



CATALYST

DEPARTMENT OF CHEMISTRY
Science. At Its Source.



Spring 2017

THE HENRY EYRING & BRYANT A. MINER CHEMISTRY LECTURE THEATER



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LETTER FROM THE CHAIR

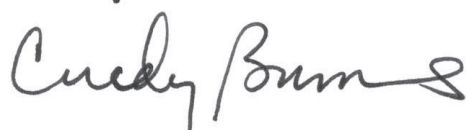
Dear chemists!

The academic year is over, and **68** B. S. chemistry majors (**9** with honors) have graduated together with **186** chemistry minors, **34** Ph.D.s and **9** M.S. degrees being awarded on May 4th. We also honored **5** distinguished alumni with awards on April 17th. In the past few months, we've been delighted to celebrate the naming of the Henry Eyring & Bryant A. Miner Chemistry Lecture Theatre in the Thatcher Building for Biological and Biophysical Chemistry while welcoming Bob Grubbs (Caltech) and Melanie Sanford (U. Michigan) as the inaugural endowed lecturers for the event. Furthermore, we are pleased to announce that the threshold has been reached for initiation of the Edward M. Eyring lectureship with the first lecture to be presented by Dr. Martin Gruebele (U. Illinois) in February 2018. And, with great pleasure, we announce a legacy gift from former faculty member Josef Michl and Sara Allensworth Michl that will establish a Presidential Endowed Chair in Chemistry in their names.

All of this great news is also accompanied by transitions: X-ray crystallographer Dr. Atta Aarif retired in December 2016; head of the electronics shop Dale Heisler will retire in June 2017, as will Prof. Chuck Grissom. These 3 combined have spent nearly a century in our department, and we wish them well—we will miss their expertise and good cheer. Joining us in August is assistant professor Andrew Roberts, presently a postdoc with Sam Danishefsky at Memorial Sloan Kettering. Andrew will add to our expertise in organic synthesis and chemical biology.

Please read on for more information about the happenings in HEB and TBBC. As always, we appreciate the generous support of our many friends and alumni.

Best wishes,



INTRODUCING THE CRIMSON LAUREATE SOCIETY

The Crimson Laureate Society is a new group for people dedicated to the advancement of science and mathematics at the University of Utah.

As a Crimson Laureate Society member, you can be an advocate for science in your community, making your voice heard as we work together with educators, legislators and business leaders to create new science programs and curricula throughout Utah.

You'll also gain VIP access to events that present cutting-edge science from the U and around the world, while your philanthropic contributions will support students, scholarships, and faculty research in Biology, Chemistry, Mathematics, and Physics and Astronomy.

A gift of at least \$100 will automatically make you a member of the Crimson Laureate Society, and will advance our education and research mission. We look forward to welcoming you as the newest member of this exclusive group!



CRIMSON
Laureate Society

LEAVING A LEGACY

Legacy gift to create a new Endowed Chair



Photo courtesy of Josef Michl and Sara Allensworth Michl

Former Utah chemistry professor Josef Michl and his wife Sara Allensworth Michl have pledged a legacy gift to name a future Presidential Endowed Chair in Chemistry. Dr. Josef Michl began his independent career at the University of Utah in 1970 after obtaining his Ph.D. at the Czech Academy of Science in Prague and postdoctoral studies at the University of Houston, University of Texas-Austin, and the University of Utah (with Prof. Frank Harris in Physics). In 1986, he moved to UT-Austin, and returned to the Rockies a few years later to his present position as Professor of Chemistry and Biochemistry at the University of Colorado, Boulder.

Professor Michl's research is characterized as far-reaching and groundbreaking. Trained as a theoretical physical chemist, his greatest impact has been in experimental and theoretical physical organic and materials chemistry—helping to elucidate how chemical reactions occur and to predict new properties of reactive molecules and materials. His work has impacted the design of molecular electronics and solar energy conversion processes. The recipient of many awards, Josef is a member of the U.S. National Academy of Sciences and holder of the Heyrovsky Gold Medal from the Czech Academy of Sciences.

When not in the lab, Josef and his wife Sara are frequently found on mountain trails in the Rockies, the Wasatch, or the hills outside of Prague.

