



A Note From Our Department Chair ~ Tom Clausen

Spring semester has nearly come to an end and is only awaiting me to post final grades and conclude a few meetings. As usual this time of year, I sit in my office a little dazed by all the events that have been squeezed into the last two semesters. I consequently find taking the opportunity to write this section of the AlasChemist to be both relaxing and an excellent opportunity to reflect on accomplishments made by our faculty, staff and students. This year is especially relevant for me to reflect on the state of the department because in just over a month I will be handing my duties as department chair over to the most experienced member of our department: Professor John Keller. I like to think that I am giving him more opportunities than problems...

To start with this year's highlights, I

would like to mention new faculty hires and faculty promotions. Marina Castillo (Biochemistry) and Todd Gouin (Environmental Chemistry) became the newest additions to our department last fall and I have been delighted at how quickly they have integrated themselves into our day to day activities. In addition, both Bill Howard and Thomas Trainor received tenure and promotion to associate professor. Finally, Kelly Drew and Bill Simpson were promoted to full professor. I ask that if any of you have taken a course from these professors that you send them a note or email congratulating them for their accomplishments!

We are currently nearing the end of two hiring searches. One is for replacing Marlys Schneider who is clearly the most senior member of the department (I

remember Marlys as a student when I attended UAF in the early 70s). She not only kept our teaching laboratories in good running condition and our chemical inventory in good shape for over three decades, she has been instrumental in our outreach efforts

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Photo by MADIG

Tom Clausen

Marlys Schneider



Photo by MADIG

Marlys Schneider

It was the fall 1977 semester when I became the stock clerk for the Department of Chemistry and Chemical Engineering in the Bunnell Building. My keys were issued, my duties outlined, and oh, look – here come the students. Fortunately for everyone the lab enrollments were much smaller than today. Freshman labs neatly fit on three days – Tuesday, Wednesday, and Thursday. Upper division labs met on Tuesdays and Thursdays, with one exception: Organic Chemistry lab 324 met on Wednesdays and Fridays. There were no night labs.

My biggest advantage during that first semester was the fact that I was already familiar with the Department. This was where I had earned my BS in Chemistry (with ACS endorsement) in 1974 and so I knew where a lot of things were stored. Even so that semester was pretty hectic. (By the way, at that time it was just the University of Alaska: Anchorage and Juneau were community colleges.)

I clearly remember my first sight of the flammable storage room. The place was part of the underground utilidor system which I entered from Bunnell's basement mechanical room. The storeroom was damp – hardly surprising since it was under the (long gone) outdoor fountain and the fountain always leaked. Three walls were lined with rusty metal shelving holding numerous bottles. Five gallon drums sat on pallets on the floor. Mounted on the fourth wall were three large circuit breakers, including one labeled "Danger – 4,000 Volts". Years later I was delighted to move the flammables out of the utilidor and into a bunker next to Duckering. The bunker location was inconvenient but it was dry – and the walls were circuit breaker free.

I also remember the fall semester when the

Department first had a night lab section. It was for CHEM 105, and it was created on very short notice to accommodate a bumper crop of freshmen engineering students. At that time freshman were still assigned individual equipment drawers. Part of opening the night lab was acquiring enough glass and ironware to outfit a new set of drawers. The School of Engineering paid \$2000 to fill 24 drawers.

My favorite memories from those early days involve students. The main office had a large table. You had to go through this office to get to individual faculty offices so of course students seeking help waited in ambush at the table. Whenever I had time I would go to the office and see if I could help. I became quite adept at teaching techniques for balancing equations, calculating solubility constants, mole questions, and problems involving gas laws. It was fun to work one on one with the students. I think those informal help sessions are the reason I later became active in science outreach programs.

The department has undergone a lot of changes since 1977. Class enrollments have greatly increased. Instruments have arrived with great fanfare and

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(ASRA, Science Potpourri, K-12 interactions, Girl and Boy Scout visits, etc). She is also an accomplished musician and often participates in the community's fine art performances. She is one of our best citizens and she will be missed. I was delighted that the College recognized her for her outstanding service at this year's college barbeque. Please take the time to send her a note congratulating her on her well-earned retirement!

The other search that we are nearing the end of is for a visiting professor to help us deliver a high quality 100-level curriculum that not only meets or exceeds the American Chemical Society standards, but also will help more students be successful. I am rather excited about the ideas that this search has already generated in how our general chemistry courses can be improved. The obtaining of funding for this position was one of our more creative endeavors and I want to thank UAF provost Susan Henrichs for her support in allowing us to think so far out of the box.

I am always amazed at the constant enhancement of the department's instrumentation available for graduate and undergraduate education. This year Brian Rasley was able to obtain funding to replace our older flame AA spectrometer with one that also has a graphite furnace. Marlys Schneider obtained funds to replace many of our balances in our teaching laboratories. Tim Trainor was also able to obtain funding (and find space to house) a modern X-ray diffraction spectrometer that will become part of the Advanced Instrumentation Laboratory. John Keller and Todd Gouin were funded by NSF to replace our older GC-MS that is being installed even as I write this paragraph. Obtaining funds to upgrade hundreds of thousands of dollars of equipment to enhance our ability to train

students is not a trivial task and these faculty and staff are to be commended in writing competitive proposals.

This year the department received an anonymous donation from one of our alumni and I would like to thank the individual for their support. I have thought long and hard on how to apply their generous donation and I have decided that the formation of an outstanding teaching assistant award (along with a monetary remuneration) is one of the best ways to recognize and support our students. Next year a plaque will be placed across from the main office with the name of the first recipient. I thank the person who made this possible and I hope they find this use of their generosity acceptable.

One of the department's main challenges last year was developing a program review document that is required of us every 6 years. This document turned into a 3" (7.6 cm) thick notebook that examined our growth, accomplishments and challenges. It was quite an undertaking and forms a snapshot of where we are now and where we want to be for our next review. I am extremely proud of the accomplishments described in the review that includes student successes and faculty/staff honors. While it describes serious challenges that we continue to face, I am confident that John Keller's leadership as our new chair, along with the quality of our faculty and staff, will enable us to continue to provide our students with outstanding experiences and memories.

I would like to end with a special thanks to all students, faculty, staff, and UAF administrators that have made my last 9 years as department chair so rewarding!

Tom Clausen

Cathy Cahill ~ Physical and Atmospheric Chemistry

My sabbatical year is now over. Although I missed hanging out in the Chemistry Department, it has been a good and productive year.

The highlight of my year was being asked to put my air samplers into Baghdad, Iraq to examine the air the soldiers are breathing. The first samples to return were among the dustiest I have ever seen! And it looks like there is a lot of fossil fuel burning occurring as well (the samples were black, an indication of fossil fuel burning). I can't wait to see what the chemical analyses show! Afghanistan is next...

My other research projects are proceeding nicely as well. I should have a prototype aerosol sampler for use on unmanned aerial vehicles flying this summer. **Peter Rinkleff**, one of my graduate students, collected aerosols from Mt. Pavlof when it erupted last fall. The Regional Haze study is examining the particles in the air entering Denali National Park and Preserve to determine the sources of any observed visibility degradation. **Mary Grimes** successfully used EPA's Chemical Mass Balance computer model to determine the sources of fine particulate

matter in Fairbanks. **Mitali Patil** determined that DRUM aerosol samplers can be used to collect biological aerosols for species analysis. This spring I collected aerosols at the Poker Flat Research Range as a part of NASA's Arctic Research on the Composition of the Troposphere from Aircraft and Satellites (ARCTAS) program. In addition, I will collect wildfire smoke aerosols this summer if we have a good smoke event.

