

Letter from the Chair, Ellen R. Fisher



It is once again the close of another academic year and I am amazed at how quickly this year has gone. Although many often consider summer to be "down time" on a University campus, there is really an amazing amount of work that gets accomplished in the absence of most of the student population.

This summer promises to be no exception. We have a record number of students (16!) scheduled to participate in our NSF-funded Research Experiences for Undergraduates (REU) program, coming from as far away as New York and Ohio and as close to home as our own CSU students. Inclusion of so many students in this amazing program would not be possible without matching funds from the College of Natural Sciences as well as from generous donations to the Department of Chemistry. In addition, the Department will be preparing for a record class of graduate students matriculating in the fall 2013 semester. Our graduate recruiting committed did an absolutely fantastic job this year and we are anticipating 58 (!!!) new Ph.D. students will be arriving to embark on their graduate programs of study. This year's highly talented and diverse class comprises 17% underrepresented minorities and 46% women, and includes 8 students who will join the growing ranks of our newest cross disciplinary program in Chemical Biology. Amidst all of this, the Department will also be undergoing several renovation projects and thus will become an absolute construction zone for the majority of the summer.

Perhaps the most exciting project is a complete renovation of the Chemistry building lobby to include creation of an undergraduate student advising center along with a study nook for students.

The vast majority of the funds for this renovation came from CSU students through the University Facility Fee Advisory Board (UFFAB) which seeks to allocate student facility fees in ways that directly benefit the students of Colorado State University. We are grateful to the UFFAB as well as Dean Nerger for financial assistance with this much needed project. In addition, four classrooms in Chemistry and Yates will be updated along with establishment of a new conference room and office space for our IT staff, and we will also be renovating some lab space for our newest faculty member, Dr. James Neilson who will begin his faculty appointment in the Department this August. Whew! All-in-all, there's not likely to be much "down time" around here for the next few months, that's for sure! As always, I encourage you to stay in touch and let us know what's going on with you. Please feel free to contact me at Ellen.Fisher@ColoState.Edu and I hope all of you enjoy the summer, wherever you are!



Back row, left: Dr. Matt Shores, Joseph Allison (PhD 2013, Rappe), Jeff Shearer(PhD 2013, Fisher), Bryon Larson (PhD 2013, Strauss), Dr. Alan Van Orden, Alberto Jimenez(PhD 2013 Williams) Front row, left: Stephanie Fiedler (PhD 2013 Shores), Dr. Tony Rappé, Dr. Ellen Fisher, Dr. Steve Strauss, Rajesh Nayak (PhD 2013 Van Orden)

Upcoming Events

June 3 to August 9, 2013 Chemistry Summer REU

July 28 to August 1, 2013 OMCOS17

First held at CSU in 1981, Organometallic Chemistry Directed Towards Organic Synthesis (OMCOS) will again be hosted at CSU by **Profs. Tom Rovis** and **Eric Ferreira**, July 28 through August 31, 2013. From its humble beginnings more than 30 years ago, OMCOS has grown to a biennial meeting held around the world. For more information, visit the OMCOS website at www.omcosl7.com.

July 31 to August 3, 2013 International Symposium for Monolayer Protected Clusters 2013

Prof. Chris Ackerson will host the third iteration of this conference, to be held at CSU's Pingree Park campus. Previous iterations were in 2008 and 2011 in Jyvaskyla, Finland. Confirmed speakers for this international conference may be found on our preliminary program <u>http:// sites.chem.colostate.edu/ackersonlab/</u> <u>ISMPC13/Program.html</u>, and include speakers from Europe, Japan, India and USA.

September 20-21, 2013 MASUA- Chemistry Chair Meeting

September 28, 2013 Robert M. Williams Symposium

Giving to Chemistry

Through the generous gifts of Chemistry alumni and friends, we are able to offer support to our students as well as resources to our faculty. Financial assistance through scholarships is very important to our students, and in many cases allows them to stay in school. In addition to improving learning opportunities, gifts also play a critical role in providing faculty the needed resources to perform cutting-edge research. To make a gift, please visit <u>https://advancing.colostate.edu/CNS/CHEM/</u>GIVE.



