

• CHEMIGRAM •

The newsletter for BYU's Department of Chemistry and Biochemistry

At the beginning of a new academic year, I am impressed with both the constancy of change and the ever-increasing pace of the passage of time. Change is certainly evident as one sees the impressive new Life Sciences' Building coupled with major changes in the flow of traffic across campus. Change is also very evident with the conclusion of President Samuelson's tenure and the beginning of Kevin Worthen's period as President of BYU. Constants across campus include the quality of its students and the commitment of staff and faculty and the incredible beauty of both the campus and the Utah Valley.

Since the last Chemigram, we said good-bye to Emily Bates and Allen Buskirk, who left for positions at the University of Colorado at Denver and Johns Hopkins, respectively. We also saw the retirements of Juliana Boerio-Goates, Phillip Brown, John Lamb and Randy Shirts. We will miss these colleagues and appreciate their numerous contributions. We wish them well with the next chapters in their lives. The retirement of John Lamb necessitated a change in the department administration and Steven Wood is now serving as an Associate Chair with a focus on undergraduate education. I am pleased to announce that we have hired six new faculty members in the last year. John C. Price (JC), a biochemist, and Stacey Smith, a physical chemist, joined us in the fall of 2013. JC focuses on protein dynamics while Stacey is responsible for our X-ray diffraction laboratory. Rebecca Sansom and Kara Stowers, both organic chemists, join us this fall. Rebecca, whose specialty is education, will be heading up our general chemistry labs (i.e., Chem 107) and Kara will be concentrating on organometallic chemistry. Jeremy Johnson, a physical chemist whose research focuses on terahertz laser spectroscopy, is completing a postdoc in Switzerland at the Paul Scherrer Institute and will come to BYU in January of 2015. Finally, Kenneth Christensen, a bioanalytical chemist who spent the last ten years at Clemson University will be joining us in the spring/summer of 2015. We are fortunate to have these new colleagues joining us during the next year and see them as bringing substantial strength to the department. We still have two faculty vacancies in the Department and hope that you might encourage qualified candidates within your spheres of activity to apply. The job openings can be found under the Department of Chemistry and Biochemistry on "yjobs.byu.edu".

In July, Robert Paxman our long-time computer systems administrator passed away suddenly. He had served for over ten years but had been in declining health over the past months. Robert was a gregarious colleague with strong computer skills who served the faculty, staff and students of the department well. He will be keenly missed.

We continue to make strides as a department including increased

external funding during the past year, even during tight economic times. Moreover, two of our faculty published three high-profile papers this year: Scott Burt published an article in *Nature* and Daniel Ess published two papers in *Science*. Overall our faculty contributed a total of 114 unique publications, 52% of which had graduate student coauthors and 20% having undergraduate student coauthors. We mentored 173 undergraduate students in our research laboratories, and we graduated 61 students with BS or BA degrees, 5 with MS degrees and 18 with PhDs. Our mentoring of graduate and undergraduate students continues to be a major focus within the department.

Thus, even though the time has gone by rapidly and we have seen significant change in the department, we have continued to push forward the tradition of the department in being good citizens, strong teachers and accomplished scholars. In this addition of the Chemigram, you will find a number of news articles that we hope will be of interest and give you a sense of what is going on in the department. Thank you for your continued support and for laying a strong foundation for the department. We look forward to our annual alumni dinner and activity that will be held the evening of October 17th. We hope that you will join us.



Message from the Chair

GREGORY F. BURTON

NEWS

Y-Chem receives award from ACS

The Y-Chem Society received its third consecutive Commendable award from the American Chemical Society. Of the 367 student chapters that submitted reports, 85 received commendable mention awards. This is the second-highest chapter award given by the ACS. Awards are given based on chapter activities and programs put on throughout the year.

“We work hard during the year and put a lot of time into already busy schedules,” Will Rankin, the current club president said. “It is always nice to receive recognition for all that we have done.”

Being a part of Y-Chem provides opportunities for students to give back to the community as well as the department. The club also helps students to form friendships and get advice from older students and faculty advisors. “I have had a successful undergraduate career because of the guidance and friends I have made through Y-Chem,” Rankin said. “Being a part of Y-Chem allows me to help other underclassmen succeed in whatever their goals may be.”

Dr. Scott Burt, Y-Chem’s faculty advisor, has enjoyed being a part of that guidance. He says that getting to know the students is the best part of being involved. On road trips to ACS conferences, he and the students are able to discuss research, plans for graduate school and other related topics. After spending so much time working with the students, Dr. Burt knows how much work they’ve put into their

activities.

“The commendable award reflects how active Y-Chem is in serving our community,” Dr. Burt said. “They spend a lot of time on scientific outreach.”

Here is a quick overview of some of Y-Chem’s biggest activities each year:

Open Lab Day: Y-Chem hosts around 300 middle and high school students every spring for Open Lab Day. Tours of the BYU research labs are given and the students get to participate in lab experiments.

National Chemistry Week: During the Chemistry Magic shows put on throughout National Chemistry Week, the club sells liquid nitrogen ice cream to raise funds.

Meet Your Professor Night: Y-Chem hosts this event which allows students to meet and get to know the professors they will be taking classes from.

Graduate School Preparation Night: The club puts together a panel of professors who answer questions about the process of applying for, choosing and getting into graduate school.

Magic Shows: Each year, Y-Chem travels to local schools and organizations to put on magic shows involving chemical reactions and experiments.





Nobel laureate, Dr. Mario Capecchi, presents Izatt/Christensen Lectures

As this year's Reed M. Izatt and James J. Christensen lecturer, Dr. Capecchi shared this story in his lecture, "The Making of a Scientist: An Unlikely Journey", to a packed auditorium in the Joseph Smith Building on Jan. 24.

Dr. Capecchi, along with Sir Martin Evans and Dr. Oliver Smithies, received the Nobel Prize in Physiology or Medicine for their discoveries and principles for making gene modifications in mice using embryo-derived stem cells. As he explained in his technical lecture, given for faculty and students in the field, this type of gene targeting has the potential to radically change how illnesses are treated and possibly lead to cures for diseases such as cancer.

