New Student Housing Planned for Fall 2016

School of Mines Foundation and the university have partnered to build a new student dormitory for 200 Mines students.

The proposal will move forward after receiving approval by the Board of Regents in June. The building will be located just west of campus and will be completed in one year, in time for the fall 2016 semester.

The university’s significant growth in recent years has led to a current demand for expanded housing options.

“We are pleased with the Foundation, we will be able to offer more housing for students and continue to redevelop the neighborhood between the Mines campus and downtown Rapid City,” said Heather Wilson, president of the university. “This is an important step forward.”

Enrollment at the university has increased 35 percent over the last six years. Currently, three traditional residence halls on campus and two new university-leased apartment buildings adjacent to campus provide 865 beds for students. According to Regents policy, freshmen and sophomores are required to live on campus.

The 1.78-acre site of the new building is owned by the South Dakota School of Mines & Technology Foundation, which plans to raze deteriorating structures for the development. The Foundation and SD Mines will enter into a 30-year lease agreement for the completed project.

The new six-story building will offer 51 suite-style units, each with a living room and private bathrooms and bedrooms. Community lounges, kitchens and group study spaces will also be provided throughout the building.

“The sole mission of the Foundation is to support the School of Mines, and building new housing options to accommodate the growing student body is one of the ways we can help,” said Foundation President Joel Kincart. “This is a great opportunity to further develop the university campus.”

Regional developer America First Real Estate Group has been selected through a competitive selection process as the developer.

“We are excited to be working with Mines and their Foundation to develop state-of-the-art student housing supporting a strong residential experience,” said Dominic Vaccaro, vice president of America First Real Estate Group. “We look forward to partnering with the local subcontracting community to deliver this high quality project.”

Since 1984, America First’s portfolios have included over 250 projects totaling over 50,000 residential units representing project values in excess of $2.5 billion.
Four New Minors, Certificate Will Increase Job Readiness

New minors in global engineering, computational statistics, environmental science and military science, along with a new graduate certificate in petroleum systems, will further enhance the job readiness skills of South Dakota School of Mines & Technology graduates.

The new minors and certificate were approved by the South Dakota Board of Regents.

The minors in global engineering and computational statistics, also referred to as “big data,” are expected to have the biggest impact on the most students. All new minors will be available for enrollment this fall semester.

Global Engineering

The global engineering minor applies to all nine engineering degrees offered at SD Mines and is designed to better prepare graduates for cultural and social challenges inherent in multicultural projects. Twenty students are expected to be enrolled within four years. Among requirements of the new minor is engineering design in a foreign country or culture.

Of the top 20 employers of Mines graduates over the past five years, 90 percent have locations in other countries as well as the United States. “The School of Mines already provides exceptional preparation in technology and engineering, and this new minor will complement the education our students are getting and better prepare them to meet the demands of a global economy,” said SD Mines President Heather Wilson. “Whether working at home or abroad, engineering and technology professionals are increasingly employed by international companies and agencies or travel internationally for specific projects, and this minor enhances the job-readiness of our students.”

The new minor formalizes practices of faculty members, who encourage students to think globally during their undergraduate careers. Since 2005, over 80 students in civil engineering alone have participated in international projects and activities in 30 countries. In the last four years, nearly 35 chemical engineering students have been involved in international experiences, including multidisciplinary/multicultural design teams and humanitarian projects.

Computational Statistics/Big Data

The computational statistics minor is a natural minor to the existing applied and computational mathematics major. A recently added new course in data analysis strengthens the emphasis. The new minor will provide basic competencies used by data analysts and a strong background for further study in advanced statistics. Eight students are expected to be enrolled within four years.

“There is a growing emphasis on big data and data analysis throughout industry, and the addition of this minor would increase the competencies of our students across many disciplines, making them even more valuable to employers,” President Wilson said. “It’s a great opportunity for students to increase their data skills and also provides an important catalyst for promoting statistical computing in the future workforce for the state of South Dakota.”

Students earning this minor will be able to apply the theory of probability in applications and simulations; apply statistical theory in applications; and demonstrate the use of technology as it relates to probability and statistics.