Honors and Accomplishments

Three Chemistry professors have been awarded the **American Association for the Advancement of Science** distinction of **Fellow**. Professors Eugene Chen, Mike Elliott and Tom Rovis received the title of AAAS Fellow, one of the most prestigious honors in science, requires nomination by scientific peers.



Eugene Chen

For seminal contributions to polymerization catalysis and sustainable chemistry, particularly for developing new polymerization reactions and techniques for advanced and/or sustainable polymers.

C. Michael Elliott

For creative work in inorganic synthesis and photochemistry as well as for teaching and mentoring of students and service as department head.





Tomislav Rovis

For distinguished contributions to the field of chemical synthesis, particularly for the development of nucleophilic carbene catalysis and asymmetric umpolung.



Professor Anthony Rappé was appointed Interim Director of **Colorado State University Clean Energy Supercluster**.

Rappé is a key player in the Clean Energy Supercluster's mission as a university-wide, multidisciplinary alliance of researchers, innovators, business experts, and social scientists

bringing CSU technology to market. He has extensive experience collaborating with scientists and consulting with companies such as Amoco, Albemarle, BF Goodrich, BP, Exxon, Ineos Technology, Rohm & Haas, Shell, Symyx, Union Carbide, and UOP. As a founding member of the Clean Energy Supercluster Steering committee, Rappé brings expertise in energy efficiency (catalysis) and solar conversion to the group.

Launched in 2008, the Clean Energy Supercluster includes over 160 faculty from all eight colleges at CSU. The supercluster integrates experts throughout the university with the goal of transitioning CSU research and development to the marketplace and improving the community's quality of life.

Honors and Accomplishments



Professor Eugene Chen was recognized as a 'Research Rockstar' by the Colorado Cleantech Industry Association. Dr. Chen received the **Excellence in Commercialization** award for his development of patent-

pending chemical processes that could create sustainable bioplastics, biofuels and other value-added chemicals from biomass. Chen has developed a platform of processes to convert small molecules derived from nonedible plant biomass to bioplastics. The material could be used for everything from optical fibers and contact lenses to furniture and automobile parts. He has also developed catalytic processes that refine biomass into a platform chemical that can then be converted into biofuels and other value-added chemicals. The Colorado Cleantech Industry Association represents the interests of the state's cleantech industry.

the International Tom Rovis was selected to win Society for Heterocyclic Chemistry Katriztky The International Society for Heterocyclic Award. Chemistry Katritzky Junior Award was established to recognize up and coming members of the heterocyclic chemistry community who have made outstanding contributions to the field. The award is presented biannually and the recipient is invited to the Society's Biannual meeting to present an Award Address. This year's meeting is held in Shanghai, China. Previous winners of this award are a 'Who's Who' of organic chemistry, including prominent scientists at Princeton, Scripps, and Max Planck, as well as Colorado State's Professor John Wood (2009).



Professor Brian McNaughton has been awarded a **Floyd A. Schlossberg Honorary Research Grant** from the **Leukemia Research Foundation**. Support from this grant will allow graduate and undergraduate researchers in the McNaughton lab to study methods for overcoming resistance to chemotherapy, as

well as identify novel approaches to treat cancer.

Ph.D. student **Monica McCallum** (Wood) received a 2013 National Science Foundation (NSF) **Graduate Research Fellowship Program** (GRFP) Fellowship. 2012 BS Alumni **Kellie Woll** (BS 2012, Crans) also received an NSF GRFP fellowship, and is working on her Pharmacology-Biomedical PhD at the University of Pennsylvania.



Dr. Amy Prieto was named a **CSU Monfort Professor.** Prieto has received wide acclaim for her research on a powerful, lighter, and cheaper lithiumion battery that recharges quickly enough to make all-electric cars the go-to green vehicle. Prieto launched the first startup company through the university's Clean Energy Supercluster

commercialization arm, Cenergy, in 2009. Prieto Battery focuses on producing batteries that are theoretically up to 1,000 times more powerful and 10 times longer-lasting and cheaper than traditional batteries. Established by the Monfort Family Foundation, this program enables Colorado State to recruit and retain top-quality faculty. These competitively-selected, two-year appointments recognize and provide support for innovative teaching and research activities.



