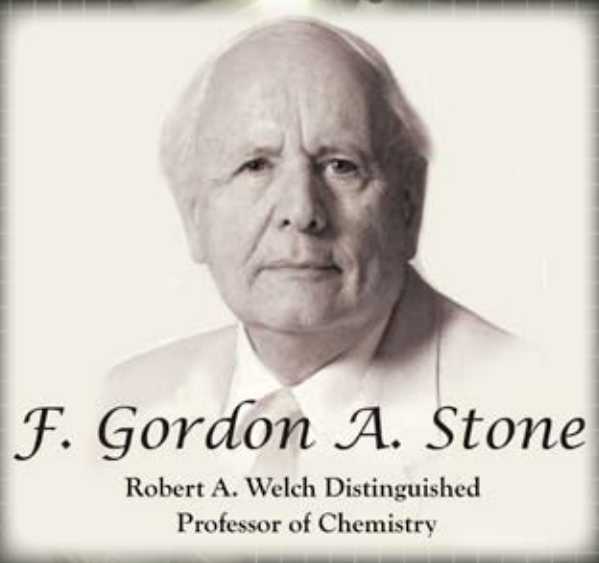


Alumni Newsletter | Fall 2010

Chemistry & Biochemistry

Featuring



Drs. Ken and Marianna Busch



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DEPARTMENT OF CHEMISTRY
AND BIOCHEMISTRY

Pictured on the front cover: Drs. Ken and Marianna Busch retired on May 31, 2010, after more than three decades teaching and conducting research at Baylor. They are now free to pursue additional interests, such as archaeology, theology, gardening and gourmet cooking. They spent most of September exploring archeological sites around the Aegean Sea as part of a tour conducted by the Archaeological Institute of America. In the background of this photograph are the remains of the facade of the Library of Celsus at Ephesus (completed ca. 135 AD) in present-day Turkey.

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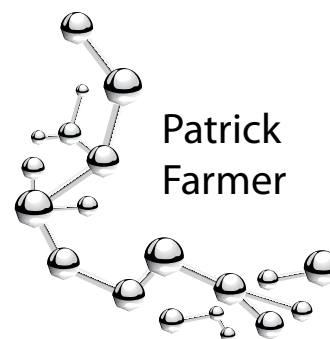
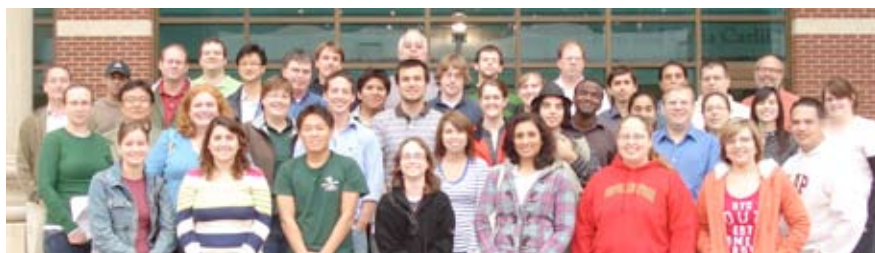
Big News from the Chair



Our Department underwent BIG changes in 2009/2010, including my arrival as new Chair (from UC Irvine), and the retirement of three senior faculty, Profs. Mariana and Ken Busch and Welch Chair Prof. F. Gordon Stone. The Buschs, who together have some 67 years as Baylor faculty, were honored with a dinner in their appreciation which went off very well, with Steve Gipson and Dennis Rabbe telling stories of the Buschs from their undergrad and graduate students' perspective. Likewise, Prof. Stone's impending retirement was honored with the Baylor Stone Symposium, a two day fete with research

talks by senior scientists from England, Australia and New Zealand. Also of note, Dr. Darrin Bellert was granted tenure and promotion to Associate Professor, and Dr. Bryan Shaw from Harvard was hired as a new Assistant Professor beginning Fall 2010.

By the numbers, in 2010 Chemistry & Biochemistry had 18 tenure-track faculty and 7 non-tenure track faculty, with departmental enrollment of 480 undergraduate and 52 graduate students. We graduated 55 C&B majors: 9 BS Chem, 1 BA Chem, 29 BS Biochem, and 16 BA Biochem, as well as 6 PhD and 1 MS students. Profs. Kevin Pinney and David Pennington along with several other Baylor University faculty were awarded the "Dean's Club Certificate of Appreciation" for having directed ten or more undergraduate Honors theses. In addition to the certificate, their names have been placed on a plaque located in the Honors Program Office. Prof. Pennington, along with several graduate students and postdocs, served as mentors for the 76 Invitation to Excellence students who



Patrick Farmer

participated in a problem solving exercise, "Going Where No One Else Has Gone... Planning a Trip to Mars".

We have also had a very successful year in recruiting graduate students, with 13 incoming students in 2009 and 13 beginning this Fall. Our hope is to expand the graduate program to 75 students, with the hiring of several new research-active faculty. A special effort on recruiting has been made this year, including mailings of our new brochure to potential students in the five-state area, and recruitment seminars by our faculty (Chambliss, Farmer, Kane, Bellert) at targeted schools across the nation. This past fall, we hosted 22 students and 8 faculty members from 10 different schools for our 4th Annual Advanced Instrumentation Workshop, pictured below; three of these students will join our incoming graduate class in Fall 2010. The success of the workshop was due to the hard work of the participating faculty: Profs. Kane, Bellert, Chambliss, Farmer, Garner, Jas, Kim and Klausmeyer.

Big news from the chair, cont...

One big effort has been on our reorganization of freshman lab series to enable increase annual enrollment from ca. 550 students to over 2000 students; this will relieve a logjam of demand for this crucial requisite by science and prehealth majors. Although this change began in Fall 2010, much planning and effort of the departmental faculty and staff went into gaining approval and funding for the plan this past year.

The research efforts of C&B faculty were also very productive, with some 37 published articles this year. Our junior faculty led the way, with Dr. Kim having 8 peer-reviewed publications and Dr. Jas 5 publications, including one displayed on the cover of the prestigious journal *Angewandte Chemie*. Similar productivity is seen in external research funding. In the 2010 academic year, we brought in ca. \$2.7 million in ongoing extramural funding, compared with ca. \$1.5 million in 2009. C&B faculty submitted 42 proposals this past year, up from 29 in 2009, of which 6 have so far been funded for over \$2.3 million in additional ongoing funding.

Three faculty in particular should be noted for exceptionally successful productivity, visibility and grantsmanship. Prof. Chambliss published 6 peer-reviewed papers, and gave 5 invited talks including ones to the Texas

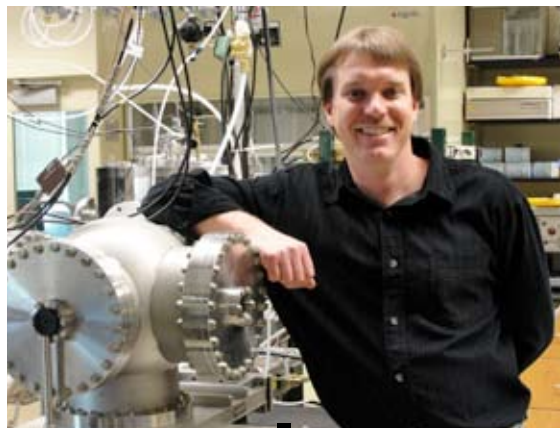
Parks and Wildlife Commission and the American Society for Mass Spectrometry. His recent paper in *Environmental Toxicology and Chemistry* was noted in the April 2010 issue of *National Geographic*, as it documents results of the first EPA funded study of pharmaceutical accumulation in wild-caught fish tissue. The study involved collaboration between researchers at Baylor affiliated with the Chambliss and Brooks laboratories, TetraTech, Inc., and the US Environmental Protection Agency. His group remains one of the best funded at Baylor, with over \$1.3 million in continuing grants. This past year, Prof. Chambliss received additional funding from the USDA for a proposal on "Advancing BioFuel Production" and was requested to submit a proposal to the DOD for "Evaluation of Environmentally Relevant Munitions Constituents (MC) Concentrations for Assessing Ecological Risk at Underwater Unexploded Ordnance".

The collaboration efforts of Profs. Pinney and Trawick also yielded an extremely successful year. They published 3 papers and a book chapter jointly, and both made presentations at the 12th International Tumor Microenvironment Workshop, in Toronto, Canada. Prof. Pinney attended the 101st Annual Meeting of the American Association of Cancer Research in

Washington, DC and is a newly appointed member of the Steering Committee for the Chemistry in Cancer Research Working Group associated with the AACR. During this past academic year, both Trawick and Pinney received multiple grants from Oxigene Inc. on projects related to combretastatin, a drug that targets the tumor microenvironment. The Pinney/Trawick collaboration also received a CPRIT High Impact/High Risk Grant for a proposal entitled "Investigation of Highly Potent Benzosuberene Analogs as Novel Anticancer Agents"; this achievement was touted in a front-page article in the *Waco Tribune-Herald* on Jan. 21st. And just recently, their collaborative NIH RO1 proposal entitled "Chemotherapeutic Agents with Enhanced Selectivity for the Tumor Microenvironment" has been funded and will start in 2010.

Other high profile events this past year include the Gooch Stevens Lectures, which were given by Prof. Nate Lewis, of Caltech, and the W. Dial Black Family Lecture which was given by Prof. Mina Bissell, Distinguished Scientist at UC Berkeley/Lawrence Berkeley National Laboratory.

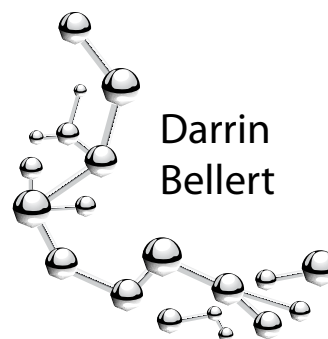
Faculty Articles



Tenured life has allowed me to re-form relationships with my family; it is amazing how much my children have grown over the past 4 or 5 years. My eldest daughter has graduated from Texas Lutheran University and plans to marry this Fall. My two middle children continue to excel at the local high and middle schools. My youngest son is a cub scout and I am becoming more active in this organization. Recently, I helped these scouts retire a U.S. flag and the ceremony is pictured here.

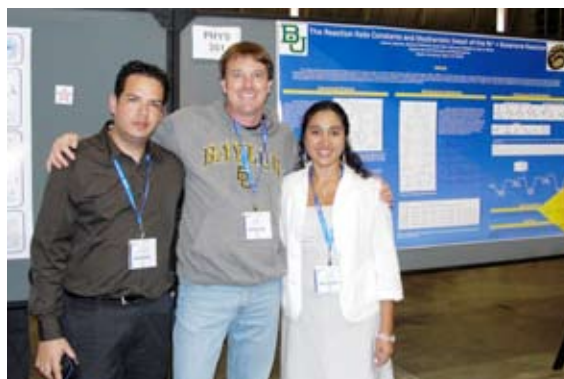


This past year has seen significant accomplishments in my academic program. Our experimental technique to fundamentally research catalytic model reactions is gaining acceptance. We have published three papers in the Journal of Physical Chemistry; the highest quality journal in my field and of international reputation. A



Darrin
Bellert

fourth paper had been submitted this past year and data for our fifth paper has been secured and is being written, targeting this fine Journal. Additionally, during 2009, I found that the data from our groups' first paper, published as Physics Letter, was incorporated into the NIST data base and published on their web-site.



Recently, I traveled with my two senior graduate students to the National, American Chemical Society meeting in Boston. Here we presented recently acquired, unpublished data. The student's posters and my talk were well received. Pictured below is me with my two senior researchers, Ivanna Laboren and Otsmar Villarroel, standing in front of Ivanna's poster at this meeting. My first two students to join my group graduated earlier this past year, earning their Ph. D. degrees.

Publications 06/09 – 05/10:

- 1) The Low Energy Unimolecular Reaction Rate Constants for the Gas Phase, Ni^+ Mediated Dissociation of the C-C σ -bond in Acetone; Vanessa A. Castleberry, S. Jason Dee, Otsmar J. Villarroel, Ivanna E. Laboren, Sarah E. Frey, and Darrin J. Bellert; *J. Phys. Chem. A.*, 113, 10417, (2009).

Darrin Bellert publications, cont...

- 2) Rate-Limiting Step in the Low-Energy Unimolecular Decomposition reaction of $\text{Ni}^+\bullet\text{Acetone}$ into Ni^+CO + Ethane; S. Jason Dee, Vanessa A. Castleberry, Otsmar J. Villarroel, Ivanna E. Laboren, Sarah E. Frey, Daniel Ashley, and Darrin J. Bellert; *J. Phys. Chem. A.*, 113, 14074, (2009).
- 3) Low-Energy Reaction Rate Constants for the Ni^+ -assisted Decomposition of Acetaldehyde: Observation of C-H and C-C Activation; S. Jason Dee, Vanessa A. Castleberry, Otsmar J. Villarroel, Ivanna E. Laboren, and Darrin J. Bellert; accepted *J. Phys. Chem. A.* 114, 1783, (2010).
- 4) The Reaction Rate Constants and Mechanistic Detail of the Ni^+ + Butanone Reaction; Ivanna E. Laboren, Otsmar J. Villarroel, S. Jason Dee, Vanessa A. Castleberry, and Darrin J. Bellert; manuscript in revision, *J. Phys. Chem. A.* (2009).

On the home front...

The adjustment to life after tenure has been an exciting change for me. The family front, which includes two dogs (Cody and Jordan) and well...me, is stable as always. We routinely enjoy evenings on the porch, college football, and trips to my farm in Arkansas. I continue to be a habitual runner. I've finished two marathons in the last two years and set a new personal best at the rock-n-roll half marathon in Nashville, TN last April. My goal of qualifying for Boston before I turn 40 was recently derailed by a pulled hamstring suffered in a paintball war with graduate students. Getting old, even older, isn't much fun. Perhaps I should consider running less and playing more golf or guitar? I haven't given up yet, but the idea appears to have merit!

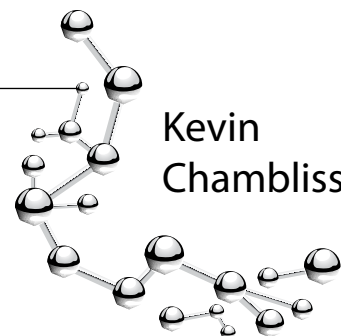
In the Classroom...

I'm currently teaching one section of CHE 1302 (the second semester of general chemistry for those that don't remember). A smaller class size

of 22 students, compared to 100-plus in previous semesters, has been a welcome change. I also teach a graduate course on chemical separations every other year and am looking forward to teaching Instrumental Analysis, a course that was previously offered by Dr. Kenneth Busch, for the first time next spring.

In the Laboratory...

The last couple of years have been a bit of a blur for me, with several students and postdoctoral fellows leaving my laboratory. Pilar Perez-Hurtado and Bowen Du



Kevin Chambliss

successfully defended Master's theses in analytical chemistry and environmental science, respectively, in May 2009. Pilar is currently a Ph.D. student at the University of Warwick in the UK and continues to study analytical mass spectrometry. Bowen chose to remain at Baylor and pursue a Ph.D. in a newly-established, interdisciplinary graduate



Kevin built a modest little barn with "living quarters" above

program focusing on Ecological, Earth, and Environmental Sciences. Two undergraduate students that spent time in my laboratory, Gabriel Roman-Melendez and Zachary Hardie, are currently pursuing Ph.D. degrees in chemistry. Gabe is attending the University of Michigan, and Zach decided to remain at Baylor. A third undergraduate, Ashley Parish, accepted a position with the Federal Bureau of Investigation. (That's right...all the way to the FBI!) Dr. Lekh Nath Sharma graduated with a Ph.D. in analytical chemistry in December 2009 and is currently a postdoctoral fellow in the Department of Microbiology at the University of Georgia. Under the mentorship of Professor Joy Doran-Peterson, Lekh hopes to broaden his expertise related to cellulosic biofuels. Two postdoctoral fellows also moved on to greener pastures during this timeframe. Dr. Richard Brain is now gainfully employed

by Syngenta Corporation in Greenville, NC, and Dr. Mohammed Mottaleb accepted a staff position in the Center for Innovation and Entrepreneurship at Northwest Missouri State University.

Dr. Richard Mowery, a research scientist that had been with my lab for almost 8 years, also left our group this fall. Rich's dedication, persistence, and creative insights have been pillars of my laboratory's success in the area of biomass analysis. More recently, Rich played a crucial role in our identification of peptide/protein conjugates as selective, *in vivo* biomarkers of exposure to the explosive 2,4,6-trinitrotoluene (TNT). Rich will be dearly missed, and we wish him all the best in his new position. He is definitely the hardest working 'retired' person I know.

Despite all of the exits noted above, things in the laboratory are still fast and furious. My

research group currently consists of six Ph.D. students (Richard Sevcik, Sharon Munisamy, Negar Hedeyatifar, Bowen Du, Zachary Hardie, and Birendra Dhungana), one postdoctoral fellow (Dr. Shou-Feng (Flora) Chen), three undergraduate students (Christopher Son, Chris Rash, and Sunay Patel), and one Research Scientist (Dr. Christopher Becker). Chris [Becker] returned to Baylor after completing a very productive postdoctoral stint in the laboratory of Prof. David H. Russell at Texas A&M University. His expertise and leadership in the area of ion mobility-mass spectrometry have greatly expanded our analytical capabilities. His willingness to assist with many of the day-to-day managerial operations of the group has also made valuable contributions to my sanity.

Our primary research interests continue to fall into three broad categories: (1) compositional analysis of biomass feedstocks and process streams, (2) occurrence and fate of pharmaceuticals in the environment, and (3) uptake and biotransformation of TNT and structurally-related nitroarenes by aquatic and terrestrial organisms. A fourth, emerging, research area that is focused on structural characterization of the asphaltene fraction of crude oils is being led by Chris Becker. Each of these projects may be classified as



Another view of the barn

Kevin Chambliss, cont...

inter- or multi-disciplinary, with strong emphasis on chemical separations and analysis. Each is also related to important environmental or energy-related problems. Our work has received gracious support from a variety of sponsors, including the United States Department of Agriculture, the United States Department of Energy (USDOE), the United States Environmental Protection Agency (USEPA), and the United States Department of Defense.

Although space does not permit me to elaborate on all of our recent successes, I would like to call your attention to one of our papers that appeared in the December 2009 issue of *Environmental Toxicology and Chemistry*. Results reported in this manuscript were picked up by numerous television, print, and on-line media outlets and were most recently featured in the April 1, 2010 issue of *National Geographic*. The lead author of this paper was Dr. Alejandro Ramirez, who graduated from my laboratory in December 2007 and currently holds a staff position in Baylor's core mass spectrometry facility. The paper reported results of the first national pilot study of pharmaceuticals and personal care products in wild-caught fish and involved collaboration between graduate students and postdocs from my laboratory, the laboratory of Dr. Bryan W. Brooks in the Department of Environmental Science at Baylor, scientists at USEPA, and TetraTech, Inc.

Collaboration has been a staple of our success and productivity. As an analytical chemist, I'm always pleased to learn that we are developing tools that other scientists find useful. In addition to the folks noted above, we also benefit from interactions with scientists and faculty at the USDOE-National Renewable Energy Laboratory (Golden, CO), U.S. Army Corps of Engineers-Engineering, Research and Development Command (Vicksburg, MS), the University of Georgia, the University of Maine, Oklahoma State University, Michigan State University, and Texas A&M University. It's truly an honor to work alongside such a talented group of people.

Recent papers, talks, and conference presentations are listed below. If you're interested in more information, please stop by when you're in town. We're always happy to talk about what we do. I also encourage you to visit our website to keep up with the latest news from the laboratory: http://bearspace.baylor.edu/Kevin_Chambliss/www/

Recently Published Manuscripts

- B. Du, L. N. Sharma, C. Becker, S.-F. Chen, R. A. Mowery, G. P. van Walsum and C. K. Chambliss, "Effect of varying pretreatment chemistry-feedstock combinations on the production of potential fermentation inhibitors in pretreated biomass," *Biotechnol. Bioeng.* 2010, 107, 430-440.
- S. P. S. Chundawat, R. Vismeh, L. N. Sharma, J. F. Humpala, L. Sousa, C. K. Chambliss, A. D. Jones, V. Balan, and B. E. Dale, "Multifaceted characterization of cell wall decomposition products formed during ammonia-fiber expansion (AFEX) and dilute-acid pretreatments," *Biores. Technol.* 2010, 101, 8429-8438.
- C. Becker, L. N. Sharma, and C. K. Chambliss. Analytical monitoring of pretreatment and hydrolysis processes in lignocellulose-to-bioalcohol production. In *Bioalcohol Production – Biochemical Conversion of Lignocellulosic Biomass*; Waldron, K., Ed.; Woodhead Publishing Ltd.: Cambridge, UK, 2010; pp 281-314.
- S.-F. Chen, R. S. Sevcik, R. A. Mowery, C. J. Scarlata, and C. K. Chambliss, "Compositional analysis of water-soluble materials in switchgrass," *J. Agric. Food Chem.* 2010, 58, 3251-3258.
- T. W. Valenti Jr., P. Perez-Hurtado, C. K. Chambliss, and B. W. Brooks "Aquatic toxicity of sertraline to *Pimephales promelas* at environmentally-relevant surface water pH," *Environ. Toxicol. Chem.* 2009, 28, 2685-2694.
- A. J. Ramirez, R. A. Brain, S. Usenko, M. A. Mottaleb, J. G. O'Donnell, L. L. Stahl, J. B. Wathen, B. D. Snyder, J. L. Pitt, P. Perez-Hurtado, L. L. Dobbins, B. W. Brooks, and C. K. Chambliss, "Pharmaceuticals and

Personal Care Products in Fish. Results of a National Pilot Study in the U. S.," *Environ. Toxicol. Chem.* 2009, 28, 2587-2597.

