Life Sciences Facility—Becoming Reality

plus

- Mosin-Nagant model 1891
- Chinese Karsts
- Statewide High School Science Symposium
- Ecological Effects of Snowmobiles
I n February I began my ‘new’ role as Dean of the College of Natural Science and Mathematics, shedding the ‘Interim’ label. Having the search process and the uncertainties associated with being interim behind me has allowed me to focus more time into thinking about CNSM’s role at UAF and how we can build support for the college and its departments. You will be hearing more about this in later newsletters.

This newsletter focuses on some very exciting new developments in CNSM. Most importantly, on March 30, 2011, we broke ground on construction of the Life Sciences Building on West Ridge. This new facility will provide state-of-the-art teaching laboratories and classrooms for life sciences, and provide much needed research space to expand our programs in biology, biomedicine and other fields. Of note is that this will be the first building at UAF to include significant space for teaching and research since the Reichardt Building (formerly known as the Natural Science Facility) opened in 1995. Life Sciences will serve as a focal point to promote interactions between undergraduates, graduate students, faculty and staff in teaching and research. This project was a long time coming and I thank all those people who worked hard to make this a reality. I look forward to its opening in 2014 (or 2013 depending on the construction progress). If you would like more information about this project, please contact me or follow construction at www.uaf.edu/lifescience/construction.

In this newsletter, we recognize our outstanding teaching faculty. I congratulate them and thank them for their dedication to quality teaching. Our wonderful faculty members are what make my job as dean so much fun. During this academic year to date, CNSM supported 16 students to attend and present their research at professional conferences in Juneau, Anchorage, San Francisco, Melbourne Australia and elsewhere. We are (slowly) building a stable fund to support this travel, and no student travel requests were denied. CNSM is a proud participant in the Alaska Statewide High School Science and Mathematics Project and one of the students has also qualified for the International Science Olympiad this year. We are (slowly) building a stable fund to support this travel, and no student travel requests were denied. CNSM is a proud participant in the Alaska Statewide High School Science and Mathematics Project and one of the students has also qualified for the International Science Olympiad this year.

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Although I have assumed the role of dean, I intend to keep an active hand in research. In February, I had an opportunity to participate in field work in Mexico again with my colleagues at the Universidad Nacional Autónoma de México (UNAM). During my trip, I visited UNAM campuses in Mexico City and Morelia. We also mapped and sampled 13,615 ft. high Tlaloc Volcano, east of Mexico City. We camped near the summit and were able to see the ruins of an Aztec shrine built to honor Tlaloc, god of rain. Our prayers were answered because we had 10 perfect rain-free days.

In March, my PhD student, Jeff Benowitz, successfully defended his PhD thesis entitled: “The topographically asymmetrical Alaska Range: Multiple tectonic drivers through space and time.” At this writing, we are cleaning up the final chapters and I am looking forward to recognizing “Dr. Benowitz” at the May commencement. Jeff will continue to work with me in the Geochronology Laboratory as a research associate in the Geophysical Institute.

Thank you to our donors. Over the past couple of years, we have significantly increased the number of donors to CNSM and I thank you all for your support. Finally, I wish to acknowledge the CNSM staff who have made my transition from faculty member to interim dean to dean an enjoyable experience. Thank you for your guidance, patience and support.

standards are established for institutions of higher learning. This is the procedure known as accreditation and, in the United States, it is not carried out by a federal department but is dispersed to the states and regional organizations. UAF is a member of the Northwest Commission on Colleges and Universities, and there are also numerous professional accreditation organizations, such as for Education, Engineering and Chemistry, which accredit specific degree programs within a university. One of the many activities required by accrediting organizations is the timely assessment of individual courses, where these courses each have faculty-established expectations for student learning outcomes. The grade you earned in a course is certainly a quantitative assessment of your success, but there are other, more qualitative, means of assessment that are increasingly required, and that can be a discussion within itself. At UAF, “timely” translates to once every five years for each course.

Picking up where I left off with the last newsletter, assessment of courses within the UAF Core Natural Science assessments have now expanded to include all core natural science courses in all venues (i.e., all UAF rural campuses in addition to the Fairbanks Campus, and summer sessions as well as the fall and spring semesters, and via distance delivery as well as in the classroom). This represents an important increase in assessment activity, with seven courses being assessed this semester, one this coming summer, and at least six in the next fall and spring semesters. The issuing of course grades generally represents the last act of the semester. Now the last act can be completion of an outcomes assessment report.

Honor Roll of Donors and Industry Partnerships

We’d like to take this opportunity and publicly thank donors and industry partners of the College of Natural Science and Mathematics. Through contributions or hands-on involvement, they have joined with the college to support our commitment to academic excellence, research and service.

We hold these relationships with donors and industry partners in high regard. They lend strength to the college and support our mission to produce outstanding graduates and a well-qualified workforce.

We wish to thank the following donors and partners:

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The College of Natural Science and Mathematics welcomes contributions and community support, monetary or in-kind.

Donors may specify how their gift is applied or allow for the dean’s discretion to use contributions where the need is greatest. All monetary gifts marked for the college are deposited into a special account at the University of Alaska Foundation and allocated by the dean of the college.