Khurram Shahazad Munawar, visiting scholar with the Crans group, w a s n o m i n a t e d t o b e a n International Presidential Fellow at Colorado State University. The International Presidential Fellows Program consists of approximately 30 graduate students and post-graduate

visitors representing a wide variety of academic disciplines at Colorado State University. The purpose of the program is to introduce the Fellows to ongoing and path-breaking research at CSU. Khurram is from Sargodha, Pakistan, and received his PhD from Quaid-i-Azam University in Islamabad. Khurram is working on vanadium chemistry, a metal that shows excellent insulin mimetic properties.



Prof. Thomas Borch, was recognized by the *Journal of Environmental Monitoring* as an **Emerging Investigator** in the field of environmental science and engineering. Borch, an associate professor in Soil and Crop Sciences and joint faculty in Chemistry, was one of just 15 international

researchers commended for their work. An expert in the movement of pollutants through soil and water, Borch's honor as an Emerging Investigator represents "the best and brightest young minds in environmental sciences and engineering", the journal's editors wrote.

CSU Chemistry's ACS Student Chapter received an **Honorable Mention Award** for its activities during the 2011-2012 academic year. Congratulations to the students as well as their faculty advisor, **Prof. Amy Prieto**.

Professor Chuck Henry Produces a New Method for Measuring Airborne Particulate Matter

CSU Chemistry **Professor Chuck Henry** and Ph.D. student **Yupaporn Sameenoi**, in collaboration with **Dr. John Volckens** from Environmental and Radiological Health Sciences at CSU have produced a new method for measuring oxidative stress caused of airborne particulate matter as reported in the journal *Environmental Science and Technology*. The new method is ground breaking because it



allows for measurements of individual exposure. As part of the study, the team measured oxidative activity of particulate matter during the 2012 High Park fire and found levels that rivaled the worst days in Los Angeles, Mexico City, or Beijing which are considered among the most polluted urban air environments in the world.

Smoke from the High Park Fire 2012

The Analytical Division hosted the 45th Annual Society of Western Analytical Professors' (SWAP) meeting in January. SWAP is an annual meeting of faculty members, postdocs and graduate students in analytical chemistry from universities and colleges in the western United States. The meeting was a huge success, bringing together 26 attendees from schools from Arkansas to California! This year, we were pleased to offer scholarships to support attendance by faculty from primarily undergraduate institutions within the state to foster collaborations. The discussion-oriented focus of the meeting helped spur many lengthy discussions among attendees, fostering an open exchange of ideas about innovations and the current challenges that we face in teaching and research. In particular, based on the recent ACS report on the need to better train students, we discussed preparing our students for careers in the 21st century, especially related to careers in industry. CSU Chemistry was honored to host the 2013 meeting, and offer attendees such valuable opportunities for improving education and research in the chemical sciences.





The McNaughton Lab Shows that Multivalency Effects Orchestrate Delivery

An important impediment to the broader use of protein reagents in medicine and basic research is the difficulties associated with their delivery

across the lipid bilayer membrane of mammalian cells. Moreover, selective delivery of protein cargo is required to optimize their use as therapeutics. Sandra DePorter and **Irene Lui**, both researchers in the McNaughton lab, have identified a twelve amino acid protein transduction domain that delivers proteins to the interior of human prostate cancer cells with potency and cell-selectivity profiles that are controlled by multivalency effects. They used rounds of in vitro selection to identify the protein transduction domain, and showed that it was able to selectively delivery green fluorescent protein to human prostate cancer cells. M13 bacteriophage that display five copies of this protein transduction domain penetrate human prostate cancer cells in the presence of human blood with potency and cellselectivity profiles that are comparable to, or exceed, antibodies and their fragments.

