Mines students engage in the time-old tradition of whitewashing M Hill during M Week’s Rocker Days.
The South Dakota School of Mines & Technology has been awarded over $1.1 million from the National Science Foundation (NSF) and John T. Vucurevich Foundation for the Culture & Attitude Program. The program aims to attract, retain and graduate more women and underrepresented students in engineering through scholarships, industry mentors, professional development and new curriculum that engages diverse learning styles. The Culture & Attitude program will also partner with local nonprofits, the city of Rapid City and the Native American Sustainable Housing Initiative to incorporate service learning into the classroom.

“The nation needs more engineers, and women are still underrepresented in the profession,” said Heather Wilson, President of the School of Mines. “This grant will help us look at learning styles and how to more be more effective in our teaching.”

In addition to support for students, the grant will allow Mines to evaluate its curriculum to ensure that it is preparing engineers with different learning styles and problem-solving strengths. The university has previously done research on brain dominance in engineering students. While there is good research to suggest that teams of people with different problem-solving strengths produce better results, engineering education tends to heavily emphasize analytical thinking over imaginative thinking, sequential thinking or interpersonal thinking.

“The traditional engineering curriculum may not engage students of different learning styles. The NSF award contains funding for faculty and curriculum development to change the curriculum to better engage underrepresented groups, particularly women, in engineering,” says Principal Investigator Michael West, Ph.D., Department of Materials & Metallurgical Engineering.

The $982,102 NSF and the $125,000 John T. Vucurevich grants will support underrepresented students in the five engineering departments that make up the Culture & Attitude team: civil, industrial, mechanical, metallurgical and mining engineering.

In collaboration with these departments, the Culture & Attitude program will launch new curriculum with experiential, service and creative learning components to better retain students who are creative, empathic and organizational in addition to analytical.

New curricular components include:

- Service Learning – Understanding the social implications and cultural considerations of design by analyzing homes designed and built by the Native American Housing Initiative
- Researching sustainability issues proposed by the Rapid City Mayor’s Committee on Sustainability and presenting findings to the City Council and Mayor
• Forensic Analysis
• 3D Printing
• Creativity and Innovation
• Martians vs. Earthlings: Addressing Bias
• Gold Rush Laboratory
• Forensic Analysis of Artifacts
• Service Projects – Developing a community garden, orchard and learning center for Youth & Family Services

To evaluate success, the entering freshman class will be administered the HBDI assessment annually to track both retention of women and student diversity across quadrants. Results and best practices will be disseminated to the campus community and a national audience.

“The goal of this program is to change the culture of engineering. These young women are catalysts to make this happen. Mentoring, professional development, networking, academic support and technical and team-building activities, like welding, machining, rock climbing or archery, empowers them to succeed in an industrial setting,” said Paula Jensen, who manages the Culture & Attitude program and teaches in the Department of Industrial Engineering.

Other faculty and staff on the grant include: Shaobo Huang, Ph.D., Department of Mechanical Engineering; Jon Kellar, Ph.D., Department of Materials & Metallurgical Engineering; Jennifer Benning, Ph.D., Department of Civil & Environmental Engineering; Cassandra Degen, Ph.D., Department of Mechanical Engineering; Andrea Brickey, Department of Mining Engineering; Kelli McCormick, Ph.D., Department of Mining Engineering, Stuart Kellogg, Ph.D., Department of Industrial Engineering, and Lisa Carlson, director of the Student Success Center and the Women in Engineering & Science program.

SD Mines Career Fair

Hosts 127 Employers

including Google, Microsoft

SD Mines hosted 127 employers for the annual fall Career Fair, including Google, one of 21 companies that participated in the career fair for the first time.

Over 1,000 Mines students attended, networking with employers including Burns & McDonnell, Barrick Gold, Cargill, Caterpillar, Garmin, EchoStar, Microsoft, Sanford Health and Dow Chemical, as well as regional companies and engineering firms. In all, 126 employers from 26 states, including 37 from South Dakota, were on hand to visit with Mines students. South Dakota companies include Daktronics, POET, Raven Industries, TSP and Vishay. In addition, nearly half of the employers stayed to conduct next-day interviews.

