Welcome back to campus, Hardrockers!

Enrollment at the School of Mines is again expected to increase this fall, with the official headcount tallied the tenth day of classes and made public by the Board of Regents several weeks later. Classes began Aug. 25.

“The nation and the region need more well prepared engineers and scientists to help solve the problems of the 21st century. The reputation of the School of Mines continues to grow and our applications were up again this year,” said Mines President Heather Wilson. Overall enrollment last fall increased nearly 9 percent compared to the previous fall for a total of 2,640 students. Last year's growth included a 20 percent increase in first-time freshmen.

“It's hard to predict how many students will actually come when offered admission. Last year's growth was probably a little too fast. We want to keep the quality of our education very high,” said Wilson. “Applications from young women were up significantly this year.”

Wilson is the first woman president in the 129-year history of the School of Mines. This year, every freshman woman will have an upperclass woman mentor.

New 2014-2015 highlights for Mines:

- Long-term lease agreement with Rocker Square apartments – The university is operating the privately-owned Rocker Square I and II apartment buildings adjacent to campus under the Office of Residence Life. Reserved for sophomore students who are required to live on campus, the twin buildings can house 269 students. The long-term lease continues through 2024.
- Minor in Petroleum Systems – As part of the new Energy Resources Initiative, the new minor is an 18-hour credit program open to students of any major. Twenty percent of Mines graduates already go to work in the oil and gas industry. The new minor is designed to help graduates be more marketable in the upstream and downstream energy industry.
- Ph.D. in civil and environmental engineering—Courses for the new doctoral program will be offered this fall. The Board of Regents approved the program in June.
- Stephen D. Newlin Family Student Wellness & Recreation Center—The new facility includes a two-court gymnasium named after former President Harvey Fraser. The gymnasium is expected to open by the end of the year, while the other space within the new wellness facility—including a bouldering wall, new student locker rooms and expanded cardio and weight training areas—should open by next April.
- Bicycle rental program—The new Rapid City B-cycle program is open to students, faculty and visitors who can explore Rapid City and beyond by checking out bikes on campus.

Hundreds of Mines freshmen participated in this year's Day of Service, heading to neighborhoods and service organizations to clean, restore and assist with projects even before the first class began.

It's a day organizers hoped would not only serve the community but also jump-start a successful collegiate career for new students at the School of Mines.

President Heather Wilson started the freshman service day last year. “Leaders serve the community. Our students will not just be in Rapid City, we will serve Rapid City. That starts with our freshman service projects,” Wilson said.

The initiative, which was a part of orientation and Welcome Week activities on campus, came as part of a larger university effort to encourage students to demonstrate a commitment to citizenship, civic engagement and service to the community.

Students spent time at a variety of locations in the community, including the Central States Fairground, the Spearfish Wildlife Sanctuary, the Outdoor Campus West in Rapid City and the Boy Scout Ranch outside of Custer. Others stayed on campus to help pull weeds, pick up trash and clean.

Cory Headley, assistant director of student activities, said more than 500 incoming freshmen were encouraged to participate.

This year, sophomore students who helped with service last year, also had the opportunity to lead groups of freshmen. But the weekend was particularly important for the freshmen who have come to the Black Hills from out of town, Headley said, because they become more acquainted with the area and make connections with people and services.

“It’s a great way to build energy and it’s a great way to get them excited about being in Rapid City and at the School of Mines,” he added.

Hundreds of freshmen make community impact

SEE PHOTOS ON PAGE 6
Students complete internships at 200 employers in 30 states

South Dakota School of Mines & Technology students reported working this summer in internship, co-op or undergraduate research experiences with more than 200 employers in 30 states, the District of Columbia and Morocco.

South Dakota led the way, with more than 70 employers from 17 communities across the state hiring students as interns to work on specific projects or research areas. In all, 340 students received internships.

South Dakota employers included manufacturing companies Daktronics, Raven Industries, SymCom/Littelfuse, Trail King, Worthington Industries and Terex. Students were drawn to telecommunications and engineering firms, as well as several state and federal agencies.