Want to leave a legacy of your own?

You can donate to the Department of Chemistry and leave your own legacy that will impact hundreds of current and future chemists every day! Contact Heather Burkhart at (801) 585-7896 or heather.burkhart@utah.edu to find out how you can make a positive change at the University of Utah.

You can also make a donation on our website at chem.utah.edu/community/donate.php

Thank you!

2017 DISTINGUISHED ALUMNI



Ellen Fisher giving her remarks at the 2017 Distinguished Alumni Awards Dinner

On April 17th, 2017, the Department of Chemistry was proud to recognize four distinguished alumni, along with an honorary distinguished alumnus, at an awards dinner in their honor. Many friends and alumni, along with the recipients of the Ragsdale scholarships, gathered together atop the S. J. Quinney College of Law building to celebrate the achievements of Carlos M. Bowman, Ellen R. Fisher, Bryant W. Ros-siter, Clifton G. Sanders, and Edward M. Eyring. Each recipient shared messages of inspiration and determination, along with a few laughs, as there was more than one mention of the Gilbert Chemistry Set and the uneasy parents that resulted from its use. But the one thing all distinguished alumni had in common were heartfelt and sincere expressions of gratitude for the incredible mentors with whom they worked during their time at the U, a valuable resource of which the University of Utah is not in short supply.

Honorary Distinguished Alumnus Edward M. Eyring, Ph.D.



Edward M. Eyring received his PhD in Physical Chemistry in 1960 and proceeded to become an NSF Postdoctoral Fellow at the University of Goettingen. He would then spend the next 50 years of his life as a dedicated faculty member of the University of Utah Department of Chemistry, where he contributed most recently to nanoparticle and chemical looping combustion research. He is the recipient of several awards, including the NATO Senior Fellowship in 1977, the Willard Gardner Prize of the Utah Academy of Sciences, Arts and Letters in 1993, and the Utah Governor's Medal for Science and Technology in 2011. He retired in 2016, after which the Edward M. Eyring Undergraduate Scholarship was established in his honor and in gratitude for his many years of service and contributions to chemistry.



Carlos M. Bowman, Ph.D.

Carlos M. Bowman received his PhD in Organic Chemistry from the University of Utah in 1957. While working in rocket fuel research early on in his career at the Dow Chemical Company, Bowman implemented the innovative use of computers in using thermodynamics to predict substance thrust capabilities for use in rocket propellants. In 1967 he became the Dow Chemical Company's Research Director, where he continued to advance the field of cheminformatics until 1980.



Ellen R. Fisher, Ph.D.

Ellen R. Fisher earned her PhD in Physical Chemistry in 1991 working with Peter Armentrout, after which she joined Colorado State University and is now Professor of Chemistry. From 2009 to 2014 she served as Chemistry Department Chair for CSU and in 2014 she became Senior Faculty Advisor to the Vice President for Research. Her research focuses on using analytical and materials chemistry methods to better understand the underlying mechanisms of the processes of chemical vapor deposition and plasma-enhanced chemical vapor deposition.



Bryant W. Rossiter, Ph.D.

Bryant W. Rossiter earned his PhD from the University of Utah in 1957 and currently works as a consultant, author, and as the senior editor of *Physical Methods of Chemistry*. From 1957-1985 he was the Director of the Chemistry Division at Eastman Kodak Co., and from 1985-1989 served as President of Viratek Pharmaceuticals, Inc. His ventures resulted in several successful attempts at developing broad-spectrum antiviral drugs, some of these treatments experiencing worldwide implementation.



Clifton G. Sanders, Ph.D.

After receiving his PhD from the University of Utah in 1990, Clifton G. Sanders went on to hold many positions in both research and education, including Research Scientist for CardioPulmonics, Dean for the School of Science, Mathematics and Engineering for Salt Lake Community College, and Adjunct Instructor for the Salt Lake Theological Seminary. He is currently the Chief Technology Consultant and Co-Owner of Better Options Consulting International, and is the Provost for Academic Affairs at Salt Lake Community College.

