Growth highlights housing needs

April 2013
Enrollment growth ignites critical housing need

Prompted by a double-digit registration spike for next fall semester, the South Dakota School of Mines & Technology has sought alternative housing to accommodate freshmen and sophomores who are required to live on campus.

The Board of Regents approved a lease agreement with Technology Housing, LLC, allowing the university to assume units within the Rocker Square apartment complex just west of campus across from the Surbeck Center. The agreement calls for 148 residents, including sophomores and resident assistants, to occupy the new apartments throughout the 2013-2014 school year.

It is anticipated there will be a shortage of more than 150 bed spaces for sophomores in the fall of 2013. The number of first-time freshmen registrations for the fall 2013 semester, as of March 6 when negotiations were made, was 35.2 percent higher than the previous year, with 246 registrants compared to 182 registrants for fall 2012. Early March figures also showed a 24.4 percent increase in housing applications for first-time freshmen, at 255 compared to 205 the previous year. The figures were among supporting documents submitted to the Board of Regents, which approved the lease agreement on March 11.

Last fall, first-time freshman increased by 9.8 percent – and overall enrollment by 4.9 percent to 2,424 students – with the university committed to growing the undergraduate count to 3,500 by 2020 as part of the Mines 2020: A Strategic Vision and Plan.

“The limited housing capacity at SDSM&T is now at the forefront of both short-term and long-term planning discussions. In order to continue to grow, it is paramount that SDSM&T provide a safe and desirable environment for students to live and learn,” according to the university’s proposal to the Regents.

Currently, the School of Mines provides on-campus housing for approximately 25 percent of the total student population (planned occupancy excluding resident assistants is 605 beds), and manages an additional 45 bed spaces in apartments owned by the SDSM&T Foundation. “These apartments are old and slated to be demolished in future years according to the campus master plan,” the document reads.

If the current growth rate continues, it is projected that by 2017-2018 the university will be 424 beds short for students required

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Mining students prove mettle with national, international finishes

From quickly and accurately installing a section of rail line to drilling deep holes through concrete with hand-held steel chisels and hammers, Mines students proved they’re among the best in the world. Mines teams earned top honors in an international competition that pitted them against peers from other premier mining engineering universities.

Sixteen universities from throughout the world, including Canada, England and Australia, entered 41 teams to compete in seven events at this year’s International Mining Games Competition hosted by the Colorado School of Mines in Golden, Colo., March 13-17.

The South Dakota School of School of Mines & Technology sent two teams, one of which placed third internationally and finished as the top overall university in the United States. SD Blue finished as the top United States university and placed third overall, behind teams from Australia and Camborne, England, respectively. SD Blue took firsts in Track Stand and Hand Steel, a second in Swede Saw and thirds in Jack Leg and Mucking. SD Gold took a third in Gold Pan.

The games celebrate traditional mining practices and serve to create a world-wide community of mining students. First held in 1978, the event was designed to honor the 91 miners who perished in a fire in 1972 at Sunshine Mine in Idaho. Events are:

Track Stand – A timed event requiring a team of five to add a section of rail onto an existing rail as quickly and accurately as possible.

Ore Muck – Five members work to fill a 2-ton ore cart and run it down a track for the best overall time.

Gold Pan – Competitors search for lead shot in a dirt-filled pan.

Swede Saw – A team of five alternate cutting through a 6-inch by 6-inch timber with 36-inch bow saws.

Hand Steel – Five members drill into a concrete block with chisel-like steels and a hammer, alternating individuals every two minutes for the deepest cumulative hole.

Jackleg – Two competitors use a pneumatic drill in order to advance the deepest hole in a concrete block in three minutes.

Survey – Teams of two must accurately compute the coordinates of an ending point using a Wild T2 Mod (erect image) theodolite.

See more photos:
http://www.sdsmt.edu/News/Mining-students-prove-their-mettle-with-top-national,-international-finishes/
Students transform sustainable practice into lasting environmental impact

With the rapid industrialization of nations around the world – and a rapidly burgeoning population to match, resource (over) consumption becomes a critical concern. For Kristen O’Connor, a civil and environmental engineering student at Mines, change begins in the classroom. “The first step is to educate.”

Pairing sustainable practice with public outreach, Mines students recently held demos, crafted websites and gave presentations open to the public and campus community on research topics ranging from nuclear power and fuel cells to hydropower and plastics.