Students not only gained experience, but earned a living, too. The average hourly wage topped $17.65/hour, with some employers also providing housing allowances, bonuses and relocation expenses.

School of Mines students contributed to high profile companies like Amazon, Cargill, Polaris, Walt Disney World, Ford, Honda, Kimberly-Clark, as well as NASA and the Sanford Underground Research Facility in Lead, S.D.

“Three fourths of Mines graduates have an internship or co-op experience before they graduate. It gives our students real world experience that helps prepare them as professionals,” said Heather Wilson, president of Mines. “I’m particularly pleased that so many of our students found summer positions in South Dakota companies.”

South Dakota is one of the few states in the nation that has increased the amount of manufacturing in the state since the recession in 2008, and a significant number of companies locate in South Dakota to serve the surrounding energy industry. Unemployment is low, there are no individual or corporate income taxes, and engineers and scientists are in high demand.

“Half of the students at Mines come from outside of South Dakota,” said Wilson. “We are importing talented, hardworking high school students who are going to be engineers and scientists. They have lots of options, and we welcome South Dakota companies who want to recruit them.”

Besides resume-building for the future, internships are often followed by an invitation back to the company for a full-time job, said Darrell Sawyer, assistant vice president for student development.

The most recent placement figures compiled by the university’s Career & Professional Development Center show 98 percent of 2012-2013 graduates landed jobs in the field for which they studied with an average starting salary of $60,020 or enrolled in graduate school. Twelve of the university’s 16 majors had 100 percent placement rates.

Rashyli Leonard, a junior physics major from Monrovia, Colo., spent the summer as a science intern at the Sanford Underground Research Facility, where she primarily focused on the Majorana collaboration. The Majorana group of 100 scientists from 19 institutions worldwide, including the SD School of Mines, is working to find neutrinoless double-beta decay a mile underground.

“I traveled underground every day and entered a clean room in order to help build the Majorana Demonstrator,” she said. “I was fortunate enough to help in every stage of the process, from growing the world’s purest copper to helping assemble detector units in the glove box. This was an experience of a lifetime, and I could not think of a better way to spend my summer,” said Leonard, who is president of the Circle K service organization on campus.

“Companies look at internships as a talent pipeline,” Sawyer said. “They know the School of Mines students, and they have seen their work.”

Audra Basal, a junior geology major from Marquette, Mich., interned at Eagle Mine in Michigan’s Upper Peninsula.

Audra Basal, a junior geology major from Marquette, Mich., spent the summer working at Eagle Mine, a subsidiary of Lundin Mining in the Upper Peninsula of Michigan. Basal worked in the exploration geology department, logging core and helping prepare for seismic testing that will occur later this fall.

She also spent valuable time in the company’s mine site. “I got to spend the day underground with our mine geologists learning about grade control, mapping, and sampling of muck piles,” Basal said. “I even got to take a ride in one of our haul trucks. It was by far the highlight of my summer.”

It’s not uncommon for internships to help shape the way a student sees the field they are interested in, or to refocus or confirm the studies they have chosen, Sawyer said. Basal, for example, now plans to focus more energy on mine geology and working underground.

Taylor Schoenfelder, a senior chemical engineering major from Dimock, S.D., interned at Cargill in Sioux City, Iowa. During his time at the company, he managed more than a million dollars’ worth of projects and was excited when he had a real-world effect on the company’s bottom line.

“A highlight of the time I’ve been here so far was when I found a solution that was going to save Cargill over $180,000,” he said.
Groven awarded to research fight against WMDs

Lori Groven, assistant professor of chemical engineering, has received the Young Investigator Award from the Defense Threat Reduction Agency (DTRA) for her research on materials that could be used against weapons of mass destruction.

The Young Investigator Award is a coveted, highly competitive program. Each year, the Defense Threat Reduction Agency presents three to four awards nationally to researchers in the science and engineering fields.

Groven, Ph.D., received the award for her project on “Printable Polymer Bound Reactives.” She will receive $300,000 for three years to develop this research area with the option of two additional years of funding at $100,000 per year.