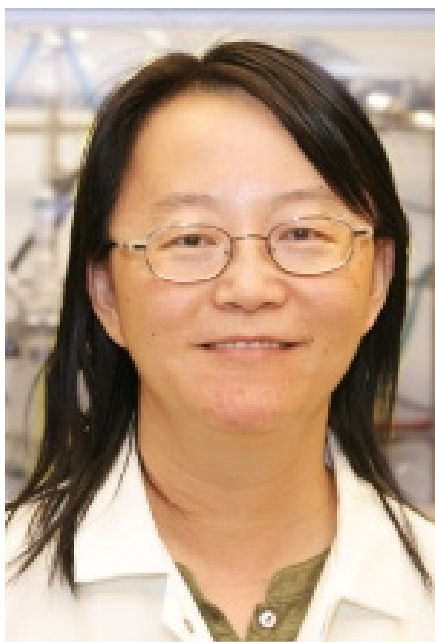
In his general presentation, Dr. Capecchi described his work like changing the letters of a book. Say you have 1,000 volumes, each 1,000 pages long. Each book in a volume contains 1,000 letters, however it is not written in a known language and a Rosetta Stone does not exist for it. By going into a book and changing some of the words, it is possible to understand their meaning. This is a metaphor for what Dr. Capecchi and his co-researchers did with DNA, which has an alphabet of four letters and roughly 3 billion words. They would change a small section of the DNA and observe the consequences. As they observed the results, they increased the size of the section. This method allowed them to evaluate the function of

specific genes.

When he first proposed his ideas for this research to a grant review committee, they said it would be impossible. Dr. Capecchi did not give up, however, and he was able to connect with scientists who had a similar vision. Together, after many years of research, they were able to do the impossible and go on to win the Nobel Prize.

Dr. Capecchi became interested in science and worked hard through school, eventually receiving his B.S. in chemistry and physics from Antioch College in 1961. He defied the odds by attending Harvard University, receiving his Ph.D. in biophysics.

In 1973, Dr. Capecchi accepted a position at the University of Utah and thrived in the collaborative environment. Thirty-four years later, he traveled to Stockholm, Sweden to attend the Nobel Prize ceremonies and accept this prestigious award. After a childhood living on the streets, Dr. Capecchi was able to beat the odds and pursued a successful career in science. His pioneering work on gene targeting set a new standard for research worldwide and holds possibilities for cures for cancer, neuropsychiatric disorders, and, in fact, every known human disease.



BYU Alumni wins ACS Hero Award

Zhifeng Ye, who received her MS in Organic Chemistry from BYU, has been honored as an ACS Hero of Chemistry for her work on a new drug to treat cystic fibrosis.

Ye is a senior technical operation manager at Vertex Pharmaceuticals. She and 11 of her colleagues are being recognized for their development of Kalydeco, a revolutionary new drug that targets the G551D mutation of cystic fibrosis.

Kalydeco is the first treatment of its kind to address the defective cystic fibrosis transmembrane conductance regulator (CFTR) protein, the underlying cause of cystic fibrosis. The disease seriously affects the lungs, and Kalydeco helps to improve lung function, among other things.

Ye and her team are responsible for optimizing the synthesis of new drugs. Because of the optimized synthetic route that Ye developed, Kalydeco is now made on a very large scale.

Ye received her master's degree in 2005. She worked with Dr. Merritt Andrus doing asymmetric catalysis development.

"Zhifeng was an outstanding student," Dr. Andrus said. "She was eager to try new things and apply her understanding." The ACS Heroes of Chemistry program began in 1996. The program recognizes "innovation and development of commercial products based on chemistry", according to a press release from the ACS.

Dr. Macedone recognized by the University Accessibility Center

Each year, the University Accessibility Center recognizes two faculty members for extraordinary service to BYU students with disabilities. This year, department member Jeffrey H. Macedone and G. Bruce Schaalje of the Statistics Department were selected.

The award winners were honored at the UAC's Annual Awards Banquet in the Wilkinson Student Center where a donation was made to the college of each recipient to fund student mentoring experiences.

"The entire event was focused on encouraging and assisting students in overcoming their challenges," Dr. Macedone said. "I'm grateful that there are people external to the university that care about students' success enough to provide financial support for those with disabilities."

This annual event was started fourteen years ago by a particular donor and has benefited hundreds of students with disabilities.



Recently Departed: Richard T. Hawkins, 1929-2013

Retired Brigham Young University organic chemistry professor Richard Thomas Hawkins passed from this mortal existence December 12, 2013, in Orem, Utah, at the age of 84. The obituary can be read at: <http://www.heraldextra.com/lifestyles/announcements/obituaries/>



Recently Departed: Coran Cluff, 1930-2014

Coran LoVell Cluff died in 2014 at the age of 84. Cluff began teaching in the department in 1962 where he earned a reputation as a tough but excellent professor. The obituary can be read at: <http://www.heraldextra.com/lifestyles/announcements/obituaries/>



Recently Departed: Robert Paxman, 1959-2014

Robert George Paxman peacefully returned to his Heavenly Father on July 16, 2014 at his home in Springville, Utah. Robert has worked as the Chemistry Computer Support Representative from Aug 2000 to May 2014. The obituary can be read at: <http://www.heraldextra.com/lifestyles/announcements/obituaries/>

Scientists find new way to upgrade natural gas

America's current energy boom may take a new direction thanks to the discovery of a new way to turn raw natural gas into upgraded liquid alcohol fuel.

In the March 14 issue of *Science* magazine, chemists from Brigham Young University and The Scripps Research Institute detailed a process that could reduce dependence on petroleum.

