

MECHANICAL ENGINEERING

Spring 2012

Industrial Advisory Board

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Ares Corporation

Dale Wilen, *BSME85*, Cabela's,
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2011-12

Department Facts:

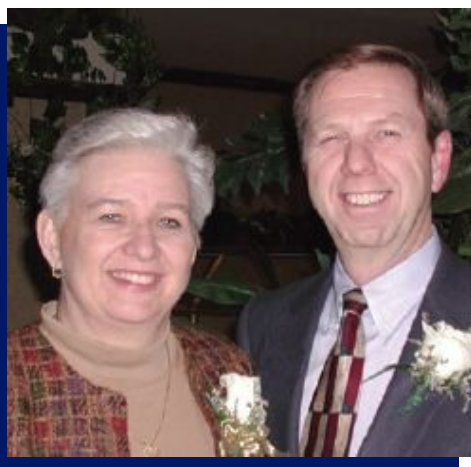
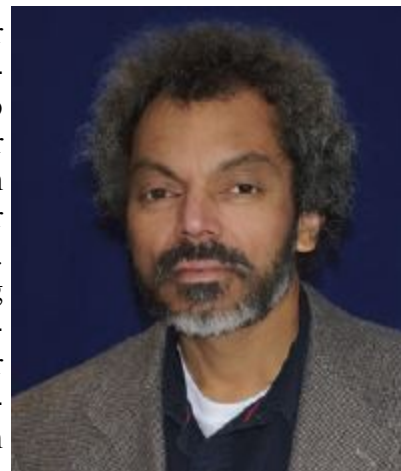
Fall 2011 Student
Enrollments: 435

Spring 2012 Student
Enrollments: 428

Research funding: \$1 million

Dr. Umesh Korde named Pearson Chair in Mechanical Engineering

Dr. Umesh Korde has a global reputation for his research emphasizing the control and dynamics of systems oscillating in response to wave motion, particularly on optimizing their motion to maximize the absorbed power in real time. He has served as an associate editor of the journal *Ocean Engineering* since 2007. Dr. Korde joined the Mechanical Engineering Department at SDSM&T in 2003 and was appointed as the inaugural Pearson Professor (now the Pearson Chair) in Mechanical Engineering in July 2010. His current research projects include control of wave energy converters and deformable optics for space applications and concentrators for solar energy conversion. He currently teaches undergraduate courses in mechanical vibrations and sustainable energy systems.



Larry (ME '72) and Linda Pearson established the Pearson Chair in Mechanical Engineering, which began as the Pearson Professorship, in 2008. The endowment funds the education and training of engineers, and the research that supports sound industry development practices with its focus on energy sustainability. This wide-ranging research includes: the availability of energy resources; technologies required to extract, process, distribute, and generate power from them; alternative and sustainable energy sources; and the best technologies and management practices for dealing with utilization efficiency and conservation of energy.

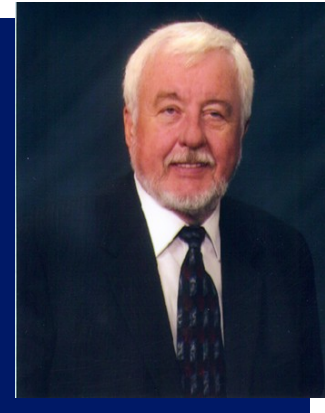
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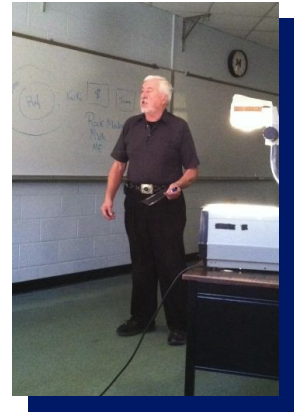
Guest Lectures in the ME Department



Mr. Larry Pearson (ME '72), founder of the Pearson Professorship, shared some of his insight with students earlier this academic year in Dr. Umesh Korde's ME 492, Sustainable Energy class. He recapped his career in energy from the early 1970s to 2008, his experiences with conventional (coal, oil, and natural gas) and renewable (wind and solar) energy, the changes in the energy landscape, and recent trends and outlook for the future of energy. Additionally, in a second lecture, Mr. Pearson discussed: energy, regulations, and government policy; economics of conventional and renewable energy systems (cost/kWh calculations); Tenaska's wind and solar projects; and energy marketing.