Submissions from graduate students **Jessica Joslin** and **Ashli Simone** (Reynolds Group) to the slide contest celebrating the 75th anniversary of the ACS Division of Analytical Chemistry have been selected to receive a \$500 travel award each to present a poster of their work at the Fall ACS National Meeting in Indianapolis.

Their 75th Anniversary Poster titles are: Probing Physical Processes Associated with Nitric Oxide Polymer Systems and LC-MS of Underivatized Oligosaccharides.

Jim S. Carsella (Crans group) received a poster award from the 26th Annual Rocky Mountain Chapter of the Society of Environmental Toxicology and Chemistry Meeting for his presentation "Selenium bioaccumulation by Hygrohypnum ochraceum: Evidence for a selenium transport mechanism."

The 2013 Hach Distinguished Lecture was presented by **Prof. Reginald Penner** from the University of California – Irvine on biosensors to detect cancer in urine. Prof. Penner is

a highly esteemed Analytical and Materials Chemistry professor who has won many national and international awards. In his talk, Dr. Penner discussed new nanomaterials as sensors for cancer biomarkers. Prof. Penner



was presented a plaque from alumni Dr. Russ Young, CTO, Hach Co. The lecture was well received and garnered attention from departments across the university. We continue to thank the Hach Company for their support of our program that allows us to host such outstanding speakers.



We congratulate the Chemistry faculty and staff who have reached service milestones during the 2012-2013 fiscal year at Colorado State University, and thank them for their many years of dedicated service.

Steven L. Alles	10 years
Elijah J. Flenner	10 years
Charles S. Henry	10 years
Igor V. Kuvychko	10 years
Patrick R. McCurdy	10 years
Janet Moder	15 years
Nancy E. Levinger	20 years
Michael D. Olsen	20 years
Christopher D. Rithner	25 years

Incoming Freshman Hannah West received a Boettcher Fellowship to CSU next fall. Mentored by **Prof. Debbie C.** Crans, Hannah and her research partner Gerri Roberts, were Colorado State 2012 Chemistry Champions in the Science and Engineering fair for their research project 'Green Processing of Fatty Acids for Fuel Production'.

Celebrate Undergraduate Research and Creativity (CURC) Honor Recipients

Congratulations to the 2013 CURC Honor Recipients. For the past 20 years, CSU has celebrated the accomplishments of undergraduate researchers in a symposium where students have presented the results of their research.

College Honors:

Mitchell Bordelon (Advisor Prof. Debbie Crans) Damaris Roosendaal (Advisor Prof. Thomas Borch)

Colorado Center for Drug Discovery (C2D2) Receives Funding to Continue Assisting Colorado-based Drug Discovery Research

The C2D2 (www.C2D2.org), a Colorado-wide program recently received additional funding from the State of Colorado's Office of Economic Development and International Trade (OEDIT). The latest round of funding (\$452K) is the last installment of a five-year, \$2.25 million-dollar grant and will be used to continue C2D2's efforts to assist Colorado-based drug discovery. In addition, C2D2 was



also the recipient of two small collaborative drug discovery grants (CSU and NJH) this year.

Small molecule-based drug discovery research remains the most popular and effective approach to explore and treat disease. Unfortunately, many promising research efforts are hindered due to lack of access to fundamental drug discovery resources (especially medicinal chemistry). These types of resources are critical to identify novel, proprietary small molecules that can be used to advance bioscience research, to optimize new drugs for human clinical trials, or to create new commercial enterprises.

Created in 2010 from an infrastructure grant for the Bioscience Discovery Evaluation Grant Program (BDEGP), the C2D2 mission is to provide essential resources to investigators engaged in preclinical drug discovery. The organization began as part of CSU Ventures and was the brainchild of **Dr. Terry Opgenorth**, and **Dr. Joe Guiles**, (PhD 1991, Meyers). The connection between the Department of Chemistry and C2D2 remains strong; **Greg Miknis** (PhD 1993, Williams) has been leading the operation. In addition, with laboratory space and support from the University, the C2D2 joined the Department of Chemistry in April 2012.

