

AlasChemist

University of Alaska Fairbanks Department of Chemistry & Biochemistry

June 2012 Volume 33 *



A Note From The Department Chair ~ William Simpson

Departmentally, we have made a lot of progress in the last year and we are looking forward to a great new year. In people news, Professor John Keller was awarded emeritus status by the University as a recognition of his sustained contributions to UAF. We are glad that Professor Keller is still maintaining research efforts and look forward to working with him. We hired Professor Kriya Dunlap in a joint position between the department and the Institute of Arctic Biology / INBRE program. We are excited for Professor Sarah Hayes to physically come to campus and start her teaching and research career. It has been great this year that she has been skyping into departmental functions to give her valuable input, particularly with respect to curricular planning and course improvement. For next year, we welcome Visiting Professor Chris Iceman who will be a huge boost to our general chemistry, analytical, and other offerings. It has been great that Visiting Professor Iceman has been leading monthly discussions on techniques for teaching general chemistry -- the "Best Practices" group. We look forward to implementing some of these ideas next year.

We are very excited to welcome our entering undergraduate students in the Fall and are offering those students the option to take a "Chemistry Honors" laboratory section that will give them an early research experience. Dr. Anastasia Ilgen taught an very successful Honors lab in Chemistry 106 in Spring 2012. We thank Dr. Ilgen for building this model, which we intend to emulate in the Fall 2012 Chemistry 105 Chemistry Honors Laboratory section. On this theme of increasing research, particularly at the early undergraduate level, we have been giving lectures around campus to highlight our research opportunities and intend to make a new lower-division research course (e.g. Chem 288) in the near future. A small working group of faculty members is working on this new course plan. To assist students in general chemistry and growing out of the "General Chemistry Best Practices Group" led by Visiting Professor Iceman, we are starting a Chemistry Learning Center that will use Supplemental Instruction plus one-on-one chemistry coaching to help students excel in general chemistry. We have also made a pretest that will be offered in the summer before students start general chemistry to help students self assess their preparation and find resources. From last year's retreat and department meetings in Fall 2011, we have make a new undergraduate curriculum, which was accepted by the UAF Faculty Senate and will appear in the next catalog. The new curriculum streamlines our programs and revamps the B.A. degree. The new offerings have the

B.A. preparing students for chemistry related careers or education (e.g. in areas like environmental law, forensic science, science education, anthropology, etc.). The Forensics concentration is now under the B.A. degree. The B.S. degree in Chemistry maintains American Chemical Society (ACS) accreditation and, in addition to the "ACS chemistry option" has two concentrations, in Biochemistry and Environmental Chemistry. Our exiting students continue to be top notch, again scoring well above national norms with a median score of 70th percentile on the national norm scale. These students continue to have excellent success at finding jobs or continuing education in professional or graduate school.

In our graduate programs, we graduated 11 students with M.S. and Ph.D. degrees, which I think is a new record and represents a continuation of our growth trend in graduate programs. For the Fall, we will welcome at least five new students, and hopefully more will chose to study at UAF. Our graduate programs have been working on curricula, and we are improving the flexibility and options for students. Redesigns of many of the chemistry courses (e.g. inorganic, organic, and other offerings) were proposed and discussed and will be implemented in the next couple semesters. Because faculty members are back from sabbaticals, we will be offering a full array of graduate courses for our students. An exciting growth in this area is that we are beginning the process of hiring a graduate program coordinator who will assist graduate students to navigate the system smoothly, assist programs in creating and enhancing their identities, and improve integration between programs and industrial partners. That new position should fuel further growth in our very successful graduate programs.

Overall, we are looking forward to an exciting 2012/13 year. We are still working on integration of graduate programs with research institutes and replacement of Professor John Keller's position with two tripartite joint-appointed faculty members that will improve undergraduate teaching and further strengthen our programs, providing more capacity to educate undergraduate and graduate students.



John Keller ~ Organic Chemistry and Biochemistry

I am retiring this year, so this will be my last contribution to the Alaschemist. First I would like to pay homage to several persons - among many - who have helped make my career in the Department of Chemistry and Biochemistry satisfying and productive. I was originally hired at UAF from a post-doctoral position at the University of Wisconsin-Madison. Paul Reichardt was department chair in 1979 and he interviewed me by telephone. He did not have to sell me too hard on the job itself because it seemed like an ideal combination of teaching and research at a small public university – and all within sight of the majestic Alaska Range! It also did not hurt that Paul's competent personality clearly came through the telephone lines to Wisconsin. Paul Reichardt was an outstanding mentor who helped me succeed as an organic chemist and science instructor. Claron Hoskins set a great example showing that one can be a productive researcher (with quite a few articles published in the Journal of Chemical Physics) and at the same time an outstanding teacher in general chemistry and upper division courses. Tom Clausen brought a student-friendly attitude into the department which I admired and tried for years to emulate.

One of the great things about being a professor is the opportunity to learn new things and to “move sideways” in science, which in my case was thankfully tolerated by my

UAF colleagues. Research itself is, of course, learning new things. But on a larger scale, I embarked on two new scientific adventures exploring areas of knowledge that hardly existed when I was a chemistry graduate student in the 1970's. In the 1980's I taught myself the craft of recombinant DNA manipulation in order to study the gene and protein structure of a decarboxylase enzyme. In the 1990's I learned all about microcomputers and began to incorporate computational chemistry in my research and in my graduate and undergraduate courses. These moves required a certain amount of Alaskan self-sufficiency, such the purchase of a second hand Graflex press camera at Alaska Camera on 2nd Avenue to photograph DNA electrophoresis gels (1986). I hope that as a retired professor I will still be able to explore new worlds of science.

In the future I look forward to staying in touch with my friends in the department and to collaborating where possible on computational chemistry projects. I also plan to leave plenty of time to enjoy the Alaska outdoors, and to enjoy my daily views of the north faces of Mounts Hayes, Deborah, and Hess. These mountains still appear as beautiful as they did in 1979!



T. Green, J. Keller, F. Heitzler & P. Reichardt

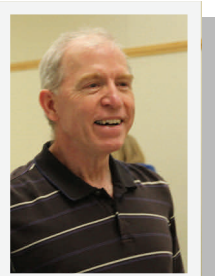


John Keller's retirement gift was an iPad with chemistry apps!



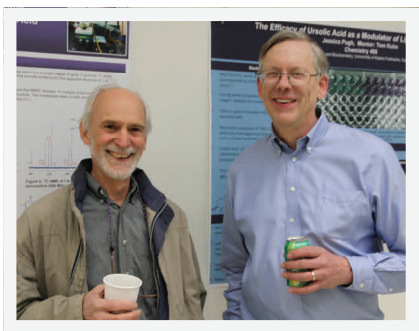
Sue & John Keller

For all the years of dedication and service we extend a huge thank you!



Thomas Green ~ Organic Chemistry

I just finished teaching a two-semester sequence of Organic chemistry (CHEM 321 and 322). I had great group of students. The class as a whole, and particularly our chemistry majors, scored above the national average on the American Chemical Society Organic Exam. Congratulations to them. I also taught a new lab course, CHEM 323 Organic Laboratory, for the first time. We used the lab book "Green Organic Chemistry" by Doxsee



Paul Reichardt & Tom Green

and Hutchinson, which has some very innovative, environmentally-friendly experiments. I'm heading to a National Science Foundation - funded workshop at the University of Oregon in July to learn more.

