Icefish fishing in Antarctica

plus

• Pebble science
• Seismic reflection in the Chukchi
• Thalattosaurus surfaces near Kake
• 20th century science meets 19th century art
Welcome to the CNSM newsletter, Fall 2011 edition. This is shaping up to be an exciting semester. We have seen a dramatic increase in enrollments in our undergraduate courses and in the number of majors, we have new facilities coming on line. Judging from the number of PhD dissertations and MS theses I have read this summer, it is looking like another strong year for our graduate programs. ASRA, the Alaska Summer Research Academy, had another fun and exciting summer. This year we added a two-week day camp for younger students. We plan to expand the number of modules for that part of our program next summer, while at the same time keeping our excellent residential camp at capacity.

In this newsletter, we highlight some of the achievements of our faculty, staff and students. This document can give you only a small glimpse of all we do, and so I encourage you to take a look at our department websites (you can start with the CNSM website at www.uaf.edu/cnsm/, and there you can find links to our other programs).

If you have been on campus over the summer, you have undoubtedly noticed the construction activity on West Ridge. The Life Sciences building is taking shape and is currently on time (and on budget). Crews are working to get the structure enclosed before winter so they can continue to work on the interior. We are aiming for teaching our first classes there in September 2013, two years from now! While the building will be fully furnished and have the basic laboratory and teaching equipment, moving our biology teaching efforts to this facility will be the perfect time to update teaching materials. This will require a substantial fundraising effort and, this year, I am making this the primary focus for our development activities. I call upon all alumni and friends of the Department of Biology and Wildlife to consider supporting our efforts in this area to provide the best research and learning experience for our majors.

As I review the draft of this newsletter, what stands out most is the growing number of individual donors and industry partners. We have seen the list continue to grow and I thank each one of you who have contributed to CNSM and its programs, including four newly established funds that will provide support to our students. In addition to better equipping the Life Sciences building, I would like to see funds to improve our instructional equipment in all departments, and to provide funding for equipment and instrument time for students in the Advanced Instrumentation Laboratory. If you are interested in contributing to CNSM or finding out more about what we do, I would like to hear from you about how you would like to help make the college stronger.

This past June, I was able to spend some time in the field on my NSF-funded research project. My now former student, Jeff Benowitz (currently a post-doc) and Sarah Roeske from the University of California at Davis and I spent time in the Nutzotin Mountains in eastern Alaska. We were sampling rocks along the Denali Fault near the Canadian border to try to understand the history of that part of the fault that did not rupture in the 2002 earthquake and compare it to our previous field areas farther to the west. I am also trying to find time to work on manuscripts and will have a few coming out this year, including one published in Russian (!) based on some work that I did a while ago on in Koryakia, far-eastern Russia.

This year UAF underwent institutional accreditation, and I believe that our college and the university came through that process well. We have strong programs at the undergraduate and graduate levels, and I want to thank our faculty and staff, and especially our department chairs, for all that they do for our university and for the college.

Spotlight on DMS Teaching: Dr. Margaret Short and STAT 402 Students

The 17 students of Scientific Sampling (Stat 402) congregated at Cornerstone Plaza early on a brisk morning in late September to estimate the Plaza's number of blades of grass for a class project. After warming up with coffee, the students split into groups, pulled out measuring tapes and templates, and extracted and counted blades in 1" by 1" patches of grass. Sixty minutes later, with roughly a dozen samples per group, the data collection was complete. The first flakes of snow began to fall as the work wrapped up. Final (typical) results: In the 30 foot wide strip of grass surrounding the concrete plaza (9500 sq-ft), there are 58.3 million blades of grass (margin of error: +/- 10.0 million, with 95% confidence). The grass density is 42.5 blades per square inch ( +/- 14.6).
Honor Roll of Donors and Industry Partnerships

We’d like to take this opportunity to 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:

BUSINESSES AND AGENCIES:
- Alzheimer’s Disease Resource Agency of Alaska, Inc.
- Alyeska Pipeline Service Company
- Arctic Division AAAS
- American Chemical Society
- The Boeing Company
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- Flint Hills Resources
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- Geraldine Wahto
- Bob and Terri Watson
- Jennie and Woody Wenstrom
- Lysa Vattimo

Newly Established or Renewed Funds
- John Murphy Memorial Geology Scholarship
- Erich Follmann Memorial Research Support
- Susan Royer Memorial Scholarship
- Alzheimer’s Resource of Alaska Research Fund
- Ted McHenry Biology Field Research Fund Renewal

How to Give
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 the 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 UAF Foundation website: www.alaska.edu/foundation/

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/. This includes a drop-down list to specify your gift be designated for the College of Natural Science and Mathematics.

For assistance contact CNSM’s Development Officer, Hild Peters at hmpeters@alaska.edu or 907-474-7941.

Paul Layer (far right), Jeff Drake (middle) accepting donation from Mike Powers, CEO of Fairbanks Memorial Hospital. CNSM photo
Antarctic fishes have inhabited the thermally stable and cold environment of the Southern Ocean for 10–12 million years. Water temperatures south of the Antarctic Polar Front, which surrounds the Antarctic Continent, isolating it from more northerly and warmer waters, range between −1.9°C and 3°C, and fluctuate minimally on a seasonal basis. Antarctic notothenioid fishes, the dominant suborder of fishes populating the Southern Ocean, possess a broad array of adaptations that make them extraordinarily well-suited for life in the cold. Less is known about the capacity of Antarctic fishes to withstand elevations in temperature, but research to date suggests that evolution in a cold, stable environment has led them to jettison genes required for life at warmer temperatures. This may not bode well for the future of Antarctic fishes, as the Western Antarctic Peninsula Region (WAP) is one of the most rapidly warming regions on earth.

In April 2011, my research group headed south to the U.S. Antarctic research station, Palmer Station, to investigate the thermal tolerance of Antarctic fishes. Members of our field team included: Irina Mueller, a PhD candidate in my laboratory here at UAF; my collaborator, Dr. Elizabeth Crockett and her MS student, Devin Devor, both from Ohio University in Athens, Ohio; Paula Dell, a high school teacher from Lindblom Math and Science Academy in Chicago, Illinois whose trip was supported by the PolarTREC program; and Dr. Jeff Grim from Northeastern University later joined our group in May. Our goal was to assess heat tolerance in two groups of Antarctic fishes – typical red-blooded Antarctic fishes, and members from a second, more unusual family of Antarctic fishes – the Antarctic icefishes.

Icefishes are a wondrous, physiological phenomenon found exclusively in the Southern Ocean. They are the only vertebrates on earth that do not have the oxygen-binding and transport protein, hemoglobin. Hemoglobin is the protein in our blood which gives blood its red coloration. It is encapsulated within red blood cells and transports oxygen from the lungs (or in the case of fish, from the gills) to tissues, where oxygen is used to oxidize the foodstuffs we eat and convert the energy stored in food into ATP, a usable form of energy. The lack of hemoglobin in icefishes diminishes the blood’s oxygen-carrying capacity to a meager 10% that of red-blooded fishes, and gives their blood, gills and liver, a startling white appearance. Icefishes have survived and thrived without hemoglobin because they inhabit the icy cold waters of the Southern Ocean. The amount of oxygen dissolved in water is inversely proportional to temperature, so that at 0°C, the blood plasma of icefish has approximately one and one-half times more oxygen dissolved in it compared to blood plasma in a fish swimming off of the coast of California. Unfortunately, the rapid warming of the WAP may jeopardize the survival of these exceptional animals, as the Southern Ocean warms and the oxygen-carrying capacity of their blood declines.

