

Reaching Out and Reconnecting



Greetings.

I would like to take this opportunity to introduce myself. My name is Josh Streufert and as Dr. Barnes alluded to in his opening letter I am the Graduate Student Recruiting and Communications Coordinator for the Chemistry Department. I am a proud graduate of the University of Tennessee with a B.S. in Biochemistry, Cellular and Molecular Biology (2002). I would like to emphasize the word proud. I believe pride is an essential characteristic to work in communications and student outreach. One must take pride in what they do and be proud in the institution they work for and in my case the institution that provided a solid education. I am a proud UT supporter and proud to be a part of the Chemistry Department.

When I arrived the Department had a well established recruiting effort which for the past five years was led by Dr. R.J. Hinde. The effort of R.J. and the various members of the recruiting committee over those five years should not go unnoticed. Their work and foresight helped establish a firm foundation of recruiting and outreach for the Department.

The recruiting effort of the Department is a multi-tiered initiative. My objective is to execute the plan of action and to maintain open lines of communication between outside faculty, potential students, those who would like information, and those within the UT community. We actively pursue opportunities for our faculty to give Outreach Seminars at schools all over the country, at no cost to the host school. This exposes potential graduate students to our faculty and their research as well as providing them information and an initial point of contact.

We continue to have great success with our Research Open House weekends which we host twice each Spring. These weekends allow students interested in Graduate Studies in chemistry to visit our Department. The Department has garnered much praise from visiting students regarding these weekends, often exceeding their expectations.

There has been an emphasis, as of late, to establish a connection to those schools which have provided us students in the past. We have begun an initiative which gives annual updates to the undergraduate mentors of our current graduate students regarding their academic successes and progress. Although this program is in its early stages the positive response we have gotten from various faculty from these schools shows we are heading in the right direction.

The Chemistry Department has also become involved in Undergraduate Open House hosted by the Office of Undergraduate Admissions every Fall and Spring. We also have become a presence at the Math & Science Regional Center Exposition each Spring. The MSRC program brings in area students in grades 5-12 and introduces them to the university environment and academic programs.

My presence here in the Department provides a resource for prospective students as well as support for the faculty as they participate in the outreach effort but I would also like to invite you, the alumni and friends of the department, to become a part of the outreach and recruiting effort. A positive message and encouragement from those currently a part of the department, and from our graduates in the outside world to prospective students can only benefit the department and its image.

The Chemistry Department moves in a positive direction for the future in uncertain times. We are making strides in solidifying an outreach and recruiting program that will show outstanding results in the areas of teaching and research for years to come. Again I invite you to become a part of this effort. If you have any questions or are interested in the Outreach and Recruiting efforts of the Department please contact me at jstreufe@utk.edu.

Be a part of the Vision

As stated earlier, it's been about 10 years since the department went through the exercise of asking itself where we are and where we are going. There are many reasons to spend the time and effort to do this but an important one is to present a strong and cogent argument justifying continued if not greater investment in the Department by the University. The context of such a discussion should always begin with the three missions of the department: to **teach** undergraduate, graduate and postdoctoral associates and prepare them for careers as professionals in science and chemistry, to foster **scholarship and research** in the area of chemistry and aligned fields of science and to provide **service** to the university and state of Tennessee through outreach, support of its industries and economy. The space that I have here does not allow for a full discussion of either a vision or a plan but we invite you to participate in the process and have established a web site for you to be kept abreast of our progress on this matter: www.chem.utk.edu/strategicplan.html. -Craig Barnes



Faculty Retirements



Professors (and spouses) **Ron and Lee Magid** retired this past summer. Ron had been on the UT faculty since 1970, and Lee since 1973.

Ron Magid was a New York boy whose psyche was scarred for life when his beloved Dodgers abandoned him. He (thus?) earned both his undergraduate and graduate chemistry degrees from Yale, with the Ph.D. under the direction of Prof. Bill Doering. After a postdoctoral stint at Stanford, he was on the faculty at Rice University until he joined UT in 1970. Ron has won numerous teaching awards over the years, inspired many students in their choice of chemistry as a career (including Prof. Bartmess of the Department), and undoubtedly saved us all from many future MDs with limited chemistry skills. He spent many years cheering on his now-favorite (ahh, fickle fandom...) Mets and football Giants, and writing the world's largest problem set for Molecular Mechanics.

