Student Entrepreneurs
Compete ‘Shark Tank’-Style

The South Dakota School of Mines & Technology is tossing 16 student teams into the “Shark Tank” Saturday, Dec. 5. Like contestants on the popular TV reality show, young entrepreneurs will have to deliver the perfect pitch to win start-up money and transform their concepts into companies at the second annual competition.

Ideas range from an intelligent wheelchair and mobile apps to guidance devices for the blind and subterranean salt caverns to store natural gas.

Joined by entrepreneurial competitions emerging at universities nationwide, Mines students will have the chance to launch their own ventures with a science and engineering twist from 9 a.m.-2 p.m. in the Classroom Building, room 204 west. The second annual CEO Student Business Plan Competition allows for an eight-minute presentation followed by four minutes of Q&A, after which a panel of judges scores teams on their plans’ quality, business potential and impact of their presentations.

Last year’s winners include Module Innovations and its product Bactisense™, a color-changing strip that detects harmful bacteria, like E. coli, in food and water within minutes, and Farnsworth Downs Technology which designs portable nuclear molten salt reactors to set up emergency power after disasters or grid failures. Both companies placed in the top three in last spring’s statewide Giant Vision Business and Student Competitions, and FarnsworthDown’s founders presented at a youth TEDx talk in Denver and the inaugural TEDxRapidCity.

“Partnering with South Dakota business leaders, we’re giving our students a real-world opportunity to experience an important part of entrepreneurship. At Mines, we produce leaders in science and engineering, some of whom will go on to establish and build new companies and new products,” said Heather Wilson, president of the School of Mines. “Experience in innovation and bringing ideas to market starts here. I really hope several of these teams of students start their businesses before they even graduate from Mines.”

Judges are former executives of Fortune 500s, heads of angel funds and local business leaders:

• Jim Meyer, Founder of Quarq Technology, Dakota Rising Fellow
• Jim Quinn, SD Mines Alumnus and Entrepreneur-in-Residence, Managing Partner of Black Hills Business Strategy LLC
• Mat Peabody, SD Mines Alumnus and Entrepreneur-in-Residence, President & CEO of SD Mines start-up Calxaqua
• Nina Braun, Partner of Ketel Thorstenson, LLP
• Jeffrey Wehrung, Director of the Center for Business, Entrepreneurship, and Tourism at Black Hills State University

Winners will receive an award of $3,000 for first place, $2,000 for second place and $1,000 for third place from sponsors including West River Electric Association, Big D Oil, Mines President’s Office and entrepreneur Darren Haar.

Mines Selected for National Engineering Innovation Program

A team of faculty and administrators from the South Dakota School of Mines & Technology has been selected to participate in the Pathways to Innovation Program designed to help institutions fully incorporate innovation and entrepreneurship into undergraduate engineering education.

South Dakota Mines is among 14 universities nationwide selected by the National Center for Engineering Pathways to Innovation (Epicenter), which runs the program. Epicenter is funded by the National Science Foundation and directed by Stanford University and the VentureWell.

Engineering is the foundation of much of the innovation required to maintain America’s global competitiveness and address pressing problems. Faculty and administrators participating in the program will lead universities into a new era of engineering education that prepares students to tackle big problems and thrive in the ever-changing economy.

“Increasing opportunities for students to be involved in innovation and creating an ecosystem that supports innovation is a priority for Mines,” said South Dakota Mines President Heather Wilson. “This is one way in which we will chart our path forward.”

The team from SD Mines will assess

ON THE COVER
Diwali Celebration

The SD Mines India Club and Rapid City public celebrated Diwali Night 2015 with cultural foods prepared by the 40 Indian students enrolled at Mines, entertainment and cultural dances, henna hand painting and a fireworks show. Diwali is the largest festival in India, celebrating peace and harmony beyond the Hindu religion. The India Club at SD Mines aims to increase awareness and understanding of Indian culture through the event, which attracts over 400 people annually.

See more photos on page 7
Ann Rhoades, a dynamic and visionary corporate executive with over 25 years of experience in a variety of service-based industries, will deliver the address at the university’s 172nd commencement ceremony.

The ceremony will be held at 9 a.m. Saturday, Dec. 19, at the Rushmore Plaza Civic Center Theatre. Over 100 Doctor of Philosophy, Master of Science, Bachelor of Science and Associate of Arts degrees will be awarded.