Dr. Paul Gnirk, ME Professor Emeritus, spoke to Dr. Umesh Korde's ME 492, Sustainable Energy, students about a variety of topics. He discussed multivariate decision analysis and its applications in power plant siting, his personal experience with Department of Energy projects, the use of multivariate decision analysis with nuclear waste disposal, and, in particular, the work done in arriving at the choice of the Yucca mountain site.



Dave Berg (ME '73), a founding member of the Mechanical Engineering Industrial Advisory Board (IAB), also gave a guest lecture in ME 492 Sustainable Energy's class in November. Mr. Berg recently retired as the President of West Plains Engineering, Inc. He is currently a member of the IAB, as well as part of the Foundation Executive Committee. He instituted the Dave and Bonnie Berg scholarship and was awarded the Guy E. March Medal in 2011, in recognition of his outstanding service to students, faculty, staff, and alumni.

Student Activities

American Society of Mechanical Engineers (ASME) Student Chapter (Jason Ash, Instructor)

Steve Sobania (junior; Foley, MN) is chairing the 2011-2012 ASME student section. The section was recognized with the 2011 South Dakota Board of Regents Award for Organizational Leadership for the range of professional development, service, and social activities held on a yearly basis. The Fall 2011 ASME Student Leadership Seminar (SLS) was held at the University of Southern Indiana in Evansville. With being so far away, travel by air was approved for three student members (Carlos Beatty, Jr., Megan Frager, and Colin McGowan) and advisor, Jason Ash. Colin and Jason delivered an invited presentation, "Fundraising for ASME Student Sections." Carlos and Jason both formally began their role as District C Student Sections Committee (SSC) student and senior representative, respectively. This is an international ASME committee, focused on the continuous improvement of the ASME student member experience.



2011 South Dakota Board of Regents Award for Organizational Leadership



Altec Industries Tour in St. Joseph, MO, prior to SPDC

A total of nine students participated in the Spring 2012 Student Professional Development Conference (SPDC), held at the University of Missouri-Columbia. On the way there, Joe Farke (ME '08) provided a tour of Altec Industries in St. Joseph, MO. Altec manufactures bucket trucks for utility maintenance, along with boom trucks, cranes, and diggers. Tyler Nack and Andy Koosman both competed in the ASME Old Guard Oral Competition and did a great job of representing the university. Andy was selected as the 2012 District C nominee for the Charles T. Main Award for his extensive service toward the K-12 outreach programs. Additionally, Colin McGowan was elected as the next SSC student representative. On the return trip, ASME stopped in Kansas City, MO, for an alumni dinner, hosted by Matt Kafka (IENG '04). Along with his career at the hospital, Matt recently opened a butcher shop called the Local Pig, located at 2618 Guinotte Avenue, featuring hormone-, steroid-, and antibiotic-free meats from the area. The smell as you walk into the Local Pig was amazing, and it made for a great alumni event. It is highly recommended that alumni in the Kansas City area visit the Local Pig. These and more stories can be viewed at <http://asme.sdsmt.edu/news.html>.



2011 ASME District C Student Leadership - Training Seminar
University of Southern Indiana - Evansville, Indiana

Fall 2011 ASME Student Leadership Seminar



ASME Alumni Dinner in Kansas City, MO, at the Local Pig

Front row (L to R): Josh Pappel, Carlos Beatty, Jr., and Megan Frager
Middle row (L to R): Ben Hanson, Steve Sobania, Kathleen Hoffman (CSC '84), Tyler Nack, Matt Kafka (IENG '04) with Noach and Ella, Justin Tomac (IENG '93), and Sarah Tomac

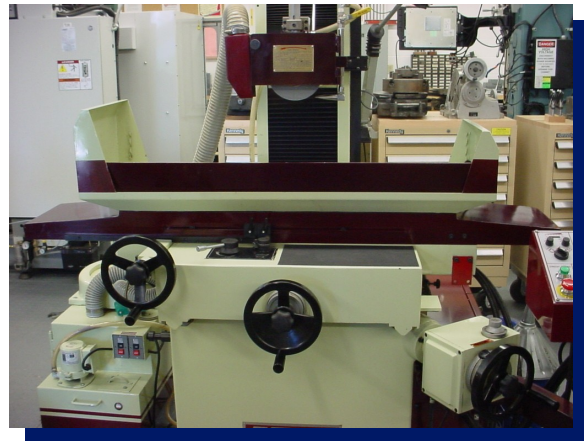
Back row (L to R): Jason Ash, Jared Johnson, Jeff Hoffman (ME '84), Andy Koosman, Joe Farke (ME '08), John Tines (ME '08), Colin McGowan, Vic DeJong (ME '64)

Not pictured: Matthew Schulte (ME '09) and wife, Rachel

Machine Shop Additions (Chuck Schilling, ME Technician)

I am happy to point out the latest additions to the Mechanical Engineering Department Machine Shop. The shop is now at a machine level commensurate with that of the industry, thus allowing our students to interact with equipment they may encounter after they graduate.