The Voyage South

Our adventure to the Antarctic began on April 11, 2011 in Punta Arenas, Chile where we boarded the 230 ft U.S. Antarctic Research Vessel the Laurence M. Gould (LMG). The journey to Palmer Station, located on Anvers Island, off of the western shore of the Antarctic Peninsula (64° 46’S, 64° 03’W), takes approximately 4½ days when weather and seas in the Drake Passage are accommodating. The trip is always exciting, regardless of the sea state. The 4+ days provides us with an opportunity to finalize research plans and to get to know the other scientists and support crew on board, many whom have become good friends over the years. The captains, crew, marine project coordinators, marine technicians, and marine science technicians are an incredibly skilled group of people who provide outstanding support. It is their extensive knowledge of fishing and fishing operations that allows us to capture the animals needed to complete our research. They are also a wonderful group of people, whose sense of humor and buoyant attitudes keep us going through the long nights of fishing.

By day four of our voyage, land is in sight. We travel through the Neumeyer Channel, where ice-covered ridges rise out of the ocean, casting shadows and dwarfing the ship as the captain maneuvers around icebergs. Rounding Anvers Island, Palmer Station comes into view, and I feel as though I’ve come home again, having spent six seasons there since 1995. Much like the LMG, the station personnel provide a wealth of expertise, supporting our research by doing everything from repairing broken equipment, to plumbing and wiring fish tanks, to preparing gourmet meals. Palmer Station is the smallest of the US Antarctic Research Stations, housing up to a maximum of ~40 people during the peak season of the Austral summer. We work at Palmer during a shoulder season (Austral fall and early winter), when the population hovers around the mid-30s. Working at Palmer is much like attending a summer camp for scientists. It’s a welcome change of pace for me, working alongside my students and colleagues at the bench and on the back deck of the LMG.

A Field Season Report
by Kristin O’Brien

The day we arrived on station, we split into two groups – the less seaworthy among us remained on station, unpacking and setting up the lab, while the avid fisherfolks departed for a four day fishing trip to sites north and east of Palmer Station. We capture animals for our research using a benthic otter trawl, deployed from the LMG, and baited pots, left to soak for up to 12 hours. This season the DUSH-11 winch, used to deploy and retrieve the otter trawl, broke down before we set the first net in the water. Once again, the crew on the LMG saved our research, working through the night, disassembling the winch to quickly identify the problem. Although the repair required a return trip to South America, the crew got the ship turned around as quickly as possible and in the end, the broken winch was only a minor setback in our research plans.

Icefishes are Sensitive to Elevations in Temperature

This year, results from our research confirmed previous work that icefishes are indeed more sensitive to elevations in temperature compared to red-blooded fishes. We assessed thermal tolerance by measuring a parameter known as the critical thermal maximum (CTMax). This is the temperature at which animals lose the ability to right themselves when the water temperature in the tank is slowly increased. For icefishes, the critical thermal maximum is 13°C, whereas for red-blooded species it is 16°C. Undoubtedly Antarctic fishes could not survive at that these temperatures for extended periods of time, but the CTMax provides a metric for assessing differences in thermal tolerance. Values for Antarctic fishes are significantly lower than temperate fish species in which the CTMax ranges between 20 and 30°C. We are also interested in determining the physiological underpinnings that result in the lower thermal tolerance of icefishes compared to red-blooded fishes. We hypothesized that the low oxygen carrying capacity of icefish blood may play a role. Much to our surprise, we discovered that icefishes are not more sensitive to elevations in temperature compared to red-blooded fishes because of their lack of hemoglobin and reduced oxygen-carrying capacity. As often occurs in research, unexpected results lead to more questions and we continue to probe the physiological basis of thermal tolerance at our laboratory here at UAF, investigating the potential contributions of ion regulation and neuronal function to thermal tolerance.

Family life

I feel incredibly lucky to have the opportunity to work in the Antarctic, and I have my mentor and PhD. advisor, Dr. Bruce Sidell to thank for introducing me to the Antarctic and encouraging and supporting my career development over the years. As a newly minted undergraduate, I attended a research seminar by Bruce while working at the Oregon Institute of Marine Biology in Coos Bay, OR. His research on lipid metabolism of Antarctic fishes was fascinating but equally enthralling were his photographs of the Antarctic and his clear passion for the place. Within a few months, I mustered the courage to contact Bruce and inquire about the possibility of studying in his laboratory. In 1994, I was fortunate enough to have him accept me as a student, and so began a 17 year friendship that ended too soon when Bruce died from cancer in 2011, two months prior to our scheduled departure for the Antarctic. Bruce was an academic father in every sense of the word. He fostered my development as a scientist not only as a graduate student, but also as I progressed as a postdoctoral research associate, and then as an assistant professor here at UAF. When I began my position here at UAF in 2004, Bruce inquired if I would like to write a proposal with him, investigating the potential role of nitric oxide in shaping the physiology of Antarctic icefishes. I may have paused as long as 10 seconds before replying with a resounding, “YES!”. We continued to collaborate until his death in 2011, and for our current project, also enlisted the expertise of another of Bruce’s former students, Dr. Elizabeth Crockett.

Bruce often remarked that one of his greatest pleasures as a professor was mentoring graduate students. Because of his guidance, several of his former students continue to work in the Antarctic. Although Bruce is no longer with us in the field, his legacy remains. One of the most memorable moments during our field season this year was our visit to Sidell Spur, located on the western shore of Brabent Island, near our fishing grounds in Dallmann Bay. The Spur was named in Bruce’s honor in 2011, in recognition of his many contributions to Antarctic science and the US Antarctic Program. The day began as a cloudy one, but as we approached the Spur, the clouds dispersed for a few brief moments and the sun shone through, illuminating the face of the Spur. I couldn’t help but think that Bruce was with us at the moment, and perhaps later in the season as well, when Lisa and I learned that our recent proposal was funded by the National Science Foundation to continue research on the physiology and biochemistry of Antarctic notothenid fishes.

I strive to mentor my students with the same kindness and generosity that Bruce showed me, helping them to achieve their goals, while getting to know and appreciate them as individuals. Like Bruce, one of the great joys in my career is bringing students to the Antarctic and introducing them to this remarkable place. I’m thrilled that Irina Mueller, a graduate student in my lab who has accompanied me during my last two field seasons, will be joining another research group following her graduation this winter, and will be spending six months conducting research at Palmer Station. I only wish I could go along too.

