

# CHEMIGRAM

THE NEWSLETTER FOR BYU'S DEPARTMENT OF CHEMISTRY AND BIOCHEMISTRY • AUGUST 2012

## Message from the Chair

Gregory F. Burton



**T**he 2011-12 academic year has been an exciting one. We hired two new faculty members and are close to completing negotiations with a third. Josh

Andersen, an Assistant Professor in the School of Medicine at Duke University will be joining us on October 1st of this year. On April 1st of 2013, David Michaelis, a postdoctoral fellow in Barry Trost's lab at Stanford will be arriving in the department. Josh is a biochemist who studies the regulation of cellular life and death signaling and David is an organic chemist who focuses his research on synthesizing biologically active compounds. We look forward to the strength and talents that these new colleagues bring. We also received notification of this year's rank advancements and the award of continuing faculty status (CFS) that will be effective with the start of the new academic year. Richard Watt (bio-organic chemist) received CFS and advancement to the rank of associate professor and Matt Linford (analytical chemist) was promoted to full professor. Emily Bates (biochemist) also received CFS candidacy.

During this past year, the department underwent an extensive external and internal unit review, a process that occurs every seventh year. The reviews characterized the department as a leader on BYU's campus and made particular mention of the quality of our faculty and students, our infrastructure

and instrumentation, and our teaching. While no major deficiencies were noted, we were encouraged to consider how best to introduce our biochemistry majors to biochemistry concepts and examples earlier in the curriculum. We were also asked to review our general chemistry offerings to ensure that they continue to meet the needs of our students. We learned a great deal from this process and are grateful for the contributions of so many to make the department a leader on campus.

This year, our Y-Chem student organization received a "Commendable" award from the ACS. You may remember that this is the second award in two years for Y-Chem, having received an "Honorable Mention" award in 2010. Professor Daniel Austin and our talented students have done exceptionally well in representing the department and university!

Lastly, Adam Woolley was selected as the 2012 Reed M. Izatt – James Christensen Faculty Excellence Award-ee. He will receive this award and present a special seminar of his research on Thursday, September 13, 2012 at 4 pm in the Benson Building. We hope you'll come and help us honor Adam if you are in town.

We express our appreciation to each of you for representing the department so well. We look forward to seeing you once again on Friday, October 12th for homecoming and wish you continued health and happiness.

## News

Department alumni, emeritus professors and current professors gathered in the rotunda of the Benson Science Building on Friday, October 7, 2011 for an enjoyable evening talking with old friends and making new ones.

Dr. Greg Burton, chair of the Department of Chemistry and Biochemistry, welcomed the guests and thanked them for their support in “continuing the tradition” of excellence. Dr. Burton also announced the 2011 Distinguished Pillar Award recipient, J. Bevan Ott, a physical chemist.

The Distinguished Pillar Award, awarded for the first time last year, is given by the department to emeritus faculty members who have helped build the tradition of excellence in the department. “There are two purposes of [this award],” Dr. Burton said on Friday. “To honor individuals and acquaint others in the department with them.”

Dr. Juliana Boerio-Goates introduced Dr. Ott to all in attendance. “It is a great honor to be asked to introduce Bevan Ott,” Dr. Boerio-Goates said to begin her presentation. “Bevan always went for the best – he set high goals for himself.”

Dr. Ott attended graduate school at the University of California, Berkeley and took his first teaching position at Utah State University before joining BYU in 1960. He first collaborated with J. Rex Goates, a previous

# Bevan & Renae Ott Honored

Distinguished Pillar Award recipient, and later with Reed Izatt in the department, James Christensen and John Oscarson of chemical engineering. Dr. Ott also mentored several students who have since returned to teach as full-time professors including Randall Shirts, Phillip Brown, John Lamb, Adam Woolley and Brian Woodfield.

“An outstanding teacher, students sought him out,” Dr. Boerio-Goates said. Dr. Ott received multiple outstanding teaching awards, served as department chair for nine years and was the associate academic vice president over research at BYU “for a time.”

Along with his tireless service, one of Dr. Ott’s trademarks in the department was his desire “to have the newest, the best equipment.” He owned an early calculator and looked forward to each new development.

In addition to introducing Dr. Ott, Dr. Boerio-Goates took the opportunity to “take some liberties” and highlight Dr. Ott’s wife Renae on behalf of the Catalyst Club. An association of women who are current or emeritus members of the department or spouses of current or emeritus members, Renae Ott was one of the Catalyst Club’s founding members. “Renae has played an important leadership role over the course of decades,” Dr. Boerio-Goates said. “And she’s always been there to support Bevan.”



*Renae and Bevan Ott at the Alumni dinner*

# Inspiring Success

Richard Zare Inspires BYU with Lecture on  
**HOW TO BE SUCCESSFUL.**

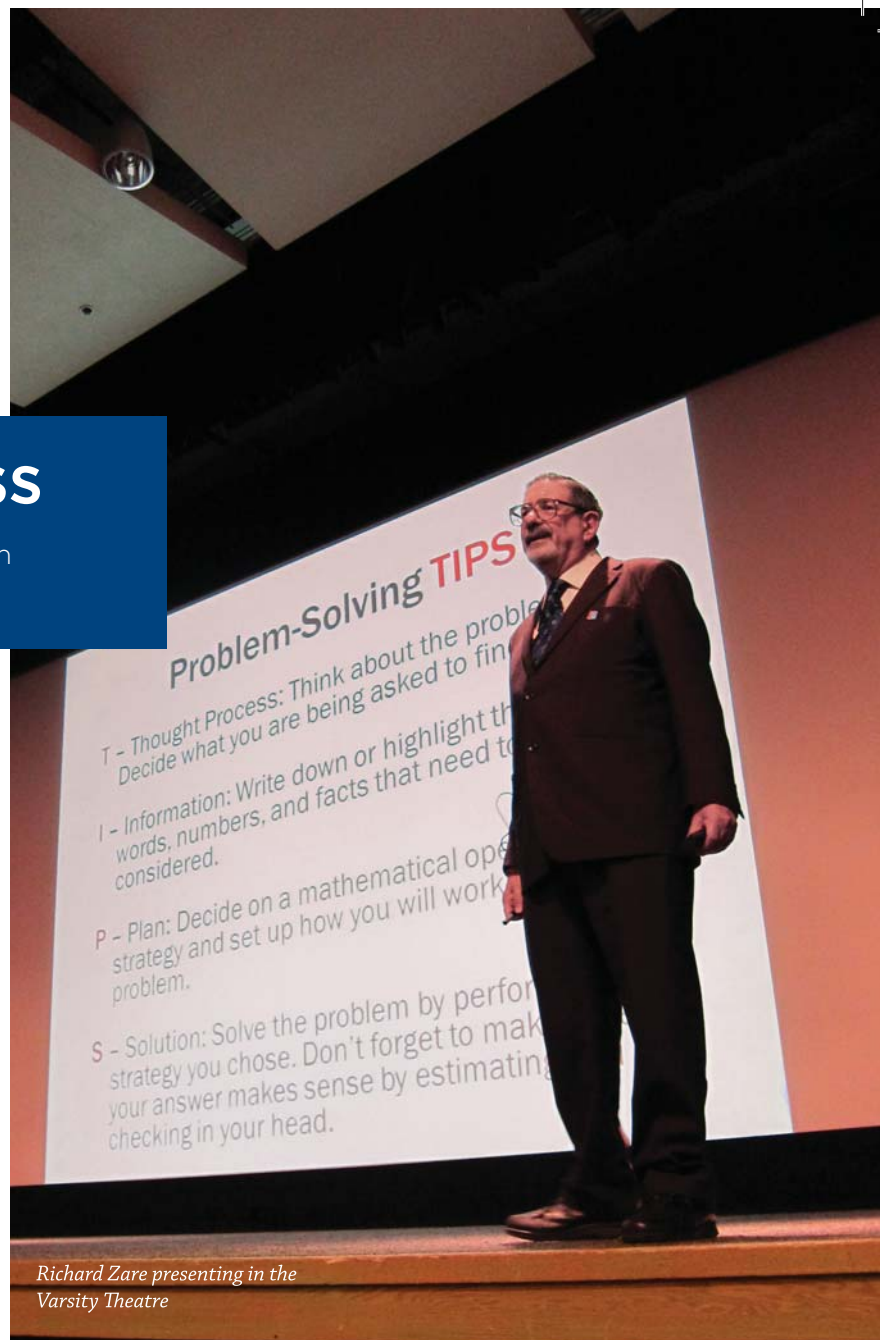
**T**he fifth annual Reed M. Izatt and James J. Christensen Lecture Series was given by Richard N. Zare on February 7 and 8. Zare is a renowned chemist who has had a long and successful career. He is currently a professor of chemistry at Stanford University.

