College of Engineering
Points of Excellence

Student-centered Campus

- **COE engages groups underrepresented in engineering.** Because women and Native Americans are generally underrepresented in engineering, COE is increasing outreach to these groups.
  - COE doubled the number of its female tenure track faculty through new faculty hires in the past 5 years.
  - COE participates in the prestigious university consortium sponsored by the William and Flora Hewlett Foundation’s “Engineering Schools of the West Initiative.” Hewlett supports the COE in its goal to become the premier college for Native American students pursuing engineering, engineering technology, and computer science education in the Northern Rockies and Northern Great Plains regions. Native American enrollment has risen 47% since 2002.

- **COE Students Excel on FE Exam.** In April, College of Engineering seniors once again outperformed most peer groups in the nation on the Fundamentals of Engineering (FE) exam. The eight-hour exam is the first step toward acquiring a professional license. COE seniors across all engineering disciplines achieved an outstanding pass rate at 86 percent; while the aggregate national pass rate was 82%. MSU COE is among the 10 percent of engineering programs that require all graduating seniors to take the exam.

- **COE Complex Goes Wireless.** COE and MSU’s Information Technology Center have provided wireless Internet access throughout the engineering complex, giving students more workspace options and faculty greater flexibility in designing class activities. Since fall 2005, students bringing their laptop computers to campus have found it easier to keep up with homework, study for exams and work in small groups.

- **All engineering programs at MSU are ABET accredited** and have been so since their respective inceptions. MSU’s Computer Science program was one of the nation’s first CS programs to receive accreditation from ABET. ABET, Inc. is the recognized U.S. accreditor of college and university programs in applied science, computing, engineering, and technology.
Students receive $3500 Gilhousen Scholarships to attend MSU.
This academic year, ten undergraduate engineering students each received a $3,500 Gilhousen Undergraduate Scholarship to study electrical and computer engineering. The scholarships were awarded through the Gilhousen Undergraduate Scholarship Program. Karen and Klein Gilhousen’s $5 million gift established the program and created the Gilhousen Telecommunications Endowed Chair in the Electrical and Computer Engineering Department.

http://www.montana.edu/commserv/csnews/nwview.php?article=2273

Nationally and Internationally Recognized Scholars

Faculty at MSU’s College of Engineering are ranked nationally in research expenditures on a per capita basis. At more than $164,500 per faculty member per year, the MSU COE is ranked just behind Virginia Tech and Arizona State, and directly above Oregon State, Arizona, Kansas State, Michigan State and Washington State (based on FY 2004, latest reporting available).

Using bees to detect landmines gains international attention. Joe Shaw, associate professor in Electrical and Computer Engineering, and Jerry Bromenshenk, an environmental chemist at the University of Montana, are using bees and laser sensors to detect landmines. An article about their research published in Optics Express, an online journal by the Optical Society of America, grabbed attention and spawned a flurry of articles in outlets ranging from Business Week to Nature Physics to Beekeeping in New Zealand. Shaw fielded inquiries that resulted in articles — both in print and online — by at least ten other publishers from the U.S., United Kingdom, New Zealand and Ireland.

http://www.photonics.com/spectra/applications/XQ/ASP/aaoaid.400/QX/read.htm
http://www.businessweek.com/technology/content/aug2005/tc20050816_6487 tc119.htm
http://www.nature.com/nphys/journal/vaop/nprelaunch/full/nphys103.html
http://optics.org/articles/news/11/8/8/1