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Kristin O’Brien is associate professor of cellular biology in the Dept. of Biology & Wildlife, CNSM and the Institute of Arctic Biology
**Fight Over an Alaskan Mine, Public Interest Turns to Science**

By Edward W. Lempinen, AAAS reporter

DILLINGHAM, Alaska – Every summer, salmon by the millions swim from Bristol Bay up into the Nushagak and Kvichak Rivers, bound for tundra waters where they repeat the primeval cycle of spawning before death. But the discovery of other natural riches beneath the tundra — a vast lode of copper, gold and other minerals — is generating deep uneasiness about the future of the salmon and the region itself.

While Bristol Bay may be the most productive wild salmon fishery remaining in the world, a plan under development by an international consortium would put one of the world’s biggest mines in the watershed that feeds the bay. It’s called the Pebble Mine, and when the AAAS Arctic Division convened here recently, elected officials, Alaska native leaders and Pebble’s CEO joined with scientists, fishermen, educators, and students to explore a critical question of science and engineering:

Can a mine be developed in a sensitive environment and an active earthquake zone without endangering the fishery and the communities that depend on it?

“It’s unusual to see a scientific meeting become a forum for public engagement on a regional scale,” said Lawrence K. Duffy, executive director of the AAAS Arctic Division. “But it certainly was inspiring.”

The annual Arctic Division meeting — held for the first time in the Alaskan Bush — convened from 21-24 September at the Bristol Bay Campus of the University of Alaska Fairbanks. More than 75 scientists, policy makers, and other attended from Alaska, the Lower 48, Canada, and Russia’s Kamchatka Peninsula, and at a half-day Pebble Mine forum, they were joined by more than 150 local residents in the gymnasium at the Dillingham Middle/High School. The meeting was organized by Duffy and division President Todd Radenbaugh, director of the Environmental Science Lab at the Bristol Bay Campus.

The controversy over the proposed Pebble Mine has already inspired lawsuits, special elections, and an intensive public relations campaign — and Pebble has not even applied yet for a permit. What the Arctic Division meeting made clear, however, was that science will be critically important both to public opinion and policy decisions on the project.

Researchers at the meeting said the mine would pose an array of risks, from dust and fuel spills to habitat destruction and dissolved copper contaminating the Bristol Bay watershed. For John Shively, chief executive officer of Pebble Limited Partnership, the key is whether engineering and technology can neutralize those risks. He said the partnership has thus far invested $120 million and hired some 500 researchers to conduct “the largest science project ever undertaken for any mining project anywhere in the world.”

The Pebble prospect is about 200 miles southwest of Anchorage, on undeveloped state-owned land just north of Lake Illiamna, one of the biggest lakes in North America. Exploratory studies over the past decade have revealed a lode of awesome dimension: 10.75 billion tons of ore, containing an estimated 80.6 billion pounds of copper, 5.6 billion pounds of molybdenum, and 107.4 million ounces of gold, plus smaller amounts of silver, rhenium and palladium. The estimated value: $300 billion to $500 billion.

The mine would require a huge investment and a supreme feat of modern engineering. An open pit at the site would cover more than two square miles and go 1700 feet deep. Dams would be built to create underwater storage for mine wastes; one earthen dam would rise to 740 feet – higher than the Hoover Dam. Roads, pipelines, a powerful gas turbine, and a massive water treatment plant would be built to support the effort.

If the mine is fully developed, there might be 10 billion tons of waste ore stored under water and behind dams at the site. In technical sessions, researchers offered a troubling scenario: Water leaches through sulfide wastes, creating an acid solution that dissolves remaining traces of copper. The copper migrates down through the porous silt, sand, and gravel beneath the tailings. Contaminated groundwater wells up into streams and lakes.

Even low levels of dissolved copper could be “highly toxic” to fish, said biologist Sarah O’Neal, associate director of Fisheries Research & Consulting. “Two to 10 parts per billion…can impair a salmon’s ability to smell — its ability to recognize mates, to recognize prey or predators.” Such contamination also could disrupt its sense of direction, reducing its ability to navigate upstream to spawn.

The mine wastes also could be released by earthquakes, or by floods and droughts associated with climate change, researchers said. Pebble might be mined out after 100 years but the risk would endure in perpetuity.

For many fishermen and others in the Bristol Bay region, the calculus is clear: If the mine threatens a sustainable salmon industry that creates thousands of full- and part-time jobs and generates $400 million to $500 million a year, why risk it? “It scares the hell out of me,” said commercial fisherman Pete Andrew, a board member of the Bristol Bay Native Corporation.

Shively acknowledged at the forum that Pebble’s studies show transfer from groundwater at the mine site to waterways beyond the area. But Pebble will plan to prevent that, he said, and if environmental safety can’t be assured, “it’s going to be very, very difficult” to proceed.

Still, opponents are preparing for a battle that could last decades, much as conservationists have fought since the 1970s to block oil and gas drilling in the Arctic National Wildlife Refuge.

Meanwhile, research will continue. By year’s end, Shively said, Pebble will release a massive “environmental baseline document” of 53 chapters and 20,000 pages. And the U.S. Environmental Protection Agency has announced a comprehensive scientific assessment of the Bristol Bay region could take years.

Rick Halford is a bush pilot and a Republican who served more than 20 years in the Alaska Legislature, including terms as the
Senate president. He has emerged as an outspoken opponent of the Pebble Mine, and as the forum closed, he noted the importance of having so many students in the audience.

“Most of these big arguments tend to be arguments between the present and the future,” Halford said. “It’s a fallacy of democracy — it over-represents the present and under-represents the future. But science can help us to understand what the future might bring.”

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Congratulations, 2011 CNSM PhD Recipients!

Jeffrey Benowitz, PhD, Geology  
**Thesis:** The Topographically Asymmetrical Alaska Range: Different Tectonic Drivers Through Space and Time.  
**Major Professor:** Paul W. Layer

Troy Michel Hegel, PhD, Biological Sciences: Wildlife Biology  
**Thesis:** Spatio-Temporal Recruitment Dynamics of Mountain-Dwelling Caribou in the Yukon Territory, Canada.  
**Major Professor:** Falk Huettemann

Deanna M. Huff, PhD, Environmental Chemistry  
**Thesis:** The Role of Ice Surfaces in Affecting Nighttime Removal of Nitrogen Oxides in High Latitude Plumes.  
**Major Professor:** William Simpson

Anastasia G. Ilgen, PhD, Environmental Chemistry  
**Thesis:** Controls on Antimony and Arsenic Speciation Via Sorption and Redox Chemistry at the Clay Mineral – Water Interface in Natural and Laboratory Settings.  
**Major Professor:** Thomas Trainor

Cassandra Marie Kirk, PhD, Biological Sciences: Wildlife Biology and Conservation  
**Thesis:** Sentinel of Arctic ecosystem health: Polar Bear and Arctic Fox.  
**Major Advisor:** Todd O’Hara

Dong-Chang Lee, PhD, Space Physics  
**Thesis:** Neural Network Approach to Classification of Infrasound Signals.  
**Major Professor:** Curt Szuberla

Sara Kristen Moses, PhD, Biological Sciences: Wildlife Biology  
**Thesis:** Nutrient and Contaminant Dynamics in the Marine Food Web of Kotzebue Sound (Alaska).  
**Major Professor:** Todd O’Hara