“This is very exciting, as it’s a very prestigious award with competitors representing tier one universities and research facilities. This award is important because not only does it jump-start my career but I have the opportunity to mentor graduate and undergraduate students in cutting-edge energetics research,” Groven said.

Her research focuses on fundamentally studying and developing printable polymer bound reactive materials for use against weapons of mass destruction (WMD) facilities and systems. The research will look at various printable polymers with reactive material inclusions and will use direct write to achieve structures and films from the developed inks. Printed structures will then be used to study the combustion characteristics. A doctoral student and several undergraduates will assist her in the research.

The research supports the Defense Threat Reduction Agency’s mission to combat weapons of mass destruction and make the world safer.

“Dr. Groven is one of our most promising junior faculty members, and I’m pleased that DTRA has recognized that fact,” said Mines President Heather Wilson.

Groven earned her bachelor’s degree, master’s degree and doctorate at SD School of Mines.

Bang designing foundation for world’s largest offshore windmill

Off the shores of South Korea, School of Mines professor Sangchul Bang is making history. Designing suction pile foundations for a 2,500-megawatt (MW) wind farm, his nearly $200,000 contract with Korea Electric Power Corporation Research Institute (KEPRI) will result in foundations for 500 windmills ranging from 3 MW to 7 MW each – the largest ever constructed.

The world’s current record holder stands at 5.5 MW, a prototype with the potential to power 1,100 households each year. Wind energy currently supplies 3 percent of the world’s electricity and is projected to more than double by 2018, with the World Wind Energy Association predicting a fourfold increase in wind power capacity by 2020.

Until 2001, Bang, Ph.D., professor in the Department of Civil & Environmental Engineering, consulted for the U.S. Office of Naval Research, which awarded him a $500,000 grant for the design of mooring systems for floating naval bases approximately one mile long – five times the length of the largest aircraft carrier. Suction pile foundations were the result of that research.

He’s been offered numerous Navy research and consulting contracts since then, most recently to supervise the design and installation of the foundations of two meteorological towers installed in preparation for this 2,500-MW wind farm west of South Korea in the Yellow Sea.

Prior to the design of offshore wind farms, towers such as these are installed to monitor the meteorological data at the planned site, accruing measurements of atmospheric air pressures, wind velocities and directions, tidal wave conditions and ocean current velocities and directions at various elevations. The data is then used to locate wind turbine orientations and elevations.

Housed underneath the towers, embedded in the seafloor, suction pile foundations are large-diameter and hollow, a structure Bang likens to an upside-down cup. Installed with a pump, they suck water out from the top and support the windmill above against external loads such as self-weight, wind, ocean currents, earthquakes, collisions and the like.

“The largest suction pile that I have designed and installed has a diameter of 40 feet and a height of 56 feet, weighing about 4 million pounds. I have used suction piles for the foundations of caisson-type breakwater, mooring of floating breakwaters, temporary mooring of immersed underwater tunnels having four driving lanes and now the meteorological towers. Basically, suction piles are a foundation structure that allows very weak ocean floor soils to provide the necessary support of extremely heavy superstructure loads,” Bang explained.

The current project presents a unique challenge as each type of windmill – 3 MW, 5 MW, 5.5 MW and 7 MW – will have a different configuration with varying lengths and number of blades as well as variant soil conditions, such as clay layers or sand, from one site to another. Thus, the foundation of each windmill must be designed individually.

With plans for the first windmill to be installed and operational by late 2015, Bang is currently training an engineer from KEPRI at the SD Mines campus on how to design, analyze and install suction piles in offshore environments. Another engineer plans to arrive in 2015.
Students receive $50,000 geological modeling software donation

The SD School of Mines has received more than $50,000 worth of software donations from Leapfrog, a leader in 3D geological modeling software, for use by the student chapter of the Society of Economic Geologists.

Kelli McCormick, Ph.D., instructor, Department of Mining Engineering & Management, says Leapfrog Geo and Mining products will be used to model ore deposits for evaluation and mining purposes, providing students with access to commercial-grade technology.