- L. N. Sharma, C. Becker, and C. K. Chambliss, "Analytical characterization of fermentation inhibitors in biomass pretreatment samples using liquid chromatography, UV-visible spectroscopy, and tandem mass spectrometry," *Met. Mol. Biol.* 2009, 581, 125-143.
- V. Balan, L. daCosta Sousa, S. P. Chundawat, L. N. Sharma, C. K. Chambliss, B. E. Dale, "Enzymatic digestibility and pretreatment degradation products for AFEX-treated hardwoods (*Populus nigra*)," *Biotechnol. Prog.* 2009, 25, 365-375.
- M. A. Mottaleb, S. Usenko, J. G. O'Donnell, A. J. Ramirez, B. W. Brooks, and C. K. Chambliss, "Gas chromatography-mass spectrometry screening methods for select UV filters, synthetic musks, alkylphenols, an antimicrobial agent and an insect repellent in fish," *J. Chromatogr. A* 2009, 1216, 815-823.

Invited Talks and Conference Presentations (2009-2010)

- S.-F. Chen, R. A. Mowery, R. A. Brain, G. R. Lotufo, G. Rosen, J. B. Belden, and C. K. Chambliss. "Identification and measurement of protein-bound residues as selective biomarkers of exposure to TNT," SETAC North America, 31st Annual Meeting, Portland, OR, November 7-11, 2010.
- A. J. Ramirez, B. Du, P. Perez-Hurtado, B. W. Brooks, and C. K. Chambliss. "Challenges affiliated with quantifying pharmaceuticals and pharmaceutically-active metabolites in fish tissue," SETAC North America, 31st Annual Meeting, Portland, OR, November 7-11, 2010.
- B. Du, P. Perez-Hurtado, B. W. Brooks and C. K. Chambliss. "Development and validation of an improved isotope-dilution screening method for pharmaceuticals and pharmaceutically-active metabolites in fish tissue," SETAC North America, 31st Annual Meeting, Portland, OR, November 7-11, 2010.
- R. S. Sevcik and C. K. Chambliss. "Rapid analysis of fermentable sugars in aqueous extracts and hydrolysates of herbaceous biomass," 22nd International Ion Chromatography Symposium, Cincinnati, OH, September 19-22, 2010.
- S. Munisamy, C. Becker, and C. K. Chambliss. "Profiling biomass pretreatment hydrolysates by ultra-performance liquid chromatography-ion mobility-high resolution mass spectrometry (UPLC-IM-MS)," 240th National Meeting of the American Chemical Society, Boston, MA, August 22-26, 2010.
- C. K. Chambliss. "Analytical Challenges Affiliated with Quantifying Trace-Level Chemicals in Complex Media," 58th Annual Meeting of The American Society for Mass Spectrometry – Waters Corporation User's Meeting, Salt Lake City, UT, May 22, 2010.
- C. Becker, S. Munisamy, and C. K. Chambliss. "Profiling biomass pretreatment hydrolysates by ultra-performance liquid chromatography-ion mobility-high resolution mass spectrometry (UPLC-IM-MS)," 32nd Symposium on Biotechnology for Fuels and Chemicals, Clearwater Beach, FL, April 19-22, 2010.
- R. S. Sevcik, W. L. Rooney, and C. K. Chambliss. "Identification and quantitation of water extractives in selected sorghum variants," 32nd Symposium on Biotechnology for Fuels and Chemicals, Clearwater Beach, FL, April 19-22, 2010.
- J. Belden, C. K. Chambliss, and G. Lotufo. "Accumulation of Trinitrotoluene (TNT) in Aquatic and Terrestrial Invertebrates: Formation and Persistence of Unextractable Bound Residues," SETAC North America 30th Annual Meeting, New Orleans, LA, November 19-23, 2009.
- B. Subedi, M. A. Mottaleb, C. K. Chambliss, and S. Usenko. "Analytical improvements in the analysis of pharmaceutical and personal care products in fish tissue," SETAC North America 30th Annual Meeting, New Orleans, LA, November 19-23, 2009.

Kevin Chambliss cont...

- C. K. Chambliss. "HPLC-MS/MS Analysis of Pharmaceutical Residues and Protein Adducts in Aquatic and Terrestrial Organisms: Novel Biomarkers of Environmental Exposure," Department of Chemistry, Texas Lutheran University, Seguin, TX, November 13, 2009.
- C. K. Chambliss. "HPLC-MS/MS Analysis of Pharmaceutical Residues and Protein Adducts in Aquatic and Terrestrial Organisms: Novel Biomarkers of Environmental Exposure," Department of Chemistry, St. Olaf College, Northridge, MN, October 22, 2009.
- C. K. Chambliss. "First National Pilot Study Finds Human Medications and Personal Care Products in Fish Caught in U.S. Waterways," Texas Parks and Wildlife Division – Water Quality Team Meeting, Buda, TX, July 23, 2009.
- C. K. Chambliss. "Pharmaceuticals and Personal Care Products in Fish. Results of a National Pilot Study in the United States," North Texas Organization of Pretreatment Professionals–Quarterly Meeting, Arlington, TX, June 25, 2009.
- N. S. Fard, Z. Hardie, D. H. Rabbe, K. W. Busch, and C. K. Chambliss. "Novel Approach to Prediction of Hydrolysate Fermentability Based on Chemometric Modeling of Spectroscopic Data," 31st Symposium on Biotechnology for Fuels and Chemicals, San Francisco, CA, May 3-6, 2009.
- R. S. Sevcik, Z. Hardie, R. A. Mowery, and C. K. Chambliss. "Identification and Quantitation of Water Extractives in Sorghum," 31st Symposium on Biotechnology for Fuels and Chemicals, San Francisco, CA, May 3-6, 2009.
- M. Zhang, M. A. Franden, P. T. Pienkos, H. M. Pilath, E. Jennings, A. Mohagheghi, Y. C. Chou, C. K. Chambliss, N. Nagle, and R. Elander. "Understanding the Relationship of Toxic Compounds in Corn Stover Hydrolysates and Their Inhibitory Effects on Ethanologen Growth and Fermentation," 31st Symposium on Biotechnology for Fuels and Chemicals, San Francisco, CA, May 3-6, 2009.
- S. Chundawat, B. S. Donohoe, T. Elder, P. Askeland, R. Vismeh, U. Agarwal, J. F. Humpala, L. N. Sharma, R. Garlock, A. D. Jones, C. K. Chambliss, M. E. Himmel, V. Balan, and B. E. Dale. "Ultra-structural and Physicochemical Modifications within Ammonia Pretreated Lignocellulosic Cell Walls that Influence Enzyme Accessibility," 31st Symposium on Biotechnology for Fuels and Chemicals, San Francisco, CA, May 3-6, 2009.
- C. K. Chambliss. "Improved Analytical Methods for Monitoring Process Intermediates in Biomass-to-Ethanol Conversion," Department of Chemistry, Trinity University, San Antonio, TX, April 23, 2009.
- C. K. Chambliss. "Advancing Texas Biofuels. Identification of Degradation Products Resulting from Chemical Pretreatment of Sorghum by UPLC-IM-MS," USDOE-OBP Biochemical Platform Peer Review Meeting, Denver, CO, April 14-16, 2009.
- P. Perez-Hurtado, A. J. Ramirez, B. W. Brooks, and C. K. Chambliss. "Pharmaceuticals in Fish. Perspectives of an Analytical Chemist," 237th National Meeting of the American Chemical Society, Salt Lake City, UT, March 22-26, 2009.
- J. B. Belden, J. Fisher, M. B. Dudley, D. Johnson, G. R. Lotufo, and C. K. Chambliss. "Accumulation of Trinitrotoluene (TNT) in Aquatic and Terrestrial Invertebrates: Formation and Persistence of Unextractable Bound Residues," presented at the 237th National Meeting of the American Chemical Society, Salt Lake City, UT, March 22-26, 2009.
- C. K. Chambliss. "Compositional Analysis of Biomass Feedstocks and Process Streams," Department of Chemistry, Texas A&M University – Commerce, Commerce, TX, February 13, 2009.

I can happily report surviving my first year as Chair of Chemistry and Biochemistry, but it has been a real education for me. At UC Irvine, I had held several administrative duties but none that come near the demands of Chair here- herding cats might be a good comparison! I survived only with the help and support of my departmental assistants: Adonna Cook, Nancy Kallus, and Virginia Hynek. And not to forget Barbara Rauls, Gordon Stone's secretary, who was indispensable in helping put together his "secret" retirement symposium.

This is quite a story- initially Gordon was adamant that we not have any large party or symposium marking the end of his 20 years as Welch Chair here, but a surprising number of his friends, both here at Baylor and around the world, were telling me it needed to be done. I enlisted several of his closest collaborators and friends, Herb Kaesz at UCLA, Selby Knox at Bristol, Malcolm Chisholm at OSU, who served as an organizing committee to chose speakers and make first contact. Barbara Rauls handled the local planning, and Keri Hodson (wife of Bruce H) did most of the fund-raising - contacting Prof's long list of former students and colleagues. Amazingly, we kept this secret from Gordon up until about a month before! Once Gordon got over the initial shock, he became quite involved and I know he was very pleased afterwards. The symposium was a smashing success, as you'll read elsewhere, and it is being immortalized in a thematic issue of the journal "Comments in Inorganic Chemistry".

My own trip to Baylor is another story, moving from California with my wife Carolyn and children John and Jessica. We arrived at the end of June 2009 just in time for three months of 100+ degree heat- thank heaven for swimming pools! We bought a house in Waco and enrolled our kids at St. Louis Elementary. Right off the bat, the Chemistry Department welcomed us with a departmental picnic that August.

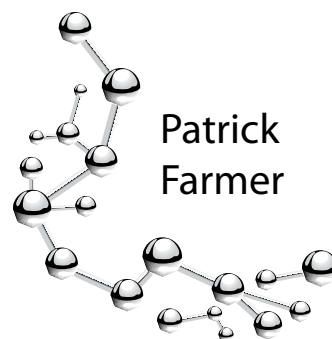
Moving my lab was a bit more problematic, it took several months for the gloveboxes and all the

Schlenk lines to be setup. I started with one postdoc, Ravi Kumar, and two new students - Britain Bruner from Austin College and Tara Clover from TAMU. My group

has now grown to six, with new postdocs Elky Almaraz from TAMU and Weigang Lu from the Pacific Northwest National Labs, and another grad student Adrian Zapata from Incarnate Word in San Antonio. I'm hoping to pick up a few more students this year.

My group is involved in several different areas- our bread & butter project is on the biochemistry of HNO, the reduced form of nitric oxide, mainly focusing on its interactions with heme proteins like hemoglobin and the cytochromes P450. For this work we often express proteins in *E. coli*, sometimes chemically modifying the protein or heme to test their effect on reactivity. We published our first paper from Baylor on this area in Inorganic Chemistry, with Ravi as first author. I presented this work at the Sixth International Conference of Porphyrins and Pthalocyanins in New Mexico in a symposium on "Heme-Based Gas-Sensor Proteins" organized by Paul Ortiz de Montellano at UCSF, and was co-chair and organizer with George Richter-Addo at Oklahoma for a different symposium on "Heme-NO_x Species, both in Proteins and Model Compounds". I have also given departmental talks on our HNO work at Prairie View A&M, UT Arlington, TCU and UNT.

Another area of research in my lab is on new photo-active dyes for solar cells. Our work is based on compounds my group first developed as metal-based drugs for melanoma (they really do work), but by chance discovered that they were particularly good photo-reductants. Britain and Weigang are working to incorporate these compounds in Dye-Sensitized Solar Cells, the so-



Patrick Farmer, cont...

called Graetzel cells. This summer, I had a talented undergraduate researcher from Austin College, Paul Derry, who won funding from the C. Gus Glasscock, Jr. Endowed Fund for Excellence in Environmental Sciences for work on this project.

I've always been a supporter of undergraduates in research labs, it's how my career got started. Many years ago, Judy Walmsley asked me to work in her lab at UTSA and I took to it like a fish to water. Since starting my independent career, I've had many talented undergraduate researchers in my lab, over 75 in my years at UCI, and 5 so far at Baylor. I believe independent research is an invaluable experience for an undergraduate, an opportunity to see how science works from a hands-on perspective. Chemistry is after all both a science and a trade, and I think every student that graduates with a Chemistry or Biochemistry degree should have spent some time in a lab practicing his art.

Publications from 2009-2010

"Reactions of HNO with Heme Proteins: New Routes to HNO-Heme Complexes and Insight into Physiological Effects" Kumar, M.R.; Fukuto, J.M.; Miranda, K.M.; Farmer, P.J. *Inorg. Chem.* 2010, 6283-6292.

"Pattern of Expression and Substrate Specificity of Pattern of Expression and Substrate Specificity of Chlamydomonas Chloroplast Ferredoxins" Aimee Terauchi, A.; Lu, S.F.; Zaffagno, M.; Tappa, S.; Hirasawa, M.; Tripathy, J.N.; Knaff, D.B.; Farmer, P.J.; Lemaire, S.; Hase, T.; Merchant, S.S. *J. Biol. Chem.* 2009, 284, 21788-21796.

"The effects of nitroxyl (HNO) on soluble guanylate cyclase activity: Interactions at ferrous heme and cysteine thiols" Miller, T.M.; Cherney, M.E.; Franco, N.; Farmer, P.J.; King, S.B.; Hobbs, A.J.; Miranda, K.; Burstyn, J.N.; Fukuto, J.M. *J. Biol. Chem.* 2009, 284, 21788-21796.

"Disulfiram, metals and melanoma" Backlund, M.; Edwards, K.; Farmer, P.J.; *J. Chem. Ed.* 2009, 86, 1224-1226.

"Photo- and thermal-induced linkage isomerizations in a peroxydithiocarbamate-Ru complex" Ng, S.; Walker, M.B.; Farmer, P.J. *Inorg Chim Acta* 2009, 362, 4013-4016.

"Nitrosyl hydride (HNO) as an O₂ analogue: long-lived HNO-adducts of ferrous globins" Kumar, M.R.; Pervitsky, D.; Chen, L.; Poulos, T.L.; Kundu, S.; Hargrove, M.S.; Rivera, E.J.; Colón, J.M.; Farmer, P.J. *Biochemistry*, 2009, 48, 5018-5025.

Presentations from 2009-2010

Farmer, Patrick J.; Kumar, M. Ravi. HNO adducts of oxygen-binding globins. Abstracts of Papers, 237th ACS National Meeting, Salt Lake City, UT, United States, March 22-26, 2009 (2009), INOR-327.

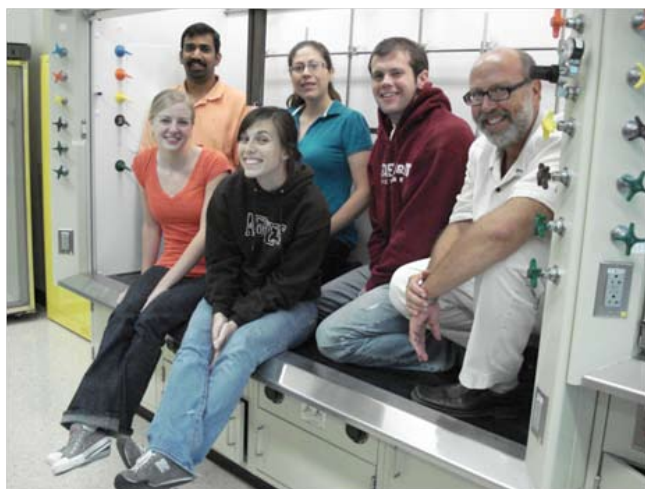
Kumar, M. Ravi; Farmer, Patrick J.; Fadeev, Evgeny. Nitrite as a source of HNO. Abstracts of Papers, 237th ACS National Meeting, Salt Lake City, UT, United States, March 22-26, 2009 (2009), INOR-472.

Farmer, Patrick J.; Kumar, M. Ravi. HNO Trapping by Ferrous Heme Proteins. Abstracts of Papers, 6th Biannual International Conference on Porphyrins and Phthalocyanines, San Bernalillo, NM, United States, July 4-9, 2010.

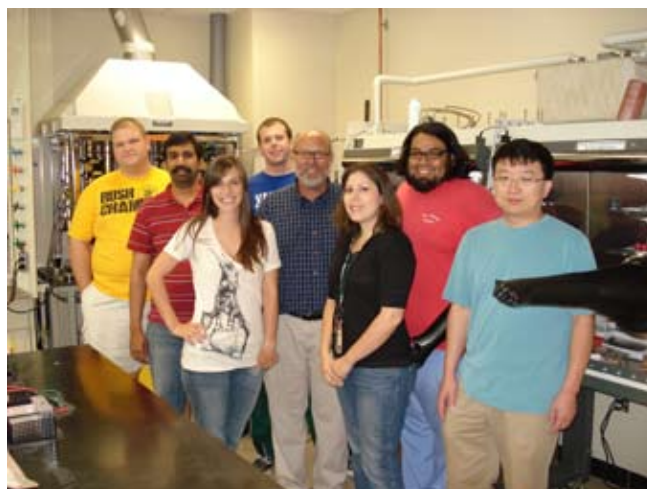
Kumar, M. Ravi; Farmer, Patrick J.; Festivus HNO. Abstracts of Papers, 6th Biannual International Conference on Porphyrins and Phthalocyanines, San Bernalillo, NM, United States, July 4-9, 2010.



Britain Bruner shows off the box to a visiting AIW student



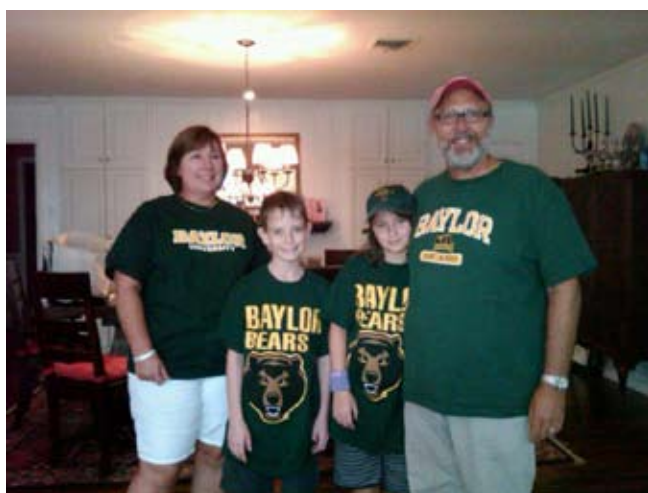
In the hood- Farmer group Winter 2009



Farmer group August 2010



Patrick and Carolyn at the Buschs' retirement dinner



On the way to our first Baylor football game



Photochemical cells (above)

Luminescent solution (right)

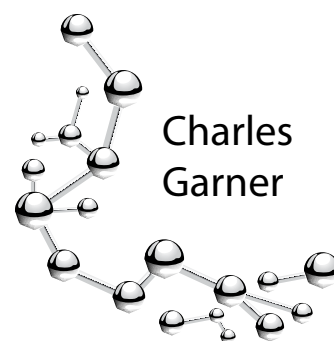


In teaching, last fall I had another at-capacity (30 students) Organic Spectroscopy course, one of our more popular grad courses. In the spring, the Advanced Organic Lab (18 students) went well, and included a two-step sequence to make a compound for Pat Farmer's lab. For the first time in many years I taught over the summer, an organic II section that went very well.