The most unexpected breakthrough in the paper was that ordinary "main group" metals like thallium and lead can trigger the conversion of natural gas to liquid alcohol. The research teams found that natural gas to alcohol conversion occurs at 180 degrees Celsius – just a fraction of the heat needed with traditional "transition metal" catalysts (1400-1600 degrees Celsius). BYU professor Daniel Ess, one of the study authors, used chemistry theory to understand how and why this process works at low temperatures and under mild conditions.

"This is a highly novel piece of work that opens the way to the upgrading of natural gas to useful chemicals with simple materials and moderate conditions," said Robert Crabtree, a chemistry professor at Yale who is familiar with the new study.

"Hardly anybody actually tries to do reactions on a genuine mixture that you would get from natural gas," said Ess. "Turns out we can just directly use the mixture of what comes out of natural gas and convert all three of them together."

The potential benefits aren't limited to the production of fuel, Ess said. Many chemicals derived from natural gas, such as methanol, are also important in manufacturing.

"Whether you use methanol to burn as a fuel or as a chemical commodity for products, this process cuts down energy usage," Ess said.

This is the second time in 2014 that Ess has seen his research appear in *Science*, which consistently ranks as one of the top two scientific journals in the world. In January, the journal published another paper he co-authored about synthesizing molecular compounds. Dr. Ess also teaches organic chemistry to undergraduate students at BYU.



RETIREMENTS

John Lamb gives last lecture at BYU Devotional

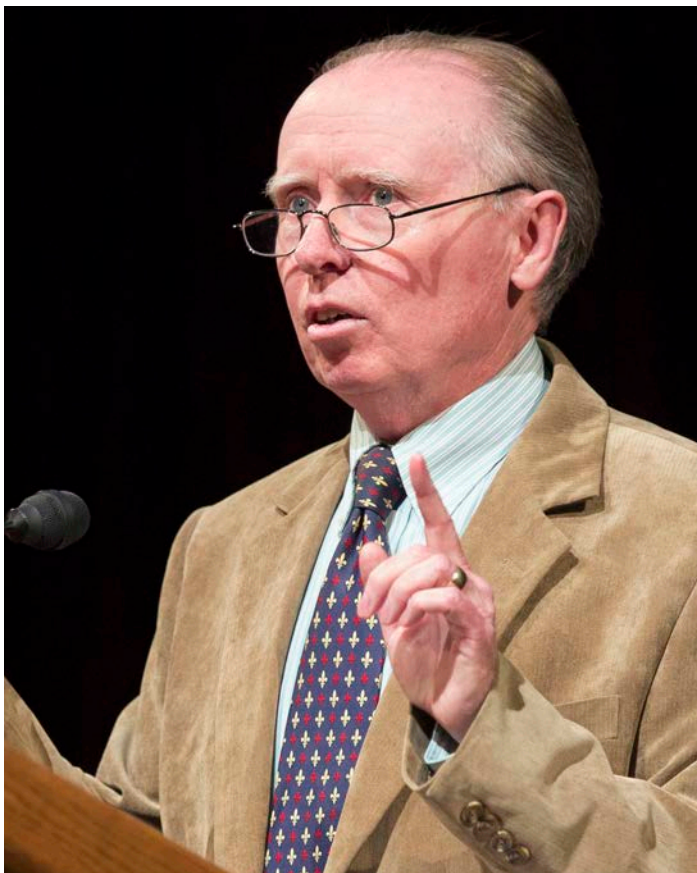
We've all come across an insufferable know-it-all who causes us to roll our eyes with exasperation.

"But when you stop to think about it," said John Lamb, associate chair of chemistry and biochemistry, at Tuesday's University Forum, "would knowing it all in real fact be such a bad thing?"

Honored as the 53rd Karl G. Maeser Distinguished Faculty Lecturer, the most prestigious faculty award given by BYU, Lamb explored the eternal significance of education inside and outside the classroom and urged the audience to seek meaningful knowledge - as much as possible, for as long as possible.

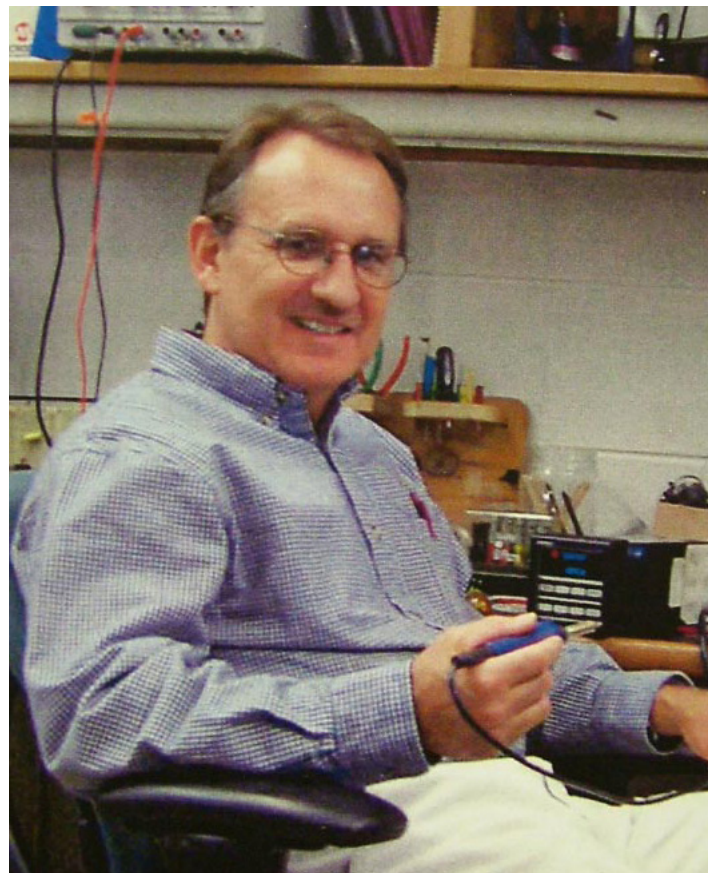
"Let me encourage you to not only be diligent, but to be eclectic in your learning," he said. "We have faith. . . that reasonable, comprehensible answers exist for every question, just waiting for God to reveal them, and waiting for our capacity to rise to the occasion."

