Starting salaries top $62,000

Graduating students at the South Dakota School of Mines & Technology enjoyed a $6,000 starting salary increase in 2012 compared to the year before, with an annual offer averaging $62,696.

New figures released by the School of Mines’ Career and Professional Development Center reflect bachelor of science degree graduates self-reporting.

In September the School of Mines made national headlines when Bloomberg News cited PayScale Inc’s annual report, which indicated SDSM&T graduates earned a higher starting salary than Harvard’s—$56,700 for Mines graduates and $54,100 for Harvard’s—at about a fourth of the cost to attend.

“These newest salary figures prove that the high quality of education we offer at the South Dakota School of Mines & Technology is recognized by employers. We prepare our students to be industry innovators and leaders of tomorrow, all the while offering a great return on investment,” said SDSM&T Acting President Duane Hrncir.

The current total estimated cost per year, including tuition, fees, room and board, is $15,300 for South Dakota students and $17,245 for out-of-state students. Last fall SDSM&T enrolled 2,424 students, a 5 percent growth from the previous year.

The most up-to-date placement figures indicate 98 percent of graduates either found employment in their field of study or advanced to pursue a master’s degree.

The School of Mines offers highly specialized programs in science, engineering, technology and math with 16 bachelor’s degrees, 14 master’s degrees and seven Ph.Ds.

Testing life as a biometrics campus

The South Dakota School of Mines & Technology and Nexus USA have partnered on a cutting-edge biometrics program, which researchers hope will one day lead to a cashless — and more secure — society.

The program makes Mines the first in the world to test life as a biometrics campus using foil-proof Biocryptology® that goes beyond a fingerprint to read multiple layers into the skin and detect hemoglobin in the blood.

Patented technology on the back end turns each finger scan into a series of valueless numbers that change every time the finger is introduced. Data encryption ensures security, as the numbers can’t be reproduced in a meaningful way, not by merchants, law enforcement, hackers or even Nexus.

The Nexus Smart Pay pilot program at the South Dakota School of Mines & Technology is being tested by 50 students and four faculty members at two locations on campus.

Consumers deposit money into an account, with which they associate their biometric data. Mines students and faculty members pay for goods with a simple finger scan, no cash, credit, debit or ID cards or pin codes necessary.

Biocryptology®, in part, reads several layers deep into the skin using radio frequency. The technology can be applied to other applications, including physical and logical access. It also protects against identity theft, as fewer forms of identification are needed to be carried on a person and the system operates in a highly secure, closed and uniquely encrypted environment.

“Advancing technology to transform lives is what we do at the School of Mines, and we are proud to be not only the first university but indeed the first organization of any kind in the world to pilot this groundbreaking program,” said Acting President Duane Hrncir, Ph.D. “We are excited about being on the front end of this technology. It’s a natural fit for us to partner with Nexus USA and Hanscan.”

Nexus USA is a subsidiary of Spanish-based Hanscan Identity Management, which is owned by entrepreneur and oil tycoon Klaas Zwart, also a Formula 1 enthusiast who has built his own racing resort in Marbella, Spain. Zwart visited the SDSM&T campus in September, spending time with the Mines’
Anna Balazs announced as 2013 Mines Medalist

Anna Balazs, a pioneer in the area of predicting the behavior of complex polymeric materials through her theoretical predictions, has been named 2013 Mines Medalist by the South Dakota School of Mines & Technology. Balazs, Ph.D., is Distinguished Professor of Chemical Engineering at the University of Pittsburgh, whose area of expertise is theoretical and computational modeling of polymer blends and composites. She is recognized as a trend-setting researcher who developed powerful, comprehensive computer models to predict the behavior of nanocomposites. These studies provided critically needed guidelines for creating high performance materials formed from polymers and nanoparticles.

She becomes the fifth Mines Medalist to be named by the South Dakota School of Mines & Technology, which founded the national award in 2009 to recognize scientists and engineers who have demonstrated exceptional leadership and innovation.

Dr. Balazs' research has significant impact on the scientific world. She leads a team that predicted the behavior of Belousov-Zhabotinsky (BZ) gels, a gel with far-reaching applications "such as artificial skin that could be sensory – a holy grail in robotics," she said. "The research being conducted by Anna Balazs has the power to transform lives, and we are excited to name such a distinguished researcher as our 2013 Mines Medalist," said Mines Acting President Duane Hrncir, Ph.D.