On the research side, the National Institute of Health funded our proposal on adenosine research. Adenosine is an important neuromodulator related to a wide range of neurological processes and diseases. Kelly Drew, a neuropharmacologist in our department, is co-PI on the project. Our lab will be developing an analytical

technique for adenosine detection that can be used by neuroscientists and neurologists to monitor real-time changes in adenosine in the brain. Undergraduates **Moriah Hunstiger**, **Terilyn Lawson**, and **Paul Tschida** will be joining the lab this summer to get started on the project. The project is interdisciplinary in nature.

Zhipeng Dai, a Ph.D. candidate Biochemistry and Molecular Biology, will finish his research on sphingosine synthesis by the end of the summer, and then begin writing his dissertation. A low-cost, stereospecific synthetic route to sphingosine is invaluable, given the evidence that sphingosine and related metabolites are thought to be involved in cancer. Adai has made excellent progress on the synthesis. **Jamie McKee**, a Ph.D. candidate Environmental Chemistry, is synthesizing nanoparticles with cyclodextrins on the surface. Cyclodextrins are capable of forming inclusion complexes with organic aromatic substrates, so these high surface area nanoparticles might be useful for environmental clean-up of contaminated waters. He is using a really cool NMR technique called Diffusion Ordered Spectroscopy (DOSY) to measure diffusion coefficients of cyclodextrins. **Dr. Carl Murphy**, our NMR facility manager in charge of our new Bruker 600 MHz instrument, has been a great help in this regard.

Sarah Hayes ~ Soil and Water Science/Analytical Chemistry

I am really excited to start at UAF in Fall 2012. Joining me are two graduate students, **Nicole Ramos** and **Amy Skidmore** and hopefully I'll be able to interest some undergraduates in my research as well.

My main research interest lies in how metals respond to different geochemical conditions (pH, presence or absence of O₂, etc) in terms of partitioning between the solid and aqueous phase and their bioaccessibility in various solid phases (e.g., in minerals, sorbed to minerals, associated with organic matter). Addressing these types of questions requires the use of both lab and field-based studies. To start with, my laboratory will be focusing on low temperature tellurium geochemistry. Relatively little is known about this rare element, but its use in high-efficiency solar panels has recently brought it into the spotlight.

Because so little is known about tellurium, we are combining well-constrained lab-based studies and field measurements to try to develop an understanding of how tellurium behaves in the environment. This is an extension of what I have been doing as a Mendenhall postdoctoral fellowship at the USGS, meaning that I have

had the last year and a half to cook up so many research questions that I'm going to need help making some of them happen!

For example, Paul Spry (Iowa State) and I have a project funded through the U S Geological Survey to look at the formation of gold telluride deposits and the efficiency of the current extraction techniques at liberating tellurium. We hope to extend this work in several ways during the coming years, so stay tuned to see how this aspect of the project develops.

I am looking forward to finding my niche within the department and getting to know all of you better!



Photo provided by S. Hayes

Sarah Hayes doing field work in Lake City, Colorado. Look at the beautiful soil pit.

Carl Murphy ~ NMR Facility

This has been a big year for the Nuclear Magnetic Resonance (NMR) Facility here. For starters, we now have an NMR Facility and I moved to Alaska to keep it running. In August of 2011 renovations were completed to Reichardt room 136 and the Varian 300 MHz NMR was moved to its new home. In the fall, the new 600 MHz Bruker NMR arrived and is now working busily on several research projects. The new instrument adds significant capabilities to the NMR Facility expanding the research possibilities. Computer controller probe tuning simplifies switching between different NMR active nuclei including ^{13}C , ^{15}N , ^{31}P , and ^{51}V . The versatile sample handler on the 600 MHz NMR even allows for all of these experiments to be queued up and run without operator assistance. The temperature control unit for the 600 MHz NMR allows for easy temperature changes between -40 and +150 Celsius. The 600 MHz NMR was also ordered with a high-resolution magic-angle spinning (HR-MAS) probe that is specifically designed to at semi-solids such as tissues and gels.

Several research projects have already started using the 600 MHz NMR and collaborating with the NMR Facility to improve their results. The primary project on the 600 MHz NMR is a metabolomics study of hibernation in the



artic ground squirrel. In this project we are acquiring not only ^1H NMR on blood plasma samples, but we are also looking at various tissues using the HR-MAS; all at 5°C . There is also a research project with Institute of Arctic Biology where ^{31}P -NMR is being used to study the phosphorus content of soil extracts. Next, there has been a lot of work with an environmental chemist using diffusion NMR experiments to look at the micelle formation in synthesized cyclodextrins with goals aimed at environmental remediation. Additionally, one of the undergraduate researchers got trained on the 600 MHz NMR to study the equilibrium of vanadium reactions.

The 300 MHz NMR is still being used by students in various classes both to aid with their experiments and to spread the excitement of NMR and what it can do.

The 300 MHz NMR was used extensively by the organic labs this spring. Through the NMR class taught by Tom Green also gives students an opportunity to learn more about NMR, how it works, and how to use it. In Spring 2012, the Analytical instrumentation laboratory used the 300 MHz NMR for one of their experiments.

The NMR facility is always open to new users and new applications. We expect to be expanding our capabilities as more research projects start making use of the instruments.

Undergraduate Student Spotlight ~ Julia Duncan

Having been born and raised in Fairbanks, Alaska, Julia knows what it means to face unrelenting challenges. Growing up, her mother always told her that she had inherited the spirit of her Yupik uncle whose name translates to *'one who strives on'*. In her academic career she has learned to thrive on challenges, whether it is a difficult geometry problem, constructing complex molecular diagrams, or skipping breakfast to get to class on time. She enjoys the stimulating conceptual thought processes involved in pursuing, sometimes unanswerable, questions.

She chose to go into the field of biochemistry after taking her first chemistry class at UAF. She has always been in awe of nature, and has taken advantage of the opportunity

to study the natural processes through the courses offered at UAF. Her plan is to continue her education to a doctoral degree in a chemistry related field.

She finds the most effective way to lead in academics is to be a model student, and collaborate with classmates in order to creatively and perceptibly understand class material.



Marvin Schulte ~ Biochemistry and Neuropharmacology

This has been another very busy year. I again had the opportunity to teach CHEM 451 (Introductory Biochemistry) to a particularly excellent group of students. We had fewer pre-meds and pre-pharmacists in the class this year, but there seemed to be an unusually high number of research interested students. I consider this a good sign as we move towards expanding enrollment in this class and as UAF continues to expand its graduate programs. I am also slated to teach CHEM 103 this fall and have been developing new active learning strategies to employ in teaching that course. Also relevant to the teaching mission of the department, I stepped down as Director of the BMB program to allow new leadership in this important program. Kelly Drew assumed the directorship, an excellent choice I believe. I have thus had more time to focus on other work at UAF. In particular, I served on a state wide committee charged with developing recommendations for biomedical programs across the University of Alaska system. I hope the document produced by this Biomedical Planning Group will serve as a guide for administration as they orchestrate the growth of these challenging new programs on the various campuses of the UA system.

