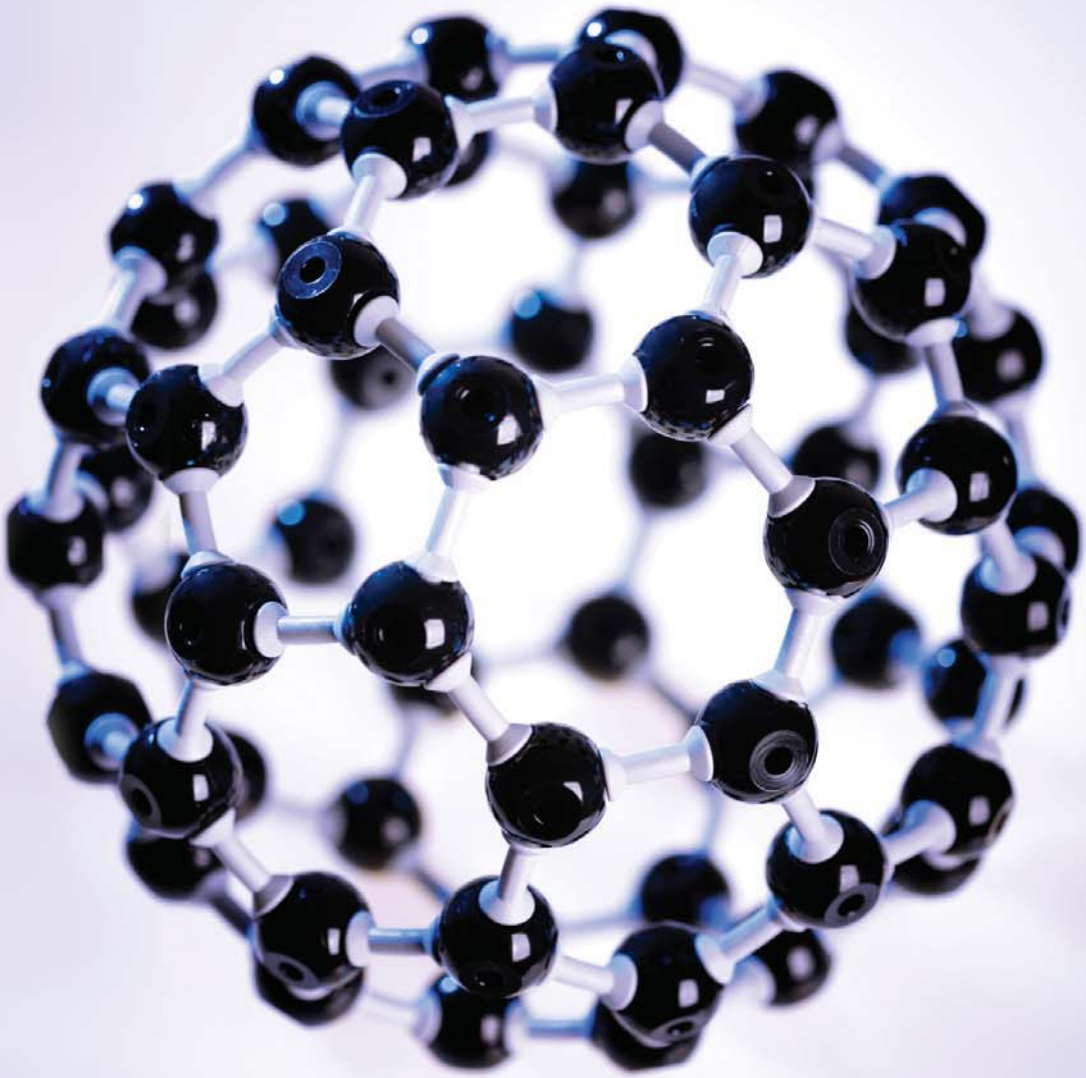
CHEMIGRAM

THE NEWSLETTER OF THE BRIGHAM YOUNG UNIVERSITY DEPARTMENT OF CHEMISTRY AND BIOCHEMISTRY• 2009



MENTORED RESEARCH • FACULTY AND STUDENT AWARDS • MESSAGE FROM THE CHAIR • RESEARCH IN TOTAL SYNTHESIS

Message

From the Chair

Paul B. Farnsworth

My appointment as chair over five years ago was followed almost immediately by a review of our department by a university committee. Such departmental reviews are conducted on a six- or seven-year cycle, so one could argue that I was the victim of bad timing. Some chairs never experience such a review. I was required as a completely green chair to prepare a detailed report of the departments programs and practices, and then respond to critiques by internal and external reviewers. It was a baptism by fire. On the positive side, the review required me to think carefully about our department's educational and spiritual role in the university and in the larger academic community. I was particularly struck by a comment from one of the external reviewers. He noted that we were unusual in our commitment to excellence in both teaching and research and wished me a skeptic's good luck in balancing those commitments.

Five years later, I think that we are succeeding, building on a decade's long commitment to excellence in teaching and research that is a firmly entrenched tradition in this department. In an era when research universities are facing growing criticism for their ivory tower approach to teaching and research, our students are blessed to be able to work with faculty members who are deeply committed to student learning, both in the classroom and in the research laboratory. As you will see from the pages of this newsletter, our students, both graduate and undergraduate, are engaged in applying the concepts that they are learning in the classroom to a range of interesting research projects. I don't want to sound too smug, but I derive real satisfaction from watching the interactions between faculty and students, and from seeing the growth that comes from those interactions. I believe that we are on the right path.

We owe a lot to our alumni. Your hard work as students and your excellent performance in graduate programs and the workplace after leaving BYU have laid the foundation for the success that we enjoy. I know that I can speak for my colleagues in saying that we are always pleased when you come back to visit. We enjoy learning about your accomplishments and successes. The coincidence of homecoming and National Chemistry Week this fall gives us a unique opportunity for our traditional alumni gathering. Instead of following our reception and dinner with a speaker, we are preparing a special version of our chemical magic show for our alumni guests. Be sure to sign up early for this popular show, and bring your families.