Her group developed the first computational model to describe large scale deformations and shape changes in chemo-responsive polymer gels. She has also made significant contributions to the area of self-healing materials and has collaborated with experimentalists at the McGowan Institute for Regenerative Medicine.

The materials and modeling methods being produced as a result of her work are far-reaching, with her research focusing on a very diverse spectrum of systems, including nanocomposites, self-oscillating gels, self-healing materials and polymeric microcapsules. Dr. Balazs' work focuses on developing theoretical and computational models to capture the behavior of polymer blends, nanocomposites, complex fluids and colloidal systems, work that is "crucial to develop predictive models for the behavior" of designing advanced materials, according to one of her nominators Steven R. Little, Ph.D., chair of Pittsburgh's Department of Chemical and Petroleum Engineering.

"It is in this area that Balazs and her research group have made fundamentally important and unique contributions, which are allowing scientists to understand how choices made at the molecular level affect the macroscopic performance of the system.\" Little called her work "theoretically elegant and applicable to real materials of industrial relevance."

She has been a fellow in the Royal Society of Chemistry; a senior visiting fellow at Oxford Center for Advanced Materials and Composites and Materials Science Department (Oxford University); visiting fellow at Corpus Christi College, Oxford University; and a fellow with the American Physical Society.

Her work has been published in Science, Nature and numerous other publications and has been described in popular media outlets such as The Economist and Science News.

Dr. Balazs says she feels "extremely honored to be inducted into a group that includes such illustrious awardees."

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; Steven Squyres, 2010 recipient and Cornell University astronomer and principal scientist for NASA's Mars Exploration Rover missions; 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.

She will be presented the next Mines Medal during the Oct. 3, 2013, Mines Medal Dinner and Award Ceremony to be held at the Rushmore Plaza Civic Center.

Student art pays tribute to late President Wharton

Though best known for their scientific and engineering endeavors, Mines students have showcased their artistic talents and paid tribute to the late President Robert A. Wharton in a mammoth Classroom Building display.

A 5-foot by 8-foot charcoal drawing hangs from the third floor east stairwell ceiling and portrays the late president scaling Antarctica's glacial peaks in fearless scientific pursuit, a radiant smile illuminating his face.

The collaborative result is composed of tile squares composed in Art 111, Drawing and Perception, led by Deborah Mitchell, Apex Gallery director and associate professor in the Department of Humanities.
RESPEC commits $250,000 to research efforts

RESPEC Consulting & Services has committed to donating $250,000 over five years to the South Dakota School of Mines & Technology's research efforts. The first RESPEC Undergraduate Research Grant Program award will be granted for the next academic year.

A Rapid City company founded in 1969 by five School of Mines professors, RESPEC has grown to become an acclaimed national leader in mining and energy, water and natural resources, and information technologies. It has eight other offices in the United States and annual revenues of more than $25 million.

“We are eager to work with SDSM&T to make this program a reality. We are absolutely committed to the School of Mines in shaping a signature program for advancing research, and we are hopeful it will encourage other similar private and industrial partnerships with the university in the future,” said Todd Kenner, RESPEC president and chief executive officer and Mines alumnus.

RESPEC has committed to match employee donations up to a combined total of $50,000 per year for five years. A portion of the funds will be used immediately to support research, and the remainder will be endowed for the same purpose. Endowments allow the principal to be invested with the earnings funding the annual awards, thus enabling the fund to continue in perpetuity. Twenty-four School of Mines alumni employed by RESPEC have already stepped up to support this initiative, and projects will be considered in early 2013 with research beginning in the fall of 2013.

“We are grateful these alumni are investing in their alma mater by ‘giving back,’ and pleased, and appreciative of the generous commitment from RESPEC. It is creative collaborations like this that will not only provide meaningful research opportunities for our students but also help the university realize our commitment to deliver academic and research programs of excellence,” said Acting President Duane Hrncir, Ph.D.

The university and RESPEC have worked together on numerous projects over the past 43 years, with the School of Mines “providing a link to the tremendous talent that we have working for us today,” said Lance Roberts, Ph.D., RESPEC vice president of mining and alumnius and former Mines faculty member. “With this grant, RESPEC will support the engineering and science leadership of tomorrow while advancing the university’s research mission in complementary areas.”

After its establishment by School of Mines professors with backgrounds in civil, electrical, mechanical, mining and geological engineering, RESPEC built a reputation for expertise in geomechanics, numerical modeling, heat transfer and fluid flow to solve problems in mining and civil engineering.