Environmental Science

This minor will supplement a student’s major field and broaden the overall academic preparation for a science and engineering career. Specifically, it will better prepare students for the atmospheric and environmental sciences graduate program and complement multiple other majors offered at SD Mines, including applied biological sciences, civil engineering, interdisciplinary sciences and mining engineering.

Military Science

This minor recognizes Military Science Leadership academic work students complete when pursuing the Army ROTC commission.

Certificate in Petroleum Systems

This certificate is geared toward working professionals and those with relevant undergraduate degrees in engineering or science seeking to expand their skill set in petroleum and related fields. Job growth in the geosciences is expected to be 20 percent above the national average for all occupations by 2020, according to the Bureau of Labor Statistics, and SD Mines is particularly well positioned to provide research for the oil and gas industry and prepare graduates to enter the energy sector.

The new certificate is a component of the Energy Resources Initiative established at SD Mines last year when the Regents approved a minor in petroleum systems. The university has since announced that over $1.4 million has been raised privately for its energy program and that a search for a permanent director is ongoing.
New $360,000 REU Site to Study Ballistics, Biofouling and Forecasting

The School of Mines has been awarded $360,000 for the new Research Experience for Undergraduates (REU) site, “Technical Experience in Advancing Modeling Sciences” (TEAMS). The site joins three others at Mines, the most of any university in the state.

The new REU site will use computational models to understand phenomenon inaccessible to traditional experiments due to size, time, cost or safety restrictions. Modeling projects will include designing grenade timers, measuring the accuracy of weather forecasts and increasing the efficiency of ethanol purification by minimizing biofouling, which occurs when leftover waste builds up on the filter used to purify the fuel stream. Students will also track how ballistic gel deforms upon impact to design better protective equipment and minimize the effect of shrapnel and other damaging materials.

The National Science Foundation funds over 600 REU sites in all 50 states, Washington, D.C. and Puerto Rico. Each REU site team is comprised of 10 undergraduates from universities across the country that work in the research programs of the host institution.

“Involvement in undergraduate research is an early opportunity to experience the joy of advancing knowledge,” said Heather Wilson, president of SD Mines. “The answers aren’t in the back of the book, and we are pleased to have four groups of REU students with us this year.”

Typically REUs last for a summer, but the new site will run for a full academic year. A summer is not long enough to gain meaningful data, says site director Kevin Hadley, Ph.D., chemical and biological engineering assistant professor. Students will train and study on campus for the summer and return to their home institutions to finish their project over the course of the year.

To prepare participants for modeling research, the REU will include courses in large data set analysis to teach students how to properly interpret and sift through data in order to correctly identify trends. The site will also host weekly seminar luncheons where modelers in industry, government and academia will share their expertise.

Since modeling relies on real-world experimentation for validation, Hadley says he designed the REU site with teamwork in mind. REU participants will receive information from experimentalists and then develop simulations to reproduce experimental observations and findings. In turn, experimentalists will test modelers’ predictions and provide data to either verify or disprove the models. Hadley is also designing teamwork development workshops for students.

The REU site takes a unique approach to mentoring as well, pairing each student with a team rather than a single mentor. Each REU participant will have an experimental, modeling and graduate student mentor, and will also serve as a mentor themselves, supervising a team of GEARUP students for one week. GEARUP is a college preparatory program for Native American and low-income students.

Similar to other REU sites on campus, this site will focus on underrepresented populations in science, technology, engineering and math (STEM).

Ninety percent of Mines’REU participants are underrepresented STEM populations such as American Indians, women and Hispanics.

Hills schools, businesses and communities.”

In an effort to enhance its performance as a new member of the Rocky Mountain Athletic Conference (RMAC) and NCAA Div. II, South Dakota Mines approached Regional about forming a collaboration for its athletic medicine services. “This partnership is designed to improve the overall experience for our scholar-athletes as we fully integrate into the RMAC and engage Hardrocker athletics with the greater Rapid City community,” said Joel Lueken, SD Mines athletic director.

