IEEE Organization

After a few years of inactivity, IEEE has been mobilized here on the SDSMT campus. Under new leadership, the student branch has set new long and short term goals along with planning numerous team building and outreach activities. The students actively involved in IEEE want the school, the department, and their fellow students to know that they are here and ready to make a difference. To show their presence in the Electrical Engineering and Physics building, IEEE has ordered binary clock kits that they have put together and place around the building. The SDSM&T IEEE has also made custom pocket protectors that can be purchased for one dollar (pictures of the pocket protectors can be found on our website). The main task on IEEE’s plate is ECE Activity Night. Freshmen from all majors are invited to the ECE labs every other Tuesday night to learn how to solder and build different electronic kits each week. This gives an opportunity for freshmen to meet and socialize with IEEE upperclassmen in a laidback environment while learning about the different electronic components and building fun circuit boards. For more information on the SDSMT branch of IEEE, please visit http://IEEE.SDSMT.edu. If you are interested in donating and helping relieve the cost of electronics kits, feel free to contact our treasurer, Jefferson Olsen (Jefferson.Olsen@mines.sdsmt.edu).

Robotics Team

The Robotics Team is dedicated to developing autonomous robotic systems as a tool for applying classroom knowledge to true design and engineering. To accomplish this, we form interdisciplinary teams of primarily computer, electrical and mechanical engineers as well as computer scientists.

This year the club competed at the Institute of Electrical and Electronics Engineers’ Region 5 Conference in Fort Worth Texas. The goal of the contest is to autonomously move spent nuclear fuel rods from a central area to remote processing locations. The robots must navigate their course using four flashing beacons and avoid randomly placed obstacles which will obstruct their paths. The fastest team to deliver all of the fuel rods to the correct locations wins, but bonus points will be given to teams based on the energy efficiency of their robots.

This year the club took two teams to competition, one led by Brady Begeman and the other led by Ian Hibbard. Despite the hard work and effort, the Robotics team did not place at the IEEE Region 5 Robotics Competition but are looking forward to compete in next year’s competition.
A new research program in autonomous underwater vehicles (AUV) has begun at the South Dakota School of Mines and Technology (SDSMT). The team is nicknamed "FRANC." The project has formed under the cross departmental robotics intelligent autonomous systems (RIAS) program at SDSMT. The team is made up of primarily undergraduate students with a growing number of graduate students (20 Students ~ 3 Professors to date). The current AUV is intended for scientific exploration and underwater work under extreme conditions. With a design pressure rating of 1500 psi (10,300 kPa), this submersible will be capable of depths of over 1000 meters beneath sea level. This pressure rating will be achieved by using crushable design techniques, e.g. instead of building a pressure vessel to protect the electrical component compartments, their compartments will be filled with mineral oil. The AUV will be capable of speeds of 1 m/s and five degrees of freedom. An array of mapping sensors will be utilized, including sonar, Inertial measurement unit, and a visual light camera. This unit is being constructed for an operation time of three hours. It will operate between 20 and 200 degrees F. The AUV is designed to incorporate many sensors including a water sampling system, visual, ultra-violet, and inferred imaging systems, temperature and pressure sampling, and potential for mineral or biological collection system. This AUV is being build specifically for use in DUESL but could be configured for other applications. The AUV's initial mission will be to map the flooded regions of DUSEL. The project has limited funding 8K from NASA and 10K from the South Dakota NASA Space Grant. We are always looking for sponsors, we just added MEMSence LLC as a sponsor with their donation of an Inertial Management Unit (IMU) worth 1.3K, so if you would like to help in any way contact us!!! See you under the water soon! Charles.Tolle@sdsmt.edu

The Autonomous Underwater Vehicles (AUV) Team

Ham Radio Club

The HAM Radio Club is a support team for the other teams. They help with communication issues with the other teams.

Members are active licensed radio operators that have done projects such as making their own antennas to contacting people around the country, around the world and even satellites. Team members include: President, Alex Brech, Vice President, Ryan Kroetch, Secretary, Chris Bliss, Treasurer, Logan Loeb, Brett Hill, Jon Huft, and Jazek Kraemer. The advisors for this team are Scott Rausch and Dr. Batchelder.
I was beyond thrilled when I was invited to spend my summer working for John Deere in the Instrumentation Engineering Department at the Product Engineering Center in Waterloo, IA. This will be my second internship, first internship with John Deere, so I was prepared to be really confused and overwhelmed for the first couple weeks and then fall into the groove of things. However, something was different this summer. This past spring semester I took Mechatronics and Measurements from Ralph Grahek; so on my first day of work when my boss told me I was going to be doing a lot of work with sensors and transducers, I felt right at home. I have been assigned three tasks this summer, develop a system to automate PTO dyno control, investigate non-shunt current sensors for 2,000 amp sources, and develop a DeweSoft and iTest module for flow calculation with viscosity correction. I am doing the real world applications of what I learned in the classroom last semester. In addition to working on my tasks, I have gotten to tour all the John Deere facilities here in Waterloo and at their world headquarters in Moline, IL. I have gotten to see the very beginning of a tractor and combine harvester assembly line and follow it to the end and even drive the finished product! I have also gotten to spend some time in the sound room, cold room (where they perform tests at -30°C), wind tunnel, and the vibration lab. I know this summer is going to be an amazing learning opportunity for me; I have already learned so much and am having an incredible time.