In the 1980s, RESPEC developed a world-class materials testing laboratory for the analysis of core samples from proposed sites for nuclear waste repositories. Meanwhile, it was also quickly advancing to the forefront in information technologies and computers. In the 1990s, with rapidly expanding expertise, RESPEC divided into three business areas – engineering, information technologies and environmental, which is now known as the Water and Natural Resources Division.

RESPEC leaders have continued their involvement with the School of Mines by serving on the Alumni Association Board, the SDSM&T Foundation, the University Advisory Board, and various department industrial advisory boards. They’ve partnered with the university on other key projects involving the South Dakota Department of Natural Resources, the Sanford Underground Research Facility, the South Dakota Department of Transportation and the Department of Energy.

The company counts more than 45 Mines graduates hired since 1972, with 33 alumni currently employed by RESPEC. Five Mines alumni serve on RESPEC’s Board of Directors.

Students spark youth imaginations as engineering, art collide

Children are often taught technology and art are mutually exclusive. You’re right brained or left. Einstein or Picasso. An artist or an engineer. In reality, and throughout history, the two are more intimately entwined: both expressions of imagination, creativity and human ingenuity; both, explorations of the unknown. Propelled by this ethos, Mines students partnered with the Dahl Arts Center on a project aimed at engaging and exciting the next generation about the interfacing of science, engineering and art.

The project, a donation box for the interactive art and science youth room, was an eight-month labor of love. The donation box, proposed and sponsored by the Dahl, was conceived as part of the students’ senior capstone design course, aimed at offering students a learning experience that spans conception and design to manufacturing and final production. The team, self-named “Big Money,” met with Dahl personnel throughout the process to develop a project that met the center’s needs: a wide base for child safety and all interactive features placed about two to three feet high. In homage to the convergence of two worlds, the upper-left half of the box is technologically-themed, while the upper-right features art.

The multidisciplinary team included both mechanical and electrical engineering students, all of whom graduated in December: Garret Aman, Michael Boschee, Nicolas Holzer, John Jensen and Johnny Mize. Jason Ash, instructor in the Department of Mechanical Engineering, and Ralph Grahek, instructor and technician in the Department of Electrical and Computer Engineering, served as advisors to the team. Victoria Ledford, Tyler Read, Naomi Even-Aberle and Pepper Massey at the Dahl partnered with the Dahl Arts Center on a project aimed at engaging and exciting the next generation about the interfacing of science, engineering and art.

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Programming team heads to World Finals in Russia

A South Dakota School of Mines & Technology student programming team has qualified for the Olympics of computer science to be held in Russia next summer.

The team of Colton Manville of Rapid City, Trevor Mahoney of Scottsbluff, Neb., and Dean Laganiere of Racine, Minn., will be among 22 other United States teams competing in St. Petersburg, Russia, in July 2013. About 90 international teams will also vie for the 37th annual world title.

It is the fifth time a School of Mines team has qualified for the World Finals of the Association for Computing Machinery (ACM) International Collegiate Programming Contest, “an accomplishment that, as far as we can tell, no other school of our size, and few other schools of any size, can claim,” says Toni Logar, Ph.D., who has coached the Mines team for 25 years. Other coaches are Roger Schrader and Larry Pyeatt, Ph.D. Ed Corwin, Ph.D., served as Regional Chief Judge.

In November, students competed in the ACM regional qualifier against 239 teams representing eight states and two Canadian provinces. SDSM&T’s World Finals qualifying team was among five three-person Mines teams. All five teams from the university placed within the top third of the regional contest. The contest fosters creativity, teamwork and innovation in building algorithms and programs to solve difficult problems, and it also enables students to test their ability to perform under pressure. It is the oldest, largest and most prestigious programming contest in the world, according to the ICPC fact sheet. In the regional contest, teams had five hours to solve nine problems.

School of Mines students heading to Russia are, from left, Trevor Mahoney, Dean Laganiere and Colton Manville.

Magazines put the spotlight on Mines salaries, programs, research

From outstanding starting salaries to highly sought-after mining engineers to technological innovations to repair B-1 bombers, the South Dakota School of Mines & Technology has been featured prominently in a wide variety of recent magazines.