In the laboratory, yet another of my graduate students finished her research and graduated this year. **Dr. Maegan Weltzin** successfully defended her thesis entitled "Investigation of the Allosteric Modulators Desformylflustrabromine and 4-(2-hydroxyethyl)-1-piperazineethanesulfonic acid (HEPES) Interactions on Nicotinic Acetylcholine Receptors." This was an exciting body of work that is being continued by a new student in the laboratory, **Huang Yanzhou**. Maegan's work was exceptional in its scope, beginning with investigation of a novel allosteric modulator with potential applications in Alzheimer's disease and characterization of several analogs of this drug class all the way to identifying its unique site of action on nicotinic receptors. Maegan's work set the stage for developing new models of this

allosteric binding site and has paved the way for a comprehensive strategy for drug development. Maegan has moved on to a post-doctoral position in Arizona. I congratulate her on her successes and wish her the best.

With Maegan's graduation, I currently have four graduate students remaining in the lab. **Yeganeh Ataian** and **Shane Rideout** are expected to complete their thesis work in the next year. Both are working on a project to develop high throughput screening approaches for drug development. Two other students, **Huang Yanzhou** and **Shailesh Khatri** are actively working on new drugs for nicotinic and serotonin receptors respectively. Shane has also begun working on a new collaboration between my laboratory and those of Karsten Heuffer and Mike Harris, two UAF colleagues. This new collaboration will explore the mechanism of action of rabies virus in the CNS. In addition to graduate students, I also had the pleasure of working with an outstanding undergraduate researcher, **Jordan Ross**. Jordan was extremely active in the laboratory and was given an interesting new project aimed at developing drugs to facilitate smoking cessation. Jordan did an excellent job on this project. Unfortunately for us, he will be leaving the lab to attend medical school this fall. We wish him the best in his career.

A particularly exciting development this past year was the receipt of a grant from the Alzheimer's Resource of Alaska. This grant enabled us to fund one graduate student to work on Alzheimer's relevant research. This was the first in what we hope will be a frequent interaction between UAF and The Alzheimer's Resource of Alaska. Their direct support of research within Alaska is a new direction for them and we are very grateful for the opportunity to work with this excellent local organization. As a result of this relationship, our laboratory was featured in their annual newsletter and in an Anchorage newspaper article.

Staff & Faculty Awards

Emily Reiter

10 Years of Service
to UAF
&
CNSM Outstanding
Service Award



Outstanding Graduate Student Mentor & Advisor Award

Cathy Cahill

Outstanding Teaching Award

Tom Kuhn

Dennis Demmert Appreciation and Recognition Award

Brian Rasley

Brian Edmonds ~ Biochemistry and Biophysics

I taught the Basic General Chemistry (CHEM 103X) and A Survey of Organic Chemistry and Biochemistry (CHEM 104X) sequence for the third time, and I was fortunate to have another good group of motivated students. For the past three years, I've been experimenting with different textbooks and online homework systems with a view to maximizing learning outcomes. Once a good textbook is identified, I'm finding that students are happier and learn better if the lectures, homework, and laboratory exercises are carefully aligned for content and language. Students with little or no background in chemistry are learning new concepts and also a new language, so I've been working to make sure that there's a consistency of language across all course resources. I think this strategy provides more time for students to focus on the more challenging aspects of the course, the concepts. I'm looking forward to continuing with my own teaching research, and working with other faculty members in the department to improve the quality of 100-level chemistry courses.

Two courses, Undergraduate Research (CHEM 488) and Chemistry Seminar (CHEM 481/482/692), were new to me this year. The undergraduate research course gave me the opportunity to see what undergraduates are able to accomplish in a chemistry research laboratory over the course of a semester. All projects were a success and students reported that they had positive experiences thanks, in large part, to the excellent mentoring provided by the faculty who took students into their laboratories. For the seminar course, students gave excellent presentations, and a number of faculty stepped in to give presentations to illustrate the key components of an effective talk. The faculty presentations added value to the course by providing students with a snapshot of the scope of research interests in the department. I'm grateful to John Keller, Brian Rasley, William Howard, and Fenton Heirtzler for their seminars, and also to, **Erin Gleason**, who spearheaded an effort to involve graduate students in recruiting outside speakers. We hope to

increase the number of outside speakers next year! My research focus remains in the area of the functional properties of neuronal nicotinic acetylcholine receptors (nAChRs). These receptors are widely distributed in the brain and normally respond to the neurotransmitter acetylcholine. Properly functioning nAChRs are required to maintain the properties of neuronal circuits that mediate cognitive processing, reward experiences, and mood. Disruptions in signaling at nAChRs is associated with a number of diseases and disorders including Alzheimer's and Parkinson's diseases, autism, and addiction to nicotine, which activates nAChRs and promotes long term changes in the receptors. We use methods to study the properties of isolated nAChRs in order to obtain a detailed understanding of how they work, and how they contribute to signaling in the different neuronal circuits in which they participate. We are also studying a new class of drugs that alter or modulate the properties of nAChRs. In the long-term, this work, together with the work conducted in Marvin Schulte's laboratory, will facilitate the development of therapeutic drugs to treat addiction and other disorders of cholinergic signaling by correcting errors at cholinergic synapses. Two new graduate students, **Spencer Hirt** (BMB M.S. program) and **Arianna Demmerly** (BMB Ph.D. program), joined our group in May 2011, and one undergraduate, **Max Hesser-Knoll**, remains active in the lab. We presented preliminary findings on the activation of 30 pS $\alpha 4\beta 2$ nicotinic receptors modeled with single-channel data on the functional properties of one class of nAChRs at the Biophysical Society Annual Meeting in February 2012. We are looking forward to continued progress in this exciting field!



Promotion & Tenure

John Keller ~ Emeritus

Thomas Trainor ~ Promoted to Professor

Brian Rasley ~ Tenured and Promoted to Associate Professor

Commencement Class of 2012 May 13, 2012



Photo by Katia Cardenas

Front Row:

Todd Fortun, Jordan Ross and Jessica Pugh

Back Row:

William Simpson, Cathy Cahill, Brian Rasley and John Keller

Master's Degrees

Todd A. Fortun

*M.S. Environmental Chemistry. B.S.,
St. Cloud State University (Minnesota),
2010*

Spencer L. Giles *

*M.S., Chemistry. Golden Key Honor
Society. Phi Kappa Phi Honor Society.
B.S., University of Alaska Fairbanks
2009*

Mary Barile Hogan

*M.S., Biochemistry/Molecular Biology.
B.S., Virginia Polytechnic State
University, 1993.*

Patrick Lawrence Joyce **

*M.S., Environmental Chemistry. B.S.,
University of Nevada Reno, 2009*

Jonathan David Nigg *

*M.S., Chemistry. Golden Key Honor
Society. Phi Kappa Phi Honor Society.
B.S., University of Alaska Fairbanks,
2009*

Mitali S. Patil **

*M.S., Biochemistry/Molecular Biology.
Golden Key Honor Society. Phi Kappa
Phi Honor Society. B.S., University of
Alaska Fairbanks, 2007*

Lisa K. Smith

*M.S., Molecular Mechanisms of
Infectious Disease: Interdisciplinary
Program. B.S., University of Alaska
Fairbanks, 2008*

Joel D. Vonnahme **

*M.A. Chemistry. B.S., University of
Alaska Fairbanks, 2008*

Ashley N. Wallace

*M.S., Environmental Chemistry. B.S.,
Millersville University (Pennsylvania),
2008*

Doctor of Philosophy Degrees

Maegan M. Daniello-Weltzin *

*Ph.D. Biochemistry/Molecular
Biology
B.S., University of Alaska Fairbanks,
2006*

Irina Andrea Mueller

*Ph.D. Biochemistry/Molecular
Biology
B.S., Eberhard Karls University
Tübingen (Germany), 2008*