Dr. Lamb retired this year after nearly 30 years of teaching at Brigham Young University.



Keith Kling retires after nearly 29 years

After almost 29 years of service, Keith Kling retired from BYU at the end of March 2014. Keith served as an Instrumentation Engineer in the Science Support Shop, which supports both the Department of Chemistry and Biochemistry and the College of Life Sciences. Keith was instrumental in maintaining and servicing a wide variety of scientific instruments, ranging from ultracentrifuges to X-ray diffractometers. In addition, he built or customized scientific instruments for specific research applications. He was always well respected by faculty and students alike for his work ethic, expertise, skills and quiet, congenial personality. He was a major asset to the mission of the Shop and will be missed. We wish Keith well in spending his retirement years with his large and devoted family.



Dr. Boerio-Goates presents "Last Lecture" at Homecoming Social

Dr. Juliana Boerio-Goates retired from Brigham Young University on July 1, 2013 after 35 years of service. She was honored at the Homecoming Alumni Dinner and Fall Social where she gave a "Last Lecture".

Dr. Boerio-Goates and husband, Dr. Steve Goates, accepted positions at the university in 1981.

Dr. Boerio-Goates was hired at a time when there were not many women in the College of Physical and Mathematical Sciences. Because of this, she was able to represent women in the sciences and speak to groups that promoted education for women such as the Women in Science Center.

While raising a family, teaching and doing research, Dr. Boerio-Goates was very active at her Catholic parish and the Diocese of Salt Lake City. She has served on numerous committees, including chairing the committee to raise funds to build a true church in place of the site the parish had been meeting at for the past 75 years.

Upon completion of the project, Dr. Boerio-Goates realized that she wanted to devote herself to the parish full-time and pursue an advanced degree in Catholic theology and pastoral ministry. To do this, she made the decision to retire from BYU.

Dr. Boerio-Goates plans to continue to participate with her husband in department and university activities. She says she will always be grateful for her time in the Chemistry Department.



Dr. Philip Ross Brown retires after 20 years of teaching

Philip Ross Brown was born in Armidale, New South Wales, Australia in March, 1945. He was the fourth child and second son of Leslie Brown and Marion Evenden. He received his schooling in Armidale, graduating from high school at the end of the eleventh grade (then



the senior year in that system) in 1961. He did a two-year Teacher Training course at the Armidale Teachers' College (now the College of Advanced Education), completing the certificate in 1968.

Dr. Brown started teaching high school in 1969, presenting courses in Chemistry, Physics, Biology, and Geology to grades 7 through 12 over the next 10 years. In September, 1971, he met Ann Babbs, divorcee with a daughter, Donna. They married in February, 1972 and had a daughter, Felicity, in March, 1973.

Phil received his doctorate in March, 1986 and proceeded to a 15 month post-doc with Dr. Richard Bartsch at Texas Tech University. He then became Chief Scientist with Tronac, Inc., a post which he maintained for 7 years before coming back on campus as a Research Associate with Dr. Bevan Ott for 2 more years. Phil became teaching faculty in 1995, and became responsible for Chem 107 and the Inorganic Stockroom in 1997, continuing in those responsibilities until retirement.

SELECTED UNDERGRADUATE RESEARCH AWARDS

“Determination of Absolute Number Densities of Helium Metastable Atoms in Helium-Based Ambient Desorption and Ionization Sources for Mass Spectrometry”

This past fall semester I have been working with Dr. Paul B. Farnsworth on studying ionization sources for mass spectrometry. Mass spectrometry is an analytical technique that sorts ionized molecules based on their mass. Converting molecules of interest into ions is a critical step in the process, and I am making measurements that should eventually help us make more efficient ion sources. I am measuring the concentrations of energetic, long-lived (metastable) helium atoms in four different helium-based electrical discharges that are used as ionization sources for mass spectrometry. The metastable helium atoms are thought to play a central role in creating ions from our samples, so knowing where they are and how concentrated they are will help us design better sources. The technique I am using for my measurements is atomic absorption spectroscopy. I pass a diode laser beam through helium in the source. When the laser beam encounters one of the metastable helium atoms of interest it loses a small amount of energy as the atom absorbs a light particle. By comparing the intensity of the light entering the sample to the intensity exiting the sample, I can calculate how many of the energetic helium atoms were in the beam. In the beginning of October I presented a poster at the FACSS SciX research conference and was awarded third place for my poster presentation. The rest of the semester was spent analyzing data collected, creating figures for publication and writing a first draft of the paper summarizing the research about absolute number densities of metastable helium atoms in plasma-based discharges used as ionization sources for mass spectrometry.

Charlotte has been awarded the prestigious Barry M. Goldwater Scholarship, which awards up to \$7,500 to sophomores or juniors studying mathematics, science or engineering.

CHARLOTTE REININGER
mentored by Paul Farnsworth



Targeting Chemoresistance in Tumors

A tumor's ability to evolve and acquire resistance to chemotherapies (otherwise known as "chemoresistance") is a common cause of chemotherapy failure and cancer mortality in the clinic. BYU undergraduate David Broadbent, under the mentorship of Dr. Josh Andersen and Vajira Weerasekara, a graduate student in Dr. Andersen's lab, is studying how a small protein called 14-3-3 ζ promotes chemoresistance in cancer.

"We know that 14-3-3 ζ is present at inordinately high levels in various cancers and that it promotes chemoresistance and tumor growth. We just haven't understood how it does this," said Dr. Andersen.