Linda (Lee) Magid was an undergraduate at Rice

University, and received the Ph.D. at UT under the direction of Prof. John Larsen in 1973. She then joined the UT faculty. Her research has focused on the chemistry and structure of micelles and surfactants, with a special focus in the use of small angle neutron scattering as a tool, long before "neutron science" became a hot buzzword in East Tennessee. Lee also spent considerable time on the administrative side of the fence: she served as Associate Dean for Research in the College of Arts and Sciences from 1987 to 1990, and as Executive Assistant to the Chancellor, 1990-91; she was Vice-President for Research and Graduate Studies at the University of Kentucky from 1991 to 1994. She was the University's ORNL/SNS Liaison for Science and Technology and the Acting Director of the UT/ORNL Joint Institute for Neutron Sciences in the early 2000's. She went to NSF in 2004 as a rotator for the Special Projects program, and ended up as Senior Science Advisor for the Chemistry Division, and its acting Executive Officer for a period.

The Magids are enjoying retirement in Gig Harbor, Washington State, across the water from Tacoma and about 25 miles southwest of Seattle. Their UTK email addresses are still active. Ron says that he will use his retirement to catch up on memorizing all the baseball statistics and facts that he has not had the time for, since the

Submitted by Dr. John Bartmess

Dr. Al Tuinman, Director of Center for Mass Spectrometry from 1987 to 2006. Al retired in the February of 2006 and occasionally stops in to discuss current events and confer with Dr. Liguo Song, his successor. The Chemistry Department thanks Al for all his hard work and dedication.

Dr. Hongjun Pan left the Department of Chemistry in 2005 to become Director of the Department of Chemistry Instrumentation Facility at MIT. His 8 years of service at the University of Tennessee Department of Chemistry as NMR Director are truly appreciated.

Chemical Bonds

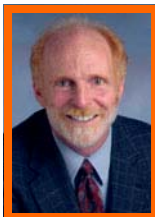
The University of Tennessee Department of Chemistry has unparalleled support from the University administration, many members of which are also chemists. Dr. Clifton Woods has been on the Chemistry faculty since 1974 and for several years has been the Vice Chancellor for Research at UT, Knoxville. In 2005 Dr. Bruce Bursten joined our fold both as a member of the faculty and Dean of the College of Arts and Sciences. Prior to his appointment as Dean Dr. Bursten was head of the Chemistry Department

and faculty member at Ohio State University. Also among our ranks is the University of Tennessee President Dr. John Petersen. He was provost and executive vice president for academic affairs at the University of Connecticut for four years before coming to UT. Prior to his time at UConn Dr. Petersen held faculty and administrative positions at Wayne State University and Clemson University. We are proud to call these men fellow Chemists.

President of the University of Tennessee and Chemist,
Dr. John Petersen

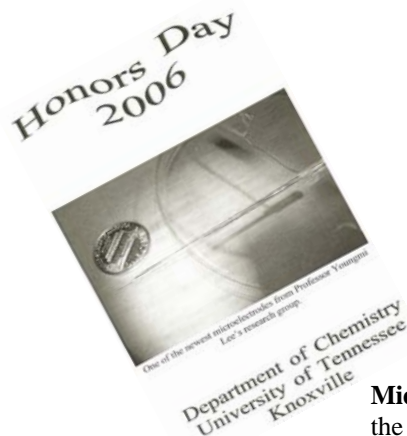


Dean of the College of Arts & Sciences and Chemist,
Dr. Bruce Bursten



Vn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
58.933	55.847	58.933	58.933	63.546	65.38	69.723	72.64	74.922	78.96	79.904	83.80
43	44	45	46	47	48	49	50	51	52	53	54
Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Pb	Bi	Po	At
98	101.07	101.07	106.42	107.868	112.411	114.818	118.710	127.46	127.46	127.46	127.46
75	76	77	78	79	80	81	82	83	84	85	86
Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	127.46
186.207	190.23	192.22	195.08	196.967	200.59	204.38	207.2	208.98	208.98	208.98	208.98

Faculty Focus - Dr. Youngmi Lee



Middle: Prof. Lee's microelectrodes were highlighted on the cover of the 2006 Honors Day program. **Above:** Prof. Lee (far left) speaks with a group of undergraduate students about her research in electroanalytical sensors.

As a part of the Department's annual newsletter we would like to highlight the research of a new faculty member. In this issue we would like to bring your attention to the research being done by Dr. Youngmi Lee. Dr. Lee joined the Department of Chemistry in 2004 as an assistant professor in analytical chemistry.