My graduate students, **Joy Gonzales**, **Taryn Lopez**, and **Peter Rinkleff**, are all progressing well towards their degrees. My undergraduate students, **Mary Grimes** and **Mitali Patil**, have both graduated in May.

It has been a busy and creative year, but I have missed everyone in the Chemistry Department. I look forward to regularly seeing all of the smiling Chemistry Department faces when I start teaching again in fall.



Photo by MADIG

Marina Castillo ~ Biochemistry

This past academic year I had an enthusiastic group of freshman students in CHEM 103 and CHEM 104. They were a pleasure to have in class! I was awarded the outstanding teaching award this year by the College of Natural Sciences and Mathematics which I believe belongs as well to all of my students for their comments, suggestions, questions, and patience toward making a more interesting and productive chemistry lecture. Examples that relate chemistry to everyday life, in class demonstrations, Online Web Learning, hands-on activities, and special visitors will continue to be in the menu. Among our special visitors last fall, we had a group of astronauts (courtesy of the Space Foundation) to talk about chemistry in space in CHEM 103.

My new CHEM 693 laboratory class titled "Current Techniques in Biochemistry" was a lot of fun to teach this spring semester. It was a great learning opportunity for students without previous hands-on experience in techniques and applications involving polymerase chain reactions (PCR), use of restriction enzymes, bacterial transformation, Western Blots, ELISAs, detection of genetically modified organisms (GMOs) and more. Thanks to all CHEM 693 students for their contributions toward making this class more interesting and to the DNA core lab for letting us use their Alpha Imager on

our DNA gels.

My summer chemistry class for high school students from the Rural Alaska Honors Institute (RAHI) will have the opportunity to experience mass spectrometry of persistent organic pollutants this summer. Thanks to the generous support of John Keller and Todd Gouin who were awarded an NSF grant for the purchase of this instrument.

Having a positive chemistry experience can make a difference in the way young students look at chemistry. This year I had the opportunity to host a group of 6th graders from Pearl Creek Elementary School for a demo on London forces versus hydrogen bonds, and a group of high school students from Monroe High School for a lecture and demo on reaction rates. They said chemistry was interesting and fun after discovering all the cool experiments that involve chemistry.

My neuroscience biochemistry research lab was completely set up this past fall in room 151 of the Reichardt Building and is now running. Many thanks to my MS student **Emma Flores** for her help setting up the lab. Emma is currently investigating Caspase-3 activation induced by arsenic in SH-SY5Y neuroblastoma cells and neuroprotection by blueberry antioxidants. Emma presented her results at the University of Alaska Biomedical Research Conference (UABRC) this spring. MA student



Photo by MADIG

Emily Reiter & Marina Castillo

Njideka Chuwku completed her degree this spring and plans to continue expanding her scientific career on the East Coast. High school student **Carla Cartagena** mentored by Njideka Chuwku spent many hours at the lab last semester looking at the effects of arsenic on the membrane integrity of SH-SY5Y cells. She won first place at the Alaska State Wide High School Science Symposium with her project. She also made it to the finals at the U.S. Army, Navy, and Air Force Sponsored National Junior Science and Humanities Symposium in Orlando Florida (after another preliminary competition there). Congratulations to Emma, Njideka, and Carla!

I would like to thank all of my students for their enthusiasm and contributions toward making our chemistry classes and neuroscience research more interesting and productive!

Lawrence K. Duffy ~ Neurochemistry & Biochemistry

It was an unusual academic year due to my appointment as Interim Dean of the Graduate School. **Anna Godduhn** and **Alicia Porter** continue their degree programs. **Linda Nicholas-Figueroa** returned from NIH to complete her Masters degree. Jim Lokken, a teacher from Lathrop High School and a Murdock Fellow, completed his work on reindeer by looking at mercury contamination in lichens from the Seward Peninsula. I am now working on a sled dog project with another Lathrop High School teacher, Wendy Ehnert. With the help of NSF funding and outstanding colleagues, Cathy Middlecamp (University of Wisconsin-Madison), Dave Barnes (UAF Civil and

Environmental Engineering) and Cindy Fabbri (UAF School of Education), we started a new course "Environmental Radioactivity, Stewardship and People in the North". In developing this course, we used methods to successfully integrate a service-based learning option along with in-class activities. In this way students learned about key nuclear and health processes, but also how an understanding of culture helps scientists solve relevant community-based, science-related problems. This course is part of a coordinated effort by UAF to leave a lasting impact from the International Polar Year (IPY) in the form of improved science courses.



Photo by MADIG

Larry Duffy

Graduates Honored Commencement 2008

Photo proved by C. Cahill / taken by T. Paris



Front Row: J. Keller, K. Drew, L. Hollen, M. Grimes, N. Chukwu
Back Row: T. Clausen, R. Rowland

Master's Degrees

Njideka Chukwu

M.A., Chemistry. B.S., University of Oklahoma, 2006

Lesa Hollen

M.S., Neuroscience Visualization: Interdisciplinary Program. B.S., University of Alaska Fairbanks, 2004

Sayali D. Kulkarni

M.S., Biochemistry and Molecular Biology. B.A., Tilok Medical College India, 2005

Sreepurna Malakar

M.S., Biochemistry and Molecular Biology. Golden Key Honor Society. B.S., Surendranath College (India), 1997. M.S., Calcutta University (India), 1999

Raena J. Rowland

M.A., Environmental Chemistry. B.S. University of Alaska Fairbanks, 2004

Kristen R. Williams-Jimenez

M.S., Environmental Chemistry. B.S. Ball State University Indiana, 2004

Baccalaureate Degrees

Adam W. D. Baxter **

B.S., Chemistry: Biochemistry/ Molecular Biology

Sandra D. Dasher

cum laude, B.S., Chemistry

Mary Elizabeth Grimes

B.S., Chemistry

Shandra Lynn Miller **

B.S., Chemistry: Environmental Chemistry

Amy R. Rask

magna cum laude, B.S., Chemistry: Biochemistry/ Molecular Biology. Honors Program

Samantha Jenny Smith

B.S., Chemistry: Biochemistry/ Molecular Biology

* Summer 2007 degree recipient

** December 2007 degree recipient

Celebrating Excellence

Outstanding Chemistry Student

Meghan Sanford

Elaine Jacobson Scholarship

Brittany Karns

Freshman Chemistry Award

Kyung Ha Kim & Sigourney Walker

Undergraduate Award in Analytical Chemistry

Jonathan Nigg

Alaska Chapter American Chemical Society Award

Spencer Giles

American Institute of Chemistry ~ Undergraduate

Shane Rideout & Charles Stark

American Institute of Chemistry ~ Graduate

Sally Gustafson & Michael Jaramillo



Photo by MADIG

Welcome to **Natalie Monacci**, our new Stockroom Clerk who joined us this spring as a replacement for Marlys Schneider. Natalie has a B.S. in Marine Chemistry from the University of South Carolina and her M.S. in Chemical Oceanography from UAF. She has worked at the Alaska Stable Isotope Facility here in Fairbanks and at the Organic Geochemistry Laboratory at the Department of Geological Sciences, USC, Columbia, South Carolina. We are pleased to have her join our awesome staff team.