Rhoades is the founder and president of People Ink, a consulting company that helps organizations create unique workplace cultures based on values and performance. She held the position of vice president of Team Services for Promus Hotel Corporation and was a founder and Executive Vice President of People for JetBlue Airways.

In 2011, Rhoades released the best-selling *Built on Values*, a book aimed at helping companies get on the pathway to greatness by showing the exact steps for either curing an ailing organizational culture or creating a new one from scratch.

Rhoades currently serves on the board of directors for JetBlue Airways, University of New Mexico Alumni Association and New Mexico Appleseed. She also serves as director of the New Mexico Health Sciences Center, board chair for Safer New Mexico Now, and is a member of the executive council for Brigham and Women’s Hospital at Harvard Medical School. She holds a Master’s in Business Administration from the University of New Mexico and will be awarded an honorary doctorate during the commencement ceremony.

Ten teams of students ages 9-14 will compete head-to-head with robots made out of Legos in a local FIRST LEGO League contest held at the South Dakota School of Mines & Technology on Saturday, Dec. 5. This year’s competition is themed Trash Trek, challenging competitors to develop innovative solutions for dealing with trash: reuse, recycling, collection, sorting or reducing waste.

The winning team will advance to the state competition in hopes of ultimately competing in the world finals.

The opening ceremony will begin at 10 a.m. in the Surbeck Center Ballroom, and competition is expected to continue through 3:30 p.m. with a closing ceremony at 4 p.m. The competition is divided into four parts: core values, project presentation, robot design judging and robot games.

The highlight will be the robot games in which autonomous robots built out of Legos score points on a playing field by completing specific missions.
Summer Camps to Feature Explosives, Entrepreneurship, Fossils & Forensics

SD Mines has opened registration for the 2016 summer camps, ranging from 3D printing, forensics, and paleontology to explosives and entrepreneurship. The unique, high-quality programing offers high school students the opportunity to engage in a Ph.D.-level experience and make connections nationwide.

The goal is to encourage the next generation to pursue careers in science, technology, engineering and math and offer a taste of college.

Students will spend a week on campus working one-on-one with professors in hands-on, immersive experiments. Each camp also comes with opportunities to explore some of the activities and attractions for which the Rushmore Region is famous. Students travel from as far away as New York, Florida, California, Texas and everywhere in between.

Camps include:

**Building the Future** – Civil Engineering, June 12-17
**What’s with the Weather?** – Atmospheric Sciences, June 12-17
**Fossils** – Paleontology, June 19-24
**Mining and Explosives** – Mining Engineering, June 19-24
**Entrepreneur Bootcamp** – Industrial Engineering, July 10-15
**Geology Rocks!** – Geology, July 10-15
**Materials, Metallurgy & Forensics** – Metallurgical Engineering, July 11-15
**3D and Beyond** – Mechanical Engineering, July 17-22
**Chemistry & Biological Engineering Summer Institute** – Chemistry & Biological Engineering, July 17-22
**Green Chemistry** – Chemistry, July 17-22
Gaming for Good, Students Raise $1,500 for Children’s Miracle Network

From consoles to computers, the student group Gamers for Service at the South Dakota School of Mines & Technology picked up the controls Nov. 21 to save lives. Hosting its third 25-hour gaming marathon, the organization raised $1,500 for the Children’s Miracle Network, which it will donate through Rapid City Regional Hospital.

Other student clubs who co-sponsored the event are: eSports, Pokémon League, the Chess Club, Game Dev Team, the Society of Physics Students, ITS, the Mines Bookstore, and various Pen and Paper gaming groups.

Club president Jordan Weaver added that with such a range of participating organizations, there was something for everyone. The marathon featured retro games, such as Pac Man and a version of Pong programmed by a computer science major at SD Mines, and large-scale gaming. “We played Tactics Forever, which is a physics-based spaceship fighting game. Players can build their ships and send them to the projector to battle,” Weaver explained.

Gamers for Service joined groups around the globe participating in Extra Life, a gaming marathon in which players recruit sponsors and raise donations for Children’s Miracle Network hospitals. Since 2008, thousands of gamers have raised more than $12 million. Extra Life was the second Gamers for Service fundraiser this fall. In October, the organization held a campus-wide game of Humans vs. Zombies, which attracted 75 participants and raised $305. The money was donated to Children’s Miracle Network Hospitals, a charity organization that helps local hospitalized children.

