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Upcoming Events

October 29, 2010
Halloween Show

SAVE THE DATE:
December 10, 2010
Holiday Party
August 29, 2011
Alumni Reception
at Denver ACS Meeting
Fall 2011
Stille Symposium

Message from the Chair



Wow! It's hard to believe that more than a year has gone by since I became Department Chair. When I started this newsletter last year, I fully intended it to be a twice-a-year publication. Yet, here I sit more than a year following the first issue, attempting to put the polishing touches on what will be only our second edition. I could use one of the standard excuses "The dog ate my column!" Or "My grandmother died (again) and I have not been able to concentrate." Or "I was having issues with my computer." But, I no longer have a dog, my relatives are all in good health, and there have been no major computer crashes recently (knock on wood). So, no excuses, but I will try to keep this brief so that we can finally publish this issue.

When I reflect on my first 15 months as Chair, I'm amazed at what we've accomplished. Our faculty have received several prestigious local and national awards recognizing their efforts as teachers and scholars. Likewise, our students continue to demonstrate their excellence, earning

competitive national and local scholarships and fellowships. We expanded our faculty ranks, with the hire of Prof. Amber Krummel, who plans to develop a dynamic, state-of-the-art research program in multidimensional spectroscopy. The Department has also seen the renovation of laboratory space designed to house a modern cell facility, which is already partially furnished and being used by several research groups, including the McNaughton, Reynolds, and Williams labs. Although not fully equipped yet, this facility promises to enhance the department's research efforts by providing a venue for trial *in vitro* studies on promising therapeutics and drug delivery systems. Finally, we successfully recruited an outstanding graduate class that began their studies this fall, and have added new graduate courses in materials synthesis, computational chemistry, and biological chemistry.

Despite the bleak economic landscape in Colorado, I am encouraged every day by the amazing things our faculty and students continue to accomplish within these walls. In the face of additional budget cuts and the looming possibility that the State of Colorado could discontinue funding for higher education, I continue to be optimistic and to believe that our department will stay strong. One of my favorite quotes (immortalized on a refrigerator magnet in my kitchen) comes from Nobel Prize winning chemist Ernest Rutherford, who once said, "*We haven't got the money, so we've got to think!*" Given the impressive efforts of faculty, staff, and students that I've seen over the past 15 months, from my vantage point, we've got a whole lot of thinking going on around here! And that's a good thing.

Chem Club Mad Scientist Halloween



Photos by chemistry grad student Jeffrey Shearer.

The Halloween Show is October 29 from 6:30 - 9 pm in the Chemistry Building. The show will include several small demonstrations where kids can learn about science and get prizes and candy at the same time! We will also have several crafts, hands-on activities and one large show. Parents are welcome to bring children of any age.

CSU's Chemistry Ranks Among Top 50 Across Nation

U.S. News and World Report has named the graduate program in the Department of Chemistry at Colorado State University one of the top 50 programs in the country.

The Chemistry Department at Colorado State University held its first alumni event at the National ACS meeting in San Francisco. The reception was held Sunday night, March 21st at the Intercontinental Hotel.

Look for additional alumni events at upcoming ACS meetings, including a reception at the Fall 2011 National ACS Meeting in Denver!



ACS
Chemistry for Life™

Materials Research at CSU Becomes a Little More SAXS-Y

Fall 2009, the Central Instrument Facility became home to yet another state-of-the-art materials characterization instrument as a result of a recently awarded Major Research Instrumentation (MRI) grant from the National Science Foundation. The addition marks an important milestone for a large number of



Fourth year graduate student Nicole Escude (Chen) sets up the SAXS instrument to analyze a polymer sample.

regional research programs now focused on nanoscale materials design and fabrication, and solidifies CSU's reputation as one of the regional leaders in materials research and characterization. The instrument, which integrates small angle and wide angle X-ray scattering capabilities (SAXS and WAXS), was custom built for CSU by Rigaku Americas Corporation and stands as one of the most advanced lab-scale scattering tools available. Over thirty engineers and scientists

from academic institutions all over the region contributed to the proposal, each with unique and fascinating new science to be explored. The instrument is extremely versatile, allowing analysis of materials and processes such as solution phase protein folding, complex liquid crystal behavior, and transition kinetics in nanostructured polymer melts. "We will have researchers using the instrument to help develop materials for new organic solar cells, water filtration membranes, chemical and drug delivery, nanoparticle catalysts, joint replacement technologies, renewable polymer composites, artificial muscles, tissue growth scaffolds...and the list goes on and on," says Professor Travis Bailey, the principle investigator on the NSF-MRI award and assistant professor in the Departments of Chemical and Biological Engineering and Chemistry.

The new small-angle X-ray scattering instrument operates by sending a highly focused and intense X-ray beam through a small sample of material to be investigated. Some fraction of the radiation passing through the sample scatters from its original path, in a manner that is wholly dependent on the sample's structure.