Some students aimed to overturn negative stereotypes. A group focused on nuclear power explained that disasters like the meltdown in Fukushima and memories of Chernobyl unfairly characterized the power source as dangerous, while in reality it’s concentrated and controlled.

Others discussed the economics of environmentalism. Explaining the benefits of wind energy, students noted that 800 steel pieces comprise each windmill made in the United States, arguing the expansion of this technology produces both power and jobs.

And in light of the presidential initiative to derive 20 percent of the country’s energy from wind by 2030, they explored broader and more efficient applications.

The most populous parts of the country occur on coasts: the east, west and Gulf. Placing offshore windmills in these areas not only produces power where it’s most consumed, but creates healthier cities. Moreover, wind speeds over oceans are consistent, unlike those on the plains, and the highest speeds occur on the hottest days when more energy is used.

O’Connor’s project involves using existing bacteria to power wastewater treatment plants, a nascent technology she hopes to one day test at the local plant.

Public demonstrations were held March 28. Mines students also presented to a breadth of local civic, community and campus organizations throughout the week, their research and projects conducted as part of the Introduction to Sustainable Design class led by Jennifer Benning, Ph.D., of the Department of Civil & Environmental Engineering.

The presentations followed a Mines-sponsored middle school recycling contest that challenged students at Southwest, North and East to use less and recycle more, and are situated as part of a larger effort called RecycleMania. A nationwide campaign and benchmarking tool, RecycleMania pits more than 600 universities against each other to promote waste reduction activities to their campus communities – which Mines has participated in six years running.

Over an eight-week period each spring, colleges across the United States and Canada report the amount of trash and recycling collected each week and are then ranked in various categories: which university recycles the most on a per capita basis, boasts the best recycling rate and generates the least amount of trash and recycling combined.

The most recent 2011 competition included 630 colleges from 49 states and four Canadian provinces. More than 7.5 million students, faculty and staff participated, collectively recycling 91 million pounds of recyclables and organic materials. This activity helped to prevent the release of 127,553 metric tons of carbon dioxide equivalent, commensurate to the greenhouse gas emissions of 25,000 passenger cars or the electricity use of more than 15,500 homes.

Nano Expo 2013 highlights student research

Slated for Saturday, April 13, the South Dakota School of Mines & Technology Nano Expo 2013 showcases small-scale technology making a big impact, as student and faculty present their research from 1-3 p.m. in the Surbeck Center Bump Lounge on campus.

Designed for current and potential students, parents and community members who may have an interest in Mines’ Nanoscience and Nanotechnology Ph.D. Program, or for those who simply want to know more about nanotechnology in South Dakota, the annual event is open to the public, and admission is free.

Students will present posters highlighting their dissertation research and will also be available to explain their work to visitors. Broad in scope, research ranges from sustainable technology with ink-jet printing of solar cells to sustainable habitats in space aided by the development of structural, thermal insulation composites.

Graduate student Xiaoxu Wang hopes the expo will offer the public an understanding of nanotechnology while situating advancements within a larger framework. “For the public, they may get some concept and basic sense of what nanotechnology is and what nanotechnology can do to improve our standard of living.”

As for the campus community, Wang believes the expo may prompt students and faculty to “find some new concept in our presentation that can broaden their scope or even benefit their own research.”

The nano Ph.D. program is an interdisciplinary doctoral program focusing on the science and engineering of nanomaterials. The goal is to manipulate matter at the atomic and nano length scales where new materials and phenomena have been discovered.

The program offers a research intensive degree, with faculty and students from chemistry, physics, chemical, electrical, materials and metallurgical, and mechanical engineering participating.

Fourteen student research projects will be highlighted.
Global bio-artist to create, install exhibit at Mines

An MIT and Harvard Medical School research affiliate and world-renowned pioneer in the emerging field of bio-art, Joe Davis will reveal his newest installation, “Hidden Knowledge,” created in collaboration with Mines students, at 5 p.m. Friday, April 5, in the Apex Gallery on the School of Mines campus.

A film screening of HEAVEN + EARTH + JOE DAVIS, a documentary by internationally acclaimed filmmaker Peter Saskowsky will follow the artist reception, accompanied by a Q&A with both men.