Catch all the Career Fair action here.

Intern Spotlight

Nick Easton | WSP Parsons Brinkerhoff

Senior mining engineer Nick Easton from Colorado Springs, Colorado, interned with WSP Parsons Brinkerhoff in Robinson, Illinois, as a mine inspector, IT support and site handyman for a project focused on excavating a 1.4 million barrel underground room and pillar butane storage cavern. Easton and the vice president of engineering are shown here while giving a tour of the butane storage caverns. Outside of his internship, Easton hunted for geodes and fossils in the local area and made some incredible friends.
A Rapid City Vision Funds request by SD Mines proposes safety upgrades and other improvements to O’Harra Stadium, a widely used community resource for local high schools and other organizations.

Mines President Heather Wilson announced details of the proposal during a news conference, in which Rapid City Areas Schools Superintendent Dr. Lori Simon and Rapid City Convention & Visitor’s Bureau Director of Sports & Events Todd Tucker also spoke.

The proposed $2.5 million project would include:

- New artificial turf and track surface to replace current surfaces nearing the end of their life expectancies. The turf and track will be removed, the substructure will be evaluated, and new, safer turf and track surfaces will be installed.

- Community playground to welcome families with children of all ages. The playground would be fenced to provide a safe entertainment option for younger fans attending sporting events.

- Updated digital scoreboard to provide live video feed and replay capability and improve overall fan experience.

- New wrought iron fencing and brick pillars in front of the stadium to replace the existing chain link fence, improving the aesthetic appeal of the stadium.

- Digital billboard signage to replace the static display on the north side of the stadium enables users like high schools to make the stadium theirs for events.

Tens of thousands of people from the Rapid City area pass through O’Harra Stadium gates each year to participate in or attend numerous community events.

In addition to hosting SD Mines Hardrockers athletics events, O’Harra Stadium is used by Stevens, Central and St. Thomas More High School for football games or track and field events. The stadium is home to regional high school football playoffs and the South Dakota State Track Meet, which is held every third year.
“By working together with the schools, the business community, and the city, we have proposed a project that is affordable, provides a great return on investment for the city, improves safety for athletes, and improves the experience of families and fans that use the stadium,” President Wilson said.

The next state high school track meet is scheduled for May 2018. Each meet brings between 5,500-10,000 people into the community for four days, generating between $3-$5.5 million in local revenue. This state track meet will come back to Rapid City a total of three times during the life expectancy of the proposed renovations, making this meet alone a $9 million to $15 million return on investment for Rapid City.

To meet the needs of the next state track meet without disrupting fall 2017 high school and college football schedules, work on the track and playing surfaces would be done in the summer of 2017, an aggressive construction schedule that the School of Mines would manage with the approval of Vision Funds this fall.

“Updates to O’Harra Stadium are a vital piece of the puzzle for Rapid City to continue to host the SD High School state track meets. That weekend every two to three years brings close to 10,000 people to Rapid City and millions of dollars in economic impact. The stadium is most active in the fall and spring, the shoulder seasons for the tourism industry. Supporting this project is a good return on investment for Rapid City,” Tucker said.

While O’Harra Stadium is home to Friday night football games for the Central Cobblers and the Stevens Raiders, other community events throughout the year are hosted by the Convention and Visitor's Bureau, Chamber of Commerce, Regional Health, Rapid City Police and Fire Departments, Pennington County Sheriff’s Office, YMCA, NFL Youth Flag Football, Black Hills Youth Football League, SD National Guard and South Dakota High School Activities Association.

“Recently our high schools played here in the Rushmore Bowl. By working together, we save money for the schools, and our high school athletes have a safer place to play. I particularly like the improved padding for greater safety on the artificial turf,” Rapid City School Superintendent Dr. Simon said.

There is no operating cost to Rapid City. SD Mines and the Rapid City Area Schools cover annual operations and maintenance costs of about $115,000.