Zare's first lecture, written for a general audience and delivered in the Wilkinson Student Center, was boldly titled, "How to Be Successful." As the recipient of numerous awards (including the National Medal of Science in 1983 and the Priestley Medal of the American Chemical Society in 2010), Zare would seem uniquely qualified to deliver such an address – but the professor never presumed he could give attendees all the answers. Instead, the talk focused on tips for dealing with and solving problems.

"There is no question that life is full of problems and problematic solutions," Zare wrote in his lecture abstract. "I suggest that these same tips [for problem solving], when vigorously pursued, lead to happy outcomes, whether or not a particular problem gets solved. They lay the basis for a wonderful life of the mind."

At the beginning of "How to Be Successful," Zare offered a copy of his PowerPoint presentation to anyone who asked. Following the presentation, he received 44 requests, many of which were accompanied by comments like "Your presentation inspired me," and "Thank you for your insights." One man, an Orem resident who attended the presentation, wrote, "Your thoughts rang true for me, though I am no chemist, or college grad. Your words were easily adaptable into all areas of life. Well done, and thank you for your thoughts."

A student added: "I agree that problem solving



*Richard Zare presenting in the Varsity Theatre*

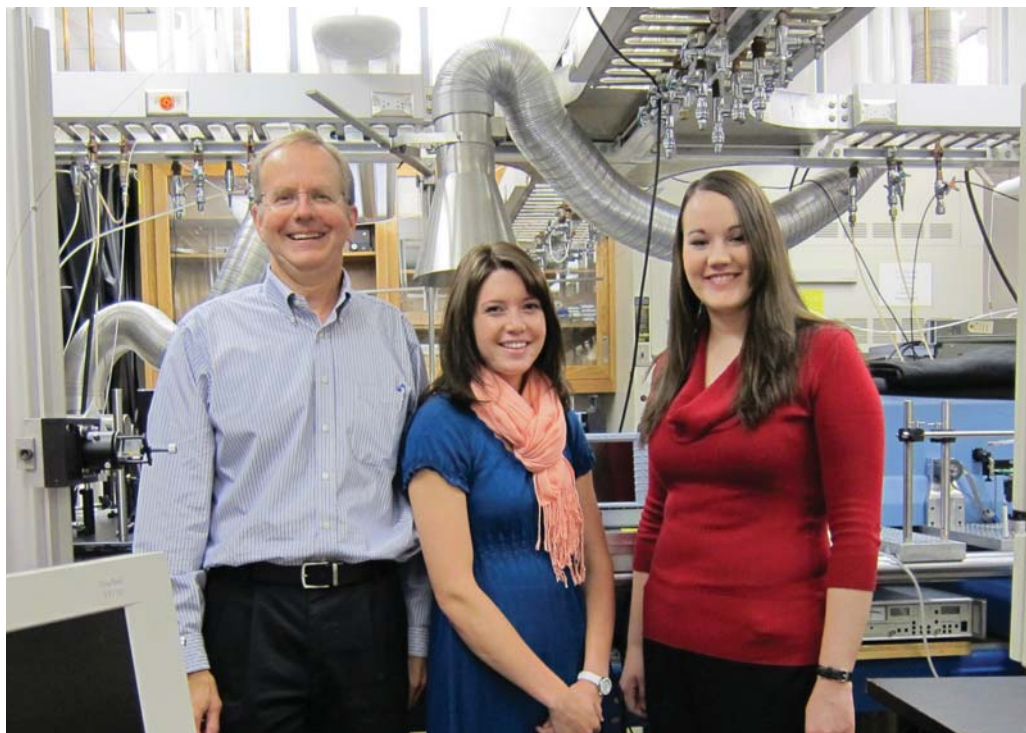
is a very useful tool, once I understand the concepts, I can apply them to whichever problem I choose which has the same concept underneath."

Problem solving was also highlighted in Zare's second seminar, a technical lecture given in the Benson Science Building to interested students and faculty on Feb. 8, in which he described some of the work going on in his laboratory at Stanford. In particular, Zare discussed the use of desorption electrospray ionization (DESI) to record short-lived intermediates in liquid chemical reactions.

"Without measurement we cannot have science, and nothing so much stimulates new measurements as inventing and perfecting new measurement devices," read Zare's second abstract.

At the beginning of his second lecture, emeritus professor Reed M. Izatt presented Zare with a plaque commemorating him as the Izatt-Christensen lecturer for 2012.

To watch the full lecture online, go to [www.chem.byu.edu](http://www.chem.byu.edu) and search "Richard Zare inspires BYU."



*Left to Right:  
Dr. Paul Farnsworth,  
Kyli McKay Bishop,  
Alisa Edmund.  
Edmund won first  
place in her session  
and Bishop took  
home a special prize  
recognizing her as a  
student presenter.*

## Prize Winning Posters

Students Rise Above the Rest at **NEVADA CONFERENCE**

Chemistry undergraduate students Kyli McKay Bishop and Alisa Edmund were both selected to receive an award at the Federation of Analytical Chemistry and Spectroscopy Societies (FACSS) conference October 3-7. Both students work in Dr. Paul Farnsworth's lab doing analytical chemistry.

The conference, held this year in Reno, Nevada, "is an annual meeting that covers the whole of analytical chemistry with an emphasis on emerging technologies" and "has a proud tradition of bringing together leading scientists across many disciplines for scientific exchange," according to their website.

Edmund won first place in her poster session, presenting the latest results of her research in how the composition of a sample affects the ion beam entering the mass spectrometer in an inductively coupled plasma-mass spectrometer (ICP-MS). An inductively coupled plasma device (ICP) is an ionization source often used in conjunction with a mass spectrometer to analyze samples. Edmund's research provides fundamental understanding for people and companies who manufacture ICP instruments to improve their products, and by extension, the accuracy of their analyses.

"I was honestly kind of shocked [when I won first in my session]," Edmund said. "Not because I thought I did poorly, just because I wasn't expecting it. ... But Dr. Farnsworth was teasing us before the conference that we should win awards because it's good research, so he was kind of vindicated."

