

Brigham Young University Chemigram

A newsletter for Brigham Young University Chemistry Alumni
April 2002

Department of Chemistry and Biochemistry, C100 BNSN, Provo, Utah, 84602
Visit our website at <http://chemwww.byu.edu>

Chair's Message

This edition of the Chemigram has been sent to 1,200 alumni and friends of the Department of Chemistry and Biochemistry at BYU. As always it brings information about faculty, staff and students. New in this issue is the alumni corner authored by Dee Johnston (class of 1968). We invite you to send us information about yourself for inclusion in the next Chemigram. You may also send your comments or information by email to chemigram@byu.edu. We hope that you enjoy keeping up with the department and that it helps in renewing old acquaintances.

We moved to the Benson Science Building a little more than six years ago. The new building has proved to be an effective and stimulating environment for the department. Since the Fall of 1995, BYU's enrollment has increased by 8%. However, the number of undergraduate majors in chemistry and biochemistry has risen to 418, almost a 50% increase since 1995. Our number of graduate students, now close to 80, has undergone a similar increase. The department has been invigorated by the addition of sixteen new faculty members (more than 40% of our present faculty) since the beginning of 1995. Both established and new faculty members continue to have vigorous research programs that provide excellent experience for our majors. Several of our emeriti faculty continue to have active research programs. A research highlights section will give you a flavor of this work. You



are also invited to visit the department website at chemwww.byu.edu for more details about current faculty members and their research.

We have more graduate and undergraduate students working with faculty in our research labs than ever. As you know, the side-by-side efforts of students and faculty in the lab add substantially to the quality of a student education and contribute to important scientific discoveries. Student research has long been a strength of the department and its value is now recognized widely at BYU. Thanks to help from the university's Mentored Learning Grants, many more students are now supported at least partially while participating in research projects. To learn more about this and other ways you can support the department see the note on the College Annual Fund in this issue.

Over the years faculty members have set a tone of collegiality, citizenship and dedication to scholarship. That culture continues in the department today. We continue to offer our students a rigorous and challenging program. As in years past, current students in chemistry and biochemistry work hard and excel. Most of us have fond memories of student life and have profited greatly. The faces may be different than those of a few years ago, but I can assure you that the experiences of today's students are similar to those of their predecessors. I hope that you enjoy this Chemigram.

Fran Nordmeyer, Chair

The BYU Annual Fund and Donations to the Department of Chemistry and Biochemistry

As BYU alumni you will soon receive a mailing concerning the Annual Fund Campaign. As you consider your gift this year, please be aware of a new fund raising strategy which applies to certain donations. Several major contributors to BYU (friends of the university) have agreed to match dollar for dollar all donations to the following three funds: (1) the Trustees/President's Priorities, (2) General Scholarships and (3) the College Annual Fund. We invite you to participate with us by contributing to one of these three funds. If you choose the College Annual Fund, please consider designating the College of Physical and Mathematical Sciences. Earl Woolley, Dean of that College, has committed that your donations to the College Fund will be transferred to the department's gift account, where they will be used to support student participation in faculty-mentored research. If you would like your donation to go into a different departmental account, please let me know. Meanwhile, the matching gift will be available for university priorities including scholarships, internships and research opportunities for undergraduate researchers. Year 2001 matching gifts have already endowed three undergraduate student mentorships in our college this year. We thank you for your support.

Chemistry Department Alumni Homecoming Activities

For the first time, the Department of Chemistry and Biochemistry hosted several alumni activities during the BYU Homecoming weekend (October 19th and 20th). This began with an open house and mixer on Friday afternoon interspersed with a chemistry magic show by Phil Brown, a slide show presentation about the Department by Paul Farnsworth, and a tour of the building by Fran Nordmeyer. Following a University-wide faculty and alumni barbecue on Brigham Square, Chemistry alumni, faculty, and friends met together for refreshments and to hear Jerald Bradshaw present a lecture entitled "Thirty-two Years of Crowning Around." The Homecoming Parade began at 10:00 a.m. on Saturday. Alumni and faculty gathered together again at noon for a luncheon in the "fishbowl," an area in the new

building that doubles for a student study area and for periodic Department social functions. It was obvious that everyone who attended enjoyed meeting old friends, renewing acquaintances, seeing the progress of the department, and eating good food. The "crowning" touch, other than Jerald Bradshaw's lecture, was winning the football game against the Air Force Academy with a score of 63-33. We plan to repeat this activity during Homecoming weekend this fall.