Attractive educational tax benefits are available for contributions to the University of Alaska as detailed on the UA Foundation website:

www.alaska.edu/foundation/

Contributions by check can be routed directly to:

College of Natural Science and Mathematics
University of Alaska Fairbanks
Reichardt Building 358
PO Box 755940
Fairbanks, AK 99775-5940

The Office of University Advancement and Community Engagement website provides a secure contribution form for donations by credit card: www.uaf.edu/giving/gift/giving-form/

The form includes a drop-down list to specify your gift be designated for the College of Natural Science and Mathematics.
February 15, 2014:

It’s a cold winter day – 40 below, at least – and you’ve just taken the shuttle to West Ridge to get to your biology class. You’re a little early and, as you head through the door, you glance at the large electronic display in the lobby, flashing the latest news. Oh good – it’s not too late to apply for an undergraduate research fellowship. Now, if only you could figure out exactly what to work on! As you wander into the lobby, some of your friends call down to you from the study balcony overlooking the lobby, and you head up the stairs to join them. Several of them have obviously been there for a while, which is not surprising: it’s by far the best place on campus to hang out. It’s open and airy, with comfortable chairs, plenty of outlets for plugging in laptops, and a great view of the mountains as well as the main lobby.

As you troop back down the stairs a few minutes later on your way to the auditorium, you pass by a set of research posters displayed in the hallway. A new group has just been put up, and as usual you take a quick look at what is going on in the department. A poster by one of your TAs catches your eye. His advisor gave some lectures in a class you took last semester, and ever since you’ve wanted to find out more about this area of research. As you realize that you are now running late, you quickly scurry through the double set of doors into the auditorium, making a mental note to read the poster in more detail later.

As you head out of the auditorium at the end of class, you remember a petition you need to get signed by the department chair. Fortunately, her office is directly across from the auditorium, and you hand off the petition to the student coordinator. While chatting with her, the advising coordinator calls out your name and you head into her office. It turns out she’s just received a new summer research opportunity that she thought you’d be interested in, and you quickly make a copy of the ad in the adjacent copy room before heading out to take another look at the posters.

You’ve got a couple of hours between classes so you head to the cafeteria just down the hall from the auditorium to pick up a coffee. While there, you run into the TA whose poster you were interested in and ask him a couple of questions. He invites you to come along to the interaction space a little further down the hall, where the two of you have an animated conversation about his research. He gets pretty excited as he grabs some pens and sketches out ideas for how you could pick up a component of his project and build on it. Good thing there are plenty of whiteboards available around all the display areas! As you get deeper into the conversation, he takes you up the stairs and down the hall to the research labs where his experiments are set up, and pretty soon you and he have developed some solid ideas of where to take a new project. Exhilarated by the possibilities, you lose track of time and go racing back down the stairs, stopping only to pick up an application for the undergraduate research fellowship on your way out the door. As you run through the lobby to catch the shuttle, it occurs to you that you may be spending an awful lot of time here in the near future.

A dream? No, just a description of what could be like to be an undergraduate student in Biology and Wildlife (B&W) when the new Life Sciences Building becomes operational. This building will have all the features one would expect in a facility that integrates teaching and research: a 150-seat auditorium, modern classrooms and teaching laboratories, an office complex for departmental staff, offices for faculty, postdoctoral fellows, and graduate students, laboratory facilities for researchers, conference rooms, several interaction spaces, a cafeteria, and bathrooms for both men and women on each floor. It also has several features you may not have thought of. An “insectivory”, for example, where invertebrates used in teaching will be housed. A set of rooms that will someday house an MRI and allow for expansion of teaching and research in subjects that rely on imaging facilities. Space in the basement to store outdoor gear such as nets and hipwaders.
Life Sciences Facility

While there are many cool features in the new building (we’re still debating the black glass “whiteboards” in the hallways!), what users will probably notice the most is how much easier it will make their lives on a day-to-day basis. Undergraduates will no longer be attending classes at one end of the campus and meeting with faculty at the other end; most biology classes will be taught in one building. Teaching assistants and the laboratory coordinator will no longer need to lug equipment and materials back and forth between the Bunnell Building and Irving I, and they will have access to prep rooms and ample specimen storage adjacent to the teaching labs. The department chair, office staff, and advising coordinator will all be found in one set of offices, making it much easier for students to get their questions answered and petitions signed. There will be interaction spaces on all three floors of the building on both the south side of the building (where the main entrance and staircase are) and the east side of the building (in between the teaching and research areas). These areas are designed to encourage undergraduates, graduate students, postdoctoral fellows and faculty to mingle and exchange ideas while providing some protection from the hubbub of the building. There is also a small conference room on each floor, perfect for graduate committee meetings. And then there are the little things: well-organized labs with dedicated spaces for coats and backpacks. Places outside of the lab where coffee cups can be left without being knocked over. Plenty of spots where one can settle down with a laptop or recharge a cell phone. Place for new students and their parents to sit while waiting for their first meeting with the advising coordinator. Dedicated computers for students who are trying to register or need to print off transcripts. And of course availability of coffee past three o’clock in the afternoon (at least the writer of this article fervently hopes so).

Some of these resources will make it easier to do what we already do, but others will change how we teach and do research. For example, all of the teaching labs and lecture rooms will have movable tables, so that students groups can be configured to best suit the exercises, facilitating group work and active learning in the classroom. Better facilities will allow us to develop labs in courses that currently don’t have them, such as immunology or developmental biology, and greatly expand what we can do in courses like Cell and Molecular Biology. One of the biggest constraints on expanding student research projects in classes right now is the lack of lab space, a lack of adequate supervision and difficult access outside of class hours. Plenty of flexible lab space with features such as moveable plant racks, and co-location with the lab coordinator and other B&W staff will make it much easier for faculty and students to be involved in enquiry-based learning. From the first day of classes, students will be aware of the research their instructors and teaching assistants are engaged in, and their ability to become involved in research will be facilitated by easy access to the offices of faculty, postdocs, and graduate students and to the research areas. The research labs themselves are large, open rooms designed for use by multiple research groups in areas such as wildlife disease or neuroscience, again encouraging interaction and collaboration.

