At SDSMT we find ourselves again calling the department leader a “head” after more than a decade of using 3-yr.-term rotating department chairs. The Institute of Atmospheric Sciences has disappeared from the SDSMT organizational chart and we are now solely the academic Department of Atmospheric Sciences. Departmental teaching personnel have moved to tenure track positions. It was my privilege to serve as interim head for the 2011-2012 academic year, the first year of this new status for Atmospheric Sciences at SDSM&T. When an external search during the year failed to yield a “permanent” head I was tapped to fill the position. As the passing this month of our SDSMT president, Dr. Robert Wharton, reminds us, none of us is permanent. My goals during my time in this position are to get everyone in the department working more effectively as individuals and in teams to energize our research activities, advance our science, and prepare our students to be outstanding contributors in our field. The waverering economy has challenged our 8 spring and summer graduates in their job searches. We all are hoping for an upswing in economic activity so that those young scientists still in the search find entries to the workforce and opportunities to make their contributions to our field and our society.

There is little chance that meteorologists can solve the mysteries of weather until they gain an understanding of the mutual attraction of rain and weekends.

Arnott Sheppard
Weather Challenge Contest  
Students Receive Trophies

The Department of Atmospheric Sciences at the School of Mines has participated in the WxChallenge nationwide forecasting contest since 2006. WxChallenge, developed and managed by the University of Oklahoma, tests the forecasting skills of students and faculty from participating colleges and universities across the nation.

During the 2011-2012 academic year, the School of Mines’ forecast team, consisting of 13 graduate and undergraduate students and one faculty member, ranked 25th overall out of 53 participating universities.

Forecasts were made for five 2-week forecast periods each semester, with each period set in a different city. For each city, the maximum and minimum temperature, maximum wind speed, and cumulative precipitation were forecast for the day. The closer the forecaster came to the actual observations, the lower their score became. Trophies were awarded when a forecaster scored the lowest for a single period or overall for all forecast sites.

Over 2000 forecasters nationwide participated in the contest this year, with schools from across the country including meteorology powerhouses such as Oklahoma, Penn State, MIT, and Wisconsin. The most successful cities for Mines forecasters were Dayton, OH, where Dan D’Amico finished 11th overall (3rd among graduate students) and Josh Brewer finished 12th overall (4th among all graduate students); New Orleans, LA, where Dan McKemy finished 14th overall (5th among all graduate students); Albuquerque, NM, where Dan McKemy finished 16th overall (5th among all graduate students); and Hilo, HI, where Emily French finished 31st overall (10th among all graduate students). The big year for Dan McKemy paid off as he qualified for the end of year tournament. The top 64 forecasters for the entire year qualify for the final March Madness style tournament. This year’s tournament city was Wichita Falls, TX. Dan outforecasted his first round opponent and moved on to the round of 32, but unfortunately ended this round with a score only 0.4 points higher than his opponent, thus eliminating him from contention. Overall, it was a very good year for Mines forecasters.

Dan D’Amico (ATM ‘12)

“\n
The trouble with weather forecasting is that it’s right too often for us to ignore it and wrong too often for us to rely on it.

Patrick Young

Pictured: Dan McKemy; Dr. Paul Smith, IAS Director in 2011; Shawn Honomichl, and Dr. Bill Capehart, Dept. Chair in 2011.
Student Activities

Having fun

The students in our department are a close-knit group. They work together and they have fun together, too. This year, students took part in decorating a Christmas tree for the annual Parade of Trees; they dressed up for Halloween; and they decorated a float for the Mines Homecoming parade, to name just a few of the fun things they participated in. There is usually a department picnic at least once a year, and students will often gather together informally just to hang out. Although their time together is short, they do form lasting friendships. The students participated in intramural volleyball, flag football, and basketball. They also participated in Relay for Life, garnering $550 toward the charity.

The students designed a “bottle tree” for the Parade of Trees contest (winning a “most unique” award); participated in the M-Day Homecoming Parade with an all-weather theme and Dan McKemy’s portrayal of Dan, Dan the Weatherman; they played “Where’s Waldo?” for Halloween, and received a certificate for participation in the American Cancer Society’s Relay for Life event.
Student numbers remain good

The Department of Atmospheric Sciences saw eight students graduate in the spring and summer of 2011: Theresa Aguilar, Gretchen Berg, Joshua Brewer, Heather Caye, Dan D’Amico, Emily French, Dan McKemy, and Frannie Sewell. There were 21 students in the BSIS-ATM program, and five students in the Atmospheric and Environmental Sciences PhD program.