New Faculty

Eric Sevy, our newest assistant professor, joined us after completing a post doctoral position at MIT. He received his Ph.D. in Chemical Physics at Columbia University. Eric loves sports, although he doesn't participate now as much as he would like. He played baseball for 11 years, starting at age 7, and in high school lettered in four sports. Additionally, Eric enjoys singing and playing the piano, despite the 8 years of piano lessons his mother made him take. He is an Eagle Scout and enjoys many outdoor activities: hiking, backpacking, camping, and rock climbing. From 1989-91 he served a mission in the England London Mission. In 1999 he married Brooke Frederickson and they are the parents of a son, Slade, who was born in August this year. He and Brooke enjoy traveling and have been (thus far) to England, France, Germany, Switzerland, Belgium, Holland, and Canada. In addition, Eric likes good books and plays; he dabbles in architecture and woodworking. His most recent interest is sailing, which he learned while living in Boston.

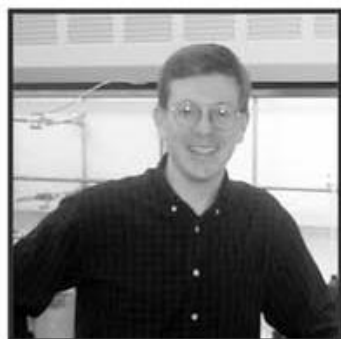


Adam Woolley came to the department from a post doctoral position at Harvard University. He graduated from BYU in 1990 and then completed a doctorate at the University of California, Berkeley. Both of his parents received degrees in chemistry from BYU; his father, Earl Woolley, earned a Ph.D. a few months after Adam was born. Thus, it would seem that both heredity and environment influenced him to become a chemist. He was raised in Orem, Utah, and as a youth he developed a love and appreciation for the outdoors, including hiking, backpacking and fishing. Following his freshman year at BYU, he served in the Argentina, Buenos Aires South mission for

two years. In May 1992, soon after his graduation from BYU, Adam married Shannon Lowry. They share a number of common interests, such as reading, biking, and watching old movies. They are the parents of two children, Nathan (almost 4 years old) and Joel (18 months). In his spare time he enjoys gardening and collecting coins; he has a penny from every year and mint for the last 75 years. He is also an avid biker riding about 4 miles to and from work year-round, through snow, ice, rain, and summer sun.



Matthew Linford left a successful industrial career to accept a faculty position with us. He was the Director of Research at AvantGarb, LLC. Previous to that position, he



completed a post doctorate at the Max Planck Institute for Colloid and Surface Science, Berlin, Germany. He has a B.S. in Chemistry from BYU, an M.S. in Materials Science and a Ph.D. in Chemistry from Stanford. Matt and his wife, Michelle, are kept busy with

3 children under the age of 3 (a boy and 2 girls). They take up the majority of his free time. He also enjoys playing the piano and playing tennis.

Steve Wood, formerly a part-time faculty member in our department, has joined us as a full-time professional faculty. Steve is filling our new freshman chemistry coordinator position and is now immersed in teaching Chem 105, hiring and training TA's, and developing an online freshman chemistry course. He received his Ph.D. in Chemistry from BYU while working under Roland K. Robins. He completed a two-year post-doctoral position at the Friedrich Miescher Institute in Basel Switzerland. His research has focused on identification, isolation and structural elucidation of biologically active



natural products. His wife, Lorraine, is a part-time instructor in the Humanities Department. They have four children.

Visiting Faculty

Howard Sandberg, a visiting professor, comes to us from Washington D.C. where he was the National Program Leader for Agricultural Sciences Education with the U.S. Department of Agriculture. After graduating in 1960, Howard married Karen Polly and returned to BYU for one year of graduate study so that Karen could complete her B.S. degree. He studied Molecular Biophysics at Yale University where he received M.S. and Ph.D. degrees. He has been a faculty member at Washington State University and the University of Tennessee, Memphis. Karen and Howard have reared 7 children and have 14 grandchildren. During those periods of his career in which he was not in the laboratory, he found a surrogate activity, which also fulfilled heeding the call of the Prophet for family preparedness. His surrogate activity is using his metric weights and graduated cylinders to measure gravimetrically and volumetrically the ingredients for making whole wheat bread. He has increased in wisdom about the properties of wheat required to make a leavened loaf of 100% whole wheat bread. And now that he has mastered the art of bread making, he is having a difficult time arresting the growth in his waist. In August, Karen and Howard sold their home in Maryland and moved to Provo. Howard and Karen are looking forward to re-establishing their woodworking shop and creating more jewel boxes, furniture, and animals for Noah's Ark.