John Keller ~ Organic and Biochemistry

National Science Foundation grant funded: This year the Department of Chemistry and Biochemistry was funded by NSF's Division of Undergraduate Education for purchase of a state-of-the-art gas chromatograph-mass spectrometer (GC-MS). The proposal, entitled "Persistent Organic Pollutants (POPs) in Alaska. New GC-MS Experiments and Experiences for College and Pre-College Students" were written by JK (PI) and Todd Gouin (co-PI), and included contributions from Emily Reiter, Tom Clausen, Marina Castillo, and Cathy Cahill. The instrument is to be used for teaching and research, with an emphasis as the title indicates on analysis of environmental pollutants. The instrument includes a robotic sample injection system (CTC CombiPAL) which makes possible a variety of automated liquid, headspace, and solid-phase microextraction (SPME) techniques. Cindy Fabbri (UAF School of Education)

is also a part of the project. She is designing assessment tools such as a website for gathering student surveys. For more information, visit the project website at <http://www.uaf.edu/chem/CCLI-2007/>.

Mercury Conference on Undergraduate Computational Chemistry: Undergraduate chemistry major **Bronwyn Harrod** and I attended the 2007 Mercury Conference at Hamilton College in New York State. Bronwyn presented a talk and poster on her research on gas phase SO₂-formic acid complexes. This is an outstanding meeting for both students and professors, as it includes several days of in-depth presentations by nationally known computational chemists.

Alaska High School Science Symposium: This year two AHSSS students worked in my lab. **Cary Fristoe** continued work on the stereochemistry of a Diels-Alder reaction. His project, which earned an AHSSS award, involved

synthesis and NMR spectral characterization of a new cis-diol acetone derivative of his major Diels-Alder product. **Sifat Chowdhury** continued Bronwyn Harrod's project. He carried out more spectroscopic and computational studies on SO₂-formic acid complexes.



Photo by MADIG

John Keller

William Howard ~ Inorganic Chemistry

Zachary Pickett and I have written our first research article together, which has been accepted for publication in the *Journal of Chemical Crystallography*. Zach has completed his third year as a MS student in my research group, and will defend his thesis in the summer of 2008. Zach will then work as an environmental chemist for Sivuniq, the environmental division of the NANA Corporation.

I enjoyed the opportunity to deliver a seminar entitled "Modeling the Decomposition of Vanadium-Based Insulin-Enhancing Drugs in Blood by Studying the Reaction between Bis(maltolato)oxovanadium(IV) and Triethylenetetraminehexaacetate Ion" at the 235th National Meeting of the American Chemical Society in New Orleans in April, 2008. Zach Pickett is scheduled to deliver a seminar at the 63rd Northwest Regional Meeting of the American Chemical Society in Park City, Utah in June, 2008; Zach's seminar is entitled "The Thermodynamics of Reacting VO₃⁻ (aq) with 4-X-2,6-Pyridinedimethanol (X = H, Cl, N(CH₃)₂) and with 2,6-Dipicolinic Acid."

Ashley K. Anderson, a first year

Masters student in my laboratory, is continuing her research work. Ashley has prepared and characterized some interesting diphenylphosphine complexes of rhodium(III). Ashley and I look forward to submitting our first article describing her research in the summer of 2008 to a peer-reviewed journal.

Since the beginning of 2008, I have served as the Chair of the Alaska Local Section of the American Chemical Society. In this capacity, I have selected some professional speakers to give seminars at UAF, UAA, and UAS in 2008 and in 2009. One of the speakers, Professor Malcolm Chisholm of the Department of Chemistry at the Ohio State University, delivered a seminar in February, 2008 at all three universities entitled "Linking MM Quadruple Bonds (M = Mo or W) with Organic π-Systems: Studies of Mixed Valency and M₂ δ-π Conjugation." We look forward to September, 2008, when Professor R. Bruce King of the Department of Chemistry at the University of Georgia will deliver a seminar entitled "The Chemical Reactivity of Phosphorus-Bridging Carbonyl Compounds: A Novel Approach to Homogeneous Catalysis" at UAF, UAA, and UAS.

Awards ~ Faculty & Staff

Promotion to full Professor

Kelly Drew

William Simpson

Tenure and Promotion to Associate Professor

William Howard

Thomas Trainor

Outstanding UAF Alumnus Fall 2007

Kelly Drew

2007-08 Outstanding Teaching Award

Marina Castillo

The 2007 - 2008 Dennis Demmert Award

CNSM Dean Joan Braddock

Special Recognition

Marlys Schneider ~ 33 years of dedicated service

Employee Service Recognition for Faculty & Staff

Mist D'June-Gussak ~ 5 Years

Todd Gouin ~ Environmental Chemistry

It has been an eventful first year, with me teaching analytical chemistry (CHEM 413) and environmental fate and transport (CHEM 631). Both courses were very enjoyable to teach. In CHEM 413, students worked through the method development of four projects, which included assessing arsenic levels in drinking water, iodine content in table salt, concentrations of polybrominated diphenyl ethers in indoor air, and the leaching of bisphenol A from baby bottles, whereas the CHEM 631 students were introduced to environmental fate modeling.

In research I have been busy setting up my lab, and I was able to submit an NSF proposal to investigate the transport mechanisms of organic pollutants to the Alaskan environment. If funded, the project will provide an exciting opportunity to contribute three fundamentally new directions to understanding the transport and deposition mechanisms of persistent toxic substances (PTS) to Alaska. (1) An

Asian-Alaskan-Northern Canada sampling transect will allow a detailed assessment of the spatial and temporal distribution of PTS in the atmosphere of Alaska and will provide an understanding of how Alaska fits into a broader hemispheric context. (2) The proposal represents the first study aimed at quantifying the deposition of PTS into the environment of the Alaskan sub-Arctic boreal forest. (3) It will develop, also for the first time, a climatological approach for interpreting levels of PTS. The project also incorporates a strong educational and outreach component for Native and rural Alaskan communities.

As mentioned elsewhere, the department has been very fortunate to receive NSF funding to purchase a new GC-MS, which arrived late in the academic year. Students enrolled in the CHEM 195 RAHI program will be the first to run samples through the instrument, in an experiment that will examine levels of brominated flame retardants in indoor air across the UAF campus. This experiment

will be overseen by Marina Castillo, John Keller, and myself. Later this summer I will be teaching CHEM 106. I am looking forward to the 2008/09 academic year, when I will be teaching CHEM 412 and CHEM 413, as well as developing a new course in environmental modeling.

Of course the biggest news of the past year besides moving to Fairbanks with my wife Svetlana was the birth of our daughter, Alisa.



Photo by MADIG

Moose ~ Chena Hot Springs

Thomas Green ~ Organic Chemistry

In my last contribution, I talked about a sabbatical to France. I am happy to report that my sabbatical was approved, so I'll be off to Europe spring semester 2009. I'll be collaborating with Eric Monflier of the Universite' D'Artois on using cyclodextrins as phase transfer catalysts. The idea is to develop "greener" processes for the synthesis of organic chemicals, that is, aqueous processes without organic solvents and where the catalytic system can be recycled. **Michael Jaramillo**, an MS student, is currently in charge of synthesizing a new series of cyclodextrins for this purpose. Suddenly, Green Chemistry now has a whole new meaning.

My other research interests include bioanalytical chemistry, with an emphasis on amino acid and peptide separation and detection. **Daniel Kirschner**, a PhD candidate, has developed a highly sensitive capillary electrophoresis technique for enantioseparation of amino acids. He uses this technique to study responses of the mammalian brain to ischemia, part of an ongoing collaboration with Professor Kelly Drew at UAF in her hibernation studies. Our analytical technique was recently reviewed in the journal *Electrophoresis* as one of the most sensitive for the separation and detection of enantiomers.