Sub-Zero Laboratory further boosts MSU’s appeal to scientists conducting cold-region research. In addition to conducting outdoor experiments, scientists need to scrutinize individual components of cold environments under precise controls to comprehend the impact and influence of the climate. With a combined $1.7 million from the National Science Foundation ($1.1 million) and the Murdock Charitable Trust, the Civil Engineering Department will create a 2,700 sq. ft. state-of-the-art Sub-Zero facility with eight cold labs. Professors Ed Adams, Civil Engineering, and John Priscu, Land Resources and Environmental Sciences, lead the project. Adams expects the lab to increase synergy among scientific disciplines studying cold environments, involve more students in leading research, and enhance MSU’s internationally-renowned reputation as a cold-region research center.
New faculty member lands significant DOE grant. Stephen Sofie, assistant professor in Mechanical and Industrial Engineering, has been awarded a one-year grant worth nearly $500,000 to conduct a three-part research project sponsored by the DOE. The DOE chose MSU for its first High Temperature Electrochemistry Center (HiTEC) satellite in 2002. Sofie’s research is expected to culminate in solid oxide fuel cells that can be used in lighter weight, higher power systems for aeronautic and aerospace applications.

MSU ranks high in number of Goldwater Scholarships. MSU is among the top 12 institutions in the nation for students who have received the prestigious Goldwater Scholarship, the highest award authorized by Congress for excellence in engineering, math and science. MSU students have earned more Goldwater awards, more than Northwestern, MIT, Yale and other top schools.

Sanks first MSU professor inducted into Professional Engineers Hall of Fame. Robert L. Sanks, professor emeritus of civil engineering at MSU, was inducted into the Montana Professional Engineers Hall of Fame in fall 2005. The Montana Professional Engineers Hall of Fame is sponsored by the Montana Society of Engineers to honor Montana engineers who made significant contributions to the development of Montana and the engineering profession.

Opportunities for Hands-on, Active Learning

Creativity in undergraduate learning at MSU’s College of Engineering was featured in a Chronicle of Higher Education article “Build Robots: An engineering course promotes hands-on skills” published June 24, 2005.

Students compete in vehicle design competitions. The MSU student chapters of Society of Automotive Engineers (SAE) and the American Society of Mechanical Engineer’s (ASME) are gearing up to compete in vehicle design contests in 2006. The ASME team will compete in a national Human Powered Vehicle (HPV) competition in April in San Luis Obispo, Calif., and the SAE team will compete as Car #20 at the SAE West race in Fontana, Calif., in June 2006. The Mechanical and Industrial Engineering Department is providing students three capstone design/build projects related to SAE club activities.

CBE team designs and tests microbial fuel cells. Zbigniew Lewandowski and Haluk Beyenal oversee a multi-disciplinary team conducting research funded by the Office of Naval Research at MSU’s Center for Biofilm Engineering. The project team, that over the course of the project has included at least 10 students, expects to confirm that “drop and forget” sensors can be designed using readily-available components. Microbial fuel cells, devices that use catalytic reactions of microrganisms to convert chemical energy to electrical energy, play a key role in designing sensors that are expected to last up to ten years without maintenance. Lewandowski predicts that advances in
nanotechnology will make it possible to develop smaller devices that use less energy, further enhancing the practicality of using microbial fuel cells.

➢ **COE’s new labs involve students in pursuing high-tech advances.**
The College of Engineering has established several new and significant laboratories in areas of strategic research and teaching emphases. These include laboratories in micro-scale fabrication, a “cold-regions,” corrosive materials, high-temp fuel cells, magnetic resonance microscopy, optical remote sensing, human factors in transportation systems, and biological engineering. Each of these facilities has many undergraduate and graduate students conducting experiments and gaining valuable experience.
WTI builds partnerships between transportation and ecology. Extensive research conducted by the Western Transportation Institute is leading efforts to protect wildlife, conserve habitat, and reduce traffic accidents at wildlife crossings. Undergraduate and graduate students working on these projects obtain firsthand experience in preserving the unique animal habitats of Montana. Recently, students have studied fish passages at road crossings in the Clearwater Basin (Missoula); deer and bear crossings at Bozeman Pass (Bozeman/Livingston); deer and elk crossings near West Yellowstone; and wildlife crossing structures on U.S. 93 (Flathead Valley).

Spectacular Educational Setting

Students conduct transportation research in Yellowstone. The Western Transportation Institute (WTI) gives students unrivaled opportunities to conduct undergraduate and graduate research in Yellowstone National Park. WTI students conducted traffic counts and speed studies in the park that led to the deployment of Intelligent Transportation Systems technologies. These research experiences also gave engineering students the opportunity to learn about the unique transportation challenges faced within a National Park environment.