In its cover story dated Jan. 26, Barron’s points out that the average starting salary of School of Mines graduates is 16 percent higher than that of Yale University grads. Entitled “The Next Boom,” the story focuses on “cheap natural gas and increasingly competitive labor costs,” including a growing U.S. petroleum and natural gas production.

The School of Mines starting salary figure of $62,696, an increase of $6,000, was released just last week.

Shashi Kanth, head of the Mining Engineering Department, was featured in an international magazine, Indian Student Guide to American Higher Education. Written about the growing demand for an education in mining engineering, the story is posted to the magazine’s website and is scheduled to appear in the February print edition.

The article tells of Kanth growing up in India and, after college, enjoying an impressive career in the mining industry before returning to revive SDSM&T’s then-floundering mining program. Also featured was SDSM&T Mining Industrial Advisory Board member Leigh Freeman of Downing Teal Inc., a Denver-based global recruitment specialist company. Freeman has served as the industry representative on a National Academy of Sciences study, whose goal is to help ensure the country will have enough minerals for the economy. He provided data showing the increased need for mining engineers, which U.S. university programs are struggling to feed.

The School of Mines is also featured in the January cover story of the Rapid City Area Chamber of Commerce’s Investment Report. The story focuses on the university’s expanding efforts to highlight and increase local economic impact. Specifically, it described technology transfer, which is developing faculty research into business start-ups. The article also highlights nanoparticle-based ink research efforts that garnered much international attention in the fall.

In other publications, the January/February issue of South Dakota Magazine focuses on cold spray technology research by Christian Widener, Ph.D., of the Department of Mechanical Engineering. The research of Widener, also director of the Repair, Refurbish and Return to Service Center, is helping to repair aging B-1 bombers at Ellsworth Air Force Base. The story was part of the 2013 Higher Education Guide, published within the magazine.

In a November story entitled “Energizing Energy,” Prairie Business Magazine highlighted a $49 million Schlumberger petroleum software gift to the university. Foster Sawyer, Ph.D., the assistant professor who authored the Schlumberger request, and Laurie Anderson, Ph.D., head of the Department of Geology and Geological Engineering, were featured. They discussed how the industry-grade software donation is helping to distinguish the university’s research and better prepare students for careers.
Museum of Geology loans a treasure of prehistoric proportions

Dinosaur tracks have made their final trek – to the Journey Museum, thanks to a loan from the South Dakota School of Mines & Technology’s Museum of Geology. And at more than 3 tons, the journey of this 7-square-foot, 14-inch thick limestone slab was an impressive feat.

The slab shows the tracks of at least two small theropod dinosaurs in the top layer of stone, and a second tiny track in an underlying layer with ripple marks preserved. Theropods are characteristically three-toed, carnivorous dinosaurs. These tracks date back to the Cretaceous period and may represent a shoreline of the Western Interior Seaway. More tracks and fossils may come to light as the slab is examined.

After leaving a ranch at the eastern edge of the Black Hills to move to Custer in the 1930s, the slab remained stationary for the next 60 years before moving to the Rapid City Regional Airport. When the airport underwent renovations several years ago, the dinosaur tracks found a new home at the Paleontology Research Laboratory on the School of Mines campus, where it remained until the Museum of Geology’s recent loan.

The dinosaur tracks, displayed in the Journey’s lobby and open to the public free of charge, were sought as part of the museum’s Interpretation and Continuity Committee’s (ICC) effort to enhance the lobby experience while providing a tantalizing taste of the treasures the museum houses and interprets. The limestone slab will be flanked by two large television screens donated by Karl’s TV and Appliance. The screens will be used to broadcast information about the Journey, its mission, its partners and its exhibits.

Planning began in the summer of 2012, with the Journey’s efforts greatly aided by the ICC’s outreach to community supporters. As part of their Mines museum studies classes, students Alexis Godeke and Alaina Fike researched and wrote the text labels for the exhibit, and cleaned and conserved the surface of the slab with members of the Paleontology Club at SDSMT. Box Elder Job Corps welding instructor Paul Baran and his class constructed the fabrication slab frame, while the Corps’ painting instructor Tim Raftery and class painted it. Greens Moving and Storage, who transported the slab to the airport 20 years ago, moved it again to the Journey, where D&W Crane and Rigging, Inc., lifted the slab onto the frame. After Hagen Glass removed the large glass door at the Stanford Adelstein Gallery, Baran’s class moved the slab inside and lowered it to the floor.