Jim Warner, also a PhD student, is looking at proteins and peptides in arctic ground squirrels. This work is in collaboration with Professor Brian Barnes at the Institute of Arctic Biology. Jim's techniques involve a combination of cIEF (capillary isoelectric focusing) and MALDI-TOF-MS (matrix assisted laser

desorption ionization time-of-flight mass spectrometry). (Don't you just love all these nice abbreviations that chemists come up with? What would we do without them!) Anyway, Jim is looking at protein markers in the serum of the arctic ground squirrel. These ground squirrels are serious hibernators, and people really want to know what makes them tick (so slowly).

And, of course, let's not forget about lichens and usnic acid. Alaska caribou and Norwegian reindeer absolutely love to munch on lichens, especially in the winter, and particularly the variety that contains lots of usnic acid, a secondary metabolite produced by the lichen. As it turns out, usnic acid is toxic for many mammals, but the reindeer show tolerance. Why so? Professors Perry Barboza at UAF and Monica Sundset of the University of Tromsø, Norway want to know. Our lab has developed a rapid capillary electrophoresis method to analyze for usnic acid in lichens, and we're currently applying it to rumen contents, urine, and fecal matter of the reindeer. It all comes down to this; where does all the usnic acid go?

For that matter, where did all the time go? I've been here at UAF for seven years now, but it hardly seems like yesterday when I was packing up my family and goods for the move north from Kentucky. I have seen a lot of "orgo" students pass through the Reichardt Building halls in that brief period. I hope you will stop by my office to say "hello" if you ever make it to campus. We could even go over a few mechanisms that you may have forgotten!

William Simpson ~ Physical and Atmospheric Chemistry; Laser Spectroscopy

During this year, we laid out a multi-year plan for improvements in the physical/analytical chemistry offerings at the undergraduate level, and improved teaching at the graduate level. At the undergraduate level, we are planning to add laboratory aspects to the physical chemistry core sequence and create a capstone senior-year physical/analytical laboratory course sequence. These improvements should help our students to do better research and communicate their findings with employers or other researchers. I taught the first semester of the physical chemistry sequence, and also the graduate-level molecular spectroscopy course. I'm very excited about the research presentation techniques class that Tom Trainor and I have been co-teaching. This course provides graduate students with training in presenting and defending their research plans, and is becoming a mature course (in its second offering). The outcome of the course is that students are much more prepared for their thesis defenses and in the long run will be much more ready to communicate at a high level with professional colleagues.

This has been a busy year in our group with major atmospheric measurement campaigns and the completion of two students' Ph.D. degree research. **Randy Apodaca**, a Ph.D. candidate in environmental chemistry, and I went to Juelich, Germany where we compared our instrument to measure nocturnal nitrogen oxides (NO_3 and N_2O_5) with all the other instruments capable of measuring these species in the world (about a dozen groups). We were very successful and demonstrated that our instrument performed as one of the best,

while having the lowest cost, smallest size, and lowest power consumption. **Randy Apodaca** and **Deanna Huff** made two measurement campaigns in the Fairbanks area that showed ice is an important surface for hydrolysis of N_2O_5 . This finding indicates that high latitude plumes in winter (which are often saturated with respect to ice) scrub themselves of nitrogen oxides. The product of the removal of nitrogen oxides is deposition of nitric acid to the local environment, which causes both acidification and fertilization. Randy, Dea, and I submitted a paper on these findings this spring. Randy plans to complete this Ph.D. thesis this summer and will become a postdoctoral associate with Professor Ron Cohen of the University of California, Berkeley. Dea Huff completed her advancement to Ph.D. candidacy (in environmental chemistry) and will continue this project testing the ice particle hypothesis that their work discovered.

In our project studying halogen chemistry, we have continued analysis of the snow, ice, and aerosol condensed phases as sources of gas-phase halogen species. **Laura Alvarez-Aviles**, a Ph.D. candidate in environmental chemistry, completed analysis of a major data set of nearly 1500 snow samples, most measured in duplicate. She has analyzed this extensive data set and has submitted one article on the subject of the role of frost flowers in aerosol production and halogen activation and is working on two other manuscripts. She plans to complete this work and her Ph.D. this summer and will take a postdoctoral position with Dr. Matthew Landis, of the Environmental Protection Agency in North Carolina.

We continued development of automated instrumentation that will be deployed on ice-tethered buoys. These buoys float with the sea ice and report data back to us from the polar ice cap via a satellite modem. Our instrument on the buoy measures halogen oxides, and **Dan Carlson** and **Deanna Donohue** are working on the development and integration of the instrument. Dan completed his advancement to Ph.D. candidacy in environmental chemistry, and Deanna (our second Deanna in the group!) is a new postdoctoral researcher who comes to us from Dr. Tony Hynes from Miami. We are very excited to have Deanna here, and she is really doing a great job with our group. She brings expertise in mercury and halogen chemistry from her Ph.D. work, which nicely complements the work in our group.

As a part of the International Polar Year (IPY), three major field campaigns were held in Fairbanks during springtime. The ARCTAS (NASA), ARCPAC (NOAA), and ISDAC (DOE) campaigns brought nearly 300 scientists to Fairbanks for most of April. Our group was actively involved with these campaigns and we really enjoyed the collaboration and excitement of these major field campaigns. I also co-organized a special session on halogen chemistry at the fall meeting of the American Geophysical Union meeting in San Francisco and completed three major review articles on polar atmospheric chemistry. I was promoted to the rank of full professor. I am excited about this change and feel ready to increase leadership in forwarding environmental chemistry at UAF.



Photo by MADIG

Mt. McKinley
Denali National Park Alaska

Kelly Drew ~ Neuropharmacology

Many people have friends or family members who have suffered a stroke, cardiac arrest or traumatic brain injury and have witnessed the long-term disability associated with these events. Our lab studies Arctic ground squirrels as a model of tolerance to brain injury caused by stroke, cardiac arrest or traumatic brain injury. During my sabbatical at the University of Miami last year we subjected Arctic ground squirrels to 10 minutes of cardiac arrest. Remarkably these animals recovered and showed no signs of brain damage. Nine out of 10 humans who suffer cardiac arrest are unable to resume their former life styles because of brain injury caused by cerebral ischemia (the lack of blood flow to the brain) during cardiac arrest. One goal of our work is to discover mechanisms of ischemia tolerance in Arctic ground squirrels and from this knowledge develop prophylactic therapies for patients at risk for cardiac arrest or stroke. **June Sun** (post-doc), **Velva Combs** (undergrad) and I have been setting up the cardiac arrest model that I learned while on sabbatical at the University of Miami. We will use this model to investigate a role for protein kinase C in regulating ion channel arrest in Arctic ground squirrels. Our studies will test the hypothesis that PKC shuts down processes that consume energy and in this way, protects the brain when energy supplies are limited, such as when blood flow to the brain is disrupted. Congratulations to Velva who reported preliminary results from this work and was awarded 2nd place in 2007-2008 Undergraduate Research Competition at UAF.