Equipment purchases and costly repairs would not be possible without the resources from the Stensaas Lab Endowment Foundation Fund and the vision of academic need and collaboration between the department head, Dr. Langerman, and the Provost, Dr. Hrnecir.



Above is the new Acer Automatic Surface Grinder, with digital readout and hydraulic drive. It can remove as little as a tenth of a thousandth of an inch of ferrous material.

To the left is a new addition to the shop—a ProTrak Computer Numeric Control (CNC) Mill, which has proven to be very user-friendly for the students. In fact, the standard of user-friendly equipment influenced us to purchase the ProTrak CNC Lathe, which is shown below.

We have also installed a new type of flooring made from recycled material, and the security and safety of the area has been upgraded by the addition of security cameras and ID card readers on the entry door and all of the machines.

Please come and visit us and check out all the advancements that we have made.



Faculty/Staff Highlights



Before joining SDSM&T in August 2011, Dr. Shahbazi was a postdoctoral researcher at the division of applied mathematics at Brown University for three years. Before joining Brown, he worked as a postdoctoral researcher at the Computational Fluid Dynamics laboratory at the University of Wyoming. He obtained his Ph.D. in Mechanical Engineering from the University of Toronto (Canada) in 2007. Dr. Shahbazi spent the summer of 2005 in the Physiological Flow Studies laboratory at Tohoku University (Japan), funded by a joint Canada-Japan fellowship for science promotion.

Dr. Shahbazi's research interests are in high-fidelity modeling of complex multi-scale fluid flows, such as compressible and incompressible multi-phase flows, low-speed and high-speed reactive flows, and physiological flows. His research finds applications in biomedical engineering, aeronautical engineering, energy and environmental engineering. His outside collaborators include Dr. Jan S. Hesthaven (Brown University), Dr. Paul F. Fischer (Argonne National Laboratory), Dr. Peyman Givi (University of Pittsburgh), and Dimitri J. Mavriplis (University of Wyoming).

Dr. Shahbazi's teaching interests are thermal science courses, including fluid mechanics, gas dynamics, heat transfer, thermodynamics, and computational fluid mechanics.



Dr. Benjamin Simmons joined the Mechanical Engineering Department in August of 2011 as an Assistant Professor. Dr. Simmons received his B.S. in 2007, his M.S. in 2010, and his Ph.D. in 2011, from the Department of Mechanical Engineering at the University of Alabama. While completing his Ph.D., he was a Department of Education GAANN fellow and performed research in the area of liquid biofuel combustion.

Dr. Simmons' research interests include fuel-flexible, low emissions combustion systems, novel fuel atomization techniques, and combustion strategies for non-traditional and waste fuel streams.



Leslee Moore joined the Mechanical Engineering Department in December 2011 as the full-time Senior Secretary. She received her B.A. in English, with a minor in Business Administration, in May of 2011, from Black Hills State University. Prior to that, Ms. Moore received an A.A. degree from the South Dakota School of Mines and Technology. Her duties include all accounting and administrative aspects of the ME department, as well as assisting with various K-12 outreach activities for the department.

During her college career and prior to starting her position at SDSM&T, Ms. Moore worked part time for KNBN-Rapid Broadcasting Company as a production assistant.

Enrollment Numbers and Recruiting Efforts at an Increase (Lisa Carlson- Assoc. Dir. of Recruitment & Graduate Programs)

The Mechanical Engineering Department made recruiting and increasing enrollment one of its top priorities for the 2011-2012 academic year. Toward this end, Lisa Carlson, the Associate Director of Recruitment and Graduate Programs, has overseen a comprehensive marketing and recruiting campaign, carried over from the 2010-2011 academic year. Some of the completed projects include a multi-faceted virtual tour for prospective students, which will be shown on newly purchased digital signs to be placed both inside the office and in the Civil/Mechanical hallway. These signs will also replace our bulletin boards and will essentially act as announcements, news, ME promotional videos, and greeters for potential students and parents.

Another completed aspect of the marketing campaign is the implementation of paid Facebook advertising. At the time of this publication, we have increased our page fans from 187 to 3,870, an astonishing 1,970% increase over the span of three weeks.



