Presidential search committee named

A group of 12 people will help the South Dakota Board of Regents in its search for the next president of the South Dakota School of Mines & Technology, serving as campus and community representatives on the presidential search and screen committee.

Joining regents Terry Baloun, Dean Krogman, Randy Morris and Kathryn Johnson are:

- Community – Dr. Charles Hart, president and CEO of Regional Health, Rapid City
- SDSM&T Foundation – Tamera Nelson, Chicago, Ill., retired former managing director of the Underground Mining Division of Caterpillar
- Alumni – Ronald Jeitz, Greensboro, Ga., retired marketing executive for Texaco Inc.
- Administration – Pat Mahon, vice president for student affairs and dean of students
- Career Service Employees – Cynthia Christensen, program assistant in the Career and Professional Development Center
- Non-Faculty Exempt Employees – Joseph Wright, associate vice president for research and economic development
- Faculty – Molly Gribb, department head of civil and environmental engineering; Stanley Howard, professor of materials and metallurgical engineering
- Students – Spencer Ferguson, senior civil engineering major and Student Association president, whose hometown is Sioux Falls; Kati Johnson, junior chemical engineering major, whose hometown is Buffalo
- Institutional Collaboration – David Chicoine, president of South Dakota State University
- Member At-Large – Benjamin Snow, president of the Rapid City Economic Development Partnership

The new president chosen will succeed the late School of Mines President Robert Wharton, who passed away in September.

The South Dakota School of Mines & Technology formally presented its Downtown Campus to the public during an October grand opening and ribbon-cutting ceremony.

The 18,000-square-foot addition at 520 Kansas City St. is home to the university’s Department of Industrial Engineering, and offers a four-room state-of-the-art conference center for community use.

The industrial engineering program and its nearly 150 students have operated out of the top two floors of the building for the past year while renovations continued on the main floor and basement conferencing rooms. The first floor also features a School of Mines information center.

The impetus for the move into downtown is two-fold, both as a way to connect with Rapid City’s economic development plans, as well as to expand the physical campus to accommodate a growing student population and laboratory needs.

Dakota Board of Regents has approved the formation of a committee to develop a plan for a projected 120,000-square-foot research facility on campus.

With a 2,424 fall headcount, SDSM&T experienced a 4.9 percent enrollment growth this year.

The new facility includes labs in which students study ergonomics in a hands-on environment, and where students create artistic or innovative designs for the marketplace using a mill, lathe and laser engraver.
Physicists play role in pursuit of elusive dark matter

School of Mines physicists have played a significant role on the dark matter research team comprised of scientists from the likes of Yale, Brown and Berkeley since the project’s beginning three years ago.

The possibility of discovering elusive dark matter and the proximity of the South Dakota School of Mines & Technology to the Sanford Underground Research Facility in Lead, where the experiment will be conducted, is what brought Xinhua Bai, Ph.D., to the university in 2009 from the University of Delaware.

With support from former colleagues in the South Pole Air Shower Experiment (SPASE-2) and Antarctica Muon and Neutrino Array (AMANDA) project, Bai built his own astroparticle physics laboratory from scratch at the School of Mines and formed a team of graduate-level researchers who consider their work with the Large Underground Xenon (LUX) project at the Sanford facility the opportunity of a lifetime.

The LUX experiment is the most sensitive device yet to look for dark matter, which is thought to comprise more than 80 percent of the mass of the universe. The LUX detector was installed nearly a mile underground in a protective tank in July and filled with 70,000 gallons of water in early November.

Scientists will begin collecting data in early 2013 in hopes of identifying dark matter. The School of Mines was tasked with calibrating 20 photomultiplier tubes (PMTs), which are installed inside the tank and which researchers hope will help identify the presence of elusive dark matter particles by essentially tagging and eliminating more everyday particles within the Standard Model, a well-established particle physics model that describes the physics of the visible portion of the universe.

For nearly two years, Mines research student Mark Hanhardt calibrated and characterized the 10-inch PMTs in Bai’s campus lab while pursuing his master's degree in physics. He earned his M.S. in 2011, and his work on LUX helped him land a similar position at Soudan Underground Lab in Soudan, Minn.