Improved safety of the turf and track is a key component in the proposal. New turf would include upgraded fiber strength, substructure padding and Ecofill, a granulated environmentally friendly non-vulcanized rubber infill.

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**SD Mines’ Online Graduate Engineering Programs Rank Top 10 in Nation**

Three new rankings by OnlineU put the South Dakota School of Mines & Technology’s online engineering graduate programs in the top tier of the nation. OnlineU’s rankings consider affordability, accessibility and quality.

SD Mines’ construction engineering and management program ranked second in OnlineU’s “2016 Best Value Online Colleges for Construction Management Degrees.” The school outranked institutions including the University of Illinois Urbana-Champaign, Purdue University and the University of Southern California.

SD Mines’ engineering management and mining engineering and management programs continue to rank in the top 10 nationally for best value, as listed in the “2016 Most Affordable Online Colleges for Engineering Management Degrees” review.

“Mines provides a great education, with the flexibility working professionals need and at a cost people can afford,” said Mines President Heather Wilson.

With an annual tuition of $11,000 in 2016-2017, SD Mines is a great value according to OnlineU’s “2016 Best Value Online Colleges for Management Degrees.”

The university offers three professional master of science degrees online: construction engineering and management, engineering management, and mining engineering and management.


Click for more information about SD Mines’ [online graduate engineering programs](https://www.sdmolines.edu/programs/online-education).
Enrollment at the South Dakota School of Mines & Technology is up slightly with a student population of 2,859 this fall semester, 16 more than a year ago.

The total number of undergraduate students is exactly the same, at 2,485, while the number of graduate students seeking a master’s degree has increased by 7 percent to 244 students.

The number of first-time, full-time freshmen enrolling at Mines who graduated from South Dakota high schools is up significantly this year, from 202 last fall to 229 this fall – a 13 percent increase at a time when the number of students graduating from high school in South Dakota is flat or declining slightly overall.

“I’m particularly pleased to see so many more South Dakota students choosing to come to Mines,” said Heather Wilson, SD Mines President. “I hope these numbers mean that a larger proportion of South Dakota students overall are choosing engineering and science as their life’s work.”

Slightly more than half of Mines students, 52.7 percent, come from other states and countries.

The university has served as a successful pipeline for importing talent into South Dakota, growing the state’s economy and creating jobs. About 20 percent of graduates who come from outside the state have a first zip code after graduation inside South Dakota, helping to meet the critical need for engineers and scientists.

Mines saw a decline in freshmen applying and coming from several states, Colorado in particular. This drop is largely attributed to out-of-state tuition rising faster than the rate of inflation over the past three years.

“Mines offers challenging academics, personal attention, a great internship program and a beautiful location to go to college,” said Wilson. “We will work with the Board of Regents and the other universities in the South Dakota system to make sure we keep college affordable and attract needed talent to the state.”

While Mines saw an increase in qualified applicants for doctoral degrees, research funding was available for 113 PhD students – two fewer than last year but more than double the number of a decade ago when there were just 45 doctoral students.

Mines has been pursuing planned growth to about 3,000 undergraduates and has added over 548 students to the student body over the last five years. While Mines has some co-enrolled high school students and distance students, Mines excels at engaged engineering and science learning and most growth has come from traditional, in-person students.

During the same five year period, Full Time Equivalent (FTE) growth was 412 students or 20.1%.
Entrepreneurial-minded students from high schools and colleges throughout the region are being encouraged to enter a “Shark Tank”-like student business plan competition sponsored by local and state partners and hosted by the South Dakota School of Mines & Technology.

After several face-to-face and online information sessions, teams will train with mentors throughout the semester and on Dec. 3 will pitch their business plans for the chance to win thousands of dollars in start-up money.

SD Mines has opened the competition to all West River high schools, as well as neighboring higher education institutions Black Hills State, Western Dakota Tech, National American University and Chadron State.

“This is our third year to host the business plan competition and it keeps getting better, with lots of mentoring and interaction between students and business leaders. We are encouraging high schools and other college students to compete to spread the culture of entrepreneurship in the region,” said SD Mines President Heather Wilson.