I've had three Ph.D. students graduate in the past year. Jason Bell defended in February ("Synthesis and Application of C_2 Asymmetric Phosphanes *via* Their Pyrylium Salt Precursors") and immediately took a postdoctoral position at Oak Ridge National Labs, my second student to postdoc there. Being from Georgia, he is happy to get back to that part of the country. Sheree Allen defended in March ("The Preparation of Novel Modified Cyclodextrins and Their Application in Enantioseparations by Gas Chromatography"). Sheree accepted an Assistant Professor position this fall at Radford University, a Virginia school of about 9,000 students in the Blue Ridge Valley. Tiffany Turner defended in July ("Design and Synthesis of Novel β -Cyclodextrins and Their Application as Chiral Stationary Phases for Gas Chromatography") and returned to her Assistant Professor position at Erskine College (600 students, in Due West, South Carolina), which she has held since January 2009.



Students: Keith, Sheree, and Lindsay



Charles
Garner

Charles and Kim Garner

I currently have three graduate students. Nelson van der Velde was recruited from Venezuela and is in his third year, working on new methods for making pyrylium salts. Dana Horgen was our first student from St. Olaf College and is working on chiral phosphinine and phosphabarrelene synthesis. Karen Lastovica was recruited from Sul Ross University and is working on unique stationary phases for gas chromatography. Both Dana and Karen are starting their second year in our program. In addition, three undergrads worked in my lab over the summer, and Harry Shen returned from his summer travels to work on completing his honors thesis (making chiral azulenes) this next spring. Our work was funded last year by both a Welch grant (\$50k) and a PRF grant (~\$40k in 2009-10). Recently, the Welch Foundation graciously renewed my grant for two years.



The Welch Foundation dinner

Our graduate program had another great recruiting year. Thirteen new students were recruited from all over the country, including two international students (one from China and one from Nigeria). For the second year in a row, nearly every student we made an offer to accepted (this year: 82%; last year 92%). The program stands at nearly 50 students, and is expected to grow in coming years.

The past year has seen lots of other changes. My wife Kim completed her Ph.D. at TCU and is doing a postdoc now. My youngest son Calvin graduated from high school (Rapaport) and is trying to decide what to do next, as they say. I

ran for and was elected to the Woodway City Council last May. That has been an adventure, and has also made me into something of a blogger as I report on Woodway happenings.

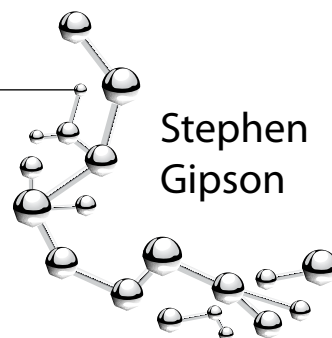
Jason R. Bell, Andreas Franken, Charles M. Garner, "Synthesis of the First C2-Asymmetric Phosphinine and its Pirylium Precursor.", *Tetrahedron* 2009, 65, 9368-72.

³New Nitrogen and Phosphorus Ligands - Pyrazolylpyridines and the First C2-Chiral Phosphinine.², LeTourneau University, February 25, 2010.

During the 2009/2010 academic year I continued teaching in the freshman program. I taught two sections each of CHE 1301 in the fall and spring and one section of 1302 in the summer. I also taught CHE 1316 in the summer of 2009 (and for the absolutely last time in the summer of 2010). I am looking forward to the fall of 2011 when 1316 will be replaced by 2216, a revised and updated introductory course in analytical chemistry. This will be made possible by the recent creation of new general chemistry laboratories to accompany CHE 1301 and 1302, a function previously served by 1316.



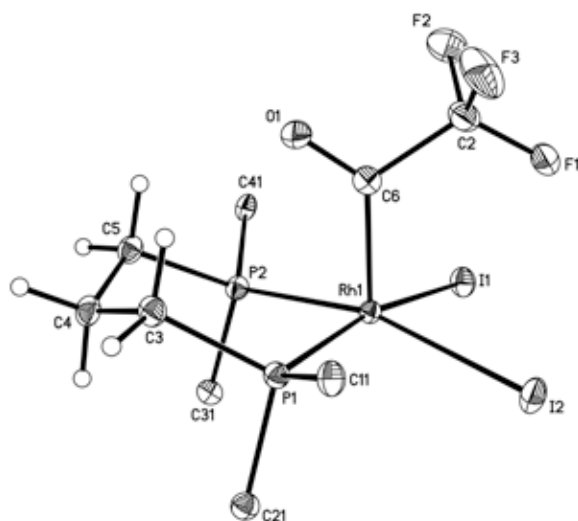
Attending a former graduate student's wedding with Basu Panthi and his family



My research group has consisted of a single Ph.D. candidate, Basu Panthi. He has been working on the synthesis and reductive chemistry of some rhodium acyl complexes and has successfully synthesized over 20 new compounds. The structure of one example is shown in the figure. During the past year we have been hard at work on Basu's dissertation and a manuscript which will publish soon in *Organometallics*. Basu will be defending his dissertation in October and will receive his Ph.D. in December.

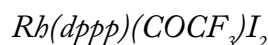
During the past year I had two manuscripts published with former graduate students Thiru Munisamy and Nanda Gunawardhana:

Syntheses of some new methylcyclopentadienylmolybdenum complexes: Characterizations, crystal structures and comparisons with related complexes. Munisamy, T.; Gipson, S. L.; Franken, A. *Inorg. Chim. Acta* 2010, 363, 20-24.



Stephen Gipson, cont...

X-ray crystal structure of the trifluoroacetylcobalt complex $\text{CF}_3\text{COCo}(\text{CO})_3(\text{PPh}_3)$. Implications for the relationship between structure and reactivity toward migratory insertion of carbon monoxide in cobalt alkyl complexes. Gunawardhana, N.; Gipson, S. L.; Franken, A. *Inorg. Chim. Acta* 2009, 262, 113-116.



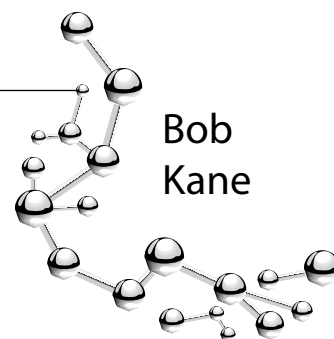
This past year has been a year of change in our group. The year started with Ms. Ae Gyeong Kang completing her MS degree. Her Thesis reported extensive studies that she performed that extended our work aimed at better understanding the complex mechanisms of photochemical protein modification mediated by a variety of synthetic naphthalimides. After completing her Master's research Ms. Kang moved to Dallas and is currently doing research at UT Southwestern.

The year was capped by two more graduations following successful PhD defenses by Dr. José Roberto Boquin and Dr. Gabriela Uzcategui. Gabriela's Dissertation was primarily focused on more naphthalimide-mediated photochemical protein modification work, and notably extended this work to the demonstration of the

photochemical modification of fresh tissue samples. After graduation Dr. Uzcategui moved to Lubbock to join her husband Dr. Fernando Hung, who is presently a postdoctoral researcher in Chris Bradley's group at Texas Tech University.

Dr. Boquin's dissertation reported significant results from our initial foray into a new area of research – the development of toll-like receptor agonists (especially for TLR-7) as immune-system activators. Our group has made this area of research our new focus, and José's work has given us a great start. After graduation Dr. Boquin moved north to Sherman Texas, where he is presently a working as a visiting Assistant Professor of Chemistry.

With these graduations the lab has been fortunate to have three exceptional continuing students who have rapidly



Bob Kane

become the new lab leaders. Matt Byrd, a PhD student, is making great progress extending our investigations into the synthesis of novel TLR-7 agonists functionalized for protein conjugation. Matt had a busy spring and summer as he had to somehow fit getting married (July 17th) into his lab schedule. Our initial foray into the TLR area has been assisted by ARRA funding from NIH for several summer undergraduate researchers (summer 2009 and 2010).

Joanna Downey, a MS student, has been using the insights gleaned in Dr. Uzcategui's work to develop compounds that are efficient agents for photochemical tissue modification. Last but

not least, Joshua Horton, a Biomedical studies graduate student (and the most senior student in the lab), has continued his studies focused on developing DNA and RNA modulators of the interesting immune system protein PD-1. Josh passed his preliminary exam this past spring and is now a PhD candidate with his 'eyes on the prize'!

This fall we have been excited to have Jeff SoRelle join our group as a Biomedical Studies graduate student. Jeff, who is doing graduate research with us before he begins his MD studies at UT Southwestern next Fall, is presently working in Dr. Bashoo Naziruddin's lab in Dallas. Our group is collaborating with Dr. Naziruddin on the development of chemical approaches to the stabilization of pancreatic islets for transplantation. This close interaction with a world's leading islet transplantation lab is certain to help us get a good start this exciting new area of research for the group.

Over the past year I have made a number of trips to attend meetings and give seminars. One big commitment has been my service on two NSF SBIR Panels – 'Biomedical Devices' and 'Tissue Engineering and Repair'. I have made three trips to DC over the past year to serve on both Phase I and II panels, including one trip last spring that I was able to bring two kids along (Jacob and Jesse) to spend a little vacation time.

I have given several recruiting seminars both close to home (MCC and TWU) as well as out of state (Centre College in Danville, KY). Finally, I was fortunate to be able to attend a top international conference in our new research area – immune adjuvants. The Keystone Conference, *Innate Immunity: Mechanisms Linking with Adaptive Immunity*, was held this summer in Dublin Ireland. It was a great conference, and I had the opportunity to meet many of the top researchers in the field.

Mention of the Keystone conference provides a great lead-in to my 'recreational' activities for the past year. Obviously, after traveling all the way to Dublin I could not avoid doing a little sightseeing. So after the conference, I headed to a small town south of Dublin, 'Carrick-on-Suir' to spend a few days enjoying the 'Clancy Brother's Music Festival'. Although there are no living 'Clancy Brothers', there is a nice community festival held in their honor at their home town. Great music and libation for sure! As usual, the majority of my recreation was centered around music... The 'Mulberry Mountain Harvest Festival' in the fall, a magical concert by Leonard Cohen in the winter, a rainy Old Settler's Festival in the Spring, and my first trip to Winfield Kansas for the Walnut Valley Festival. (20,000 bluegrass fans/pickers!) All were great fun. I also

worked on picking up a couple new instruments (see photos) and actually had a gig at the Beale Street Bar on 6th Street in Austin playing washtub bass with a band! Occasional jams at our new Chair's house were also a highlight, including a great time at the Departmental Holiday party.

Family wise my son Joe spent some time in California and is now back in Waco attending MCC. Isaac graduated from Vanguard last spring and did a year of school in Austin at St. Edwards. This year he is back home attending Baylor. Jacob graduated from high school this Spring and has now moved down to Seguin to start school at Texas Lutheran University—my alma mater and a school we have a great relationship with here at Baylor. Finally, Jesse is starting his sophomore year at Rapoport High School and is doing really well.

Theses, Dissertations, Seminars

"Mechanistic Studies of Protein Crosslinking Using 1,8-Naphthalimides", Ae Gyeong Kang, *Masters of Science Thesis* (Spring 2009).
"Discovery of DNA-enzymes Dependant on Small-Molecule Cofactors; Design, Synthesis, and Evaluation of TLR-7 Agonists and their Immunoprotein Conjugates", José Roberto Boquin Romero, *Doctor of Philosophy Dissertation* (Summer 2010).

Bob Kane, cont...

“Photochemical Modification of Proteins and Tissue Surfaces using 1,8-Naphthalimides”, Gabriela Uzcategui, *Doctor of Philosophy Dissertation* (Summer 2010).

Invited seminar presentation at the Centre College Department of Chemistry, September 30 Danville, KY: “The Organic Chemistry of Fresh Flesh”

Invited seminar presentation at Texas Woman’s University Department of Chemistry, March 2 Denton, TX: “Hedging our bets: Suppressing or Stimulating Immune Responses Using Organic Synthesis”

Invited seminar presentation at McLennan Community College ‘BioChatter’ Seminar Series, March 16 Waco, TX: “Hedging our bets: Suppressing or Stimulating Immune Responses Using Organic Synthesis”



Playing the tub in the rain at the “Old Settlers Music Festival” in Dripping Springs, Texas, spring 2010



Pictured above: Playing a frying pan with “Dirtfoot” (great band!) at the “Mulberry Mountain Harvest Festival” Ozark Arkansas, fall 2009

Pictured below: Group photo summer 2009 (l-r) Dustin Fowler, Robert Hazlitt, Matthew Coker, Ae Gyeong Kang, Brittany Myers, Gabriela Uzcategui, Joshua Horton, Bob Kane, José Boquin



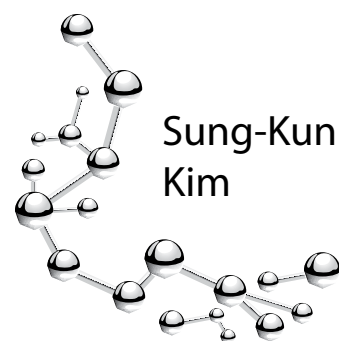


In our lab, we have been working on a couple of projects. Developing novel inhibitors that can help cure patients who are infected by drug-resistant bacteria is one of our projects our team is working on. Particularly, Sara Schlesinger and Sang Gon (Scion) Kim have focused on this project. They have successfully expressed metallo-beta-lactamase and purified the protein, and they have tried to find potential inhibitors of the protein metallo-beta-lactamase. Because the protein is a main cause of drug-resistant bacteria, finding effective inhibitors of the protein will be a solution of drug-resistant bacteria issues. We are very dedicated to this project.

Developing early disease diagnostic system is also a project we are working on. Mieke Lahousse, Sheena Shipley, Taylor Foster, and Scion have been working on these projects. Mieke and Scion worked on finding detecting materials using a novel

combinatorial, high-throughput method, SELEX, against a toxin from anthrax in collaboration with Korean universities – Hanyang and Ewha. Finally, we found materials that can detect the toxin with high binding affinity and high selectivity. We called those as BH-2, and -4, where BH stands for Baylor and Hanyang (only you who are now reading this article know this secret, and of course Baylor's name had to come first). Taylor Foster passed her research proposal for her Ph.D. requirement this July, 2010 with her projects – developing detecting materials against an opportunistic pathogenic Gram negative bacillus, *Enterobacter aerogenes*. Sheena Shipley has also worked on finding detecting materials against *E. coli*, and she plans to graduate with a MS degree this fall.

Mechanism studies on redox proteins are another set of ongoing projects. Jong-Sun (Sun) Lee and Scion have worked on these projects. Sun has successfully cloned a new gene, and purified the protein using *E. coli* expression system. It turned out that a function of the protein is converting a sulfate-attached nucleotide to sulfite in an archaeon, a bacterium that can survive under extreme conditions. This is the first discovery in the sulfate pathway in an archaeon. Scion is a superman in our team. He has worked on almost all of our projects, and he also focused his own



projects such as thioredoxin-like proteins, arsenate reductase, other reductases, and more.

This spring, Sun, Sara, and I went to the ACS National meeting in San Francisco, CA. We visited UC Berkeley and the Golden Gate Bridge, along with presenting our research topics at various ACS sessions. During this summer, I went to Washington D.C. to visit the Department of Defense (DoD) and the National Institute of Health in order to meet with program managers, supported by the Vice Provost Office for Research and our department. I also had a great opportunity to present my research topics to the DoD.

Every year during the summer, we try to interact outside of the lab by going to the movie theater and eating lunches together. Last summer, we watched "Transformers 2" and went to Kitok restaurant and this summer we continued our Kitoks tradition. This year, many people tried to have some Korean food in place of the world famous hamburgers. I will continue to tell our beautiful team story next year!



Top row: Dr. Sang Gon (Scion) Kim, Jong-Sun (Sun) Lee (G), Dr. Sung-Kun Kim, Ethan White (U); Middle row: Mieke Labousse (G), Taylor Foster (G), Connie Tang (U), Sara Schlesinger (G); Front row: Sheena Shipley (G), Kristin Brown (U); G: Graduate student; U: Undergraduate student

Publications

Kim, S.G., Kim, S.T., Wang, Y., Kim, S.K., Lee, C.H., Kim, K.K., Kim, J.K., Lee, S.Y., and Kang, K.Y. (2010/01) Overexpression of rice isoflavone reductase-like (OsIRL) confers tolerance to reactive oxygen species, *Physiologia Plantarum*, 138, 1-9.

Xu, X., Schumann, P., Chung, J.S., Hass, M.A., Kim, S.K., Hirasawa, M., Tripathy, J.N., Knaff, D.B., and Ubbink, M. (2009/12) Ternary protein complex of ferredoxin, ferredoxin:thioredoxin reductase, and thioredoxin studied by paramagnetic NMR spectroscopy, *J. Am. Chem. Soc.*, 131, 17576-17582.

Chung, J.S., Noguera-Mazon, V., Lancelin, J.M., Kim, S.K., Hirasawa, M., Hologne, M., Leustek, T. and Knaff, D.B. (2009/11) The Interaction Domain on Thioredoxin for *Pseudomonas aeruginosa* 5'-adenylylsulfate Reductase, *J. Biol. Chem.*, 45, 31181-31189.

Kim, S.K., Sims, C.L., Wozniak, S.E., Drude, S.H., Whitson, D., and Shaw, R.W. (2009/10) Antibiotic resistance in bacteria: novel metalloenzyme inhibitors, *Chemical Biology & Drug Design*, 74, 343-348.

Yoon, M.Y., Park, H.Y., Park, H.C., Park, S.H., Kim, S.K., Kim, Y.C., Shin, M., and Choi, J.D. (2009/07) Cloning and characterization of UDP-glucose dehydrogenase from *Sphingomonas chungubkensis* DJ77, *Bull. Korean Chem. Soc.* 30, 1547-1552.

Yoon, M.Y., Lee, K., Park, H.C., Park, S.H., Kim, S.G., Kim, S.K., and Choi, J.D. (2009/06) Cloning, expression, and characterization of UDP-glucose pyrophosphorylase from *Sphingomonas chungubkensis* DJ77, *Bull. Korean Chem. Soc.* 30, 1360-1364.

Presentations

Shipley, S.L., White, E., and Kim, S.K. (2010) Selection of Aptamers against live *E.coli* cells using Cell SELEX, The 2010 Annual American Society for Biochemistry and Molecular Biology (ASBMB) meeting, April 23-28, 2010 Anaheim, California

Schlesinger, S. R., Kim, S. G., Lee, J. S., Knaff, D. B., Lee, S. Y., and Kim, S. K. (2010) Redox properties of a thioredoxin-like *Aradopsis* protein, AtTDX, 239th American Chemical Society National Meeting and Exposition, March 21-25, San Francisco, California.

Kim, S. G., Chung, J. S., Lee, J. S., Wood, M. J., Knaff, D. B., and Kim, S. K. (2010) Redox properties of arsenate reductase from *Synechocystis* sp PCC6803, 239th American Chemical Society National Meeting and Exposition, March 21-25, San Francisco, California.

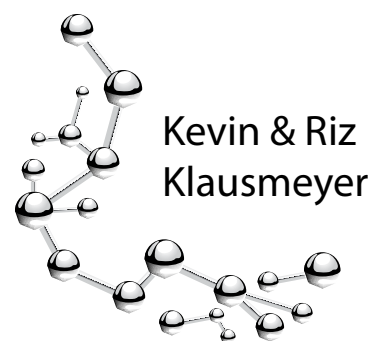
Lee, J. S., and Kim, S. K. (2010) Discovery of a new class of 3'-phosphoadenosine-5'-phosphosulfate reductase from the methanarchaeon *Methanocaldococcus jannaschii*, 239th American Chemical Society National Meeting and Exposition, March 21-25, San Francisco, California.

Margaret, our oldest daughter, started Junior High this year at St. Louis School; she will be a Baylor freshman before we know it. Elizabeth is in fourth grade and Gracie is in second, all three are doing great. Softball continues to be a constant presence in our daily lives, all three played in Robinson Little League in the spring. Margaret made Major Girls All-Stars as a pitcher and first baseman. She is now the main pitcher for the Centex Buzz 99 select team and is still pitching well in spite of some knee problems. Elizabeth plays pitcher, first base, catcher, and third base for Centex Buzz 01, she is very versatile. Gracie played for the first time this year and is looking forward to playing next year.

Riz: I have been keeping busy with teaching and being the advisor for the American Chemical Society (ACS) Student Affiliates chapter. The main activity for the ACS is the chemistry magic shows at the Mayborn Museum. We had two shows in the fall and two in the spring and they were well received by the kids. I also taught natural products in the spring in addition to my normal load of organic chemistry sections and I had a great time teaching the synthesis of tons of compounds. I am always happy to keep contact with my former students and I enjoy receiving updates on their careers and adventures.