Geared toward the mining, hydrogeology and geothermal energy industries, Leapfrog's software takes raw drillhole data and creates surfaces using interpolation. The software is also fully dynamic, meaning any new drillhole information that becomes available can be loaded, and the models will update automatically based on the rules with which they were built. In addition, its impressive processing power allows users to model highly complex geology, while the software's evaluation component duplicates models to test various hypotheses, improving geological understanding.

Leapfrog Promotion Manager Toni Stenhouse explained that the time saved by using the technology will allow geologists to “focus on doing what they do best, interpreting the geology.”

Economic geology students, who study mineral deposits and the geologic processes leading to their formation, stand to gain invaluable, real-world experience with industry-standard software.

“Exploration geologists and mine geologists use this program routinely, and it will be beneficial for the economic geology students to learn the program as they may have to know the program when they enter the workforce,” McCormick said.

Stenhouse said that’s the end goal for Leapfrog, as well, to ensure students entering the workforce are up to speed with the latest technology, leaving them fully proficient in the use of Leapfrog to give them a head start in industry.

“We are approaching well-respected schools, known for preparing highly capable, world-class geologists. Mines most definitely fits this profile,” said Stenhouse.

Mines receives gift of Gulf of Mexico seismic, geophysical data to analyze

The Department of Geology & Geological Engineering at the School of Mines has received a gift of digital seismic and well log data from TGS, a global multi-client geoscience data provider.

The 2D and 3D seismic data and digital well log information covers over 3,000 square miles in the Gulf of Mexico and will be used to develop training exercises for students preparing to enter the petroleum industry. Students and faculty will analyze the data through a $49 million gift of Petrel software received from Schlumberger in 2012.

Analysis of the data and development of training exercises are expected to take six to nine months, although students can begin using the data immediately in their petroleum-related coursework.

“When we explore for oil, the most powerful method is evaluation and interpretation of seismic and geophysical well log data. This area in the Gulf of Mexico is geologically complex, and it will give our students excellent experience in processing and interpreting raw data,” said Foster Sawyer, Ph.D., associate professor in the Department of Geology & Geological Engineering, who will manage the use of the data and software.

“Students will be able to make interpretations regarding subsurface structures and to develop models regarding oil migration and accumulation in that portion of the Gulf. This is state-of-the-art data in an extremely interesting area, and the experience of working with these data will put our students in a different league when it comes to landing industry jobs,” Sawyer said.

The School of Mines also has launched an Energy Resources Initiative, which includes a new minor in Petroleum Systems and expanded research in the fields of petroleum exploration and production.

NASA awards $500,000 space grant to SD Mines for partnerships

NASA has awarded $500,000 to the South Dakota Space Grant Consortium headquartered at the SD School of Mines to work toward increasing student and faculty engagement in science, technology, engineering and mathematics (STEM) at the Lake Area Technical Institute (LATI) in Watertown.

The SD Space Grant Consortium will work in partnership with LATI, South Dakota State University (SDSU) and NASA Johnson Space Center on the project entitled “A Sustainable Food Chain: Growing the Right Stuff!”

NASA’s Office of Education awarded 35 such grants to increase NASA-related STEM engagement at community colleges and technical schools across the U.S. The state of South Dakota has no community college system, but there are four technical institutes, including LATI, a long-time affiliate of the SD Space Grant Consortium.

LATI will lead a two-year effort to advance interaction between technical institutes and NASA and to elevate the role of technical institute partnerships in the state. Emphasis will be directed toward attracting more female and Native American students into STEM programs at technical institutes.

The principle fields of study to benefit from the project are Aviation, Agri-Aviation, Environmental Technology and Robotics. These four fields have clear relevance within NASA Mission Directorates, and they align well with South Dakota research and development priorities. Growth in these four fields of study will also open new pathways for technical school graduates to transfer into related STEM programs at the state’s four-year research universities.