Jonathan Andrew O’Donnell, PhD, Biological Sciences: Biology  
**Thesis:** The Effects of Permafrost Degradation on soil Carbon Dynamics in Alaska’s Boreal Region.  
**Major Professor:** A. David McGuire

Jennifer K. Rohrs-Richey, PhD, Biological Sciences: Biology  
**Thesis:** Biotic Pest Damage of Green Alder (Alnus fruticosa): Susceptibility to a Stem Disease (Valsa melanodiscus) and Functional Changes Following Insect Herbivory.  
**Major Professor:** Christa Mulder

Elena Suleimani, PhD, Geophysics  
**Thesis:** Numerical Studies of the Tectonic and Landslide-Generated Tsunamis caused by the 1964 Great Alaska Earthquake.  
**Major Professor:** Roger Hanssen

Audrey Rebecca Taylor, PhD, Biological Sciences: Wildlife Biology and Conservation  
**Thesis:** Postbreeding Ecology of Shorebirds on the Arctic Coastal Plain of Alaska.  
**Major Professor:** Abby Powell

Gregory Scott Van Doren, PhD, Indigenous Science Education: Interdisciplinary  
**Thesis:** Science Education in Rural America: Adaptations for the Ivory Tower.  
**Major Professor:** Lawrence Duffy

Johann Walker, PhD, Biological Sciences: Wildlife Biology  
**Thesis:** Survival of Duck Nests, Distribution of Duck Broods, and Habitat Conservation Targeting in the Prairie Pothole Region.  
**Major Professors:** Mark Lindberg, Jay Rotella

Travis L. Booms, PhD, Biological Sciences Zoology  
**Thesis:** Gyrfalcon Breeding Biology in Alaska.  
**Major Professors:** Falk Huettemann, Kevin McCracken

Amy Lynn Breen, PhD, Biological Sciences: Botany  
**Thesis:** From Forest to Tundra: Historical Biogeography, Floristic Diversity and Nucleotide Variation in Balsam Poplar.  
**Major Professor:** Matthew Olson

Elvin Brown, PhD, Biochemistry and Molecular Biology  
**Thesis:** ATP-Dependent Chromatin Remodeling Complexes in Xenopus Development.  
**Major Professors:** Kelly Drew, Jocelyn Krebs

Mariana Bulgarella, PhD, Biological Sciences: Biology  
**Thesis:** Ecogeographic, Adaptive, and Phyllogenetic Variation in the Crested Duck (Lophonetta specularioides) And Their Hemoglobins in the Andes.  
**Major Professor:** Kevin McCracken

Fred John Calef III, PhD, Geology  
**Thesis:** Investigating the Retention of Bright and Dark Ejecta From Small Rayed Craters on Mars.  
**Major Professor:** Robert Herrick

Anna Godduhn, PhD, Environmental Health: Interdisciplinary  
**Thesis:** The Northway Wild Food and Health Project: Confronting the Legacy of Toxic Waste Along the Alcan.  
**Major Professor:** Lawrence Duffy

David D. Gustine, PhD, Biological Sciences: Wildlife Biology  
**Thesis:** Protein Status of Muskoxen and Caribou in Late Winter.  
**Major Professor:** Peregrine Barboza

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What’s Happening in ESTES
by John Craven and Shana Ingebrigtsen

The ESTES (Engineering, Science and Technology Experiment Station) office has recently been restructured. First the sad news (for ESTES that is): Brandy Pedersen has accepted a position in the GI proposal office. Her last official day with ESTES was 30 September. We wish her all the best in her future endeavors. And now to the good news: first, Jessica has returned to the office after giving birth to a healthy baby boy, named Cody Walker Sigh, on 19 September. Along with becoming a mom for the third time, Jessica has also taken on the new role of Grant and Proposal Coordinator. Second, Vanessa Santana has been hired to replace Brandy, effective 17 October, and will also be a Grant and Proposal Coordinator. Jessica and Vanessa will be responsible jointly for all travel and procurement, grant management and proposal coordination. In short, the ESTES office is now fully staffed. We are excited about the new office structure as it should prove more efficient to have Jessica and Vanessa both trained to fulfill all ESTES duties. ESTES appreciates your understanding and patience during this time of transition.

We would also like to extend an enormous amount of gratitude to the GI’s Janet Daley and the GI Proposal Office and say thank you for assisting ESTES PIs with their proposals over the last few weeks. They have graciously agreed to continue to provide us this service until our ESTES coordinators are up to speed, which is anticipated to be within several weeks.

And now to the routine stuff, for which faculty and staff research that is supported through external agencies is organized through ESTES, the CNSM research office. By way of summary for the recently completed 2011 fiscal year (ended 6/30/2011), the ESTES office assisted with development of 37 new proposals, for which 33 were completed and submitted in FY11 and for which $9,802,650 was requested for research and other sponsored activities. Three of these proposals were awarded in FY11 as well as two originally submitted in FY09 and three originally submitted in FY10, for a total FY11 award amount of $1,548,703. Congratulations to Erin Pettit, Tom Trainor, Elizabeth Allman, Kriya Dunlap and Alexei Rybkin for recent awards. Twelve FY11 proposals remain under review for requested funding of $6,851,022. In addition, ESTES also provided post-award administrative support for the 77 continuing and newly awarded grants with authorized budgets totaling $10,944,281 and also provided support for travel and procurement activities by faculty and staff. Looking to the future, so far in FY12 there have been eleven new awards for proposals submitted in FY11 and FY12 (including two collaborative proposals: one with IARC and one with INE) in the amount of $785,392. These awards are to Nancy Bigelow (2), Richard Boone, Elisabeth Nadin, Rainer Newberry, Todd O’Hara (2), Alexei Rybkin, Erin Pettit (2), and Jay ver Hoef.

It is always worth reminding 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.

John Craven is CNSM’s Associate Dean and Director of ESTES; Shana Ingebrigtsen is CNSM’s Fiscal Officer.

Celebrating Teaching Excellence Spring 2011

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 courses 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 for their efforts in teaching during spring semester 2011!

BIOLOGY & WILDLIFE
- Andrea Bersamin
- Donie Bret-Harte
- Abel Bult-Ito
- Karsten Hueffer
- Stefanie Ikert-Bond
- Denise Kind
- Jonathan Runstadler
- Derek Sikes

CHEMISTRY & BIOCHEMISTRY
- Cathy Cahill
- Tom Clausen
- Tom Kuhn
- Marvin Schulte
- Bill Simpson

GEOLOGY & GEOPHYSICS
- Pat Druckenmiller
- Sarah Fowell
- Rainer Newberry
- Ken Severin
- Chris Wyatt

MATHEMATICS & STATISTICS
- Jill Faudree
- Julie McIntyre

PHYSICS
- David Newman
Mary Curry (MS Chemistry) and Emily Westbrook (BS Chemistry) work on a project that investigates the neurochemical mechanism of hibernation in arctic ground squirrels (*Urocitellus Parryii*). They are measuring the concentration of the neurotransmitter adenosine in the brains of arctic ground squirrels (hibernators) and rats (non-hibernators) with a technique called high pressure liquid chromatography (HPLC) to see if there are differences in adenosine levels between hibernating and non-hibernating species. Monitoring the concentration of adenosine in hibernating and non-hibernating species may help delineate the neurochemical mechanism of hibernation. Understanding the mechanism of hibernation has applications in human medicine in the study and treatment of strokes and heart attacks.