Participants must attend the on-campus business plan training and throughout the semester will receive assistance from the Small Business Development Center in preparing financial statements, as well as mentoring from local business leaders and SD Mines’ Entrepreneurs-in-Residence.

“This is a fantastic event that would give our students real-world experience and possibly jumpstart their careers as business entrepreneurs and professionals. I’d encourage our students to take advantage of this opportunity to showcase their cutting-edge business plans,” Rapid City Area Schools Superintendent Dr. Lori Simon said.

Student competitors will get the opportunity to learn from lead mentor Darren Haar, one of 27 SD Mines Entrepreneurs-in-Residence. Haar was previously global business director of Microcircuit Materials for DuPont before leaving to pursue other ventures, including spinning off technologies developed at SD Mines.

Judges include former executives of Fortune 500s, heads of angel funds and local business leaders.

Teams may also take their business plans to compete statewide at the South Dakota Governor’s Giant Vision Awards. Students who have competed in the CEO Competition have gone on to win the Governor’s Giant Vision Award the last two years.

In the past, student business plans have ranged from an intelligent wheelchair and mobile apps to guidance devices for the blind and subterranean salt caverns for natural gas storage.

2016 CEO Competition sponsors are Big D Oil, Golden West Technology and Internet Solutions, Regional Health, South Dakota Governor’s Office of Economic Development, South Dakota School of Mines & Technology and West River Electric Association.

Click to learn more about the competition.
BLACK HILLS BRAWL & M WEEK
Pumpkin Chunkin’
Tests Engineering Prowess

Mines CAMP students put their skills to the test in a public display of ingenuity, designing catapults that tossed pumpkins high overhead in the annual Pumpkin Chunkin contest for the most accurate and furthest flight.

Internet Firewall Inventor
Speaks at SD Mines

Bill Cheswick, the computer programmer credited with inventing the Internet firewall led two presentations for the Center for Security Printing and Anti-Counterfeiting Technology (SPACT) headquartered at South Dakota Mines.

The first talk “Computer Security: ‘I think We Can Win!’” focused on the use of tools, techniques and needed software updates to combat cybercrime and espionage. The second, “Rethinking Passwords,” focused on alternatives and solutions to concerns associated with the use of traditional passwords required by many Internet sites.

Cheswick’s experience with computer programming and security stretches back to 1968. Over the decades he has worked on early firewall designs for Bell Labs and corporate and Internet mapping. In 2000, he left Bell Labs and co-founded Lumeta to commercialize mapping technology. In 2006, Cheswick joined AT&T Shannon Lab, where he worked on security, visualization and user interfaces. He retired in 2012 and is currently a visiting scholar at the University of Pennsylvania.

In 1994, he published “Firewalls and Internet Security: Repelling the Wily Hacker,” the first full book on the subject which helped to train a generation of new security experts.

SPACT is a collaboration between South Dakota Mines, the University of South Dakota and South Dakota State University focusing on initiatives to combat counterfeit goods and theft of intellectual property.
Honored with a national award for his leadership and contributions to the American Institute of Professional Geologists, Mines geologist Foster Sawyer, Ph.D., was recognized with the 2016 AIPG Martin Van Couvering Memorial Award at the organization’s national conference in Santa Fe, N.M.

Last year, Sawyer served as national president of the AIPG, which has more than 7,000 members. From 2009-2016 he was a member of the organization’s National Executive Committee and has also served in other capacities at the national level. In 2012, Sawyer chaired the AIPG National Annual Conference held in Rapid City and has also served as president of the AIPG South Dakota section.

Since joining the South Dakota Mines faculty in 2008, Sawyer has strengthened the university’s petroleum-related curricula, recently adding a new petroleum field camp and securing major donations of petroleum industry software and digital datasets for research and teaching. Another of his significant accomplishments at Mines has been the development and supervision of two STEM (science, technology, engineering and math) education programs for Native American students in collaboration with tribal colleges in western South Dakota.