I'll look forward to seeing you this fall.

Best Wishes,
Paul B. Farnsworth

Research in Total Synthesis

Researchers complete total synthesis of compound that has the potential to restore memory loss.

The aspirations of Dr. Steven L. Castle's research group were recently achieved, and the praise of their work has just begun. Dr. Steven L. Castle, an associate professor of chemistry and biochemistry at BYU, as well as graduate student Fang Li and undergraduate student Samuel S. Tartakoff, completed the total synthesis of acutumine.

This compound comes from an Asian hanging vine and has a unique structure. The vine is often used in Chinese medicine to reduce pain and fever. Dr. Castle said acutumine has anti-amnesic properties in rats, meaning that it can potentially restore memory loss in humans. The process used to synthesize acutumine includes new chemical reactions that could be used by pharmaceutical companies to synthesize medicines, Dr. Castle said. It took 42 years after acutumine was discovered for someone to synthesize it. "The structure is so challenging that people weren't trying to make it until 8 or 9 years ago," Dr. Castle said.

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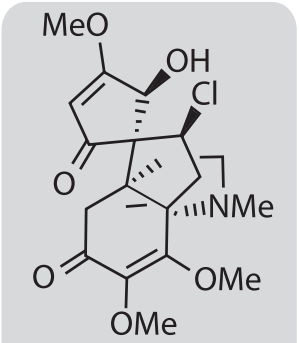
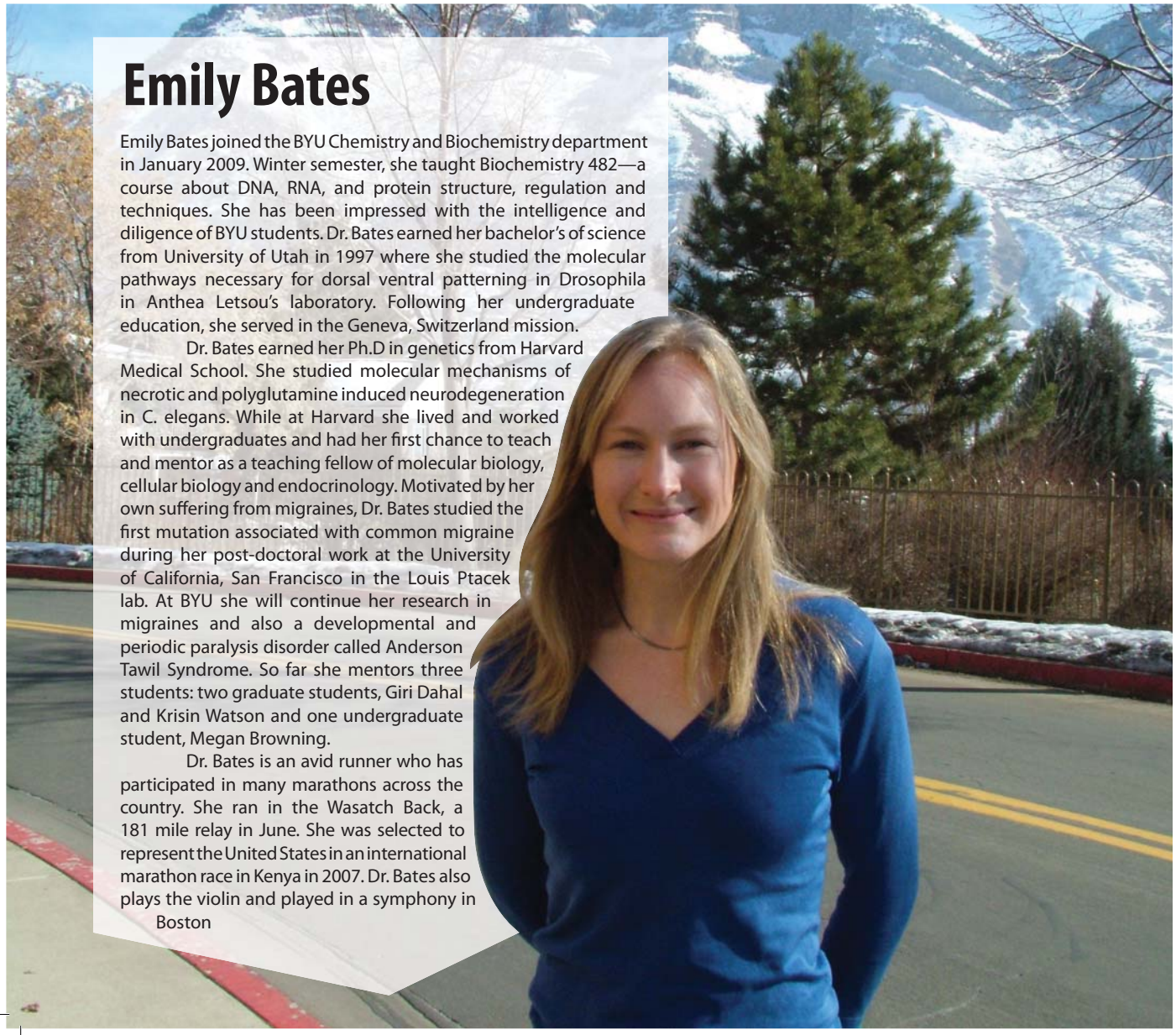
Dr. Castle has been researching acutumine since 2003. Fang Li began in 2004. Their article, entitled "Total Synthesis of (–)-Acutumine," was published in the Journal of the American Chemical Society website on April 28 and needed little time to skyrocket into popular demand. The paper ranked 7th on the most read papers list in Journal of the American Chemical Society for April. More than 200 papers are published in this journal in a given month. A summary of the article, followed by many positive reviews, can be found on a website created by an Oxford graduate. Paul Docherty started www.totallysynthetic.com three years ago. Many of the papers selected to be summarized on the site are from universities such as Stanford, MIT and Harvard. Dr. Castle was pleased with the exposure that BYU and his students will get by being featured on the site. ■



Acutumine

New Faculty

The Department of Chemistry and Biochemistry welcomed two new full-time faculty in 2009.