Emily Westbrook (left) and Mary Curry (right) work in the lab. [D'June-Gessell photo]

### 2011 CNSM Master’s Degree Recipients

- Ashley Anderson, MS, Chemistry
- Jason A. Baggett, MS, Mathematics
- Anna K. Bellesiles, MS, Geophysics: Solid Earth Geophysics
- Emily Rose Benson, MS, Biology
- Branden C. Christensen, MS, Geophysics
- Ryan J. Cooper, MS, Biology
- Austin Eliot Cross, MS, Atmospheric Sciences
- Kristin A. Degroot, MS, Wildlife Biology
- Benjamin Vitaliano Gaglioti, MS, Biology
- Ophelia A. George, MS, Geophysics: Solid Earth Geophysics
- Lori Ann Gildehaus, MS, Wildlife Biology
- Cheryl Lynne Hartbauer, MS, Geology: General Geology
- Kyndall B. Hildebrandt, MS, Biology
- Ashley Marie Jaramillo, MS, Environmental Chemistry
- Aaron Robert Kammer, MS, Biology
- Benjamin R. Kraft, MS, Wildlife Biology
- Rebecca A. Legatt, MS, Atmospheric Sciences
- Mathew F. Leonawicz, MS, Statistics
- Julie A. Malinowski, MS, Atmospheric Sciences
- Aleya Reann Nelson, MS, Wildlife Biology and Conservation
- Julieanna I. Orczewska, MS, Biochemistry and Molecular Biology
- Elisabeth Sarah Robins Padilla, MS, Wildlife Biology
- Erika Rader, MS, Geology: Volcanology
- Vanessa Jean Ritchie, MS, Environmental Chemistry
- Garrett G. Speeter, MS, Geology: General Geology
- Vanessa Kirsten Spencer, MS, Physics
- Valerie Anna Steen, MS, Wildlife Biology
- Megan L. Tillapaugh, MS, Geology: General Geology
- Jason Neuswanger, MS, Statistics
- Adam Timothy Watson, MS, Statistics

### Chemistry Student Highlights

Mary Curry (MS Chemistry) and Emily Westbrook (BS Chemistry) work on a project that investigates the neurochemical mechanism of hibernation in arctic ground squirrels (*Urocitellus Parryii*). They are measuring the concentration of the neurotransmitter adenosine in the brains of arctic ground squirrels (hibernators) and rats (non-hibernators) with a technique called high pressure liquid chromatography (HPLC) to see if there are differences in adenosine levels between hibernating and non-hibernating species. Monitoring the concentration of adenosine in hibernating and non-hibernating species may help delineate the neurochemical mechanism of hibernation. Understanding the mechanism of hibernation has applications in human medicine in the study and treatment of strokes and heart attacks.

### Fall 2011 Student Travel Grant Recipients

- Matthew Balazs
  International Society for Photogrammetry & Remote Sensing Student Consortium Summer School, Fayetteville, NC
- Amanda Barker
  Advanced Photon Source at Argonne National Laboratory, Chicago, IL
- Helena Buurman
  American Geophysical Union, San Francisco, CA
- David McAlpin
- Jordan Metzgar
  International Botanical Congress 2011, Melbourne, Australia
- Jason Neuswanger
  American Fisheries Society 141st Annual Meeting, Seattle, WA
- Susana Salazar
  Geological Society of America Annual Meeting, Minneapolis, MN
- Daniel Thompson
  Arctic Ungulate Conference, Yellowknife, Northwest Territories
- Huy Tran
  Community Modeling and Analysis System Annual Conference, North Carolina
- Trang Tran
  American Geophysical Union, San Francisco, CA
- Rachel Westbrook
  American Geophysical Union, San Francisco, CA
Botany is a very old discipline. It probably goes back to the first person who started classifying plants as 1) plants that are edible, 2) plants that are poisonous, and 3) plants to take after eating 2) and too much of 1). After a while, artists started to take a serious look at plant life. Who wouldn’t want to look at them? Plants are architecturally interesting, and there is an almost infinite variation of shape and size. Reflecting both groups, traditional botany is a unique convergence of both art and science.

The scanning electron microscope (SEM) is a bit younger, being a 20th century invention. It brought a whole new world into focus. Seemingly boring things were full of crags and surface texture. Even the boring plants became interesting.

During advanced photography, we learned alternative printing processes. Many of these processes originated in the 19th century, and they appeared to be perfect ways to produce prints that mirrored the convergent nature of botany. Using images taken with the SEM also seemed to exemplify the dual nature of botany, by combining a 20th century scientific tool with a 19th century art technique.

I chose the subject of gymnosperm leaves to see if the SEM could unearth any hidden complexity. While being a very old group of plants, gymnosperm leaves do not appear to reflect their storied past at first glance. There isn’t a huge variety of shape and size like in the flowering plants, but I thought there might be something interesting hidden away. The alternative printing process I chose was called salted paper printing, also known as the calotype. It is a method of contact printing (printing a negative by laying it directly on the paper and exposing them both to a bright light) using sodium chloride and silver nitrate. It was developed in the 1830’s by a British photographer named Talbot and was commonly used until the 1860’s. One of the great things about this method is that you can use any high quality, heavy-weight paper or cloth on which to print.

Because I needed a negative to make this printing method work, I had to figure out a way of turning the positive digital images obtained with the SEM into a negative. The solution was simple if you grew up in the time of overhead projectors. I inverted my image in Photoshop and printed it on transparency paper using a high quality printer. Then it was a matter of laying the negative over water color paper coated with my salt and silver nitrate solution and exposing it to sunlight for a certain length of time.

The resulting prints weren’t crisp and pristine like a digital print. Instead of the typical cool black, the salt solution produced dark purple and brown for the lowlights. My images ended up looking like etchings, as if the process brought the artistry back to images made with a scientific instrument.
New Books!

Nicole Mölders, Professor of Atmospheric Sciences, has a new book out: *Land-Use and Land-Cover Changes*. It was published by Springer in the Atmospheric and Oceanographic Sciences Library series. The book comprehensively reviews the current knowledge on how natural and anthropogenic land-use/cover changes affect weather, air quality and climate worldwide and explains how these changes may trigger further land-use/cover changes. It can be purchased at [www.springer.com](http://www.springer.com); ISBN 978-94-007-1526-4.