Philip LaFleur has joined us as a part-time instructor after having retired from a career with industry, culminating as the Director of the Analytical Technology Division at Eastman Kodak. He received a B.S. degree in Chemistry from Idaho State College, an M.S. degree in Chemistry from the University of Idaho, and a Ph.D. in Physical Chemistry from the University of Michigan. Besides chemistry, he has interests in cooking, photography, history, and woodworking. He has become interested in digital photography, especially restoring old and/or damaged photos. He likes cooking with a French flair, and also making

desserts. He keeps telling people that chemists are really closet chefs. His woodworking tends to the functional as opposed to the beautiful or exotic. He is interested now in the medieval era and the history of chemistry. After having lived in the East for over 30 years, he is happy to be back in the shadow of the "absolutely gorgeous" mountains. He and his wife, Helen, have four children and fourteen grandchildren.



Jonathan Adjimani joined our department for a one-year sabbatical from the University of Ghana. Jonathan's wife, Janet, and his son, Emanuel, were with him during his stay at BYU. He received his B.S. degree from the University of Science and Technology in Ghana, his M.S. degree from Brock University, Canada, and a Ph.D. from Utah State University. Jonathan and his wife joined the church in Switzerland 21 years ago and he was the Bishop of the Achimota Ward in Accra, Ghana when he came to BYU. He loves teaching and any job where he interacts with many people. His research has focused on medicinal plants used to treat malaria, anemia, and inflammation. His hobby is fixing old cars and teaching soccer.



New Staff

Robert Paxman was hired to provide computer support services for the department. He was born in Nephi, Utah, graduated from Juab High school in 1977, and served as an LDS missionary in the Australia Brisbane Mission. Upon returning home he earned an Associates degree in Electronics and a Bachelors degree in Computer Science. While he was in school, he worked as a locksmith to support his family. He still receives calls



from his neighbors when they are locked out of their house or car. Robert has worked for many companies including: Signetics, Eyring Research Institute, State of Utah Department of Transportation, Digital Technology International and iLumin Corporation. His work assignments have taken him to every state in the United States except Alaska. He is married to the former Salee Robbins of Springville. Robert and Salee are the parents of four children: Rachel, James Robert, Diana, and David William Paxman. Robert is an avid fisherman and hunter when he has time off from work.

Michelle Stacey has taken over as the Assistant Stockroom Manager in the Chemistry Central Stockroom. Michelle graduated from BYU in August with a degree in Exercise Science. She returned three years ago from a mission to Porto Alegre, Brazil. Right now, she's in the middle of the tedious process of applying to medical school. In her spare time, she enjoys hiking, jogging, singing and playing the piano. She currently lives in Orem with her parents and five younger siblings.



Robert Hallock has been hired as the new Instrument Repair Technician in the Instrument Shop. He was born in Henderson, Nevada and moved to Utah at the age of 14, where he finished high school and served a mission in the Bolivia-La Paz Mission. He continues to speak, read, and write fluent Spanish. Spanish, as a second language, comes in handy for Bob, considering he is married to a Mexican born girl, named Angelica. Bob has six children, 4 boys and 2 girls; his oldest son just turned 19 and is preparing for a mission. Bob worked simultaneously raising a family and completing a degree from UVSC in Electronics Technology in 1992. He has been employed in the electronics industry for many years, working with companies such as Signetics, and National Semiconductor. Working with several companies has given Bob a variety of experience and skills in many electronic applications. This experience is what is needed when working in the Instrument Shop.



Assignment changes in the Department

The passage of time inevitably brings change, but perhaps the biggest news item for administration in the Department of Chemistry and Biochemistry is one of non-change. **Fran Nordmeyer** has consented to serve a third term as chair of the department and is continuing his vigorous and effective leadership in that office. In August, **Noel Owen** cheerfully abandoned his responsibilities as associate chair to return to teaching and research. **Paul Farnsworth** has replaced him in the associate chair's office.

The retirement of Kent Dalley last summer created the need for someone to run the x-ray diffractometer for the department. **John Cannon** has assumed responsibility to solve "small molecule" x-ray structures for the Department. He has had to dust off some skills that had lain dormant since his early years at BYU, but is fitting well into his new role.

Professional Development Leaves

Roger Kaspar was able to spend Fall semester 1999 working with Drs. Tomohito Kakegawa and Hiroshi Kobayashi in the Faculty of Pharmaceutical Sciences at Chiba University in Japan, thanks to support from the Japanese Dan Charitable Trust Foundation, The Department of Chemistry and Biochemistry and BYU. While there, he was able to develop a method to translate messenger RNA into protein in extracts that he prepared from human monocytes and lymphocytes. Since returning to BYU, Roger and his students have been using this system to study monocyte gene regulation as well as develop a method to test various inhibitors that are important in inflammatory diseases such as rheumatoid arthritis and septic shock. As a result of his visit, several papers have been submitted for publication. He was also able to host a graduate student (Akiko Hayakawa) from their lab group at BYU Fall semester 2000.