DEDICATED TO EXCELLENCE

With the fairly recent completion of the Thatcher Building for Biological and Biophysical Chemistry, a bright, new lecture hall was added to the collection of intellectual learning spaces for students. On March 27, 2017, that lecture hall was given a name and two accompanying lectureships were established - both of which pay a fitting homage to the remarkable history of the University of Utah Chemistry Department.



Robert Grubbs (CalTech, Nobel laureate) and Melanie Sanford (University of Michigan) presenting the Henry Eyring Lectureship and Bryant A. Miner Lectureship, respectively

The Henry Eyring and Bryant A. Miner Chemistry Lecture Theater was dedicated in honor of two extraordinary chemists, both of whom have strong ties to the Department, as well as to each other. Bryant A. Miner was nephew to Henry Eyring, with whom he also studied during his time at the University. Recognizing the value of such an inspirational relationship as that of mentor and mentee, family members helped to establish the Henry Eyring Lectureship and the Bryant A. Miner Lectureship, synonymous positions that will continue in the spirit of Eyring and Miner by presenting exceptional research done by prominent chemistry mentors and their students each year.

Many members of the Eyring and Miner family were present at the dedication of the lecture theater (on cover: Henry Miner, Ted Eyring, Camilla Smith, Rosemary Miner Fairbourn, and Karen Miner), including Camilla Smith who shared some memories of her brother and uncle. Among the other speakers were Cynthia Burrows, Peter Stang, and Senior Vice President for Academic Affairs Ruth Watkins, who shared their own experiences with Eyring and Miner, and further remarked on the significant relation that a mentor and student share.

The inaugural lectures were provided by Robert H. Grubbs, Victor and Elizabeth Atkins Professor of Chemistry at California Institute of Technology for the Henry Eyring Lectureship, and Melanie S. Sanford, Moses Gomberg Distinguished University Professor of Chemistry at University of Michigan for the Bryant A. Miner Lectureship. Grubbs, who received his PhD from Columbia University in 1968, served as mentor and advisor to Sanford during their time at the California Institute of Technology, from which she received her PhD in 2001. Grubbs' talk, titled "Design and Applications of Selective Olefin Metathesis Catalysts" preceded the dedication of the Lecture Theater, while Sanford presented the following morning, April 28, her talk titled "Development and Applications of New Fluorination Reactions."



Cynthia Burrows reads from a student thesis on the biography of Henry Eyring

Henry Eyring & Bryant A. Miner

Henry Eyring (1901 – 1981) served as the Dean of the Graduate School and as a Chemistry Department faculty member at the University of Utah from 1946 to 1981, positions which greatly benefitted the growing graduate research programs within the Department of Chemistry and the University as a whole. He authored over 600 scientific articles and several scientific books, including those expounding on the harmony between science and religion, a concept he firmly believed in. Known for his energy and good health, he often participated in footraces with his research students and would calm tense situations with his numerous athletic feats. Aside from his pioneering science, his lasting legacy to the Chemistry Department is one of tenacity, intelligence and humor.

Bryant A. Miner (1934 – 2012) earned his PhD in Chemistry from the University of Utah in 1965, during which Henry Eyring, his uncle, served as his thesis advisor and mentor. Miner went on to teach chemistry at Weber State University for 43 years, which he considered to be his greatest passion, and has often been described as a brilliant teacher. Throughout his life he expressed a great love of travel, service, and above all things, his family. His dedication to teaching and love of science are evident in the lives of his numerous students, and are a lasting testament to chemists everywhere.

SUREFIRE SCIENTIFIC GLASSBLOWING



Kevin Teaford is the recipient of the prestigious 2017 Helmut E. Dreschel Award from the American Scientific Glassblowing Society (ASGS). This is one of the society's highest awards, and is presented in recognition of a member's tireless efforts to promote the ASGS and the field of Scientific Glassblowing. With his position as Chair of the Allan Brown Workshop for the ASGS, it's easy to see why he was chosen for this honor. Aside from being an excellent glassblower, he's paramount in setting up torches, lathes, and other necessary equipment for the annual Allan Brown Workshop put on by the ASGS. This entails a lot of travel and hard work on Teaford's part, but when asked about whether or not he would have ever expected to receive an award like this, he simply said, "I was just doing my job."