The instrument then captures the pattern formed by the scattered X-rays, from which researchers are able to reconstruct the details related to the material's three-dimensional structure. Although X-ray scattering has been widely used to elucidate crystal structure for a long time, the SAXS instrument allows the probing of structures with dimensions on the size scales in the 10s to 100s of nanometers, rather than the 10s of angstroms (i.e. the length of several chemical bonds) associated with classic X-ray diffraction. Ironically, many nano-structured materials are on a size scale that is just *too big* for other diffraction instruments to accurately elucidate structural characteristics.

Professor Bailey compares the issue to looking at the skyscrapers in the Denver skyline, with a telescope that is so powerful you can only see a few bricks at a time. "The new instrument will allow us to not only see the bricks, but to *zoom out* and see how the windows and floors are arranged as well. In fact we may be able to see the next building over, too." It's this incredible range over which the new instrument operates, from several angstroms to hundreds of nanometers, that makes it such a valuable addition to materials researchers in our area.

Students in the Bailey, Chen and Reynolds groups have been collecting data for multiple publications and use of the SAXS by researchers in CSU Engineering departments along with researchers at other institutions continues to grow.

The department welcomes.....

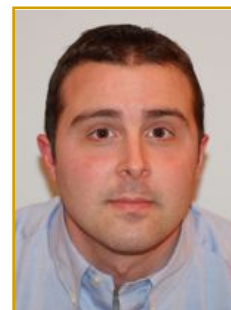


Dr. Chris Ackerson (Fall 2009)

Dr. Ackerson joined the faculty of CSU's chemistry department in the Fall of 2009. His research is focused at the interface of inorganic nanoparticle chemistry and biology. To this end, his research group endeavors to both make nanoparticles that can effect or reveal biological processes, especially disease processes, as well as harness biological processes to synthesize novel inorganic clusters and nanoparticles. The group currently comprises one postdoc, one graduate student and one technician. In addition to starting the lab, Dr. Ackerson teaches Inorganic Synthesis and is active on the Graduate Admissions Committee. Dr. Ackerson was born in Boulder, Colorado, grew up in Stillwater, Oklahoma, and earned a bachelor's degree with honors at the University of Texas–Austin where he completed a Special Honors Thesis in Chemistry under the supervision of Tom Kodadek. He pursued PhD studies at Stanford University under Roger Kornberg, the 2006 Nobel Laureate in Chemistry, where he developed new gold cluster synthetic strategies for application to biological electron microscopy. Immediately prior to joining the faculty at CSU, Dr. Ackerson worked as a postdoc in the lab of CSU Chemistry alumnus Professor Dan Feldheim, at the University of Colorado in Boulder, where he worked on genetically encodable nanoparticles.

Dr. Brian McNaughton (Fall 2009)

Dr. McNaughton joined the Chemistry Department at CSU in the fall of 2009, and currently oversees a lab of seven postdoctoral, graduate, and undergraduate researchers. Research efforts in the McNaughton group are multidisciplinary, but focus on small molecule-dependent regulation of RNA biochemistry; inhibition of protein-protein interactions; targeted delivery of therapeutic and bio-imaging reagents; and novel biopolymer chemistry. Members of the McNaughton group address these challenges using methods in organic synthesis, combinatorial chemistry, molecular biology, and cell biology, in the context of high-throughput screening and evolution-based selections. Brian received his Ph.D. from the University of Rochester under the direction of Benjamin Miller, where he worked on methods for small molecule evolution and small molecule - RNA interactions. He then conducted postdoctoral research as a Howard Hughes Medical Institute fellow at Harvard University, where he worked on protein engineering under the direction of David Liu. Shortly after arriving to CSU Brian received a CDMRP New Investigator Award from the Department of Defense.



Dr. Amber Krummel (Fall 2010)

Dr. Krummel, who is originally from the Northwest, completed her Bachelor's in Chemistry at Portland State University in Portland, Oregon. Dr. Krummel then moved to Madison, WI to pursue graduate studies at the University of Wisconsin—Madison. Dr. Krummel earned her Ph.D. in Physical Chemistry under the guidance of Prof. Martin Zanni. Her graduate work focused on developing 2D IR spectroscopy as a tool for investigating the structure and dynamics of DNA. Upon completing her Ph.D., Dr. Krummel moved to Cambridge, Massachusetts, where she worked as a Postdoctoral Fellow in the Weitz lab at Harvard University. In July 2010, Dr. Krummel relocated to Fort Collins to join the Chemistry Faculty at Colorado State University. Research in Dr. Krummel's lab will focus on elucidating the molecular level details that drive nano- to microscopic properties in condensed phase systems. Initially, our group will exploit the structural and temporal resolution of two-dimensional infrared spectroscopy to address questions related to pore-formation in lipid membranes, charge transport in polyelectrolyte membranes, and the nano-aggregation process of asphaltenes.