Kevin: For the fall of 09 I was on sabbatical, working a couple of days every week at Texas A&M University learning the basics of Density Functional Theory in the Laboratory for Molecular Simulation under the direction of Dr. Mike Hall. The rest of the week was spent in the X-ray lab and directing research. The X-ray lab continues to crank out structures as quickly as we can grow the crystals. Work continues in lab on the coordination chemistry of pyridyl containing phosphines and their oxides. Most recently we have been exploring the chemistry of various mercury salts which has produced a diverse series of structures; this work is being done by graduate student Daniel Padron. Graduate student Beth Martine is also working in this area with cobalt and silver salts. In March my doctoral advisor Dr. Don Darensbourg of Texas A&M received

the ACS Award in Inorganic Chemistry. I attended the ACS meeting San Francisco, and in addition to giving a talk, helped chair the Award Symposium in Dr. Darensbourg's honor.



Publications:

- Syntheses and coordination studies of pyridylphosphine oxide ligands toward copper(II). F. Hung-Low, K.K. Klausmeyer *Polyhedron*, 2010, 29, 1676-1686
- The Variable Binding Modes of Phenylphosphino-bis-(2-methylpyridine) and Phenyl-bis-2-pyridylcarbinolphosphonite with Ag(I) and Cu(I) F. Hung-Low, A.L. Renz and K.K. Klausmeyer *Eur. J. Inorg. Chem.* 2009, 2994-3002
- X-ray crystal structures of discrete and polymeric silver based molecules containing 4,4'-dimethyl-2,2'-bipyridine and 2,2'-bipyridine F. Hung-Low, A.L. Renz and K.K. Klausmeyer. *J. Chem. Crystallogr.*, 2009, 39, 438-444
- An X-ray diffraction study of anion and ratio dependence in the formation of discrete molecules versus polymeric arrays involving silver salts and bipyridine ligands F. Hung-Low, A.L. Renz and K.K. Klausmeyer. *Polyhedron*, 2009, 28, 407-415
- Effect of anion and ligand ratio in self-assembled silver(I) complexes of 4-(diphenylphosphinomethyl)pyridine and their derivatives with bipyridine ligands. F. Hung-Low, K.K. Klausmeyer, and J. B. Gary, *Inorg. Chim. Acta*, 2009, 362, 426-436

Invited Talks:

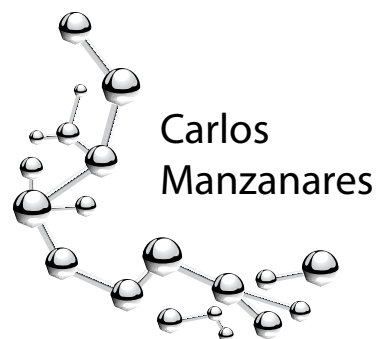
- Metal complexes of pyridyl phosphine oxide ligands. K.K. Klausmeyer, F. Hung-Low and A. Renz 239th ACS National Meeting in San Francisco March 2010.

Research in my laboratory:

This year, I received a Welch Foundation grant for two years (\$100,000.00) and a one year Faculty Research Investment Program grant (\$25,000.00) from Baylor University. These funds have allowed me to hire Dr. Yasnahir Perez-Delgado as a Postdoctoral Research Associate in my group and use the Welch grant to continue partial funding of two graduate students. We have been developing different approaches to Cavity Enhanced Spectroscopy of molecules at low temperatures for gas and liquid samples. Yasnahir has been working on vibrational fundamental and overtone spectroscopy and chemical reactions that are induced with visible radiation. Our main interest is to simulate in the laboratory, some of the photochemical transformations that we think are occurring in the Earth's atmosphere when some volatile organic compounds absorb visible radiation. The reactions should occur at altitudes below 50 km where visible radiation is more abundant than ultraviolet radiation. Helena Diez-y-Riega defended her dissertation and is scheduled to graduate in December of 2010. Her laboratory experiments serve to simulate the composition and temperatures of the lakes and seas of methane and ethane present on the surface of Titan (a satellite of Saturn). The composition of the atmosphere of Titan is: N₂ (98%), methane (around 1%), Argon (around 0.0043 %). Researchers have suggested that the methane in the stratosphere of Titan absorbs radiation in the vacuum UV (100-180 nm) and forms other hydrocarbons like ethane, propane, and butane. The same radiation could also be responsible for the formation of small unsaturated hydrocarbons like ethylene, acetylene, and butadiene. The average Titan temperature (90 K) makes it possible that all of them condense on the surface as liquids or solids forming part of cryogenic solutions where the main solvents are methane and ethane. David Camejo and Jenny Barroso continue studying weak absorptions of oxygen at temperatures between 80 K and 200 K. Jenny has also been doing calculations of rate of reactions for

decomposition of esters induced with visible radiation.

She uses ab initio methods to obtain the lowest energy structures of reactants, products, and transition states during each stage of the reaction. Two undergraduate students: Abraham Rodriguez and Lauren Garofalo, are presently working on solubilities of organic molecules in cryogenic solutions. Recently, Dr. Mary Salazar and Dr. Antonio Hernandez came from Universidad Simon Bolivar in Caracas, Venezuela, to spend their sabbatical year at Baylor working in my laboratory on theoretical calculations of molecular properties of excited states. They have been collaborating in our group for the last 10 years.



Front: Lauren Garofalo (left), Jenny Barroso, Helena Diez-y-Riega, Yasnahir Perez-Delgado. Back: Mary Salazar, Antonio Hernandez, Abraham Rodriguez, Carlos Manzanares, David Camejo

Research with High School Students:

For the last five years, Sandy Ren, Jessie Rianne, and Ivonne Sandoval (juniors at Midway High School) and their teacher Mrs. Melissa Rhoden, have been very active in my research group in our Titan project. This year Sandy and Mrs. Rhoden presented our results at the International Science and Engineering Fair held in San Jose, California. Sandy's poster "Astrobiology: Life in the Universe, Year IV" won the first prize and resulted in a college scholarship for Sandy. She also received the Best in Fair Award at the regional Central Texas Science and Engineering Fair at Texas State Technical College.

*Front: Jessie Rianne (left), Sandy Ren, Ivonne Sandoval
Back: Mrs. Melissa Rhoden, Helena Diez-y-Riega, Yasnahir Perez-Delgado*



Conferences:

In June, I participated in the Faraday Discussion 147: "Chemistry of the Planets". I presented the paper "Cavity Ring Down and Thermal Lens at Low Temperatures for Laboratory Studies of Planetary Atmospheres". This conference took place in Saint Jacut de la Mer, Brittany, France. The Faraday Discussion 147 gathered international leaders in several areas of planetary atmospheres. The areas discussed were: chemical aspects of planetary exploration and observation, neutral atmospheric chemistry of the planets, chemistry of planetary thermospheres and ionospheres, exoplanet chemistry, and planetary aerosols, surfaces, interior and formation. Following on directly

from FD147, within the framework of the NSF Collaborative Research in Chemistry (CRC) Network, I also participated in another conference titled: "Chemistry of Unsaturated Hydrocarbons in Titan's Atmosphere" as part of the Fourth NSF Workshop on Titan. In August, I was invited by the organizers of the Symposium Physical Chemistry of Spectrochemical Analysis (Physical Chemistry Division) to give an oral presentation as part of the 240th American Chemical Society National Meeting in Boston, MA. I presented the paper: Off-axis Cavity Ring Down Spectroscopy at Low Temperatures for Laboratory Studies of Planetary Atmospheres. In this symposium, recent advances in instrumentation and methods with potential impact for spectroscopy were presented. New device technology, advances in light sources, and the discovery of new physical effects that enhance sensitivity were discussed.

Teaching activities:

I continue teaching freshman chemistry and physical chemistry at the undergraduate and graduate levels. This year (spring) I had a section of Physical Chemistry II where I presented topics in quantum chemistry, spectroscopy, and statistical thermodynamics. The laboratory of physical chemistry dealt with molecular spectroscopy and the students wrote 6 laboratory reports. As is now usual in my laboratory courses, the students learned how to write journal style laboratory reports. During the fall, I am teaching "Basic Principles of Modern Chemistry" to 117 students.

Family news:

My son Charlie received a Fulbright fellowship to spend a year in Barcelona, Spain working on a research project in economics at the Pompeu Fabra University. In January of this year, my family reunited with Charlie. My daughter Christina spent one semester at the "Escolàpies Llària" school in Barcelona, taking courses in Spanish, Catalan, and Latin. I visited them for a week during spring break. During this time, Charlie received news from the National Science Foundation informing

Carlos Manzanares, cont...

him that he had been selected for a graduate research fellowship in economics. He also received an offer from the American Economic Association to teach at their summer institute in economics at the University of California in Santa Barbara. He finished his work in Spain and California and he is now at Vanderbilt University in Nashville, Tennessee working on a Ph.D. in economics where he will continue the research experiences initiated in Europe.

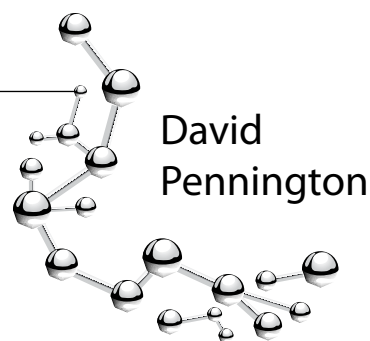


Charlie and Christina in Santander, Spain

During the spring term I attended the 2010 Annual Meeting of the Council for Chemical Research in Atlanta, Georgia representing the Department, attending sessions on Purification of Chemical Substances primarily in the industrial sector, hearing updates from Program Directors from the NSF, NIST, and USDA. But perhaps the most important subject I brought back from the meeting came from the breakout sessions for Graduate Education where Dr. William Olbricht (Cornell, Chem. Engr.) presented the results of his investigation into the training requirements for NIH and NSF grantees and their undergraduate and graduate students, and postdoctoral associates

Recent Publications:

- Y. Perez-Delgado and C. E. Manzanares, "Cavity Ring Down and Fourier Transform Infrared Spectroscopy at Low Temperatures (84-297 K): Fermi Resonance and Intensities of the C-H Fundamental and Overtone ($\Delta\nu = 1-6$) Transitions of CHD₃", J. Phys. Chem. A. 114, 7918-7927 (2010).
- A. Lopez-Calvo, Helena Diez-y-Riega, and C. E. Manzanares, "Vibrational overtone spectra and interactions of C₂H₄ and H₂CCHCH₃ in liquid Kr", Vib. Spectrosc. 52, 69-78 (2010).
- A. Lopez-Calvo, Helena Diez-y-Riega, and C. E. Manzanares, "Vibrational C-H Overtone Spectroscopy and Bond Distances of Butenes Dissolved in Liquid Xe", J. Molec. Struct. 935, 39-46 (2009).
- Y. Perez-Delgado, E. K. Lewis, C. J. Moehnke, M. C. Salazar, A. J. Hernandez, and C. E. Manzanares, "Cavity Ring Down Absorption at Low Temperatures: C-H Spectra ($\Delta\nu = 1-6$) of CH₃D and C-H Overtones ($\Delta\nu = 5, 6$) of CH₂D₂ and CH₄", Mol. Phys. 107, 1367-1377 (2009).



on the Responsible Conduct of Research. Further, I learned about the courses already in place at UMass and Iowa State University. Professor James Hill (ISU, Chem. Engr.) shared the content of an ethics course taught on their campus the past several years, employing a book titled, Introduction to the Responsible Conduct of Research, by Nicholas H. Steneck,

which addresses the issues raised by the NIH mandates. Planning is underway for offering a course on this topic during the 2011 spring term.

During the fall semester I taught 43 students in the Honors section of first-semester General Chemistry, assisted the Chair by writing personal notes to donors to the Departmental Excellence Fund, served as departmental liaison to the Moody Library, followed by planning and participating in the Invitation 2 Excellence recruiting activities [including contributing the Design Method of Problem Solving used by participants in Planning A Trip to Go Where You Have Never Been (a trip to Mars)]. During the year I directed Matthew Naumann's Honors Program research project involving preparation of Chromium-Glutathione Complexes. In the spring semester I taught five graduate students in Chemistry of the Elements (assisted by Dr. Farmer the last two weeks), 12 students in Undergraduate Seminar, and 33 students in second semester General Chemistry Honors. I attended the Stone Symposium and the Retirement Dinner for Drs. Marianna & Kenneth Busch, providing a brief roast and memorable moments on behalf of the department.

During the 2009/2010 academic year I served on the Faculty Senate and chaired an *ad hoc* Committee to develop an administrative protocol for the selection of Master Teachers at Baylor University (now in final states of approval) and as Senate Liaison to the University Library

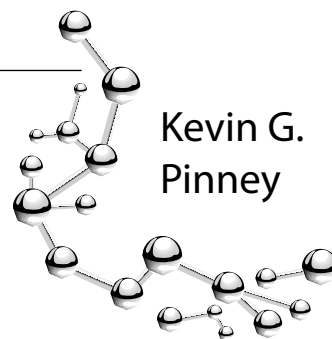
I am pleased to be able to share some recent highlights with you in the accompanying pages. Please be sure to visit us in the Baylor Sciences Building (BSB) when your travels bring you to the Baylor campus. You are always welcome! The last couple of years have been busy and productive years for Baylor University and the Department of Chemistry and Biochemistry. I continue to be blessed with a core group of extremely hard-working and talented individuals including



Committee. Additionally, I served as a member of the University Premedical/-Pre dental Advisory Committee as an interviewer, JAMP Faculty Director (JFD) (JAMP = Joint Admission Medical Program for four economically disadvantaged students), attended two JFD meetings in Austin, and served as a host for the Annual Doctors' Homecoming Breakfast at Homecoming. I attended the Texas Association of Advisors for the Health Professions 2010 Annual Meeting in Lubbock, Co-sponsored the Texas Beta Chapter of Alpha Epsilon Delta on its trip to the 2010 National Convention in Tampa, Florida where we earned second place awards for large chapters in our region for Activities and for Attendance. I also received a Certificate of Appreciation for 20 or More Years of Service as A Sponsor of the Texas Beta Chapter.

graduate students,
undergraduate
students,
postdoctoral
research
associates, and
administrative

staff. In the fall semester of 2009, the Pinney Research Group included approximately twenty members (8 graduate



Kevin Pinney, cont...

students, 9 undergraduates, 2 postdocs, and 1 part-time administrative associate) and those numbers grew slightly into the spring of 2010 (10 graduate students, 11 undergraduates, 2 postdocs, and 1 part-time administrative associate).

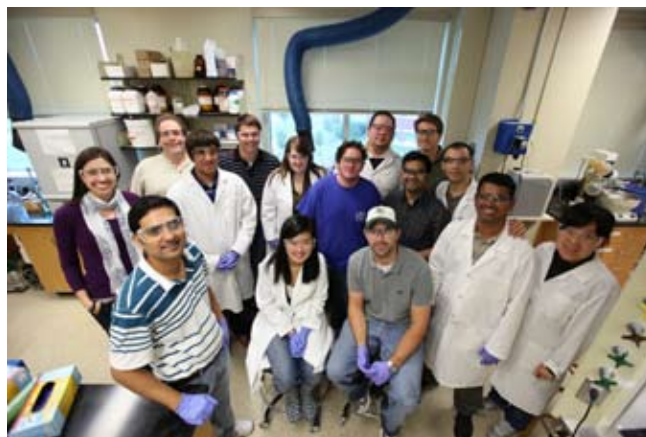
Current members of my research team include: Dr. Rajendra Tanpure (postdoctoral research associate); graduate students Laxman Devkota, Clinton George, Lindsay Jones, Chen-Ming Ling, Matthew MacDonough, Benson Nguyen, Erica Parker, Jiangli Song, Justin Tidmore (co-mentored by Dr. Trawick); and undergraduates Liela Bayeh, Akshar Chauhan, Priscilla Hor, Mahmood Khan, Ashleigh Locke, Kahler Low.



The Pinney Research Group, Fall 2010

In addition, I wish to extend a huge THANK YOU to Ms. Cristin McAnear (part-time research administrative associate) whose hard work and dedication contributes greatly to the infrastructure of our day-to-day functioning as a research team. Cristin has recently started a graduate program in the Business School (Economics) but we are fortunate that she will remain with us as an “auxiliary staff member”. Much thanks also to our Departmental administrative staff Adonna Cook, Nancy Kallus, Barbara Rauls, and Virginia Hynek, for all of their excellent support. Recent graduates from the Pinney Group include Dr. Gerardo Elguezabal-Torralba (Ph.D. August 2010), Austin Adair (BS, May 2010), Elizabeth Conner (BS, May 2010), Adam Jantz (BS, May 2010), Audra

Johansen (BS, May 2010), Richard Longoria (BA, May 2010), Peter Robinson (BA, May 2010), and Grace Yoo (BS, December 2009). Dr. Benson Nguyen successfully defended his Ph.D. in July of 2010 and will officially go through commencement in December of 2010. Dr. Nguyen has accepted a position as Laboratory Coordinator (for selected organic and biochemistry labs) in the Department of Chemistry and Biochemistry at Baylor University for the 2010-2011 academic year. After several years of outstanding work as a postdoctoral research associate, Dr. Kishore Kumar Gaddale Devanna departed in June of 2010 for the UK to eventually take up a position as Research Fellow at Queens University (Belfast).



The Pinney Research Group, Fall 2009

During the summer sessions, I am always pleased to welcome one or two high school students to our laboratory for a four to five week research experience as part of the Baylor University High School Summer Science Research Program (HSSSRP). Recent students include Ms. Ashley Newton and Ms. Michelle Suh (co-mentored by graduate students Justin Tidmore and Benson Nguyen, respectively, summer 2009) along with Ms. Danielle Suh (co-mentored by graduate student Erica Parker, summer 2010).

I continue to enjoy teaching courses in organic chemistry at both the undergraduate and graduate level. I recently completed the instruction of a sequence of organic chemistry courses at the honors level (CHE 3331-H, Fall 2009 and CHE 3332-H, Spring 2010), and

I am currently (Fall 2010) enjoying teaching a graduate course (CHE 5336) entitled “Advanced Synthesis and Natural Products.”

If you are a former member (graduate, undergraduate, high school, postdoctoral, or staff) of the Pinney Research Group, please send an email to me and let me know how you are doing and what activities you are currently involved with. It is my hope to put together a Christmas Newsletter for distribution to our current and past group members, and I would be most pleased to include information from you in that newsletter format.

For further information on the activities of the Pinney Group, please visit our website: http://bearspace.baylor.edu/Kevin_Pinney/www/index.html

I remain extremely grateful to Ms. Sadie Jo Black for her heart-felt generosity in establishing an endowed fund that provides summer stipend support for an undergraduate student researcher in the Pinney Research Group. The initial awardees, designated as “Sadie Black Medical Researchers,” include Elizabeth Conner (summer 2009) and Ashleigh Locke (summer 2010). In addition, we are so indebted to Sadie Black for her establishment of the W. Dial Black Family Lectures that bring world-renowned researchers to the Baylor campus for a seminar and to provide an opportunity for informal discussions with our students, faculty, and staff. One major goal of this seminar series is to foster an appetite in our students to pursue careers in fundamental research that address significant areas of medical need. Our inaugural lecturer (April 2008) was Professor George R. Pettit (Arizona State University), and our most recent lecture was presented by Professor Mina J. Bissell (Lawrence Berkeley National Laboratory) in February of 2010.

Our ongoing research efforts continue to utilize and further develop the tools of synthetic organic chemistry and medicinal chemistry as we work towards the design and synthesis of new compounds that have the potential to be improved

treatment agents for cancer, Chagas’ disease, and certain brain-chemistry related disorders. While we remain interested in all of these areas, our primary focus is in cancer research. We are intrigued and motivated by the challenge inherent in the design of new, more effective treatment agents that are characterized by their selectivity for the tumor microenvironment (versus healthy cells). In a more specific sense, we “target” tumor vasculature (by vascular disrupting agents) in an effort to “starve” tumors of necessary oxygen and nutrients. In another approach, we target tumor hypoxia (low oxygen) as a means of target-selective chemotherapeutic drug delivery. In addition, we focus on the process of metastasis in an effort to retard or halt the progressive spread of a primary tumor to other locations in the body. These areas of research are highlighted by a variety of recent presentations and publications by the Pinney Group (detailed further below).

We are fortunate to enjoy a number of outstanding research collaborations with scientists both here on the Baylor University campus and beyond. A selection of these important collaborations include: Dr. Mary Lynn Trawick (Baylor University), Dr. David J. Chaplin (Oxigene Inc.), Dr. Ralph P. Mason and Dr. Li Liu (The University of Texas Southwestern Medical Center), Dr. George R. Pettit (Arizona State University), Dr. Ernest Hamel (National Cancer Institute), Dr. Michael Horsman (Aarhus University Hospital, Denmark), Dr. Bronwyn Siim (Auckland, NZ and Oxford, UK), and Dr. Michael P. Hay (Auckland Cancer Society Research Centre). It is especially important to note the contributions of Dr. Mary Lynn Trawick and her research team here at Baylor University as they collaborate in the design of new molecules and the selection of targets, and provide the biochemical and biological studies necessary to evaluate the potential efficacy of new synthetic compounds and to determine their mechanisms of action in living cells.