Additionally, Sawyer has traveled and worked frequently in Mongolia and participated in two paleontological expeditions to the Antarctic Peninsula.

The early years of his career were devoted to geological and hydrological projects as a geologist and hydrologist with the South Dakota Geological Survey in the Black Hills region. Notable projects on which he worked included serving as co-author for the Geologic Map of South Dakota, performing source water assessments and vulnerability mapping for over 500 public water supply systems in the Black Hills area, and supervising and participating in numerous hydrologic and geologic investigations in western South Dakota.

During his time at SD Mines and the South Dakota Geological Survey, he has authored and co-authored more than 50 articles, maps and abstracts on a variety of geologic and hydrologic topics. He has also served on the board of directors of the West Dakota Water Development District for 12 years.

“It is a tremendous honor to receive this award. Mr. Van Couvering was renowned for his personal and professional integrity and his high standards of professional competence,” Sawyer said. “The AIPG has provided me with opportunities to represent American geoscientists on an international stage, as well as opportunities to give something back and to make a difference for future generations of geoscientists.”

Other awards Sawyer has received during his career include the 2016 Virginia Simpson Award for community service from the South Dakota School of Mines & Technology, 2016 Honorary Awardee from the Rocky Mountain Federation of Mineralogical and Lapidary Societies, 2005 Antarctic Service Medal from the United States of America and the 2004 Geologist of the Year Award from the AIPG South Dakota section.

“Dr. Foster is an exceptional faculty member and has been a leader in his profession. It’s a pleasure to see him recognized in this way,” said SD Mines President Heather Wilson.
Homeless Hustle & Wharton Challenge Combine Forces for 5K/10K Runs

The South Dakota School of Mines & Technology and the Homeless Coalition Youth Task Force teamed up for combined runs during a day of shared compassion and community engagement. While Mines’ Wharton Challenge was organized by CAMP in honor of late Mines President Robert Wharton, the Coalition’s Homeless Hustle 5K raised awareness of youth homelessness and assisted those affected by collecting tennis shoes and monetary donations.

Mayor Allender Celebrates Constitution Day at Mines

In honor of Constitution Day, Mayor Steve Allender spoke on the structure of government and civic engagement. Allender is a native South Dakotan, raised in a military family. He began his career in law enforcement in 1983 working for the Belle Fourche Police Department. Joining the Rapid City Police Department (RCPD) in 1985, Allender spent the next 29 years serving as a patrol officer, detective, sergeant, crime lab director, lieutenant, captain and chief of police. He retired from the RCPD in 2014. Allender holds a bachelor’s degree from National American University and has attended the FBI National Academy.

New “Movement, Muscle, Measure” Art Exhibit Open at Apex Gallery

Mines is hosting a new art exhibit entitled “Movement, Muscle, Measure,” by Michael B. Baum that includes 40 drawings from four different series, exploring the intersection of kinesiology, drawing and technology.

Baum left South Dakota in his early twenties to work and travel in the mountain ranges of California, Wyoming, Montana, Washington and Alaska. After completing his graduate studies in fine art at Washington State University, Baum returned to South Dakota and now serves as an assistant professor of art at Black Hills State University and the curator for the Ruddell Gallery. Baum has also been the recipient of a career development grant through the South Dakota Arts Council for a series of drawings entitled “Heart to Heart.”

The exhibit will run through Friday, Oct. 28.
Mines in the News

The Washington Times
School of Mines Engineering Program Getting Big Grant

Rapid City Journal
SD Mines Career Fair Draws Some Really Big Names

Rapid City Journal
Hardrockers Run Past Jackets to Win Black Hills Brawl

Prairie Business
Mines Geologist Sawyer Honored with Prestigious National Award

KEVN Black Hills FOX
Rocker Days Brings the Community Together with a Fair

KOTA TERRITORY
Bank Official: Politics Don't Impact Federal Reserve Actions

Rival South Dakota Schools Team Up to Make New Technology

Students Commemorate 220th Signing Anniversary of U.S. Constitution

SD Mines Proposes $2.5M Project to Improve O’Harra Stadium

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