However, recent work from the Andersen lab has shown that 14-3-3 ζ plays a critical role in helping tumor cells dynamically adjust to and survive the unique metabolic conditions within the tumor environment—conditions that would otherwise, without 14-3-3 ζ , lead to the demise of the tumor. Specifically, David and his colleagues have found that 14-3-3 ζ activates a cellular process called autophagy, which initiates the recycling of cellular components for energy. Autophagy is a key mechanism that tumor cells use to survive the metabolic demands of rapid growth and poor blood supply, commonly found within tumors. In addition, autophagy makes tumor cells chemoresistant. David and his team are preparing to submit



DAVID BROADBENT
mentored by Josh Andersen

a paper this month describing the molecular mechanism by which 14-3-3 ζ accomplishes this feat.

This summer, David plans to continue research on autophagy in Dr. Sharon Tooze's laboratory at the London Research Institute, one of the preeminent autophagy laboratories in the world. After the summer, David will return to Dr. Andersen's lab to continue his studies on 14-3-3 ζ .



"Zinc Oxide Nanostructures"

We have found that when the right chemicals are present, ZnO forms into hexagonal prisms or plates. The plates are usually smaller with diameters of 100 nm, while the prisms have lengths of 3 microns. We have continued to change the chemicals to make different structures and sizes. Other carboxylates, including lactate, butyrate, pyruvate, and trifluoroacetate have been tried and prisms formed with butyrate and lactate but not with the other carboxylates. We are looking for materials with large surface area, so we performed BET analysis on the prisms and plates and found both the prisms and plates to be porous. As ZnO is activated by light, we have begun to test the ability of our structures to decompose chemicals upon exposure to light.

WILLIAM RANKIN
mentored by Roger Harrison



BEN ENFIELD

mentored by Brian Woodfield

“Determining the Effects of Synthetic Variables on the Properties of Al-modified TiO₂,”

TiO₂ is an excellent support material for metal and metal oxide catalysts in a number of oxidative synthesis and pollution-control reactions. Given the complexity involved in preparing catalyst supports, many synthesis variables are expected to affect these properties. Optimizing anatase supports has been the subject of much research; however, most studies have used a traditional approach of varying one factor at a time while holding all other factors constant. Results from the one factor at a time approach are often misleading and inconclusive because (a) only a small amount of the factor space is covered, (b) interactions between factors are unaccounted for, and (c) the statistical relevance of data is unknown. Statistically designed experiments (design of experiments or DOEs) are excellent tools to identify factor effects and interactions and determine conditions needed to obtain the desired properties in a minimum number of experiments. The benefits of using DOEs in the study of process variables are dramatic and clear, but this has yet to be demonstrated effectively in the literature. To our knowledge, there are no previously published studies using statistically designed experiments to optimize the synthesis of anatase catalyst supports.

We have recently developed a simple method that enables preparation of anatase catalyst supports of high surface area and unusually high thermal stability. Moreover, this method enables preparation of anatase having a wide range of pore properties. While this method is relatively simple, more than 10 variables must

be optimized to maximize surface area and pore volume, and to control pore diameter. Since analyzing variables individually is inefficient and ineffective, two DOEs, (1) a traditional fractional factorial design and (2) a definitive screening design, were used to optimize surface area and pore volume, and to control pore diameter in a reasonable number of experiments. Traditional fractional factorial designs are among the most widely used DOEs, however, main effect factors are often confounded with one or more two-factor interactions, requiring further experimentation. Screening designs are useful in assessing the relative impact of a large number of factors in relatively few trials. The definitive screening design (DSD) used in this study is based on a new model proposed by Jones and Nachtsheim in 2011 which allows for the study of many factors at three levels in only $2k + 1$ (k = number of factors) experiments.

In this study we have shown that through the use of DOEs (a) the surface area and pore structure of anatase supports can be predicted, and (b) unusually high surface areas and thermal stabilities can be realized. This work also demonstrates the successful use of DSD to separate and identify the effects of 10 variables with no confounded interactions, an approach that is generally applicable to materials and process optimization.

AWARDS/RECOGNITION

Dr. Matthew C. Asplund receives Nichols-Butler University Citizen Award

Dr. Matthew C. Asplund was awarded the Nichols-Butler University Citizenship Award on October 29, 2013, which recognizes a faculty member that exemplifies having balance between religious commitment, academic achievement and education in the broadest sense.

The late Eliot Butler and his wife Ann set up the award to recognize the contributions of Professor Joseph Nichols and to honor a faculty member in the department who has demonstrated a



clear understanding of and dedication to the highest purposes of Brigham Young University.

Professor Nichols joined the department in 1933 and was a key figure in the early development of the department. Professor Butler taught from 1956-1991 and pushed students, as well as faculty, to be well-rounded citizens of the university. Dr. Asplund was a student of Professor Butler and remembers his influence well.

“I was influenced by his passion for teaching, his demands that students really learn the material, and his love of the university,” Dr. Asplund said. “I was greatly influenced by his example.”

After almost ten years in the department, Dr. Asplund couldn't be more thankful for the recognition that his hard work has earned him.

“This award is a wonderful acknowledgement of a lot of things that I sometimes think have gone unnoticed,” Dr. Asplund said. “I greatly appreciate the support of my colleagues and the opportunity to work with them in all aspects of the work of the department.”

Matthew R. Linford named Fellow of the American Vacuum Society

Matthew R. Linford, Ph.D., a professor of analytical chemistry at BYU, has been awarded the honor of being a Fellow of the American Vacuum Society (AVS). This award is meant to recognize members of the society who have made sustained and outstanding technical contributions in areas of interest to AVS.