Research funding is currently provided by three major sources that are detailed further below. We remain indebted to Oxigene Inc. for long

Kevin Pinney, cont...

term (1999-present) funding and support and we are pleased to add recent funding through an inaugural grant from Texas-based CPRIT (thanks to the voters for proposition 15!) along with a five year R01 grant (multiple Principal Investigators: Pinney and Trawick, Baylor University) from the NIH. In addition, I was fortunate to have a summer 2010 sabbatical awarded from the College of Arts and Sciences.

Oxigene Inc.

- (1) Project Title: Synthetic and Medicinal Chemistry Oxigene Core Grant Focusing on the Tumor Microenvironment
Project Dates: February 1, 2009 – October 31, 2009
- (2) Project Title: Combretastatin A1 Glucuronide Synthesis and Characterization
Project Dates: February 1, 2009 – October 31, 2009
- (3) Project Title: Synthesis of Anticancer Agents with Enhanced Selectivity for the Tumor Microenvironment
Project Dates: November 1, 2009 through December 31, 2010

Cancer Prevention and Research

Institute of Texas (CPRIT):

High Impact / High Risk Research Award
Project Title: Investigation of Highly Potent Benzosuberene Analogs as Novel Anticancer Agents
PI (Dr. Kevin G. Pinney); Co-PI (Dr. Mary Lynn Trawick)
Subcontract to Dr. Li Liu (University of Texas Southwestern (UTSW) Medical Center)
Project Dates: April 1, 2010 through March 31, 2012

National Institutes of Health (NIH) – National Cancer Institute (NCI):

Project Title: Chemotherapeutic Agents with Enhanced Selectivity for the Tumor Microenvironment
Multiple PIs (Dr. Kevin G. Pinney and Dr. Mary Lynn Trawick)

Subcontract to Dr. Ralph Mason (University of Texas Southwestern Medical Center)

Project Dates: June 1, 2010 through March 31, 2015

I am so appreciative of the generous press coverage by Baylor University and others that accompanied the funding of the recent research grants from CPRIT and the NIH. Web links to the summer 2010 issue of “The Baylor Line” along with the CPRIT press release are included below:

<http://www.pursuantmedia.com/baylorline/0710/default.asp>

http://www.cprit.state.tx.us/pdfs/pr_baylor_200thousand.pdf

I attended the 101st Annual Meeting of the American Association of Cancer Research (AACR) in Washington, DC (April 17-19, 2010). As a newly appointed (2010-2012) member of the Steering Committee for the “Chemistry in Cancer Research” (CICR) Working Group associated with the AACR, I participated in the CICR Committee Meeting and Town Hall Meeting. It was a real honor for me to initiate



CPRIT Check Presentation and Press Conference (April 12, 2010) l-r: Mr. James Mansour (CPRIT Oversight Committee Chairman), Dr. Truell Hyde (Vice-Provost for Research), Dr. Kevin G. Pinney, Mr. William Gimson (CPRIT Executive Director), Dr. Elizabeth Davis (Provost), Dr. Mary Lynn Trawick, and Dr. Lee Nordt (Dean, College of Arts & Sciences)

the nomination (and ultimately serve as co-nominator) of Professor John A. Katzenellenbogen (University of Illinois) for the inaugural Philip S. Portoghese Medicinal Chemistry Lectureship Award jointly sponsored by the Division of Medicinal Chemistry of the American Chemistry Association and the Journal of Medicinal Chemistry. I was thrilled that Professor Katzenellenbogen won this National award and my wife Tracy and I enjoyed traveling to the ACS National Meeting in Boston (August 2010) to hear Professor Katzenellenbogen's lecture and participate in a group dinner in honor of the award. Two Pinney Group graduate students (Lindsay Jones and Jiangli Song) also gave posters at the meeting. [Professor Katzenellenbogen was Dr. Pinney's Ph.D. mentor at the University of Illinois.]

Recent Research Presentations (detailed below):

Kishore Kumar Gaddale Devanna, Lindsay M. Jones, Jiangli Song, Matthew MacDonough, Elizabeth Cyril, Akash Desai, Grace Yoo, Elizabeth Conner, Wara M. Arispe, Gustavo Chavarria, Amanda Charlton-Sevcik, Tracy E. Strecker, Shen-En Chen, Mary Lynn Trawick, and Kevin G. Pinney, Design, Synthesis, and Biological Evaluation of Novel and Potent Thiosemicarbazone Based Cathepsin L Inhibitors, Abstract No. B1, Division of Organic Chemistry, 41st National Organic Symposium, The University of Colorado, Boulder, CO, June 7-11, 2009. (poster presented Monday June 8th).

Michelle Suh (co-mentors Kevin G. Pinney and Pinney Group graduate student Benson Nguyen), Bioreductively-Linked Vascular Disrupting Agents for the Treatment of Cancer, Baylor University High School Summer Science Research Program Symposium, July 2, 2009.

Ashley Newton (co-mentors Kevin G. Pinney and Pinney Group graduate student Justin Tidmore), Design and Synthesis of a Combretastatin A-4 (CA4) Analog Incorporating a Bioreductive Trigger, Baylor University High School Summer Science Research Program Symposium, July 2, 2009.

Kimberly C. Mayes (Biochemistry)

Title: Microplate Analysis of Thiosemicarbazone Inhibitors of Cruzain (Co-Authors: Kimberly C. Mayes, Jacob A. Wiley, Gustavo E. Chavarria, Wara M. Arispe, Lauren J. Adamson, Lindsay M. Jones, Kevin G. Pinney, and Mary Lynn Trawick), Baylor's URSA (Undergraduate Research and Scholarly Achievement) Scholar's Week, Baylor Sciences Building, Poster Board #30, March 22-25, 2010

Kevin G. Pinney, Mary Lynn Trawick, G. D. Kishore Kumar, Gustavo Chavarria, Amanda Charlton-Sevcik, Matthew MacDonough, Grace K. Yoo, Ashleigh R. Locke, Wara M. Arispe, Bronwyn G. Siim, and David J. Chaplin, Synthesis of Functionalized Benzophenone Thiosemicarbazone Analogues as Inhibitors of Cathepsin L, The Tumor Microenvironment Workshop, 12th International Workshop (Hypoxia, Angiogenesis & Vasculature), Toronto, Canada, May 2-5, 2010 (oral presentation on Wednesday May 5th).

Mary Lynn Trawick, Kevin G. Pinney, Gustavo Chavarria, Amanda Charlton-Sevcik, Wara M. Arispe, Shen-En Chen, G. D. Kishore Kumar, Matthew MacDonough, Tracy E. Strecker, Bronwyn G. Siim, and David J. Chaplin, Initial Biological Evaluation of a New Series of Cathepsin L Inhibitors, The Tumor Microenvironment Workshop, 12th International Workshop (Hypoxia, Angiogenesis & Vasculature), Toronto, Canada, May 2-5, 2010 (oral presentation on Wednesday May 5th).

Danielle Suh (Mentor: Kevin G. Pinney; Co-Mentor: Erica Parker), Synthesis of Small-Molecule, Thiosemicarbazone-Based Inhibitors of Cathepsin L for the Treatment of Metastatic Cancer, Baylor University High School Summer Science Research Program (HSSSRP) Symposium, July 2, 2010.

Jiangli Song, Lindsay M. Jones, Kishore Kumar Gaddale Devanna, Elizabeth S. Conner, Gustavo E. Chavarria, Amanda K. Charlton-Sevcik, Mary Lynn Trawick, Bronwyn G. Siim, David J. Chaplin, and

Kevin Pinney, cont...

Kevin G. Pinney, Synthesis of a Series of Nonpeptidic Thiochromanone-based Thiosemicarbazone Analogs as Inhibitors of Cathepsin L Abstract No: MEDI 168, 240th ACS National Meeting & Exposition, August 22-26, 2010, Boston, MA (poster presented on Sunday August 22, 2010).

Lindsay M. Jones, Jiangli Song, Audra L.

Johansen, Adam K. Jantz, Gustavo E. Chavarria, Amanda K. Charlton-Sevcik, Mary Lynn Trawick, Bronwyn G. Siim, David J. Chaplin, and Kevin G. Pinney, Thiosemicarbazone Derivatives of Functionalized Tetralone, Indanone, Chromanone, and 2,3-dihydroquinolinone Scaffolds as Inhibitors of Cathepsins L and B Abstract No: MEDI 169, 240th ACS National Meeting & Exposition, August 22-26, 2010, Boston, MA (poster presented on Sunday August 22, 2010).

Presentations and Research Discussion by members of the Pinney and Trawick Research Groups during visits to Baylor University by individuals from Oxigene Inc. on June 17-19, 2009, October 4-6, 2009, Nov. 4-6, 2009, and July 29-31, 2010.

Recent Research Publications (detailed below):

Anupama Shirali, Madhavi Sriram, John J. Hall, Benson L. Nguyen, Rajsekhar Guddneppanavar, Mallinath B. Hadimani, J. Freeland Ackley, Rogelio Siles, Christopher J. Jelinek, Phyllis Arthasery, Rodney C. Brown, Victor Leon Murrell, Austin McMordie, Suman Sharma, David J. Chaplin, and Kevin G. Pinney, Development of Synthetic Methodology Suitable for the Radiosynthesis of Combretastatin A-1 (CA1) and its Corresponding Prodrug CA1P, *Journal of Natural Products*, 2009, 72, 414-421.

Rodney T. Brown, Victor L. Murrell, Austin McMordie, Madhavi Sriram, Kevin G. Pinney, Suman Sharma, and David J. Chaplin, Carbon-14 Radiosynthesis of Combretastatin A-1 (CA1) and its Corresponding Phosphate Prodrug (CA1P), *Journal of Labeled Compounds and*

Radiopharmaceuticals, 2009, 52, 567-570.

Rajendra P. Tanpure, Amanda R. Harkrider, Tracy E. Strecker, Ernest Hamel, Mary Lynn Trawick, and Kevin G. Pinney, Application of the McMurry Coupling Reaction in the Synthesis of Tri- and Tetra-arylethylene Analogues as Potential Cancer Chemotherapeutic Agents, *Bioorganic and Medicinal Chemistry*, 2009, 17, 6993-7001.

G. D. Kishore Kumar, Gustavo E. Chavarria, Amanda K. Charlton-Sevcik, Wara M. Arispe, Matthew T. MacDonough, Tracy E. Strecker, Shen-En Chen, Bronwyn G. Siim, David J. Chaplin, Mary Lynn Trawick and Kevin G. Pinney, Design, Synthesis, and Biological Evaluation of Potent Thiosemicarbazone Based Cathepsin L Inhibitors, *Bioorganic and Medicinal Chemistry Letters*, 2010, 20, 1415-1419.

Rajendra P. Tanpure, Tracy E. Strecker, David J. Chaplin, Bronwyn G. Siim, Mary Lynn Trawick, and Kevin G. Pinney, Regio- and Stereospecific Synthesis of Mono β -D-Glucuronic Acid Derivatives of Combretastatin A-1, *Journal of Natural Products*, 2010, 73, 1093-1101.

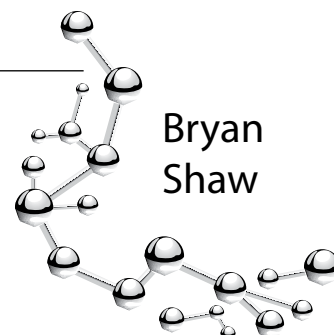
Kevin G. Pinney, George R. Pettit, Mary Lynn Trawick, Christopher Jelinek, and David J. Chaplin, Chapter 3 entitled: The Discovery and Development of the Combretastatins. Book (second edition) entitled: Antitumor Agents from Natural Products, edited by David Kingston, David Newman, and Gordon Cragg, CRC Press, Taylor and Francis Group, Boca Raton, Florida. Submitted March 6, 2010; Accepted June 22, 2010.



Kevin and
Tracy Pinney

G. D. Kishore Kumar, Gustavo E. Chavarria, Amanda K. Charlton-Sevcik, Grace K. Yoo, Jiangli Song, Tracy E. Strecker, Bronwyn G. Siim, David J. Chaplin, Mary Lynn Trawick and Kevin G. Pinney, Functionalized Benzophenone, Thiophene, Pyridine, and Fluorene Thiosemicarbazone Derivatives as Inhibitors of Cathepsin L, *Bioorganic and Medicinal Chemistry Letters*, (Submitted: July 12, 2010; Fully Accepted September 7, 2010).

It has been a real privilege (and so far, a lot of fun) to become the newest member of the Department of Chemistry and Biochemistry at Baylor. My wife Elizabeth and son Noah and I moved to Waco from Cambridge, Massachusetts in late July of this year. We are enjoying Baylor and Waco more than we had anticipated! Everyone—the faculty and staff, and administrators—have been so warm and helpful. I must admit, however, that every so often, my wife begins to miss our old home back east. She quickly brightens up when I remind her of the 450 square foot apartment that we could *barely* afford in Cambridge (not to mention the entire month of February in the whole of New England). The first few months of research and teaching at Baylor have been a blast.



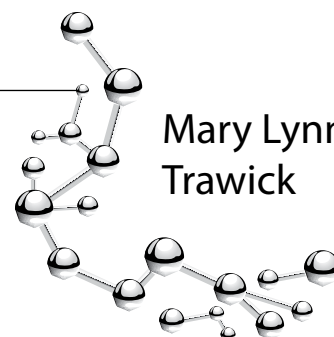
Bryan Shaw

Shaw lab is focusing part of its research on the biophysics of protein aggregation. We are trying to understand why one protein in particular, superoxide dismutase, aggregates. The aggregation of superoxide dismutase causes amyotrophic lateral sclerosis (also known as Lou Gehrig's disease). We believe that acquiring a complete understanding of why the superoxide dismutase protein undergoes aggregation will help us develop new drug therapies that can inhibit the aggregation of superoxide dismutase, and possibly treat this devastating neurodegenerative disease.

The Shaw Laboratory has been set up and three graduate students have joined the lab. We have also hired a very experienced post-doctoral fellow/research scientist. We have submitted our first grant to the Department of Defense (and have made it past the first 'white-paper' phase). The

Shaw, B.F., Moustakas, D.T., Whitelegge J.P., Faull, K.F. Taking charge of proteins: from neurodegeneration to industrial biotechnology. *Adv. Prot. Chem. Struct. Biol.* 2010; Vol. 39:128-158.

This was a good year for the Trawick Group which includes the following exceptionally talented and diligent individuals: post-doctoral research fellow, Dr. Tracy Strecker, graduate students Amanda Charlton-Sevcik, Gustavo Chavarria, Samuel Odutola (Biomedical Studies) and Justin Tidmore who is co-mentored with Dr. Kevin Pinney, four undergraduate students, and part-time administrative associate, Cristin McAnear. Our research collaborations in the area of



Mary Lynn Trawick

Mary Lynn Trawick, cont...

cancer research with Dr. Kevin Pinney and his group have continued to expand. The collective expertise between the two groups now includes the design of target compounds, synthesis, molecular modeling, and biochemical and cell biology evaluation. These exciting collaborative projects in the area of cancer research target the tumor microenvironment, disruption of the blood supply to tumors, and inhibition of enzymes involved in tumor metastasis.



The Trawick Group. Bottom row: Cristin McAnear, Mary Lynn Trawick, Amanda Charlton-Sevcik, Melinda Soeung, and Victoria Soeung. Top row: Tracy Strecker, Gustavo Chavarria, Samuel Odutola, Lindsey Snyder, and Rafael Deliz Aguirre. Justin Tidmore not pictured.

After an intense year of writing grant proposals with colleague and collaborator, Kevin Pinney, we found success in a number of areas. We received a first round 2-year grant ("Investigation of Highly Potent Benzosuberene Analogs as Novel Anticancer Agents") from the new Cancer Prevention and Research Institute of Texas (CPRIT) with Kevin Pinney as PI and myself as co-PI. Web links to the summer 2010 issue of "The Baylor Line" along with the CPRIT press release are included below:

<http://www.pursuantmedia.com/baylorline/0710/default.asp>

http://www.cprit.state.tx.us/pdfs/pr_baylor_200thousand.pdf



CPRIT Check Presentation and Press Conference (April 12, 2010) l-r: Mr. James Mansour (CPRIT Oversight Committee Chairman), Dr. Truell Hyde (Vice-Provost for Research), Dr. Kevin G. Pinney, Mr. William Gimson (CPRIT Executive Director), Dr. Elizabeth Davis (Provost), Dr. Mary Lynn Trawick, and Dr. Lee Nordt (Dean, College of Arts & Sciences)

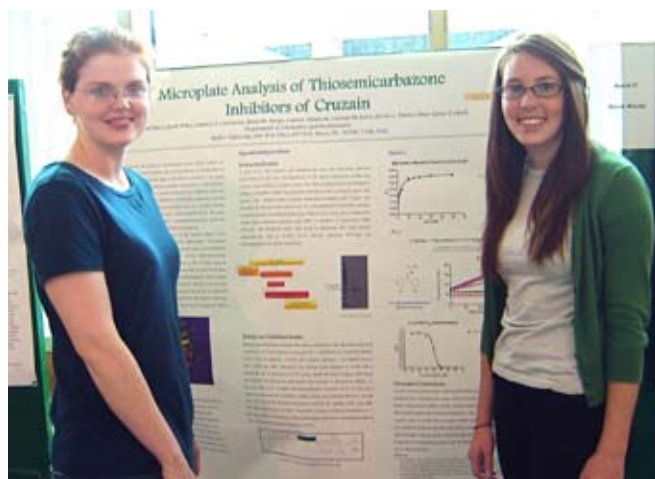
As multiple PIs, Kevin Pinney and I were awarded a 5-year NIH R01 grant entitled "Chemotherapeutic Agents with Enhanced Selectivity for the Tumor Microenvironment." I am very appreciative of continued funding from Oxigene, Inc. in the form of a grant, "Biochemistry and Cell Biology Oxigene Core Grant Focusing on the Tumor Microenvironment." Baylor University funded undergraduate research in our laboratory with support in the form of an Undergraduate Research and Scholarly Achievement Program (URSA) grant to me for the "Biochemical Evaluation of Cathepsin Enzymes." I also received a summer sabbatical for the "Evaluation of Cathepsin K Inhibitors for Potential Application to the Treatment of Advanced Cancer."

Along with Dr. Pinney and his group, we are privileged to collaborate with a number of outstanding scientists including Dr. Bronwyn Siim, Dr. David J. Chaplin (Oxigene, Inc.) and Dr. Michael Hay (Auckland Cancer Society Research Centre School of Medical Sciences) in drug development, Dr. Ralph Mason and Dr. Li Liu (UT Southwestern Medical Center) in

biological imaging, Professor George R. Pettit (Arizona State University) in vascular disrupting agents, and Dr. Michael Horsman (Aarhus University Hospital) in biological evaluation.

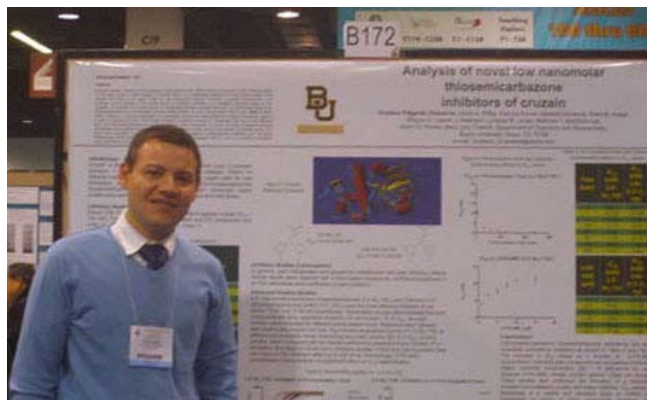
Our department chair, Dr. Pat Farmer, worked with Dean Lee Nordt toward the major equipment purchase of an isothermal titration calorimeter (ITC). The instrument is up and running, and is an important addition for the study of drug/protein, drug/DNA or RNA, and protein/protein interactions in the process of drug discovery.

In addition to graduate and undergraduate research, I taught Topics in Human Biochemistry (Che 4342) which is now offered in both the fall and spring semesters due to increasing enrollment in the biochemistry major, Undergraduate Seminar to a class of articulate and hard-working seniors, and Enzymology (Che 5348) which is always rewarding because I learn so much in updating the class. Melinda Soeung, Lindsey Snyder, and Victoria Soeung (mentored by graduate students Amanda Charlton-Sevcik and Gustavo Chavarria, and myself) worked on their Honors Theses in my laboratory this year.



In March, undergraduate Kimberly C. Mayes, who was mentored by graduate student Gustavo Chavarria and myself, presented a poster at Baylor University Undergraduate Research and Scholarly Achievement (URSA) Scholar's Week.