Teaford is also the 2015 recipient of the Arthur Dolenga Award, given by the Great Lakes Section of the ASGS which recognizes outstanding administrative, technical, or fraternal contributions to scientific glassblowing. He is greatly valued by the ASGS, but doesn't let his awards go to his head. According to Teaford, "I just look out for the success of the seminar, and make sure everything stays safe."

NEWS FROM THE DEPARTMENT



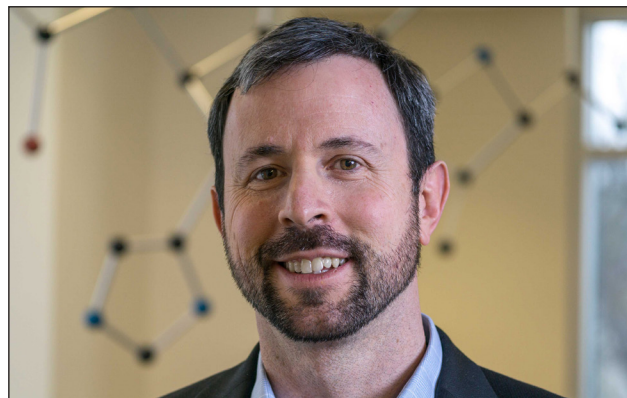
Lawrence Thatcher (left) with Cynthia Burrows at the 2016 Governor's Medal for Science and Technology Awards Dinner

On January 18, 2017, Distinguished Professor and Chair of the Department of Chemistry Cynthia Burrows was awarded a 2016 Governor's Medal for Science and Technology at the program's 30th anniversary award's dinner. Also recognized with the award in the industry division was U alumnus Lawrence Thatcher, founder of Thatcher Chemicals, a highly successful firm in the Salt Lake Valley.

"The medal recipients are true leaders in innovation, serving as educators, mentors and influencers statewide," says Gov. Herbert. "Innovation drives Utah's thriving economy and unmatched quality of life. I commend the winners for excellence in their fields and for their important work, which will benefit Utah residents for generations."

The award is given to individuals who have provided significant service and contributions to the areas of scientific knowledge, education and industry in Utah. Burrows' research efforts focus on the chemistry and biology of free radical stress on DNA and the effect of changes in DNA and RNA structure on cellular function. She has also tackled new methods for DNA sequencing to identify sites where chemical modifications have occurred.

"I'm thrilled to join my Chemistry colleagues, about a dozen of them, who have previously won this honor." says Burrows. "It's important that the State of Utah recognizes the value of scientific research and innovation."



Matthew Sigman, Distinguished Professor & Peter J. Christine S. Stang Presidential Endowed Chair of Chemistry has been awarded the ACS Award for Creative Work in Synthetic Organic Chemistry, "For his creative, seminal work in synthetic organic chemistry, especially his innovative contributions to the Wacker oxidation and Heck reaction." The department feted this occasion at the San Francisco ACS meeting with a special luncheon attended by more than 60 faculty, friends, and alumni.



Natascha Knowlton (right) with Whitney Hills, (left)

Academic Advisor Natascha Knowlton is the recipient of the University of Utah 2017 UAAC New Outstanding Advisor Award and will be representing the University of Utah in the National Academic Advising Association (NACADA) advising awards next year. Natascha, assisted by Whitney Hills, is responsible for advising our nearly 400 chemistry majors.

"I feel very honored to receive this award. I had over 40 nominations, the majority coming from students. It is great to hear what a positive impact you are making in someone's life and helping students to achieve their goals."



Professor **Ryan Steele** has been awarded the **2017-18 College of Science Award for Fostering Undergraduate Research Excellence**, an award given in recognition of his outstanding contributions to undergraduate research. Steele recalled that when he arrived in Utah six years ago, there was a shortage of graduate students available to perform research in his group, so he decided to take a chance on a select handful of undergraduate students from his Quantum Chemistry course. "Suffice it to say that I was pleasantly surprised. The undergraduates at the University of Utah are phenomenally talented, and they constantly surprise me in their ability to be top-notch researchers."

Included with the award is funding that will be put to use supporting undergraduate researchers, and Steele is excited to continue their contributions to the University's research program. "The proverbial punch line for this award is that the students deserve all of the credit. I have been lucky to have some really fantastic students over the years (including my current ones!)."