Faculty and Staff Highlights

Commander Tiger Pittman (CHEME 1994) invited SDSM&T faculty to participate in an Educator Orientation Visit in San Diego to learn about the Nuclear Propulsion Office Candidate Program (NUPOC). NUPOC provides engineering majors benefits while in school and after graduation training to become a submarine or surface officer in the nuclear Navy. Dr. Korde and Dr. Muci from the Mechanical Engineering and Dr. Batchelder from Electrical & Computer Engineering enjoyed the orientation and the day on and under the Pacific aboard the USS Jefferson City, a Los Angeles class fast attack submarine. They were impressed with the enthusiasm and dedication of everyone aboard the boat.

Keith W. Whites earned his Ph.D. and M.S. degrees from the University of Illinois Urbana-Champaign and the B.S.E.E. from SDSMT. He teaches many courses in applied electromagnetics at the undergraduate and graduate levels, and analog and RF electronics. He is the current and founding director of the Laboratory of Applied Electromagnetics and Communications at SDSMT with two full-time and one part-time employee, two Ph.D. students, one M.S. student, and one undergraduate student. His current sponsored research spans artificial electromagnetic materials, materials characterization, ultrawideband antenna miniaturization, and direct-write printing of solar cell collector networks.
Contragulations to Dr. Dimitris E. Anagnostou, Assistant Professor of Electrical and Computer for being selected for the prestigious 2010 John Kraus Antenna Award. This award was given by the Institute of Electrical and Electronics Engineers (IEEE) Antennas and Propagation Society.

The award was established in 2003 by Professor John Kraus of Ohio State University and recognizes an individual or a group that has made an exceptional contribution to the field of antennas through innovation. Dr. Anagnostou and his team were selected for their contributions in the integration and design of reconfigurable multiband antennas. Providing wide frequency range with low power consumption and small size, these antennas can also be applied to Software-Defined-Radio and other multifunctional radio systems.

Dr. Anagnostou’s collaborators and fellow award recipients on this project include recent Georgia Institute of Technology Ph.D graduate, Guizhen Zheng, Georgia Institute of Technology Professor, John Papapolymerou, and University of New Mexico Professor, Christos Christodoulou. The team received the award at the IEEE International Symposium of Antennas and Propagation and the 2010 CNC/USNC/URSI National Radio Science Meeting, held in Toronto on July 11-17, 2010.

Dr. Dimitris Anagnostou joined SDSM&T Electrical and Computer Engineering Department in 2007. He specializes in antennas, electromagnetics, and microwave design and applications.

Dr. Tolle graduated with his PhD from Utah State University and his primary areas of support are Control-Robotics, DSP, and Applied Math. Dr. Tolle was a former Group Leader at the DOE’s Idaho National Laboratory (INL). His 21 years of research has included system identification, fractals, analysis of signals, target detection, chaos and complexity theory, control of thermal mechanical processes such as welding and tube making, vector quantization for image compression, fuzzy logic modeling and control, biological and biomedical control systems, as well as aircraft guidance. His research has been supported by General Electric, Hamilton Ventilators, Honeywell CFGS, and TARDEC & ARL, U.S. Army research labs, the RMt. NASA SG & SDNASA SG, and the DOE Offices of Science, Industrial Technology, and Fossil Energy. Dr. Tolle is still designated as a Senior Researcher for the INL’s ICIS signature. He is a senior member of the IEEE, IEEE advisor for SDSMT, member of the IEEE Controls Society, member of the IEEE Computer Society, member of SIAM Dynamical Systems Activity Group, member of Sigma Xi, member of AWS, as well as a member of the Idaho Section of the American Nuclear Society (IANS). Currently, Dr. Tolle in leading an effort to develop an Autonomous Under Water Vehicle (AUV) to explore the flooded portions of DUSEL. In addition, this AUV is also being designed to explore Yellowstone Lake as an alpha level approximation to a search for life mission to Europa for NASA. He also leads a DOE/INL project to develop next generation SysID methods via nonlinear differential equation based reconstruction process. Dr. Tolle also currently mentors the SDSMT’s Robotics, and UAV Teams. Dr. Tolle also guides 6 master students working of thesis research projects as well as supports numerous other master’s and Ph.D. students by acting as part of their thesis committees.