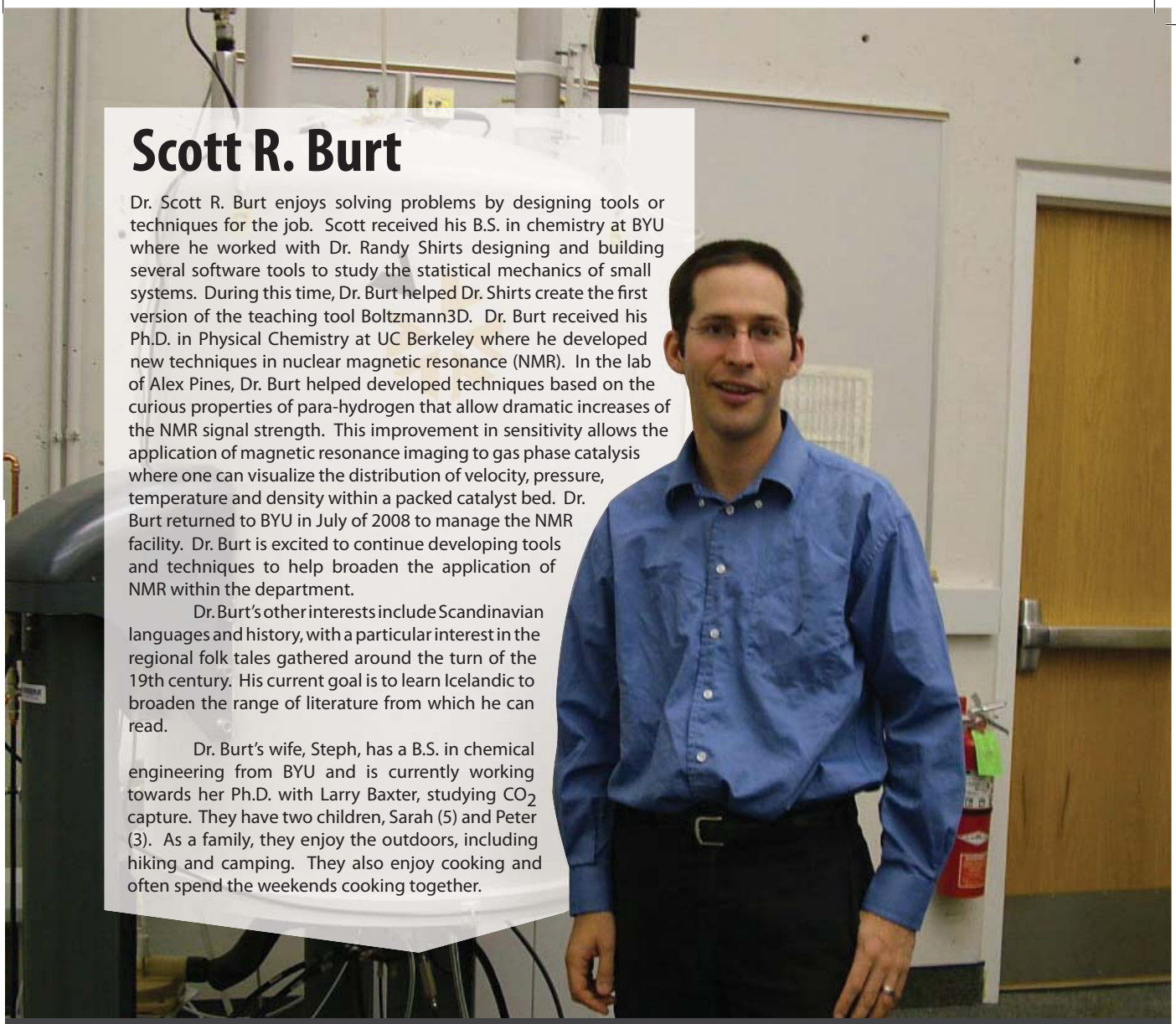


Emily Bates

Emily Bates joined the BYU Chemistry and Biochemistry department in January 2009. Winter semester, she taught Biochemistry 482—a course about DNA, RNA, and protein structure, regulation and techniques. She has been impressed with the intelligence and diligence of BYU students. Dr. Bates earned her bachelor's of science from University of Utah in 1997 where she studied the molecular pathways necessary for dorsal ventral patterning in Drosophila in Anthea Letsou's laboratory. Following her undergraduate education, she served in the Geneva, Switzerland mission.

Dr. Bates earned her Ph.D in genetics from Harvard Medical School. She studied molecular mechanisms of necrotic and polyglutamine induced neurodegeneration in C. elegans. While at Harvard she lived and worked with undergraduates and had her first chance to teach and mentor as a teaching fellow of molecular biology, cellular biology and endocrinology. Motivated by her own suffering from migraines, Dr. Bates studied the first mutation associated with common migraine during her post-doctoral work at the University of California, San Francisco in the Louis Ptacek lab. At BYU she will continue her research in migraines and also a developmental and periodic paralysis disorder called Anderson Tawil Syndrome. So far she mentors three students: two graduate students, Giri Dahal and Krisin Watson and one undergraduate student, Megan Browning.