In addition to having a wonderful scientific experience, he and his family thoroughly enjoyed immersing themselves in Japanese culture. Despite speaking no

Japanese, they attended a local ward, placed their children in local Japanese schools and tried to live as much like the locals as possible. One of the highlights of their trip was running into Elder Jeffrey Holland at the Tokyo Temple and sharing ice cream with him at a nearby Baskin-Robbins. As a result of their visit, his 12-year old son is anxious to return to Japan some day, either as a missionary or a student. Both in the laboratory as well as in the community, spending the semester in Japan was a great learning experience – one that he recommends to anyone if they have the opportunity.

Paul Farnsworth spent the eight months from September 1998 through April 1999 as a visiting scientist at the Joint Research Center of the European Commission in Ispra, Italy. He was accompanied by his wife, Elizabeth and his two youngest children, Sarah and Stephen. The leave was a valuable scientific experience for Paul, and an enriching cultural experience for the entire family. Ispra is located northwest of Milan in the Italian lake district. It is a beautiful area in the foothills of the Alps, and is aptly nicknamed "the garden spot of Italy."



Paul worked in the atmospheric processes unit at the Joint Research Center on the development of an instrument to characterize airborne particulates one at a time. The instrument draws individual particles through a series of orifices, determines their size by measuring their velocity as they are accelerated into a vacuum, and measures their chemical composition by laser ablation – mass spectrometry. By analyzing single particles the instrument provides information about atmospheric particulates that cannot be obtained by bulk sampling methods.

While Paul was working in the lab, Sarah and Stephen made the difficult adjustment to a European school, where they were conspicuous both because of their religion and their nationality. Elizabeth soaked up as much Italian culture as possible while keeping the rest of the family sane and making major contributions to the struggling LDS branch. The payoff for the non-scientific members of the family came in the form of vacation travels in Italy, France, Germany, Austria, Spain, Switzerland, and the Czech Republic.

Morris J. Robins spent a productive half-year leave completing manuscripts, devising new research proj-



ects for potential anticancer agents, and presenting work from Brigham Young University at other institutions and scientific meetings. At the end of February 1999, Professor Robins was in Washington, D.C. for service on an NIH AIDS Research Study Section. He

then went to Montreal to present an invited lecture and visit scientists at Biochem Pharma, Inc. He, Jackie, and their two daughters went on a ten-day tour of Israel in mid-March, and then he attended the 12th International Conference on Antiviral Research in Jerusalem. This meeting provided an excellent opportunity for discussions with international leaders in the field of chemistry and biomedical applications of nucleoside analogues. In April, Professor Robins was the invited Graduate Students' Lecturer for 1998-99 in the Department of Medicinal Chemistry at the University of Minnesota. In July, he was an invited speaker at the Gordon Research Conference on Purines, Pyrimidines, and Related Compounds in Newport, Rhode Island, and then went to Washington, D.C. for the NIH AIDS Study Section. In September, he was an invited lecturer at the 22nd Gulf Coast Chemistry Conference in Pensacola, Florida. It was a busy study leave filled with many interesting experiences and scientifically stimulating interactions.

Retirement

Kent Dalley retires as a full-time faculty member of the Department of Chemistry and Biochemistry after thirty-three years at BYU. He has taught consistently over all those years in the area of analytical chemistry, and as an X-ray crystallographer, he has been actively involved in research projects. His work has always been characterized by careful and meticulous analysis, and his publication record is excellent having published 140 papers in peer reviewed journals, and what is more unique, he has collaborated in publishing articles with 14 out of 36 of his colleagues currently working in the department. He will be missed for his willingness to serve others,



his gentle but very effective humor and his calming, non-confrontational attitude on committees and in other meetings.

Jerald S. Bradshaw, the Reed M. Izatt Professor of Chemistry, retired in the summer of 2000 after 34 years as a faculty member. He is an enthusiastic teacher of organic chemistry, a valued mentor for 135 undergraduates, graduate students and postdoctoral fellows who have worked in his laboratories. He is a leading authority on the synthesis of organic macrocyclic compounds. His research has resulted in more than 300 publications. He and his students have given more than 200 presentations and seminars at conferences and universities around the world. Professor Bradshaw has received numerous awards including the Governor's Medal for Science and Technology in 1991, BYU's Annual Distinguished Faculty Lecturer in 1992, and the ACS Award in Separation Science and Technology in 1996. He has been a committed university citizen. He has served on the Faculty Advisory Council, as assistant department chair and as acting department chair. His contributions have blessed the lives of many students and colleagues and have strengthened the department and university.