Over the past 3 years, C2D2 has provided research funding (via a competitive statewide, annual RFP process), industry-based medicinal chemistry knowledge, synthetic expertise, compound libraries for screening (library of > 12,000 compounds including compounds prepared from CSU chemistry faculty), and with grant application assistance to more than 20 projects from every major research institution in Colorado. C2D2 provides resources such as computer-aided drug design capabilities that are rarely found within individual research groups or departments. Working collaboratively with investigators, C2D2 advances programs by generating novel compounds that can be patented, partnered, and leveraged to attract additional funding. Additional C2D2 staff available to assist investigators includes two synthetic chemists, **Sarah Stevens** (PhD 2011, Wood) and **James Graham** who brings extensive medicinal chemistry knowledge to C2D2.

Drug discovery research is rapidly expanding as changes in federal funding and the pharma industry's R&D process are creating new opportunities to participate in drug discovery research at unprecedented levels. Much of the focus is directed at programs capable of generating innovative methods and technologies that enhance the development and implementation of diagnostics/therapeutics across a wide range of diseases. These changes provide C2D2 with opportunities to significantly impact CSU and Colorado's economy. Increased university-industry partnerships as well as new company creation will continue to build CSU's reputation as a bioscience innovator.

Alumni & Department News

Kate Norvell (BS 2005) is working as an agronomist for the USDA-NRCS in Billings, Montana. "My chemistry degree paired with my agronomy degree has made me very marketable in the job market. It has come in handy for understanding chemical processes in soils and plants. I love my job, I work with farmers to implement conservation practices while improving their bottom line."

Shannon Pease-Dodson (BS 2008) is finishing graduate school at Northwestern University. A member of the Poeppelmeier group, her research focuses on hydrothermal chemistry to deposit thin films of p-type inorganic oxides on ITO for use in organic photovoltaics.

Dr. Carmen M. Simone (PhD 1992) was named President of Trinidad State Junior College. Prior to joining Trinidad State, Dr. Simone served as the Provost and Vice President for Academic Affairs at Lewis-Clark State College in Lewiston, ID, Vice President for Academic Affairs at Casper College in Casper, WY and chemistry faculty member at Casper College.

Kellie Woll (BS 2012) has joined the Pharmacology Group at the University of Pennsylvania Perelman School of Medicine, working in the area of anesthetics and sedatives. She currently serves on the committee of the Teen Research and Education in Environmental Science Program (TREES).

Dow Lecture on Sustainable Chemistry

With generous support from Dr. W. Jack Kruper, currently a Dow Corporate Fellow in the Chemical Sciences, Core R&D of the Dow Chemical Company, CSU's "Dow Lecture on Sustainable Chemistry" was established in the fall of 2012. This is a new seminar series focusing on lectures by distinguished scholars working in the forefront of chemistry for sustainability. The first such Dow Lecture was commenced in October 2012 by Dr. John Warner, President and Chief Technology Officer of Warner Babcock Institute for Green Chemistry. Dr. Warner is one of the founders of the field of Green Chemistry, co-authoring the defining text Green Chemistry: Theory and Practice with **Paul Anastas**. Dr. Warner delivered a departmental seminar entitled "Entropic Control in Materials Design as an Example of Green Chemistry" and also served as a guest lecturer for the department's new course "Chemistry of Sustainability" by lecturing the class with the topics related to "Green Chemistry, The Missing Element". The second Dow Lecture was given in April 2013 by Prof. Tom Baker of University of Ottawa. Dr. Baker is a Canada Research Chair in Catalysis Science for Energy Applications and Director of the Center for Catalysis Research and Dr. Baker's lecture was focused on the design of molecular Innovation. catalysts for selective deconstruction of lignin for renewable chemicals and biofuels.

DEPARTMENT OF CHEMISTRY



Dow Lecture on Sustainable Chemistry

John C. Warner Warner Babcock Institute for Green Chemistry

October 5, 2012

Chemistry alumni **Edna Donar** (BS 1958), **Ross Morgan** (BS 1974) and **Russ Young** (PhD 1995) join Chemistry chair Ellen Fisher as the Rams football team takes on rival New Mexico. Rams win 24-20 over the Lobos.