Baccalaureate Degrees

Talal Ahmed **

*magna cum laude, B.S.,
Chemistry: Biochemistry/
Molecular Biology, Golden Key
Honor Society*

David M. Ayotte

*B.S., Chemistry: Biochemistry/
Molecular Biology*

Kyra Ann Brown

*B.S., Chemistry:
Forensic Chemistry*

Alesha Mae Castner

*magna cum laude, B.S.,
Chemistry*

Jessica M. Pugh

*B.S., Chemistry: Biochemistry/
Molecular Biology*

Jordan Charles Ross

*B.S., Chemistry: Biochemistry/
Molecular Biology*

Grant McCoy Wright **

*B.S., Chemistry: Biochemistry/
Molecular Biology*

* Summer 2011 degree recipient

** December 2011 degree recipient

Celebrating Excellence

Outstanding Chemistry Student

Jordan Ross

Elaine Jacobson Scholarship

Julia Duncan

Freshman Chemistry Award

Bryan Rosenbaum

Undergraduate Award in Analytical Chemistry

Paul Tschida

Undergraduate Award in Inorganic Chemistry

Emily Olson

Outstanding Teaching Assistants in Chemistry

Mary Hogan & Erin Gleason

Alaska Chapter American Chemical Society Award

Terilyn Lawson

American Institute of Chemistry Undergraduate

Emily Westbrook & Jessica Pugh

American Institute of Chemistry Graduate

Erin Gleason & Mary Hogan

HyperCube Scholar Award

Eyal Saiet

Scholar Athlete

(awarded by the Athletics department)

Theresia Schnurr



Jessica Pugh, Emily Olson & Alesha Castner



Paul Tschida



Bryan Rosenbaum



Emily Westbrook



Eyal Saiet



Terilyn Lawson & Theresia Schnurr

Jacy Pietsch ~ Department Outreach Activities

My second year in the Department of Chemistry and Biochemistry has come and (almost) gone, and what can I say? I have certainly had to stay on my toes in order to keep up with all of the happenings around here! Outreach coordination is only a portion of what I do for the department, but there has been a fair amount of it.

As one of his last official acts in the department, Tom Clausen dazzled a group of students from Chinook Charter School with some cool chemistry. He helped make UV bead necklaces for the kids, exploded some balloons, and set off some thermite. There were lots of smiles in that crowd and Tom's was one of the biggest.

The next major event was the Fall Fundraiser at KUAC. Tom Green, Emily Reiter, Brian Edmonds, John Keller, and Bill Simpson all answered phones during the *What'd Ya Know* segment. They had a great time supporting a great radio station and it was greatly appreciated.

The Fall Fundraiser at KUAC was followed by Halloween. And Halloween means the Salcha Fall Carnival. Brian Rasley continued his tradition of participating. With the help of his assistants, **Emily Westbrook**, **Terilyn Lawson**, **Paul Tschida**, and **Zac Carlson**, they wowed the crowds in Salcha. They got to

make spooky slime, see a wire 'remember' what shape it was supposed to be in, and watch what happens to a marshmallow Peep when you put it under vacuum. It was all very ghostly stuff.

As usual, the final major event for the department (and the college) was the 19th annual Science Potpourri. Kate Pendleton and I reunited to work on getting this event prepared for the Fairbanks community. It was awesome! Kids could make their own earthquakes, eat liquid nitrogen ice cream, touch a star fish, make dinosaur buttons, and watch a shark 'swim' through the air. And the explosions! It was a good idea to keep your hands close to your ears during the chemistry show because Cathy Cahill knows how to make some noise! Brian Rasley stepped up to the plate again and took care of the chemistry part of Science

Potpourri so that I could focus on the event as a whole. Because of Brian and because I had already done this one time before, there were fewer frazzled moments this year. But it was all worth it to see so many happy people learning about science.

That pretty much catches us up to the present. It is always a wonderful experience to work with a group of people that cares so much about their community. There will be lots more to do in the next twelve months and I am really looking forward to it.



Photo by K. Pendleton

Kelly Drew ~ Biochemistry and Neuropharmacology

2012 promises to be another productive year for the Drew lab. We eagerly anticipate thesis defense and graduation of our students **Lori Bogren** (Ph.D. candidate in Biochemistry and Molecular Biology), **Velva Combs**, M.S. candidate in Interdisciplinary Studies, and **Zachary Carlson**, M.S. candidate in Chemistry, this coming year. **Joel Vonnahme** graduated earlier this year with his M.A. and now attends University of Hawaii Hilo in a Pharmacology doctorate program. **Dr. Tulasi Jinka** continues investigations into what triggers hibernation and currently is focusing on medical applications of therapeutic hypothermia in rat as a human model. Lori Bogren is busily analyzing her data related to blood loss and cardiac arrest in the Arctic ground squirrel with findings that these animals are adept at surviving hemorrhagic shock. Along with undergraduate student **JoAnna Carpluk**, they are revealing characteristics of intestinal inflammation that result from loss of blood flow.

Velva Combs is putting the final touches on her M.S. thesis in which she established the asphyxia cardiac arrest model of global cerebral ischemia in our lab at UAF. Zachary Carlson is finalizing his research to investigate changes in adenosine receptors that could cause ground squirrels (and maybe rats) to hibernate. We also welcome new graduate student **Saurav Bhowmick** who is continuing research to investigate the role of neuroglobin in the Arctic ground squirrel's resistance to ischemia.

Undergraduate student **Melissa Pietila** has helped out with data analysis of cardiac arrest surgeries. Lab technician Jeanette Moore has perfected perfusion and immunohistochemistry techniques in preparation for studying cFos activation to understand the similarities of sleep and hibernation. This fall, we welcome the return of **Carla Frare** as a new doctorate student. We acknowledge support from the Department of Defense and the National Institutes of Health.

Article written by Jeanette Moore

Lawrence K. Duffy ~ Neurochemistry and Biochemistry

Last fall, I had the opportunity to teach the upper level Macromolecules biochemistry course and enjoyed working with the juniors and seniors. I will teach Macromolecules again this coming fall and will experiment with the option of using an e-textbook in an effort to reduce student costs. **Dr. Anna Godduhn** and I are working to develop an on-line chemistry 100 course using the ACS published *Chemistry in Context* and are designing the course based on ACS recommendations for introductory classes. I will continue to teach LAS 601, Responsible Conduct of Research, for the Graduate School. This summer I am teaching chemistry in the nationally acclaimed RAHI program. **Linda Nicholas-Figueroa** is co-instructing RAHI Chemistry and is additionally developing a climate change science camp for the Ilisagvik Tribal College in Barrow. As part of the Sci West National Reform in Science Education Consortium, I am part of a model network with Ilisagvik, UAF's Bristol Bay campus and UAS. Our contribution to the network is the development of engaging science courses appropriate for students living in rural settings. This effort is being

supported by the W.M. Keck Foundation.

On the research side, Vashta Urijah, an Effie Kokrine Charter High School student, has joined my laboratory to work on an Alaska Statewide High School Science Symposium project comparing anti-oxidant levels in wild Alaska berries and commercial berries. Ph.D. student Linda Nicholas-Figueroa continues to work on monitoring radon in Barrow as well as developing educational modules. **Jing Zheng**, a new M.S. student, has begun a research program exploring the toxicity of metallic nanoparticles on neuronal cells. Dinara Tamabayeva completed her M.S. in Environmental Quality Science from the Department of Civil Engineering here at UAF with a study of mercury remediation in an industrially contaminated river system. My mercury related monitoring of lichens and fish continues.