Dr. Bates is an avid runner who has participated in many marathons across the country. She ran in the Wasatch Back, a 181 mile relay in June. She was selected to represent the United States in an international marathon race in Kenya in 2007. Dr. Bates also plays the violin and played in a symphony in Boston



Scott R. Burt

Dr. Scott R. Burt enjoys solving problems by designing tools or techniques for the job. Scott received his B.S. in chemistry at BYU where he worked with Dr. Randy Shirts designing and building several software tools to study the statistical mechanics of small systems. During this time, Dr. Burt helped Dr. Shirts create the first version of the teaching tool Boltzmann3D. Dr. Burt received his Ph.D. in Physical Chemistry at UC Berkeley where he developed new techniques in nuclear magnetic resonance (NMR). In the lab of Alex Pines, Dr. Burt helped developed techniques based on the curious properties of para-hydrogen that allow dramatic increases of the NMR signal strength. This improvement in sensitivity allows the application of magnetic resonance imaging to gas phase catalysis where one can visualize the distribution of velocity, pressure, temperature and density within a packed catalyst bed. Dr. Burt returned to BYU in July of 2008 to manage the NMR facility. Dr. Burt is excited to continue developing tools and techniques to help broaden the application of NMR within the department.

Dr. Burt's other interests include Scandinavian languages and history, with a particular interest in the regional folk tales gathered around the turn of the 19th century. His current goal is to learn Icelandic to broaden the range of literature from which he can read.

Dr. Burt's wife, Steph, has a B.S. in chemical engineering from BYU and is currently working towards her Ph.D. with Larry Baxter, studying CO_2 capture. They have two children, Sarah (5) and Peter (3). As a family, they enjoy the outdoors, including hiking and camping. They also enjoy cooking and often spend the weekends cooking together.

2009 FACULTY AWARDS

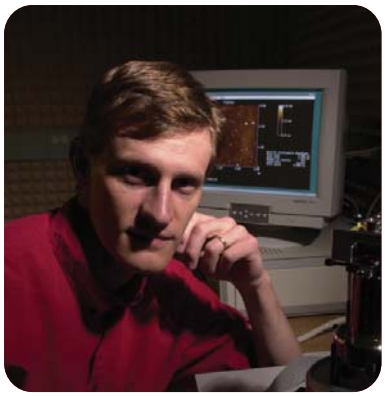
Douglas Henderson

Douglas Henderson, an emeritus professor, was accepted into the Royal Society of Chemistry this year after receiving an unexpected letter from the President of the society, C. David Garner, requesting he apply for membership.

Dr. Henderson applied and was accepted as a fellow, the highest level of membership in the society. To be considered a fellow of the society means the member has at least five years of experience and has made an outstanding contribution to either the advancement or application of chemical science, the chemical science profession or the management or direction of an organization in which chemical science is important. As part of admittance into the society, Dr. Henderson is entitled to use the initials FRSC after his name, meaning he's a fellow of the RSC. There are three levels of membership in the RSC: Associate (AMRS), Member (MRSC), and Fellow (FRSC). Dr. Henderson said to use the initials after his name is a form of recognition, or in a sense like having a degree. He said this recognition is also an indirect reflection of BYU, because he taught and continues to do research here. As well as the initials, Dr. Henderson will have his name printed in the Times of London along with the other new members.

Dr. Henderson was a student of Dr. Henry Eyring at the University of Utah and said Dr. Eyring influenced him to study chemistry. Dr. Henderson received his undergraduate in mathematics and his Ph.D in physics. He taught physical chemistry courses at BYU for 13 years. He retired in 2005 and for the last six or seven years has been conducting research on biophysics. Dr. Henderson is also a member of the American Chemical Society.

Adam T. Woolley



Adam T. Woolley received a BYU Young Scholar Award, honoring him for his research and teaching. Dr. Woolley currently mentors six undergraduate, six graduate and three postdoctoral students in two areas of research. One group is working on polymer microchips, miniaturized devices used for chemical analysis. The small plastic tools separate molecules and are being designed for use in a doctor's office. The microchips make separation faster and easier, in a disposable and relatively inexpensive format. The group's interest is in separating proteins indicative of liver cancer.

The other area of research is in coating DNA with metal and other materials to enable it to conduct electricity. With colleagues in Chemistry (Prof. Linford) and other departments, this team coats and shapes the DNA. This method could lead to faster computer processors. Dr. Woolley has been at BYU since 2000, when he started both research projects, and he is presently an Associate Professor in the Department of Chemistry and Biochemistry.

Milton L. Lee

Milton L. Lee is the first recipient of the Reed M. Izatt and James J. Christensen Faculty Excellence in Research Award. The award was set up to honor faculty who have been productive in research throughout their academic careers. Dr. Lee has been at BYU for 33 years, participating in active research the whole time. "I don't believe there's been a year go by that I haven't had external funding," Dr. Lee said.

Dr. Lee currently specializes in monolithic stationary phases and temperature gradient gas chromatography, but is best known for his research in capillary separations and mass spectrometry detection. He has mentored 65 graduate students, most who have or are currently pursuing Ph.D degrees. Dr. Lee has published over 500 peer-reviewed scientific papers, 200 of which have been co-authored by other Chemistry faculty and 60 that were co-authored with other BYU faculty, such as professors in botany, physics and food science, as well as in chemistry. "I like to collaborate with other members of our faculty," Dr. Lee said.

The Izatt-Christenson award is in memory of a former BYU Chemical Engineering professor, James J. Christensen. Reed M. Izatt, an emeritus faculty member, worked closely with Christensen for many years. After Christensen's passing Izatt established the award to recognize other chemists and chemical engineers who have been successful in research at BYU.

Paul Savage

Paul Savage was recognized by the Office of Research and Creative Activities for successfully obtaining external funds for research. He received the Outstanding Achievement in Sponsored Research Award at the Annual Sponsored Research Luncheon Program in November of 2008.