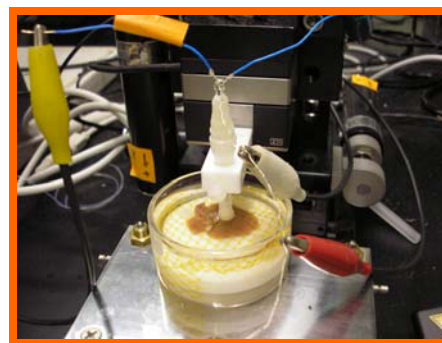
Research in Dr. Lee's group is focused on electroanalytical approaches to the investigation of various unknown biological and physiological processes with a particular emphasis on the development of novel electrochemical micro-(nano)-sensors. She describes her research as follows:

"Our research spans the disciplines of chemistry and biology. We study the microscopic structures and the corresponding functions of a variety of living biological samples (e.g., organ tissues, individual cells, etc.) and eventually, we attempt to clarify many critical and fundamental issues (but still unresolved) regarding various biological processes."

"Indeed, we develop various electrochemical microsensors which are capable of direct, real time, selective measurements of many physiologically important molecules (signaling molecules, amino acids, peptides, DNA, etc.). In addition to sensors selective for single species, we also develop multifunctional sensors for the simultaneous detection of two or three different species. These multifunctional sensors possibly provide more information for a better understanding of complex cellular mechanisms. We use these sensors coupled with scanning electrochemical microscopy (SECM, one of scanning probe microscopy) in order to explore dynamic biological behaviors with high spatial resolutions."

"For example, one of our microsensors is designed to measure the physiological levels of nitric oxide (NO) and carbon monoxide (CO). Both gases, naturally produced in mammals, are known to give diverse and important functional effects (e.g., vasodilation, inhibition of platelet adhesion and activation, and mediation of anti-tumor activity, etc.) on many biological and pathological processes. We adapt the developed sensor as a probe in SECM to obtain chemical images of living organ tissues (e.g., kidney, liver, cartilage, etc) in terms of the site-dependent tissue-generating NO as well as CO concentrations with concurrent topography."

"The photo shown below is a dual microsensor selective for NO and CO. The sensor is being scanned over a mouse (c57) liver to measure the independent concentrations of both gases as a function of locations. This experiment is being carried out for the purpose of studying the roles of NO and CO in liver related to ischemia-reperfusion injury and long-term graft survival which are important concerns in the transplantation of organs."



See highlights of other Chemistry Department faculty in upcoming issues of J.Chem.Tenn.



Dr. Adcock's research continues in the area of fluorine chemistry and currently involves the tribiological properties of perfluoropolyethers. Research involves the syntheses of prototype molecules for lubricants for use in extreme environments. The determination of structure-property relationships in a number of oligomeric analogs of prototype perfluoropolyethers are being investigated to provide data for computer simulations of the behavior of high performance lubricants in extreme environments. Other research involves preparation of perfluorinated poly-amantanes, a class of compounds accessible only by direct fluorination. These beautiful molecules present unique opportunities to study chemical bonding and phonon-photon interactions.

The focus of the **Barnes group** activities has changed rather dramatically in the last five years. Yes, we are still synthesizing molecules, but now, more often than not, we will be measuring surface areas and testing catalytic activities at 300 - 500°C than determining the X-ray structures. The group consists of Richard Mayes, Ming-Yung Lee, Geoff Eldridge, and Dustin Collier at the moment. Everyone is working on preparing new, heterogeneous catalysts supported on synthetic silica matrices. Rich and Geoff work with titanium, Ming-Yung with vanadium and Dustin with tungsten. Our lives revolve around trips to the National Synchrotron Radiation Laboratory where we perform XAS measurements for EXAFS analysis or measuring lightoff curves to see when our catalysts start to transform substrates into products in our gas phase flow reactor. Recent graduates from the group include Jason Clark and Suree Saengkerdsud, both of whom are working at ORNL on catalysis and materials science projects.

Professor Bartmess' research is currently focused on the thermochemistry of solvation of species in ionic liquid solvents, via solution calorimetry, and on computational chemistry of gas phase ions. The former area is "green chemistry"; these are proposed as replacements for volatile organic solvents, to reduce pollution. The latter is in support of the long-standing efforts of collecting and evaluating ion thermochemistry for the NIST Webbook (<http://webbook.nist.gov/chemistry>), with funding from that agency. The group consists of one graduate student (calorimetry) and one undergraduate (computations). The long-standing efforts in experimental gas-phase ion chemistry via ICR spectrometry await an interested grad student to continue.