The fall semester will see returning M.S. students Kurt Chowanski, Chris Hammrich, Kathy Haselhorst, Chip Redmond, John Hamilton, and Christine Sandvik. We welcome seven new students: Alana Ballweber, Aaron Carmichael, Rebecka Hastings, Ryan Lueck, Kenny Miller, Erin Walter, and Aaron Ward. The PhD program continues with six students: Darren Clabo, Sushil Gautam, Parker Norton, Scott Rudge, Kevin Cooper, and Tom Warner. As of press time, there are 19 undergrads enrolled in the BSIS-Atmospheric Sciences program: Shelby Allen, Leanna Andert, Audra Basal, Laura Case, Eric Colvin, Patrick Ealy, Kylee Hanson, Eric Hout, Brett Kavanugh, Kelsey Kramer, Jed Lemaster, Trisha Michael, Cody Moldan, Anna Robertson, Laura Rochlitz, Alex Roeber, Aaron Shaw, Scott Stearns, and Jacey Wipf.

Three BSIS-ATM Students Receive NASA Summer Internships

Jacey Wipf, Trisha Michael, and Anna Robertson (pictured left to right), BSIS-ATM juniors at SDSM&T, were awarded a summer internship with NASA for 2012.

Jacey and Anna spent part of their summer in California for an internship in the NASA Student Airborne Research Program (SARP). It is organized by the NASA Airborne Science program at the National Suborbital Education and Research Center (NSERC). The first half of their internship was spent in Palmdale, CA in the Hilton Garden Inn. During this time, they had an opportunity to fly on the NASA P-3B at the Dryden Aircraft Operations Facility. Their work at Dryden was to collect air quality samples while there. The second half was spent at the University of California Irvine, where they did analytic work. They were also required to present on a topic of their choice when they entered the program.

Trisha spent eight weeks at the Goddard Space Flight Center in Greenbelt, MD assisting in a program to analyze Mesoscale Convective Systems.

The students had to write several essays, submit applications, and send letters of recommendation in order to apply for the program.

MS Student is Avid Photographer

In addition to studying meteorology and being an avid storm chaser, Christopher (Chip) Redmond, second-year M.S.-degree student at South Dakota School of Mines, is an avid photographer. Check out his blog at: http://chip-redmond.blogspot.com. His ability with a camera has made his work with the UPLIGHTS research project ideal. (See article on page 7).
A Busy Fire Season

It was a very busy fire season this year in South Dakota and in the Rockies in general. As Incident Meteorologist for one of three Type-II Incident Management Teams across the Rocky Mountain Region, I was called out to three different and individually unique fires. The Weber Fire, outside of Mancos, CO, burned from 24 June until containment on 3 July. The fire was controlled at just over 10,000 acres. Little did we know this would be the small fire of the season.

We were then called out to the Rosebud Indian Reservation for the Longhorn Complex which was initially five separate fires that eventually burned together. Our team was on assignment, based in St. Francis, SD, from July 20-28. Coming into this fire, I expected to be forecasting for a large grass fire. Little did I know that this fire would be burning in the Ponderosa Pine forests along river bottoms and canyon draws. This was a fuel complex that was very similar to the southern Black Hills, not south-central SD. This fire burned over 44,000 acres and was the largest fire to date for our Incident Management Team.

On August 29, we were called to the Douthit and West Ash Fires, collectively known as the Region 23 Complex near Crawford, NE. Again, this was another fire that we expected to be burning in the prairies (it was afterall in the Nebraska Panhandle). We soon found the fire burning in the Pine Ridge Escarpment—a region of dense Ponderosa Pine stands spanning an elevation from 4000 to 4800 feet above sea level. This fire took two major runs on two different days where it became plume dominated. It was apocalyptic at times but we managed to control it by September 6. This fire burned over 86,000 acres, nearly double the size of the Longhorn Complex, and set a new size record for our fire team once again.

South Dakota has seen a very active fire season this year and the season has not yet wrapped up. With the continuing exceptional drought, only a long lasting cool/wet period will bring us out of the enhanced fire danger. I look forward to the winter season and, hopefully, a few good snows.