The ability to decrease energy consumption in response to cardiac arrest may be related to the capacity to decrease energy demand during hibernation. Suppression of energy demand is a hallmark of prolonged torpor a defining feature of hibernation. Adaptations associated with hibernation may contribute to the Arctic ground squirrel's tolerance for cardiac arrest. Discovery of natural processes that drive hibernating animals into the suspended-animation-like state known as torpor is the Holy Grail of hibernation research. **Tulasi Ram Jinka** (Ph.D. grad student) has evidence that adenosine, the neurochemical inhibited by your morning cup of coffee, is the endogenous ligand that makes Arctic ground squirrels hibernate. Tulasi can now give a drug and induce torpor in Arctic ground squirrels.

His next challenge will be to mimic this process in a

nonhibernating species. These results fuel our optimism that in the future, emergency medical technicians will administer a drug to trauma, stroke or cardiac arrest patients to induce a state of suspended animation that will eliminate the need for blood flow or other vital processes until these processes can be restored. Neuronascent Inc., a Maryland-based drug discovery company, has patented and licensed neural stem cells derived from our Arctic ground squirrels. These cells can be induced to proliferate and differentiate into neurons.

Neuronascent Inc. is using these neurons to screen compound libraries in search of novel compounds that will mimic ischemia tolerance in Arctic ground squirrels.

Technicians **Ann Wilson** and **Jeanette Moore** will be culturing these Arctic ground squirrel neurons in our lab this fall. These cells will complement Ann and Jeanette's current studies of brain slices aimed at discovery of mechanisms of ischemia tolerance in Arctic ground squirrels. **Dan Kirschner** (Ph.D. grad student in Tom Green's lab) has been using these brain slices to investigate D-serine's role in stroke-induced brain injury. Dan and Tom published a paper last year describing a novel capillary electrophoresis technique for D-serine analysis. This technique was recently cited as the most sensitive technique for separation and detection of chiral compounds. To complement this work, **Grant Wright** (undergrad in Brian Rasley's lab) has been measuring adenosine in the samples Dan collected for D-serine analysis. While D-serine is toxic, adenosine is protective to the brain. Understanding the balance between these two neurochemicals may shed light on mechanisms of ischemia tolerance in Arctic ground squirrels.

We welcome two new undergrad students into the lab, **Zac Carlson** and **Joel Vonnahme**. Finally we congratulate **Lesa Hollen** on completion of her Interdisciplinary MS degree in neuroscience visualization. Lesa's projects included an annotated, multimedia recording that visualized arousal from hibernation in an Arctic ground squirrel and a detailed animation of the function of D-serine and L-glutamate in a glutamatergic synapse. We wish Lesa well with her future in scientific visualization and acknowledge the contributions that her projects have made to our ability to communicate and visualize our research on hibernation.

Environmental Chemistry ~ William Simpson

This has been an exciting year for the Environmental Chemistry program, which includes seven chemistry faculty members, Cathy Cahill, Tom Clausen, Larry Duffy, Todd Gouin, Tom Green, Bill Simpson, and Tom Trainor, plus affiliated faculty. We have revamped our web page, greatly improving the content. Check it out at <http://www.uaf.edu/chem/echem>. We also invited four others, Mary Beth Leigh and Todd O'Hara from Biology & Wildlife and Clara Deal from IARC, as well as Dr. Tom Douglas from CRREL, to be affiliate faculty members in the EC program. We continue to have a very active seminar series with excellent presentations. We worked on recruiting materials, and Professor Todd Gouin made an excellent recruiting poster that was sent to nearly 100 environmental chemistry and related departments. This poster resulted in a small but high quality applicant pool. We look forward to enhanced recruiting efforts to build this program.

We developed proposals to create an "Alaska Environmental Chemistry Symposium." The goal of the symposium is to build a statewide consortium of people working within the broadly defined field of Environmental Chemistry. This consortium will improve the coordination between UA campuses, Federal/State laboratories and agencies, and local industries along with increased competitiveness for collaborative grants. The meeting will expose our graduate students to a more diverse community of researchers and widen the scope of the Environmental Chemistry program within the UA system. We are modeling the symposium after the "University of Alaska Biomedical Research Conference", which has been very successful at coordinating statewide efforts in Biochemistry and Biomedical research. We will continue to develop these ideas and build Environmental Chemistry strength in the state.

Thomas Trainor ~ Environmental Chemistry and Geochemistry; Surface Chemistry

We have had an exciting and busy year in the lab. Two members of the group have completed their M.S. degrees in the spring of 2008; **Kristen Williams** finished her thesis on “The impact of ferrous iron on mercury adsorption to iron-oxides”, and **Raena Rowland** defended and completed her thesis on the “Characterization of magnetite surface oxidation by electrochemical impedance spectroscopy.” We have also had several new additions. **Chris Iceman** joined the group as a postdoctoral research associate last summer. His work is mainly directed at theoretical/computational studies of mineral fluid interfaces, primarily using the local computational resources available through the Arctic Region Supercomputing Center. **Ashley Jones** also joined the group last fall as a new M.S. student. Ashley is working in conjunction with Dr. Tom Douglas of the U.S. Army Cold Regions Research and Engineering Laboratory in Fairbanks, a UAF Environmental Chemistry Affiliated Faculty member, on a study investigating the adsorption of nitro-aromatic compounds on soil clay minerals.

Continuing in the lab are Ph.D. students

Kunaljeet Tanwar and **Anastasia Ilgen**, M.S. student **Vanessa Ritchie** and post-doctoral research associate **Sarah Petitto**. Kunal and Vanessa are nearing the completion of their thesis; Kunal should be defending early this fall and Vanessa will be completing a few remaining experiments this summer to finish in the fall. Anastasia has made excellent progress on her thesis work and will likely be submitting her first manuscript this summer. Also working in the lab this year is undergraduate student **Chris Eversman**, working jointly with Bill Simpson’s group, and **Logan Daum** a former West Valley High School student, now MIT undergraduate. Chris is working on a project looking at freezing pathways of brines. Logan will be returning to our lab as an ARSC intern to develop software for surface crystallography analysis and thermodynamic simulations.

Our group was well represented at the 2007 spring American Chemical Society meeting in New Orleans, with eight first author or coauthored presentations.

Kunal Tanwar and **Anastasia Ilgen** both gave oral presentations, **Sarah Petitto**,

Anastasia Ilgen and **Ashley Jones** also presented posters. The meeting held a number of great sessions and provided a good opportunity for us to connect with colleagues from outside the state.

We are looking forward to a busy and exciting summer. One of our major projects will be the installation and commissioning of a new X-ray diffractometer (XRD). The XRD was recently purchased from PanAnalytical Inc. using funds from a National Science Foundation Major Research Instrumentation grant funded through the Division of Earth Sciences. This grant was jointly written with Mike Whalen (Geology and Geophysics) and Jing Zhang (Mechanical Engineering), to establish a centralized diffraction facility at UAF for materials characterization. The new instrument is capable of high resolution powder diffraction, single crystal diffraction and surface diffraction techniques, and should find widespread use by researchers across campus. I will direct the facility which is being operated under the framework of the UAF Advanced Instrumentation Laboratory.