The organization has also donated to Habitat for Humanity, St. Jude Children’s Research Hospital, the Susan G Koman Foundation, the American Heart Association, the Ronald McDonald House, and Child’s Play, which gives toys and games to children in critical care.

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the university’s current offerings, design a unique strategy for change and lead peers in a transformation process to broaden and strengthen campus-based innovation and entrepreneurial ecosystems.

Michael Langerman, Ph.D., head of the Department of Mechanical Engineering, and Darren Haar, SD Mines Entrepreneur-in-Residence, met with the Pathways program for the first time at Stanford University Nov. 19-20. A second meeting in January 2016 will bring together the full Mines team with others in the cohort to analyze the needs and opportunities at individual schools and develop plans for transforming the undergraduate engineering experience.

Other member of the Mines Pathways to Innovation team: James Green, Caterpillar (retired); Paul Hinker, Ph.D., assistant professor, Department of Mathematics & Computer Science; Kayhan Karatekeli, Department of Mathematics & Computer Science; Jon Kellar, Ph.D., professor, Department of Materials & Metallurgical Engineering; Mike Selzer, SD Mines Foundation; Larry Simonson, Ph.D., SD Mines Foundation; Joseph Wright, associate vice president, Office of Research and Economic Development.

Teams will receive access to models for integrating entrepreneurship into engineering curriculum, custom online resources, networking opportunities, guidance from a community of engineering and entrepreneurship faculty, and membership in a national network of schools with similar goals.

The teams in the new cohort join a community of 36 institutional teams that are currently participating in the program. The projects include innovation certificates and majors, maker and flexible learning spaces, first-year and capstone courses, faculty fellows programs, and innovation centers. Additionally, several cross-institutional collaborations have resulted from the first group of schools.

“Today, engineering and computer science students are expected to enter industry with technical knowledge as well as a diverse set of mindsets, skillsets and attitudes that help them innovate, collaborate and create value,” said Tom Byers, director and co-principal investigator of Epicenter and professor at Stanford University. “As educators, we need to better prepare this generation of students for the workforce, position them for success in their careers and give them more opportunities to bring their innovative ideas to life.”
The Great Northwest Athletic Conference announced its 2015 GNAC Football All-Conference selection with South Dakota School of Mines & Technology. Mines earned three First Team selections, one Second Team selection and three Honorable Mentions.

Seniors Trent McKinney and Sam Cowan earned GNAC First Team Offense spots while junior Martin Rodriguez earned a position on the First Team Defense.

Junior David Jakpor was named to the GNAC Second Team Defense and freshman Devin Nixon, senior Josh Thomas and senior John Tyler earned GNAC Honorable Mention nods.

### Volleyball Players Named to All-RMAC Honorable Mention List

South Dakota School of Mines & Technology volleyball players Mikkella Reese (outside hitter) and Anna Breidt (middle hitter) were named to the All-RMAC (Rocky Mountain Athletic Conference) Honorable Mention roster.

“It is a very nice honor for both Mikkella and Anna to be recognized as All-RMAC performers,” said Hardrocker volleyball head coach Doug Tabbert. “The RMAC is loaded with volleyball talent and the competition for all-conference honors is very significant. It is a notable accomplishment for both of them.”

Reese, a junior Chemical Engineering major from Case Grande, Ariz., finished the season with 307 kills to lead the Hardrockers to go along with 304 digs and 36 blocks.

“Mikkella put together a very solid season for us,” Tabbert said. “She averaged over three kills per set and three digs per set. We relied on her heavily for offense, and she was also one of our best passers, one of our best defenders and one of our best servers.

Reese was also recognized for her academic accomplishments early this season by the league by earning Academic All-RMAC honors.

“She certainly carried a lot of responsibility for us while at the same time carrying a heavy academic load,” Tabbert said. “She deserves a lot of credit for being recognized by the conference for both her level of play and her academic performance.”

Breidt, a freshman from Fort Collins, Colo., was a welcomed new addition to the Hardrockers this season and was the team’s second leading player in kills (234) and in digs (30) while leading the team in total blocks (64).