"I cannot describe the joy of working in a field that is both personally interesting and immensely important. Like scientists of the previous age whose discoveries led to the ubiquitousness of electricity, computers or wireless communication – things that have fundamentally changed the entire world – I have the privilege of participating in building the world of tomorrow," Hanhardt said from his new position in Minnesota.

His father, Jim Hanhardt, worked at the Homestake Gold Mine until it closed its doors in 1986 and is now part of the team replacing steel in the Ross Shaft. Mark spent two years calibrating and characterizing photomultiplier tubes for the LUX dark matter experiment.

In addition, Tiedt, who plans to complete his master's degree in spring 2013, helped install Tyvek in the tank the week before it was sealed and filled with water. He and Daniel Nix, a Mines undergraduate physics student, have finished a dust characterization system designed to measure the inherent charge on dust particles present at the facility, which has been using the LUX cleanroom space on the surface for the past several months. This project is supposed to provide fundamental data to develop a cleanliness plan for the next generation dark matter experiment, LZ.

While the search for dark matter may seem an incomprehensible pursuit, Bai described the LUX project as an uncomplicated “beautiful experiment,” which, one way or another, will set records.

“The most unique part is that this detector is the largest one in the world that is running. If we don't see dark matter particles, we will have a new world record in sensitivity for sure. And, if we do see dark matter particles that will really be a breakthrough,” Bai said.
New student recreation center planned

The South Dakota School of Mines is teaming with an architectural and engineering group to develop plans for a new 60,000-80,000-square-foot student recreation center and field house, which will provide much needed health and wellness opportunities for current and future students.

A contract has been signed with TSP, which has offices in Rapid City and throughout the Midwest. TSP will partner with RDG of Ames, Iowa, to prepare a facilities design plan to present to the South Dakota Board of Regents in April.

RDG is a recognized leader in athletic and recreational design and has built similar facilities for Iowa State University, the University of Oregon and the University of South Dakota. Many of its buildings include vertical open spaces with glass walls and sweeping views.

Focus groups will be held on campus during the next several months to gather information from students, faculty, staff and community stakeholders regarding priorities and desired amenities. The facility is expected to offer a rock-climbing wall, indoor 200-meter track, recreational courts, multipurpose rooms, fitness center, weight and locker rooms, lounge/study space and a food/drink bar.

The School of Mines is also exploring a potential partnership with Rapid City Area Schools to build a 50-meter Olympic-size pool and the potential for other shared uses.

A new road looping around the building and connecting the east and west parts of campus will also be integrated into the plans. The new facility will more than double recreation/wellness space from the King Center’s existing 64,494 square feet to as much as 144,000 square feet, as the new facility is likely to be joined with the King Center to maximize space. The King Center, which sits at the rear of campus, was built in 1978.

The King Center currently houses all indoor student recreation, intramural, physical education and athletic activities, including just one area dedicated to student wellness, a 2,488-square-foot room for treadmills, weights and exercise equipment. Racquetball courts and a swimming pool are also available during scheduled times. Open court space is limited, as one gymnasium attempts to accommodate all intramurals and varsity athletics schedules.

Last spring, the student body approved a $10 per credit hour fee to support the building. In all, the student fee is expected to fund approximately $6 million of the project. The expected total building cost will be $7 million-$10 million, the remainder of which must be privately raised by the university.

The Rapid City TSP office, where 60 percent of its employees are School of Mines graduates, will lead the effort. Bob Morcom, a 1974 School of Mines graduate, will act as a project manager.

TSP was the lead architect for the most recent addition to campus, the Chemical and Biological Engineering and Chemistry Building, which opened in August 2010, as well as the Hall of Fame.

Mines is second in ‘Best for Vets’ magazine survey

The South Dakota School of Mines & Technology moved into second place in the 2013 Military Times EDGE magazine’s “Best for Vets: Colleges” survey. The evaluation process included survey responses from 650 colleges and considered the accommodations for veterans and active-duty service members within each institution.