Prof. Bartmess is now in his 20th year as Departmental Safety Officer, and thus has been known to run towards an explosion, instead of away from it, like a sane chemist would. He is currently in charge of the Organic division, on the Dean's Advisory Council, the campus Biosafety Committee, and oversees the Departmental Mass Spectrometry facility, along with the recently hired Staff Mass Spectrometrist, Dr. Ligu Song.

Dr. Best joined the faculty at UTK as an assistant professor of organic chemistry in the summer of 2005. Since then, he has been building up his research program. The Best Group currently includes five graduate students (Mary Coulter, Chi-Linh

Do-Thanh, Erin Losey, Meng Meng and Matt Smith) and four undergraduate students (Amy Pollard, Justin Reno, Chinenye Usoh and Tim Weatherall.)

The group is currently pursuing research in two major areas. In one project, analogs of cell surface phospholipids are being synthesized for application as probes for studying the binding of proteins to the cell membrane. In addition, the group is developing novel strategies for molecular sensing, with phosphorylated peptides and proteins being specifically targeted for detection. To date, much progress has been made in the synthesis of the described compounds, including the recent completion of the first phospholipid probe. Studies involving the resulting compounds are expected to commence soon.

Students in the group have received a number of honors in the last year. Justin Reno was awarded the C.A. Buehler Chemistry Scholarship, given to an outstanding chemistry student, and the D.A. Shirley Award in Organic Chemistry at the department's Honors Day Awards Ceremony. Both Justin and Amy Pollard were awarded summer undergraduate research fellowships funded by the Chancellor's Office, allowing them to perform full time research over the summer of 2006. Finally, Chi-Linh Do-Thanh was awarded a First Year Achievement Award at the department's Honors Day Award Ceremony. More information about the group can be found at our website: <http://web.utk.edu/~mdbest/>.

Dr. Kelsey Cook's research group is settling into another year. Dr. Cook will likely spend a 2nd year as a Program Officer in the Analytical and Surface Chemistry Program at the National Science Foundation. Activities there have included a lead role in organizing an upcoming (December) workshop related to the American Competitiveness Initiative, co-sponsored with NIST and NIH. ACI proposes to double government funding for fundamental research in the next 10 years. The Workshop (for which Kelsey recruited as chair chemist Mark Wrighton, Chancellor of Washington University in St. Louis) will seek to gather input from industry concerning research and educational priorities.

A paper derived from the Cook group collaboration with Ron Wetzel was one of the 8 most-cited fundamental papers in Alzheimer's research in 2005. ["Mapping A-beta Amyloid Fibril Secondary Structure Using Scanning Proline Mutagenesis," A.D. Williams, E. Portelius, I. Kheterpal, J. Guo, K.D. Cook, Y. Xu, and R. Wetzel, *J. Mol. Biol.*, 335, 833-842 (2004)]

There are many group member and alumni updates:

- Maolian Chen (Ph.D.) and Elizabeth Stewart (M.S.) defended theses the week of August 6. They remain for the time being in Knoxville, finishing a couple of papers each.
- Ph.D. alumnus Kevin Bennett has been granted tenure and named Chair at Hood College in Frederick, MD.

Mn	Fe	Co	Ni	Cu	Zn	Al	Si	P
55.845	55.847	58.933	58.69	63.546	65.38	26.9815	28.0855	30.9738
43	44	45	46	47	48	49	50	51
Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb
98	101.07	101.07	106.36	107.868	112.411	114.818	118.710	121.757
25	26	27	28	29	30	31	32	33
Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi
186.207	190.23	192.22	195.08	196.967	200.59	204.38	207.2	208.98

Faculty Updates

- Ph.D. alumnus Benji Prebyl completed law school at Franklin Pierce Law Center and took the Bar exam this summer. Results of the Bar were pending at last contact.
- Ph.D. alumnus Shaolian Zhou accepted a position from Thermo and will be stationed back in his home country of China, realizing a long-term goal.