Along with being named first in her session, Edmund received a \$400

cash award, sponsored by FACSS.

It is unusual for undergraduate students to win a conference award because most conferences cater to attending graduate students, post doctoral students, and faculty.

Bishop, a senior from Pleasant Grove, came to BYU as an exercise science major. She was interested in becoming a pediatric plastic surgeon, but changed her mind after she didn't like the initial classes.

"I didn't take chemistry in high school, so I didn't know I had such an affinity for it," Bishop said. "After taking two chemistry classes and loving them, I decided to change my major."

She started working for Dr. Farnsworth in the fall of 2009, working in the Exploratory Lab as a Teacher's Assistant before that. Bishop's research also involves ICP, focusing on the changes in the plasma itself when samples differ in composition. She won a special award at the FACSS conference recognizing her as a student presenter. The award, sponsored by biotechnology company Monsanto, included \$100 in cash.

# ACS Awards BYU Presenter

PhD Student Takes Third in New **ACS SYMPOSIUM**

**S**tacey Smith, a graduate student in the Department of Chemistry and Biochemistry, was surprised and honored when her name was read at the fall 2011 ACS meeting in Denver as the third place presenter in a new graduate student award symposium.

“[I was] surprised, like, ‘wow, that’s really neat,’ because... it was already a select group of people presenting, and then everyone that was there did a really good job,” Smith said. “They’re all very polished speakers and were presenting very interesting research. So I don’t know how the judges picked the winners, but I felt very fortunate to be one of them.”

When asked how it felt to have a student recognized for an outstanding accomplishment, one of Smith’s advisors, Dr. Branton Campbell of the Department of Physics and Astronomy, said, “It’s really satisfying. I know they’re good already, but it’s nice when others recognize it too.”

Dr. Michael A. Matthews, co-organizer of the symposium and Professor of Chemical Engineering at the University of South Carolina, said the Industrial and Engineering Chemistry (I&EC) Division of ACS developed the new symposium to provide a venue for “aspiring chemical scientists and engineers to present their work to their peers and professionals.”

“We believe the profession needs to recognize their research in an interdisciplinary forum,” Dr. Matthews said in an e-mail. “We hope that students will continue to use ACS and in particular the I&EC Division as a professional home for building relationships and their careers.”

To that end, I&EC spread the word for their first annual I&EC Graduate Student Award Symposium. Out of 23 students nationwide who applied, 18 presented their work. Some traveling from the east coast even adjusted their travel plans in order to avoid Hurricane Irene.



*Stacey Smith*

Smith is currently researching chemical catalysts that typically operate in high temperatures, collaborating with three different professors on campus: Dr. Juliana Boerio-Goates and Dr. Brian Woodfield from the Department of Chemistry and Biochemistry as well as, more recently, Dr. Campbell. The presentation she gave in Denver focused on cobalt-based catalysts and the aluminum-oxide nanoparticles that support the catalyst, particularly the research she’s done on how to improve the nanoparticles’ stability at high temperatures.



## Going Green

**HYDROGEN PEROXIDE** Goes Green in Undergrad's Published Paper on Renewable Energy by BYU News

*MacKenzie Mayo*

**M**ost of us know hydrogen peroxide as a way to bleach hair, but MacKenzie Mayo is using it to help turn yard waste into renewable energy.

A chemistry major, Mayo applies hydrogen peroxide to algae, sawdust and grass clippings so that they can be more easily converted to biofuels like natural gas. She's the lead author of an academic journal article on the topic.

What's more, the hydrogen peroxide changes to water in the process. "That's one of the advantages to using this kind of pretreatment," she said. "A lot of other treatments leave some toxic waste."

The research could be applied in any setting with a stream of incoming organic waste. At landfills, for example, yard waste could be separated and fed into a machine designed to digest the material and convert it to methane gas. Such equipment is already being developed and used by Mayo's mentor, Professor Jaron Hansen, at dairy farms in Utah and China.

With graduation coming in April, Mayo is polishing an Honors thesis that will demonstrate the optimal concentrations of hydrogen peroxide and UV light when processing sawdust and grass clippings.

"The thing that gets me most excited is the fact that this is a renewable energy source," Mayo said. "I feel like I have a responsibility to figure out how to live more sustainably and be cleaner with the energy we use."

Mayo work was published last semester by the Transactions of the American Society of Agricultural and Biological Engineers.

# ACS Fellowships at BYU

Graduate Student Awarded Competitive **ANALYTICAL CHEMISTRY FELLOWSHIP**



*Pankaj Aggarwal  
and Dr. Milton Lee*

nation make him a good fit for the fellowship. “He knows how to use information from the literature and what he’s learned in the lab to design new experiments, solve problems and obtain new, exciting results,” Dr. Lee said. “He doesn’t give up easy. He’s really dedicated.”

The nine-month ACS DAC fellowship includes a \$21,000 award to fund a student’s dissertation research in the field of analytical chemistry at their home institution. His fellowship is sponsored by Eli Lilly and when the fellowship ends in 9 months he will present the results of his research at Eli Lilly.

Dr. Emily Niemeyer, a professor at Southwestern University and co-chair of

**W**hen Pankaj Aggarwal came to BYU in August 2009 to start his PhD studies, he wasn’t sure if he was doing the right thing. He entered Dr Milton Lee’s research group that December and began studying new liquid chromatographic methods used for identifying proteins and peptides.

Two and a half years later, his hard work and diligence have already paid off with the authorship of three peer-reviewed published papers with Dr. Lee, and soon he will take advantage of another key opportunity: a nine-month fellowship awarded by the American Chemical Society Division of Analytical Chemistry (ACS DAC).

“I was thrilled, excited, and also surprised [to find out that I received the fellowship],” Aggarwal said. “Only two people in the world get it. While I was applying, I was hoping I would get it but I didn’t know if I would.”

Dr. Lee said Aggarwal’s exceptional work ethic, intelligence and determi-

the ACS committee that selects the fellows said, “Students who receive awards have typically already published a considerable amount of high quality research and show the potential to continue that trajectory with support during the fellowship period.”

Aggarwal expressed his gratitude for the three years he’s spent so far at BYU.

“I remember when I first joined Dr. Lee. He said the feeling you get when you discover something new, which nobody knows, is great!” Aggarwal said. “I’m still searching for that feeling. I’m thankful to get the opportunity to work at BYU, and especially in Dr. Lee’s lab. He has been a great mentor and helped me get where I am today.”

# National Recognition

Student in Dr. Austin's Lab Receives 2012 **BARRY M. GOLDWATER SCHOLARSHIP**



Terik Daly

For the fourth year in a row, BYU students claimed the Barry M. Goldwater Scholarship, a program established by Congress in 1986 to honor Sen. Barry M. Goldwater and given to outstanding students in mathematics, natural sciences or engineering.