Escaping tidy descriptor or simple explanation, Davis’ art, like the laboratories from which it springs, emerges at the vanishing point between experience and experiment.

Ranging from placing a map of the Milky Way into the ear of a transgenic mouse (where the genes of one species are placed inside the cells of another) to transforming light information into sound in order to hear living cells, his artwork and research probes fields of molecular biology, bioinformatics, sculpture and space art, using diverse tools as centrifuges, radios, prosthetics and magnetic fields of genetic materials.

Davis’ newest installation proves to be just as unorthodox. Partnering with Mines students, he will stamp around 500 stones with the DNA sequence of the wild apple Malus sieversii — the first apple to ever exist. Until now, the wild apple’s DNA had never been sequenced, allowing Davis’ project to also serve as a test bed for next-generation nanopore DNA sequencing technology. After the exhibit ends, the stones will be transferred to the courtyard of the Chemical and Biological Engineering/Chemistry Building, a fitting tribute to the work unfolding within.

The School of Mines exhibit will serve as a prototype for a permanent, larger-scale installation at Harvard Medical School entitled “Shadow Garden,” which will be displayed in an atrium housing more than 180,000 rocks, 46,000 of which will be stamped.

Deborah Mitchell, director of the Apex Gallery, seizing the opportunity to explore the nexus of science and art, invited Davis to the School of Mines to share his work. Mitchell is currently working on developing a visiting artist’s program to bring more such opportunities to campus.

A wild progenitor species of the domesticated apple, M. sieversii was initially dispersed via a historic trade route leading from Central Asia east to China and west to Europe. As trade declined over the last few centuries, this flow of apple germplasm slowed, ceasing completely in the 20th century as Central Asia became isolated for political reasons.

Though wild populations of the apple are scattered throughout a remote, mountainous region of the Tian Shan Mountains in Central Asia, until now the wild apple’s genome had never been sequenced – despite being a critical genetic resource for disease resistance, fruit quality and tree physiology in cultivated apples.

While Davis underscores the scientific importance of understanding the M. sieversii genome, he also delights in the profoundly poetic nature of the project. Ancestral to all domestic cultivars, these progenitor apples evoke legends of Eden, calling to a mind the Tree of Knowledge – apropos for the institutions of higher learning, Harvard and the School of Mines, in which the exhibits will be housed.

Davis’ initial foray into bio-art dates back to the mid-1980s, when the first work of transgenic art was created. The piece, entitled Microvenus, was comprised of a strand of DNA encoded with the symbol of the Germanic rune for life inserted into an E. coli bacterium. It was not only an echo of human origins, it defined a new artistic medium.

His art has not gone unnoticed. In 2012 he won the Golden Nica Prix at Ars Electronica Hybrid Art for his piece Bacterial Radio. His exhibits have appeared around the world, most recently in Saudi Arabia, the Bauhaus in Germany, Rome and Paris. And articles in current issues of both Discover and ARTnews reveal that Davis’ compelling and often controversial work has enraptured scientists and artists alike, including filmmaker Saskowsky.

Continued on page 5
Alumna honored with prestigious engineering award

A School of Mines alumna has been awarded the prestigious national Outstanding Young Engineer Award by the Society for Mining, Metallurgy, and Exploration (SME).

Lisa Schlink was recently presented the award, which recognizes significant contributions of a young individual within the mineral processing extractive discipline. Established in 1984, the honor is given in memory of Subhash Chander, SME’s Mineral & Metallurgical Processing Division Past Chair.

Schlink earned her B.S. in metallurgical engineering in 2004 and M.S. degree in materials engineering and science with a concentration in the field of nanotechnology in 2007, both from the School of Mines. Currently, she is chief engineer for Freeport-McMoRan Copper and Gold’s Water Treatment Test Facility, overseeing the commissioning and operation of three water treatment test plants.

A native of Sioux City, Iowa, Schlink graduated from Vermillion High School in Vermillion and joined the U.S. Army after high school, serving as an unmanned aerial vehicle operator at Ft. Huachuca in Arizona before returning to South Dakota to complete her college education.

The Arizona facility is a large-scale experimental plant built to test innovative water treatment technologies. Currently there are two plants operating for the treatment of sulfate impacted solutions using ion exchange and biological sulfate reduction. The third plant is currently being commissioned; it is designed to treat water and recover residual metals from copper heap leach solutions during closure.