Darren R. Clabo
South Dakota State Fire Meteorologist

Atmospheric Sciences professor receives AAAS Fellowship

Dr. P.V. Sundareshwar, state carbon scientist for South Dakota and associate professor in the Atmospheric Sciences department at the South Dakota School of Mines and Technology, was awarded a fellowship by the American Association for the Advancement of Science, “Triple A-S” (AAAS). He will be a AAAS Science and Technology Policy Fellow in the Diplomacy, Security and Development track of the Executive Branch. In this position, Dr. Sundareshwar will be serving as a Climate Change Advisor to the Africa Bureau of the United States Agency for International Development (USAID). He will spend one year in the Washington, DC office with several trips to Africa.

The AAAS Science and Technology fellowships are extremely competitive and use a formal, three-tier merit review and peer-review process for selection. Interviews are conducted in Washington, DC by selection committees of professionals with expertise in science, technology, and policy. From the pool of scientists and engineers that are selected as finalists, the selection committees will choose those persons who they feel will offer significant expertise, skills, effort and new perspectives to the hosting offices.

Dr. Sundareshwar is in Washington, DC, to participate in a comprehensive orientation program before beginning his fellowship. He will also take part in a AAAS professional development program throughout his year-long appointment.

As a part of the Bureau of Africa’s climate change team, Dr. Sundareshwar will work closely with the senior regional climate change advisor on adaptation, providing program planning and design support to AFR missions throughout sub-Saharan Africa. He will also serve as a member of the wider Environment Team and be expected to engage regularly with the Agriculture Team in the Economic Growth, Environment, and Agriculture Division within the Bureau of Africa’s Office of Sustainable Development.
ATM Students are Actively Engaged in Networking in 2012

AMS Career Fair

Several School of Mines Atmospheric Sciences students attended the AMS annual Career Fair, held in New Orleans January 22-27, 2012. M.S. students (and 2012 graduates) Emily French and Gretchen Berg each presented posters about their research work. Others in attendance were Theresa Aguilar and Dan D’Amico, masters degree students who also graduated in 2012, and Eric Hout, BSIS-ATM undergrad. Associate Professor Dr. Bill Capehart accompanied the students.

Attendance at the career fair is always an exciting time for the students, as they get to meet other professionals in their field of study, and they meet with the next group of college students who are interested in the atmospheric and environmental sciences.

AGU Annual Meeting

Heather Caye, master’s degree graduate (2012) in Atmospheric Sciences at South Dakota School of Mines, presented a talk entitled “Electrification of the 29 June 2000 Supercell Thunderstorm” at the American Geophysical Union’s annual meeting held in San Francisco in early December, 2011. Heather completed her degree work under the direction of Dr. Andrew Detwiler. She is from Allen Park, Michigan.

In addition to networking with others in their field, these opportunities also afford them practice in speaking and making presentations, a skill that will no doubt be necessary as they enter the workforce.

Students Attend Fire and Fuels Workshop

Dan McKemy, Fran Sewell, and advisor Darren Clabo attended the Ninth Symposium on Fire and Forest Meteorology, held in Palm Springs, California in October, 2011.

Welcome, Dr. Kunza

Dr. Lisa Kunza joined the staff of the Department in the Fall of 2012 as a post-doctoral associate. She will be teaching Dr. P.V. Sundareshwar’s classes for the next academic year, as well as supervising students conducting research for his grants. She received her PhD in Ecology from the University of Wyoming at Laramie in 2012. Dr. Kunza’s research focuses on aquatic ecology, biogeochemistry, phycology, and outreach.

Students and Research

As part of their graduate work, students conduct research, either on their own project or on one of the ongoing research projects being conducted by staff. Following are some highlights of the work being done by our staff.

UPLIGHTS, a project that involves capturing images of upward triggered lightning. The project was awarded to John Helsdon (retired) and Tom Warner, current PhD student. Working with them on the project are Ryan Lueck, Chip Redmond, and Alana Ballweber. (See story next page)

Squall lines: Dr. Adam French, assistant professor, was recently awarded a South Dakota Board of Regent Competitive Research grant for a project examining cases where severe storms evolve from squall lines into isolated supercell storms. Kenny Miller, first-year MS student, is assisting Dr. French as part of his research assistantship.