Dr. Savage said some scientific research at BYU is funded by the university, but most research is supported through government, private and industrial sources. The department of chemistry and biochemistry continues to see an upward slope in external funding, and this funding supports postdoctoral, graduate and undergraduate students in their research. He said applying for grants is a continual process that takes time to gather information and put together proposals. The department applies for about $35 million and receives approximately $5 million annually. "It's exciting when things get funded," Dr. Savage said. Currently Dr. Savage's research is supported by multiple grants and subcontracts from the National Institutes of Health and industrial sponsors.

James Patterson

James Patterson received the Air Force Young Investigators award of $300,000 for his research on the molecular basis of adhesion. The grant will be over a period of three years and will fund new equipment, materials, and support for students. Out of the 210 applicants only 39 scientists and engineers were selected for the $12.1 million in grants. According to the Air Force, "The Young Investigators Research Program is open to scientists and engineers at research institutions across the United States who have received Ph.D or equivalent degrees in the last five years and show exceptional ability and promise for conducting basic research.

The objective of this program is to foster creative basic research in science and engineering, enhance early career development of outstanding young investigators, and increase opportunities for the young investigators to recognize the Air Force mission and the related challenges in science and engineering." Dr. Patterson said he is pleased with the program because, since it is targeted at young scientists, it allows them to "get their foot in the door" of research.

Currently Dr. Patterson is working with one postdoctoral researcher, two graduate and five undergraduate students. They use a technique called vibrational sum-frequency generation spectroscopy to understand links between the molecular structure of adhesive bonds and adhesive performance. Dr. Patterson learned this technique during his Ph.D work at the University of Illinois at Urbana-Champaign.


Jadd Shelton


Elisabeth Pound

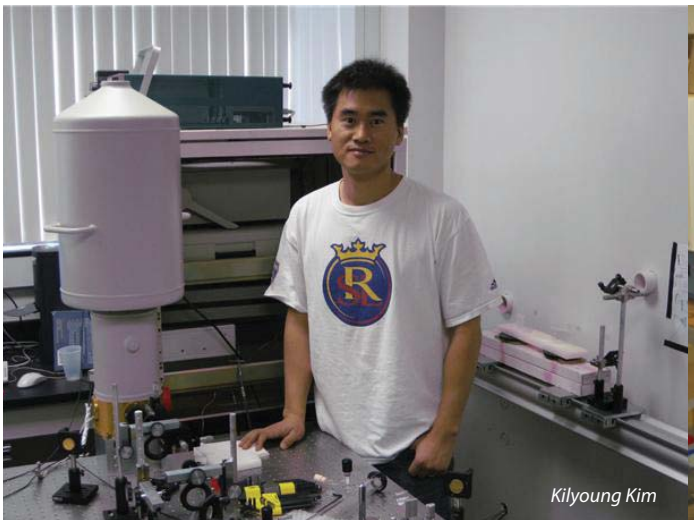
2008 2009 Mentored Research

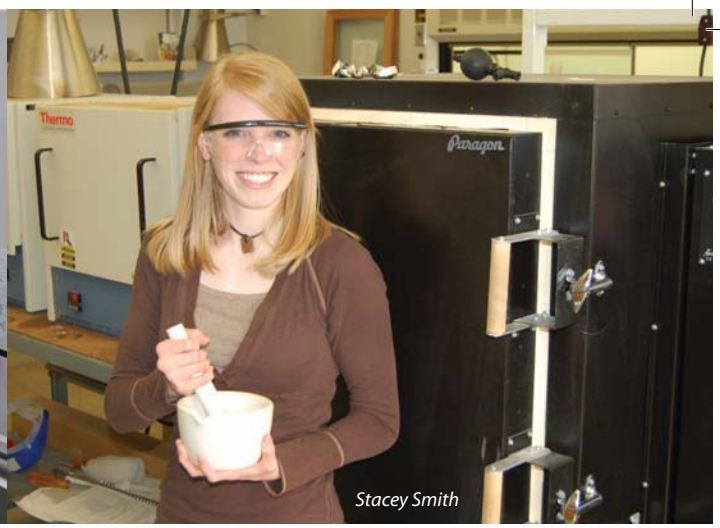
During the past several years many of our alumni have made significant contributions toward the support of graduate student research projects through donations. The following paragraphs contain summaries of some of this research as described by the students.

Metal Oxide Nanoparticles: Their Make and Model

Stacey Smith mentored by Juliana Boerio-Goates

I am originally from Jonesboro, AR, and I just finished my second year as a Ph.D student in the physical chemistry area. Metal and metal oxide nanoparticles are being incorporated into myriad applications ranging from catalysts, solar cells, and batteries to dental implants, cosmetics, and MRI imaging agents. Unfortunately, industrial-scale production of these nanoparticles has been limited by the fact that virtually every material requires its own unique synthetic process. Recently, Dr. Juliana Boerio-Goates and Dr. Brian Woodfield patented a remarkably simple synthetic approach capable of producing over 50 different metal and metal oxide nanopowders that promises to meet the increasing demand for metallic and ceramic nanoparticles. In this two-step, solvent deficient process, a solid metal salt is ground with a solid base (usually ammonium bicarbonate) for about 10 minutes forming a solid precursor which is then calcined at relatively low temperatures (~300°C) to form the nanoparticle product. My research over the past two years has focused on understanding the mechanism of this versatile new method. I have used mass spectrometry and thermogravimetric analysis (TGA) to elucidate the two reactions and their byproducts, and I have used powder x-ray diffraction (XRD) to identify the precursor formed during the first step.