Sole joins the team after completing his fellowship in Sports Medicine at John Peter Smith Health Network, during which time he served as a team physician for the Texas Christian University Horned Frogs. He completed his PM&R residency at Mayo Clinic in Rochester, Minn., and attended medical school at Creighton University School of Medicine in Omaha, Neb. Sole is also a former college athlete as a member of the University of Nebraska-Kearney football team from 2006-2009.

“I’ve been both a college athlete and physician, so I fully understand the importance of quality medical care at this level. I’m passionate about Division II athletics and working with these student-athletes to make sure they can perform at the highest level, academically and athletically.”

Dr. Joshua Sole is the new Hardrocker team physician.
Funded Research Studies Mine Wall Stability, Bone Repair

Newly funded projects involving South Dakota School of Mines & Technology researchers could enhance expansion of Sanford Underground Research Facility laboratories through improved mine wall stability, and also aid in repairing bones through nanofiber materials. They are among competitive state research grants announced by the South Dakota Board of Regents.

Christopher Shearer, assistant professor in the Department of Civil & Environmental Engineering, was awarded $98,056 for his work, “Performance of Fiber-Reinforced Shotcrete in Mining Applications.”

Shotcrete is a type of concrete that can be used in combination with welded wire mesh to stabilize tunnels in underground mines. However, the use of wire mesh can result in corrosion, shadowing of the shotcrete behind the mesh during placement resulting in a weak bond to the rock, and increased labor costs due to installation.

Use of fiber-reinforced shotcrete, which does not require welded wire mesh, can alleviate these issues while reducing rebound and shrinkage cracking, and improving flexural toughness and impact resistance.

The mining industry has been hesitant to adopt fiber-reinforced shotcrete as a replacement in part due to a limited understanding of its performance, Shearer said.

“Dr. Shearer is an exceptional professor who has just completed his first year at Mines. We are very happy to have him with us and very interested in his research to improve structural materials used in mining,” said Heather Wilson, SD Mines president.

Ultimately, this research will support enhancement and expansion of laboratories at Sanford Lab and development of a separate mining research facility at the former Homestake gold mine, Shearer said.

This research grant is an exciting opportunity to establish a field test site at the Sanford Underground Research Facility to gather data on the in situ mechanical performance of fiber-reinforced shotcrete used for ground support in tunneling and mining,” Shearer said. “This grant will help me establish my research career at SD Mines, and it will strengthen my ability to secure external funding for future research opportunities.”

Shearer, who joined the SD Mines staff last August, investigates the chemical, physical and mechanical properties and durability of infrastructure materials, with a focus on sustainable concrete materials technology.

Over the past few years, he has conducted research at the University of Melbourne, Australia, as part of the National Science Foundation East Asia and Pacific Summer Institute program, at Lawrence Berkeley National Laboratory and at the National Institute of Standards and Technology.

Additionally, Hao Fong, Ph.D., professor in the Department of Chemistry & Applied Biological Sciences, is co-principal investigator on a state-funded research project examining the repair of bones through nanofiber materials.

The project, “Erythropoietin Immobilized Biodegradable Nanofibrous Scaffold for Bone Tissue Engineering,” received a $100,000 grant award.

The principal investigator is Hongli Sun, Ph.D., assistant professor in the Program of Biomedical Engineering at the University of South Dakota. SD Mines will receive $25,000 of the total amount through a sub-award.

“Dr. Fong will be working with biomedical researchers at the University of South Dakota to use nanofibrous scaffolds to repair bones. This is the kind of interdisciplinary work between materials scientists and medical experts at two universities that holds great promise,” President Wilson said.

Preliminary in vitro studies have revealed that the novel scaffold can lead to high cell viability and represents a new strategy of “developmental tissue engineering” to mimic natural bone repair processes, Fong said.

Business Boot Camp Launches

Mines launched its first Engineering Accelerator recently. Twelve to 14 Mines-affiliated early stage technology teams founded by faculty, researchers and students were selected for the four-day business boot camp.

Funded by the Enterprise Institute with a $100,000 grant from the Blackstone Charitable Foundation, the goal of the program is to launch new businesses and to create jobs in South Dakota.

“Accelerators like this have been successful at other universities in helping increase the pace of technology-based business formation,” said Heather Wilson, president of SD Mines. “We are very grateful for the support of the Blackstone Foundation and the Enterprise Institute to make this happen at Mines.”