Drylines: Dr. French is also joining Dr. Bill Capehart and Darren Clabo in supervising the work of Erin Walter, first-year MS student, who will be using observations and high-resolution model data to investigate drylines crossing the Black Hills region.

A-10, the Storm Penetrating Aircraft: This project, awarded to Drs. Andy Detwiler and Donna Kliche through NSF and the U.S. Naval Postgraduate School, involves outfitting a Fairchild A-10 (known affectionately as the Warthog) in preparation for storm penetration research. The A-10 is a replacement aircraft for the T-28, which was operated for many years as a one-of-kind plane to actually enter a thunderstorm to gain severe storm data. Aaron Ward and Aaron Carmichael will be completing their research under Dr. Detwiler’s and Dr. Kliche’s guidance.

continued on page 7
Student’s Work in UPLIGHTS

As a student, I spent the summer working with high-speed cameras attempting to photograph lightning. Before the field project ever began, there was much to do to prepare for the actual study that would take place later that summer as well. My thesis will use lightning data not only from the project, but past data as well that date back to 2005. This past data familiarized me with the operating software that would be used during the summer and helped develop an understanding of lightning that was needed for the study. The spring was also spent doing numerous practice runs with the two vehicles UPLIGHTS uses. Each run would deploy the vehicles as if there were an approaching storm and then bring up all the associated equipment to a running/recording status. Within each vehicle, the person running it was in charge of up to two high-speed cameras, a still camera, and three video cameras. One vehicle, the truck, also had electric field antennas that recorded the potential charge in the atmosphere around it.

Throughout the summer, we were on call to deploy anytime, day or night—24 hours a day. Even if a thunderstorm came through overnight, we would rush out and set up in advance of the oncoming lightning that would hopefully barrage the city and the associated towers. The timing aspect was another portion of the project that took quite a bit of time. Daily and up to three times a day during active periods, we (the forecaster of the day) would have to make a forecast based upon models to attempt to accurately portray the picture for the day/period. The forecast would be given and discussed during the daily morning operation meeting and then updated through the day. We would look at what environmental variables controlled the type of storm, the direction of its movement if it did indeed develop, and most importantly, we would attempt to give a prediction of upward lightning at the towers. These decisions would determine the time we would need to be prepared and if there were even operations that day (we ended nearly 50/50 for active project days).

Other aspects of the summer included running numerous sensors across the town from one location during a deployment and also collecting/analyzing data from previous events. This was a great experience and a type of research that many students don’t get an opportunity to do in their student careers. Although it was trying at times by staying up late or making user errors, it was a great learning experience and really gave me a lot of drive to push on with my research while greatly expanding my knowledge of lightning.

Christopher Redmond, M.S. Student
RAPID CITY - Dr. Harold “Harry” Orville, 79, Rapid City, died Monday, June 6, 2011, at a local nursing home. He was born January 23, 1932, in Baltimore, Md., to Howard and Lillian (Duvall) Orville. He grew up in Arlington, Va., graduating from high school in 1950. Harry graduated from the University of Virginia in 1954. He married Laura Milster in 1954. Harry served with the U.S. Army Signal Corp and was honorably discharged in 1956 as a 1st Lieutenant. He received his master’s degree from Florida State University, Tallahassee, in 1956, and his PhD from the University of Arizona, Tucson.

Dr. Orville came to the Black Hills and the South Dakota School of Mines and Technology in February 1965. Dr. Orville helped set up the Department of Meteorology - the academic arm of Institute of Atmospheric Sciences - and became department head in 1974, serving for 20 years in that position. He took sabbaticals with the National Oceanic and Atmospheric Administration and the World Meteorological Organization travelling extensively around the world. He served as interim vice president at SDSM&T in 1987 and 1993, and as acting director of IAS. Upon retiring from full-time teaching in 1996, Orville was named a distinguished professor emeritus in the Department of Atmospheric Sciences.

Dr. Orville was a Fellow of the American Meteorological Society and in 1993 and was awarded the Charles Franklin Brooks Award, the highest award for service. In 1965 Harry became the manager of Harney Little League teams. He was active in the Boy Scouts of America and served as PTA President.