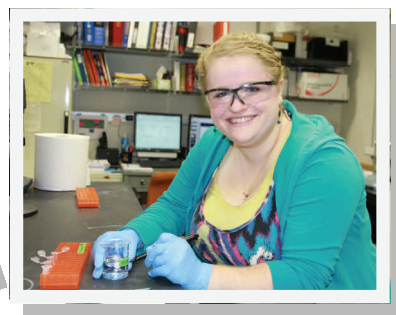
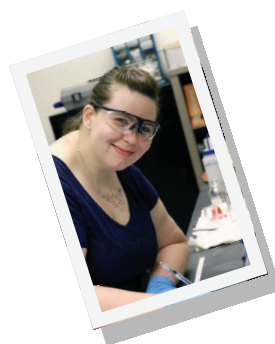
I would like to thank Alzheimer's Resource of Alaska for their support of Chemistry and Biochemistry graduate students. Public and alumni contributions are extremely important as national and state resources dwindle.

Brian Rasley ~ Analytical and Inorganic Chemistry

The past year has (as usual) been very busy with teaching and research projects. I taught a distance delivery chemistry classes for the College of Rural and Community Development and two classes for the Department of Chemistry and Biochemistry. As always, teaching is a challenging but very rewarding experience.

With regard to research, **Jonathan Nigg** and **Spencer Giles** finished their masters degree programs last summer. Jon is currently working in the Chicago area as an analytical chemist and Spencer Giles is working on a Ph.D. degree at George Mason University in Virginia. I am co-chairing Spencer's Ph.D. committee and we are continuing to work with the Naval Research Laboratory on various aspects of coatings research. **Mary Curry**, an M.S. candidate, is continuing her work in the area of hibernation in my research laboratory. **Ruth Osborne** is an undergraduate student that just started working in my laboratory this summer and she will also be working on hibernation research.

From a professional perspective, I was awarded tenure and promoted to associate professor this past May. I am also continuing as the directorship of the Fairbanks Chapter of the Alaska Native Science and Engineering Program (ANSEP). All in all, it was a very productive year.



Student Research

Mary Curry and **Emily Westbrook** work on a project that investigates the neurochemical mechanism of hibernation in arctic ground squirrels (*Urocitellus Parryii*).



Cover photo and above photos: Mary Curry & Emily Westbrook

William Simpson ~ Atmospheric and Environmental Chemistry

This has been a fun year in the Simpson Research Group. We had a great field season in Spring 2012 near Barrow, Alaska, and I'm finally getting a grip on what needs to be done for the department chair job. In personal news, we are all well. Maggie has grown her community supported agriculture (CSA) farm to fifteen families; it is great she is producing good local food for so many. Amelia (age 10) is doing great in elementary school and enjoys her friends and peaceful nature watching, both outdoors and with her pets. Layla (age 4) loves the social interaction at her preschool and is doing great. They both are growing up so fast.

I taught Physical Chemistry I in the Fall, and experimented with a lecture capture system to allow students to view podcasts of the class discussions. I was happy with the system, and hope to adapt it for next year's offering of General Chemistry I (CHEM 105X) which I'm teaching. I've been putting a lot of effort into figuring out how to enhance the general chemistry experience and help interested students to do better in our introductory courses. Those discussions have led to developments described in other parts of the AlasChemist, including starting the Chemistry Learning Center, trying to increase interaction in the lecture, and moving the pre-course diagnostic test earlier into the summer. I'm very hopeful that these efforts will help students excel in general chemistry and see how chemistry helps them.

We had a busy research year, with a major field campaign centered out of Barrow, Alaska in March 2012. That



Steven Walsh

campaign has produced some great data that we will be working hard on during the next year. Starting the year chronologically, **Patrick Joyce** completed his M.S. thesis on modeling nighttime nitrogen oxide chemistry in the Fairbanks plume. He graduated in December 2011, and his paper is now ready to be submitted. His work has important policy implications, because he

finds that aerosol particles in the Fairbanks airshed are not likely to gain nitrate mass if other controls affected the pH of the aerosol particles. This finding simplifies control strategies for improving air quality in Fairbanks. We have continued to study halogen chemistry related to sea ice, and were involved with the NASA-funded BROMEX field campaign at Barrow in March 2012. The campaign went amazingly well, partially due to luck with great weather and the conditions we needed, and partially due to a lot of hard work by our group in preparing for the campaign. **Steven Walsh**, a Ph.D. candidate, did an excellent job heading up the halogen oxide project field work. Steve built two "IceLanders" that floated with the sea ice and reported on the chemistry they were experiencing. His work is featured in the current CNSM newsletter. That work involved deployment via



Polar Bear interacting with the atmospheric chemistry instrumentation floating on the sea ice

helicopter, and we also were flying a small twin-engine aircraft (Purdue University's ALAR) and had around 30 scientists in Barrow for much of March. The whole group, including **Peter Peterson**, **Erin Gleason**, and **Eyal Sait** went to Barrow to work with the campaign and had a great time while learning a lot of about Arctic sea ice and field work. In addition, Steve got to go to the North Pole to a Russian-run ice camp in April to deploy a NSF-funded autonomous instrument to study atmospheric chemistry as a part of the "Arctic Observing Network" (AON). Peter Peterson, a Ph.D. candidate, has made progress in dealing with the tremendous data streams coming from our autonomous instruments that are floating around the Arctic. Erin Gleason, a new M.S. candidate, learned a lot at Barrow and is looking to do laboratory investigations of ice surfaces that promise to improve our conceptual understanding of how ice catalyzes reactions. Eyal Sait, an undergraduate, was instrumental in getting ready for the field and also had his own project observing the distribution of pollution around Fairbanks by adapting one of our instruments for use on a car and then driving it around Fairbanks and North Pole. **Simeon Schum**, and undergraduate student, did a cool project examining polycyclic aromatic hydrocarbons (PAHs) in snow and developed a fluorescence assay plus started work on extracting PAHs off of the surface of frozen snow/ice.

Overall, it has been a great year, and we look forward to reporting the findings of our projects and teaching general chemistry.

Fenton Heirtzler ~ Organic and Materials Chemistry

The first academic year at UAF has been one full of excitement and changes. My first taste of UAF-style teaching was the General Chemistry I (CHEM 105X) course, which I taught evenings this past fall. While doing so, I submitted one funding proposal to the National Science Foundation, coordinated the submission of a "White Paper" to the Air Force Office of Scientific Research and finished up the last details on a research paper to be submitted. The research laboratory was also set up to operate for initially one researcher, me. Come the new year, that research paper, titled "*A self-assembled, metallo-organic supramolecular frequency doubler*", was published in Chemical Communications, which was a nice way to hit the ground running as a UAF researcher. With the new year came also new teaching, in this case the Advanced Organic Chemistry Laboratory (CHEM 324W). I started off the course writing a detailed laboratory manual so that the students would know well ahead of time the experiments which they would be performing. A new edition of this document will be used in the upcoming academic year. Two undergraduate researchers who had taken CHEM 324W, **Emily Westbrook** and **Cicely Shankle**, began research in my laboratory this summer.