“It’s not easy for freshmen to make an impact in this conference, but Anna was able to do that,” Tabbert said. “We threw her in the mix right away and expected her to contribute significantly. She led us in blocks and was one of our most productive offensive contributors, so she certainly made her mark this season.”

### Mines to Showcase Parade of Trees with a Dr. Seuss Twist

SD Mines hopes to make holiday cheer with a Dr. Seuss-themed Parade of Trees this year, where 25 to 30 organizations will strive to outdo each other with the most festive and creative trees of the season.

Sponsored by the Student Leadership and Activities Association (SALC), “A Dr. Seuss Holiday” will be open to the community from 9 a.m.-3 p.m. Wednesday, Dec. 9, in the Surbeck Center ballroom. The public and media are invited to attend and vote for their favorite tree. SALC requests a donation of a can of food for admittance, with all proceeds going to the student pantry to help those in need.

The campus viewing is from 9 a.m.-4 p.m. Thursday, Dec. 10.
2015 Diwali Night
Mines Among Top 10 ‘Best for Vets’ for Sixth Straight Year

SD Mines has been ranked ninth in the Military Times “Best for Vets: Colleges 2016” list.

The new survey puts SD Mines among three universities nationwide to be ranked in the top 10 for six consecutive years, since the ranking was established.

SD Mines was ranked sixth in 2015, ninth in 2014, second in 2013, eighth in 2012 and was tied for third in 2011. The distinction recognizes colleges and universities for their commitment to providing opportunities to America’s veterans. One hundred twenty-five four-year institutions were ranked this year.

Of the 2,843 current students at SD Mines, 148 are veterans representing all military branches. The job placement rate for the university’s graduating veterans has been 100 percent for three consecutive years.

“Mines doesn’t just support veterans, we respect them and we want them here,” said SD Mines President Heather Wilson. “My husband and I are both Air Force veterans, and we noticed it almost immediately on campus when we arrived. The programs here for veterans are great, but it’s the climate that really sets Mines apart.”

SD Mines has a support system for veterans to help each other succeed. Veteran-to-veteran tutoring and many other resources are available at the Veterans Resource Center located in the Surbeck Center. Other services include assistance with scholarship searches and applications, as well as résumés and cover letters; counseling and referral services for VA benefits, G.I. bills and community veterans organizations; and academic- and life-skills advising and instruction in areas such as learning styles, test preparation, note taking, time management, stress management and wellness.

The extensive evaluation process required schools to meticulously document a wide array of services, accommodations, special rules and financial incentives offered to military and veteran students, such as percentage of tuition covered by the GI Bill, and to describe many aspects of veteran culture on campus. Military Times also factors in data from the Veterans Affairs and Defense Departments, as well as three Education Department sources: the IPEDS Data Center, College Scorecard data and the Cohort Default Rate Database.

The rankings are published in full in the issues of Army Times, Navy Times, Air Force Times and Marine Corps Times on newsstands this week; and online at MilitaryTimes.com, as well as ArmyTimes.com, NavyTimes.com, AirForceTimes.com and MarineCorpsTimes.com.

“We award the Best for Vets designation to the very best – the colleges that really are setting the example,” said Amanda Miller, editor of Military Times’ Best for Vets rankings and special editions.

Three Selected for Nucor Mentor Scholars Program

Three Mines students have been selected to participate in the Nucor Mentor Scholars Program, each receiving a $3,000 scholarship.

Mechanical engineering students Spencer Johnson, a junior from Lakefield, Minn.; Chandler Monk, a senior from Cheyenne, Wyo.; and Eric Holmgren, a senior from Rapid City, were selected as this year’s mentors.

The mentoring program, created in 2013 and partially funded by industry partner Nucor Steel, places students in the mechanical engineering department’s manufacturing lab teaching fellow students machining, welding and fabrication.

Mentors are selected based on their ability to work with other students of varying backgrounds and fabrication skill levels and their ability in the areas of design for manufacturing and employee interaction. Students at the sophomore level or higher can apply for the program.

The goal of the program is to enhance student skills in the areas of design and resource planning, better preparing them for transition into industry through training beyond their mechanical engineering curriculum.