James L. Bills, Professor of Chemistry, retired in the summer of 2000 after 37 years as a member of our faculty. A dedicated teacher, he has taught approximately 15,000 students in various courses of freshman and advanced inorganic chemistry. His teaching has always been rigorous and demanding, and those who have made the effort appreciated the care and attention he has given. Through his career Professor Bills has continued to carry out research and publish scholarly articles. Dr. Bills' professional development leaves included such diverse topics as copper complexes of olefins and the study of metal hydrides. He has made substantial contributions in various departmental committee assignments through the years. His willingness to shoulder substantial teaching assignments has contributed in a very positive way to the department's development and current status.

James Thorne retired in the summer of 1999. He joined the Chemistry Department in 1966. His fields of research include magnetic circular dichroism, laser separation of isotopes, the application of lasers to chemical problems, and the use of lasers to treat tumors. His work with

X-ray optical devices, in collaboration with members of the Physics Department, have led to scientific discoveries and the commercial company, Moxtek. Jim has been a friend and instructor to many freshman chemistry students and to our majors who have studied physical chemistry. He helped develop the university's Physical Science 100 course and coauthored the PS100 textbook, which has been used at BYU for about 20 years. His faculty colleagues have always found him to be friendly, kind, soft-spoken, and very generous. Many students have greatly benefited from his efforts.

J. Bevan Ott retired in the summer of 1999 after 40 years in the Chemistry Department. In 1986 he was named the Joseph K. Nicholes Professor of Chemistry. A fine administrator, he served nine years as department chair and seven years as Associate Academic Vice President. His excellence as a teacher and mentor has led to numerous teaching awards including the Karl G. Maeser Teaching Excellence Award. He has coauthored three chemistry textbooks, published 118 research papers, and served on several professional boards. His contributions to science have been recognized by receipt of the American Chemical Society's Utah Award in 1982, the Distinguished Faculty Lecture in 1988, The Calorimetry Conference's Huffman Award in 1990, and the Utah Governor's Medal of Science and Technology in 1992. His love for teaching and his boundless enthusiasm have benefited the university and its students.

Special Recognitions

Several of our Faculty members were honored at the 2001 University Conference. **Steven Fleming** was selected for a Karl G. Maeser Excellence in Teaching Award. **Daniel Simmons** was awarded a John A. Widtsoe Fellowship in recognition of research that enhances our quality of life. You can learn more about his research in the section on our current research programs. **Randy Shirts** was selected as an Alcuin Fellow for his contributions to the general education and honors curriculum. **Merritt Andrus** was recognized as a Young Scholar for his contributions in the early stages of his career.

Douglas J. Henderson was honored as a Corresponding Member of the Mexican Academy of Molecular Engineering in July 2001 while attending the Applied Statistical Mechanics Conference in Cancun. He is also leading the Organizing Committee for the Conference on Interfaces in Nanjing, China in October 2002.

Steven Fleming and **Paul Savage** were recognized at the Annual Office of Research and Creative Activities' fall luncheon for their work on Organic Reaction Animations. This award is given to faculty members who demonstrate outstanding achievement in the development of creative works that have had wide acceptance and distribution nationally and internationally. You can get more details on this research under the section titled "What's Happening in our Current Programs" later in this newsletter.

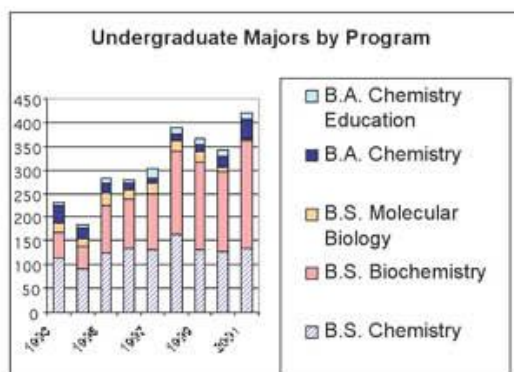
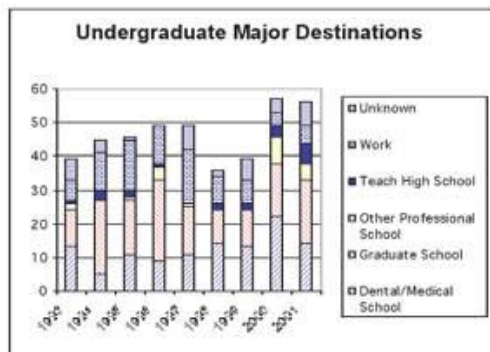
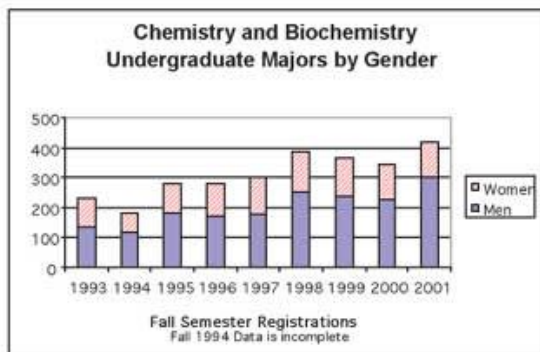
Alumni Corner