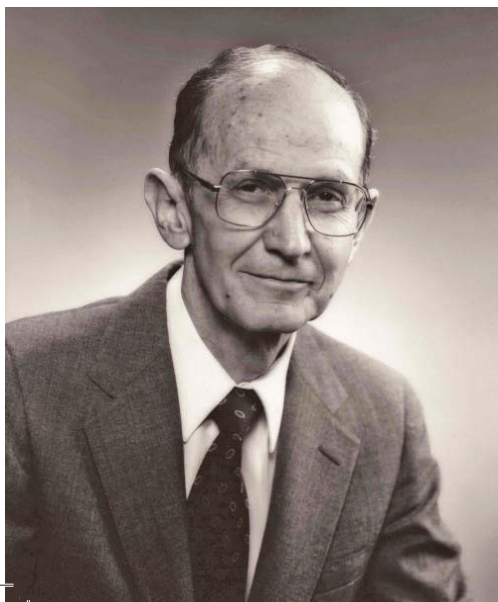
R. Terik Daly was one of two BYU students selected for the 2011 award. A geological science major, Daly studies the chemistry of micrometeorite impact with analytical chemistry professor Dr. Daniel Austin. Dustin D. Gerrard, a mechanical engineering mathematics major at BYU, also received a scholarship.

"Daly has successfully charged neutral quartz crystals for acceleration to meteorite velocity in laboratory impact studies, and he is building a time-of-flight mass spectrometer to detect the chemical species resulting from these impacts," a news release states.

John Bell, the dean of Undergraduate Education at BYU, credited the awards to the "wonderful research opportunities" Daly and Gerrard have had.

"We also credit the strong academic record each of the applicants has maintained and the wonderful advisement they have received during their application process from BYU's Goldwater faculty coach, Randy Shirts," Bell said in a news release.

Daly was recently accepted into the Brown University graduate program, where he will continue on his way to becoming a planetary geologist.



## Eliot A. Butler

**DISTINGUISHED CHEMIST** and Administrator Passes Away at 85

We regret to inform you of the death of one of our emeriti faculty, Eliot A. Butler (January 19, 2012). A World War II veteran, Dr. Butler studied chemistry at California Institute of Technology (CalTech) and served an LDS mission to Canada before joining the Chemistry Department as a teaching professor in 1956. His students remember him for his high expectations of himself and them. He helped develop the rigorous curriculum the department follows today. During his time at BYU, Dr. Butler served as the chemistry department chair, dean of the College of Physical and Mathematical Sciences, and Associate Academic Vice President. He received the Distinguished Pillar Award in October 2010, which recognizes emeritus professors who are "pillars" in the department, and will be remembered for his significant contributions to the department.

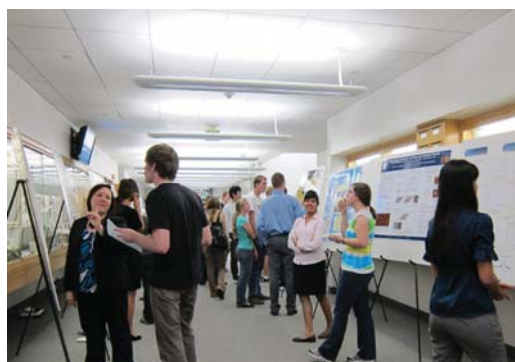
(See department website for obituary.)



# National Chemistry Week 2011

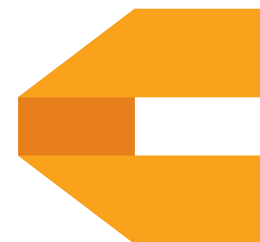


The theme for National Chemistry Week in 2011, *Chemistry—Our Health, Our Future* was celebrated this year by BYU Chemistry and Biochemistry majors through a variety of exciting activities including chemistry magic shows, poster sessions, and making ice cream using liquid nitrogen in the Benson Science Building during class breaks.



Counter Clockwise from top: During class breaks Y-Chem makes ice cream from liquid nitrogen; Dr. Asplund presenting during a Chemistry Magic show; Student poster session in the Benson Building; An explosion during a Chemistry Magic Show given by Dr. Patterson.

# Selected Undergraduate Research Projects Funded by Mentoring Grants



## Synthesis and Characterization of $\text{Co}^{2+}$ , $\text{Ni}^{2+}$ and $\text{Mn}^{2+}$ Doped $\text{ZnO}$ Nanoparticles as Dilute Magnetic Semi-Conductors

*William Rankin mentored by Roger Harrison*

At the beginning of the semester my goal was to find a way to make  $\text{ZnO}$  nanoparticles soluble or at least dispersible in solvents.  $\text{ZnO}$  nanoparticles are used in many materials ranging from sunscreen to semiconductors. I re-examined a method for nanoparticle synthesis I had tried last summer. This method included adding diethanol amine to the solution of methanolic solution of zinc acetate. Upon heating the solution, no nanoparticles formed, but after the addition of water, they instantly formed. I redid the experiment and performed more extensive characterization of the material and found that this method produced nanoparticles of consistent sizes and shape. I also found that if the materials were rinsed with water they produced hexagonal nanocolumns, whereas if they were rinsed with ethanol they assembled into spheres. Dr. Harrison was surprised and very interested, so my project shifted more towards understanding the assembly and morphology of these new structures. I have designed a variety of experiments using different controls to determine what aspects of the procedure affect the structures including heating, concentration and addition of diethanol amine. There is still a great deal of work to do. During the past semester, I presented my research at the Spring Research Conference and the ACS meeting.

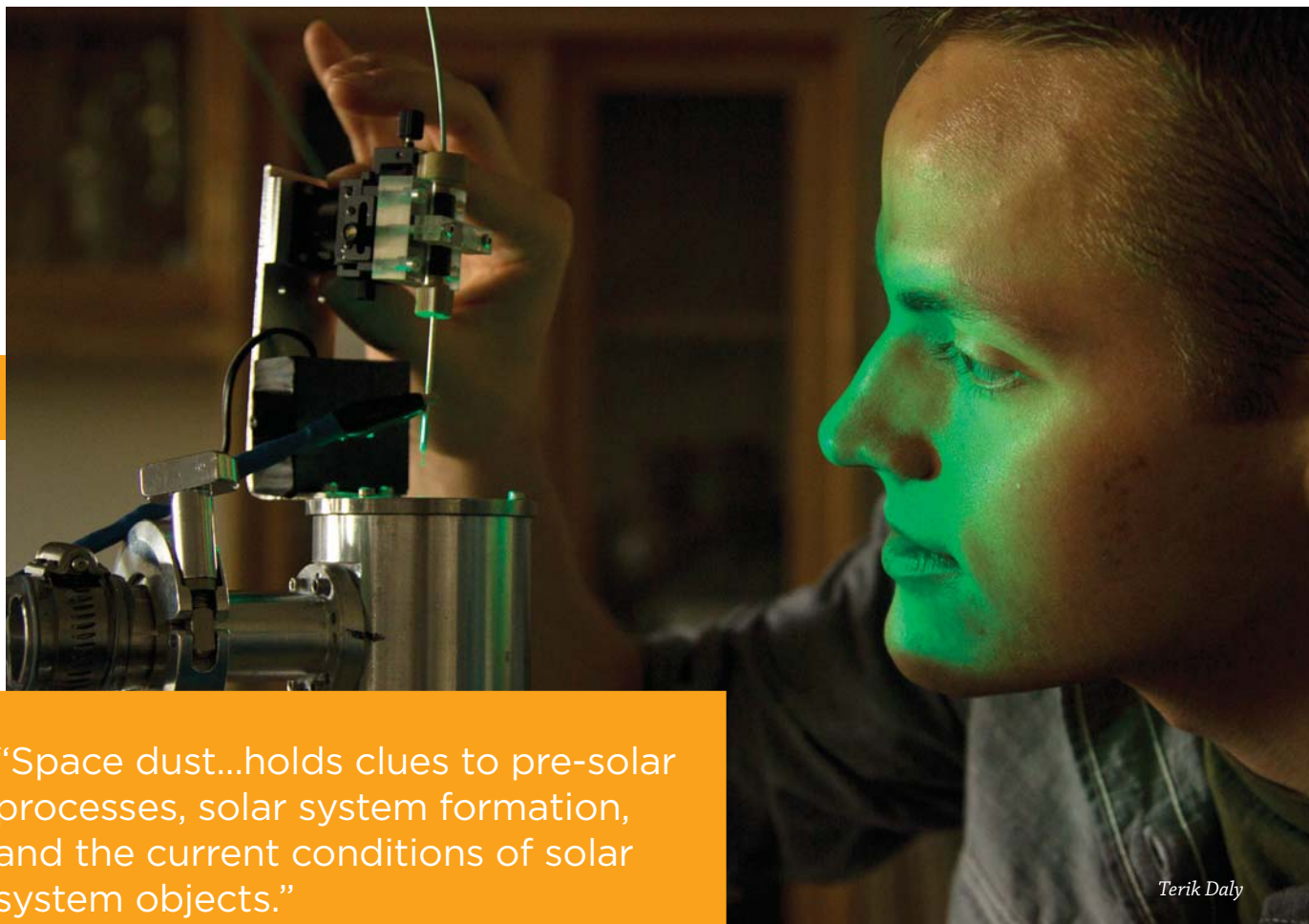
## Electrospray Charging as a New Particle Source for Dust Accelerators