Schlink continues to be an active member of SME. After fulfilling her duties as secretary/treasurer for the Southwestern New Mexico section, she joined the Young Leaders Committee. During her four years as a Young Leader, she participated in the Mentor Program and the Member Selection Committee, developed the Alumni Directory, organized the Technical Session and served as secretary. She assisted in the 2012 MPD Student Poster Contest as a judge.

The week’s schedule includes:

**Wednesday, April 3**
Film screening of HEAVEN + EARTH + JOE DAVIS, Q&A with Davis: 6 p.m., Dahl Art Center

**Thursday, April 4**
Understanding Exohexahedra, public lecture by Davis: noon, SDSM&T Classroom Building, room 327

**Friday, April 5**
Opening reception for Hidden Knowledge: 5 p.m., Apex Art Gallery

Film screening of HEAVEN + EARTH + JOE DAVIS, Q&A with Saskowsky and Davis: 6 p.m., Classroom Building, room 204

More information on the Apex Gallery can be found at [https://www.facebook.com/pages/Apex-Gallery/130749636983487](https://www.facebook.com/pages/Apex-Gallery/130749636983487)
WiSE Symposium and Girls’ Day opens doors in STEM careers

Pairing professional development with K-12 outreach, the first annual Women in Science and Engineering (WiSE) Symposium and eighth annual Girls’ Day aimed to build a pipeline of female talent from the classroom to the boardroom.

Though numbers are on the rise, women are still underrepresented in science and engineering. But WiSE intends to change the tides, reaching out to more than 100 middle and high school women for a day of hands-on demonstrations, networking and mentorship.

Designed to give attendees a taste of the varied applications of science and engineering, breakout sessions featured bridge building, blacksmithing and robotics, among other offerings. A speed mentoring session with Mines students helped young women acquire skills integral to success.

The March 27 Symposium also spotlighted guest speakers who have blazed a path for women in STEM careers.

Guest speakers included Joan Howard, a former project manager and 15-year veteran of Ball Aerospace and Technologies, Inc., whose formidable technical acumen has blazed a path for women in STEM careers; and Kathryn Johnson, Ph.D., president of the South Dakota Board of Regents and Mines alumna. Dr. Johnson delivered the keynote address, entitled “Options – Yours for the Making.”
A newly-minted, prestigious group of student leaders at the South Dakota School of Mines & Technology is set to kick off the inaugural year of the Professional Development Institute.

The Institute, comprised of student leaders dedicated to advancing professional development and leadership while increasing their own skills, will “be a great opportunity to make a difference on campus, in the community and in the lives of fellow students,” says Julie Ohlsen, assistant director of the Career & Professional Development Center located in the Surbeck Center.

Selected through a rigorous process of nomination, résumé review and interviewing, 35 students will serve three semesters, gaining advanced leadership training and helping to organize the Leadership Awards Ceremony and two campus-wide retreats. Additionally, students will engage in public outreach, including leadership and professional development training for area businesses, community and campus organizations, along with programming for K-12 students.

Advanced leadership training for Institute members will be determined by students, with possible topics ranging from public speaking and marketing techniques to decision-making and leadership styles.

Membership perks include special interaction with the university president and campus speakers, as well as tickets to events focused on leadership and professional development. Institute members will also benefit from opportunities for meetings with employers that recruit on the Mines campus.

The Professional Development Institute’s mission is to prepare future professionals by engaging students in leadership roles and collaborative efforts; helping develop effective communication skills; fostering understanding and appreciation of human diversity; inspiring civic engagement; providing and supporting career opportunities; and aiding in personal development.

For more information, businesses and organizations interested in leadership and professional development training may email professionaldevelopmentinstitute@mines.sdsmt.edu

New program prepares students for careers

In today’s fast-paced world, companies expect graduates to hit the ground running. The newly-created South Dakota School of Mines & Technology Mines Advantage program aims to give them an edge.

With universities touting internships and cooperative education opportunities, starting salaries and placement rates, competition for careers is fierce. But Mines Advantage has developed an innovative approach to separate students from the pack. Rather than offering companies students with just professional experience, it gives employers what they really want: a professional.

A program of distinction, Mines Advantage fosters “personal development on a professional level,” combining the classroom’s technical expertise with real-world vocational knowledge.