Ralph Grahek started as an EE Masters student in August, 2009. He graduated with his BSEE from SDSM&T in May of 1986. Originally, he planned on starting his Masters program in the fall of 1987, but family and work obligations came first. Ralph worked at the Sanmina-SCI Rapid City plant until it closed in the summer of 2009. Since the job market was limited at the time the plant closed and he was eligible for retraining, he decided to pursue his original plans of getting his Masters degree.

Along with studying for his Masters degree, Ralph has been teaching the Mechatronics class (EE/ME 351). The term “Mechatronics” is used to describe the integration of mechanical and electronic components. This class introduces the student to system integration using a microcontroller along with various sensors and actuators. Teamwork is stressed during the lab portion of the class. Each team needs to complete a robot and free project along with the various labs. Ralph is married to Diane and they have two sons, Chad and Paul.
It is with great honor that we announce Dr. Larry Simonson as receiving Professor Emeritus status in the Electrical and Computer Department. He is currently the Associate Dean for Advancement in the SDSM&T Foundation.

Dr. Simonson started teaching in the Electrical Engineering Department in 1976 and received his B.S., M.S., and Ph.D. at the South Dakota School of Mines and Technology. Dr. Simonson was ECE Department Chair from 1998-2002 and advised many students and continually keeps in touch with alumni. His professional society affiliations include: IEEE, ASEE, NSPE, ABET (program evaluator representing IEEE), and Tau Beta Pi (current President). Dr. Simonson also serves on many university service organizations: YEA (Founder and campus coordinator), SDSM&T Commencement Chairman and member, and University Scholarship Committee. His dedication of fund raising has brought in thousands of dollars for undergraduate student scholarships throughout the years and also funds to the department in other areas. Congratulations Larry!

Deb Tompkins, a familiar face around campus, joined the ECE Department in August 2009 as the new department secretary. She began her career on campus 22 years ago in the Office of Economic Development and later moved to the Mechanical Engineering Department where she spent the past 13 plus years. She has brought an abundance of experience and “wealth” to the department in the areas of student and faculty interaction, plus accounting and office management. She took the initiative to write and publish an informative ECE Christmas letter to ECE alumni, a department brochure, prospective student and alumni reunion flyers, and the Alumni Newsletter to be mailed to alumni and friends of the ECE Department. It features the ECE Department activities and information about the faculty, students, and new staff.

Her past experiences include the coordination of four International conferences, Engineers Week in various capacities for the past 22 years, and the 2010 Order of the Engineer initiation. She is dedicated to the students and over the years has opened her home to over 100 international and national students. Deb works at presenting a very positive attitude in the department at all times. Her assistance to the students and faculty is invaluable and she is always ready to lend a hand to “get things done”.

A celebration of Professor Cy Cox’s 85th birthday was held on April 13, 2010. It was an enjoyable time spent reminiscing with retired and present faculty and staff. Professor Cox taught in the SDSM&T Electrical Engineering Department from 1951 - 1992. Cy has been married to his wonderful wife, Fanny, for 63 years and they live in Rapid City.

On a worthy note, on April 28, 2009, Professor Emeritus Cox was honored for his service in preserving the heritage of the Electrical and Computer Department with the dedication of the Cyrus W. Cox Historical Collection.

Cy visits the department regularly and we enjoy his visits and his stories immensely.

As in many state budget cuts the departments feel the effect in many different areas. We welcome support in areas of:

- Departmental support
- Lab Equipment
- Student Organizations
- Scholarships
- Faculty Development

We encourage all alumni and their guests to visit the department while visiting Rapid City and if we can be of any assistance please do not hesitate to contact us!
Chair's Message:

Friends, colleagues, and alumni, as the new 2011 academic year begins it is my pleasure to welcome several new changes in the department. We would like to welcome Drs. Kazem Sohraby and Randy Hoover to our department. Dr. Sohraby will begin his duties as ECE Department Head in the Spring and Dr. Randy Hoover will begin his teaching duties this fall semester.

Our students have represented the department and institution very well at several regional and national competitions. The student section of IEEE officers has been taking the initiative to recruit new members and volunteer for on and off campus activities. Along with other department organizations, such as the Ham Radio Club, they continue to build strong relations with the department and campus in various activities.

Congratulations to Assistant Professor Dimitris Anagnostou for being selected as the recipient of the prestigious 2010 John Kraus Antenna Award, which is given by the Institute of Electrical and Electronics Engineers (IEEE) Antenna Propagation Society.

We would also like to thank our ECE Industrial Advisory Board members for their time and efforts in helping the department to meet their vision and goals in the upcoming year.

It was a great to see so many alumni at the SDSM&T alumni reunion this summer. We were able to visit with many alumni and their families to reminisce and show the many changes that have taken place in the department.

We look forward to the upcoming year with anticipation and growth in the many areas of our faculty’s research and development.

We also encourage you to visit the department if you are in the Black Hills area.

Michael Batchelder
Professor and Department Chair
SDSM&T Electrical and Computer Engineering Department