On the research front, the project which has been taking most of my attention in the laboratory has been the

synthesis of so-called "metallo-cyclophanes" containing two copper(I) centers and two equivalents of an organic ligand. The intention is to obtain liquid crystalline Cu(I) coordination complexes for application as p-type semiconductors in organic photovoltaics. A class of recently-synthesized materials contains long-chain aliphatic carboxylic acids joined through ester linkages to the ligand. One such compound has just been shown using our new differential scanning calorimeter (DSC) to form thermotropic mesophases upon heating. It is now undergoing further study through an external collaborator. Another dicopper(I) metallo-cyclophane has been prepared which contains the dodecyl sulfate counterion. The investigation of its ability to form mesophases using the DSC is now pending.

Among the two undergraduates now working with me in the lab, Emily Wesbrook is working on the preparation of new ligands for frequency-doubling metallosupramolecular complexes. It is anticipated that this effect in these target materials will exceed those determined for the compound featured in this year's publication. Also, Cicely Shankle is studying the synthesis of so-called "back-to-back" double ligands. In the presence of appropriate metal ions, these compounds should self-assemble into organic/inorganic block co-polymers in solution.

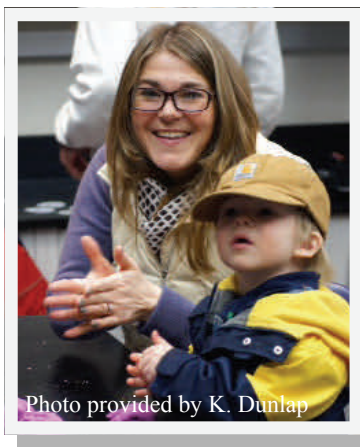
Kriya Dunlap ~ Biochemistry and Nutrition

I am so fortunate to have this opportunity to continue working in the chemistry department with so many people that I enjoy and respect. This year has been quite a whirlwind – starting off this new position and new year with a visit to our collaborators at the Plants for Human Health Institute (PHHI) at North Carolina Research Campus with bags full of wild Alaskan blueberries for fractionation and the expert, **Dr. Colin McGill**. We met up with **Dr. Sally Gustafson** while she finished up her post-doc with the PHHI. A few weeks later Sally returned to Fairbanks just in time to help me set up the lab, differentiate adipocytes, improve insulin sensitivity with wild Alaskan blueberries and sort mononuclear cells of dogs with the flow cytometer and train a few undergraduates. She has been very busy! I am going to miss her enormously when she goes off to medical school at Pacific Northwest University this fall. I wish her the best and I look forward to collaborating with her in the future!

Theresia Schnurr added to my good fortune by continuing her undergraduate research pursuits and has

decided to stay on for a M.S. in Biochemistry that officially starts in the Spring of 2012, although she is getting a good head start! Her project will involve an innovative technique for studying insulin signaling in mononuclear cells and the effects of exercise in sled dogs. She will be presenting her preliminary results and moderating a session at the International Conference of Circumpolar Health this coming August.

So many people have been incredibly supportive in this transition and I am looking forward to many years of fruitful collaborations, excited students and rewarding teaching experiences.



Kriya & her son Dax

Cathy Cahill ~ Physical and Atmospheric Chemistry

This year has been a busy, and productive, year for me and my research group. We have had success on many fronts.

This has been a very good year for the Cahill research group's students. Four graduate students are graduating this academic year: **Todd Fortun** (M.S. Environmental Chemistry), **Mitali Patil** (M.S. Biochemistry), **Peter Rinkleff** (Ph.D. Geology), and **Ashley Wallace** (M.S. Environmental Chemistry). Kudos to Todd, Mitali, Peter, and Ashley! In addition, **Taryn Lopez** has made good progress towards her doctorate this year, including having several journal articles published, and **Jennifer Bell** has passed her comprehensive exam. I also brought two new graduate students into my group: **Tara Craft** and **Sean Egan**. Last, but not least, on the student front, **Kyra Brown** and **Alesha Castner** conducted undergraduate research in my lab. I am very pleased with the quality and progress of my students and their research!

Dr. Chris Iceman, my postdoctoral fellow, made great advances in our research. He has been instrumental in setting up the physical and computational systems required for us to analyze aerosol samples at the Stanford Synchrotron Radiation Lightsource. He also helped the Department by teaching the second semester of General Chemistry in during Fall semester and Advanced Analytical Laboratory (CHEM 413) in Spring semester. I



Early Purple Orchid ~ Ireland
Orchis Masculina

am delighted to be working with such a competent and talented scientist and teacher!

This year I taught both the second semester of Physical Chemistry (CHEM 332) and Environmental Fate and Transport during Spring semester. I've never taught two courses in a semester before and it was a challenge to do with everything else on my plate. I really appreciate the students for putting up with my absent-minded professorship!

My research is going very well. My work on the concentrations and compositions of particulate matter in air samplers in the Middle East continues. In addition, we are developing a sampler that will warn aircraft if they encounter volcanic ash so they can change their routes to avoid getting deep into an ash cloud. I also am working with both NASA and the Japanese space agency, JAXA, on characterizing wildfire smoke using unmanned aircraft. I have several other research projects that are progressing as well. It has been a productive research year.

In addition to my normal busy teaching and research schedule, I have participated in many service activities. I organized The Technical Cooperation Program's Volcanic Ash Working Group meeting for 50 civilian and military participants in Fairbanks during August. The meeting was a success and created some new connections between disparate organizations. Other service activities included being President for the UAF Faculty Senate, blowing things up at Science Potpourri, and serving on the Fairbanks North Star Borough Air Pollution Control Commission as a Commissioner and now as Chair of the Commission.

Overall, it has been a good year for me and my group. I look forward to the fun we'll have next year!

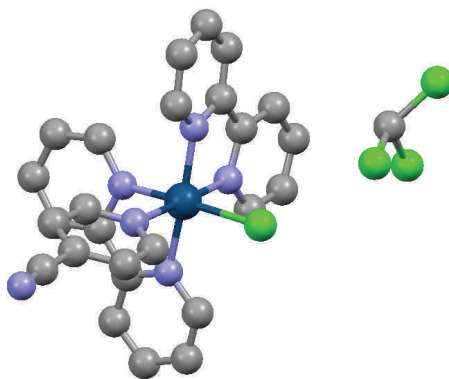
Thomas Trainor ~ Environmental Chemistry and Geochemistry

During the past year my group heroically survived my absence while I did a sabbatical visit with the US Geological Survey in Denver Colorado. **Dr. Anastasia Ilgen**, who completed her Ph.D. degree the previous year continued on as a postdoctoral research associate. Having an experienced hand was key I think to keeping the lab running smooth during my time away. The main focus of the group this past year was our Department of Defense (DoD) project on Lead and Antimony in soils. The DoD is interested in the rates of weathering and alteration of these

metals in soils, particularly in association with spent munitions from training operations. This project is being done in collaboration with Dr. Tom Douglas from the Cold Regions Research and Engineering Lab (CRREL) located at Ft. Wainwright. Tom is one of the departments affiliate faculty. In addition to Anastasia the project supports Ph.D students **Amanda Barker** and **Jackey (Canrong) Qiu** and postdoctoral research associate **Dr. Franta Majs**. This team did a fantastic job during the past year, and as far as I can tell didn't even notice that I was gone.