Tom Kuhn ~ Cellular/Molecular Neuroscience

So I am sitting here, trying to review this past year when I realized that I have barely acquainted myself with the fact that this year is actually over. I was pleased with how the research progressed. Everyone worked hard, thank you all. Our research focuses on the molecular mechanism of neuroinflammation, its implication in CNS pathologies, and the protective/beneficial aspects of Alaskan Wild Blueberries. I am fortunate to work with many others on this project including Tom Clausen, Larry Duffy, and Jim Joseph (Tufts University, Boston, MA). **Sayali Kulkarni** graduated this last fall (M.S.) and was offered a job (pre-graduation) in a Biotech company in Berkeley, CA. She very much enjoys her new working environment. **Brian Barth** is graduating this summer (Ph.D.) and was offered a postdoctoral position at the Penn State Medical School in Hershey, PA. **Sally Gustafson** (M.S.) is making excellent progress on her project. She has already a first-author manuscript published and two more are in the works. I am very fortunate to have **Shane Rideout** (undergraduate student) and **Kriya Dunlap** (post-doctoral research associate) in the lab. Overall, the research is ‘berry’ exciting! Last fall I taught CHEM 450 General Biochemistry of Macromolecules and a graduate course CHEM 470/670 Cellular and Molecular Neuroscience. Towards the end of the semester, students in the neuroscience class presented talks on the implication of environmental toxins on microglia activation related to Parkinson’s disease. We all enjoyed these very interesting topics.



Photo provided by T. Kuhn

What? ... Just Kidding! Tom Kuhn impersonating yet another Tom in town.

Other News...

Larry Duffy, CNSM and Graduate School, and **Gary Laursen**, CNSM each received a \$15,000 grant from the M.J. Murdock Charitable Trust Partners in Science program. Duffy will partner with Wendy Ehbert of Lathrop High School and Laursen with Wayne A. Woodgate at Marshall School in Marshall, Alaska. The program provides high school science teachers opportunities to work at the cutting edge of science. **Larry**, who was recently appointed Interim Dean of the Graduate School, was also elected president of the American Society for Circumpolar Health.

John Keller and **Todd Gouin**, CNSM, received a \$150,000 grant from the NSF Division of Undergraduate Education for purchase of a new gas chromatograph-mass spectrometer. Chemistry students will be able to use the instrument to analyze samples beginning this summer.

Tom Clausen - Organic and Natural Products

This has been a reasonably good year in getting results out to the scientific community and it promises to become even better. I am very proud of a recent publication in the *Journal of Chemical Education* coauthored with Professor Tom Green and a student, **Benjamin Steiner** which describes some strategies and experiments we developed for the organic chemistry laboratory. I found it interesting that a major concern expressed by a reviewer of the manuscript was disbelief at how advanced our experiments were for the undergraduate laboratory, which was a criticism that I found complimentary. Our work on Alaska blueberries is also showing a great deal of promise as partly described in a joint publication with Dr. Kuhn's research group in a nutrition journal. Since this publication, my Ph.D. student **Colin McGill** has isolated about six relatively purified fractions that show the ability to protect cells from oxidative stress by two independent assays. Colin will focus his energies over the summer on identifying the structures of these substances and he hopes to have the laboratory portion of his project

completed by December. From my perspective, however, Colin has discovered a playground of chemicals that will keep me occupied for the remainder of my professional career!

I have also found some time this year to pursue one of my more pressing goals- to publish results from projects that have long since been completed. One project was associated with one of my first graduate students (**Ed Treadwell** who is now a tenured professor at Eastern Illinois University), and investigated the chemical basis for the alleged toxicity of Wild Iris (*Hedysarum mackenzii*) that was first reported by an early explorer to Interior Alaska, Sir John Richardson. Ed was agreeable to write an initial draft and we hope to submit it over the summer while he visits UAF as a visiting professor. Another project was completed by **Brian Englund** (currently pursuing his Ph.D. at Michigan State University) and details the structures of some "missing links" in the biosynthesis of an important class of diterpenes. A third project involves work with an Alaska High School Science Symposium

Student, **Janice Chen**, who discovered some interesting chemical dynamics in the defense of "winter dormant" Alaska cottonwood twigs and a draft of her results is being reviewed by my good friend John Bryant. I have also identified a new triterpene from a species of birch not native to Alaska and I look forward to submitting a manuscript with two former student coauthors (**Shandra Miller** and **Patrick Tomco**).

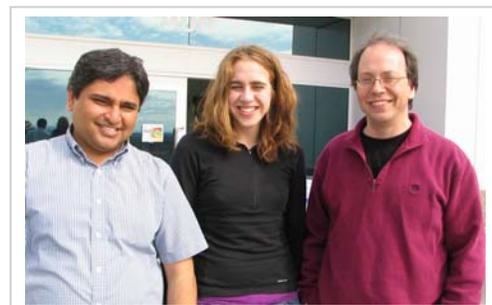
While this has personally been a good year, I am very much looking forward to the new leadership challenges that I will face in the coming years as I pass the old challenges of being department chair to John Keller. I am particularly excited about being able to devote more of my time to interact directly with students. One challenge that the department is facing is to find means to make our students more successful in general chemistry without compromising our standards. Another identified need is to foster greater participation of under-represented minorities in the molecular sciences. These are worthy goals and I am personally committed to making real contributions to them.

Brian Rasley ~ Analytical & Inorganic

The past year has been very busy with teaching and undergraduate research projects. I taught two distance delivery classes for the College of Rural and Community Development and two classes for the Department of Chemistry and Biochemistry. The overall experience was challenging but very rewarding. During the fall semester, I was successful in obtaining funding for a new atomic absorption spectrometer that will significantly improve our teaching and research capabilities in the department. During the spring semester, I worked at the Naval Research Laboratory (NRL) on an applied synthetic chemistry project focused on developing self-decontaminating surface coatings. While at NRL, I attended the national ACS convention in New Orleans and a local conference in Washington, D.C. related to my work at NRL.

This summer I am continuing to work with Dr. Kelly Drew and undergraduates **Grant Wright**, **Joseph (Buddy) Wentzel**, **Spencer Giles**, **Jon Nigg** and **Bronwyn Harrod** on various projects. Last summer and this summer I agreed to host the Advanced Technology Environmental and Energy Center (ATEEC) fellowship program. The ATEEC program sponsors field trips for high school and junior college teachers to help them develop teaching materials on various environmental issues. Last year's workshop was featured on Google Earth and the teaching materials resulting from the workshop can be downloaded at <http://www.ateec.org> (the materials are free but site registration is required). Overall, the past year has been busy but very productive.

Anshul Pandya, Maegan Weltzin & Marvin Schulte



Marvin Schulte ~ Biochemistry & Neuropharmacology

This has been an active and exciting year for me at UAF. Changes in the laboratory and the opportunity to teach another group of undergraduate and graduate students has kept me busy. Over the past year I again taught the Protein Structure and Function graduate course (CHEM 654) as well as Biochemistry Metabolism (CHEM 451). The CHEM 451 class was particularly enjoyable this year and I would like to thank all of the students in this year's class who contributed to its success.

One of my graduate students, **Chelsea Paskvan**, left the laboratory this year to pursue a medical degree. Chelsea was a valuable member of the laboratory both for her enthusiasm and her ability to work through obstacles. Her first year of medical school went very well and we look forward to her return to Alaska. Chelsea is currently participating in a summer research program where she is evaluating breast cancer cell lines for their value in cancer therapeutics.

Sayali Kulkarni, who worked in Tom Kuhn's laboratory, graduated this year. Sayali helped build a collaborative project between my laboratory and Dr. Kuhn's using surface plasmon resonance techniques to study actin dynamics.

Sayali was, for the first time, able to determine nucleation kinetics for actin in real time and showed that oxidation of actin monomers alters the ability of actin to correctly nucleate. Tom Kuhn and I hope to further develop this project by studying the effects of oxidation on interaction of actin with other actin binding proteins.