It’s not just students and faculty in the life sciences who will benefit from the new building. The move to the new building will free up space in the Bunnell Building and other buildings that other departments will take advantage of. The campus as a whole and the general public will have plenty of opportunities to take advantage of the new auditorium and the large lobby, as we expect lecture series and receptions to take place there regularly. The addition of a new auditorium will make scheduling public events much easier, and give us a chance to show the community at large what is happening in the sciences and other fields at UAF.

I am sure there will be times over the next two years when I will curse the construction process as I struggle to find a parking space or fail to focus on my computer screen through the noise emanating from the construction site. But the Life Sciences Building will be a wonderful opportunity to improve our curriculum, increase integration between teaching and research, and expand interactions with the wider campus and beyond. And yes, sip that latte while watching the sun set over the mountains on a cold February afternoon.
The 2011 ASHSSS: Another STEM Success

Dr. Abel Bult-Ito
Professor of Biology and ASHSSS Director

The 26th Alaska Statewide High School Science Symposium (ASHSSS) was held March 5–6, 2011, at the University of Alaska Fairbanks (UAF) in College of Natural Science and Mathematics (CNSM) facilities and in collaboration with the Fairbanks North Star Borough School District (FNSBSD).

The ASHSSS is a regional event, with winners going on to participate in the National Junior Science and Humanities Symposium (JSHS). The JSHS is administered by the Academy of Applied Science and is jointly sponsored by the U.S. Departments of the Army, Navy, and Air Force. These organizations also provide funding to regional symposia, including the ASHSSS.

The ASHSSS program objectives are those of our parent national organization, the JSHS:

- To promote research and experimentation in science, technology, engineering, and mathematics (STEM) at the high school level
- To recognize the significance of research in human affairs and the importance of humane and ethical principles in the application of research results
- To search out talented youth and their teachers, recognize their accomplishments at symposia, and encourage their continued interest and participation in the sciences, engineering, and mathematics
- To expand the horizons of research-oriented students by exposing them to opportunities in academic, industrial, and governmental communities
- To increase the number of future adults capable of conducting research and development

Over 150 people were involved in making this year another success. These awesome individuals included West Valley High School (WVHS) teachers Cyndie Beale and Greg Kahoe, three ASHSSS Directors, nine UAF faculty paper/abstract reviewers, 11 student organization volunteers, 21 UAF judges, 22 community member research mentors, and 27 sponsors, in addition to many supportive peers and parents.

On Saturday, March 5, 22 WVHS students competed in five scientific sessions presenting on research in physics and chemistry, environmental chemistry, organismal science, plant diversity, dietary quality and abundance, and animal physiology and disease. The first and second place winners in each session continued to the finals session on Sunday, March 6. The students’ accomplishments were celebrated at an awards banquet on Saturday night at the Wedgewood Resort.

Anna Quist is this year’s 1st place finalist with her presentation on “Prevalence Rates of Microfilaria in Alaskan Moose Calves.” Anna studied four different moose populations and found that calves were infected with at least two different Microfilaria parasites and that one population had a significantly lower parasite load than the other three populations. She received a total of $8,150 in scholarships, travel funds, and cash. Anna will represent Alaska as Alaska’s first speaker at the

Front row from left to right: Julia Covell, Emma Funk, Anna Quist, Kieran O’Neil, Dolma Ombadykow.
Back row from left to right: Dr. Gary Laursen, Dr. Abel Bult-Ito, Dr. Barbara Taylor.
National JSH in San Diego, California, April 27 through May 1, 2011.

**Emma Funk** is the 2nd place finalist with her presentation on “Concentration of Secondary Metabolites in Alaskan Birch and Felt-Leaf Willow in Relation to Snowshoe Hare Winter Browsing.” Emma found that snowshoe hares most likely prefer to eat the first few inches of a willow stem because it has the smallest amounts of papyriferic acid. She received a total of $7,500 in scholarships, travel funds, and cash. Emma will be Alaska’s 2nd speaker at the National JSHS.

**Kieran O’Neil** is the 3rd place finalist with her presentation on “The Biodiversity and Abundance of Polychaetes within the Holdfasts of Dragon Kelp, Eulalia fistulosa, in Barren and Abundant Kelp Forests, Adak Island, Aleutian Islands, Alaska.” Kieran discovered that deposit and filter-feeding polychaetes were more abundant in kelp holdfasts in areas where kelp forests were decimated by sea urchins compared to holdfasts in dense kelp forests, while mobile feeders were equally common in holdfasts from both areas. She received a total of $7,150 in scholarships, travel funds, and cash. Kieran will be Alaska’s poster presenter at the National JSHS and she is also the alternate national speaker.

**Julia Covell** is the 4th place finalist and will travel to the National JSHS with the two Alaska speakers and poster presenter in a supporting role. She received a total of $6,500 in scholarships, travel funds and cash, and Julia is also the alternate national poster presenter. **Dolma Ombadykow** is the 5th place finalist and is the 1st National JSHS alternate. **Jessica Lingaas** is the 6th place finalist and is the 2nd National JSHS alternate.