Going with the Flow...Microfluidics in the Henry Group

Professor Charles Henry's group is on the move and in the groove. Literally. The Henry group (http://www.chem.colostate.edu/cshenry/Henry_Group/Home.html) develops microfluidic devices and separation chemistry using microfluidic technology, also known as "lab-on-a-chip", to study environmental and bioanalytical systems. This hot new area of chemistry has attracted significant attention because of the potential for enormous improvement in biosensors for water remediation, electrochemical sensors for pharmaceutical applications, and in development of alternative biofuels. Dr. Henry has also created a new startup company, Advanced MicroLABs, Inc., which is currently working with a range of CSU researchers to develop many of these microfluidics-based technologies into commercial products. Over the past year or so, Dr. Henry and his group have received considerable recognition for their efforts, including:

- **Dr. Charles Henry** was awarded a prestigious US Scholars Fellowship from the Fulbright Foundation to conduct research for a semester at Chulalongkorn University in Bangkok, Thailand. The fellowship was hosted by the Thailand-U.S. Education Foundation (TUSEF) in Bangkok. While there, Dr. Henry worked on a project to develop sensors based on ordinary filter paper. The sensors are very inexpensive, costing approximately \$10Baht (\$0.30) to make and are designed to ultimately be read by an inexpensive handheld instrument in the field. Tests for both environmental pollutants and disease biomarkers were developed as part of the project with a paper recently published in *Analytical Chemistry*. In addition to research, Dr. Henry taught a course in Microfluidics for graduate students at Chulalongkorn University and spent his time visiting other universities and giving a number of lectures on a variety of research topics.
- **Dr. Carlos Gonzalez** was awarded an Oak Ridge Institute for Science and Education post-doctoral fellowship to conduct research at CSU for the US Army Corps of Engineers. Dr. Gonzalez is co-advised by Drs. Charles Henry (CSU) and Donald Cropek (Army Corps) and conducts research in development of electrochemical biosensors as sensing elements looking at cellular responses to waterborne toxins in a multi-institutional research project. He received his B.S. degree in Chemistry from Chapman University in 2001 and his Ph.D. in Chemistry from Oregon State University in 2007.
- **Chuck Henry** had a 2009 article named as the "Hot Article" by the Analyst which is a journal focusing on new science work of the highest quality, covering the areas of analytical, bioanalytical and detection science. Hot Articles are ones that have been rated "significant" by peer-reviewers.
- **Megan Easterly**, a grad student in the Henry group obtained her B.S. in Chemistry at Harding University in Arkansas and is currently working toward her Ph.D in analytical chemistry. Megan was awarded a National Science Foundation grant to work on a GK-12 project, which is a collaboration between the Biomedical Sciences, Computer Science, Chemistry, Electrochemical Engineering, and Mathematics departments. The work focuses on fabricating a biosensor that can detect concentration gradients of biologically relevant compounds in the brain and other tissues. Currently her research has centered on fabricating gold electrode arrays. These fabricated arrays are then electrochemically tested and their responses calibrated according to varying concentrations of a model analyte. In addition to research, the GK-12 project involves visiting high schools and enhancing student/teacher learning by providing real world scientific applications to the things they are learning about in the classrooms.



Professor Charles Henry,
Dr. Carlos Gonzalez,
Megan Easterly and Scott Noblitt

- **Scott Noblitt**, a senior grad student in the Henry group did his undergraduate work at Rose-Hulman Institute of Technology. He was awarded a Science to Achieve Results (STAR) fellowship from the US EPA beginning in January 2009. STAR fellowships are highly competitive with less than 5% of applicants receiving funding. The fellowship provides both tuition and a stipend for up to three years. Scott's research project focuses on the development of an instrument for routine atmospheric aerosol chemical speciation using lab-on-a-chip technology. Atmospheric aerosols represent a major unknown in developing a fundamental understanding of the impacts of human activity on the atmosphere.

Faculty Honors and Accomplishments

Our faculty have been recognized in many ways. Recent highlights from members of the Chemistry Department include the following:

Professor **Amy Prieto** received a prestigious **NSF Career Award** with a proposal entitled "Energy Storage and Conversion - Coupling the Direct Electrodeposition of Crystalline Intermetallics with Targeted Outreach to Elementary Schools". Dr. Prieto hopes to use some of her NSF funds to focus on adding renewable energy topics (in the context of transportation) to the popular Harry Potter based outreach shows the undergraduate Chemistry Club at CSU has already developed.

Professor **Brian McNaughton** was honored with a **New Investigator Award** entitled "A Selection-Based Approach to Evolve Prostate Cancer-Selective Cell Penetrating Peptides: Application for Targeted Therapeutic Delivery and Imaging from the Prostate Cancer Research program of the Department of Defense.