Since several years have lapsed since we last sent you an update from our Department, some of our requests for updated addresses and information may not be as current as we would like. But of our respondents from our last inquiry, we heard from Department Alumni in 17 states, The United Kingdom, and Hong Kong. Approximately half of our respondents are in medical school or active in medical practice and research. Several medical schools are represented such as Baylor, Cornell, St. Louis, University of Texas, University of Utah, and the University of Iowa. A third are employed with major firms such as IBM, 3M, Perkin Elmer, Akzo Nobel, Amoco, Diamond Shamrock, Phillips 66, etc. We heard from some "not so recent" alumni, one who has a major medical enterprise, one who is a chief of staff at his hospital, and one who is retiring after 30 years of medical practice, and one, Paul Boyer, who won a Nobel Prize. It is exciting to hear of your accomplishments and to share them with our Chemistry Alumni Family. It is reassuring to hear such comments as "BYU really prepared me well for Medical school", among others.

Our hats are off to you. You are truly the ambassadors for our program, and your accomplishments make us proud of your association with us.

(Please share your accomplishments with us so we can help others know of your achievements. You can email us at chemigram@mailchem.byu.edu or by regular mail at Chemigram, C100 BNSN, Brigham Young University, Provo, UT, 84606).

What is the make-up of our Current Classes and where are they Going?



Research Highlights

Obviously, we cannot cover all of the many research programs being pursued in the Department currently, but here are a few brief highlights to bring you up to date.

Crown Ethers that Glow in UV Light to Reveal the Presence of Heavy Metals

Trace heavy metals currently are generally detected by offline batch analyses and can allow significant discharges before analytical results can be acted upon. Dr. Jerald Bradshaw, Dr. Paul Savage (a recent addition to our faculty), Dr. Reed Izatt plus several of their talented students have designed crown ethers that not only absorb heavy metals, but fluoresce in UV light when the metal



is bound. This makes them an instant detector of contaminant breakthrough and allows improper effluent dumping to be stopped before it becomes significant. Concentrations in the ppb range are detectable. This will allow them to even be used in detecting drinking water contamination. They are made with diazatrithia-crown ether ligands that bind to heavy metal ions, and the presence of hydroxyquinolines makes them fluoresce. Currently they can be used to detect zinc, mercury, and cadmium.

Want to know more? Try www.chemweb.com/alchem/articles/994149892038.html online for a review, or if you want it straight, it was featured as the cover story in *J. Org. Chem* 2001, **66(14)**: 4752-4758.

COX-2 (cyclooxygenase-2) Research may well mean less pain for you

Since Daniel Simmons made the initial discovery of a COX-2 enzyme in 1991, the whole world of nonsteroidal pain relievers (aspirin-like drugs) is undergoing a revolution. To explain, the COX enzyme was theorized to cause pain and inflammation in arthritic joints, but it also protects the stomach wall; hence, aspirin-like drugs had limited application because of the side effect of causing stomach ulcers. Dr. Simmons discovered that there were in fact two COX enzymes and he refers to the new enzyme as COX-2. Exploiting this knowledge led to Vioxx® and Celebrex®

which can inhibit the COX-2 enzyme with about 100 times preference over COX-1, which means much needed pain relief with a far reduced problem of internal bleeding and stomach ulceration. There are now other products in development with a 10,000 selectivity factor and other aspects of our BYU Cancer Center program suggest this type of research has significant application in cancer inhibition. Hundreds if not thousands of other researchers are now in this field, but none is making better headway than Dr. Simmons and his talented group. His work and others in this area have caught the attention of the *Wall Street Journal*, *The New York Times* and local publications. For more information, try the *Brigham Young Magazine*, Spring 1999, p. 13. A video concerning this research effort is also available through our office. You can get additional references to Dr. Simmons research at: <http://chemwww.byu.edu/faculty/dls/simmons.html>, or http://cpms.byu.edu/cancerresearch/html/daniel_1._simmons.html.



Understanding the Role and Impact of Particles in the 2.5 micron Range on Human Health

Dr. Delbert Eatough and Dr. Arden Pope are helping the EPA get a handle on the role of small particles in human health. Dr. Eatough has developed technology to collect and characterize particles physically and chemically. The results are then compared to collated medical records to determine the apparent impact on human health. Because the techniques developed can analyze the particles as well as collect them, it will also allow a determination of whether particle makeup or just size is the apparent health risk. This work is written up on <http://empact.byu.edu/> if you want to check it out.