Dr. Orville was an avid golfer, becoming a member of the Hole-In-One Club in 1998, and he initiated the annual South Dakota School of Mines and Community Golf Tournament, which has raised tens of thousands of dollars for scholarships. The seventh annual event took place the day that Dr. Orville passed away.

Survivors include his wife, Laura Orville, Rapid City; three sons, Douglas Orville and his wife, Lynn, Ellsworth, Maine, Laurence Orville and his wife, Diane (Price), Lake Forest, Calif., and Allen Orville and his wife, Elise Ferrette, Long Island, N.Y.; a daughter, Katherine “Trinka” Miracle, Robbins, Calif., two brothers, H. Thomas Orville, Roanoke, Va., and Richard Orville, College Station, Texas; six grandchildren; and three great-grandchildren.

Memorial services were held on Saturday, July 23, at Emmanuel Episcopal Church in Rapid City, with Fr. Rich Ressler officiating. Memorials will be placed towards the Harold and Laura Orville Graduate Fellowship through the SDSM&T Foundation, the South Dakota School of Mines and Community Golf Tournament or the Hardrocker Club.

**A Tree is Planted in His Honor**

On July 31, 2011, a honey locust tree was planted in front of the Mineral Industries building on the campus of SDSM&T in memory of Dr. Harry Orville. Dr. Orville, who passed away in June of 2011, was a distinguished professor emeritus of the atmospheric sciences department and was also a generous benefactor to the department and the School of Mines. In addition to being a favorite professor of the students, he also conducted research work, served as department chair, and served as an interim vice president of the university. He was also one of the founders of the South Dakota School of Mines Golf Tournament. It was not unusual for Harry and Laura to host a dinner for those students who could not make it home for a holiday occasion, and they often hosted department events as well.
Harold and Laura Orville Graduate Fellowship

In 1998, Dr. Harry Orville and his wife, Laura, established the Harold and Laura Orville Graduate Fellowship. His dream of having $1 million in endowed funding to support students in the Department began with a “phase one” goal of $200,000, starting with their personal $25,000 investment.

This endowment fund has supplied a portion of support to eleven entering or current graduate students in atmospheric sciences or an environmental field.

The fund balance is at $60,000, and a campaign is underway aiming for the Phase One goal of $200,000. There are several ways you can contribute to this fellowship fund.

Please contact the SDSM&T Foundation at 1-800-211-7591 (toll free); locally at 605-394-2623; or visit the website at http://foundation.sdsmt.edu.

Why Attend SDSM&T?

- SD School of Mines has been designated one of the U.S.’s “Top 10 State Universities by Salary Potential” in a report released by PayScale, who specializes in global online compensation data.
- We have a small teacher to student ratio.
- Graduates from SDSM&T are very sought after in the marketplace because of the quality of the education they receive here.
- Our faculty are highly regarded.
- Research opportunities are plentiful.
- We have a close-knit community.
- Our students are among the best and the brightest.
- We produce leaders.

Visit our website at:
http://www.ias.sdsmt.edu/dept

or call
1-605-394-2291
Weather Modification Association Award

Dr. Andy Detwiler Receives Thunderbird Award

Dr. Andrew Detwiler, professor and research scientist in the Department of Atmospheric Sciences at SDSM&T, received the Thunderbird Award at the annual meeting of the Weather Modification Association, held in April, 2011 at Park City, Utah. The annual Thunderbird Award, symbolized by a distinctive bolo tie, is an honored presentation which recognizes an individual who has made fundamental and continuing contributions to the art and science of weather modification. Dr. Detwiler has published numerous articles on weather modification and has been the editor of the association’s Journal of Weather Modification for six years.

Chilean Senate Award

Dr. P.V. Sundareshwar receives Chilean Senate award

Dr. P.V. Sundareshwar, state carbon scientist and associate professor of atmospheric sciences at SDSM&T, was awarded the highest honor bestowed on a civilian by the Chilean senate in 2011. The Congreso Nacional Senado medal of the Government of Chile was presented by senior Senator Honorable Antonio Horvath Kiss. The award is in recognition of efforts to help establish a biosecurity program in Chile to mitigate invasive threats from organisms such as the Didymosphenia geminata. This alga, that has caused troublesome blooms in our own Rapid Creek of the Black Hills, was recently discovered in Chile.