This year, 102 awards were distributed to 22 student participants. The student monetary awards totaled $39,550 in cash, and scholarship and travel funds, which averages $1,800 per student. Financial program gifts totaled $18,100 and cash awards to student volunteers totaled $650. Travel funds for the chaperone and two ASHSSS directors totaled $6,000. In addition, $60,000 was contributed in in-kind support, bringing the total amount of monetary and in-kind funds utilized during this year’s ASHSSS to almost $125,000.

The local organizing committee, the ASHSSS Director Abel Bult-Ito, Associate Director **Barbara Taylor**, and Past Director **Gary Laursen**, thank all who participated in making this, the launch into another 25 years of providing Alaska’s students with innovative STEM opportunities, another successfully conducted experience.

Please visit our website [www.ashsssuaf.edu](http://www.ashsssuaf.edu/) for additional information and a listing of our contributors.

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### AY2010-11 CNSM Student Travel Grant Recipients

- **Gavin Baker**  
  American Medical Students Association 2011 Annual Convention in WA, DC
- **Jeremy Davis**  
  Geological Society of America Meeting in Denver, CO
- **Yuning Fu**  
  American Geophysical Union in San Francisco, CA
- **Wenyu Gong**  
  American Geophysical Union in San Francisco, CA
- **Ryan Kovach**  
  Alaska American Fisheries Society Annual Meeting in Juneau, AK
- **Mindona Krzykowski**  
  Women in Physics Conference in Lincoln, NE
- **Dave Larimer**  
  Alaska Miners Association Annual Convention in Anchorage, AK
- **Jordan Metzgar**  
  International Botanical Congress 2011 in Melbourne, Australia
- **Jonathan Nigg**  
  Institute of Food Technologists Annual Meeting in New Orleans, LA
- **Shane Rideout**  
  Experimental Biology Conference in WA, DC
- **Jill Shipman**  
  American Geophysical Union in San Francisco, CA
- **Katie Spellman**  
  Invasive Plant Council of British Columbia Annual Conference in Richmond, BC
- **Caroline Van Hemert**  
  OneHealth 1st International Congress in Melbourne, Australia
- **Patrick Wallace**  
  Nanotechnology Conference & Expo 2011 in Boston, MA

### Olaus Murie Caribou Fellowship Recipients

- **Lindsay VanSomeren**  
  Annual Meeting of the Alaska Chapter of the Wildlife Society in Juneau, AK
- **Jacqueline Ball**  
  Annual Meeting of the Alaska Chapter of the Wildlife Society in Juneau, AK

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**Have a Burger…on Us!**  
**Noon • May 12, 2011**  
**Reichardt Building Front Lawn**
Weaponry Changes Warfare and Medical Understanding

By Michael B. Harris
Associate Professor of Neuroscience and Integrative Physiology, Department of Biology and Wildlife, Institute of Arctic Biology

When teaching neurobiology, I try to provide historical context to the subject matter, and emphasize situations where talented people take advantage of circumstances to greatly advance scientific understanding. A common theme is how biomedical science is advanced by careful study of injury.

In the brain, areas of the cerebral cortex commonly organize sensory information as figurative maps, with sensory inputs represented in regular patterns across brain tissue. The portion of the cortex processing visual information is organized in this manner. One of the first understandings of this distribution came through the observations of a talented Japanese Ophthalmologist, Dr. Tatsui Inouye, and resulted from both military technical innovation and careful scientific observation.

When lecturing on the visual cortex, I recount the innovations of Russian armorists at the turn of the 19th century in developing the Mosin-Nagant model 1891 long rifle, one of the first weapons to fire a hardened and small caliber projectile at a high velocity. Prior to such innovation, military head wounds were generally fatal as the bullet would expand upon impact. Injuries from the Mosin-Nagant 1891, however, were commonly “through-and-through” wounds, entering and exiting the skull with a straight trajectory.

During the Russian-Japanese war of 1904–05, many Japanese soldiers suffered and survived such head wounds. Why? Dr. Inouye was tasked with assessing the severity of vision problems associated with head wounds in order to match a wounded soldier’s pension to the severity of his injury. Noting that these wounds produced a linear injury, Inouye linked functional deficits with areas of injury and provided the first extensive map of how the visual world is represented on the brain.

During the Meiji era (1868–1912), Japan welcomed Western influences and Germany was the primary conduit of modern medical knowledge. Dr. Inouye published his findings in German in 1909. Unfortunately, few volumes of this published work were printed and German language scientific literature lost its predominance with the onset of World War I. Shortly after original publication, Dr. Inouye left research for medical practice. Inouye’s work was effectively lost until two scholars happened upon a photocopy of the original publication in the library of the London Institute of Neurology. The first English language translation was published in 2000, almost a century after its origin and after the organization of the visual cortex was rediscovered with more modern neuroscience techniques.