William Howard ~ Inorganic Chemistry

I enjoyed the privilege of mentoring the research of three chemists who worked simultaneously in my laboratory in the Summer of 2011: (1) **James M. Simmerman**, a UAF undergraduate chemistry major; (2) Professor Dana Haagenson, a visiting professor from the Department of Chemistry at the University of Wisconsin – Marshfield/Wood County; and (3) **Gwynn Pruce**, a West Valley High School senior. All three prepared and characterized some novel photo-sensitive, redox-active iridium compounds. The thermal ellipsoid diagram from the single crystal X-ray structure of $[\text{Ir}(\text{ppy})_2\text{Cl}(\text{pyCN})]$ (ppy = 2-phenylpyridyl; pyCN = 4-cyanopyridine) is shown in the figure below; this complex was prepared by Micah Simmerman.



Molecular Structure of $[\text{Ir}(\text{2-phenylpyridyl})_2\text{Cl}(\text{4-cyanopyridine})] \cdot \text{CHCl}_3$, a Compound Isolated and Characterized by **James M. Simmerman**, from the X-ray Diffraction Study.

Gwynn Pruce's work was funded by the American Chemical Society's Project SEED program. Notably, Gwynn was recently awarded a \$5000 college scholarship to pursue her studies in chemistry next year as a freshman at the University of Florida. Congratulations Gwynn!

I also enjoyed the privilege of mentoring **Emily Olson's** undergraduate research. Emily's work involved measuring the equilibrium constant in the ligand exchange reaction between $\text{Na}[\text{VO}_2(\text{2,6-pyridinedicarboxylate})]$ and 2,6-pyridinedimethanol in aqueous solution as a function of temperature by ^1H NMR spectroscopy. From these measurements, Emily can determine the standard state changes in enthalpy,

entropy, and free energy for this reaction.

Emily's project was actually initiated a few years ago by **Zachary Pickett**, an M.S. student who worked in my laboratory. Zach currently works for Red Dog Mine in Alaska, and his work involves analyzing mineral samples by X-ray fluorescence. In July of 2012, Zach will defend his Masters thesis.

I have continued to serve as the Chair of the Alaska Local Section of the American Chemical Society (ACS). In this role, I select two ACS speakers each year, who tour Fairbanks, Anchorage, and Juneau and give high quality research seminars. In the 2011-2012 academic year, Mr. Keith Butler (Milan Army Ammunition

Plant, American Ordnance) and Dr. Donald Stedman (Department of Chemistry, University of Denver) visited Alaska and gave excellent seminars at UAF, UAA, and UAS. We eagerly anticipate a visit by Dr. Paul Helquist (Department of Chemistry & Biochemistry, University of Notre Dame) in the Fall 2012 semester, who will give a biochemistry-related seminar at UAF, UAA, and UAS. Dr. Helquist will be our guest speaker for our 2012 National Chemistry Week celebration!

I am very pleased to announce that the Alaska Local Section of the ACS was awarded a **2010 ChemLuminary Award for Outstanding Performance by a Local Section** in a ceremony that was held at the Autumn 2011 National ACS Meeting in Denver. This honor belongs to all the Alaska ACS members. Thank you!

Graduate Student Spotlight ~ Taryn Lopez

Taryn Lopez came to UAF in 2007 to study volcanic gases as an Environmental Chemistry graduate student. Since arriving at UAF, she has conducted field work on active volcanoes in Alaska, Russia, and other, warmer, locales (Bolivia and Costa Rica for example). Taryn has developed new gas-sampling methodologies, performed satellite image analyses to determine volcanic gas fluxes, conducted airborne gas sampling flights, and published numerous journal articles. Her work on volcanic gases in the atmosphere has led scientists

around the world to ask her to work with them. Taryn hopes to get a postdoctoral fellowship that allows her to continue this work after graduating from UAF. Her eventual goal is to be a volcanic gas chemist for the United States Geological Survey (USGS) and help protect people from the hazards associated with volcanic eruptions.



University of Alaska Biomedical Research Conference (UABRC) ~ K. Drew

The 7th Annual University of Alaska Biomedical Research Conference (UABRC) was held in Fairbanks May 21-23, 2012 (alternates between Anchorage and Fairbanks annually) at the UAF Wood Center Ballroom. Participants included seventy faculty, students, and postdoctoral associates from UAF, UAA, Providence Hospital, and the Alaska Native Tribal Health Consortium. Professor Kelly Drew, Coordinator of the Molecular Biology and Biochemistry graduate program in the Department of Chemistry and Biochemistry organized the event with assistance from Cathy Griseto, INBRE. The annual event sponsored by Molecular Biology and Biochemistry programs at UAF and UAA was supported by Alaska INBRE, the Department of Chemistry and Biochemistry, the UAF Provost's office, the Institute of Arctic Biology, VWR Scientific and Olympus America.

This year's event was the result of the team efforts of Dr. Marvin Schulte (drug discovery), Dr. Michael Harris (breathing, thermoregulation and hibernation), Dr. James Fitterling (behavioral health), Dr. Cindy Knall (immunology), Dr. Kriya Dunlap (Art in Science competition) and Professor Larry Duffy (neuroscience); each of whom chaired sections and assisted in facilitating the event.

The Plenary Lectures of Dr. Sven Ebbesson, Dr. Marvin Schulte, Dr. Cheryl Frye and Dr. Kenneth Tyler highlighted the multi-day conference. A grant writing workshop was led by Dr. Gabrielle Leblanc and energetic



Presentation of Sven Ebbesson Award to Dr. Jeffery and Jo Zuckerman Family by CNSM Dean Paul Layer

discussions were led by Adam Krynicki, Helena Wisniewski and Dan White on Intellectual Property and Commercialization in Biomedical Research. Thank you for all of your hard work and participation in this conference.

The Dean of the College of Natural Science and Mathematics, Professor Paul Layer presented the 2012 Sven Ebbesson Award for Excellence in Neuroscience to the Dr. Jeffery and Jo Zuckerman family. A radiologist in Fairbanks since completing his residency in

1993, Dr. Zuckerman has an extensive medical resume. He has served as a board member on the Greater Fairbanks Hospital Foundation and assisted Fairbanks Memorial Hospital in obtaining certification as a national breast center—the only nationally accredited center in the state.

A collaborator of Professor Kelly Drew, Dr. Zuckerman lends his expertise as a radiologist to the understanding of ischemia tolerance observed in Arctic ground squirrels, an innovative model for developing therapies for stroke recovery. Jeff and Jo's daughter, Bianca, worked in Professor Drew's laboratory as an undergraduate researcher. Her project used MRI to study regional blood flow in hibernating ground squirrels. She is now a physical therapy Ph.D. student in Texas. The Alaska Neuroscience Program appreciates the family's interest in neuroscience and biomedical imaging research as evidenced by their active participation in Dr. Drew's research and the provision of facilities and resources to advance biomedical research at the University of Alaska Fairbanks.



Participants of UABRC

Tom Kuhn ~ Biochemistry and Cellular/Molecular Neuroscience

Another easy, calm, relaxing year just passed - a walk in the park. Well, not really at all but most everyone starts with pointing out just how busy their year was. Who'd guess that a year full of research, teaching, and administration would not be very busy? Research progressed well with its focus on the molecular mechanisms underlying inflammatory processes pivotal to the phenomena of aging and chronic degenerative central nervous system diseases. A key avenue of my laboratory's research studies the tremendous health benefits derived from a nutritious diet rich in fruit and vegetables, particularly Wild Alaska Bog Blueberries. Most diseases that we battle as a society do not have a genetic origin and are with great certainty the result of lifestyle choices – that is the fascinating field of epigenetics. In short, our health is our responsibility, which really should not come as surprising news.