A second graduate student, **Abe Harms-Smyth**, is currently working on his graduate thesis and will be finish within the next few months. Abe helped develop much of the preliminary data that went into a recent NIH R01 proposal that will be funded in July 2008. Abe's project focused on engineering soluble proteins from membrane bound neuronal receptors. These proteins will be used to develop high-throughput screening platforms. This NIH grant enables us to continue this project at a level comparable to what we received from the Alaska INBRE program. Ph.D. candidate **Yeganeh Ataian** was recruited to continue this project and is working with Abe through the transition effort. I am very happy she joined the laboratory. I hope to recruit an additional student over the next 6-8 months to help Yeganeh as this project develops.

A second research project in my laboratory is also rapidly picking up speed. We are developing nicotinic receptor modulators for use in conditions such as Alzheimer's disease and Autism Spectrum Disorder. This project has now produced new, synthetic active analogs of our original lead molecule *d*-formyl flustrabromide. This compound is uniquely specific to a subtype of nicotinic receptor found to be decreased in Autistics. Two of my students, **Anshul Pandya** and **Meagan Weltzin**, are actively trying to develop improved compounds based on the lead molecule and determine its site and mechanism of action on this particular nicotinic subtype. This information will be used to develop modulatory agents for other subtypes and will increase our knowledge of the nature of the specificity of this new class of drugs on nicotinic receptors. An extension of this project is a new collaboration with Abel Bult-Ito of the UAF Department of Biology and Wildlife that will investigate the role of nicotinic receptors in obsessive-compulsive disorder.

This has been an exciting year with new additions to the laboratory and rapidly expanding research areas and collaborations.

Selected Publications:

- Dunlap, K. L., A. J. Reynolds, P. M. Bowers, and L. K. Duffy.** 2007. Hair analysis in sled dogs (*Canis lupus familiaris*) illustrates a linkage of mercury exposure along the Yukon River with human subsistence food systems. *The Science of the Total Environment* **385**:80-85.
- Jewett, S. C., and L. K. Duffy.** 2007. Mercury in fishes of Alaska, with emphasis on subsistence species. *The Science of the Total Environment* **387**:3-27.
- Shi, B., T. B. Kuhn, H. Liang, and L. K. Duffy.** 2007. Tribochemical performance of cell-treated nickel matrix. *American Journal of Biochemistry and Biotechnology* **3**:141-144.
- Pickett, Z., W. Howard, and C. Graves.** 2008. 4-Chloro-2,6-bis(hydroxymethyl)pyridinium Chloride and 4-Dimethylamino-2,6-bis(hydroxymethyl)pyridinium Chloride Hemihydrate. *Journal of Chemical Crystallography* **38**:In press.
- Gouin, T., M. Shoeib, and T. Harner.** 2008. Atmospheric concentrations of current-use pesticides across south-central Ontario using monthly-resolved passive air samplers. *Atmospheric Environment*:In press.
- Gouin, T., and F. Wania.** 2007. Time Trends of Arctic Contamination in Relation to Emission History and Chemical Persistence and Partitioning Properties. *Environmental Science and Technology* **41**:5986-5992.
- Gouin, T., F. Wania, C. Ruepert, and L. Castillo.** 2008. Field testing passive air samplers for current-use pesticides in a tropical environment. *Environmental Science and Technology*:In press.
- Falk, A., T. Green, and P. Barboza.** 2008. Quantitative determination of secondary metabolites in *Cladonia stellaris* and other lichens by micellar electrokinetic chromatography. *Journal of Chromatography A* **1182**:141-144.
- Kirschner, D., M. Jaramillo, T. Green, F. Hapiot, L. Leclercq, H. Bricout, and E. Monflier.** 2008. Fine tuning of sulfoalkylated cyclodextrin structures to improve their mass-transfer properties in an aqueous biphasic hydroformylation reaction. *Journal of Molecular Catalysis A: Chemical* **286**:11-20.

Selected Publications continued:

- Domine, F., M. Albert, T. Huthwelker, H. W. Jacobi, A. A. Kokhanovsky, M. Lehning, G. Picard, and W. R. Simpson. 2008. Snow physics as relevant to snow photochemistry. *Atmospheric Chemistry and Physics* **8**:171-208.
- Domine, F., A. S. Taillandier, S. Houdier, F. Parrenin, W. R. Simpson, and T. A. Douglas. 2007. Interactions between snow metamorphism and climate: physical and chemical aspects. *Physics and Chemistry of Ice*, [Proceedings of the International Conference on the Physics and Chemistry of Ice], 11th, Bremerhaven, Germany, July 23-28, 2006:27-46.
- Domine, F., A. S. Taillandier, and W. R. Simpson. 2007. A parameterization of the specific surface area of seasonal snow for field use and for models of snowpack evolution. *Journal of Geophysical Research* **112**:F02031.
- Douglas, T. A., M. Sturm, W. R. Simpson, J. D. Blum, L. Alvarez-Aviles, G. J. Keeler, D. K. Perovich, A. Biswas, and K. Johnson. 2008. Influence of Snow and Ice Crystal Formation and Accumulation on Mercury Deposition to the Arctic. *Environmental Science and Technology* **42**:1542-1551.
- Flowers, B. A., J. F. Stanton, and W. R. Simpson. 2007. Wavelength Dependence of Nitrate Radical Quantum Yield from Peroxyacetyl Nitrate Photolysis: Experimental and Theoretical Studies. *Journal of Physical Chemistry A* **111**:11602-11607.
- Grannas, A. M., A. E. Jones, J. Dibb, M. Ammann, C. Anastasio, H. J. Beine, M. Bergin, J. Bottenheim, C. S. Boxe, G. Carver, G. Chen, J. H. Crawford, F. Domine, M. M. Frey, M. I. Guzman, D. E. Heard, D. Helmig, M. R. Hoffmann, R. E. Honrath, L. G. Huey, M. Hutterli, H. W. Jacobi, P. Klan, B. Lefer, J. McConnell, J. Plane, R. Sander, J. Savarino, P. B. Shepson, W. R. Simpson, J. R. Sodeau, R. von Glasow, R. Weller, E. W. Wolff, and T. Zhu. 2007. An overview of snow photochemistry: evidence, mechanisms and impacts. *Atmospheric Chemistry and Physics* **7**:4329-4373.
- Simpson, W. R., D. Carlson, G. Honninger, T. A. Douglas, M. Sturm, D. Perovich, and U. Platt. 2007. First-year sea-ice contact predicts bromine monoxide (BrO) levels at Barrow, Alaska better than potential frost flower contact. *Atmospheric Chemistry and Physics* **7**:621-627.
- Simpson, W. R., R. von Glasow, K. Riedel, P. Anderson, P. Ariya, J. Bottenheim, J. Burrows, L. J. Carpenter, U. Friess, M. E. Goodsite, D. Heard, M. Hutterli, H. W. Jacobi, L. Kaleschke, B. Neff, J. Plane, U. Platt, A. Richter, H. Roscoe, R. Sander, P. Shepson, J. Sodeau, A. Steffen, T. Wagner, and E. Wolff. 2007. Halogens and their role in polar boundary-layer ozone depletion. *Atmospheric Chemistry and Physics* **7**:4375-4418.
- Taillandier, A. S., F. Domine, W. R. Simpson, M. Sturm, and T. A. Douglas. 2007. Rate of decrease of the specific surface area of dry snow: Isothermal and temperature gradient conditions. *Journal of Geophysical Research* **112**:F03003.
- Christian, S. L., A. P. Ross, H. W. Zhao, H. J. Kristenson, X. Zhan, B. T. Rasley, P. E. Bickler, and K. L. Drew. 2008. Arctic ground squirrel (*Spermophilus parryii*) hippocampal neurons tolerate prolonged oxygen-glucose deprivation and maintain baseline ERK1/2 and JNK activation despite drastic ATP loss. *Journal of Cerebral Blood Flow & Metabolism* **28**:1307-1319.
- Brown, G. E., T. P. Trainor, and T. P. Chaka. 2007. Geochemistry of mineral surfaces and factors affecting their chemical reactivity, p. 457-509. *In* A. Nilsson, L. Pettersson, and J. Norskov (ed.), *Chemical Bonding at Surfaces and Interfaces*. Elsevier, New York.
- Ghose, S. K., S. C. Petitto, K. S. Tanwar, C. S. Lo, T. P. Chaka, and T. P. Trainor. 2008. Surface Structure and Reactivity of Iron Oxide-Water Interfaces, p. 1. *In* M. O. Barnett and D. B. Kent (ed.), *Adsorption of Metals to Geomedia II*. Elsevier, New York.
- Tanwar, K. S., S. C. Petitto, S. K. Ghose, P. J. Eng, and T. P. Trainor. 2008. Structural study of Fe(II) adsorption on hematite (1-102). *Geochimica et Cosmochimica Acta* **72**:3311-3325.
- Waychunas, G. A., Y. S. Jun, P. J. Eng, S. K. Ghose, and T. P. Trainor. 2008. Anion Sorption Topology on Hematite: Comparison of Arsenate and Silicate, p. 31. *In* M. O. Barnett and D. B. Kent (ed.), *Adsorption of Metals to Geomedia II*. Elsevier, New York.
- Clausen, T. P., T. K. Green, and B. Steiner. 2008. Use of the chemical literature as a template to probe stereoselective reactions by NMR. *Journal of Chemical Education* **85**:692-694.
- Pant, R. R., B. T. Rasley, J. P. Buckley, C. T. Lloyd, R. F. Cozzens, P. G. Santangelo, and J. H. Wynne. 2007. Synthesis, mobility study and antimicrobial evaluation of novel self-spreading ionic silicone oligomers. *Journal of Applied Polymer Science* **104**:2954-2964.