This story has long fascinated me. Given my penchant for incorporating the use of tangible objects in my lectures, as it helps focus attention on the subject matter, I recently I acquired a Mosin-Nagant 1891 rifle. With appropriate permission from UAF administrators, I was able to show the rifle to my students in class which resulted in a memorable lecture and, by all indications, this subject stuck. I am delighted that campus administration was supportive of such an unorthodox tool, and consider this open-mindedness an asset for UAF and our students.
Geologists Gather in China for the Talks, Stay for the Karsts

by Michael Whalen
Associate Professor, Department of Geology & Geophysics, Geophysical Institute

As part of the UNESCO-funded International Geoscience Programme (IGCP) 580, I was privileged to travel to Guilin, China in late 2010 for a conference and field excursion. The area surrounding Guilin is one of the most spectacular geologic landscapes on Earth and is the basis for some of the most iconic Chinese imagery. The karst, or dissolved limestone, topography in the area is the result of the development of ancient cave systems in even more ancient limestones (Devonian or roughly 380 million years old). The roofs of many of these caves collapsed long ago, leaving thousands of enormous karst towers that dot the landscape.

IGCP projects are intended to bring together scientists from the developed and developing world. Participants from Austria, Belgium, Cameroon, China, Colombia, Czech Republic, Estonia, France, Germany, India, Iran, Poland, Portugal, Russia, Senegal, U.S.A., and Vietnam travelled to Guilin for the meeting. We spent one day on oral and poster presentations and then had two days of field excursions. The first day in the field, we visited several outcroppings of Devonian rocks and ended the day with a tour of a spectacular cave. The second day, we took a half-day trip on the Li River that provided tremendous views of the truly astounding landscape.

Several of us planned to stay on in Guilin to conduct additional fieldwork after the formal conference and field excursion. The Devonian rocks in the area contain the record of one of the “big five” mass extinction events in the geologic record. Our goal was to conduct high-resolution sampling across this mass extinction boundary. Through various laboratory and research techniques, we hope to gain a better understanding of the ecological changes associated with an event that terminated approximately 25% of all genera of marine organisms. The cause of this extinction event remains somewhat controversial, but much evidence points toward rapid climate change and associated low oxygen conditions in the world ocean. The extinction occurred in two pulses near the end of the Devonian period and the first pulse was associated with a rather rapid global warming event so the environmental and biotic response to this episode provides insight, and perhaps a cautionary tale, about current global change.

Our international group of researchers is now evaluating the samples we collected while in China and there are currently three graduate students in the Department of Geology and Geophysics involved in various aspects of research including microscopic and geochemical analyses. While IGCP projects do not provide extensive research funding, they offer crucial assistance to permit scientists from the developing world to participate and are integral to establishing international collaboration among scientists. I also acknowledge the generous financial support from Daniel Julius and UAF Academic Affairs and Research that defrayed the cost of this trip.

Ecological Effects of Snowmobiles
by Timothy C. Mullet, MS

Since the 1970s, snowmobiling has significantly increased in the United States and Canada. Previous studies have found that snowmobiling has detrimental effects on vegetation and wildlife. Additionally, snowmobiles emit a great deal of noise that can cause additional stress to wildlife and alter the natural processes that sound plays in the ecosystem. Snowmobilers’ ability to access remote wilderness areas during winter has therefore, been a developing concern for wildlife managers charged with managing this popular outdoor activity.

I am a second-year PhD student in the Biology and Wildlife Department at UAF. During the winter of 2010-2011, I began my 2-year field research on the ecological effects of snowmobiles on the 2 million acres of the Kenai National Wildlife Refuge. The Refuge manages over 1.2 million acres of congressionally designated wilderness that is open to snowmobiles from December to April. Additionally, the Refuge is subjected to a variety of anthropogenic sound sources that emanate throughout the landscape during the year. My study focuses on the area affected by snowmobiles, how snowmobiles affect the distribution and stress levels of moose, how snowmobiles affect vegetation, and how snowmobiles and other anthropogenic noises contribute to the soundscape.

I am conducting aerial photography of the Kenai National Wildlife Refuge’s 2 million acres to capture snowmobile tracks and moose tracks. To determine moose stress response to snowmobiles, I am conducting glucocorticoid (stress hormone) analyses of fecal samples taken in snowmobile use and non-use areas. Impacts of snowmobiles to vegetation are being tested by running snowmobiles across designated control and treatment transects. Finally, I am assessing how snowmobiles contribute to the soundscape by recording decibel levels and ambient sounds at permanent and rotating sound stations using sound level meters and sound recorders. These data will be input into a predictive modeling software to map the extent of snowmobile effects to the entire Refuge.

These data may indicate that snowmobiling has landscape-scale affects on Refuge resources and the quality of congressionally designated wilderness. This information will also provide Refuge managers with information to make informed decisions of whether they should regulate snowmobile activity for the conservation of wildlife, their habitats, and human experience.
Faculty and staff research that is supported through external agencies is organized through the CNSM research office, ESTES (Engineering Science and Technology Experiment Station). In the current 2011 fiscal year (as of April 6, 2011), the ESTES office has assisted with development of 25 new proposals, of which 24 are completed and submitted, and for which $6,507,587 has been requested for research and other sponsored activities. Two of these new proposals have already been awarded in FY11 as well as five originally submitted in FY09 and FY10, for a total FY11 award amount to date of $1,507,165. Three FY10 proposals remain under review for requested funding of $1,142,896. In addition, ESTES has also provided post-award administrative support for the 50 continuing and newly awarded grants with authorized budgets totaling $8,464,753 and also provided support for travel and procurement activities by faculty and staff.