Hajo Eicken, Professor of Geophysics (CNSM/GI), and Amy Lovecraft (CLA), Associate Professor of Northern Studies/Political Science, have edited a new book that will be available from the University of Alaska Press this fall: *North by 2020 – Perspectives on Alaska’s Changing Social-Ecological Systems*. This book is a major product of the university’s contributions to the Fourth International Polar Year 2007-2009. Eicken and Lovecraft worked with a team of ten theme leaders and with close to one hundred authors contributing to a total of more than 50 chapters. The book’s main sections focus on the North by 2020 Forum themes of Sustainability, Indigenous Knowledge, Climate Change, Freshwater Resources, the Arctic Coastal Margin, Management of Marine Living Resources, Marine Infrastructure and Transportation, Coastal and Offshore Oil and Gas Development, and Expressions of Climate Change in the Arts. The volume highlights the importance of Alaska as a vanguard of adaptation and sustainability in the North. Authorship of the different chapters encompasses faculty members, students, Native elders, independent researchers and experts representing major stakeholder groups in the state. The book makes it clear that the nature of challenges of opportunities emerging over the next decade or two will require cross-disciplinary and cross-sector partnerships that grow from the bottom-up and can become communities of practice. Two examples illustrate how such partnerships might evolve: (1) coastal community relocation to strategies minimizing the impacts of climate change and (2) engagement of local and indigenous knowledge in industrial development in northern Alaska. The university can play an important role as an honest broker of information that facilitates planning for effective responses to environmental and socio-economic change. Preparations for a 12 December 2012 panel discussion and related activities focusing on how to reduce barriers and enhance the dialog between the academy and the state are underway. The book is available at the University of Alaska Press website, [www.uaf.edu/uapress/](http://www.uaf.edu/uapress/).

Department of Atmospheric Sciences

By Nicole Mölders, Department Chair

The Department of Atmospheric Sciences (DAS) is excited to have ten new graduate students: Rathawat Daengnern, Gregory Deemer, Matthew Gruber, Richard Lader, Cameron Marcus, Alexander Semenov, Derek Starkenburg, Manatchanok Tantiphiphathana, Colin Triplett, and Joshua Walson. Please welcome them when you meet them. We also welcome our new associated and affiliated faculty Anupma Prakash (UAF) and Tony Hall (NOAA). They broaden our expertise in remote sensing and local weather forecasting, respectively. They serve on graduate student advisory committees and/or collaborate with DAS faculty and students.

DAS students had a very successful spring and summer: Ketsiri Leelasakultum won an award to participate in the NCL tutorial at the National Center for Atmospheric Research; Trang T. Tran won the Geophysical Institute and American Geophysical Union travel award; Huy N.Q. Tran won a CNSM travel award; Oliver Dammann and Huy Q.N. Tran won the Atmospheric Sciences Graduate Student Travel Award (ASGSTA).

Congratulations to all of them. We would like to express our deep thanks to the donors who make the ASGSTA and other student awards possible through their donations. We hope to receive further donations from alumni, staff and faculty to support awards in the future. DAS students watch out — the deadline for applications for the ASGSTA is coming up soon.

Congratulations also to our recent graduates and their advisors: Oliver Dammann (MS, Bhatt), Jiayi Zhu (PhD, Sassen). Dammann went into wind energy and Zhu got employed at GINA here in Alaska.

DAS students were very active in publishing their research with their advisors: Peter Bienek, Kara Sterling, Huy N.Q. Tran and Trang T. Tran published papers in peer-reviewed journals. There will be an Atmospheric Science Graduate Student first author paper competition coming up soon.

Barbara Day, DAS’ administrative assistant, was selected by the Alumni Association’s Fairbanks Chapter to be the recipient of the William R. Cashen Service award for 2011. Please congratulate her when you see her. DAS is very proud of her achievements and thankful for the great service she also provides to us.

DAS faculty are engaged in a variety of projects and research. Recent activities include:

- **Richard L. Collins**, Professor of Atmospheric Sciences, secured a grant to study the stratosphere and mesosphere using lidars across the Arctic. This grant supports a student research assistantship. He and Cameron Martus are working on developing ATM101 as a distance delivery class.
DAS will co-host the Alaska Weather Symposium (AWS) again during the 2012 spring break. In 2012, there will be, for the second time, a student poster and oral presentation competition similar to those held at AMS or AGU. At this year's AWS, DAS students presented posters and/or gave oral presentations; Patrick Joyce (Environmental Chemistry) and Huy N.Q. Tran (DAS) won the competitions, respectively.

DAS is a very active, successful atmospheric science department. If you want to be part of a winning team, apply for admission in Alaska's only Atmospheric Sciences MS and PhD programs here in CNSM at UAF.

**Department of Mathematics and Statistics**

by Tony Rickard, DMS Chair

The Department of Mathematics and Statistics (DMS) welcomes Kathleen (Kitty) Mathers as Administrative Assistant for DMS. Kitty is a longtime Fairbanks resident who began working with DMS in July. In her role as Administrative Assistant, Kitty is an integral member of DMS (pun intended) and we are delighted to have her with us!

DMS also welcomes new graduate students Ulrika Cahayani, Lyman Gillispie, and Yin Song. Ulrika and Yin are currently serving as teaching assistants with DMS and Lyman is a research assistant with professors Allman and Rhodes.

All UAF students taking core mathematics and statistics courses are encouraged to make use of the Math Lab (CHAP 305) where tutoring is available. See the DMS website at www.uaf.edu/dms/ for the Math Lab schedule.

Finally, DMS marks the passing of Susan Royer, who retired from the DMS faculty in 1997 and passed away at her home in Hawaii last summer.

DMS faculty are engaged in a variety of projects and research. Recent activities include:

- Alexei Rybkin, Professor of Mathematics, recently gave invited presentations in Florida, Georgia, Kentucky, and Austria, as well as receiving supplementary support from Austria, as well as receiving supplementary support from

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**New Mathematics Scholarship in Memory of Susan Royer**

The Royer family has established the Susan Royer Memorial Scholarship to support students majoring in mathematics and students who are pursuing teaching K-12 mathematics as a career. Recipients must be mathematics majors or BAE majors or post-baccalaureate certification students who have completed the Math 205/206 series. The first award will be made for the 2012-13 academic year. Applicants apply for the award through the Financial Aid Office www.uaf.edu/finaid/applyonline/

Susan Royer loved mathematics, teaching and students. During her long career at UAF (27 years!) she taught a wide variety of mathematics courses and was heavily involved in professional development and outreach with K-12 mathematics teachers nationally and throughout Alaska. She especially enjoyed teaching mathematics for elementary teachers.

Susan earned a B.S. from Salem State and two MS degrees from Texas A&M where she was one of the first female graduates. In 1969, she and her husband Tom agreed to give Alaska a try for a couple of years and ended up staying 28 years.

Outside her classroom, Susan was active in many capacities at UAF including the Athletic Committee and the Academic Advising Center. Susan was one of the founders of the Alaska Math Consortium and remained active in it for over 10 years. She traveled frequently to hold math conferences and classes across Alaska and served on the committee establishing standards for K-12 mathematics education in Alaska. After moving to Virginia in 1997, she returned to Alaska for a year to work with the Fairbanks North Star Borough School District to help them develop their math curriculum. Her interactions with students were something that she missed most in her retirement. Her daughters continue the family math tradition with Samantha working as a content coach in math for Fairbanks North Star Borough School District and Heather as an assistant professor of economics at the University of California at Santa Barbara.