Professor **Charles Atwood** said that when he was told he was going to be awarded the **2017-18 College of Science Award for Teaching Excellence**, he was stunned. "When we sent the stuff in I didn't think I'd have a chance." But the College of Science thought differently. Atwood's dedication to the success of his students is remarkable, and something he takes very seriously. "One of the things I'm proudest of here at Utah is that in the five to six years I've been here, we've managed to increase student success rates, especially for those students at the bottom. We have data that shows they are doing 22% better, while at the same time making the course harder." Another luxury he's had over the years is seeing the successes of his previous students. "Occasionally I'll hear from students or I'll Google them and see all the cool jobs they have. There are times when I don't think I have an effect on their lives, so it's nice to see students doing well." The College of Science awards will be recognized at convocation on May 4, 2017.



Amanda Bischoff received the 2017 Outstanding Undergraduate Researcher Award in the College of Science, and was honored at the Undergraduate Research Awards Luncheon on April 3, 2017. "I feel that this award reflects not only on my own abilities, but on the dedication and guidance from my faculty mentor, Matt Sigman, as well as my lab members, whose advice and support has been essential in helping me achieve my research goals."



Graduate Teaching Assistant Jen Crawford has been awarded the NSF Graduate Research Fellowship. The Graduate Research Fellowship "recognizes and supports outstanding graduate students in NSF-supported science, technology, engineering, and mathematics disciplines who are pursuing research-based master's and doctoral degrees at accredited United States institutions."



Please welcome this fall Professor Andrew G. Roberts, who will be joining us as an Assistant Professor of Organic and Bioorganic Chemistry! Roberts received his PhD from the University of California in 2013, and has been a postdoc at Memorial Sloan Kettering from 2013-2017. His lab will be focused on the design and chemical synthesis of peptide-based therapeutics, and we are excited to work with him!

NEWS FROM CHEMISTRY ALUMNI

Steven & Sarah Snow



Steven and Sarah both graduated with their PhDs in 1985 under Bob Parry, Steven having recently retired from Dow Corning Corporation after a 30 year career in Research and Development. He is now the Director of Research and Development at AB Specialty Silicones, a small chemical company in the Chicago area. Sarah has worked in Research and Development for Dow Corning, CalTech, and Clorox.

They recently moved from Michigan to Kanosha, Wisconsin where they are restoring a 100-year-old home on the shores of Lake Michigan. They have four adult children, Andy (26), Jessica (24), Chelsea (20), and Josh (19) who make them very proud. They frequently travel to Utah for vacations, which usually include skiing trips to the Wasatch Mountains.

Joe Stewart

Joe graduated from the University of Utah Department of Chemistry with his MS in 1991. He is currently employed as a Research Engineer and Assistant Lab Manager at the Utah Water Research Laboratory at USU in Logan, Utah. His work involves method development for chromatography and also for mass spectrometric approaches

to analysis of anthropogenic compounds in the environment. He also assists students with the setup and maintenance of bench-scale experimental reactors.

Some of his past roles have included Senior Project Engineer in the water management group at a copper mine, Process Development Chemist for the study of treatment methods of acid mine drainage, and owner of OnSite Analytical Services, a small environmental testing laboratory and consulting business.

Alan Eastman



Alan is a PhD recipient from 1975, and has since co-founded his own company, GreenFire Energy, which is focused on geothermal energy. However, while most geothermal-to-electricity companies use water pumped down a well into a hot rock formation, then back up where it is flashed to steam and used to turn a turbine, GreenFire does things a little differently by using supercritical carbon dioxide (sCO₂) instead, which has a couple benefits.

First, it eliminates the problem that arises with most of the accessible hot rock being in the West and most of the water being located in the East. Second, Hot sCO₂ is

much less dense than cold sCO₂, so it is possible to set up a siphon in which the cool sCO₂ descending to the hot rock formation drives circulation of sCO₂ through the entire fluid system, eliminating or greatly reducing the need for pumping.

In early March, GreenFire received a \$1.48 million grant from the California Energy Commission to fund their technology testing, for which they will be using an existing well at the Coso geothermal site located on the US Navy's China Lake Naval Test Station. Not only do they expect to produce a small amount of power in that first test, but to also obtain the financial and technical data necessary to build and sell full-scale commercial units.