It is always worth remembering that these numbers do not tell the full story about research funding and the CNSM faculty’s research activities. First, faculty members who hold joint appointments and teach within the college carry out their research efforts mainly in research institutes such as the GI, IARC, and IAB. It is the usual practice for these faculty members to submit their proposals for sponsored research within their respective institutes. Second, both joint-appointment and full-time CNSM faculty members obtain unsponsored research funding (i.e., Fund 1) from CNSM as part of their tripartite faculty positions; e.g., about 30 percent of their CNSM appointment. These research efforts by CNSM faculty are also acknowledged.

The following PIs had grant awards received in FY2011:

- **Erin Pettit**: The Influence of Climate on Ice Rheology at Dome C, East Antarctica, NSF, submitted in FY09.
- **Tom Trainor**: Lead and Antimony Speciation in Shooting Range Soils: Molecular Scale Analysis, Temporal Trends and Mobility, DoD SERDP, submitted in FY09.
- **Alexei Rybkin**: Inverse Scattering Transform and Non-decaying Solutions of Completely Integrable Nonlinear PDE’s, NSF, Submitted in FY10.
- **Nancy Bigelow**: Interglacial and Interstadial Vegetation of the Southern Yukon Territory, Yukon Government, submitted in FY11.

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**Mission Statement**

Through instruction and mentoring, the College of Natural Science and Mathematics promotes students’ self-motivation to excel and guides them towards professional careers and public service in an environment of lifelong learning. Through research, the college advances knowledge of natural, physical, technological and numerical systems from a northern perspective. Instruction, mentoring, research and outreach are brought together within undergraduate, graduate and continuing education programs to benefit Alaska, the nation and the world.

**Vision Statement**

The College of Natural Science and Mathematics is the education and research leader in science and technology for the public and private sectors of Alaska and the north. Research and instruction are strengthened by competitive grants at the national level, to the benefit of the university and its students. Research, teaching, and outreach contribute to achieve a superior learning experience. Vitality in scholarship is improved at all levels by recruiting and retaining the best and brightest faculty, staff, and undergraduate and graduate students. Instructional programs use the most current technologies and methods to focus on developing skills for both scholarship and vocation to allow students to develop to their full potential and become the scientific leaders of the future. Leaders throughout Alaska seek our input for solutions to problems facing Alaskans.
Celebrating Teaching Excellence

Student opinion surveys are one measure of teaching excellence. While high student opinions of a course do not assure that a course is an excellent course, engaging students is an important step in the process of learning. At the end of each semester, an Instructional Assessment System Survey (IAS), also known as student opinion of instruction, is formally given to every class in the university system.

As dean, I would like to recognize CNSM faculty, instructors, adjuncts and lecturers who taught courses highly rated by students during the last semester.

The criteria for recognition is having received an overall IAS score of greater than or equal to 4.5 (median of terms 1-4) in course with at least eight students responding. A score of 4.5 indicates that 75% of students rated the course as very good to excellent.

Congratulations to the following on their efforts in teaching during spring and fall semesters 2010!

**ATMOSPHERIC SCIENCES**
- Uma Bhatt (fall)

**BIOLOGY & WILDLIFE**
- Andrea Bersamin (spring)
- Rich Boone (fall)
- Abel Bult-It (spring)
- Michael Harris (spring)
- Karsten Hueffer (spring)
- Knut Kielland (fall)
- Diane Wagner (spring and fall)

**CHEMISTRY & BIOCHEMISTRY**
- Cathy Cahill (fall)
- Tom Clausen (fall)
- Tom Green (spring and fall)
- Tom Kuhn (fall)
- Bill Simpson (spring)
- Marvin Schulte (spring)
- Tom Trainor (spring and fall)

**GEOLOGY AND GEOPHYSICS**
- Patrick Druckenmiller (spring)
- Sarah Fowell (spring)
- Paul Layer (spring)
- Paul McCarthy (fall)
- Rainer Newberry (spring)
- Ken Severin (fall)

**MATHEMATICS & STATISTICS**
- Ron Barry (spring)
- Leah Berman (fall)
- Ed Bueler (spring)
- Jill Faudree (fall)
- Latrice Laughlin (spring and fall)
- John Rhodes (spring)
- Margaret Short (spring and fall)

**PHYSICS**
- David Newman (fall)

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**Department of Atmospheric Sciences**

By Nicole Mölders, Department Chair

The Department of Atmospheric Sciences (DAS) is excited to welcome our new affiliated faculty Dr. Georg A. Grell and Dr. James Partain, both with NOAA. Their expertise is in photochemical modeling and climate research, respectively. Both serve on various graduate student advisory committees and collaborate with faculty and students of DAS. Also give a warm welcome to our new graduate student Cecile Borres and undergraduate research student Evelyn Jackson who will work with Dr. Xiangdong Zhang and Dr. Nicole Mölders, respectively.

**Faculty News:**
- Richard Collins, Associate Professor of Atmospheric Sciences, is working on developing ATM101 as a distance delivery class.
- Uma Bhatt, Associate Professor of Atmospheric Sciences, and her graduate student Peter Bieniek have started collaboration with Dr. Ann Fienup-Riordan, an anthropologist who has worked with native groups along the Bering Sea for more than two decades. This collaboration kicked off with a meeting in Anchorage where they met with Calista Elders to compare indigenous and western knowledge of climate on the Yukon coastal area. They have found that in southeast Alaska vegetation productivity trends have been decreasing. Discussion with what has been observed through local knowledge has supplied ideas of climate data analysis priorities.
- Nicole Mölders, Professor of Atmospheric Sciences, won a grant to perform simulations on various emission-reduction scenarios. This work may help Fairbanks to find ways to mitigate the PM$_{2.5}$ concentrations and to get attainment.
- Javier Fochesatto, Associate Professor of Atmospheric Sciences, received funding to perform measurements in support of the efforts of the borough to develop strategies to comply with the new National Ambient Air Quality Standard for PM$_{2.5}$.
- Kenneth Sassen, Professor of Atmospheric Sciences, has secured funds from NSF to support lidar and CALIPSO research. All these grants support graduate student research.