We have also produced two different commercials aimed at recruiting young women and are currently underway with the production of a third. The first commercial features the Hardrocker Formula vehicle racing around the curves of the Needles Highway, with a young woman as the driver. We were able to get the highway closed for a short period of time to shoot this commercial and had the help of the entire Formula team.

The second commercial features a little girl innovatively using her UAV to rescue an abandoned Barbie placed up high by her brother. We had the help of a willing UAV pilot for this spot. The commercials, placed on YouTube, Facebook, and the department website, along with airing across South Dakota and in Omaha, have been seen in 16 different countries and went viral online. Both commercials have been translated to Spanish for Hispanic and Spanish-speaking potential students and families.



These efforts have collectively helped the department increase its enrollment to unprecedented numbers. Total undergraduate enrollment in mechanical engineering jumped from 396 in 2010 to 438 in 2011, more than an 11% increase. Women enrolled in ME increased from 20 in 2010 to 30 in 2011, a 50% increase.

Recruiting efforts are paying off for the Ph.D. program, as well. The number of applicants for the Fall 2012 semester, as of this publication date, is at 18, a 260% increase from the inception of the program in Fall 2010.

You are encouraged to view the department's commercials and virtual tour on YouTube at <http://www.youtube.com/user/sdsmtmecheng?feature=watch>. You can also find our page on Facebook, under SDSM&T Mechanical Engineering.

Remember Your Alumni Association

The SDSM&T Alumni Association promotes communication and interaction among alumni, students, faculty, and administrators of the South Dakota School of Mines and Technology, with the objective of strengthening the school's academic, research, and service roles. Whether through the *Hardrock* or the *Hardrock E-News*, area meetings or reunions, the Alumni Directory or award programs, they are here to help you and to help our alma mater. So please consider supporting your Alumni Association with your contributions and your time. Learn more via <http://alumni.sdsmt.edu>.

We wish to extend a heartfelt thank you to all the ME department's generous benefactors. Please take some time to view the list of donors on the department website, found at <http://me.sdsmt.edu/about/185782/>.



Head's Message

Dear ME Alumni and Friends,

Last fall, and again this spring, student enrollment numbers at SDSM&T were down slightly. However, unlike the institution as a whole, the ME department enrollment during these same semesters reached record levels. The beginning fall enrollment was approximately 440 undergraduates (up from 396 a year earlier) and the beginning spring enrollment was approximately 425 students (up from 367 a year earlier). I credit this increase to the recruitment efforts led by Ms. Lisa Carlson, the department Associate Director for Recruitment and Graduate Programs. The details of her recruitment plan are described in this newsletter.

Our Ph.D. program continues to grow, and we graduated our first Ph.D. student, Abdulaziz Alhulaifi, last spring. Abdulaziz studied under Dr. Gregory Buck, and his research involved focusing powder jets during cold spray processing. We currently have five Ph.D. students enrolled in the program. So far, we have had 18 applications for Fall 2012, up a factor of 3 from Fall 2011.

As the spring semester comes to a close, we can look back and see another very successful academic year. Our students placed very high in several national and international competitions. The Alternative Fuel Vehicle/Clean Snowmobile (AFV) team won Best Simulation in the Clean Snowmobile Challenge 2011 in Houghton, MI, finishing 4th overall in the competition. The Baja SAE team traveled to Peoria, IL, for the Baja SAE Competition, achieving 3rd in presentation, 7th in the Static event, and 9th in Design. Meanwhile, the Formula SAE Hardrocker Racing Team traveled to Brooklyn, MI, for the Formula SAE Competition, placing 3rd in Autocross. Finally, the Supermileage team placed 9th, overall, in the Supermileage SAE Competition, in Marshall, MI.

Last fall, we welcomed three new members to our department team. Drs. Khosro Shahbazi and Ben Simmons joined us in August as Assistant Professors, and Ms. Leslee Moore was hired in early December as the department Senior Secretary.

Finally, I want to remind anyone who may have an interest to serve on our department Industrial Advisory Board (IAB) to contact us. The board lost three members through resignations over the last couple of years. Art Hunt (BSME 65/MSME 71), who resigned in 2010, was with the board for over ten years, serving as the board president for over four years. Victor DeJong (BSME 64) resigned this spring and was with the board for over six years. Dave Braun (BSME 61) resigned this year and was a board member for three years. On behalf of the department, I want to thank these past board members for their years of service and commitment to the department and similarly to the current members for their continued service.

Michael Langerman
Professor and Department Head
Mechanical Engineering Department
SDSM&T