During the following months, a detailed description of the track’s specimen will be undertaken. The public can view the dinosaur tracks free of charge in the lobby during the museum’s winter hours: 10 a.m.–5 p.m. Monday through Saturday and 1-5 p.m. on Sundays. The Journey Museum is located at 222 New York St., Rapid City.

Co-chaired by Reid Riner and Karen Miller, the ICC, in cooperation with the board of directors, identifies the specific projects and emerging needs of the Journey Museum. The Museum of Geology at the South Dakota School of Mines & Technology is one of the four founding partners of the Journey, and is in charge of the geology hall and programs at the museum. Sally Shelton, Museum of Geology associate director, serves as curator for this area.

International conference coming to campus in May

The 2013 International Electro/Information Technology Conference, sponsored by the Institute of Electrical and Electronics Engineers (IEEE) Region 4, will be hosted May 9-11, 2013, on the South Dakota School of Mines & Technology campus. The conference will focus on basic and applied research results in the fields of electrical and computer engineering, physics, computer science, industrial engineering and mathematics.

R.J. Trew, National Science Foundation director for the Electrical, Communications, and Cyber Systems Division located in Arlington, Va., will deliver the keynote address on Friday, May 10.

The purpose of the conference is to provide a forum for students, researchers and industrial investigators to exchange ideas and discuss developments in these growing fields. Exhibits featuring the latest electro/information technology tools and products will be showcased. Industry researchers will present abstracts and short papers related to products in new and emerging markets such as robotics and autonomous systems, multi-agent and intelligent systems, embedded systems, power systems and power electronics, consumer and automotive electronics, biomedical applications and telemedicine, nanotechnology, MEMS, wireless systems, ad hoc and sensor networks, cyber security, image and signal processing, data fusion, big data and data mining, cloud computing and software engineering and systems.

Region 4 consists of IEEE members in Illinois, Indiana, Iowa, Michigan, Minnesota, Nebraska, North Dakota, South Dakota, Ohio, Wisconsin and the Windsor area of Ontario, Canada. Typically, these conferences draw 150-200 participants. It will also facilitate booths representing company products and services. Registration and corporate sponsorships are available at various patron levels listed on http://eit-conference.org/eit2013/.
**Raven Industries’ donation gives Robotics Team an edge**

From left are Ian Carlson, Caleb Jamison, Jim Slichter, Matt Richard, Lon Stroschein, Dan Rykhus, Matt Burkhart, Anthony Schmidt

**Battle-hardened unmanned ground vehicle gifted to Mines lab**

The South Dakota School of Mines & Technology has added a major military-grade unmanned ground vehicle (UGV) to its rapidly-expanding autonomous robotics program, thanks to a donation from Utah State University (USU). Developed by USU and employed in a variety of capacities, from military scout missions to remote surveillance and sensor deployment, autonomous unmanned ground vehicles are a critical component of U.S. Army infrastructure. The donation was given to the electrical and computer engineering department controls lab, where it will be housed, under the direction of Charles Tolle, Ph.D., professor of the Department of Electrical and Computer Engineering and a USU alumnus. Built in the late 1990s, the UGV was originally designed for scout work within military field operations. However, with the emergence of improvised explosive devices (IEDs) throughout field operations, the vehicle was repurposed by the military and reengineered by USU to work with smaller inspection vehicles that detect IEDs at check points and U.S. government installations and patrol parking areas for bombs. Today, unmanned ground vehicles sport a variety of applications, including transporting, surveying, deploying and refueling other robots; detecting mines; surveying forest fires; carrying food and provisions to military encampments; and autonomous farming operations.

Donated by USU after its Center of Excellence closed, the $250,000 unmanned ground vehicle, named the T2e, boasts USU’s “smart wheels” technology, in which processors independently control both the speed and direction of each wheel. When applied to the T2e, the result is an omnidirectional vehicle. Tolle explains the vehicle’s impressive capabilities, “With this robot’s wheels and their ability to turn 360 degrees, it can literally slide left or spin on a dime.” The vehicle’s guidance system boasts noteworthy credentials of its own. Far more advanced than most of the robots in the field today, the system shifts focus from simply arriving at a destination, by following a highly specified path along its journey, to driving within a corridor. In other words, the vehicle drives in its own lane rather than requiring a set of waypoints along its path.

A member of USU’s Omni-Direction Inspection System family of unmanned ground vehicles, this donation offers Mines professors and students alike access to a top-of-the-line, field-tested UGV for advanced autonomous guidance and cooperative robot research.