The university was ranked eighth in the magazine’s 2012 survey.

“Providing excellent services for our veterans is a small way to give back for the larger sacrifices they’ve made for us. Our student vets contribute greatly to our legacy of excellence,” said Acting President Duane Hrncir.

Services offered at the School of Mines Veteran Resource Center include assistance with scholarship searches and applications, as well as resumes and cover letters; counseling and referral services for VA benefits, G.I. bills and community veterans organizations; academic- and life-skills advising and instruction in areas such as learning styles, test preparation, note taking, time management, stress management and wellness; and tutoring.

45-star flag gifted to university

From left, Dr. Tom Fontaine, School of Mines professor; Lt. Col. Oliver Hasse, professor of military science; and Jill Fontaine.

The South Dakota School of Mines & Technology has received a 45-star American flag from 1895/1896. Measuring 23.5 feet by 12 feet, the flag was presented by donors Jill and Tom Fontaine. Jill Fontaine works in the university’s cashier’s office. Dr. Tom Fontaine is a civil and environmental engineering professor.

The flag was given to Jill’s father, John R. Reynoldson, a Korean War combat veteran and a recipient of both the Silver Star and Purple Heart, by a neighbor in 1967.

Historians believe due to the size of the flag it would have flown over a fort between 1895/1896.
Mines researchers defeat the Yellow Dragon

Each year the Yellow Dragon, a series of ferocious sand storms, sweeps through northeast Asia, its sun-blotting blasts shifting millions of tons of sand, spurring desertification, which occurs as the land’s topsoil – and farmers’ livelihoods – are blown away. Sookie and Sangchul Bang, of the South Dakota School of Mines & Technology, share more than a marriage. They share a common pursuit, one that has led them from South Korea to South Dakota, where, along with their research teams, they have potentially invented a means of halting global desertification, taming the seemingly invulnerable Yellow Dragon whose crippling economic effects are felt throughout Mongolia, China, South Korea and Japan.

And like any good David and Goliath story, the hero is small. In fact, microscopic.

Enter bacteria. When bacteria extract carbon dioxide and ammonia from urea in the presence of water and calcium, a reaction occurs to form calcium carbonate, better known as limestone. This process not only occurs sporadically but at a maddeningly sluggish rate in natural environments, as the bacteria become dormant in adverse conditions whenever nutrients cannot be found.

By adding nutrients as needed to resuscitate the bacteria, scientist Sookie Bang, Ph.D., has followed a cascade reaction, ensuring that the process is not only continual, but dramatically faster. In essence, Bang can grow limestone directly within cracks in concrete blocks, creating a self-healing concrete. Pollution-free and environmentally-friendly, this selective microbial plugging seals from the inside out, integrating with the porous concrete rather than simply filling the space.

The applications are monumental. From the Empire State Building to Mount Rushmore, Bang’s bacterial cement restores national landmarks devastated by cracks and fractures and ravaged by the elements. This concept introduced in the late 1990s so drastically altered the scientific landscape that Reuters Entrepreneurial blog enshrined her invention in the post “Baby Boomer Inventions that Changed the World,” in 2010, sandwiching it among the World Wide Web, rechargeable lithium-ion batteries and the artificial heart.

Sookie, a microbiologist, and her husband, Sangchul, Ph.D., a civil engineer by trade, turned their marital partnership into a working one, refocusing bacterial cement’s application on airborne dust control. When this bacterial cement and soil fibers are incorporated into natural soil, a hardened surface is formed that weighs down soil particles, preventing them from being airborne. This airborne dust control has incredible practical and immediate application in landfills, open pit mines, and...
Willy the Whale, beloved by generations of kids, has returned home to Storybook Island, thanks to the dedication of Mines civil engineering students. Weathering both time and nature, Willy served as a landmark of Storybook Island since 1952, withstanding even the devastating Rapid City flood of 1972. However, after 60 years Willy lay in a disheartening state of disrepair.

Through 800 hours of labor, seven months of construction and hundreds of feet of steel, the American Society of Civil Engineers student chapter took up the mantle of restoring Willy to his former state of glory.