You Can Take a Chemistry Lab without any Chemicals? YES, You Really Can!

It is hard to believe, but you can now work your way through a Qualitative Inorganic Lab or a Virtual Organic Lab thanks to some very innovative programming developed as *Virtual Labs* by Brian Woodfield and Merritt Andrus. You can select reagents, perform all the tests, check pH, run NMR and IR spectra, even take quizzes and you won't break a single beaker or start a single fire! (However, they still can't reproduce that all too familiar lab smell). You can tour the program and its scope at <http://cid.byu.edu/gallery/chemlab/> but you'll have to try it for yourself to believe how well it works. This tool will not eliminate lab work on campus, but it will allow for self-study and will introduce lab subjects on small university campuses where large-scale laboratories and lab programs are unavailable. This is truly revolutionary work in exploiting computers for learning. You can contact Brian Woodfield if you are interested in evaluating a copy.



Using Reaction Animation Simulations to visualize Organic Chemical Interactions

Trying to visualize organic chemical interactions is very difficult and it becomes especially so when we start to account for electron interactions and focus on the reactions in three-dimensional orbitals. Steven Fleming, Paul Savage, and student, Greg Hart got tired of ball and stick models and chalkboard sketches and decided to create a set of dynamic, three-dimensional molecular representations on a computer screen. These representations show how the electrons enter the combined molecular orbitals, the interactions and finally bonding with filled orbitals. They have created interactive organic reaction animations for 53 reactions. The software is called Organic Reaction Animation (ORA) and is available with the textbook, *Organic Chemistry, 2nd Edition* by Maitland Jones. It can also be purchased at the BYU



Bookstore for \$5. You can see their efforts and download your own demo copy from <http://chemwww.byu.edu/ORAI/index.html>. At this time, more than 30,000 organic chemistry students around the world are using ORA.

New Analytical Instrumentation for High Throughput Analysis in the Pharmaceutical Industry

The process of discovering and developing a new drug is typically long and complex. For every 5,000 to 10,000 chemically synthesized molecules screened, only one becomes an approved drug. In drug discovery, pharmaceutical companies employ thousands of scientists to search for therapeutic compounds. While previously this was largely a process of rational thinking by clever synthetic chemists combined with trial and error, in recent years it has become a more systematic process with the use of increasingly sophisticated technology. Modern combinatorial chemistry techniques are being employed to conduct, for example, 384 syntheses in parallel in plates containing micro wells. As the approaches to synthesize and screen drug candidates become faster, so also must the analytical technology required to provide information in support of these efforts. Instrumentation which can provide faster analyses with more information per analysis is essential in order for pharmaceutical companies to remain competitive. Unfortunately, current analytical techniques require from 10 to 30 minutes to complete a single analysis.

Researchers in the laboratory of Milton Lee have developed a high throughput analyzer for pharmaceutical samples based on ion mobility separation and time-of-flight mass spectrometry. Samples are converted into ions by an electrospray, pulsed into a small drift tube under an electric potential, and separated based on their differing velocities attained when they pass through the electric field. These ions then enter the mass spectrometer where they can be identified by their mass-to-charge ratios. Since ion separations in the drift tube take tens of milliseconds, and time-of-flight mass spectra can be acquired within 200 microseconds, this coupled system is extremely fast and powerful. Potentially, thousands of samples can be analyzed in a single day. Based on this research, one of the major pharmaceutical companies is currently funding the development of a fully automated system, complete with robotics sample handling.

Final Note

As you can see, there are many exciting areas we are studying. There are far too many to review in a single issue, and there are still other things that are just as challenging and rewarding as these. We are trying to help our students get involved at an earlier stage of their academic experience and get the vision of chemistry and research so that they can find exciting, challenging careers in our field. We are now trying to raise some funding so we can sponsor graduate and undergraduate fellowships for as many of our students as we can. The caliber of our students matches your own high quality and we want to be able to give each of them a chance to experience Science at a level where all of the answers are not yet known and there is much to experience. You can contribute to this effort by donating to the College Annual Fund in Physical and Mathematical Sciences (see article on page 2).

We are certainly proud of our many Alumni and your accomplishments. We admire your efforts and hope you will always be proud to be part of the BYU Chemistry Department Family. You are always welcome and we hope you will drop by whenever you are able. Come and get acquainted with some of our new, young faculty and share their optimism and vision. Let them introduce you to many of our impressive students with our excellent facilities and let yourself regain that same enthusiasm that carried you into science in the first place. Please drop by or give us a call. Our email addresses are all available at <http://chemwww.byu.edu/research/rsrchpro.html#> if you would rather drop us a note, or find your particular favorite faculty member and check up on their current activities by phone or letter.