**Student News:**
- Rebecca Legatt (advised by Dr. Igor Polyakov) graduated this fall with an MS degree, received a position at the Palmer Tsunami Forecast Center.
- Paula Moreira, Huy N.Q. Tran and Trang T. Tran all won awards to participate in the NCL tutorial at the National Center for Atmospheric Research. This tutorial will provide
We are very thankful for the donations for the Atmospheric sciences. DAS co-hosted the Alaska Weather Symposium 2011 during spring break. Various graduate students presented posters and talks. This year, for the first time, there was a student poster and oral presentation competition similar to those held at AMS or AGU.

We are very thankful for the donations for the Atmospheric Sciences Graduate Student Travel Award (ASGSTA) and a new Atmospheric Sciences Graduate Student Publication Award (ASGSPA). We hope to get further donations from alumni and faculty in the future to start a tradition on awarding the ASGSTA and ASGSPA. Atmospheric Sciences graduate students watch out for the deadline for applications for these awards that is coming up soon.

Department of Chemistry and Biochemistry
by William R. Simpson, Department Chair

- The Department of Chemistry and Biochemistry welcomes a familiar student, Sean Egan (BS Fall 2010), back to our MS program. Sean will be working with Professor Tom Trainor’s research group.

- As a part of the department’s assessment process, seniors in one of our capstone laboratory courses took the ACS Diagnostic of Undergraduate Chemical Knowledge 2008. This is a national exit exam for chemistry students. Our students did very well, with our mean score ranking 89th percentile on the national curve. Every single student scored significantly above the national average.

- Patrick Joyce was awarded the best poster award at the Alaska Weather Symposium.

- Biochemistry and Molecular Biology researchers from the department were featured in the March 2011 Alaska Magazine in an article entitled “Arctic Lessons” by Kalb Stevenson. Featured work from our department included Kelly Drew’s work on arctic ground squirrels, and Larry Duffy and Kriya Dunlap’s work with blueberries, subsistence foods, and mercury in sled dogs.

- We have invited five candidates for on-campus interviews in tenure-track professor searches, one for an environmental/analytical chemistry professor, and one for an organic chemistry professor. Recently, we have begun a new tenure-track search for a biochemist who would work with the INBRE program and the Institute of Arctic Biology. We look forward to these new faculty members enhancing our department.

- Tom Clausen will be retiring from the department at the end of this semester. We will miss him and his contributions to the department and wish him well in the future.

- In the Fall, we had four students (Tulasi Jinka, PhD BMB, Elvin Brown, PhD BMB, Nastia Ilgen, PhD Echem, and Dea Huff, PhD Echem) complete their PhD degrees. During the spring, at least two MS students are intending to graduate. Best of luck to our graduates.

Department of Mathematics and Statistics
by Tony Rickard, DMS Chair

The Department of Mathematics and Statistics (DMS) will begin a new era this summer, as Administrative Assistant Jenise Klos will retire from UAF on June 30th, 2011. At her retirement, Jenise will have completed 35 years of uninterrupted service to DMS, consistently providing excellent support to faculty and students. Jenise began her work with DMS in the summer of...
1976 and during her career has worked with nine DMS Chairs: Robert Brown, Jack Distad, Ron Gaterdam, Thomas Head, Clif Lando, John Rhodes, Tony Rickard, Dana Thomas, and Jon Wiens (NOTE: DMS Chairs are listed alphabetically and it is left as an exercise for the reader to organize them chronologically). Over 35 years, Jenise has been with DMS through many changes, including when the department office received its first computer in the early 1980s. In her 1984 annual evaluation, Jenise was praised for “…quickly mastering the techniques of word processing.” Jenise will be missed by full-time and part-time DMS faculty, as well as by our undergraduate and graduate students, and student employees. We all wish Jenise the very best in retirement and we look forward to her occasionally dropping by the Chapman Building to check up on us.

DMS faculty are engaged in a variety of research and outreach projects. Professor of Mathematics Sergei Avdonin, for example, was an invited speaker at the Newton Institute in Cambridge during July 25-31, 2010 and is currently organizing a minisymposium on Differential Equations on Graphs and their Applications at the International Congress on Industrial and Applied Mathematics in Vancouver, BC July 18-23, 2011. Associate Professor of Mathematics Jill Faudree and Instructor of Mathematics Latrice Laughlin are currently planning the DMS Summer Math Bridge Program, which will take place on campus this spring. The Summer Math Bridge Program is a collaborative effort between DMS, Summer Sessions, and the College of Rural and Community Development and will provide invited students with enhanced opportunities to prepare for selected summer mathematics courses and improve students’ success.