Susan enjoyed her last several years on Maui, a place where she had visited for decades. She finally was able to live in warm weather near the ocean, although she dearly missed the Fairbanks community.
NSF for an ongoing Research Experience for Undergraduates project, which supported undergraduate mathematics student Samantha MacNeith and graduate mentor Jason Baggett during Summer 2011.

• Jill Faudree, Associate Professor of Mathematics and Latrice Laughlin, Instructor of Mathematics, implemented the first Summer Math Bridge Program (a continuing DMS project) in May 2011. Jill, Latrice, and Tony Rickard presented results from the program at the 2011 Alaska Mathematics and Science Conference held in Fairbanks in September.

• Professors of Mathematics Elizabeth Allman and John Rhodes will take part in an American Institute of Mathematics SQuaRE grant (Structured quartet Research Ensemble) which will support investigations into latent class models. In addition, Allman continues to be involved in the National Institute of Mathematical and Biological Synthesis working group on species delimitation, which is an interdisciplinary research team with the goal of gaining a better understanding of the concept of species from philosophical, biological, and statistical perspectives. Allman and Rhodes will also participate in an inaugural conference sponsored by the Society of Industrial and Applied Mathematics activity group in algebraic geometry; Rhodes will give two talks and Allman is a member of the program committee and co-organizer of a mini symposium on Applications in Mathematical Biology.

• During June 2011 Sergei Avdonin, Professor of Mathematics, served as Visiting Professor at the University of Valenciennes (France) and worked on collaborative research in applied mathematics with a team of researchers, including French mathematician Serge Nicaise.

**Department of Physics**

by Saundra Jefko

**FACULTY NEWS:** The Physics Department is extremely happy to welcome Roman Makarevich as the new associate professor of space physics. Dr. Makarevich comes to us with a lot of experience in teaching and an excellent record of scholarly activities in space physics. He is off to a good start, and teaching one of our introductory physics courses, PHYS 211 this fall semester.

The Physics faculty members have approved as new Affiliated Faculty members, Tom Logan, Jean-Noel Leboeuf and David Fee. Tom Logan works with ARSC (Arctic Regional Supercomputing Center). He is an experienced computational scientist with many years of experience in teaching High Performance computing and parallelizing large scientific codes. Dr. Leboeuf is Principal Scientist with JNL Scientific in Atlanta, Georgia and Dr. Fee is a Research Professor of Infrasound at the Geophysical Institute.

**STUDENT NEWS:** The Department of Physics gives a warm welcome to our new graduate students Mark Graybill, Jacopo LaFranceschina and Jody Mann, who are working their first academic year as Teaching Assistants, and Douglas Ogata who is working as a Research Assistant for David Newman’s Research Group.

Sun-Hee Lee, a physics graduate student working with Hui Zhang, Assistant Professor of Space Physics, has been selected to receive a NASA Earth and Space Science Fellowship. The winning rate is only 20%. Sun’s proposal title is “Particle Acceleration by Magnetic Reconnection at the Earth’s Magnetopause.”

Mindy Krzykowski, a physics undergraduate student, was awarded a travel fellowship by the International Programme Committee for the 62nd International Astronautical Congress to present her work “Identifying and characterizing VxB events on the lunar surface from the Suprathermal Ion Detector Experiment (SIDE) that was part of Apollo 14 mission.” This was held in Cape Town, South Africa, early October.

Two of our continuing exceptional physics students, Levi Overbeck and Andrew Winkelman, will have the rare opportunity to become an undergraduate teaching assistant for the forthcoming semester. They will gain teaching experience and potentially boost their resumes. This opportunity only comes from their hard work and understanding of the physics academic coursework and from achieving a high GPA.

At the beginning of the school year, the Society of Physics Students (SPS) held the annual welcoming BBQ to celebrate the start of a new academic year. Any students who are interested in physics, regardless of their major, are invited to join SPS.

**STAFF NEWS:** Agatha Light, Physics Lab Supervisor, has made extraordinary strides in updating physics lab manuals and the operations of the lab classroom experiments-settings. Our last Student IAS Assessment gave high reviews of these improvements, creating a more effective learning for all students taking physics core classes, 103/104 and 211/212.

**Department of Chemistry & Biochemistry**

by William Simpson

In Fall 2011, we welcomed 20 new undergraduate majors and pre-majors as well as five new graduate students to the chemistry, environmental chemistry, and biochemistry and molecular biology graduate programs. We welcomed those new students plus our returning students at a departmental open house on 18 October, 2011, which was done in collaboration with the Fall 2011 American Chemical Society (ACS) visiting speaker’s talk. Thanks to Bill Howard, Associate Professor of Biochemistry and Alaska ACS chapter president, for organizing the talk. These students fill the gap left by the eight undergraduates and nine graduate students who completed their degrees in the last academic year.

In the summer of 2011, three more graduate students completed their degrees: MS students Spencer Giles and Jon Nigg, who worked in Brian Rasley's laboratory, and PhD student Maegan Weltzin, who worked with Marvin Schulte, Associate Professor of Biochemistry. Congratulations to these students and their mentors.

During the summer we held a departmental retreat, where we discussed the state of the department plus areas in which to focus for the current year. The outcome of that meeting was to focus on improving and streamlining the undergraduate curriculum plus improving relationships of graduate programs with the respective research institutes. In the Fall, we acted
upon the undergraduate curricular changes by submitting new curricula for the Chemistry B.S. and B.A. degrees and concentrations in Biochemistry, Environmental Chemistry, and Forensic Chemistry. We look forward to these changes helping students to graduate and find chemistry and biochemistry careers.

Last year, we carried out three tenure-track faculty searches. The first was for an organic chemist, which was filled by Fenton Heirtzler, PhD, who joined the department in Fall 2011 and is rapidly becoming integrated into the department. The second was for an analytical/environmental chemist, which was filled by Sarah Hayes. Because Sarah was just starting on her Mendenhall Postdoctoral Fellowship (a highly competitive fellowship from the US Geological Survey), she will complete that position before coming to the department in Summer 2012 as assistant professor of chemistry. The third search was for a new membrane biochemist that is a joint appointment between the department and the Institute for Arctic Biology, in association with the INBRE program. Kriya Dunlap has accepted that position as assistant professor of biochemistry and will begin in January 2012.

In comings and goings, we were sad that Tom Clausen, Professor of Chemistry, retired in summer 2011, but excited that he was awarded emeritus professor status by the University at the 2011 commencement. Another retirement is that of John Keller, Professor of Chemistry, who will retire in early 2012. We will miss John a great deal and wish him the best of luck. Hopefully he will still be involved with the department into the future.

In graduate program news:

- Kelly Drew, Professor of Chemistry, has become the coordinator of the biochemistry and molecular biology program. I look forward to working with Kelly and research

Bernie Coakley – Scientist at Sea

On September 5th 2011, the RV Langseth pulled away from the dock in Dutch Harbor, Alaska to sit at anchor for a day and a half, waiting on weather, before embarking on a cruise to explore the Arctic Ocean. We left the harbor, northbound, on the 7th, passing through the Bering Strait in a non-ice reinforced vessel, headed for the central Chukchi Shelf, where we streamed a ten-gun air gun array and a six kilometer streamer. This towed hardware was used to image the sedimentary section below the seabed. Our objectives were to map the stratigraphy and structure across the transition between the Chukchi Shelf and the Chukchi Borderland and to use these data for two purposes; 1) develop better constraints on the history of the Canada Basin and 2) bring real stratigraphic age control into the Arctic Ocean.