The SD School of Mines is headquarters for the 19-member SD Space Grant Consortium, which is directed by Ed Duke, Ph.D., who is also a professor in the Department of Geology and Geological Engineering and manager of analytical services of Mines’ Engineering and Mining Experiment Station.
Welcome Week 2014
Mines gears up to celebrate M Week

Students at the South Dakota School of Mines & Technology are gearing up for the annual M Week celebration, which kicks off Sunday, Sept. 14, and leads up to the Saturday, Sept. 20, parade and football game against Wisconsin River Falls.

This year’s theme is Rocker Days with a Mardi Gras twist and includes a busy week of activities for students, alumni and the community.

“M Week is full of tradition, and it’s a great way for upperclassmen to pass those traditions down to the other students,” said Mike Keegan, director of student activities. “It brings the whole community together.”

There are several new activities this year, including a comedian emcee at an event to introduce the five queen and five king candidates Monday, Sept. 15. The royalty was selected last spring, and students will vote Wednesday, Sept. 17, with the coronation and bonfire taking place Thursday, Sept. 18.

A comedian announcing the candidates is a great addition this year, Keegan said, and will “elevate the caliber of the event.”

Students and the campus community are also invited to take part in the M Hill climb at noon Friday, Sept. 19, at Founders Park, as well as the annual student/alumni golf tournament Sunday, Sept. 21. The University will also host the Wharton Challenge, an annual run named after the late SD School of Mines president Robert Wharton. The run will begin at 9 a.m. Saturday, Sept. 20, at Founders Park.

The community and local businesses will join the celebration for the annual M Week parade, which will begin at the Surbeck Center at 3 p.m. Saturday, Sept. 20, and end at O’Harra Stadium in time for the tailgate activities and football game at 6 p.m. The parade route from campus will follow west on Main Street, turning south at Seventh Street, then east onto East Saint Joseph Street.

“If it’s an opportunity for student organizations to put in an entry, as well as a great opportunity for local businesses to participate,” said Cory Headley, assistant director of student activities.

Students will also connect with downtown businesses this year as they participate in the annual M Week activity “Paint the Town” at 2 p.m. Sunday, Sept. 14, in Main Street Square. Student organizations will paint business windows before returning a week later to wash off the paint.

“It’s a great way to partner with local businesses,” Headley said.

Ziadat awarded Tau Beta Pi scholarship

John Ziadat of Rapid City has been awarded a scholarship from Tau Beta Pi.

Ziadat, a senior mechanical engineering major, is the son of Holly Jacobs of Spearfish. He was employed as an intern at Space Exploration Technologies in Hawthorne, Calif., during the summer.

He has received the $1,000 scholarship for the fall semester.

Tau Beta Pi is the world’s largest engineering honor society. Scholarships are awarded to members on a competitive basis, considering scholarship, campus leadership and service, and promise of future contributions to the engineering profession.

About Legacy News

Legacy News is produced by the Office of University Relations the first Wednesday of each month. The newsletter is a compilation of news releases, photos and Web articles.

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New Mines’ art exhibit examines concept of contradiction

A new exhibit, “Suspended,” featuring paintings by Sandy Brooke, is on display at the Apex Gallery on the SD School of Mines campus.

“The work is suspended between the freedom of line and the containment of space,” according to Brooke’s artist statement about the exhibit.

The concept of contradiction is addressed through her body of work. For example, while the painting “Amelia” is brightly colored the viewer is aware of the tragic disappearance of Amelia Earhart. In “Climate Change,” bright happy colors can’t hide the bleak future one may be facing.

Brooke’s dynamic quality is apparent, but what also comes through is her use of color. Moving from somber and moody in some pieces to lively and light in others, she mines images of her many travels with a keen eye towards contemporary culture, the natural world and collective history.

Foremost a painter—her application of paint is lush and varied—Brooke also adds mystery to each image through layers of collage, encaustic, paint stick, graphite and gouache.

If You Go

What: “Suspended,” paintings by Sandy Brooke
When: Exhibit Aug. 25-Sept. 26
Reception: 5-7 p.m. Friday, Sept. 5, with gallery talk at 6 p.m.
Where: Apex Gallery, Classroom Building