Lastly, DMS faculty encourage students to make use of the Math Lab, located in 305 Chapman. UAF students can receive assistance with all 100- and 200-level MATH and STAT courses at the Math Lab from qualified tutors, including during evenings and weekends (see www.dms.uaf.edu/dms/MathLab/MathLabIntro.html for the schedule and more information about the DMS Math Lab). The DMS Math Lab will also be open throughout the summer to provide support for students taking mathematics and statistics courses during Summer Sessions 2011.
Talal Ahmed, Chemistry & Biochemistry
I attended UAF in 2007 with the intention of earning a degree in engineering, but I had such a positive first year experience in my science classes that my interests quickly shifted towards chemistry. Everyone in the Department of Chemistry and Biochemistry has had a profound impact on making the past four years at UAF fun, exciting, and full of opportunities. I would like to thank all my professors for being welcoming, patient, and encouraging me to explore all my interests by providing me with a diversity of options for research.

Sara Boaz, General Science
I was working construction in Greenland when I first decided to return to college. One of the scientists there wanted me to join his research team. The position required a Bachelors of Science degree. He encouraged me to go back to college and get a General Science degree. Then a year later, I was working building antennas for General Dynamics, when the recession began. I found myself unemployed in Texas and decided it was a great time to return to school. I started looking at schools with General Science degrees. When I got to the UAF web page, I thought Alaska looked like an adventure, so I applied and bought a ticket. I decided to focus on Geology within the General Science degree, because I had already decided that I wanted to work at Pogo Mine doing exploration. I also want to be able to pursue research opportunities in Arctic and Antarctic regions, and maybe the oil industry. People often question my motives for getting a General Science degree. But I have a specific purpose. I want to work and travel. I do not want to be so specialized that I am over qualified for the jobs I want. I would like to be qualified for entry level science research. I know I can always move up through hard work. But I also want to be able to get a job digging holes if I want to, especially if those holes are in Europe.

Kit Dawson, Physics
Kit Dawson joined the UAF Physics program from North Pole High School. A native of Interior Alaska, he also currently serves with the Alaska Air National Guard. Kit first got interested in Physics when he took a class at NPHS from Dr. (now Prof.) Curt Szuberla. Beyond his excellence in the classroom, Kit has an impressive record of undergraduate research experience, including digital signal processing of infrasound measurements at the Geophysical Institute, and currently the development of a complex systems model for Arctic sea ice at the Physics Department. Kit’s research proposal was funded with an EPSCoR Undergraduate Student Research Award. Kit is active in the UAF Society of Physics (SPS) chapter and his classes and to advance his mastery of the larger subject, seeking to make connections between topics and to internalize the methods of inquiry in the field. His future plans include graduate study towards a PhD in Physics.

Mark Gilbertson, Biological Sciences
As a student at UAF I am pursuing a bachelor’s degree in Biology, BS. Upon completion, I hope to enter UAF’s graduate program in neurobiology. When I’m not studying for classes, I’m playing the violin in the Northern Lights String Orchestra and the North Star String Orchestra. Choosing UAF was an easy decision. It’s a great school with a wonderful Biology program. That’s why I am making the decision to go to grad school here. Why go anywhere else?

“When I got to the UAF web page, I thought Alaska looked like an adventure, so I applied and bought a ticket.”
**Awards**

*Riley Hall, Geology*  I didn’t decide to come to UAF for the mild winter climate, but because it seemed like the best combination of educational quality and proximity to some of the things I love to do outdoors. I have stayed on for my undergraduate studies because, in addition to those qualities, I have found the people here in town, including many of professors in the geology department, to be extremely kind and hospitable.

*Wenqian “Jen” Wang, Mathematics*  Currently I’m a senior math major at UAF. My undergraduate study can be divided into two parts. At first, I was a math major at China University of Petroleum Beijing (CUPB); and then, I transferred to UAF at the end of my second year due to the “2+2” joint program between CUPB and UAF. I have been studying at UAF for about two years. Hopefully, I will graduate and get my bachelor’s degree this spring; and then I will go to UW-Madison to pursue a math PhD. I really appreciate the opportunity to study at UAF. It sparks my interest in applied and computational mathematics. Besides math, I learned a lot from history, sociology, and other social science classes.

*Lindsay VanSomeren, Wildlife Biology*  I came to UAF in the Fall of 2005, from Traverse City, Michigan. I chose to attend UAF because of its strong science program, as well as its physical location which is suitable for dog racing, which I was (and plan to be in the future) an active participant in. Over the course of the years that I’ve been here I’ve become increasingly interested in hunting, as well as the issues of Alaska and its wildlife. This has driven me to excel in my studies, as wildlife biology is an intensely fascinating subject to me and there is much competition for careers in this field.

Ultimately, I would become a wildlife biologist and help develop new methods for monitoring and managing wild populations of large mammals in Alaska. As climate change progresses and the human population continues to expand across Alaska, new and increasing pressure will be put upon wildlife populations and I would like to help ensure that new generations of Alaskans will still be able to enjoy the same wildlife resources that we have today.

This spring, the mumified corpse of a small lizard was found at the bottom of a box of organic dates purchased at a local supermarket. A group of graduate students in the geology and geophysics department saw an opportunity to hone their skills on the scanning electron microscope (SEM) located at the Advanced Instrumentation Laboratory (AIL) in the Reichardt Building.

*(Left) The lizard was covered with a gold-palladium coating to increase the resolution of SEM images. It originally was light tan and reddish brown in color. Note the penny for scale.*  
*Photo by Colby Wright*

*(Right) This images is magnified 170 times and also shows some of the lizard’s scales.*  
*SEM image by Jeremy Davis and Maciej Siwinska*