*Terik Daly, mentored by Daniel Austin*

Space is a dusty place, and space dust (commonly referred to as “cosmic dust”) holds clues to pre-solar processes, solar system formation, and the current conditions of solar system objects. Numerous spacecraft,



*William Rankin*



Terik Daly

“Space dust...holds clues to pre-solar processes, solar system formation, and the current conditions of solar system objects.”

including the Stardust mission to comet Wild/2, the Galileo mission to Jupiter, and the Cassini mission to Saturn, have studied cosmic dust using instruments called *in situ* cosmic dust analyzers. These dust analyzers resulted in a wealth of illuminating data; however, understanding this data requires experiments here on Earth. Under the mentoring of Dr. Daniel E. Austin, I have been working to improve the experimental capabilities for studying cosmic dust in the lab.

I had the opportunity to present my research at the Lunar and Planetary Science Conference (LPSC), an international meeting for planetary science held in Texas, on March 22. It was well received by the community. At the conference, I also explored potential collaborations with the Colorado Center for Lunar Dust and Atmospheric Studies. To facilitate a smooth transition between me and fellow undergraduate Jonathan Kerby (who both graduated in April) and the people who continue this project, I coauthored a sixty-page transition document, cataloged and organized the tens of thousands of data collected during the current and prior research award periods, and conducted experiments to tie up loose ends. I also have worked on calibrating the image charge detector used to measure charge particles during experiments.

As a result of this semester's research, the work that I have done has been communicated to the scientific community, connections have been made to enable future collaboration with other institutions, and those who continue this work after I leave will be able to do so effectively.

## How tmRNA Enters Stalled Ribosomes

*Matthew McDowell, mentored by Allen Buskirk*

**R**ibosomes are responsible for protein synthesis in the cell. Ribosomes work by reading the genetic information in messenger RNA three nucleotides at a time and matching them with corresponding transfer RNAs (tRNA). tRNAs are chemically linked to amino acids; by bringing tRNAs together, the ribosome polymerizes amino acids into proteins. This process is known as translation and is used in cells in order to produce proteins necessary for life.

Ribosomes occasionally run into problems and stall during translation. Fortunately, two molecules known as tmRNA and SmpB are made by bacterial cells in order to free stalled ribosomes. In conjunction with Professor Allen

Buskirk, I have had the opportunity in the past couple months to investigate our question of how the tmRNA/SmpB rescue complex enters the stalled ribosome in order to release and recycle them.

To determine how the tmRNA/SmpB complex binds the ribosome, we made mutations in the ribosomal RNA to block tmRNA function. Since mutating the ribosome can kill the cell, we used orthogonal ribosomes that are designed to translate only a single specific mRNA. This allows the cell to survive with the normal ribosomes already present in the cell. In our research we used a LacZ reporter gene

“Currently, we are using a new method to purify our mutated ribosomes and measure the kinetics of ribosome rescue in vitro.”

that is only translated by orthogonal ribosomes. Of the 12 mutant ribosomes that we made, only the G517 mutants maintained the ability to synthesize the LacZ protein. Currently, we are using a new method to purify our mutated ribosomes and measure the kinetics of ribosome rescue in vitro. This kinetics assay should



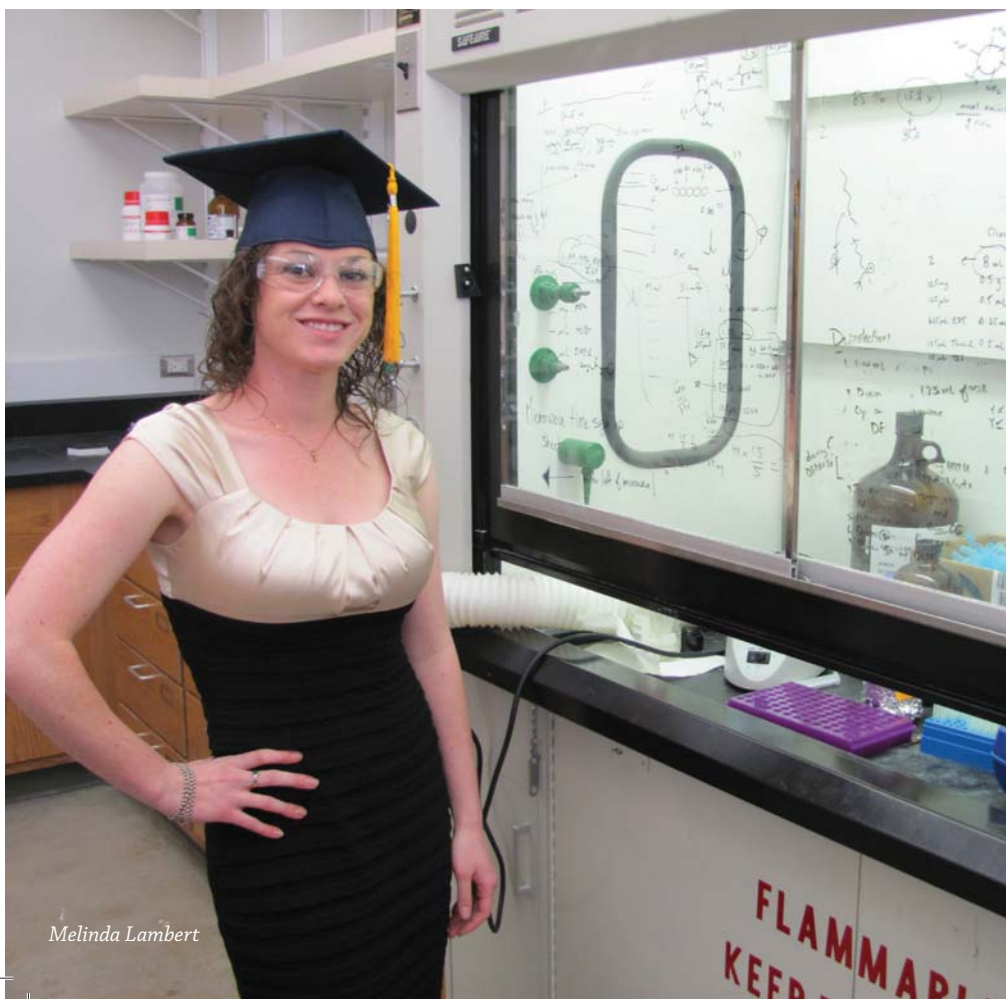
Matthew McDowell

give us the information we need to obtain conclusive results in elucidating the mechanism of how tmRNA and SmpB work to free stalled ribosomes.