The UGV is part of a larger equipment donation that includes spare parts and an autonomous wheelchair from USU’s Center for Self-Organizing and Intelligent Systems, part of its electrical and computer engineering department.

**Mines professor’s new book forecasts the future of fuel**

As ecological and climactic concerns move to the forefront of public consciousness, South Dakota School of Mines & Technology associate professor Lew Christopher’s tome Integrated Forest Biorefineries: Challenges and Opportunities offers a prescient perspective, the first of its kind to provide a critical overview of the topic within a social, economic and environmental framework. Aimed at an expansive business and scientific community, ranging from scientists and academics to policymakers and industry leaders, the reference book focuses on the transformation of pulp and paper mills into integrated forest biorefineries (IFBRs) that would require the development of advanced bio-based processes to benefit industry and society.

As a professor, Christopher, Ph.D., serves as the book’s editor. Integrated Forest Biorefineries: Challenges and Opportunities is published by the Royal Society of Chemistry. Additional details and purchase information may be found at the publisher’s website at rsc.org/Shop/books/ or through other bookstores.
Donation drives Formula team closer to the finish line

With heart-pounding acceleration and exhilarating hairpin turns, the South Dakota School of Mines & Technology Formula Hardrocker Racing team offers students an adrenaline-fueled experience they won’t soon forget. And now, thanks to A2L Technologies, Inc.’s, recent $10,000 donation toward the purchase of a trailer, the team can take its car to compete in the 2013 Formula Society of Automotive Engineers (SAE) competition and to other events, including recruiting trips.

Designed and built by a team of 15 to 20 Mines students each year, these cars prove themselves against those from more than 100 universities all over the world, from Purdue to the University of Stuttgart, Germany.

But the price of competition is high. The team must use a personal truck to haul a trailer each time they wish to compete. Currently, the team is seeking the donation of a truck to help defray costs. Donations such as A2L’s allow the team to funnel high cost savings into high performance, giving it an edge over the competition as it sprints down the track.

This spring, the team will test its car at Ford’s famed wind tunnel in Allen Park, Mich., for the third year in a row at $20,000 per eight-hour session, a cost absorbed by Ford.

The A2L trailer and truck that will help transport the race car to Ford’s wind tunnel will be used not only by the Mines Formula team but also other student vehicle teams from the Center of Excellence for Advanced Manufacturing and Production (CAMP). Among the many teams are the Human Powered Vehicle, Supermileage SAE and unmanned aerial vehicle teams.

A2L Technologies, Inc. is an environmental consulting, engineering and remediation company in Thonotosassa, Fla.

Student receives national award at AISES conference

Patrick Ealy, a recent atmospheric sciences graduate, received national attention at the annual American Indian Science and Engineering Society (AISES) conference held during the fall in Anchorage, Alaska.

Ealy, from Kinmundy, Ill., placed second in the undergraduate section of the conference and was the recipient of $400 and a new iPad for his oral presentation entitled “Comparative Analysis of Atmospheric Thermal Inversion Conditions Reported by South Dakota WRAN Network.”

Ealy earned a bachelor of science in interdisciplinary sciences, with an atmospheric sciences specialization, during the fall 2012 semester. He started the first SDSM&T Weather Club in spring 2011. Of Cherokee heritage, Ealy was also a member of the SDSM&T award winning AISES chapter.

AISES is a national, not-for-profit organization which nurtures building of community by bridging science and technology with traditional Native American values.

Continued from page 1

own Formula Hardrocker Racing SAE team. Some of those Mines students are participating in the biometric pilot program.

“The convenience factor is huge. It’s safe, and I believe it’s going to accelerate fast. We’re in tune with the technology age. Look at how the fax went to email and then to our cell phones. Within three years we’ve gone from making calls to taking care of everything we need in our lives,” Maas said.

Learn more about the Biocryptology® pilot program at www.nexussmartpay.com.
New Ph.D. degree in physics to be offered contingent on funding

The South Dakota School of Mines & Technology has been granted authority to begin offering a new Ph.D. degree program next fall. With the South Dakota Board of Regents approval all that remains to make the degree a reality is to secure funding for the program from the 2013 legislature.

A $1.9 million request from the regents to fund the program has been recommended to lawmakers by Gov. Dennis Daugaard.