Construction began in April, with the steel and rebar frame erected by students at Hansen Industries in Fort Pierre. Concrete was poured and hand-shaped around the whale on site at the park in October, and the new and improved Willy was unveiled in November.

The new Willy boasts a pair of lookout domes and a blowhole and is slightly larger than his predecessor at 24-feet long, 8-feet wide and 6-feet tall, with an 8-foot-tall tail.

Local businesses donating services and equipment were Bierschbach Equipment and Supply, Benchmark Foam, Hebron Brick Co., Cheyenne River Spec Mix, Pete Lien and Sons Inc., GCC of America, Croell Redi-Mix, Solid Construction Inc., Elkem Materials Inc. and TrueNorth Steel.

Music Activities at the South Dakota School of Mines & Technology has received the loan of several keyboard instruments, including rare Steinway grand pianos. For many years Gene McPherson, a 1968 electrical engineering graduate, has invested in Steinway grand pianos and placed those instruments where they might be used and appreciated. Two McPherson pianos are now housed in the Music Center on the SDSM&T campus. One is a mahogany M-model Steinway, the other a rare Steinway square grand piano that was manufactured in 1859 of fine black walnut. These McPherson Steinway grand pianos will remain the property of Mr. McPherson but are on loan indefinitely.

In like fashion, director of Music Activities, Dr. James D. Feiszli, and his wife, Michelle, have placed two of their personal keyboard instruments, a Steinway upright piano and a modern harpsichord, in the Music Center for use by the music program.

The South Dakota School of Mines & Technology will offer eight new and modified residential camps for high school students this summer.

The camps will mimic the college experience, with students living and eating on campus, and are designed to immerse high school students in a variety of science and engineering fields. Students will also get a chance to learn from top professors and their graduate students in their field of interest in a small group setting.

The curriculum for each camp was created by science and engineering department heads, professors and graduate students and will feature hands-on learning opportunities and highlight examples of career possibilities.

Visits with scientists and engineers in the field and tours of specific companies will combine the concrete with the abstract and allow students to experience a variety of professions that are available with corresponding degrees.

The School of Mines camps will occur between June and August, 2013. Specific dates will be announced soon. Camps are:

- Mining and Explosives Engineering Institute
- Chemical and Biological Engineering Institute
- ASM Materials, Metallurgy and Forensics Institute
- Earthwise: Shape the World with Civil and Environmental Engineers
- Fossils: The Path of the Paleontologist
- Power Camp: Electronics and Computers in Your Hands
- Geology Rocks! Youth Field Camp in the Black Hills
- Robotics Camp
Diwali Night, Festival of Lights, features fireworks, taste of India

The India Club of the South Dakota School of Mines & Technology celebrated Diwali Night 2012, Festival of Lights, on Nov. 17. Diwali is the largest festival in India, celebrating peace and harmony beyond the Hindu religion. The evening, which attracted some 500 guests, offered cultural dances, fireworks and a silent auction featuring 20 original pieces of artwork from the student club, as well as a variety of Indian cuisines.

The university enrolls 37 students from India this semester. The goal of the India Club, which was started in 1985, is to increase awareness and understanding of the Indian culture.

Share your Mines Pride

What’s your story? Students, faculty, staff, family members, alumni and industry partners alike all have stories to tell.

And the South Dakota School of Mines & Technology has launched a new “Mines Pride” campaign encouraging friends to do just that.

The goal of Mines Pride is simple: to build pride and awareness of our world-class university through those who love it most.

Friends and family are asked to log on to a new Mines Pride facebook account — www.facebook.com/minespride — to share stories about classes, campus experiences, research, or dreams, along with pictures and video.

Mines Pride merchandise includes a vintage-like blue and gold T-shirt, $15, and silicon bracelets, $3. Proceeds from a limited-edition commemorative artwork showcasing M Hill in the sunset, $50, will go toward a scholarship honoring the late President Robert A. Wharton.

Log on and share your Mines Pride story today.

‘Time’ magazine features Squyres, 2010 Mines Medalist

Past recipients of the prestigious Mines Medal award continue to be recognized as groundbreakers in their areas of expertise.