Student Awards

New Graduate Fellowship Announced

We are pleased to announce the Charles E. and Margaret P. Maw Graduate Fellowship Award. This award recognizes an outstanding graduate student and provides for a full year stipend that allows the recipient to devote his or her full attention to their dissertation project. The Fellowship is funded by an endowment established by the Maw family.

Charles Edward Maw was the first person trained primarily in chemistry to teach at the Brigham Young University. Aside from brief leaves, he served continuously from the time he was first employed in 1903 until his retirement from teaching in 1946. From the time that chem-

istry at BYU was first recognized as a separate discipline apart from the general rubric of physical science, Dr. Maw served as its chairman. During his tenure as chairman he added five more full-time faculty. Those who now bear the mantle of chemical education at BYU owe a debt of gratitude to Charles Edward Maw.

This first fellowship was awarded to David Collins. Dave worked under Milton Lee on the development of a time of flight mass spectrometer for analytical detection. He completed his Ph.D. in August of 2001 and is now teaching chemistry for criminal justice students at Weber State University.

New Undergraduate Fellowship Announced

The James A. and Virginia S. Ott Undergraduate Research Fellowship has been established to fund stipends for undergraduate chemistry majors for spring and summer term research projects.

James and Virginia had a great love for teaching. James began his career in education working as an Educational Advisor for the Civilian Conservation Corps during the depression years. They spent most of their lives as school teachers in St. George Utah. She taught in the elementary school and he in the junior high. James and Virginia also had a great love for Brigham Young University and were staunch supporters of this special school all of their lives. It is for their commitment to church and school, backed up by a lifetime of service to their students, to their family, and to their God, that we recognize them by the establishment of this fellowship.

The first fellowships were awarded to David Faux and Katie Jensen. David completed his B.S. degree working under Steven Graves and is now a medical student at the University of Utah. His research project was on factors that initiate human labor. He will present his research results to the National Society for Maternal Fetal Medicine this next winter. Katie will graduate in April of 2002 with a B.S. degree in Chemistry. She worked with Paul Savage performing research on new antimicrobial agents. Katie has been the Ychem President for the last two years.

Graduate Student Awards

Charles E. & Margaret P. Maw Research Fellowship –
Erik Meredith.

Roland K. Robins Graduate Research Fellowship –
Joseph Gardner, Yunshan Peng, Uale Taotafa, Xylophone Victor, Yanqiao Xiang, Yueying Zhen.

Nicholes-Maw – Allison Nelson and Ryan Kelly.

Stanley & Leona Goates Award – Marisa Stark, Rebecca Stevens.

Garth L. Lee Fellowship – Russell Long.

Outstanding Graduating Graduate Student – David Collins.

BYU Graduate Studies Research Fellowships –

Qirong Wu, Ning Yin, Bingfang Yue, Minghong Zhong, Ziniu Zhou.

Undergraduate Recognitions

Congratulations go to Jamon Holzhauser for his selection as Outstanding Student from the 2001 Brookhaven National Laboratory Summer School in Nuclear and Radiochemistry. He will receive an expenses paid trip to the upcoming American Chemical Society national meeting in Chicago.

Rebecca Stevens was a recipient of a Giauque Travel Award to the Calorimetry Conference, receiving a plaque, cash award, and recognition at a plenary session of the conference.

Undergraduate Student Awards

Freshman Chemistry 111/112 – Jeffrey Boyer.

Chemistry 105/106 – Christine Johnson.

Organic Chemistry – Adam Washburn.

Chemical Literature – Ruth Tolman.

Physical Chemistry – Lars Nielsen.

Biochemistry – Thomas Lowery, James Harkness.

Analytical Chemistry – Dilworth Parkinson.

Inorganic Chemistry – Allison Nelson.

Keith P. Anderson Outstanding Senior – Scott Boyle.

Outstanding Service Award – Katie Jensen.

Glenda L. M. Harr Undergraduate Research Award –
Mark Meng.

Catalyst Club Research Award – Rebekah Stanley.

Y-Chem Officers for 2001-2002

President – Katie Jensen. Vice President – Amy Wilson. Secretary – Karl Jackson. Treasurer – Eric Merckley. Historian – Amanda Hunt.

Homecoming 2002

The department will again be hosting alumni during Homecoming weekend, Oct. 17-19, 2002. We plan an Open House, Alumni Luncheon, and group seating at the BYU vs. UNLV Homecoming game. We can also arrange for the purchase of tickets to the Homecoming Spectacular on Oct. 17th and 18th. Please plan to attend.

Department of Chemistry and Biochemistry
Brigham Young University
C100 Benson Science Building
PO Box 25700
Provo, UT 84602-5700

Address Correction Requested