According to Alan, "Geothermal energy is a far cry from boron hydride chemistry, the subject of my thesis, or refinery catalysis, the area I worked in for many years, but perhaps it just illustrates the ability to be flexible that I learned in grad school working with Bob Parry at the U!"

Jessica Kramer



Jessica graduated with her Bachelor of Science in 2004 and is very happy to be back home at the University of Utah, now as an assistant professor

of bioengineering. She obtained her PhD from UCLA and did post-doc work at UC Berkeley and Stanford. She started her lab in February and her team is investigating the role of cell-surface glycoproteins in cancer, infection, absorption of pharmaceuticals and nutrients, and glycoproteins that protect cells from damage during freezing. We are so glad to have her back!

Jaqueline Kiplinger



On March 9, 2017, Los Alamos National Laboratory Fellow Jaqueline Kiplinger was presented with the International Union of Pure and Applied Chemistry (IUPAC) 2017 Distinguished Women in Chemistry or Chemical Engineering award, and out of all twelve recipients, was the only one from the U.S. She was recognized for her contributions to the organometallic chemistry of pentavalent uranium, the realization of a terminal nitride complex of uranium, and non-aqueous uranium and thorium precursors for use in subsequent inorganic and organometallic synthetic efforts.

In an article published on the Los Alamos National Laboratory website, Alan Bishop, Principal Associate Director for Science, Technology and Engineering at Los Alamos stated, "The IUPAC Award recognizes Kiplinger's outstanding scientific achievements. She is a pioneer in uranium and thorium chemistry, and her research has

significantly expanded the broad understanding of actinide and lanthanide chemical bonding and reactivity... Her work provides scientific underpinning that supports the Laboratory's national security mission as well as advancing the fundamental understanding of actinide chemistry.

Dallen Cox

Dallen graduated in 1977 with his BS in chemistry and has experienced a rewarding career. He enjoyed working as Concentrator Chief Chemist for the Kennecott Copper Corporation Assay Office until 1985, after which he became employed by the Tooele Army Depot where he started their first Oil Analysis Program to test the operability of engines and transmission based on oil sample testing. By 1993 he had built the analytical facility to a fully operational environmental laboratory as the laboratory leader, in addition to maintaining oil analysis capabilities.

After the Army Depot closed, Dallen began work with the Chemical Ammunition Destruction System (CAMDS), where he was leader of a team of government scientists who completed the (5X) test, which was vital in sending metal for nerve gas storage containers to a landfill. While working for CAMDS Dallen was also the Laboratory Director and was an integral part of creating a method for neutralization of the deadly nerve gas VX.

Dallen has been married for 50 years to his wife Leslie, and has two children, seven grandchildren, and two great-grandsons. He moved from Salt Lake City to Surprise, Arizona in 2011 and currently volunteers at the Surprise spring training baseball facility. He has really enjoyed watching the Utes play in Arizona the last couple years. Go Utes!

Craig Metcalf



Craig graduated with a Bachelor of Science in Chemistry and proceeded to spend a couple years doing biomedical research at the University of Utah. He took a change of direction after that, however, and decided to go to law school. He has spent most of his career as a patent attorney, a profession which requires both a law degree and a science or engineering degree. He is using his talents as a patent lawyer to continue working in the chemistry and biomedical industry, and has drafted and prosecuted more than 1000 U.S. patents, along with many foreign counterparts around the world. He has done patent work for Fortune 500 companies, smaller companies during all stages of development, and universities such as the U.

Sucharita Kundu

Sucharita graduated with her PhD in 2009 and is currently working as Publications Manager for Editage, a division of Cactus Communications. Based out of India, Suchi helps authors all around the world with their publication requirements.

Alyssia Lambert

Aly earned her BS and MS from the University of Utah Chemistry Department in 2011 and 2014. In the fall of 2016 she accepted a position as a tenure-track faculty member at Pierce College in Puyallup, Washington.



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CURIE CLUB NEWS

Funds from the Curie Club helped send 6 undergraduate women to the National Meeting of the American Chemical Society in San Francisco in March 2017!