During the five weeks we spent at sea, we collected ~5300 km of new seismic reflection data. These data, in addition to the swath bathymetry, gravity and magnetic anomaly, sub-bottom profiler and sonobuoy refraction data, will make it possible to reconstruct the history of the region and understand how these two pieces of continental are related. Or not.

On board RV Langseth were the 34 crew and science support staff employed by Columbia University, the ship’s operator. The science party numbered 11: four UAF students (two grads, Melissa Johnson and ibrahim Ilhan, and two undergraduates, Grant Cain and Emily Decker) as well as Anne Hegewald (PhD student from Alfred Wegener Institute), Sookwan Kim (PhD student from the Korean Polar Research Institute), Rachael Gray (MS student from Ohio State), Margot Swank (undergraduate from Stanford), Karina Monsen (undergraduate from the University of Tromso), Dayton Dove (UAF Alum employed by the British Geological Survey) and myself. The science party, many of whom had never been to sea, worked exceptionally well with the ship staff to exceed all expectations for the quantity and quality of the data acquired during the cruise. Already in the raw records, which we viewed at sea we have been surprised by what has been revealed by these data. Now, at home, we have begun to improve the raw data by processing to eliminate certain known effects. Then follows the interpretation and writing. I am confident we will leave this region in a very different condition than we found it.

For further information about the cruise, visit my blog at http://scientistatwork.blogs.nytimes.com/author/bernard-coakley/
institutes to strengthen and expand that graduate program.

- **Tom Trainor**, Associate Professor of Chemistry, remains the coordinator of the environmental chemistry program, although he is on sabbatical for the 2011-12 academic year. **Tom Kuhn**, Associate Professor of Biochemistry, is also on sabbatical for Spring 2012.

- A new high-field (600MHz!) nuclear magnetic resonance (NMR) spectrometer, funded by a grant obtained by **Kelly Drew** and **Tom Green** and IAB director **Brian Barnes** recently arrived in the department, along with **Carl Murphy**, who is the NMR facility director. will be capable of analyzing liquids, tissues and solids with high resolution and sensitivity, with many new applications possible. Look for the announcement of an open house for the NMR in early 2012.

We couldn’t do this work without the excellent assistance of the departmental staff, **Emily Reiter**, who keeps us safe and coordinates the labs, **Jacy Pietsch**, who runs the laboratory areas and deals with our chemicals, and **Mist D’June Gussak**, who is our able-bodied administrative assistant, performing so many tasks. Mist’s excellent work as well as many of our department’s successes can be seen in the 2011 edition of the AlasChemist, which you can download at the department’s website. Overall, there is a lot going on around the department, and we are excited for a great year.

**Geology & Geophysics**


**Patrick Druckenmiller**, Assistant Professor of Geology and Curator of Earth Sciences, was part of a team that extracted a fossil of a prehistoric marine reptile called a thalattosaur this past summer. The fossil was found in May when a member of a geological team working on a southeast Alaska island near Kake chanced upon the find during an extremely low tide. In May, 2011, US Forest Service geologist Jim Baichtal contacted Druckenmiller with the exciting news. The skeleton was exposed in the intertidal zone of an outcrop that is only above water six days a year, during extreme Spring tides. Druckenmiller immediately made plans to visit the site during the next big minus tide in June with Baichtal. Joining them was **Kevin May**, UA Museum Operations Manager, and a field crew of employees from the USFS, including the specimen’s discoverer, Eugene Primaky.

During the field visit, the fossil was only exposed above water for four hours on each of the two days they were there. On the first day, using rock saws and hammers and chisels, they successfully excavated the main slab with the exposed part of the skeleton, weighing about 200 pounds. The skeleton continued into the outcrop and a second, equally large slab was removed the following day. Based on initial inspection, Druckenmiller believes it is likely the entire skeleton is preserved in the two slabs.

Thalattosaurs are small (usually less than 3 meters long) marine reptiles that lived only during the Triassic Period. The group was first named on the basis of fragmentary finds in California in 1905, and has subsequently been found in western Canada, the Alpine region of Europe, and China. The new Alaskan discovery represents the most complete specimen ever found in North America and is one of the most complete anywhere. Several months of work to remove the rock will be necessary before the skeleton is fully exposed and Druckenmiller can study it to determine if it is a known, or possibly new species.

**Biology & Wildlife**

by Christa Mulder

We look forward to welcoming **Laura Prugh** to our department starting in January 2012 as assistant professor of wildlife biology. Dr. Prugh is a wildlife biologist with expertise in carnivore ecology, and extensive experience in Alaska, including winter field work. Dr. Prugh will teach mammalogy in alternate years, and develop a new course in her area of expertise.

**Andrea Repetto**, biology graduate student, was the recipient of the 2011 Larus Award. This award is for the best graduate student presentation at the annual meeting of AAAS’s Arctic Science Conference in Dillingham, Alaska.

**Rich Boone**, Professor of Biology, accepted a one-year appointment at the National Science Foundation as the program director for the Integrative Graduate Education and Research Traineeship (IGERT) Program.

Congratulations to **Katie Villano Spellman**, biology graduate student, who received the 2011 Education Scholar Award from the Ecological Society of America, and on her appointment as an education review board member for ESA’s EcoEd Digital Library. This award supports the development of EcoEd Digital Library and is made possible through a grant from the National Science Foundation. EcoEdDL provides scientists and educators a forum to contribute and locate peer-reviewed ecological education resources that are scientifically sound and pedagogically useful to prepare young ecologists for 21st century science. Katie is a RAP (Resilience and Adaptation Program ) student whose PhD combines basic ecology and testing of educational theory.
Alaska Summer Research Academy Continues to Grow!

ASRA launched a new day program in June with three modules for students entering 7th & 8th grade. ASRA plans to expand the June offerings in 2012 to include students in 7th - 12th grades.

The ASRA residential program in July offered several new modules including Paleontology and Fiber & Electronics which combined electrical engineering and the science of fiber. 118 students attended the camp.

Chris Park, President of the New York Life Foundation, visited ASRA in July to see students in action. For the past three years New York Life has made it possible for rural students from all over Alaska to attend ASRA. Chris got a chance to be a participant in the class activities, interact with excited students, and experience first-hand the impact of their generous gift. ASRA students who were recipients of the New York Life support joined ASRA, the Rural Alaska Honors Institute staff and dignitaries from UAF on a Riverboat Discovery celebration cruise to share stories about their experiences. ASRA is visiting rural villages this winter thanks to a grant from New York Life.

The ASRA Saturday Thing, an MIT concept brought to ASRA in 2009, is an experience with no boundaries that occurs during the school year on the UAF campus every Saturday. ASRA’s new lab space in Bunnell has been put to good use. Recent projects have included a piano that plays light instead of sound and modifying the room clock to run backwards.

For more information on ASRA visit www.uaf.edu/asra.