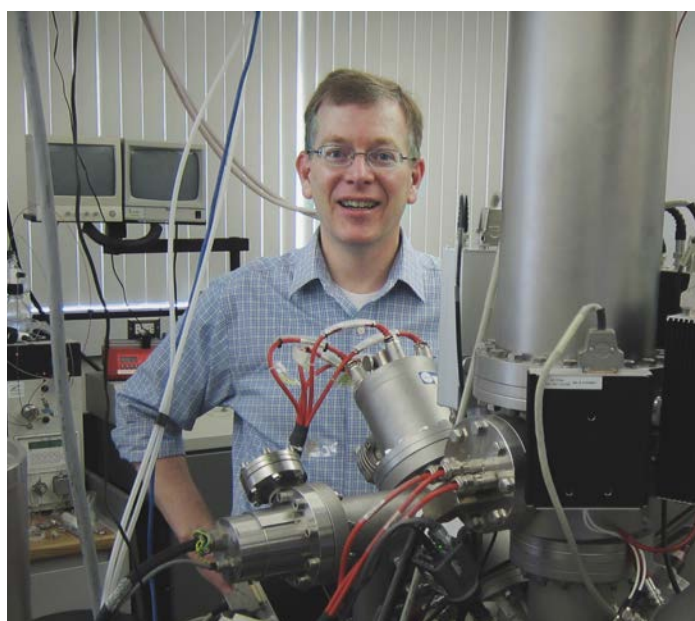
“I'm honored to receive this award,” Linford said. “I think that it's not only good for me, but also for BYU and for my research group, and I'm just really grateful to be on the list of recipients.”

“AVS is one of the really important societies in the areas of thin films, surfaces, nanotechnology and material characterization,” Linford said. “We work in these areas so it's an important society for us. I attend their main meeting almost every year and often bring one or more students with me. This year I'll attend with two graduate students and an undergraduate student.”

This award from AVS is not something that is easy to obtain. In order to even be nominated for the award, the nominee must have made sustained and outstanding scientific and technical contributions in research, engineering, technical advancement, academic

education or managerial leadership for at least ten years. Because of this, those who receive the award are usually considered to be the brightest and most experienced in their field.

“When you have your name on that list [of recipients], it's a stamp of approval on the work that you've done and are doing,” Linford said. “It's just very nice to see that coming from my colleagues.”





Dr. Milton Lee receives Lifetime Achievement Award from LCGC Europe

“Service with a Smile”

At this year’s Annual University Conference (AUC), Sue Mortensen of the Department of Chemistry and Biochemistry received the President’s Appreciation Award. This award was given to her because she exemplifies the eight values criteria—particularly “exceeding customer expectations,” “respect for all individuals,” and “innovation.”

Mortensen does her job well by responding kindly and quickly to any concerns that are brought her way. She is also a great role model for student secretaries who follow her example in excellent customer service. She works with the student employees on developing new skills that will help them in future employment opportunities.

“Sue is the face of our department,” said a member of the department. “She has a remarkable talent of making everyone she deals with think that their project or request is the most important.”

Mortensen shows respect for everyone by recognizing that each person is important and needs to be served. It is this mindset that makes her an excellent example of cheerful service.

Dr. Milton Lee has been awarded the 2014 Lifetime Achievement Award from LCGC Europe for his exceptional contributions to hyphenated chromatographic techniques and his distinguished work in the international separation science community.

Presenting the award was Dr. Alasdair Matheson, editor-in-chief of LCGC Europe. Dr. Lee accepted the award at the HTC-3 conference, which took place in Bruges, Belgium.

“It was a great honor to receive the Lifetime Achievement Award in Bruges. It caused me to reflect on the many exciting times I have enjoyed over the years working with talented graduate students, postdocs, and colleagues. In fact, I feel additional enthusiasm now to see if I can still contribute more in the future to the field of separation science!” said Dr. Lee in an article on the LCGC website.

Since Dr. Lee joined BYU in 1976, he has mentored over 71 graduate students and 26 postdoctoral researchers. Currently, his research is focused on “monolithic column technology for capillary liquid chromatography and instrumentation for field sampling and hand portable gas chromatography-mass spectrometry.”

LCGC, which stands for “Liquid Chromatography and Gas Chromatography”, has editions in North America, Europe, and the Asian Pacific. The website chromatographyonline.com combines unbiased, peer-reviewed technical information from all editions as well as other sources.



STUDENT AWARDS

Chemistry graduate student Suresh Kumar wins third place award at 41st Symposium of HPLC in New Orleans

Suresh Kumar, a BYU graduate student originally from New Delhi, India, has received the third place award for best poster at the 41st International Symposium on High Performance Liquid Phase Separations held in New Orleans. The symposium, which was held from May 10 to May 15, is considered one of the best places to learn about the latest issues important to discovery, development, and economic production processes inherent to a wide range of related technologies and techniques.

“I was very delighted when my name was called for third place,” Kumar said. “I was approached by many researchers and given business cards to provide them a reprint of my poster. It helped me in networking with them which is very good for my professional career.”

While Kumar put significant effort into preparing and submitting this award-winning poster, he made sure to thank all those who helped him along the way, including his faculty mentor at BYU, Dr.

Adam T. Wooley.

“I am very happy that I chose Dr. Adam T. Woolley as my research adviser,” Kumar said. “He is an amazing mentor with incredible experience and knowledge. His constant suggestions and guidance help me in designing my research strategies and overcoming hurdles during research.”

Kumar became interested in his field of study (lab on a chip) because it's a relatively new field that has application in providing miniaturized diagnostic tools which have a wide variety of beneficial uses. After his time at BYU, he looks forward to continuing in this growing field.

“These tools can be very helpful in terms of providing affordable, rapid, and point of care diagnosis of many diseases including cancer and preterm birth,” Kumar said. “Such tools can be very useful, especially in developing countries, and I hope I can continue to be part of that.”



2014
DEPARTMENT AWARDS

SPRING RESEARCH CONFERENCE

<i>1st Place</i>	<i>Outstanding Undergraduate Presenters</i>
COURTNEY BANKS	ANDREW DEARDEN
DEBOLINA CHATTERJEE	BRIAN GRAHAM
MICHAEL DEVONAS	HOLLY LARSON
MADHURA DHAVALA	GIDEON LOGAN
CONNER HARPER	RYAN H. MILLER
MARSHALL HUTCHINGS	BRADEN MYERS
KOMAL KEDIA	DAVID PANEK
ZHIWEI MA	WILLIAM RANKIN
MINNIE OSTVIG	GLEN THURSTON
MICHAEL PORTER	
JESSICA RAMSEY	
CHAD ROGERS	
TREVOR SMITH	

ACS Analytical Chemistry

Junior Award:

Recognizes an outstanding junior student with exceptional aptitude in analytical chemistry.