The high-growth potential businesses range from mobile apps and molten salt reactors to color-changing strips that detect E. coli and thermal insulation composites for lunar habitats.

Sessions were led by the Enterprise Institute Executive Director and some of the 17 Mines entrepreneurs-in-residence. Sessions included sales and marketing, product pricing and elevator pitch development.

Mines start-ups have won the Governor’s Giant Vision Business Competition three years running, and this year also placed third in the business competition and first in the student division. Mines partnered with the Black Hills Angel Investors to hold the first “Shark Tank” business plan competition, and the business incubator on campus is currently full.
Around 300 high school students are attending this year’s SD GEARUP (Gaining Early Awareness and Readiness for Undergraduate Programs) Summer Honors program on the South Dakota School of Mines & Technology campus. Students take classes during the day, and evenings and weekends are programmed with study, athletic and cultural activities.

SD GEARUP provides a rigorous curriculum in a college setting to increase American Indian and low-income student graduation rates from high school and acceptance into post-secondary educational institutions.
Croell, Alberts Selected as RMAC Scholar-Athletes

SD Mines students Nick Alberts and Katie Croell have been selected as the Rocky Mountain Athletic Conference (RMAC) 2014-15 Scholar-Athletes announced by the league.

Administrators from each of the 15 RMAC institutions chose a male and female student-athlete as their honorees. To be eligible for the RMAC Scholar-Athlete award, individuals must compete in one of the conference-sponsored championship sports; carry at least a 3.30 Grade Point Average (GPA); be a starter or reserve on their respective team; be of good character and must have participated at the active member institution for two or more seasons.

“Mines prepares leaders in engineering and science. Athletics is an important part of our leadership development program, and these students are excelling in both academics and athletics. We are very proud of them,” said Mines President Heather Wilson.

Alberts is a junior on the Hardrocker track and field team from Langford, S.D., majoring in electrical engineering. He finished his junior season with a 3.97 GPA after placing eighth in the 200-meter dash during the RMAC Outdoor Championships this past spring. He holds the SD Mines school record in the men's 400-meter dash in a time of 50.27 seconds and is a member of the record-holding men's 4x100 relay team (42.27).

“We are very excited for Nick to receive this recognition,” said Hardrocker track and field head coach Jerry Schafer. “He is the consummate scholar-athlete excelling in an electrical engineering education and training to be successful athletically as well. His academic and athletic records are a testament to his work ethic.”

Croell is a sophomore on the Lady Hardrocker track and field team from Broomfield, Colo., majoring in mining engineering. She finished eighth in the women's 100 high hurdles and sixth in the 400 intermediate hurdles during the RMAC Outdoor Championships this past spring. She finished the year with a 3.42 GPA.

Croell broke the SD Mines school record this season in the women's 400 hurdles during the RMAC Championships (1:03.64) and is a member of the record-holding SD Mines women's 4x800 relay team (10:36.15). She also has the second all-time fastest time in Hardrocker history in the women's 100 hurdles (9.41) behind two-time national champion hurdler Shannon Hellman.

“Katie is a joy to coach. She approaches athletics in the same way she approaches her academics – as a student of the sport,” Schafer said. “She is a true scholar-athlete and we are very happy to see her receive this honor from the RMAC.”

Mines Participates at Sanford Lab Neutrino Day

From 8:30 a.m.-2 p.m. Saturday, July 11, the South Dakota School of Mines & Technology will host interactive science and engineering activities as part of the annual Neutrino Day science festival hosted by the Sanford Underground Research Facility located in Lead. All events are free and open to the public.

Students will be available to answer questions about Mines’ research endeavors and offer more information about the university at its booth located at Sanford Lab’s surface campus. Faculty and students are involved in five high-level research projects a mile underground including the next-generation search for dark matter, cutting-edge research in neutrino and particle physics, radon-mitigation efforts, astrophysics-based research on solar neutrino sources and copper electroforming.

Mines faculty and students will also conduct interactive experiments designed for all ages, such as gold panning and Geiger counter activities.

For a complete list of events, visit http://sanfordlab.org/neutrinoday.

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