Service and Outreach

Bridge and dam building workshops engage 2nd and 3rd graders. Nearly 400 second and third grade students throughout Montana have had a chance to learn about civil engineering concepts during hands-on workshops. MSU women engineering students guide young girls and other groups underrepresented in engineering as they explore challenges related to building bridges and dams. MSU students also travel to Montana tribal schools to involve Native American children. Bridges and Dams workshops have been held in Broadus, Ashland, Pryor and Big Sky.

Montana Manufacturing Extension Center (MMEC) recently celebrated its 500th client recognition luncheon with Nutritional Laboratories International in Missoula. MMEC reached this milestone in its tenth year of service to Montana’s 2,300-plus manufacturers. The Center ranks first in customer satisfaction among the 59 National Institute of Standards and Technology (NIST) Manufacturing Extension Partnership centers, and recently moved up from fourth to second in the nation in leveraging client investment dollars (a ratio of investment clients report as a direct result of services in a quarterly survey to federal dollars invested to deliver services.)

Alumni Recognition

Joel Long receives honorary doctorate. Joel Long, retired principal of JTL Group, was awarded an honorary doctorate in Engineering in May 2005. After earning a bachelor’s degree in physics in 1965 and a master’s degree in civil
In 1967, Long served in the Army Corps of Engineers, then returned to Montana. In the ‘90s Long formed the JTL Group, which he later sold. Long has served as an industry leader, community builder, and philanthropist. Named in 1992 as one of MSU’s “Centennial Alumni,” Long currently serves on MSU’s Advanced Technology Institute Board of Directors.

➢ **Sparling awarded MSU Alumni Achievement Award.** Thomas Sparling, EE ‘39, co-founder of Sparling, the nation’s largest engineering and technology consulting firm, was posthumously awarded the MSU Alumni Achievement Award in September 2005, during Homecoming Week. Sparling worked for more than 15 years to improve the National Electrical Code and was a former editor and chairman of the *Gray Book*, a recommended-practices manual for electrical power systems in commercial buildings. Following Sparling’s death in December 2004, his family initiated the Thomas E. Sparling Electrical Engineering Memorial Scholarship for electrical engineering students at MSU.  
  [Link to Sparling award information](http://www.montana.edu/cpa/news/nwview.php?article=2804)

➢ **Engineering Legacy Scholarship Program is one of a kind for children of MSU graduates.** The College of Engineering’s Legacy Scholarship Program is open to the children of Montana State University Bozeman graduates who are studying engineering or computer science at MSU-Bozeman. Individual awards are $3,000 per year, renewable for up to 4 years. The Legacy Scholarship is awarded competitively based upon total academic achievement with consideration for financial need. The COE Legacy Scholarship awards are made possible, in part, by a large gift to the COE scholarship endowment from the estate of William V. Benjamin.  
  [Link to Legacy Scholarship information](http://www.montana.edu/wwwfa/PDFormsFiles/Schol_Fin_Aid_forms_Fresh_App.pdf)

**Corporate Support**

➢ **Sobek MSU’s first Boeing Professor.** The COE has appointed Durward K. Sobek II as its first Boeing Professor. Sobek, associate professor and graduate program coordinator for MSU’s Department of Mechanical and Industrial Engineering, will design an undergraduate program to teach engineering students how to work effectively on a multi-disciplinary team and help prepare them for work in a global economy. Sobek has conducted research on product development practices at two world-class manufacturing firms. Read the full news release online.  
  [Link to Sobek appointment information](http://www.montana.edu/cpa/news/nwview.php?article=3067)

➢ **Micron Awarded $49,000 in Scholarships to MSU’s Engineering Students.** This fall, twelve Montana State University engineering students were awarded scholarships from Micron Technology, Inc. The scholarship support accompanies MSU’s “Key School” status and Micron Scholars are chosen from the best and the brightest studying electrical engineering and computer science at MSU. Only ten universities in the nation are key schools for Micron.