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UNIVERSITY OF ALASKA FAIRBANKS

America's Arctic University

The University of Alaska Fairbanks is accredited by the Northwest Commission on Colleges and Universities. UAF is an affirmative action/equal opportunity employer and educational institution.

Alumni Out & About

Sue (Deisher) McClure (B.S. 1971, M.A. 1974) retired from teaching at Cal Poly State University in San Luis Obispo and has moved back home to Seward, Alaska.

Howard Merken (B.S. 1989, M.S. 1991) moved to Union University in Jackson, TN and is a Visiting Associate Professor of Chemistry. His pride and joy is his family: wife, and two children 4 yrs old and 1 year old.

Trent Volz (B.S. 1997, M.S. 2000) is working on his post-doctorate with Annette Fleckenstein in the Pharmacology Dept at the University of Utah and has received promotion to Research Assistant Professor at the University of Utah, Dept. of Pharmacology and Toxicology.

Elizabeth Hillard (B.S. 1999) received her PhD from Texas A&M in 2003. She is currently working as a chargée de recherche première classe for the French CNRS.

Andrew Krohn (B.S. 2002, M.S. 2005) is working with the USDA Agricultural Research Center at the University of Wisconsin-Madison. The work involves phylogeographic study of invasive grasses, quantitative trait locus (QTL) mapping of selective loci in forage crops, and development of forage and bioenergy crops adapted to northern climate through marker-assisted breeding.

Laurie (Martin) Kemp (B.S. 2002, M.S. 2005) & **Scott Kemp** (B.S. 2003, M.S. 2005) are the proud parents of Scott Wayne Kemp Jr. born October 13, 2007.

Danielle (Arnold) Britt (B.S. 2002, M.A. 2004) is currently completing a first year pharmacy residency at Providence Alaska Medical Center. She and her husband were expecting their first child in November 2007.

Adrienne Orr (B.S. 2003) PhD, postdoctoral fellow in the Department of Molecular and Cellular Physiology, is one of nine recipients to receive the 2006-07 Porter Physiology Fellowship awarded by the American Physiological Society. Her research focuses on the role of different protein kinase C (PKC) isozymes in stroke and is examining how one small peptide drug may inhibit or activate specific PKC enzymes to lessen brain tissue damage.

Jeff Bickmeier (M.S. 2005) works for Metabolix, Inc. in Cambridge, MA in their Microbial Metabolic Engineering Group, working on developing bacterial strains for production of biodegradable plastics. He lives in Arlington, MA with wife Laura and daughter Ada born March 26, 2008.

Danielle LaVictorie (B.S. 2006) was accepted into South Eastern Missouri State University's Master of Natural Science Program for the fall of 2007.

Adlai Burman (M.S. 2007) is living in Prague and is in a clinical trial for multiple sclerosis. He reports that it is going wonderfully and he is nearly asymptomatic. He is attending Charles University and works at the Institute for Experimental Botany.

Sheila Chapin (Administrative Assistant Extraordinaire retired 2007) has made Harrisburg, Oregon home. She and her husband Tom are enjoying the joys of living next to grandchildren and feel truly blessed.

Brittany (Dykstra) Davies (B.S. 2007) was accepted to the University of Washington Medical School entering class of 2008.

Sayali Kulkarni (M.S. 2007) is working for a pharmaceutical firm, XOMA (US) LLC, in Berkeley, CA and has had an abstract accepted for the annual meeting of American Society of Cell Biology that was held in December 2007.



Photo by MADIG

Reichardt Building Spring 2008

Alumni Notes ~ Out & About News Wanted

Department of Chemistry & Biochemistry graduates, where are you? We would like to hear from you. Please feel free to clip out this form and send it to us or send us your update via email to: fychem@uaf.edu with the subject line ALUMNI UPDATES. All news will be published in the next issue of AlasChemist.

Visit our web site at: www.uaf.edu/chem

Name: _____
Please include maiden name if applicable

Address: _____

City: _____ State: _____ Zip: _____

Year Graduated: _____ Degree Received: _____

News for *AlasChemist Out & About* (education, employment, travel, or family news)



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Photo by MADIG

James & Marlys

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then, after years of service, quietly been sent to surplus. Chemistry spread into Duckering and Arctic Health. Faculty positions were added, along with new programs. Eventually we moved into a brand new building – and finally had enough fume hoods in the teaching labs. Even the name has changed from “Chemistry and Chemical Engineering” to “Chemistry” to “Chemistry and Biochemistry”.

When I first took this job I didn’t expect to keep it for 31 years. I had been a research lab tech on soft money up on West Ridge and I expected to go back to that in a few years. I was surprised when I realized how much I enjoyed working in the stock room. The job tasks - organizing chemicals and supplies, making solutions, basic maintenance on instruments – were a perfect match for my skills and temperament. But the best part was always the people in the Department. During fall 1977 I learned that the faculty put the students first and the staff was expected to do the same. That philosophy has been maintained over the years. And the students have been a joy to work with. Our majors and grad students are the best on campus. My only regret is that as the department grew larger I had less time to spend with them. I’m going to miss all of you.

Marlys Schneider



Girl Scouts Junior Event Day,
Experience Science - Expect a Challenge
Instructed by Dr. Marina Castillo and
graduate student Sally Gustafson