Kilyoung Kim



Stacey Smith

Through my XRD studies, I noticed that the method produces some metal oxide and hydroxide structural phases in the precursors which are either completely new or are not well characterized. To characterize these unusual structures, I am working with Dr. Branton Campbell of the Physics Department to learn a new method for analyzing nanoparticle XRD data called atomic pair distribution function (PDF) analysis. This method involves converting the reciprocal-space XRD data into a real-space, experimental PDF via a sine Fourier transform. Once I have this experimental PDF, I generate a structural model for my nanoparticles, calculate the model's PDF, and compare the model PDF to the experimental PDF. I then tweak certain parameters in the model structure until the model PDF matches the experimental PDF. Because structure is often related to function, once I determine the structure of these nanoparticles, I will be better able to understand their physical properties and functionalities in applications such as catalysis and solar cells.

"Recently we discovered a new class of nucleoside derivatives that exhibit very promising activities against over half of the human tumor cell lines in the NCI 60 cancer panel"

Surface Characterization, Modification and Patterning

Lei Pei mentored by Matthew Linford

I am from China and am a fifth year graduate student in analytical chemistry. Dr. Linford is my advisor and gives me a lot of guidance on both my research work and my academic life. My research is mostly focused on surface characterization, modification, and patterning. In these five years, I learned many valuable analytical techniques at BYU. I use X-ray photoelectron spectroscopy (XPS) for surface elemental composition and oxidation state information, time-of-flight secondary ion mass spectrometry (ToF-SIMS) for mass spectrometry of ionized particles which are emitted from the surface, atomic force microscopy (AFM) and scanning electron microscopy (SEM) for surface morphology information, ellipsometry for surface thickness of a material, goniometry for surface free energies information, etc. These methods help me to collaborate with other groups working on different projects. We did ToF-SIMS and chemometrics analysis on a series of coal samples provide by Dr. Baxter in the Chemical Engineering Department. With Dr. Asplund's group, we did ToF-SIMS, chemometrics, and AFM analysis on laser activation-modification of semiconductor surfaces (LAMSS) of 1-alkenes on silicon. My current research is on understanding carbon nanotubes, one of the strongest materials in the world, with Dr. Davis and Dr. Vanfleet's group in the Physics Department. We can grow vertically aligned carbon nanotube (VACNT) forests and make nanotube – polymer composite films. Recently, we have developed a new and straightforward method for fabricating ultrathin carbon nanotube membranes, which may have many useful applications.

Spectroscopy

Kilyoung Kim mentored by Eric T. Sevy

I am from Seoul, South Korea. This year I will finish my fourth year in the Ph.D program in physical chemistry. While pursuing my master 's degree in Korea, I frequently felt I lacked in-depth knowledge of spectroscopy and even basic chemistry. This shortage of knowledge stimulated me to study chemistry. However, I had to work and support my family after I received my degree because of the economy. My family responsibilities did not allow me to study fulltime. I went to work at a chemical company and discontinued my studies. This decision made me want to study even more because I wanted to know more about spectroscopy to understand ICP-MS, ICP, AAS, and UV-VIS spectroscopic instruments so I could be more effective in persuading customers to purchase our instruments.

My passion for studying made me quit working and go abroad to study chemistry. After I got accepted in a Ph.D program at BYU, I became a real chemist trying to understand natural events using chemical knowledge learned from Prof. Sevy and other faculty. Prof. Sevy especially has often discussed with me how scientists have to think about solving problems in research. For example, I have been investigating the effect of physical properties on collisional energy transfer with CO_2. I believed results from previously published papers and tried to apply the analysis to interpret our results. When Prof. Sevy discussed the assignment of C_6F_6 normal vibrational modes with me, he found my analysis was wrong. Right away I argued with Prof. Sevy about my analysis because I applied the same assignment as the previous papers. However, Prof. Sevy showed me why the assignment is wrong using a fundamental assignment method. He said, "We need to think about every aspect of our research with logical thinking. Also, we need to double-check with the current theory to analyze our results." His advice shocked me because I believed published papers were always true. This caused a huge change in my attitude and I began to analyze and interpret results differently.

"We found that strong collision energy transfer events significantly relate to the electronic-excited state of donor molecules."

Stacey Smith

Converting Genetic Information Into a Functional Amino Acid Chain

DeAnna Cazier mentored by Allen R. Buskirk

Converting genetic information (DNA and RNA) into a functional amino acid chain (protein) is crucial for life. The synthesis of proteins from a messenger RNA template is called translation, and it happens in the ribosome. Although the ribosome is very efficient, there are some things that can arrest ribosomes in the middle of translation. Ribosomes that have begun translating but cannot continue or terminate are called stalled ribosomes. Stalled ribosomes detract from the number of available ribosomes, hindering the cells ability to synthesize needed proteins. If stalled, ribosomes continue to build up and are not


DeAnna Cazier


Jadd Shelton


Elisabeth Pound

released, the cell will die.

Bacterial cells have developed a unique system to rescue stalled ribosomes, called trans-translation. The two components of this system are transfer messenger RNA (tmRNA) and small protein B (SmpB). My research in Dr. Buskirk's lab has focused on making and characterizing amino acid mutations in SmpB. I have found some mutations that break trans-translation by altering the structure of the SmpB carboxy terminal tail. I have also found mutations in the body of SmpB that restore functionality to a defective tmRNA mutant. I am currently working on writing my thesis so that I can graduate with my master's degree in August. Working in Dr. Buskirk's lab has been a great opportunity for me to learn and develop my microbiology/biochemistry lab skills.

Synthesis of Various Analogues of Adenosine

Jadd Shelton mentored by Matt Peterson

I am from both Cheney, WA and Logan, UT. I just finished my first year of graduate school in the area of biomolecular organic chemistry, and my research advisor is Dr. Matt Peterson.