"Now it becomes our job to convince South Dakota lawmakers that this is a very important step forward for the state's investment in research, technology transfer, and long-term economic development," said Regents President Kathryn Johnson.

Both the School of Mines and the University of South Dakota received authority to grant the degree. It is estimated the program would launch initially with 12 students enrolled in fall 2013, growing to 48 five years later.

The doctoral degree will support the state's significant investment in the Sanford Underground Research Facility at the former Homestake Gold Mine. Regents' officials said the degree will increase South Dakota's national and international reputation in physics, and make its physics faculty more competitive for external grant funding because of the availability of doctoral students and post-doctoral researchers.

South Dakota and Vermont are the only two states without a doctoral program in physics.

Applied biological sciences degree, certificates approved

The South Dakota Board of Regents has authorized a new bachelor's degree in applied biological sciences at the South Dakota School of Mines & Technology. The new applied biological science degree program seeks to prepare students for careers based in South Dakota or for graduate study by training them in the fields of biology and engineering.

By giving students a strong preparation in chemistry, mathematics, and physics, the new program will prepare them for careers in biomedical engineering and technology, biotechnology, bioprocessing, bioenergy, medicine, pharmaceutical sciences, and patent law.

Regents also approved two new certificate programs for the university: Global Engineering (9 credit hours) and Occupational Safety (9 credit hours), offering students a pathway to develop specialized expertise or seek career advancement.

The certificate programs are developed by packaging a small set of courses that allow students to develop expertise within a focused area of study to address identified market or workforce development needs.

Student organizations earn recognition from Regents

Three student organizations from South Dakota School of Mines & Technology were recognized by the South Dakota Board of Regents for their outstanding academic, community and organizational work. They are:

- Award for Academic Excellence – The American Society of Civil Engineers student chapter at School of Mines promotes professional development by hosting academic speakers, the biannual Surveying Conference, and the annual Concrete Conference. The chapter has also held test review sessions to prepare students to study for the Fundamentals of Engineering (FE) exam.

- Community Service Award – Circle K International stresses community service, while developing leaders and promoting fellowship. Circle K has grown significantly on the Mines campus, fulfilling about 750 service hours in the past academic year. The group collects donated food for Feeding South Dakota and also sponsors clients from Black Hills Workshop to attend athletic and other group activities.

- Award for Organizational Leadership – Members of Triangle Fraternity serve in leadership roles across the Mines campus, including the American Society of Mechanical Engineers, the M Week Committee, Inter-Fraternity Council, Student Ambassadors, Student Senate and the Leadership Development Team. Triangle's community service projects include the Red Ribbon Parade, highway clean-up and Habitat for Humanity.

Museums collaborate to offer Geology of the Black Hills class

The Museum of Geology at the South Dakota School of Mines & Technology has partnered with the Journey Museum to offer a class entitled “Geology of the Black Hills” for high school students and adults. Alvis Lisenbee, Ph.D., School of Mines professor emeritus of geology, is teaching a five-session introductory view of geological features of the Black Hills region, including Devil’s Tower, the Harney Peak granite and pegmatites, gold deposits, caves and fossils. The class, which began in January, also includes an introduction to the general geologic principles used to study the evolution of the Earth.
Representatives from the South Dakota School of Mines & Technology’s Youth Programs were interviewed by the U.S. Department of Education (DOE) in December as part of a research study which, in part, examined the impact of Mines programs on the Red Cloud Indian School. During the summer of 2012 alone, 45 Red Cloud Middle School students attended the university’s Science, Technology, Engineering and Math (STEM) programs. Between the 21st Century grant and other Red Cloud Indian School grants and Mines scholarships, more than $32,000 was awarded to help those students attend Mines’ summer camps and classes.

The DOE is studying the Red Cloud Indian School’s 21st Century Community Learning Center programming as one of only 15 after-school programs chosen from across the country. The DOE was at the Pine Ridge Indian Reservation school to complete research on how it is partnering with the School of Mines, which offers STEM education through a variety of programs, including summer camps and classes for youth. Information provided by the School of Mines will be used in the study and also in four national “Lessons Learned Guide” that will help similar programs nationwide.

Eight teams of students ages 9-14 competed head-to-head with robots made out of Legos in the First Lego League contest held at the South Dakota School of Mines & Technology in December. The winning team advances to the state competition in hopes of ultimately competing in the world finals.