## The Impact of Reverse Turn PEGylation on the Thermodynamic Stability of the WW Domain

Melinda Lambert, mentored by Joshua Price

My proposed project for this semester was to determine how the PEG stabilization of the four amino acid residue reverse turn would compare to that of the six- and five-amino acid reverse turns in the WW domain of the human protein Pin 1 and to determine in the location of the PEG in the four residue turn changed in stabilization. My mentor for this project was Dr. Joshua Price. The goal was to first synthesize all the different peptides in both their PEGylated and non-PEGylated forms via microwave-assisted solid-phase peptide synthesis, purify them by reverse-phase HPLC, and with characterization done by mass spectrometry.



Melinda Lambert

Following the final characterization, the peptides were to be analyzed by variable temperature CD experiments. The differences in the change of enthalpy ( $\Delta\Delta G$ ) of the PEGylated and non-PEGylated would be compared between the different turn lengths and the different locations of the PEG throughout the four-residue reverse turn.

In comparing the different lengths of reverse turns, it was found that the six-residue turn was the most stabilized by the addition of PEG, followed by the five- and four-residue turns in that order. The current hypothesis for this is that the method of PEG stabilization is the volume exclusion theory, in that the unfolded state of the peptide is destabilized by the PEG and therefore it more readily converts to its folded state. A poster showing this was presented at the ACS national meeting this past March in the biochemistry poster session. In the location experiment, the peptides were synthesized but were not able to be all purified, characterized, and then analyzed by the CD experiments. This project will be continued on by other member of the Price research group.

## LIF of NO<sub>2</sub>

*Joseph Mosley, mentored by Jaron Hansen*

This semester I worked to build a Laser Induced Fluorescence (LIF) experiment for NO<sub>2</sub>. Progress has been good this last semester, we have set up our laser and cell, worked to get LabView to communicate with the photon counter, and obtained calibration curves between 50 and 200 ppm NO<sub>2</sub>, but with insufficient signal-to-noise.

Instrument setup required a good amount of time and effort. A doubled-frequency Nd:YAG (532 nm) pulsed laser and photon counter are being used to facilitate fast rep rates (~8.5 KHz) and short (5  $\mu$ s) gated collection windows. The cell was set up and then laser aligned with a half-wave plate to properly orient the polarization of the laser through the cell. The cell was connected to a vacuum with a MKS Bara-

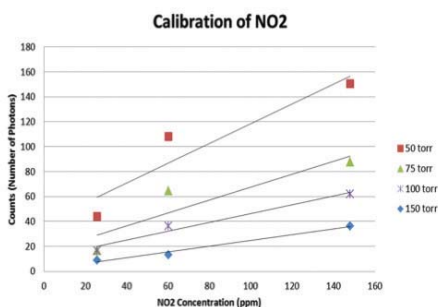
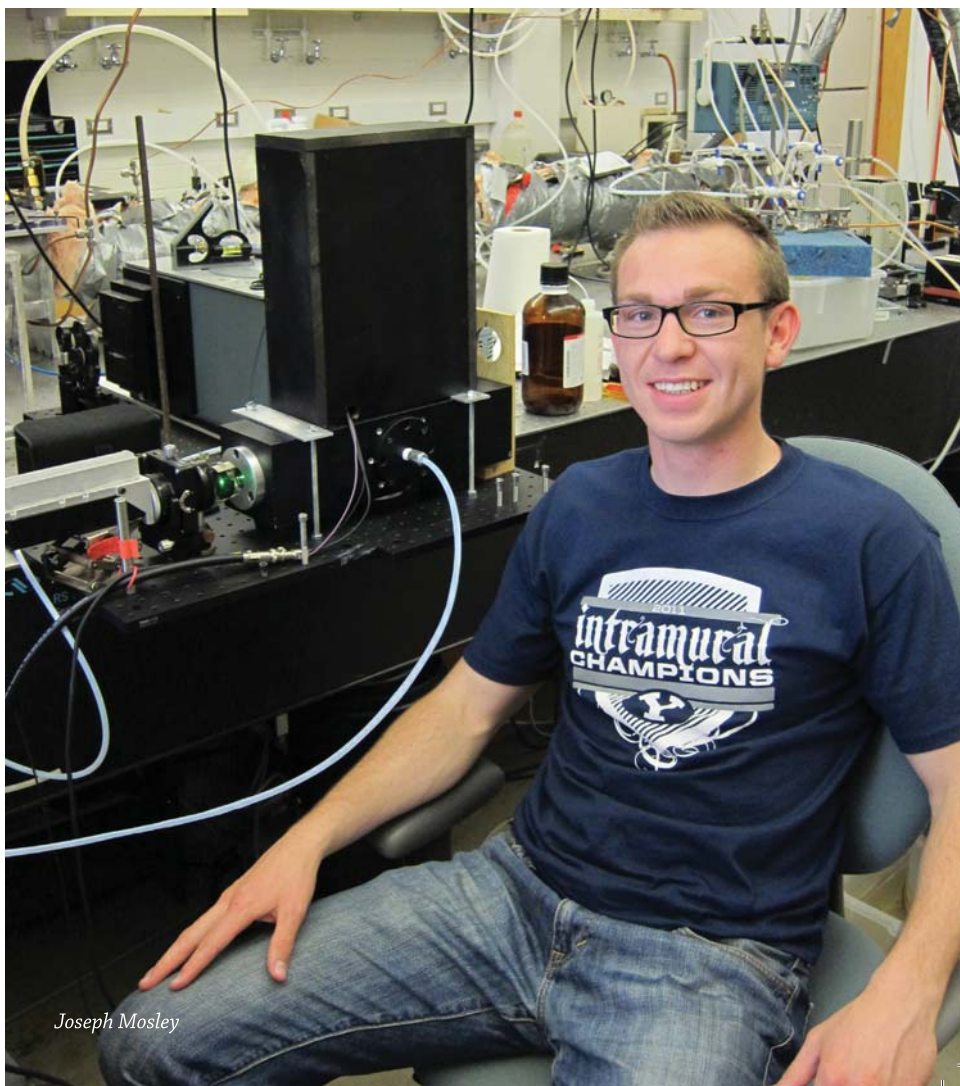


Figure 1. Calibration curves for NO<sub>2</sub> at 50, 75, 100, and 150 torr

tron pressure transducer and to a manifold that delivers known concentrations of NO<sub>2</sub>. The light detector is connected to a photon counter and placed orthogonally to the beam excitation at the angle of least Rayleigh scattering to detect the fluorescence. Adjusting the detector and the delay on the photon counter helped to acquire calibration curves for 50, 75, 100, and 150 torr. These preliminary calibration curves can be seen in Figure 1. This data reveals that the signal-to-noise ratio is still too low and also that quenching at such high pressures makes this experiment difficult.