Microplate Analysis of Thiosemicarbazone Inhibitors of Cruzain Kimberly C. Mayes, Jacob A. Wiley, Gustavo E. Chavarria, Wara M. Arispe, Lauren J. Adamson, Lindsay M. Jones, Kevin G. Pinney, and Mary Lynn Trawick



Graduate student Gustavo Chavarria presented a poster at the National Meeting of the American Society for Biochemistry and Molecular Biology in Anaheim in April.

Chavarria, G. E., Wiley, J. A., Kumar, G. D. K., Arispe, W. M., Li, W., Adamson, L. J., Jones, L. M., MacDonough, M. T., Pinney, K. G., Trawick, M. L. "Analysis of novel low nanomolar thiosemicarbazone inhibitors of cruzain."

I attended and gave a presentation at The Tumor Microenvironment Workshop, 12th International Workshop (Hypoxia, Angiogenesis & Vasculature), in Toronto in May.

Mary Lynn Trawick, Kevin G. Pinney, Gustavo Chavarria, Amanda Charlton-Sevcik, Wara M. Arispe, Shen-En Chen, G. D. Kishore Kumar, Matthew MacDonough, Tracy E. Strecker, Bronwyn G. Siim, and David J. Chaplin, Initial Biological Evaluation of a New Series of Cathepsin L Inhibitors.

Mary Lynn Trawick, cont...

Other collaborative presentations include:

Kishore Kumar Gaddale Devanna, Lindsay M.

Jones, Jiangli Song, Matthew MacDonough, Elizabeth Cyril, Akash Desai, Grace Yoo, Elizabeth Conner, Wara M. Arispe, Gustavo Chavarria, Amanda Charlton-Sevcik, Tracy E. Strecker, Shen-En Chen, Mary Lynn Trawick, and Kevin G. Pinney, Design, Synthesis, and Biological Evaluation of Novel and Potent Thiosemicarbazone Based Cathepsin L Inhibitors, Abstract No. B1, Division of Organic Chemistry, 41st National Organic Symposium, The University of Colorado, Boulder, CO, June 7-11, 2009. (poster presented Monday June 8th).

Kevin G. Pinney, Mary Lynn Trawick, G. D.

Kishore Kumar, Gustavo Chavarria, Amanda Charlton-Sevcik, Matthew MacDonough, Grace K. Yoo, Ashleigh R. Locke, Wara M. Arispe, Bronwyn G. Siim, and David J. Chaplin, Synthesis of Functionalized Benzophenone Thiosemicarbazone Analogues as Inhibitors of Cathepsin L, The Tumor Microenvironment Workshop, 12th International Workshop (Hypoxia, Angiogenesis & Vasculature), Toronto, Canada, May 2-5, 2010 (oral presentation on Wednesday May 5th).

Jiangli Song, Lindsay M. Jones, Kishore

Kumar Gaddale Devanna, Elizabeth S. Conner, Gustavo E. Chavarria, Amanda K. Charlton-Sevcik, Mary Lynn Trawick, Bronwyn G. Siim, David J. Chaplin, and Kevin G. Pinney, Synthesis of a Series of Nonpeptidic Thiochromanone-based Thiosemicarbazone Analogs as Inhibitors of Cathepsin L Abstract No: MEDI 168, 240th ACS National Meeting & Exposition, August 22-26, 2010, Boston, MA (poster presented on Sunday August 22, 2010).

Lindsay M. Jones, Jiangli Song, Audra L.

Johansen, Adam K. Jantz, Gustavo E. Chavarria, Amanda K. Charlton-Sevcik, Mary Lynn Trawick, Bronwyn G. Siim, David J. Chaplin, and Kevin G. Pinney, "Thiosemicarbazone Derivatives of

Functionalized Tetralone, Indanone, Chromanone, and 2,3-dihydroquinolinone Scaffolds as Inhibitors of Cathepsins L and B" Abstract No: MEDI 169, 240th ACS National Meeting & Exposition, August 22-26, 2010, Boston, MA (poster presented on Sunday August 22, 2010).

Presentations and Research Discussion by members of the Pinney and Trawick Research Groups during visits to Baylor University by individuals from Oxigene Inc. on June 17-19, 2009, October 4-6, 2009, Nov. 4-6, 2009, and July 29-31, 2010.

Our publications are listed below:

Rajendra P. Tanpure, Amanda R. Harkrider, Tracy E. Strecker, Ernest Hamel, Mary Lynn Trawick, and Kevin G. Pinney, Application of the McMurry Coupling Reaction in the Synthesis of Tri- and Tetra-arylethylene Analogues as Potential Cancer Chemotherapeutic Agents, *Bioorganic and Medicinal Chemistry*, 2009, 17, 6993-7001.

G. D. Kishore Kumar, Gustavo E. Chavarria, Amanda K. Charlton-Sevcik, Wara M. Arispe, Matthew T. MacDonough, Tracy E. Strecker, Shen-En Chen, Bronwyn G. Siim, David J. Chaplin, Mary Lynn Trawick and Kevin G. Pinney, Design, synthesis, and biological evaluation of potent thiosemicarbazone based cathepsin L inhibitors, *Bioorganic and Medicinal Chemistry Letters*, 2010, 20, 1415-1419.

Rajendra P. Tanpure, Tracy E. Strecker, David J. Chaplin, Bronwyn G. Siim, Mary Lynn Trawick, and Kevin G. Pinney, Regio- and Stereospecific Synthesis of Mono β -D-Glucuronic Acid Derivatives of Combretastatin A-1, *Journal of Natural Products*, 2010, 73, 1093-1101.

Kevin G. Pinney, George R. Pettit, Mary Lynn Trawick, Christopher Jelinek, and David J. Chaplin, Chapter 3 entitled: The Discovery and Development of the Combretastatins. Book (second edition) entitled: Antitumor Agents from Natural Products, edited by David Kingston,

David Newman, and Gordon Cragg,
CRC Press, Taylor and Francis Group,
Boca Raton, Florida. Submitted March
6, 2010; Accepted June 22, 2010.

G. D. Kishore Kumar, Gustavo E. Chavarria,
Amanda K. Charlton-Sevcik, Grace K. Yoo,
Jiangli Song, Tracy E. Strecker, Bronwyn
G. Siim, David J. Chaplin, Mary Lynn
Trawick and Kevin G. Pinney, Functionalized
Benzophenone, Thiophene, Pyridine, and
Fluorene Thiosemicarbazone Derivatives as
Inhibitors of Cathepsin L, *Bioorganic and
Medicinal Chemistry Letters*, (Submitted: July
12, 2010; Fully Accepted September 7, 2010).

In addition to departmental committees,
I served on the university Institutional
Biosafety Committee (IBC).
Former graduate students, Dr. Maryuri
Roca accepted a faculty position in the
Department of Chemistry at Lawrence
University in Appleton, Wisconsin, and Dr.
Shen-En (Sam) Chen accepted a postdoctoral
fellowship in the laboratory of Professor
Ernesto Freire in the Biology Department
at the Johns Hopkins University.



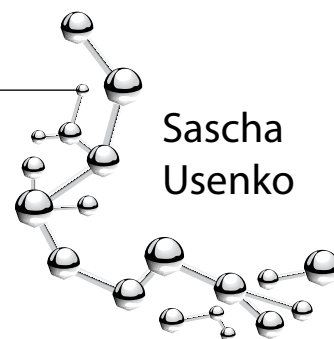
*Protein (tubulin) purification team. Gustavo,
Tracy, Amanda, Aaron, Samuel and Justin.*

This past year has gone by with
amazing speed. After a busy
year of proposals, publications,
presentations, and hires, I can
honestly say that I love my job.

My laboratory has published
three manuscripts, just
submitted a fourth, and is the
working on five additional
manuscripts. I am very proud
of all three manuscripts
published this last year, however
I am exceptionally proud of
a manuscript published in
Environmental Science and
Technology titled "Sources
and Deposition of Polycyclic
Aromatic Hydrocarbons to

Western U.S. National Parks".
In this article, my co-authors
and I were able to identify
and track polycyclic aromatic
hydrocarbons from specific
emission sources to remote
high-elevation perched
lake systems located in U.S.
National Parks. Specifically,
in Glacier National Park,
Montana we were able to
identify a local aluminum
smelter as the major polycyclic
aromatic hydrocarbons
source for the park.

I am currently advising three
graduate students, a post-doc,
and one undergrad research



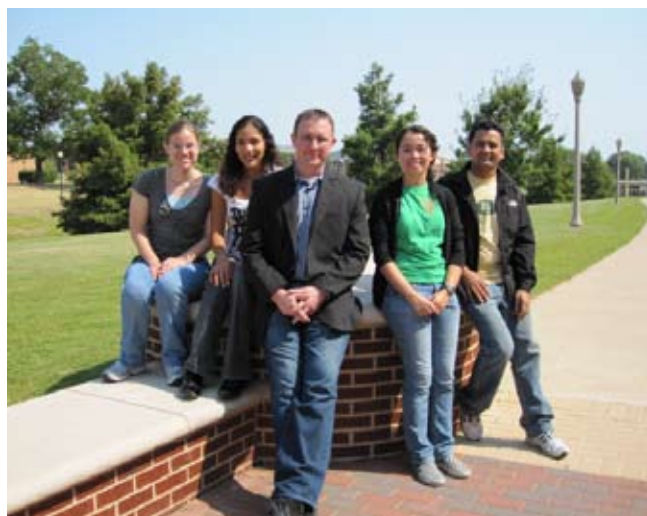
Sascha
Usenko

assistant. My post-doctoral
researcher, Olga Furman,
just arrived on campus this
summer. She is being advised
by Boris Lau of Geology and
myself and we are extremely
pleased and fortunate to have
her working with us. Two of
the three graduate students
presented at last year's national
Society of Toxicology and
Environmental Chemistry

Sascha Usenko, cont...

conference held in New Orleans, 2009. I believe that it is important for students and Baylor to do well at national and regional conferences. Eleanor Robinson, who is one my graduate student won first place for Best Oral Presentation in a regional SETAC conference. This November my entire laboratory will present at the national SETAC conference held in Portland, Oregon. I am originally from Oregon, therefore I am excited to go back and show off some of my students' hard work. I encourage all of my advisees to pursue scholarships and other funding opportunity. I am happy to say that this year my three graduate students received five scholarships/ small research grants for a total of ~\$27,000.

Crystal, my wife, and I are also working on our first manuscript together. This is a fairly rare opportunity that was just too good to pass up. I am an analytical chemist and she is a mechanistic toxicologist, hence we are a good match. Our research interests crossed paths with brominated flame retardants, a hot topic of environmental concern. Our laboratories were able to determine rates of uptake for different flame retardants and their major metabolites. These manuscripts are still in draft form, but so far the data looks great and should result in a Usenkos' et al publication.



The Usenko Research Group, 2010: Jessi Carrothers, Lissette Aguilar, Sascha Usenko, Eleanor Robinson, and Bikram Subedi.



Crystal and Sascha Usenko at Independence Pass, CO

Lecturers' Articles

I just celebrated my first year at Baylor and our first year in Texas! I can still remember the long but memorable drive from Storrs, Connecticut, to Waco with my husband, Fernadel, and my daughter, Jen, accompanying me. After 8 years of snowy winters, we were excited to experience a winter without snow but it seems that the white stuff is following us – last winter, it snowed in Texas. Early this year my parents came down from Montreal, Canada to join us in celebrating my daughter's graduation from high school.

As for my first year of teaching at Baylor University, it was great. I teach Introductory Chemistry and Introductory Organic and Biochemistry. The majority of the enrollees taking Introductory Chemistry are pre-nursing students while Introductory Organic and Biochemistry is taken by nutrition majors. I enjoy teaching these courses because I am able to apply the methods and techniques that I learned from teaching in an experimental three-semester general chemistry

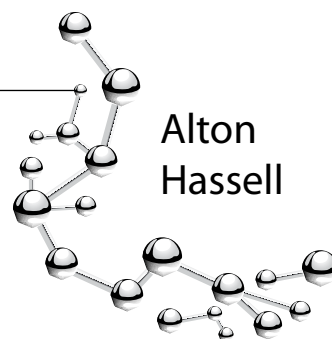
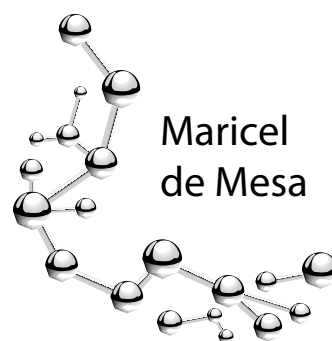
In addition to teaching my normal General Chemistry and Chemistry and Society courses, I made a speaking tour for the American Chemical Society and did some writing. I wrote articles for Salem Press's encyclopedia type books, did reviews of chapters of several text books, an accuracy check of the Instructor's manual for McMurray and Fay's *Atoms First* text and an accuracy check of the solutions manual for Gilbert, Kirss, Foster, and Davies *Chemistry* text.

For the ACS tour, I gave talks on "CF-252 Plasma Desorption Mass Spectrometry" to the Western Carolinas Section, March 1, on "Chemistry Appreciation 100" to the Carolina-Piedmont section, March 2, and on "A Chemist Wanders into Archaeology" to the Savannah River section,

course developed at the University of Connecticut.

That course was designed for diverse classes of historically underrepresented minority students, late bloomers, and women who struggled in their high school math and science subjects.

Last summer, I was one of the participants in the Summer Faculty Institute along with fifteen other faculty members of Baylor University coming from various fields of disciplines. The institute was sponsored by the Academy of Teaching and Learning with Dr. Thomas Hanks, Dr. Lenore Wright, Dr. Gardner Campbell as facilitators. I enjoy teaching at Baylor and I look forward to meeting more students and also more of those who were students once.



March 3, the Middle Georgia section, March 4, and the Northeast Georgia section, March 5.



Alton Hassell, cont...

1 article (Hanford Nuclear Reservation) for *The Forties in America*, Salem Press, 2010

6 articles (David Barclay, Robert Bass, Richard Mellon, John D. Spreckels, James Stillman, and Louis Swift) for *Great Lives from History: The Incredibly Wealthy*, Salem Press, 2010

5 articles (Gertrude Elion, Rosalyn Yalow, Richard Axel, Seymour Benzer, and Bela Schick) for *Great Lives from History: Jewish Americans*, Salem Press, 2010.

1 article (Adrianna Ocampo) for *Great Lives from History: Latinos*, Salem Press, 2010.

4 articles (Atomic energy Commission, International Atomic Energy Agency, Nuclear Regulatory Commission, and Price-Anderson Act of 1957) for *Encyclopedia of Environmental Issues, Revised Edition*, Salem Press, 2010.

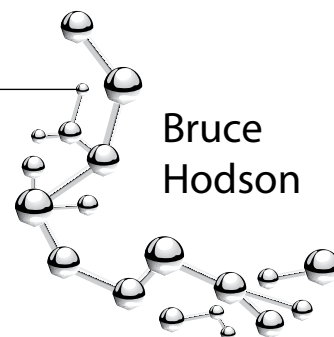
Home and Family

For my wife and I, this past year has seen perhaps the biggest possible change in our lives with the happy arrival of our first child, Alexandria Isobel McCall Hodson. After an initial shaky start, 'Alex' has developed in leaps and bounds, and is currently the proud owner of two front teeth (see picture below for the initial breakthrough), is standing up, and showing signs of taking her first tentative steps. Parenthood so far has been both challenging and supremely rewarding. Keri



and I could not be happier, and count ourselves truly blessed to have such a happy and healthy baby.

During the summer we took a trip to the U.K., where my father was reduced to tears on meeting his first grandchild. The separation from 'home' has been difficult for all concerned, though I am, as ever, supported by my Baylor family.



Specific to myself, I continue to be inspired by the vertical world, and am pleased to have progressed to another level in my rock climbing career with ascents of 'House of Pain' and 'Lord of the Dance' at Reimer's Ranch State Park near Austin, TX (see photo below). It should be noted that since the arrival of Alex I have not made the time commitment required to maintain this level of fitness, though I can think of no better reason to let this part of my life 'slip' somewhat.



The imposing bulge of 'House of Pain' at Reimer's Ranch, near Austin, TX.

Teaching and Service

I continue to take great pleasure in finding new (and where possible, amusing) ways to illustrate concepts in chemistry. It seems that being British (in particular having this peculiar accent) is a benefit when lecturing in the U.S., and I hope to have broadened both the cultural and comical horizons of at least a few students during classes. I was pleased to be nominated for the National Society of Collegiate Scholars 'Inspire Integrity Awards' 2010 as a result of my efforts.

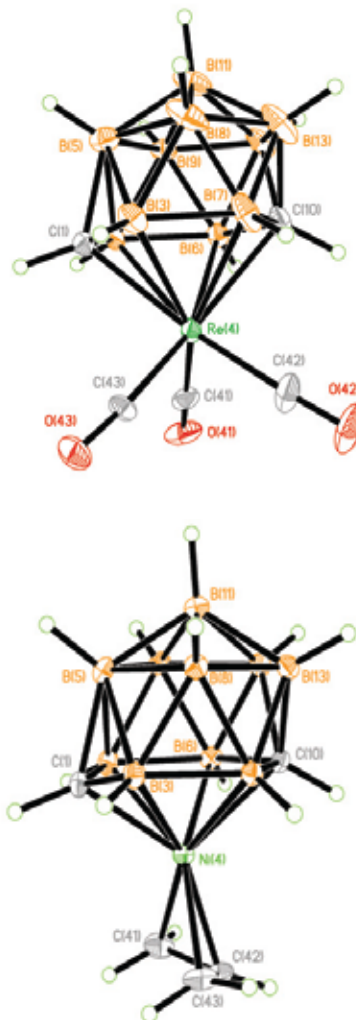
As faculty advisor to both Martin Hall of residence and the Baylor Rock climbing Team, it has been my great pleasure to interact more closely with the student body at Baylor. The relationships I have built over the years with many students are certainly one of the greatest perks of my job.

Research

I have been fortunate in successful collaborations with other members of the Welch Chair group for a number of years. The most recent publication appeared in early 2010 in *Organometallics*, and dealt with rare examples of paramagnetic metallamonocarboranes.¹ I was also involved with the Salem press publication 'Great Lives From History: Inventors and Inventions', for which I wrote biographies of both Willard S. Boyle and Joseph Gay-Lussac.²

Also this academic year, my own research with Brandon Wold (an undergraduate Honors Thesis student) has finally started to produce some very nice results after many weeks of frustration. We have succeeded in synthesizing two novel supraicosahedral metallocarboranes with 4,1,10-MC₂ cluster geometry (see structures). Less than 10 examples of this architecture have been reported, and the chemistry of such species has yet to be explored. In an attempt to redress this imbalance, we have begun preparation of derivatives of the nickel-containing compound. There are some exciting avenues to be explored here. These compounds are richer in boron atoms than their icosahedral counterparts, making them candidates for Boron Neutron

Capture Therapy (BNCT) in the treatment of brain tumors. Additionally, the antipodal distribution of the {CH} units lends itself to the formation of polymeric materials not accessible from other isomers. Watch this space!



Supraicosahedral Rhenium- (top) and Nickel- (bottom) containing metallocarboranes prepared by undergraduate honors student Brandon Wold, Fall 2009 / Spring 2010.

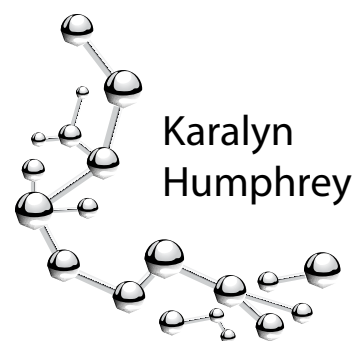
1. Adams, C.; Franken, A.; Hodson, B. E.; McGrath, T. D.; Stone, F. G. A. *Organometallics*, 2010, 29(10), 2377–2380.
2. Hodson, B. E. 'Willard S. Boyle'; 'Joseph Guy-Lussac' in *Great Lives From History: Inventors and Inventions*, Salem Press 2009, 124–126, 419–422.

My duties as a Lab Coordinator are somewhat dynamic as different needs arise within the department. They currently include managing the teaching labs and assisting the TAs in doing their jobs smoothly and effectively. In addition to this, I serve as Instructor of Record for the department's liberal arts laboratories, Chem 1100 and Chem 1146. I also serve as the department's Safety Officer, where I'm in charge of ensuring



the department is in compliance with the federal, state, and local safety regulations. I'm also in charge of training departmental personnel in safe practices, and I keep records of and investigate all accidents that occur in the department. I've been involved in a few publishing projects dealing with Chemistry texts, and these have included writing a study guide to accompany a text by Averill & Eldridge, revising textbook companion websites, reviewing new materials, and revising textbook supplemental media content. I'm currently waiting for the next project to come my way...