Our research focuses on the discovery and optimization of nucleoside derivatives with potent anticancer activity. Recently we discovered a new class of nucleoside derivatives that exhibit very promising activities against over half of the human tumor cell lines in the NCI 60 cancer panel. The NCI 60 is a repository of representative human tumor cancers from such key disease types as leukemia, breast, ovary, renal, prostate, non-small cell lung, central nervous system and colon cancers. Cell growth in over 30 of the 60 cell lines in the NCI 60 panel were inhibited by our compounds at promising compound concentration. We are currently in the process of optimizing the anticancer activities of these exciting new lead compounds. Appropriate fine-tuning of the basic core structure for our compounds could yield promising new candidates for clinical testing. My research involves the synthesis of various analogues of adenosine.

"Our research focuses on the discovery and optimization of nucleoside derivatives with potent anticancer activity."

Single Collision Energy Transfer Events

Alan Johnson mentored by Eric Sevy

I am a third year master's student working for Dr. Eric Sevy. We are a laser spectroscopy group studying single collision energy transfer events. Specifically we conduct studies to find contributing factors into the energy transfer probability distribution function; this function relates the amount of energy transferred in a single collision to its probability. As a lab, we


Alan Johnson

study collisions between fluorinated benzene molecules and carbon dioxide; my work focuses on using the three isomers of tetrafluorobenzene and the three isomers of trifluorobenzene. This study has the benefit of comparing molecules with the same chemical makeup that only differ in spatial arrangement giving each a different dipole moment. Our experiment uses a 248 nm UV excimer laser to excite the fluorinated benzene molecule into an electronically excited state that relaxes into a vibrationally excited state; this excited molecule collides with a CO_2 molecule transferring energy into rotational and translational states. We probe the CO_2 molecules with a 4.3 μm high resolution IR diode laser at 1 μs which is ¼ the mean gas collision time for our experimental conditions. By measuring the full width at half-maximum and the line strengths for selected rotational states, we can calculate the rate at which CO_2 molecules are scattered into that rotational state. This rate is turned into a probability by using the Leonard-Jones rate constant and is then reordered as probability per energy transfer amount. This function fits well to a double exponential that gives fitting parameters representing strong and weak collisions. Our research finds these parameters to be correlated with the density of states of the donor molecule, which is an application of Fermi's Golden Rule.

Using DNA as a Template for Nanoscale Electronic Circuits

Elisabeth Pound mentored by Adam Woolley

Electrical circuits have continued to decrease in size and increase in complexity over the past several decades. Currently, circuits are made with a layering technique. Masks are created to protect certain areas while others are either built up or etched away to form the complex circuitry. As circuits become smaller they are more difficult to manufacture, and new ways of making them are being explored. One new method being investigated is creating small and intricate devices from the bottom up; by building them with molecules, atoms and nanoparticles.


Pei Lei

DNA is a useful building block in assembling such small structures. DNA forms a double helix, with each strand composed of nucleotides that pair in a very predictable, specific manner. With careful planning, DNA can be controlled and folded into different shapes. A new technique, called DNA origami, uses the predictable base pairing to create pre-designed structures. In this method, a long, single strand of DNA acts as a scaffold and folds throughout the desired shape. This long piece is held into place with small complementary strands that cross from one to another part of the scaffold, acting like little staples.

"With careful planning, DNA can be controlled and folded into different shapes."

I am using the technique of DNA origami to create templates which will be coated with metal to form nanocircuits. The DNA shapes or templates are designed with a computer program and then formed in solution. I have assembled several origami structures and characterized them by atomic force microscopy. Now I am working on more complex designs. With metal deposited on them, these tiny DNA shapes will create circuits that are much smaller than currently possible. I am a second year graduate student from Nevada. ■

StudentAwards 2008-2009

Keith P. Anderson Outstanding Senior:
Devin Busby

Analytical Chemistry
Devin Busby

Biochemistry
Jason Nielson

Chemistry Literature
Laura Webb

Freshman Chemistry Major
Nathan McMaster

Freshman Chemistry Non-major
Dylan Pratt

Inorganic Chemistry
Samuel Tartakoff

Organic Chemistry Major
Aaron Pulsipher

Organic Chemistry Non-Major
Daniel Condie

Physical Chemistry
Jacob Grange

Catalyst Club-Outstanding Junior Woman
Amy Felsted

Chemistry Service Awards
Kate Sadler

James A. and Virginia S. Ott Undergraduate Research Award
Aaron Johnson

Glenda Harr Scholarship Award
Jon Low

GARTH L. LEE UNDERGRADUATE TEACHING AWARDS

Spring 2008
Megan Browning
Trisha Collins
Katie Comstock
Michelle Merrill
Aaron Miller
Ally Peet
Spencer Rowan
Curtis Seare
Jordan Smith
Kristin Watson

Summer 2008
Damon Demars
Christopher English
Caleb Hiller
Dan Jacobs
Spencer Rowan
Trent Savage

Fall 2008
Geoff Bean
Daniel Condie
Emily Evans
Amy Felsted
Jacob Jones
Annelise Kelly
Laura Lassetter
Matt LeCheminant
Shawn Middelson
Brian Mugleston
Mitch Peterson
Matt Rowley
Trent Savage
Jordan Smith
Stephen Wilkinson

Winter 2009
Geoff Bean
Justin Black
Katie Comstock
Daniel Condie
Paul Fischbuch
Jonathan Hedges
Jacob Jones
Matt LeCheminant
Bailey Mortensen
Brian Mugleston
Ashley Peet
Andy Peterson
Mitch Peterson
Aaron Pulsipher
Chuck Richards
Spencer Rowan
Matt Rowley
Trent Savage
Isaac Thimmesch
Matt Winterton