The John T. Vucurevich Foundation has gifted $10,000 to the Youth Programs office at the South Dakota School of Mines & Technology to be used for scholarships for students who may not otherwise be able to participate in a science and engineering camp in the summer of 2013.

Summer camps are designed to engage students in STEM topics, majors and careers.

2013 camp dates are:
- June 9-14: Geology Rocks! Youth Geology Field Camp in the Black Hills
- June 23-28: Mining and Explosives Engineering Institute
- June 23-28: Fossils: The Path of the Paleontologist
- June 23-28: Earthwise: Shape the World with Civil and Environmental Engineers
- July 7-12: Power Camp: Electronics and Computers in Your Hands
- July 7-12: ASM Materials, Metallurgy, and Forensics Engineering Institute
- July 21-26: Robotics Camp
- July 21-26: Chemical and Biological Engineering Institute

Students awarded Power & Energy Society scholarships

Eight Mines students were awarded Power & Energy Society scholarships through the Institute of Electrical and Electronics Engineers (IEEE). The scholarships were issued through the IEEE Power Engineering Society Scholarship Plus Program and ranged from $2,000 to $3,000 per student. Mines students were among 228 recipients from 100 universities. The university was among the top 10 in number of awards received, according to Dr. Kazem Sohraby, Electrical and Computer Engineering Department head.

Among the first-year recipients were Daniel Friendshuh, a senior from Buffalo Gap, S.D.; Sean Bestgen, a senior from Whitewood, S.D.; Brandon Yuill, a senior from Rapid City; Collin Eddy, a junior from Phoenix; Zachary Norstedt, a sophomore from Powers Lake, N.D.; and Lance Baum, a sophomore from Clearwater, Neb.

Underclassmen will be eligible for renewal next year by maintaining a 3.0 grade point average, securing an internship in the electric power industry or working on a power-related research project. Senior Jimmy Higgins, a senior from Rapid City, was awarded the scholarship for a second academic year. He received an additional $5,000 scholarship from IEEE through its veteran’s scholarship program for power engineering students.
The room filled quickly, students clustered around tables, notebooks and pens strewn among design projects and old machinery molds. The artist Masayuki Nagase was to conduct a workshop in the Center of Advanced Manufacturing and Production (CAMP) Design Lab on the School of Mines campus.

Spanning four continents, Nagase's public art installations transfuse and transcend, enrapturing patrons of all countries, cultures and generations. For Nagase, public art is a dialogue, an exchange of a community's artistic visions and his own. And so, having recently been selected to sculpt the granite pillars of Main Street Square in Downtown Rapid City, Nagase decided to meet with local organizations over the course of a week. The purpose was to both articulate his artistic translation of the region's natural beauty, cultural traditions and historical narrative and hear the community's own. In short, Nagase was in search of a conversation.

The topic: defying expectations.

After giving students sealed paper bags, he instructed them to close their eyes, open the bag and feel the object inside, noting their first impressions – and their evolution.

Austin Norberg, a master's student in civil engineering, shared his experience, “It was hard and cold; and at first, it felt smooth, but as it got into more detail, you could feel the cracks and divots. It's a smooth surface that had a lot more to it” – an apt metaphor for Nagase's art, and CAMP engineering.

Engineers are often characterized as left-brained and logical, with a dogged determination to avoid intuitive leaps, to let facts dictate the process. But at its core, engineering is a creative endeavor, demanding innovation and daring.

Nagase's work, too, emerges as a paradox: analytical and intuitive, definitive and amorphous, permanent and ephemeral.

Dan Dolan, Ph.D., the director of CAMP and a professor of the Department of Mechanical Engineering, says this dichotomy is why CAMP reached out to Nagase. “Much of creativity comes from bringing together normally unconnected domains. When we gain a little knowledge in something we don’t even know we don’t know, we may be able to blend things in a way that is different and beneficial.”

Kim Osberg, associate director of CAMP, expounds, “Engineers do not have to be cold, exact and logical. Sometimes more right-brained or creative approaches are exactly what is needed to solve the problem.”

And when these worlds collide, the result is breathtaking.

CAMP students possess Nagase's familiarity with material, melding form and function so seamlessly that the result feels spontaneous, sprung into being through necessity alone. The racing car's sleek lines convey power before performance ever comes into play.

As the workshop wound down, students began to file out of the room, handing Nagase their responses scrawled across his questionnaire. The voices had quieted into silence, but for Nagase, the conversation had just begun.

Sculpture and the art of CAMP engineering

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