Steven Squyres, 2010 Mines Medalist, is currently featured by Time magazine as one of the “25 Most Influential People in Space” in a special publication being sold on newsstands. Time New Space Discoveries will be displayed until Dec. 14.

The South Dakota School of Mines & Technology founded the national Mines Medal award in 2009 to recognize scientists and engineers who have demonstrated exceptional leadership and innovation, and to ensure the United States’ global preeminence in engineering and science.

Squyres, a Cornell University astronomer, is principal scientist for NASA’s Mars Exploration Rover missions. More than 100,000 full-color images of the Martian landscape and analyses of rocks and soil surfaces have been transmitted back to Earth as a result of Squyres’ research.

In addition to Squyres, previous Medalists include Dr. Diana Wall, 2012 recipient and University Distinguished Professor and director of the School of Global Environmental Sustainability at Colorado State University; Dr. Lee Rybeck Lynd, 2011 recipient and professor of engineering and adjunct professor of biology and earth science at Dartmouth College; and Dr. Cindy Van Dover, 2009 recipient and chair and professor of Duke University’s Division of Marine Sciences and Conservation and director of the Duke University Marine Laboratory.
M Hill celebrates 100th birthday

M Hill turned 100 in October, and civil engineering students at the South Dakota School of Mines & Technology hosted a campus party to celebrate the milestone birthday.

The Mines student chapter of the American Society of Civil Engineers offered demonstrations of how the original “M” was laid out on the hill 100 years ago, and students, faculty and staff got a chance to examine the letters from afar through an old-fashioned surveying telescope.

On Oct. 8, 1912, civil engineering students and faculty built the original “M,” measuring 112.5 feet tall and 67 feet wide, on what is now an iconic fixture in Rapid City. Horses carried more than 100 wagons of rock atop the hill.

In 1922 the stone-formed “M” was replaced with 160 square feet of concrete that could be seen from 12 miles away. That “M” stood alone for another 31 years before being joined by the slightly smaller “S” and “D” on either side in 1953.

Construction of the “M” was a result of faculty and students seeking a way to attract attention to the institution. A century later, students continue to ascend the hill during its annual M Day climb.

Metallurgy professor explores education’s new frontier

Dr. Jon Kellar of the South Dakota School of Mines & Technology attended the National Academy of Engineering’s fourth annual Frontiers of Engineering Education symposium Oct. 14-17. The nation’s most innovative, young engineering educators gathered for the three-day event in Irvine, Calif., to exchange ideas, learn from research and best practices in education and create a charter to improve the educational offerings and methods at their home institutions.

Kellar, professor in the Department of Materials and Metallurgical Engineering, was chosen from a highly-competitive pool of applicants, among them educators at MIT, Harvard and Purdue. Selected for his success in developing and implementing inventive education approaches, Kellar engaged in discussions focused on innovation in the context, curriculum and delivery of engineering education. This year’s program aimed to build a robust intellectual infrastructure that meets the demands of a 21st-century education through new developments ranging from MOOCs (massive, open, online courses) to online publishing.

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quarries, unpaved roads and construction sites.

But its power lies in its potential. Applying this technology to Mongolia, home to the worst dust storms in the world, the Bangs could not only mitigate global desertification, but prevent it from ever occurring. Presenting their research findings at the 2011 U.N. Conference to Combat Desertification and the 11th International Symposium on New Technologies for Urban Safety of Mega Cities in Asia, Oct. 10-12 of this year, they revealed the success of their experiment on a small laboratory scale.

Beginning July of next year, Sookie and Sangchul Bang will conduct full-scale field testing on Mongolian desert sands in partnership with the National University of Mongolia and Mines sister school, the Mongolian University of Science and Technology, with research funding provided by Lotte Engineering & Construction of Korea. They will use biodegradable instead of synthetic fibers, layering vegetation atop bacterial spray to augment the effect, which will keep the soil in place long after the bacterial cement degrades. If successful, the Bangs will have defeated the giant, not only changing the world, but potentially saving it.