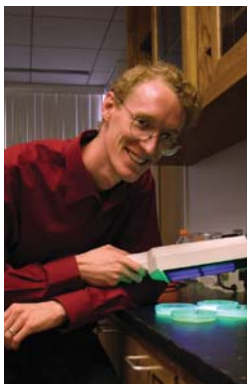
The LabView program is still under progress, and our basic program can already communicate with the gated photon counter. Our group has also been training on LabView programming for group meetings, and we are working to improve the program. Once this setup and program have been made, the calibration curve will be completed.



Joseph Mosley

# Awards and Recognition

President Cecil O. Samuelson paid tribute to all BYU faculty and staff members in the Marriott Center Tuesday morning (Aug. 23), and announced the 2011 recipients of numerous university honors, including **SIX PEOPLE FROM THE DEPARTMENT OF CHEMISTRY AND BIOCHEMISTRY.**



**Allen R. Buskirk**

*BYU Class of 1949 Young Faculty Award*

The BYU Class of 1949 Young Faculty Award went to Dr. Allen Buskirk for “outstanding contributions by junior faculty.”



**Daniel L. Simmons**

*Technology Transfer Award*

Dr. Daniel Simmons received the Technology Transfer Award for “significant research contributions that have led to the development of useful commercial products.”



**Steven R. Goates**

*General Education Professorship*

Dr. Goates was chosen to receive a General Education Professorship, an award that “encourages and acknowledges outstanding contributions to undergraduate general education and honors courses by faculty who have pursued their scholarly interests and provided services to the university community.”

“Steven R. Goates is a champion of the principles of general education and honors programs,” reads the University Conference program. “Perhaps one of Steven’s most impressive qualities is his complete dedication to superior teaching and to his students. It is not uncommon to see students lined up outside his office, where he provides an attentive ear, a depth of knowledge, and a genuine desire to help.”



**Steven G. Wood**

*Karl G. Maeser Professional Faculty Excellence Award*

A co-recipient of the Karl G. Maeser Professional Faculty Excellence Award for “outstanding achievement in fulfilling professional faculty responsibilities,” Dr. Steven Wood was especially recognized for his creative use of humor and sophisticated online materials to engage classes of more than 200 students. The University Conference program states, “Steven G. Wood is a consummate teacher who has mastered the mix of academic rigor and humor to assist his students in successful learning. ... Steve is such an effective teacher that his own colleagues frequently approach him to find out how he teaches particular concepts. As a previous student once remarked, ‘If you really want to learn something, take a class from Professor Wood.’”



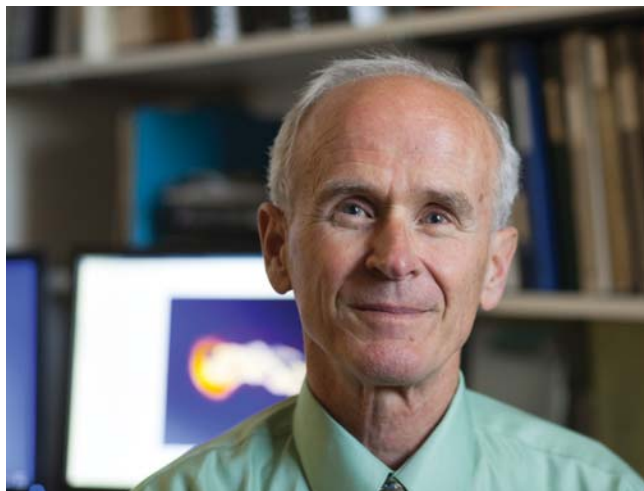
**Milton L. Lee**

*2012 National Award in Separations Science and Technology*

Milton L. Lee was awarded the 2012 National Award in Separations Science and Technology by the American Chemical Society. Lee has made significant contributions in all fields of separation science, developing useful technologies and instrumentation that are especially relevant to environmental, biomedical, and chemical-biological warfare analysis. But he considers his most important accomplishment to be the growth and development of students who work in his laboratories. He has worked in the department for more than 35 years as a researcher, teacher, and entrepreneur.

**Faculty Awards**

# Staff Recognition



**Wayne Anderson**

*Ben E. Lewis Management Award*

Dr. Wayne Anderson, the grants and personnel administrator for the department, was awarded the university's top administration award "for outstanding management abilities," Ben E. Lewis Management Award.



**Linda Richards**

*President's Appreciation Award*

Linda Richards is the assistant manager in the Chemistry Stockroom. She received a President's Appreciation Award "for exceptional service, creativity, and competence."



**Kim Christensen**

*5-year service award at college banquet*

Kim Christensen is the business manager in the Department of Chemistry and Biochemistry. He was awarded a 5-year University Service Award at the College Awards Banquet.



**Robert Paxman**

*10-year service award at college banquet*

Robert Paxman was recognized at the College Awards Banquet with a 10-year University Service Award. Paxman's work as a Computer Support Representative (CSR) is invaluable.

# Student Awards

## ACS Analytical Chemistry Junior Award

*Joel Everett*

Recognizes an outstanding junior student with exceptional aptitude in analytical chemistry. Provided by the ACS.

## Catalyst Club Award

*Lisa Heppler*

*Sadie Hirschi*

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. This award was presented by Randalynn Macedone, president of the club.

## Freshman Chemistry Major Award

*Kristine Senkane*

*Oliver Moore*

Recognizes an outstanding student in the General Chemistry 111/112 sequence (majors)

## Freshman Chemistry Non-Major Award

*Daniel Anderson*

An outstanding student in the 105/106/107 sequence (non-majors).

## Organic Chemistry Major Award

*Zac Poole*

*Elissa Cardon*

Recognizes an outstanding student in the Organic Chemistry 351M/352M sequence (majors)

## Organic Chemistry Non-Major Award

*Zachary Gibson*

An outstanding student in the 351/352 sequence (non-majors).

## Chemistry Literature Award

*Megan Hirschi*

Recognizes an outstanding student in Chemistry 391.

## Hypercube Scholar Award

*Matthew Greer*

Recognizes an outstanding student for scholastic excellence in chemistry.

## Physical Chemistry Award

*Matthew Nielsen*

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

## Biochemistry Award

*James Miller*

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

## Analytical Chemistry Award

*Jacob Hedelius*

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

## Inorganic Chemistry Award

*Kevin Teuscher*

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

## Eliot A. Butler Service Award

*Austin Gillespie*

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.

## Keith P. Anderson Outstanding Graduating Senior

*James Miller*

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.

## UNDERGRADUATE RESEARCH AWARDS GIVEN BY DEPARTMENT

Award is \$1500 for wages to do research during Spring and Summer 2012. This year, 47 students received an undergraduate research award.

### James A. and Virginia S. Ott Undergraduate Research Award

*Emily Watkins*

*Trevor Pugh*

*Elizabeth Snedecor*

Recognizes a student for academic achievement and potential for success in research. This award is named in honor of James A. and Virginia S. Ott who were master teachers.

### Glenda L.M. Harr Undergraduate Research Award

*Jonathan Wright*

Recognizes a student with enthusiasm for chemistry and potential for success in research. This award is named in honor of the mother of an outstanding undergraduate teaching assistant who spent countless hours tutoring the donor of this award.