CHARLOTTE REININGER

Catalyst Club Outstanding Continuing

Undergraduate Woman

Recognizes an outstanding female junior student in chemistry or biochemistry. This award is sponsored by the Catalyst Club, an association of women who are current or emeritus members of the department or spouses of current or emeritus members.

BROOKE HAMILTON

UNDERGRADUATE STUDENT AWARDS

Freshman Chemistry Major Award

Recognizes an outstanding student in the General Chemistry 111/112 sequence.

MEGAN ASPLUND

Freshman Chemistry Non-Major Award

Recognizes an outstanding student in the 105/106/107 sequence.

JOSHUA HANSEN

Organic Chemistry Major Award

Recognizes an outstanding student in the Organic Chemistry 351M/352M sequence.

KURT LEININGER

Organic Chemistry Non-Major Award

Recognizes an outstanding student in the 351/352 sequence.

BRETT GRAHAM

UNDERGRADUATE STUDENT AWARDS

Chemistry Literature Award

Recognizes an outstanding student in Chemistry 391.

JEFF SCHACHTERLE

Hypercube Scholar Award

Recognizes an outstanding student in the 105/106/107 sequence.

**MEGAN HIRSCHI
KELLIE WOODFIELD**

Physical Chemistry Award

Recognizes an outstanding student in the Physical Chemistry 462/463 sequence.

CHARLOTTE REININGER

Biochemistry Award

Recognizes an outstanding student in the Biochemistry 481M/482M sequence.

PRESTON MOORE

Analytical Chemistry Award

Recognizes an outstanding student in the Analytical Chemistry 521/523 sequence.

JACK FULLER

Inorganic Chemistry Award

Recognizes an outstanding student in the Inorganic Chemistry 514/518 sequence.

CONNER HARPER

Eliot A. Butler Service Award

Recognizes a student who has provided significant service to the department while maintaining a high performance in course work and professional activities. This award is named in honor of Eliot A. Butler who was a former professor, chair, dean and associate vice president.

**WILLIAM RANKIN
MAX SCOVILLE**

NAMED UNDERGRADUATE RESEARCH AWARD FOR SPRING AND SUMMER

Keith P. Anderson Outstanding Graduating Senior

Recognizes outstanding graduating senior(s) for overall scholarship and professionalism and classroom performance. This award is named in honor of Keith P. Anderson, a physical chemist who taught at BYU for more than 35 years.

LISA HEPPLER

GRADUATE STUDENT AWARDS

Loren and Maurine F. Bryner Award

Recognizes advanced continuing graduate students. This award is in honor of Loren C. Bryner, professor of chemistry for 38 years, and Maurine F. Bryner, a faculty member of Food Science and Nutrition.

**SHAWN AVERETT
PAUL CROPPER
ANUBHAV DIWAN
CHAD JONES
SURESH KUMAR
TAYYEBEH PANAHI**

Telford and Frank Woolley Memorial Research Award

Recognizes outstanding students who are conducting significant research in cancer or in other health-related areas. This award is named in honor of Telford Woolley, a physician who passed away prematurely due to cancer. When his father died, his name was added to the award.

**MICHAEL BEAUCHAMP
DONALEE CHANTRY**

Jennie R. Swensen Award

Recognizes advanced continuing graduate chemistry or biochemistry students. This award is named to honor Dr. Albert D. Swensen and his lifetime of contributions to the department and in memory of his wife, Jennie Romney Swensen.

**SWATI ANAND
ANDREW MATHIS
MATT OLLERTON**

Garth L. Lee Award

Recognizes an outstanding continuing graduate student for religious commitment, service and scholarship. This fellowship is named in honor of Professor Garth L. Lee, who was a professor of chemistry at Utah State University for many years.

SONIKA SHARMA

Outstanding Graduating Ph.D. Student

**PANKAJ AGGARWAL
CHRIS TRACY
CHRIS WOOLSTENHULME**

GRADUATE RESEARCH FELLOWSHIPS

Stanley and Leona Goates Fellowship

Recognizes an advanced chemistry graduate student for outstanding scholarship and achievement in research. This award is named in honor of Stanley and Leona Goates, the parents of Dr. J. Rex Goates, professor of chemistry emeritus, and grandparents of Steven R. Goates, professor of chemistry.

ADAM SWENSEN

Roland K. Robins Fellowships

Recognizes outstanding graduate students for outstanding scholarship and promise in research. These awards were created to honor Dr. Roland K. Robins, who was world-renowned for his creativity and activity in the syntheses of new medicinal compounds.

**MADHURA DHAVALE
SARA MATA**

Bradshaw Organic Chemistry Fellowship

Recognizes an advanced organic chemistry graduate student for scholarship and achievement in research. This award is named in honor of Jerald S. Bradshaw, an outstanding emeritus faculty member.

SAMANTHA GUSTAFSON WARNER

Charles E. and Margaret P. Maw Fellowship

Recognizes an advanced chemistry graduate student for outstanding scholarship and achievement in research. This award is named in honor of Charles E. Maw who was the founding chair of what became the BYU Department of Chemistry. He remained chair from 1907-1946. Margaret P. Maw was a teacher, school principal and prominent civic leader.

JACOB SCHLIESSER

NEW FACULTY

Developing a Taste for Research and Mini-Muffins

The College of Physical and Mathematical Sciences welcomes Stacey Smith as a new assistant professor in the Department of Chemistry and Biochemistry.

Smith earned both her bachelor's and doctoral degrees from BYU in 2007 and 2012, respectively. While working on her PhD, she developed a taste for research, specifically in the structural analysis of materials using X-ray diffraction, absorption, and scattering methods.