Professor **Yian Shi** was the recipient of a **Fellowship from the Japan Society for the Promotion of Science Fellowship**.

Professor **Melissa Reynolds** received a grant from the **Bioscience Discovery Evaluation Grant Program** (BDEGP) – a state of Colorado HB1001 program through the State of Colorado Office of Economic Development and International Trade (OEDIT). Dr. Reynolds will use the funding to study the development of a universal biocompatible coating process for medical devices.

In addition, the Boettcher Foundation named Colorado State University chemist **Melissa Reynolds** as one of only six 2010 Boettcher Investigators as part of the **Webb-Waring Biomedical Research Program**, which helps recruit, retain and advance scientific talent in Colorado. Reynolds is the only researcher from Colorado State University to receive the honor, which comes with a three-year, \$200,000 grant.

The 19th International Symposium on Fluorine Chemistry, co-organized by **Steve Strauss**, was held in Grand Teton National Park last summer. The conference was a smashing success with over 400 chemists and engineers in attendance.

Faculty Honors and Accomplishments continued



University Distinguished **Professor Bob Williams** was appointed last year as the **Co-Director of the Experimental Therapeutics groups in the Infectious Diseases and Cancer Superclusters**. CSU Superclusters are groups of CSU researchers focused on crosscutting research areas of global importance (see <http://superclusters.colostate.edu/> for more information on these world-class programs).

Also announced on August 30, **Bob** is the recipient of the **2011 ACS Ernest Guenther Award in Chemistry of Natural Products**. This is the highest award the ACS bestows for Natural Products research. The Ernest Guenther Award is given to individuals who have accomplished outstanding work in analysis, structure elucidation, and chemical syntheses of natural products, with emphasis on independence of thought and originality.

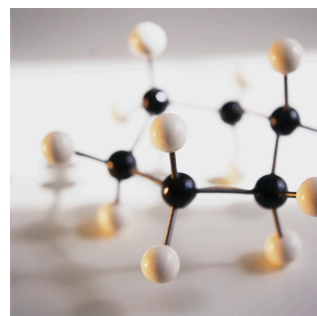
Lisa Dysleski received the College of Natural Sciences undergraduate teaching award.

Professor Ellen Fisher Colorado State University professor and chair of the Department of Chemistry, has been recognized with the university's **Scholarship Impact Award**, one of the highest annual honors given by the university that includes \$10,000 in funding to support her research.

Chemistry by the Numbers

The following list gives a snapshot of the chemistry department at CSU, by the number of:

Current graduate students(Fall 2010).....	156
International graduate students (Fall 2010).....	16
Current undergraduate majors (Fall 2010).....	167
Female Chemistry majors (Fall 2010).....	89
Freshman Chemistry majors (Fall 2010).....	51
Ph.D.'s granted 2009-2010.....	14
M.S. degrees granted 2009-2010.....	6
B.S. degrees granted 2009-2010.....	23
Full time research-active faculty (Fall 2010).....	29



Graduate Degrees Awarded 2009-2010

Doctor of Philosophy

Tim **Arthur** (Summer 2010, Prieto)
Atanu **Bhattacharya** (Spring 2010, Bernstein)
Cameron **Burnett** (Spring 2010, Williams)
Jie **Hong** (Spring 2010, Elliott)
Xiangna **Jia** (Summer 2009, Williams)
Dana **Johnson** (Spring 2010, Kennan)
Igor **Kuvychko** (Summer 2009, Strauss)
Qin **Liu** (Spring 2009, Rovis)
Jennifer **Moore** (Spring 2009, Rovis)
James **Mosby** (Summer 2010, Prieto)
Brian **Murphy** (Spring 2009, Henry)
Karl **Stupic** (Spring 2010, Meersmann)
On Lo **Wong** (Fall 2009, Shi)
Robert **Yu** (Spring 2009, Rovis)

Masters

Tashi **Herzmark** (Summer 2010, Elliott)
Tina **Ma** (Fall 2009, Rappé)
Lucas **Mason** (Fall 2009, Henry)
Michelle **Morgan** (Fall 2009, Fisher)
Brian **Nettles** (Fall 2009, Shi)
Mark **Oinen** (Spring 2010, Rovis)



Spring 2010 Commencement



Honors grads: Amanda Ehlenbeck, Kristin Suhr, Dan Nelson, Ran (Nancy) Tao

Front row (l to r): Amanda Ehlenbeck, Dustin Keller, Roy Miller, John Wydallis, Dan Nelson
Second row (l to r): Kristin Suhr, Madison Martinez, Ran (Nancy) Tao, Travis Folsom, Julia Devine, Sheryl Johnson
Back row (l to r): Branka Ladanyi, Grzegorz Szamel, Nancy Levinger, Ellen Fisher, Steve Strauss, Oren Anderson