UNDERGRADUATE RESEARCH AWARDS

Fall 2008
Lee J. Allen
Brent McKay Allred
Katie Andrus
Katherine Biggs
Ben Brockbank
David Buck
Ben Cragun
Ronald Terik Daly
Alan Erdmann
Leah Hall
Adam Herring
Megan Renee Hirschi
Aaron George Johnson
Steven Kearnes
Jeremiah Keyes
John Mahler
Bryan Mangelson
Devin Mathews
Scott Terry Maughan
Jason Nielson
Seth Olson
Andrew Orton
Lafe Timothy Peavler, Jr.
Amber Lee Powell
Arthur D. Quast
Katherine Sadler
Mark Ian Sawyer
M. Curtis Seare
Logan Shumway
Jordan Smith
Lauren Spence
Robert Swenson
Samuel Steucek Tartakoff
Kara Tolzmann
Jacob Voelkel
Matthew Wright

Winter 2009
Lee J. Allen
Katie Andrus
Devin Busby
Solomon Campbell
Jeffrey Clark
Ben Cragun
Alan Erdmann
Amy Felsted
Sarah Julina Fenn
Megan Renee Hirschi
Cameron Horch
Aaron George Johnson
Steven Kearnes
Jeremiah Keyes
Bryan Mangelson
Devin Mathews
Scott Terry Maughan
Aaron C. Miller
Bailey Mortensen
Jason Nielson
Katherine M. Sadler
Mark Ian Sawyer
M. Curtis Seare
Logan Shumway
Jordan Smith
Robert Swenson
Samuel Steucek Tartakoff
Jacob Voelkel
John Ross Williams
Matthew Wright

Spring and Summer 2009
Lee J. Allen
Devan Olin Beck
Megan Browning
Aaron Michael Clark
Jeff Clark
Daniel L. Condie
Ammon Eaton
Alan Erdmann
Austin Hadley
Leah Hall
Aaron George Johnson
Steven Kearnes
Jonathan Kerby
Jeremiah Keyes
Laura Lassetter
Jon Low
Bryan Mangelson
Devin Mathews
Sam S. Matthews
Scott Terry Maughan
Bailey Mortensen
Daniel N. Mortensen
Emily Nelson
Anthony D. Peterson
Aaron Pulsipher
Arthur D. Quast
Matthew Rowley
Mark Ian Sawyer
Lauren Spence
Robert Swenson
Jonathan O. Wright
Jonathan P. Wright
Irene Young

CHEMISTRY DEPARTMENT GRADUATE AWARDS

FELLOWSHIPS

Bradshaw Graduate Fellowship in Organic Chemistry
Joshua Robinson

Outstanding continuing graduate student in organic chemistry —10-hour research assistantship for up to 12 months beginning Fall 2009.

Charles E. & Margaret P. Maw Research Fellowship
Weichun Yang

Outstanding continuing graduate student in any area— 20-hour research assistantship for up to 12 months beginning Fall 2009.

Roland K. Robins Research Fellowship
Mickey Miller
Rebecca Plimpton
Stacey Smith

Outstanding continuing graduate students in any area—20-hour research assistantship for up to 12 months beginning Fall 2009.

BYU Graduate Studies Research Fellowships (Internships)
Rob Hilton
Fan Yang

Outstanding continuing graduate students in any area—10-hour research assistantship for up to 12 months beginning Fall 2009.

Stanley & Leona Goates Research Fellowship
Elisabeth Pound

Outstanding continuing graduate student in any area—20 hour research assistantship for Spring and Summer beginning Spring 2009.

CONTINUING STUDENT SUPPLEMENTARY AWARDS

Outstanding continuing graduate student in any area, based on religious commitment, service, and scholarship—$2,000

Loren C. & Maurine F. Bryner Award
Yanshu Feng
Xueyuan Zhou

Outstanding continuing graduate student in any area—$1,000

Jennie R. Swensen Award
Peter Shen

Outstanding continuing biochemistry graduate student—$1,000
Outstanding continuing graduate student working in health or cancer related research

GRADUATING AWARDS

Outstanding Graduating Ph.D.
Xiangtian Long

An Invitation

from Friends, Students and Faculty of the Department of Chemistry and Biochemistry to Support Mentored Student Research

With the current economic conditions, we have an even greater need for mentoring and scholarship funds. We are fortunate to have some of the brightest and best students anywhere. More and more graduates from our classrooms are leaving and contributing instantly and significantly in many professional and academic fields.

The opportunities in our labs and lecture halls are stimulating and challenging. Students are provided with exceptional "real world" learning experiences.

However, they cost money and that's where we would like to invite you to help. Please consider contributing to our student mentoring and scholarship fund. Your donation, when combined with others will give another student an opportunity to participate in a learning experience they might otherwise not have. Down the road your contribution will likely put a student in a position to give a little something back. Just like you!

Brent Hall, LDS Philanthropies Representative College of Physical & Mathematical Sciences

To contribute email brenth@byu.edu or call 801-422-4501

BYU Homecoming 2009 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 23

6:00 p.m.	Reception
6:30 p.m.	Dinner
7:30 p.m.	Magic Show – (Room W-112 Ezra Taft Benson Science Building)

University Activities

Homecoming Spectacular, October 22 & 23 (Marriott Center)

Homecoming Parade and Breakfast along parade route, October 24 (downtown Provo)
Tailgate Party – October 24 at TBD West Stadium Parking Lot

Homecoming Game – October 24 at TBD, LaVell Edwards Stadium, BYU vs. TCU

Homecoming Dance – October 24 at 7:30 pm in various locations

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. Reservations should be made no later than October 13, 2009.

Response Card

I plan to attend:

Reception & Dinner, YES ☐ NO ☐
October 23, Friday; 6:00 pm
Reserved seating for alumni.
Number of Guests _____
Number who are BYU Alumni _____
(Please include yourself in both totals.)

Chemistry Magic Show YES ☐ NO ☐
7:30-8:30 pm.
Reserved seating for alumni.
Number of Guests _____
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 October 13)