Presently the **Compton group** consists of a mixture (enantiomeric excess) of chemistry (Jeff Steill, Andy Fischer) and physics (Nasrin Mirsaleh, Shaun Ard, Olga Ovchinnikov, Watheq Al'Basheer) graduate students working in the area of negative ion physics, chirality and atmospheric chemistry. Dr. Andy Fischer successfully defended his Ph.D. thesis in June and is presently employed as a post-doctoral student in the chemistry division at ORNL. Watheq recently defended his Ph.D. thesis and will soon take a faculty position at the Hashemite University in Amman, Jordan. All of these students were an important part of the highly successful DAMOP meeting hosted by UT and co-chaired by Compton and Dr. J. Macek (Physics Department) at the Knoxville Convention Center in May. Jeff Steill has presented a number of invited talks on Atmospheric Chemistry at the American Geophysical Union meetings. He has also recently performed research on IR absorption of the SF_6^- ion at the FELIX free electron laser in Utrecht, Holland.

Compton will present invited talks in Crete (ICCMSE 2006, *Experimental Searches for Minute Parity Violation Effects in Molecules*) and the Chicago ACS meeting (*Linear and Non-Linear Circular Dichroism*). He will also present a Keynote Lecture (*A History of Cluster Physics*) at a meeting on Size Selected Clusters (S3C) to be held in Brand, Austria in March 2007.

The Dadmun group has gone through many changes in the last few years. I have recently begun a joint faculty appointment with ORNL, and thus our research has begun to expand into the area of polymeric photovoltaics, where we will seek to use our expertise in multi-component polymer systems to create nanostructured polymeric materials with precise structure to enhance their photovoltaic properties. My family and I also spent the last year on sabbatical, the first six months at MIT with Prof. Ned Thomas at the Institute for Soldier Nanotechnologies, where I learned electron microscopy techniques and developed an understanding of the perspective of the military when it comes to funding research. I spent the second half of the year with Prof. Jörg Baschnagel at the Institut Charles Sadron in Strasbourg France, reinvigorating my computational research effort.

Our research continues to concentrate on multi-component polymer systems, where we are trying to develop methods to modify and control the structure of polymers on the molecular level to create materials with targeted properties. However, we have moved into the area of polymer nanocomposites, where we have developed an understanding of how to improve the dispersion of nanoparticles (carbon nanotubes, clays, quantum dots) in a polymer matrix, which translates into a dra-

matic improvement in materials properties. We have also concentrated on modifying and characterizing polymeric interfaces and surfaces. An off-shoot of this is a push into new areas of research, including developing new polymeric materials that are anti-microbial and understanding the chemistry of superglue fuming to develop latent fingerprints. You may have seen this process dramatized on popular forensic shows, such as CSI. The National Institutes of Justice recently funded this study and we are excited to begin to understand how we can improve the process so that forensic scientists can obtain better quality prints using this technique in the future.

Finally, the group has seen a large turnover, where Michael Arlen, Steve Wargacki, Kevin Rice, Scott Fontana, Nathan Crawford, Pradeep Kumar, and Charles O'Brien defended their theses in the last few years. Pradeep moved to ORNL as a Post-doc, Nate remained at UT as a post-doc for Prof. Adcock, Steve and Mike are both Post-docs at the Air Force's Wright Patterson Research lab, and Kevin, Charles and Scott all work for the FDA in Bethesda, Maryland. The group remains strong however, as they have been replaced by the current members that have joined in the last couple of years: Earl Ashcraft, Nathan Henry, Jack Lee, Dias Linton, Caleb Dyer, and Brian Bachner.

The research of **Dr. Charles Feigerle** remains strong and focused. He shares his time between the Chemistry Department and Oak Ridge National Laboratory. Dr. Feigerle will make the jump to administration this Winter when he becomes Associate Department Head in January.

Dr. Georges Guiochon has been a busy traveling the globe lecturing and presenting his research. In 2005, the Guiochon group published 35 papers in peer-reviewed journals and so far in 2006 they have published one book and 12 papers. The group has continued to attend the annual Pittcon and PREP meetings giving oral presentations and posters each year. Dr. Guiochon gave plenary lectures at the Balaton Symposium in Siofok, Hungary and at the 2005 meeting of the International Separation Science Society in Pardubice, Czech Republic. Lectures and seminars throughout the world allowed him to speak at the Universities of Ferrara in Italy, Uppsala in Sweden, and the Kyoto and Osaka Prefecture in Japan. Dr. Guiochon is also the 2006 chairman of the Scientific Committee of HPLC, the committee of which he was also a member in 2005.

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