Several of our recent manuscripts are in press or published, and the most recent one describes the potency of a specific fraction obtained from Wild Alaska Bog Blueberries in inhibiting the production of reactive oxygen species generated by an enzyme – NADPH oxidase. This enzyme is vital in the implication of innate inflammation in the progression and likely initiation of pathologies. My former graduate student **Dr. Sally Gustafson** performed the majority of this research and she moved on to an exquisite postdoctoral position at North Carolina State University with Dr. MaryAnn Lila. Now Sally was just accepted to Medical School starting this fall. Another graduate student, **Mary Hogan**, finished her thesis in exceptional style. She demonstrated that alcohol-initiated damage in the developing brain is primarily caused by strong inflammation and, not surprising, specific fractions and even individual purified molecules from Wild Alaska Bog Blueberries blunt neuronal damage. Her investigations focused on the cerebellum, which plays a crucial role in many higher cognitive processes aside from fine movement regulation. Many psychiatric disorders (autism, schizophrenia, depression) are suspected to have roots in aberrant neuronal development. Mary hammered out her M.S. thesis, which included research of volume similar to a Ph.D., in record time. Aside from that, she was a stellar teaching assistant (see the awards section of this



UAF photo by Todd Paris

document), and took care of her family of three girls. I'm still trying to figure out she did all that. An undergraduate student, **Jessica Pugh**, also spent a semester in my laboratory. She had been accepted to Pharmacy School and so we tuned her project to this future avenue. She initiated experiments to compare the efficacy of isolated molecules from blueberries to structurally similar molecules.

In the teaching arena, this was an active year with many new challenges. In my graduate course "Molecular Foundations of Gene Expression", I introduced a major focus in epigenetics and the students exhibited strong interest. We plowed through two books, many research papers, and review articles. The biochemistry colloquium, which I initiated a couple of years ago with a professional skills focus, took a closer look at experimental design. Instead of a focus on statistics that would try to make good data out of bad data, we instead homed in on how to obtain good data. We asked the question "Is the classic hypothesis approach most promising?" In the spring semester, I taught CHEM 105x, which was more of an eye opener than I would have expected from the large enrollment (160+ students). The surprising finding was that an obsession to learn minute details seemed to prevent an actual broader understanding of science. At least to me, tectonic changes in teaching science are necessary to move from "knowing" science to "understanding" science. After all it was an interesting year.

Alumni Out & About

Robert Arnold (B.S. 1980) is a pediatric ophthalmologist in Anchorage, Alaska. He was instrumental in naming our newsletter. AlasChemist is a perfect fit ~ thank you! His son Andrew recently changed his major to chemistry here at UAF. We look forward to the day we add Andrew's name to our list of alumni.



Richard Hoopes (B.S. 1979) has relocated to sunny California from New York. We hope you are enjoying the sun, surf, and warm of California.

Anastaisa (Tranbenkova) Ilgen (Ph.D. 2011) and her family welcomed Ksenia Maria born December 10, 2011. Ruslan is a proud big brother to his baby sister.



David Ayotte (B.S. 2012) has taken a Lab Technician position at the Tesoro Refinery in Kenai.

Kyra Brown (B.S. 2012) has been accepted into the Forensic Science master's program at University of California Davis.



Gregory Cushing (B.S. 2004, M.S. 2006) recently received his Ph.D. at the University of Virginia, Charlottesville and is currently employed as a surface chemist for Dow-Corning in Midland, Michigan

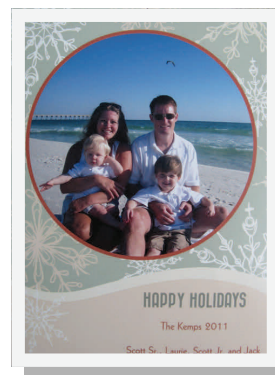
Todd Fortun (M.S. 2012) has taken a position at Jacobs Engineering in Anchorage, Alaska.

Spencer Giles (B.S. 2009, M.S. 2011) is working on his Ph.D. degree at George Mason University in Virginia.

Zachary Hill (B.S. 2006) recently received his Ph.D. at the University of Washington Chemistry department under Dustin Maly and has started a post-doctoral fellowship at the University of California, San Francisco.

Michael Jaramillo (B.S. 2005) & **Ashley (Jones) Jaramillo** (B.S. 2006, M.S. 2010) welcomed Ester Josephine on August 19, 2011. They have all recently moved back to Fairbanks and Michael will be finishing up with his Master's degree.

Laurie (Martin) Kemp (B.S. 2002, M.S. 2005) and **Scott Kemp Sr.** (B.S. 2003, M.S. 2005) and Scott Kemp Jr. welcome Jack into their family in 2011 and send their greetings from Alabama.



Other News

Sheila Chapin sends her greeting to everyone and cannot believe that another year has flown by since they left Alaska. Her husband Tom is officially retired and she is working an almost full time job at Carquest overseeing the drivers and taking care of the office for the owner. She stays connected on Facebook so look her up and send your hellos.



Incoming graduate student Nicole Ramos doing field work in Delamar Nevada. Nicole will be working with Sarah Hayes.

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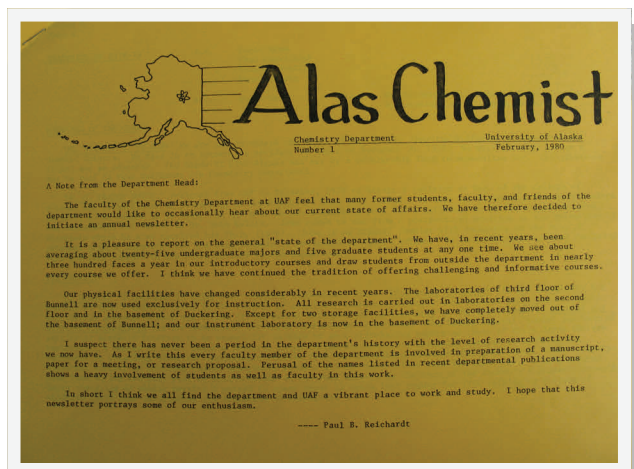
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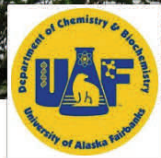
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Department at a Glance

- American Chemical Society (ACS) approved programs (only such program in Alaska)
- 7 B.S., 9 M.S., and 2 Ph.D. graduates in 2011-12 academic year
- 15 faculty, 3 staff, 3 postdoctoral associates, 2 technicians
- 35 graduate students
- 31 publications in 2011-12 academic year
- 64 Undergraduate majors and pre-majors
- 25 entering undergraduate students - 12 of whom are UA Scholar award recipients
- 5 entering graduate students
- 70th percentile median score of our graduating seniors on the ACS Diagnostic of Undergraduate Chemical Knowledge exit exam
- 881 students taking introductory (100-level) chemistry offerings in the 2011-12 academic year

AlasChemist Volume Number

There are those among our readers who are very astute with keen editing abilities and will notice that last years edition of the AlasChemist was volume 29 and this year it is volume 33. After a close examination of our archived editions the explanation is very simple, we duplicated edition numbers several times in the early years of the AlasChemist. With this edition I am setting the record straight and sharing with you the true age of our newsletter, 33 years and getting better with each new edition.

Happy Birthday AlasChemist !



All photos taken by Mist D'June-Gussak unless otherwise tagged .



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: chemistry.uaf@alaska.edu with the subject line ALUMNI UPDATES. All news will be published in the next issue of AlasChemist.

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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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