Ellen Fisher, Dave Donar, Edna Donar

Russ Young & Ellen Fisher

Ross Morgan, Ellen Fisher, Hannah Morgan (current CSU student)

2012 - 2013 Student Awards

Graduate Student Awards

Daniel DiRocco Megan Lazorski

Joseph Allison Eric Bukovsky Christian Collins Chelsey Crosse Susan Stevenson James Whitaker Chemistry Dissertation Award Chemistry Dissertation Award

Graduate Teaching Assistant Award Graduate Teaching Assistant Award Graduate Teaching Assistant Award Graduate Teaching Assistant Award Graduate Teaching Assistant Award Graduate Teaching Assistant Award



Undergraduate Student Awards

Mitchell Bordelon Erika Boyd David Daley Jordan Dennison Tucker Dunivan Hannah Feldman Craig Forsthoefel Melissa Grav Ammon Lehnig David Mack Susannah Miller Kenzie Moore Kristin Olsson Blaine Pedersen **Brittany Ramer** Damaris Roosendaal **Kelsey Schulte** Paul Skogerboe Heidi Spears Suriya Vijayasarathy Hanna Vik **Robin Ward** Robert Weakly Kelly Welton Garrett Wheeler Ryan Whitcomb **Nicholas Wolpers** Zichun (Lisa) Xu

ACS UG Award in Analytical Chemistry G. H. Whiteford Scholarship Undergraduate Research Award - Senior **Chemistry Graduating Senior** Undergraduate Outreach Award ACS UG Award in Organic Chemistry **Chemistry Life Sciences Bridge Award** Clifford C. Hach Memorial Scholarship Undergraduate Research Award - Senior **POLYED Organic Award** ACS - Hach Land Grant Fund Scholarship and Chemistry Early Achievement Award Clifford C. Hach Memorial Scholarship ACS - Hach Land Grant Fund Scholarship Undergraduate Research Award - Junior ACS - Hach Land Grant Fund Scholarship Undergraduate Research Award - Senior Clifford C. Hach Memorial Scholarship G. H. Whiteford Scholarship Undergraduate Research Award - Senior **Cornell Stanhope Scholarship Fund** Dr. Jennifer Dawn Alexander Scholarship ACS - Hach Land Grant Fund Scholarship Reuben G. Gustavson Memorial Award and Undergraduate Service Award **Cornell Stanhope Scholarship Fund** ACS UG Award in Inorganic Chemistry Professor Leslie DiVerdi Scholarship Dr. Harry Puleston Memorial Scholarship **Chemistry Physical Award**

In Memoriam



John A. Haase, passed away October 18, 2012. John joined Colorado State University in September 1997 and ran the Chemistry department's electronics shop until his retirement in 2002. John received many patents for electrical design work and was pleased to have many woodworking articles published with his ingenious solutions and ideas.



Dr. Jerold C. Robertson passed away Saturday, December 8, 2012 at the age of 79. Dr. Robertson was a professor of Organic Chemistry with the Chemistry department from 1961-1992 and both he and his wife have remained good friends of the Department since his retirement. Dr. Robertson served as Assistant Chair during a portion of his tenure at CSU. He received both his BS and PhD degrees from Brigham Young University.







Dr. Joseph J. Lehman, Jr passed away April 23, 2013 at the age of 91. Dr. Lehman was a member of the Organic Chemistry faculty at Colorado State University from 1949 until his retirement 41 years later in 1991 as Emeritus Professor. Joe joined the Navy Reserve in 1943 and served in active duty as a line officer on the USS Caelum in the Pacific theater during World War II; as a medical officer at the Naval Medical Research Laboratory at Camp Lejeune, N.C. during the Korean War; and as a professor at the United States Naval Academy at Annapolis, Md. in 1961. He retired from military service with the rank of Captain in 1981. Dr. Lehman earned his MS (1947) and PhD (1949) degrees in organic chemistry from Washington State University Pullman. Those who knew him remember him as a great storyteller and a favorite with students.