This past year has been a busy one in my little corner of the universe. We proposed, got funding for, and then launched the

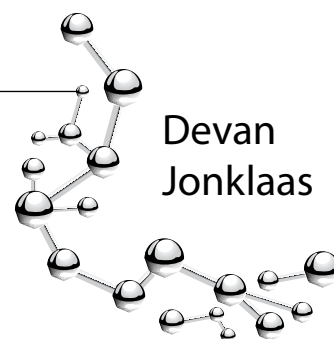


new general chemistry lab sequence of Chem 1101 and 1102 (see related article in this newsletter). There have been changes in the university safety program, as well as an EPA audit of the university – and these kept the safety side of things busy.

The upcoming year looks to be just as busy, as we move through our first year of teaching the new labs, and we continue to revamp our safety program. One thing is certain – I will not be bored.

The 2009 to 2010 school year had been a very productive year for my family. Our biggest “production” has been a little baby daughter whom we are expecting in mid October! Hannah and I are incredibly thankful for this amazing miracle, especially after having endured years of trying to get pregnant and several failed pregnancies. We can attest to the fact that God loves us and hears the entreaties of His children! Truly, the Father turns our weeping into jubilation

(Psalm 30:5)! Even before being born, Mia Grace has already won her daddy's heart! Our waiting has only made savoring pregnancy even greater, and we have cherished every sonogram, Doppler-heartbeat and tiny kick against mommy's tummy! A chemistry-shaded highlight from our pregnancy: As someone who knows O-Chem./ Biochem., I have been acutely aware of the susceptibility of the fetus to medication (especially in the first trimester) and poor Hannah has had



to bear with my scrutiny of every drug she has wanted to take (including those prescribed by our OB/GYN)!

The last academic year has also been one of moving and travelling. Our mortgage rate



changed, and Hannah and I decided to sell our house and buy a new one instead of refinancing. This led to the time-consuming task of getting our home prepared for sale as well as searching for the “perfect” house to buy. Unfortunately, we only found a buyer in the middle of the Fall ’09 semester! It also took us looking at over forty houses before we found one that we liked! So about two months before Thanksgiving, I had the unenviable task of teaching three classes, fixing-up a house for sale and getting ready to move! Highlights of this time involved waging war against a hidden roof rat infestation in our home for sale and bounding into our new home right after closing only to be met by the stench of pet urine. This was a huge surprise (it had been imperceptible during previous visits) and was the result of urine stained carpets (I wish I knew the formula for the wonder-chemical that they had

used to disguise it – as I could market it for millions)! With the intuition of a chemist (that urine will absorb in the UV due to proteins!), I sequestered the O-Chem. Lab’s UV light to see how badly stained the carpets were – only to find (to our horror!) that the carpets littered with white, UV-fluorescent spots! This was a hitch that we had to overcome (which

we did by replacing all carpet with wooden flooring), but are now happily settled into our new home! Next, the task of getting the baby room ready!

We have also travelled to many places in the 2009-2010 school year! This has included trips to the pine forested mountains of Ruidoso, New Mexico where Hannah’s parents have a cabin and also vacationing with them in beautiful Saco, Maine. The Saco trip included a visit to Boston and I was really fascinated by how much the city participated in the foundation of US political thought and nationhood. (Yes, I walked the history-twined Freedom Trail... twice!) One of our New Mexico trips included a visit to Carlsbad for a family reunion that gave us a chance to experience the wonder of the Carlsbad Caverns and see one of the world’s largest underground chambers. I also took a trip to UAE and Sri Lanka this August

for an aunt’s wedding. This trip allowed me to visit Dubai, where my immediate family live and where I also lived when in junior high. Highlights of my time in Dubai included seeing my brother after four long years, meeting his just-married wife, eating great Lebanese and Indian food and standing at the base of the world’s tallest building! I hadn’t been to my homeland of Sri Lanka for six years, and highlights of my trip there included seeing my fifty-something aunt get married for the first time (and being the second photographer for her wedding!), eating curry and seeing family and friends who I hadn’t seen for a very long time!

Professionally, the past academic year has been productive as well. I have taught three biochemistry classes in the Fall and Spring, plus General Biochemistry in Summer I. This has included the development of a PyMol (molecular visualization software) based experiment for CHE 4142 and producing several video lectures to complement the General Biochemistry course. The latter resulted in a poster presentation on how to make video lectures at Baylor’s 2010 Educational Technology showcase (I can forward this information to anyone who is interested!). In Spring ’10, I was also one of six faculty members nominated by the Honor Council, the Academic Integrity Student Advisory Board, the Disciplinary Committee and

Devan Jonklaas, cont...

the Judicial Affairs Student Advisory Board to receive recognition “for promoting a culture of academic integrity” by the Baylor’s Office of Academic integrity, which was humbling. In addition, I was recently asked by Pearson to conduct a textbook review (my first!) of certain chapters of their Biochemistry text by Mathews, van Holde and Ahern, which I found very fulfilling. I have also written several recommendations to medical and dental schools on behalf of my students - and it is always a pleasure to receive positive comments from those who go on to these! One such email said

“...I am about to finish my 2nd week of med school - and I just had to drop you a line to tell you THANK YOU so much for how you taught biochem to our class. At the time, I sometimes thought it was a little too intense or detailed, but now that I’m taking biochem (called Molecular Medicine here) at A&M med, I realize that your dedication to making us learn the mechanisms and details is literally making all the difference in the world. I couldn’t have asked for a better preparation ... Anyone who has taken your class has a HUGE advantage here ... You did an excellent job preparing us...”
I take my job of educating

students in Biochemistry and preparing them for success post-Baylor very seriously and consider comments like these one of the highest honors of being an educator.

On a personal note, Hannah and I still attend Antioch Community Church (ACC) and really enjoy the fellowship and teaching! Hannah resigned from her post as ACC’s Pre-School Director as of August 1st (to get ready for the baby) and it has been strange walking in to church as purely members/attendees, rather than people connected to its inner workings!

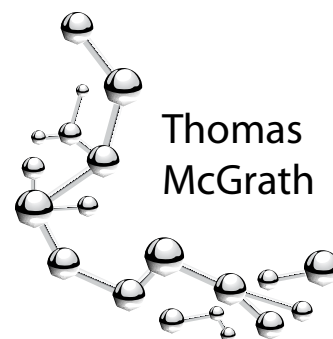


At the foot of the world’s tallest building, in Dubai, UAE!



A picture I took of Hannah at a lighthouse in Portland, ME in early August. I acquired a new DSLR over Christmas and it has allowed me to re-start pursuing photography as hobby.

The theme of the past year for me has been “Change.” At the beginning of the summer our son took his first small steps towards spreading his wings when he started pre-school. A few days later, our daughter was born!



Looking back to that time, and the intervening months, it is truly amazing how much can happen in such a short time – especially in the lives of children. The end of this academic year sees the beginning of big changes in our research group with the imminent retirement of Professor Gordon Stone, the Welch Chair and leader of the group, and my research mentor since arriving at Baylor University almost eleven years ago. To mark Gordon’s retirement, and to pay tribute to his remarkable career and many contributions to chemistry, the Department hosted a symposium in his honor at the end of May. I had the pleasure there of presenting a paper surveying highlights from the group’s work in metal–monocarborane chemistry. It was a privilege to be part of what was a truly unique gathering.

Teaching continues to occupy most of my time, with the majority of students that take Chemistry 1302 passing through one of my five sections (two in the fall and three in the spring)! Last fall I again taught the senior lab course in inorganic chemistry, and have had mentored several undergraduate students that worked with our research group throughout the year. One of these, Tara Molina, is working towards her Honors Thesis. Meanwhile, this summer sees our graduate student Robin McCown defend her M.S. thesis prior to graduating in August.

This past academic year marked my fourth year on the faculty of the Department of Chemistry and Biochemistry and inevitably the end of the spring semester was a little emotional as I wished farewell to a number of students who had sat in my class as freshmen on my very first day of teaching at Baylor. Some were heading

to medical school or other professional schools, some to graduate school, and some were venturing out into the world. Two students that had also worked in our research group during their time here came to visit me on the morning of their graduation to say goodbye – a small gesture, but one that was very much appreciated. It serves as a reminder of how much of an impact we can have on the lives of those in our care.

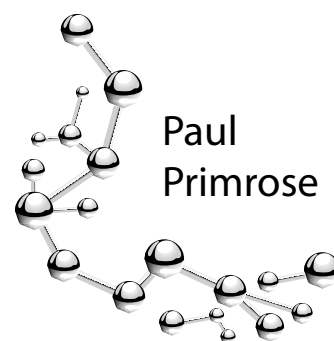
Presentations:

- “*Synthesis and Reactivity of 9-Vertex Iridium–Monocarborane Cage Complexes.*” R. A. McCown, T. D. McGrath, and F. G. A. Stone, presented at the ACS Southwest Regional Meeting, El Paso, November 2009. (Poster)
- “*Metal Complexes of Monocarbon Carboranes: A Neglected Area...?*” T. D. McGrath, presented at the F. G. A. Stone symposium, Baylor University, May 2010.

Publications:

- Franken, A.; McGrath, T. D.; Stone, F. G. A. Ten-Vertex {*closo*-2,1,10-FeC₂B₇} Clusters with Intramolecular Imidate Linkages: Anchors for Supramolecular Construction. *Dalton Trans.* 2009, 7353–7355. (Communication)
- Franken, A.; McGrath, T. D.; Stone, F. G. A. Towards Supramolecular Assembly of Ten-Vertex {*closo*-2,1,10-FeC₂B₇} Clusters: Intramolecular Imidate Formation, Polymetallic and Polycluster Species. *Organometallics* 2010, 29, 2234–2247.
- Hodson, B. E.; Franken, A.; McGrath, T. D.; Stone, F. G. A. Paramagnetic Ten-Vertex Ferramonocarboranes. *Organometallics* 2010, 29, 2377–2380.

The temperature is finally falling, the rivers in central Texas are coming back to life and the Baylor Science Building is once again teeming with future doctors, pharmacists, and yes, even a few future chemists. I often wonder where some of those SI leaders, undergraduate researchers and memorable students of the classroom have gone; having had opportunity to work with them and befriend them becomes more special as the years go by.



My family and I were able to stop by and visit with Dr.

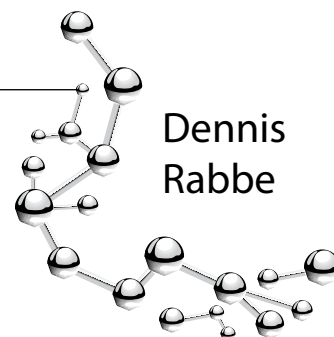
Jason Bell, a recent Baylor graduate, and his family in the Appalachian Mountains just near his home; it must be rough. It was great to talk shop with him and to watch the kids play in the downright icy creeks. If you are wondering, Benjamin is now nine, Liam is a newly minted seven, and Emmaline (my little pull-up girl) is five. It was great to hear of the things that Jason is dreaming up and doing in the chemical research lab that he works in.

Here at Baylor the spring of 2010 was active. Four undergraduate students worked hard in the lab to ensure that future organic chemistry lab manuals stay pertinent, stay fresh, and maybe a bit greener; which of course is a great color. Many of you who have gone through the CHE 3238 lab will be glad to hear that the classic KCN catalyzed method for benzoin synthesis has been replaced. As of this fall, we will now rely on the synthesis and use of a recently reported ionic liquid based catalyst for this reaction. Chris Czisch, who did the research to support this change, is now pursuing a master's degree in the biotechnology program at San Jose State University in California. Lastly, I want to report that at the fourth annual 2010 Educational Technology Showcase here at Baylor I was a winner! Presenting a poster and seeing how others are using technology to improve the learning experience for students was great, having my name drawn from a box and taking home a new computer monitor was even better! Well, if you sat in on my class and you want to drop a line to let me know how you are doing; please do, it would be great to hear from you.



My position is the lab coordinator for the science and prehealth major's laboratory courses and a part time lecturer.

At this point CHE 1316 which has been the introductory lab course for this group of students for more than thirty years is being phased out. This semester we have 8 sections with approximately 190 students and next semester the number is projected to drop back to 4 sections with about 100 students. The spring of 2011 is planned to be the last time the course will be offered.



Also, this is the first semester that the new freshman lab CHE 1101 is being offered in conjunction with CHE 1301. The enrolment started out at over a thousand students. At this point things are running relatively smoothly with a few glitches of course. Helping with the lab is Dr. Karen Humphrey. We have 10 lab instructors (PhD graduate students) who are the instructor of record for their sections. They are doing an outstanding job. We have a crew of undergraduate students helping with the grading of the virtual labs. Sheena Shipley is coordinating this endeavor.

Next semester CHE 1102 will be offered which is designed to give the students lab experience that will support material covered in the second lecture course CHE 1302.

CHE 1316 is a good course but out of place since it is not the freshman level lab course for general chemistry that it should be. The change was long needed and we are finally accomplishing the transition with the help of a lot of people in the department and in the University.

My training is in environmental science and analytical chemistry. I received my BS in chemistry from Texas A&M University, a MS in environmental science from Baylor University with Dr. Meryl Alexander as mentor and a PhD in analytical chemistry from Baylor University with Drs Kenneth and Marianna Busch as mentors.

My research interests include instrumentation, chemometrics and spectroscopy. I am



collaborating on several research projects and plans are in the making for others. We have available LabVIEW software for instrument control and data acquisition. For chemometrics, software programs available are Camo's Unscrambler and MATLAB with Eigenvector's toolkit.



Presently I reside on a farm and ranch near the small community of Coryell City where I grew up. I am still involved in production agriculture as a very expensive hobby along with restoring a 1967 Cougar GT.

I commute daily forty miles. The drive is pleasurable most of the time except when I forget my keys.



Feature

The F.G.A. Stone Symposium

The career of Distinguished Professor F. Gordon A. Stone CBE FRS has spanned over six decades, during which he has remained one of the most highly respected and cited inorganic chemists worldwide. His contributions to science (detailed in over 750 journal publications to date) have been many and fundamental, ranging from the chemistry of boranes and their carbon and metal containing relatives, to coordination and organometallic chemistries. He has held academic posts at many exceptional institutions worldwide, in both a tenured and visiting capacity. Most notably he spent 8 years at Harvard, and 27 years at Bristol University, the latter involving time served as head of the Chemistry Department.

Gordon's career at Baylor began in 1990, upon acceptance of the Welch Chair of Chemistry. His appointment signaled a new era for the department, as he stipulated the installation of an X-ray diffractometer, and a significant upgrade of the existing NMR equipment. Over the years his academic contributions have included over 120 journal articles published, and over 30 world-class researchers employed in his laboratories. The colleagues and friends he has made during his tenure have benefitted from Gordon's vast experience and his great ability to inspire.

The F. Gordon A. Stone Symposium was held in May of 2010, in recognition of Gordon's achievements, including the two decades of service to Baylor. Delegates travelled from across the globe in order to celebrate this extraordinary scientist and his career. Many of these were Gordon's former colleagues, collaborators or employees, though an equal number simply held a deep respect for his research.



*Professor F. Gordon A. Stone,
July 2010, Waco, Texas*

Gordon insists that his greatest scientific legacy is the more than 200 graduate students and postdoctoral workers he supervised over the last 57 years. Those attending the symposium included Gordon's most recent, Mrs. Robin McCown, who graduated in 2010, and one of his very first students, R. Bruce King, now Professor of Chemistry at the University of Georgia. A number of former postdoctoral workers were also present, including Peter Maitlis, the now retired Head of Chemistry at Sheffield University, who worked with Gordon at Harvard in the 1950s. Workers from 'the Bristol years' also appeared in the forms of Judith Howard (originally an undergraduate research student with Gordon), and Anthony Hill (a former postdoctoral worker), both of whom are now full Professors of Chemistry (Durham University and the Australian National University, respectively) and Fellows of the Royal Society.

A remarkably large percentage of those who have worked with Gordon over the years are now highly successful both in the academic and industrial chemistry arenas worldwide. Many will, in part, attribute success in their careers to Gordon's generous advice, support, and friendship.

*Stone Symposium Speakers,
Left to right, back row:
Patrick Farmer, Thomas
D. McGrath, Tony Hill,
Peter Maitlis, R. Bruce
King, John Fackler, Alan
Cowley, Ian Manners.
Front row: Larry F.
Dahl, Fred Hawthorne,
Judith A. K. Howard, F.
Gordon A. Stone, Marcetta
Darensbourg, Malcolm
Chisholm, Malcolm Green.*



Feature **Ken & Marianna Busch Retirement**

The department of chemistry and biochemistry held an appreciation dinner for retiring Dr. Kenneth Busch and Dr. Marianna Busch at the McMullin-Connally Faculty center. MC for the event was Dr. Pat Farmer. Dr. David Pennington made comments on their careers. Their distinguished careers began for Marianna

as a PHI KAPP graduate of Randolph-Macon Woman's College. She spent seven months at the University of Heidelberg involved with an organic practicum, a one-year Fulbright-Hays Fellowship at Victoria University in New Zealand Studying Mossbauer spectroscopy, and in 1972 completed her PhD at Florida State with Professor Ron Clark. She had four different fellowships. There she met Ken who shared a mutual interest in Chemistry and mathematics. Ken and Marianna were married and moved to Cornell University for postdoctoral appointments.

Ken accepted a position as assistant professor of chemistry at Baylor University in 1974 and rose through the ranks to full professor in 1988. Marianna began her career at Baylor with

a post doctoral appointment with Dr. Pennington funded by the Welch Foundation. She also won a competitive NSF fellowship research award under the direction of Dr. Thomas Franklin and Dr. James McAtee, Jr. After several lecturing stints in the department she was appointed Assistant Professor in the fall



Busch retirement, cont...

of 1977, and rose through the ranks to professor in 1991. She served as chair of the department from 1993 to 2006.

Ken began his journey at Florida Atlantic University earning a B.S. degree in Chemistry with a minor in mathematics. He received his PhD in analytical chemistry with Professor George Morrison at Florida State University and served as half time Assistant Professor there for the 71-72 academic years. Ken and Marianna Anderson were married and they both took post doctoral appointments at Cornell.

Marianna and Ken have some 59 peer-reviewed journal articles mostly published jointly, polished three books jointly and have at least 8 patents.

Dr. Stephen Gipson made comments He attended Baylor receiving his B.S. and took several courses taught by Ken and Marianna. Dr. Dennis Rabbe made comments representing the graduate side of the equation. He received his PhD in analytical chemistry in 2003 with Ken and Marianna as mentors. Ken also served on his committee for a M.S. in environmental science under Dr. Meryl Alexander here at Baylor. He mentioned misspelling Dr. Busch's name at the oral defense for the M.S. and the repercussions of the oversight. You can only imagine!

For all who spoke the common denominator was Ken and Marianna's philosophy of teaching emphasizing a meaningful experience for the students. Also, mentioned on several occasions was Ken's sense of humor. Whether it was faculty or students, his humor is remembered by all. It was common to see several students reading something authored by Ken and posted on his office window in Marrs McLean Science Building. Favorite topics included explaining his absence to attend a conference or vacation time by abduction by aliens or terrorists or satires of an issue on campus. Posters were also favorites for example "Darth Rabbe scourge of CHE 1316" in the image of Darth Vader of Star Wars fame. At the time Dennis Rabbe served as a TA for the course.

Later in the evening, Marianna pointed out that as for her and Ken as a team, she took the role of the "straight man". That may have been the outward appearance, but she had a sense of humor of her own.

Last but not least Ken and Marianna made comments on their experiences and aspirations at Baylor. In essence they came to Baylor University because of the size of the university, not too small and not too big, and for the most part the emphasis of offering a quality education in a Christian environment.

Marianna addressed her service as Head of the Department.

As pointed out by Dr. Pennington during her leadership the department expanded from 18 to 22 faculty, had external reviews for the purposes of revising the curriculum, and established a Center for Analytical Spectroscopy which she and Ken co-directed. Also, an expansion of research initiatives had begun. She was heavily involved in planning the new Baylor Science building. She was a role model for women pursuing careers in science. Someone once made the comment that "Women don't do chemistry". The response was "This one does!"

Ken and Marianna will be missed; we wish them the best in their retirement. From their comments their plans include traveling and writing with the emphasis on traveling. They live in Waco and no plans of moving are in the works. It may be fitting that the Busches retire at this point. One of the first directives Ken had when he arrived at Baylor was to design a course that would serve as the introductory general chemistry lab and a foundation course for analytical chemistry. Thus, CHE 1316 was born. It was revised in the late 80's by Dr. Marianna, Dr. Ken Busch and Dr. Stephen Gipson. Many premed and science majors considered it a "rite of passage" and the course took on a reputation of its own. The last time it will be taught is the Spring of 2011 after 37 years.