Students are led through a panorama of experiences in six areas of competency, challenged to stretch their education in imaginative ways that blur boundaries among curriculum, community, campus life and career. Students completing the Mines Advantage program will have 30 experiences of their choosing, two core requirements and three electives in each area.

Some experiences are expected: career preparation through internships and interviews, leadership and teamwork.

Others are more surprising. A cultural and global diversity tenet urges students to attend a cultural event and immerse themselves in a diversity or social justice program, as well as choose among a breadth of other electives, such as visiting a sacred or multicultural site or participating in an international design team. In an increasingly globalized world run by a diversified workforce, this cultural exposure and awareness has never been more important.

And as this world becomes ever smaller, the importance of communication grows, mandating students move easily from the laboratory to the lectern. Mines Advantage prepares them through professional presentations or sharpens their speaking skills through memoranda that convey technical information to nontechnical audiences. Students may also gain social media savvy by building their LinkedIn profile or verbal versatility as they host a radio show or work as a journalist for the Aurum, the school paper.

Mines Advantage also challenges students to not only be successful, but significant, meaningfully contributing to the community around them through civic duty, community service and sustainable design – and to discover a balanced and purposeful life along the way.

The program also aims to delve beyond action into reflection, compelling students to synthesize their experiences, knowledge and expertise into a short composition after each activity or event.

Proof of the value of a Mines education is already in the numbers, with graduates enjoying an average starting salary of $62,696. As Darrell Sawyer, director of the Career & Professional Development Center, explains, “Mines Advantage reinforces strong placement rates and career success. It’s added value,” in an education that is as rigorous as it is relevant.
After an initial launch with 50 selected students and faculty, the biometrics payment pilot program has been expanded to a third location on campus and is now open to all members of the Mines community. The South Dakota School of Mines & Technology recently made international headlines as the world’s first biometrics campus, and now Nexus Smart Pay terminals are available in the Hardrocker Café dining hall, as well as the Miner’s Shack and Java City, enabling students, staff and faculty members to purchase meals, snacks and beverages with a swipe of the finger. Researchers hope the technology could one day lead to a cashless society. Biocryptology® safeguards against security theft and ensures money is safe, reading beyond a fingerprint into multiple layers of skin and detecting hemoglobin in the blood. The 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 Smart Pay.

Students, faculty and staff members interested in signing up to test the technology for the remainder of the semester should log on to www.nexussmartpaysdsmt.com and go to the members area. They will receive a Nexus Smart Pay number via email and should bring it when completing registration by swiping their finger on a terminal. Money can be added to their account by logging onto their personal page on the Nexus website. There is no minimum amount to open an account.

“We hope to have SDSM&T as not only the first place in the world to start the biometric payment system but also the place the world looks to as the model to continue it. We are very pleased to have all the cooperation from the students and staff of SDSM&T and would not have the world looking at us now if it was not for that cooperation,” said Nexus USA president Al Maas.

To complete registration, contact Kimberly Osberg at the CAMP office, located in the Civil and Mechanical Engineering Building, at Kimberly.Osberg@sdsmt.edu or Al Maas at Nexus USA at call (605) 939-0510 or (605) 390-3742 or alan.maas@nexussmartpay.com.
Fraternity trades specs for spurs at 34th annual Cowboy Party

The South Dakota School of Mines & Technology is known for its trailblazing discoveries and pioneering research. But at 8:30 p.m. on Saturday, April 13, Mines fraternity Delta Sigma Phi plans to forge a different frontier.

Trading today's state-of-the-art for yesterday's Old West Fairgrounds, Delta Sigma Phi will host the 34th annual Cowboy Party at Central States Fairgrounds, featuring a mechanical bull, hand-chopped logs and a homemade corral. The band Slamabama performs at 9 p.m.

"The Cowboy Party is a great way to have fun, listen to a quality band and dance. The money generated goes to a great cause and we certainly have fun putting it together," says Ty Murphy, a Delta Sigma Phi member.

Open to the public, tickets are $10 if purchased in advance and $15 at the gate, with a large portion of the proceeds benefiting the Rapid City Club for Boys.