Dr. Sundareshwar spent several weeks in Chile during the summer and fall of 2010 researching the blooms of Didymosphenia geminata (didymo), which is severely affecting the rivers in several regions of Chile, rivers that are highly prized for their fishing and rafting opportunities. He was consequently invited by Senator Horvath to help organize and attend an international workshop in Puerto Varas to discuss how to prevent or limit the spread of didymo to other water bodies in Chile. This workshop is the basis for future training and empowerment programs in Chile and other risk areas. Plans are underway to create a Biosafety Authority that will be able to further monitor this diatom, and others like it, and to create preventive measures in order to safeguard the natural resources of the country.

Didymo, while native to Northern Europe and Northern North America, has dramatically expanded its range, forming massive blooms in many clean, temperate rivers across North America. Since its first discovery in New Zealand in 2004, it has spread to almost 32 watersheds affecting 80% of the waterways in the South Island, generating serious economic, social, and environmental damage. Dr. Sundareshwar and several of his students and colleagues are conducting research on the ecology and management of the invasive Didymo blooms that have been observed in Rapid Creek since 2002.

Work continues on the study of the Didymo alga, and as a result of the work being done, a paper was published in Geophysical Research Letters. Several students in both the Masters and PhD programs have been involved in field work as part of their thesis and dissertation work. Presentations have been given at several conferences by Dr. Sundareshwar and the students.
Faculty background and interests

Andrew G. Detwiler
Professor, Dept. Head
PhD., Meteorology, State University of New York-Albany.

Dr. Detwiler’s areas of expertise include airborne meteorology measurements, atmospheric physics, and atmospheric electricity.

William J. Capehart
Assoc. Prof.
Ph.D., Meteorology, Pennsylvania State University.

Dr. Capehart’s expertise lies in hydrometeorology, regional climate modeling, and the modeling and remote sensing of surface processes.

Darren Clabo,
State Fire Meteorologist
M.S., Atmospheric Science, South Dakota School of Mines and Technology.

Mr. Clabo serves as the state wildland fire meteorologist in support of the state wildland fire crews during the fire season. His areas of interest lie in fire, radar, and mesoscale meteorology. He also is an instructor in the Department of Atmospheric Sciences during the academic year.

John H. Helsdon, Jr.
Professor Emeritus, Research Scientist
PhD., Atmospheric Science, State University of New York at Albany.

Dr. Helsdon, a professor emeritus with the Department, is still active in lightning research. His other areas of interest and expertise lie in thunderstorm electrical modeling and cloud physics.

Mark R. Hjelmfelt
Professor Emeritus, Research Scientist
PhD., Meteorology, University of Chicago.

Although retired from active teaching, Dr. Hjelmfelt is still conducting research for a special project. His past areas of work include mesoscale and radar meteorology, severe storms, and cloud physics.

Donna V. Kliche
Associate Professor
PhD., Atmospheric and Environmental Sciences, South Dakota School of Mines and Technology.

Dr. Kliche’s areas of expertise include satellite remote sensing, air quality, meteorology, and scientific analysis of data.

Richard D. Farley
Research Scientist
M.S., Meteorology, South Dakota School of Mines and Technology.

Mr. Farley’s areas of expertise involve the development and application of numerical modeling to studies of various meteorological phenomena including cloud physics, hail, severe storms, weather modification, atmospheric electricity and lightning.

Adam French
Assistant Professor
PhD., Atmospheric Science, North Carolina State University.

Dr. French’s areas of expertise are the dynamics of convective storms, mesoscale meteorology, numerical modeling, and forecasting.

Paul L. Smith
Professor Emeritus
PhD., Electrical Engineering, Carnegie Institute of Technology.

Although retired, Dr. Smith continues to support the department in many ways. His area of expertise is radar meteorology.

Lisa Kunza
Post-doctoral Associate
PhD., Ecology, University of Wyoming.

Dr. Kunza’s research focuses on aquatic ecology, biogeochemistry, phycology, and outreach.

Pallaoor V. Sundareshwar
State Carbon Scientist
PhD., Biology, University of South Carolina.

Dr. PV’s areas of expertise involve biogeochemistry, wetland and systems ecology, water quality, coastal zone ecology and management, and global change. In addition to being the State carbon scientist, Dr. Sundareshwar is an associate professor in the Atmospheric Sciences department and the director of the Biogeochemistry Core Facility lab at the university.