The Gooch-Stephens Lecture Series

The Gooch-Stephens Lectures were established in the Department of Chemistry and Biochemistry to pay honor and respect to the legacies of two former long-term professors and chairmen of the Department, Dr. W.T. Gooch and Dr. W.R. Stephens. These individuals played major roles in strengthening the foundation of research excellence that the Department continues to enjoy and were instrumental in the establishment of a graduate program in Chemistry that continues today to offer Ph.D. and M.S. degrees. Efforts to raise the initial endowment for this lecture series were championed by Dr. James C. Kirk, retired Vice President, Research and Development, Continental Oil Co. Numerous alumni, faculty, staff, and friends of the Department have contributed generously to support these lectures. To date, the annual Gooch-Stephens Lectures have featured the outstanding research contributions of forty preeminent scientists, many of whom have been honored with national and international awards including Nobel Prize recipients.

The 40th annual Gooch-Stephens Lectures of 2010 were presented by **Professor Nathan S. Lewis**, George L. Argyros Professor of Chemistry at the California Institute of Technology. Dr. Lewis received his Ph.D. in Chemistry from the Massachusetts Institute of Technology and later served on the faculty at Stanford University from 1981 to 1988. He joined the faculty at the California Institute of Technology in 1988, serving as Professor of Chemistry since 1991. He has also served as the Principal Investigator of the Beckman Institute Molecular Materials Resource Center at Caltech since 1992. He has received numerous awards, including the Fresenius Award in 1990, the ACS Award in Pure Chemistry in 1991, the Orton Memorial Lecture Award in 2003, the Princeton Environmental Award in 2003 and the Michael Faraday Medal of the Royal Society of Electrochemistry in 2008. His current research interests focus on artificial photosynthesis and electronic noses.

Professor Lewis gave two lectures during his visit: a research talk for the Chemistry Department entitled "'Sunlight-Driven Hydrogen Formation by Membrane-Supported Photoelectrochemical Water Splitting"; and a second talk for a general audience



of Baylor students and faculty entitled "Where in the World Will Our Energy Come From?"

Where in the world will our energy come from? What would it take for the world to get away from fossil fuels and switch over to renewable energy? It takes more than willingness to buy a Prius or to have solar panels installed on your roof. If we want to use wind, solar thermal, solar electric, biomass, hydroelectric and geothermal energy it will take a lot of planning, and willingness on the part of governments and industry. It takes R&D investment, a favorable price per unit of energy to get anyone to produce alternative energy, and plenty of resources to create those energy sources. These and other hurdles - technical, political, and economic - must be overcome before the widespread adoption of renewable energy technologies.

This year, we are pleased to announce that the 2011 Gooch-Stephens Lectures will be presented by Professor Peter G. Schultz (The Scripps Research Institute) on March 17-18, 2011. We welcome alumni and others interested to join us, please contact our department office for more information.

The W. Dial Black Family Lectures

This lecture series is designed to bring outstanding research scholars to the campus of Baylor University to present their work in areas related to cancer, Parkinson's, or other major diseases. A primary goal of the Lectures is to catalyze, through a seminar presentation and related discussions, an interest and passion in our students to consider pursuing careers in fundamental research and medicine that address these significant diseases.

This past year's W. Dial Black Family Lecture featured Professor Mina J. Bissell of Lawrence Berkeley National Laboratory. Dr. Bissell is a pioneer in the area of the role of extracellular matrix (ECM) and microenvironment in regulation of tissue-specific function with special emphasis in breast cancer, where she has changed some established paradigms. After receiving a Ph.D. in bacterial genetics from Harvard University, she joined the Lawrence Berkeley National Laboratory in 1972, became Director of Cell & Molecular Biology in 1988, and was appointed Director of all of Life Sciences in 1992. Upon stepping down as the Life Sciences Division Director, she was named Distinguished Scientist and continues in her groundbreaking research.

Dr. Bissell's lecture (given on February 18, 2010) was entitled: "The Importance of Tumor Microenvironment in Initiation, Promotion, and Therapy of Cancer"



Professor Mina J. Bissell (Thanks to Professor Bissell for the photo)



A wonderful lecture and delicious refreshments

The Lectures are made possible by the wonderful insight and generosity of Sadie Black. A survivor of two cancer occurrences and touched forever by the impact cancer had on her own mother, brother, and sister-in-law, Sadie Jo Black is passionate about finding cures for this dreaded disease. When she learned about the promising cancer research being conducted at Baylor, she was committed to enhancing these efforts. Sadie Jo Black has established an endowment that will provide a distinguished lecturer series focusing on preeminent research in cancer, Parkinson's disease, or other major diseases. The lectures will offer a valuable forum for students to interact with professional researchers and will enhance research opportunities through discussions with faculty and students. This type of setting nurtures fresh ideas for research and collaboration and enhances teaching. The W. Dial Black Family Lectures will truly enhance Baylor's reputation by bringing to campus multidisciplinary speakers in chemistry, molecular biology, and other suitable fields of interest to address diseases that touch the lives of many families. Sadie Jo Black graduated from Baylor University in 1950 and was an assistant professor at Baylor in the Family and Consumer Sciences Department, retiring in 1992 after completing 35 years of service at the university. She attended public schools in Teague, Texas. Her parents, Dial and Tula Black, instilled in her and her brother, William Dial "Dub," the love of God and His church and peoples, as well as the responsibility of sharing.

The W. Dial Black Family Lectures, cont.

The W. Dial Black Family Lectures Committee:

Committee Chair: Dr. Kevin G. Pinney

(Chemistry and Biochemistry)

Dr. David Pennington

(Chemistry and Biochemistry)

Dr. Frank H. Mathis

(Mathematics and Associate Dean for the Sciences)

Dr. James A. Marcum

(Philosophy and Director of Medical Humanities)

Dr. Myeongwoo Lee *(Biology)*

Dr. Mary Lynn Trawick

(Chemistry and Biochemistry)

Previous Lecture:

Professor George R. Pettit, Regents' Professor,
Department of Chemistry and Biochemistry,
Arizona State University, "From an African
Tree to Cancer and Blindness Clinical Trials,"
April 22, 2008.

Our Graduate Program is Growing

Our graduate program is clearly in a growth phase, both in terms of size and quality. We currently have 46 students in the program, despite having graduated eight Ph.D. students and one M.S. student in the past year (see bottom right).

Recruiting efforts are coordinated by our Graduate Committee (Professors Bellert, Chambliss, Kane, Kim and Klausmeyer) and department Chair Pat Farmer. This year's efforts included two Graduate Recruiting Weekend events, a GRE-based mailing, an Advanced Instrumentation Workshop, and aggressive follow-up of inquiries. Also, Alumni recommendations have been responsible for some of our recruiting success.

For the past two years, we have had two consecutive incoming classes of 13 students each. Our acceptance rate is impressive: for fall 2009, 93% of the students we made offers to accepted, and this year we had 81% choose to join our program. Most graduate programs have about 30% of their offers accepted. I attribute our success to excellent facilities and instrumentation, an enthusiastic research faculty, a nurturing departmental atmosphere, an improved base stipend (\$19k/year) and a reasonable living environment in Waco.

Graduates

August 2010

Degree	Advisor
Jose Boquin	Ph.D. Bob Kane
Scott Jason Dee	Ph.D. Darrin Bellert
Gerardo Elquezabal	Ph.D. Kevin Pinney
Gabriela Uzcategui	Ph.D. Bob Kane
Robin McCown	M.S. Gordon Stone

May 2010

Sheree Allen	Ph.D. Chuck Garner
Jason Bell	Ph.D. Chuck Garner
Vanessa Castleberry	Ph.D. Darrin Bellert

December 2009

Lekh Sharma	Ph.D. Kevin Chambliss
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Graduate program, cont...

This fall's entering class consisted of:

Babatope Akinbobuyi, University of Ibadan, Ibadan, Nigeria
Long Dao, Houston Baptist University, Houston, TX
John Gillis, Cameron University, Lawton, OK
Michelle Hentz, Southwest Texas State University, San Marcos, TX
Christine Herdman, St. Mary's College Indiana, Notre Dame, IN
Adam Mansell, Concordia University California, Irvine, CA
Marissa Penney, Texas Tech University, Lubbock, TX
Carrie Poe, Stephen F. Austin State University, Huntsville, TX
Chelsea Ruiz, University of Mary Hardin Baylor, Belton, TX
Yunhua (Keats) Shi, Beijing Normal University, Beijing, China
Blake Winn, Westmont College, Santa Barbara, CA
Adrian Zapata, University of the Incarnate Word, San Antonio, TX
Aaron Zimmer, University of Houston, Houston, TX

U.S. News and World Report ranked all chemistry graduate programs this year. There were about 197 programs ranked on a 1-to-140 scale (so ties were common). Our Ph.D. program ranked 94th, ahead of Texas Tech (107), U.T. Dallas (107), U.T. Arlington (129), the University of North Texas (140) and BYU (107), to name just a few. Graduate chemistry at Baylor is becoming more visible nationally, and there is much more to come!

Our Undergraduate Program

Chemistry/Biochemistry
Undergraduate Program

The undergraduate Chemistry/Biochemistry program at Baylor continues to be strong. There are 145 incoming freshmen who listed chemistry or biochemistry as their major. They will add to about 500 upperclassmen in the six chemistry/biochemistry degrees that are offered by the department. There are more biochemistry majors than chemistry majors.

There were 57 chemistry/biochemistry majors scheduled to graduate in 2010, in either May, August, or December graduation ceremonies.

The Chemistry/Biochemistry courses continue to be in

demand for many students.

The department is teaching 15 sections (1 honors) of 1301 with 1074 students. 1302 has 3 sections with 226 students. Both the organic lab, 3238, and the analytical lab, 1316, have 190 students. The 6 sections (1 Honors) of organic 3331 have 373 students. Organic 3332 has 2 sections with 92 students and the first biochemistry course has 3 sections with 209 students.

New this fall is the CHE 1101 lab course to accompany the first general chemistry course, CHE 1301. Alternating virtual laboratory assignments with in-lab assignments allows the department to teach a lab for the large number of freshmen

taking CHE 1301. Spring 2011 will be the initial semester of CHE 1102, the lab to accompany the second general chemistry course, CHE 1302.

Many of the 1301 and 1302 classes have SI leaders. This undergraduate leader attends class and provides two review sessions each week. In past semesters, data has shown that students that attend SI sessions perform better than students who do not attend. In addition to the Baylor referral system for students who are struggling, the graduate students of the department will tutor. There is a list of tutors on the website.

Many of the general chemistry teachers also use Mastering Chemistry, an online homework and tutorial program. Requiring the students to use Mastering Chemistry has proven to be very beneficial to many students. Some students don't realize that they need to review what they were taught in a high school course. Working through the Mastering Chemistry assignments provide a review of past material or a learning situation for new material.

Next fall the new analytical course, CHE 2216, will be

taught. It will be required of chemistry/biochemistry majors. The analytical chemistry course, CHE 1316, which did accompany general chemistry is being phased out with this coming summer the last time it is taught. The analytical division is designing the new course with the chemistry/biochemistry majors in mind.

Ken and Marianna Busch retired last spring. New to our faculty is Bryan Shaw, in bio-analytical chemistry. His B.S. in Biochemistry and Biophysics is from Washington

State University. His Ph.D. is in Inorganic Chemistry from University of California, Los Angeles. He did a post-doctorate at Harvard University.

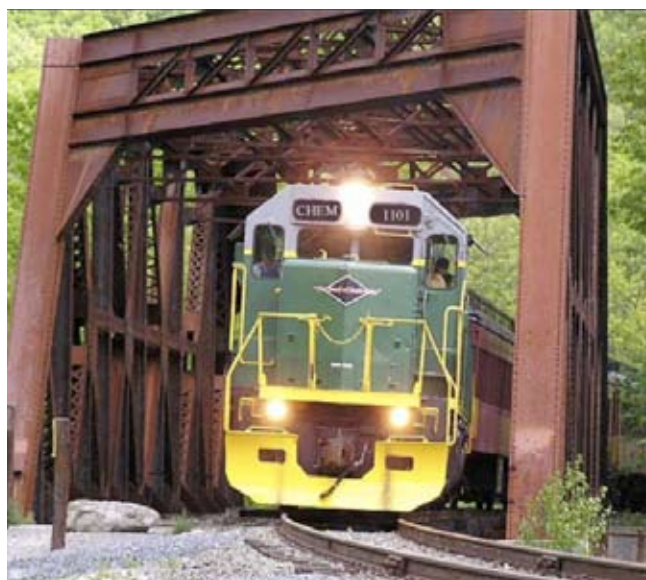
Another new plan has the lecturers doing the advising for the department. This frees the research faculty to concentrate more on research. All chemistry majors are being advised. Advising all biochemistry majors would be a large time and resource commitment, but is being discussed because it would be in the best interest of the student.

New General Chemistry Lab Sequence

After nearly a year of working to make it a reality, the Chemistry department launched the new General Chemistry lab sequence at the start of the 2010-2011 academic year. The fall semester saw the first class of Chemistry 1101 – General Chemistry Laboratory 1, with an approximate enrollment of 1,050 students.

The process for initiating this new lab sequence began a year ago with an idea and a feasibility plan, which soon evolved into a fully documented proposal that included justification for making the change, as well as cost estimates and a set of proposed experiments for the new course. The case was made that it was no longer feasible to have Chemistry 1316, Lab Measurements and Techniques, serve as the first laboratory exposure for our science majors, and that this new course sequence was needed.

The university administration approved the proposal in January of 2010 and then the focus shifted to the logistics of making the new courses a reality. The first step involved was to convert lab space that was already used for liberal arts



chemistry labs into space for the new General Chemistry labs. The liberal arts labs moved up into space formerly occupied by Chemistry 1316 – and Chemistry 1316 began to shrink as the new sequence went into effect. Then came the ordering, stocking of the labs, and various other duties that kept our laboratory coordinators busy and in need of caffeine through the spring and summer of 2010.

Chemistry lab sequence, cont...

Finally the big day came and the course launched, with 54 sections and a cadre of teaching assistants and graders involved with helping the course run smoothly. The course runs on an alternating schedule, with odd sections in lab one week while even sections do a “virtual laboratory” at home, and then they switch the following week. It’s this alternating schedule that allows us to have such a large lab course with the current space we have available.

In the spring, the course will switch to Chemistry 1102 – General Chemistry Laboratory 2, with

an estimated 600 students on a single schedule of eleven laboratory experiments. At the same time, an off-sequence version of Chemistry 1101 will begin in another lab room, once again filling space formerly occupied by Chemistry 1316.

For those of you wondering whatever is to become of the beloved Chemistry 1316 course— it will be transformed into Chemistry 2216, a more traditional Quantitative Analysis course for Chemistry and science majors. Gone are the days of burette-wielding Freshmen, but welcomed are the days of two semesters of General Chemistry lab experiences.

Advanced Instrumentation Workshop

In the Fall of 2009 the Department offered our fourth Advanced Instrumentation Workshop (AIW). This annual event has become a great outreach activity, as our faculty give hands-on training in state of the art instrumentation techniques to students and faculty from smaller liberal arts schools in Texas and the surrounding states. Since the first Workshop in 2007 we have hosted 70 students and 19 faculty from 19 different schools in the program! The 2009 workshop was the most successful yet, with 28 students and 12 faculty members attending. Seven of our faculty members offered Workshops, usually assisted by hard-working graduate students. The seven Workshops offered in Fall 2009 were:

Darrin Bellert: *“Laser based spectroscopic studies in a custom-built time of flight mass spectrometer”*

Kevin Chambliss/Alejendro Ramirez: *“Introduction to Mass Spectrometry: Fish on Prozac?”*

Chuck Garner: *“Advanced NMR: High Resolution, Multinuclear and Two-Dimensional”*

Gouri Jas: *“Molecular Modeling and Biochemistry”*

Kevin Klausmeyer: *“Small Molecule X-ray Crystallography”*

Pat Farmer: *“Fluorescence Spectroscopy”*

Sung-Kun Kim: *“Biochemical Chromatography/Confocal Microscopy”*

Besides being a great ‘service’ opportunity, the AIW has turned out to be an exceptional graduate recruiting tool. Several of our current graduate students, including Britian Bruner, Karen Lastovica, Matthew Byrd, Chelsea Ruiz, and Charlotte Poe, first visited our Department as part of the Workshop. We are looking forward to the 2010 AIW, which will be held October 29-30, and which will offer some new blood, with workshops organized by Sascha Usenko and Bryan Shaw.

Right: 2009 AIW students working in the Farmer group gloveboxes, supervised by Britain Bruner, AIW alum and current Farmer-group graduate student.





The Chemistry Graduate Student Assoc.

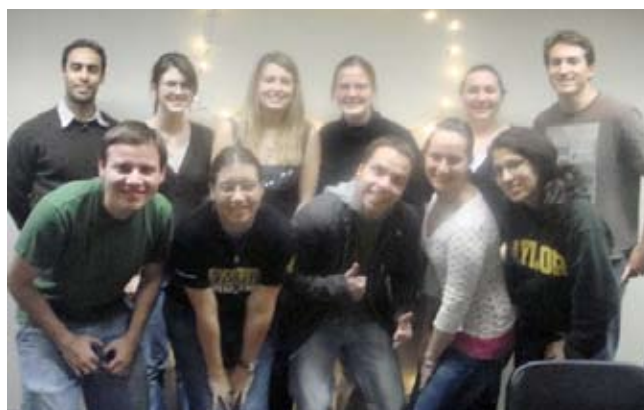
The Chemistry Graduate Student Association (CGSA) is a subsection of the larger Graduate Student Association. All members of the CGSA are graduate students within the Chemistry and Biochemistry department. Although we cater to our fellow chemistry students and the chemistry department, we do work with the GSA to plan events and act as advocates for all graduate students at Baylor. However our main goals are rooted in the subject that we love most; chemistry!

Our organization has 21 members this year. We have a group of officers who oversee our meetings, facilitate communication between students, faculty and the GSA as well as a treasurer and a historian. Our main purpose is to further the study of chemistry within the organization, department, university and the local community. We accomplish these goals by various means throughout the year. For example, last year we raised the budget for colloquium snacks from \$30 to \$50. Dr. Primrose allowed us to help him teach local boy scouts about chemistry and give them the opportunity to earn their own chemistry merit badge. During each semester we helped Dr. Garner host recruiting weekends where we talked to students about all aspects of graduate school such as academics, our chemistry community, and what is like to be a graduate student at Baylor. Around the holidays the CGSA organized a holiday party with games, treats and fellowship before the long Christmas break. In the spring we visited Mt. Calm middle school to perform some demonstrations for 7th and 8th graders in



order to teach them about important chemistry ideas. In April, CGSA formed a team for the Baylor Relay for Life event, where we raised for \$1,400 dollars to give to the American Cancer Society. Also we were able to give suggestions as to our fall colloquium speakers and invited two professors that we voted on to come give a seminar on their research. As well as much more!

Overall we are a group of dedicated students who wish to enhance our graduate school experience. We want to lead and serve



Graduate Student Association, cont.

Pictured on previous page: New graduate students, Michelle, Blake, Carrie and Christine at a graduate recruiting weekend we hosted last spring (top), and a group picture at the 2009 Holiday Party (bottom)



CGSA Relay for Life team, in April 2010



The Fall picnic in 2009 that the CGSA helped set up

The American Chemistry Society

The American Chemistry Society's student affiliates at Baylor are busy. They perform chemistry magic shows, judge science fairs, attend regional and national ACS conferences, and much more! For more information, contact the ACS Advisors: Rizalia_Klausmeyer@baylor.edu or Darrin_Bellert@baylor.edu.



Where in the world are you now?



We would love to know! Please complete the form on the back, fold in half, place a stamp, and put it in the mail. We will use this information to update our departmental files. You can also email your information to: Adonna_Post_Cook@baylor.edu

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Baylor University
Department of Chemistry and Biochemistry
One Bear Place #97348
Waco, TX 76798-7348

Personal Information Sheet

Department of Chemistry and Biochemistry

Name: _____ Class: _____

Degree(s): _____

Phone: _____ Email: _____

Mailing Address: _____

Type of Work: _____ Location: _____

Company Name: _____

Family Information: _____

Hobbies: _____

Interests: _____

Spare Time Activities: _____

Would you like to share information in our next newsletter? Yes _____ No _____

If yes, write information here: _____

Are you willing to speak to the Department?

Yes ____ No ____ If yes, write topic here: _____

Suggestions: _____



Aerial photo of Baylor Campus with Baylor Sciences Building (BSB) in foreground

Remember...

**We always welcome a
visit from our alumni!**



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DEPARTMENT OF CHEMISTRY AND BIOCHEMISTRY



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