Aaron Lalley, a lab coordinator and instructor for the Department of Mechanical Engineering who will be overseeing the program, believes the support provided by Nucor this year will not only benefit mentors, but will also make every mechanical engineering graduate a better engineer.

“The support that Nucor and the mechanical engineering department provides the mentors allows them to dedicate their time to training incoming freshman in design for manufacturing, manufacturing and team building,” Lalley said.

Lalley and Adam Kuenkel, a lab technician for the mechanical engineering department, will work with the mentors to provide the freshman class a design and manufacturing experience that will prepare them for their upper-level courses and ultimately for industrial design projects.
The “Living Traditions: Dakota, Nakota, Lakota Art” traveling exhibit was displayed at SD Mines this November as part of American Indian Heritage Month.

The South Dakota State Historical Society exhibit, which showcases artistic work on pop-up kiosks from the nomadic hunting period, the reservation period and modern times, was brought to campus by the Office of Multicultural Affairs.

“Although about 10 percent of South Dakotans identify as American Indian, the general public knows relatively little about Native people. Our office strives to promote inclusiveness by highlighting tribal diversity and cultural life, including those of the Lakota, Dakota and Nakota of this region,” said Jesse Herrera, director of Multicultural Affairs.

The strong traditions of decorative quillwork, beadwork, painting and carving is highlighted in everyday objects.

“The artwork featured in this exhibit is outstanding,” said Helen B Louise, Museum of the South Dakota State Historical Society director. “Using visual art from different historic periods shows how important traditions continue to be a part of life today.” The exhibition was funded by the South Dakota Heritage Fund and the State of South Dakota.

**Mines Places 9th in Programming Contest**

The top-scoring South Dakota School of Mines & Technology student programming team placed ninth out of 223 teams in the North Central North American Regional Programming Contest, which included both United States and Canadian teams. SD Mines had five of the top seven teams in South Dakota, with the best four finishing in the top 10 percent of the region and all five teams in the top 20 percent. Other teams scored 14th, 18th, 23rd and 38th.

The invitational contest prepares teams for competition in the International Collegiate Programming Contest (ICPC) World Finals, known as the Olympics of computer science, to be held in Thailand this May.

**Holiday Events**

- **Friday, Dec. 4**
  - Artist Reception, Apex Gallery, 5-7 p.m.

- **Saturday, Dec. 5**
  - Choral Concert, Cathedral of Our Lady of Perpetual Help, 7:30-9 p.m.
  - FIRST LEGO League, Surbeck Center Ballroom, 10 a.m.-4 p.m.
  - Student Business Competition, Classroom Building, Room 204-West, 9 a.m.-1:30 p.m.

- **Sunday, Dec. 6**
  - Choral Concert, Cathedral of Our Lady of Perpetual Help, 7:30-9 p.m.

- **Monday, Dec. 7**
  - Band Concert, Music Center, 7:30-9 p.m.

- **Wednesday, Dec. 9**
  - Parade of Trees Community Viewing, Surbeck Ballroom, 9 a.m.-3 p.m.
  - Late Night Study Breakfast, Surbeck Dining Hall, 9-10:30 p.m.

- **Thursday, Dec. 10**
  - Parade of Trees Campus Viewing, Surbeck Ballroom, 9 a.m.-1:30 p.m.
  - Late Night Study Breakfast, Surbeck Dining Hall, 9-10:30 p.m.

- **Friday, Dec. 11**
  - President’s Holiday Dinner, Surbeck Dining Hall, 5-6 p.m.
  - Children’s Holiday Party, Surbeck Ballroom, 6-7 p.m.

- **Thursday, Dec. 17**
  - Native American Honoring Ceremony, Surbeck Ballroom, noon-3 p.m.

- **Saturday, Dec. 19**
  - Commencement, Rushmore Plaza Civic Center Theatre, 9 a.m.

**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.

To submit news or story ideas or to subscribe to the email distribution list, please contact Dani Mason, public relations officer, at 605.394.2554 or at Danielle.Mason@sdsmt.edu. For more Mines news, visit news.sdsmt.edu

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Dress with beaded yoke. Photo courtesy of the Museum of the South Dakota State Historical Society.
This holiday, think outside the box.

With fossils, explosions, forensics and more, give a summer camp gift they are sure to adore.

SD MINES SUMMER CAMPS
www.sdsmt.edu/summercamps