### Spring Research Conference Section Winners

Recognizes the top presenters in chemistry sections of the Spring Research Conference.

SESSION 2

1<sup>st</sup> place: *Christopher Tracy*

2<sup>nd</sup> place: *Jayson Pagaduan*

SESSION 3

1<sup>st</sup> place: *Benjamin Kwok*

2<sup>nd</sup> place: *Dipti Shah*

SESSION 4

1<sup>st</sup> place: *Debolina Chatterjee*

2<sup>nd</sup> place: *Elisabeth Pound*

SESSION 5

1<sup>st</sup> place: *Brian Kirk*

2<sup>nd</sup> place: *Zhiwei Ma*

SESSION 6

1<sup>st</sup> place: *Chad Jones*

2<sup>nd</sup> place: *Alisa Edmund*

SESSION 7

1<sup>st</sup> place: *Sara Pratt*

2<sup>nd</sup> place: *Taylor Cline*

SESSION 8

1<sup>st</sup> place: *Brad Loertscher*

2<sup>nd</sup> place: *Thomas Cook*



## SESSION 9

1<sup>st</sup> place: *Jie Xuan*2<sup>nd</sup> place: *Steven Foltz*

## SESSION 10

1<sup>st</sup> place: *Angela Calchera*2<sup>nd</sup> place: *William Rankin*

## SESSION 11

1<sup>st</sup> place: *David Eng*2<sup>nd</sup> place: *Pamela Nge***GRADUATE STUDENT AWARDS**

The following are cash awards.

**Jennie R. Swensen Award***Brian Anderson**Vinod Chaudhary**Mickey Miller*

Recognizes advanced continuing graduate chemistry or biochemistry students.

This award is named to honor Dr. Albert D.

*Mark Acerson**Christopher Woolstenhulme**Sara Mata**Komal Kedia*

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.

**Garth L. Lee Award***Chad Rogers*

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.

**Roland K. Robins Fellowships***Angela Calchera**Vipul Gupta**Giri Dahal*

20 hour research assistantship plus a cash award. 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.

**Bradshaw Organic Chemistry Fellowship***Zhiwei Ma*

10 hour research assistantship. 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.

**Charles E. & Margaret P. Maw Fellowship***Anzi Wang*

20 hour research assistantship plus a cash award. 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 is now the BYU Department of Chemistry and Biochemistry. He remained chair from 1907 to 1946. Margaret P. Maw was a teacher, school principal and prominent civic leader.

Students on track to graduate from June 2011 to August 2012 were recognized including 58 undergraduate students who graduated or will graduate and 21 graduate students earning a Master's or PhD.

Swensen and his lifetime of contributions to the department and in memory of his wife, Jennie Romney Swensen.

**Loren & Maurine F. Bryner Award***Debolina Chatterjee**Yubo Li**Taylor Cline**Brad Loertscher**Marie Killian**Andy Peterson**Sambhav Kumbhani**Sara Pratt*

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.

**Telford and Frank Woolley Memorial Research Award****Outstanding Graduating Ph.D. Students***Alex Curtiss**Jeffrey Lai***GRADUATE RESEARCH FELLOWSHIPS****Stanley & Leona Goates Fellowship***Catalina Matias*

20 hr. assistantship for Spring and Summer 2012. 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.





## New Faculty

**DR. JOSHUA L. PRICE** Joins the Chemistry and Biochemistry Department as an assistant professor

**D**r. Joshua L. Price joined the Department in June 2011 as an assistant professor in the organic area. Josh graduated from BYU in 2003 with a B.S. in Biochemistry after doing undergraduate research with Profs. Earl Woolley and Heidi Vollmer-Snarr. He then moved to beautiful Madison, Wisconsin, where he worked in Prof. Sam Gellman's lab, developing strategies for generating protein-like tertiary and quaternary structures based on unnatural  $\alpha/\beta$ -peptide foldamers. After receiving his Ph.D. in 2008, he moved to San Diego (major weather upgrade!) to do postdoctoral work in Prof. Jeff Kelly's lab at The Scripps Research Institute. At Scripps, Josh studied protein-carbohydrate interactions, and helped discover the enhanced aromatic sequon, a compact protein structural motif that consistently increases protein conformational stability when glycosylated.

At BYU, Josh continues to pursue his interest in protein structure and conformational stability. Josh and his students are currently trying to understand how attaching a polyethylene glycol (PEG) oligomer to a protein side chain can influence the protein-folding free energy landscape. They hope to develop guidelines for using PEG to increase protein conformational stability that will be useful in both research and pharmaceutical settings.

Josh and his wife Amber live in Vineyard, UT and are the proud (and sometimes exasperated) parents of four boys: Nathan (9), Jack (7), Dallen (5), and Adam (1). They like to hike, read, pull weeds, eat cookies, and come to National Chemistry Week magic shows.

## Give Back



**B**elow you will see a note of thanks and gratitude from one of our fine students for the opportunity to participate in mentored research with Dr. John Prince.

This is a great example of what is happening in the department, but it is not an isolated case. Because of your gifts to the department we are able to award mentoring grants to these great students. Thanks to all of you for your help. Please keep it up. Many times this help is the thing that makes the difference in the outcome of a student's educational opportunities. These mentored students also are consistently better prepared for graduate work and/or entering into a career position following graduation.

### **Intrasource Separation of Lipids**

*Brendan Coutu mentored by John Prince*

I have had the amazing opportunity of continuing my research with Dr. Prince in the winter 2012 semester. My project to develop a high throughput analysis of lipids, small, hydrophobic biomolecules, using mass spectrometry has had a lot of success. I am now working with a number of labs to analyze samples ranging from asthma to kidney cancer using this new method. We have also done a lot of work this semester to develop an extremely useful data analysis program that we call Lipidomic-Search. This program allows us to identify all of the specific lipid species in our samples. Not only did we complete our goals of complete the development of our protocol, establish meaningful collaborations, and develop a data analysis tool, but I was able to present this research at two different conferences as well. I am looking forward to continuing this project throughout my senior year at BYU.

*To give, contact Brent Hall at [brenth@byu.edu](mailto:brenth@byu.edu), or call 801-422-4501. You'll never regret being generous.*

# Homecoming Events

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

## Department of Chemistry and Biochemistry Activities on October 12<sup>th</sup>

6:00 p.m. Reception  
 6:30 p.m. Dinner  
 7:30 p.m. Award presentation and talk

## University Activities

Homecoming Parade & Breakfast along the parade route  
 October 13 (Downtown Provo)

Homecoming Game BYU vs. Oregon State  
 October 13 (LaVell Edwards Stadium. Time TBA)

Homecoming Dance  
 October 12 & 13, 8:30 p.m.  
 Venues: TBA

Pancake Breakfast  
 October 13, 8:30 a.m.

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, UT 84602, or email to [marcia@chem.byu.edu](mailto:marcia@chem.byu.edu). Reservations should be made no later than September 24, 2012.

## RESPONSE CARD

I PLAN TO ATTEND:

**Reception & Dinner,**

Friday, October 12, 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

Research



News



Awards



THE NEWSLETTER FOR BYU'S DEPARTMENT OF CHEMISTRY AND BIOCHEMISTRY • AUGUST 2012

# CHEMIGRAM



Brigham Young University  
Department of Chemistry and Biochemistry  
C-100 Benson Science Building  
PO Box 25700  
Provo, UT 84604-5700