Following her PhD, Smith spent a year as a postdoctoral fellow at MIT where she pursued additional studies in X-ray crystallography.

Smith's interest in chemistry was peaked in high school and fostered through influential professors at BYU.

"I had really great AP chemistry and physics teachers in high school," she said. "Because I had enjoyed those subjects, I took chemistry my freshman year of college [and] did well in it, and my freshman chemistry professor offered me a job in undergraduate research. The rest is history."

Smith and her husband, Justin, have been married for seven years. They enjoy doing outdoor activities together, such as hiking,

backpacking, camping, biking, and running.

"We like to do 5K races and have run the Wasatch Back Ragnar a few times," she said.

They also enjoy cooking together, singing in choirs, traveling, and photographing the interesting places they visit. When she is not outside, Smith enjoys reading, playing the piano, and baking.

"I particularly enjoy experimenting with mini-muffin recipes," she said. "My current favorite Stacey-original recipe is a banana-oat-meal-ginger muffin."

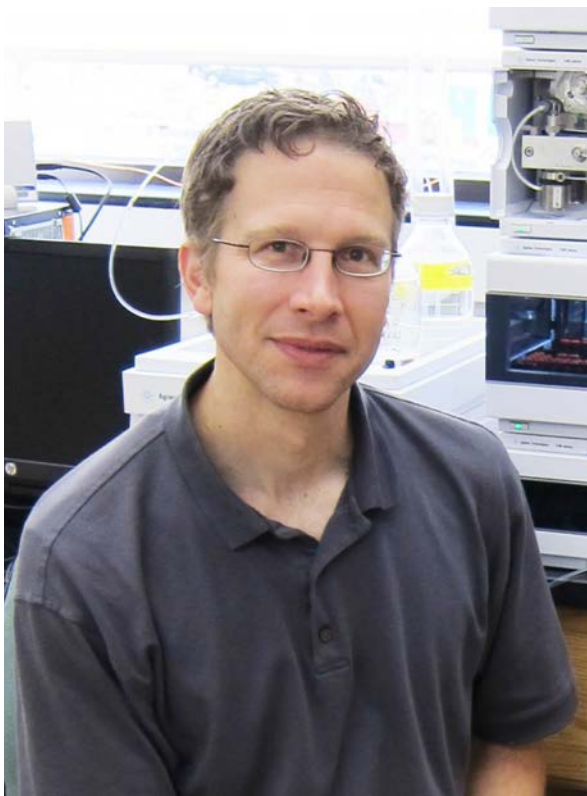
Although she admits that she is a little biased, Smith said she looks forward to working with the bright, highly motivated, and friendly students at BYU.

"I am also excited to teach in a place where faith and science are both encouraged; most of the rest of the world sees the two as conflicting opposites, but to me they are complementary," she said. "I relish the opportunity to share them both openly."

—Meg Monk, College of Physical and Mathematical Sciences

Stacy Smith





J.C. Price Joins Faculty

JC grew up in the desert of south-east Idaho. He went to Penn State for his Ph.D. and was a postdoctoral Fellow at Univ. Cal. San Francisco working on prion disease. While at UCSF he developed a technique for monitoring protein synthesis in the body. KineMed Inc. a biotechnology company in Emeryville California hired him to start up a proteomics division so that they could do these types of measurements. This worked out spectacularly but his family needed to relocate to Utah. He is now expanding upon his previous research and measuring the cellular control of protein homeostasis in response to outside stimuli. JC and his students are currently investigating the use of stored mRNA in cells and proteolytic pathways to modulate protein homeostasis.

JC is married to Jessica Arrowsmith, a wonderful girl from Issaquah Washington. They have 4 children with another on the way. His favorite pastime is playing with his kids and being involved in the scouts and other activities with the kids.



GIVING BACK



Does giving back to the department help? Here's a typical letter from a grateful student for your help:

Dear [your name],

I want to thank you for your help that allowed me to receive a mentorship to work in the lab with Dr [name of professor]. We spent the semester working on [description of research] which solidified my desire to make this work my career. We were able to make significant progress and the paper we wrote was accepted by one of the top journals for publication. I am sure this opportunity is was an important part of what got me acceptance to [name of top graduate program] for my PhD work.

Thanks for your kindness and generosity. It has made a difference in my life and that of my family.

Sincerely,

[name of student]

It's a good bet that someone stepped in to help each of us sometime during our undergraduate years. Your decision to give back so someone else can have the same blessing will change lives for generations.

Send your generous check made out to BYU Chemistry to: BYU – c/o Brent Hall, N181 ESC, Provo, Utah 84602 or send an email to brenth@byu.edu saying you want to talk, or call 1-801-422-4501.

2014
HOMECOMING EVENTS

*Please mark your calendars and plan to renew your friendships in
the department at our homecoming activities as follows:*

DEPARTMENT OF
Chemistry & Biochemistry
ACTIVITIES

October 17th

6:00 *pm* RECEPTION
6:30 *pm* DINNER
7:30 *pm* PRESENTATION

University
ACTIVITIES

October 17th

TBA DANCES

October 18th

8:30 *am* PANCAKE BREAKFAST
10:00 *am* PARADE
TBA FOOTBALL GAME

Below is a reservation form for the Department Homecoming activities. Please mail your reservation form to: Homecoming, Department of Chemistry and Biochemistry C-104 BNSN, Brigham Young University, Provo, Utah 84602, or email marcia@chem.byu.edu.



I PLAN TO ATTEND:

Reception & Dinner
Friday, October 17, 6:00 pm
Reserved Seating

YES NO

Number Attending _____

Number who are BYU Alumni _____
(Please include yourself in both totals.)

Name: _____

Address: _____

City, State, Zip: _____

e-mail: _____

Contact telephone: _____

PLEASE RSVP NO LATER THAN SEPTEMBER 24

2014

Department of Chemistry and Biochemistry

THE NEWSLETTER FOR BYU'S

• CHEMIGRAM •



Brigham Young University

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