Tickets may be purchased by contacting Ty Murphy at ty.murphy@mines.sdsmt.edu or Danny Besmer at danny.besmer@mines.sdsmt.edu

Youth Programs, Mines faculty power up for summer

Youth Programs is relying on the power of the School of Mines family of experts in both developing and delivering a summer camp lineup that engages high school students in immersive experiences and exposes them to potential career opportunities.

Four of the eight summer camps – robotics, fossils, civil and environmental engineering, and electrical and computer engineering – are new, with curricula designed by department heads and professors.

In the new "Power Camp," students with interest in electrical and computer engineering will build their own radios and devices to measure quantities related to power and energy, learn the lifelong skill of how to build a working device out of electronics components, and tour Black Hills Power, Symcom and the nearby Basin Electric Intertie, which connects the country’s east and west power grids.

Kazem Sohraby, Ph.D., head of the Department of Electrical & Computer Engineering, said students will learn that generating electricity is a sort of assembly-line process. "Hopefully we will be able to raise young kids’ curiosity and their awareness of what goes into the production of power and energy, what they can build with simple electronics components so that they see how a device like a cell phone, a computer or a TV works, and learn what type of effort goes into their construction."

"The ‘aha’ moment is when, at the end of the week, they put the battery into their radios that they built, it receives a radio signal and they tune to a station. It’s the excitement that they built this with their own hands. Hopefully they will start thinking about the scientific principles that went into it," Dr. Sohraby said.

Students will work primarily at the instruction of Ralph Grahek, an electrical and computer engineering department instructor/technician. Grahek and Sohraby agree many people take for granted that things “just work.” Part of being an engineer is fixing things and figuring out how they work and why they don’t work sometimes,” Grahek said. “It’s an understanding.”

Molly Gribb, Ph.D., head of the Department of Civil & Environmental Engineering, designed the "Earthwise" camp, to be guided by Kathleen Hanley, an instructor within the department. "Earthwise" is structured to offer the chance to experience the richness and diversity of civil and/or environmental engineering careers. These types of engineers not only design a wide variety of infrastructure systems, including dams, bridges, airports, water supply systems and renewable energy facilities, they are also required to serve as stewards of the environment and its resources.

Students attending “Earthwise” will have many unique opportunities, including a day of testing ground water in the Black Hills, learning about and racing concrete canoes on Canyon Lake, assembling and testing small-scale steel bridges, learning about rock mechanics by seeing first-hand the maintenance and testing on Mt. Rushmore National Memorial conducted by RESPEC engineers and working in teams to create a simulated, sustainable city.

Learn about other summer camps:
- (605) 394-2693
- youthprograms@sdsmt.edu
- sdsmt.edu/learn
Darren Clabo, the state’s fire meteorologist and School of Mines faculty member, warned of another dry-weather fueled wildfire season in his annual fire forecast.

Last year’s extremely dry conditions led to a record wildfire season. Clabo’s “2013 Fire Weather Outlook” held March 28 attracted a number of media outlets, as well as firefighters throughout the area and other community members to the School of Mines campus.

In his annual fire season forecast, Clabo, an atmospheric sciences instructor, said he expects an “above-average” large fire potential, particularly throughout the western part of the state, during the spring and early summer months. The potential for large wildland fire growth is “well above average” in the area south of Rapid City toward Nebraska.

Conditions were hot and dry last summer, with little considerable wet snowpack during the winter. Surface water storage is low to very low, according to Clabo. Spring is the wettest season with 50 percent of the yearly average falling between April and July.

However, the potential for large wildfires remains, as the U.S. Drought Monitor dated March 26 shows a significant portion of the Midwestern part of the country, including most of the western half of South Dakota in “extreme” or “exceptional” drought.

Mountain pine beetles continue to be a major concern, with dead trees and dried pine needles creating fuels.

As fire meteorologist for the State of South Dakota, Clabo is part of an incident management team that is often summoned during an extreme fire event. He observes weather patterns associated with the fire (wind direction, humidity, etc.), as well as any upcoming storms that could affect the safety of the firefighters and others on-scene.

Clabo works directly with the Department of Agriculture, Wildland Fire Suppression Division. He is also the IMET (incident meteorologist) on the state’s Type-II Incident Management Team, which is part of the Rocky Mountain Coordination Group. He is carded to work directly on wildfire lines and deploy meteorological instrumentation.

Download “2013 Fire Weather Outlook”
http://www.ias.sdsmt.edu/clabo/index.htm