

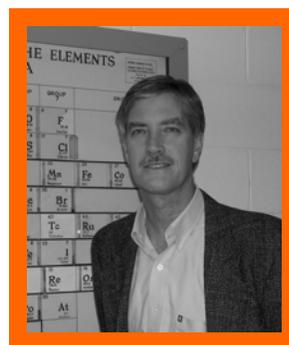
20 Ca 40.078 ^Δ		22 Ti 47.88 [†]		24 Cr 51.9961 ^Δ		21 Sc 44.95591		23 V 50.9415		25 Mn 54.938
38 Sr 87.62		41 Nb 92.9064		38 Sr 87.62	39 Y 88.9059		42 Mo 95.94	43 Tc (98)		
				56 Ba 137.33		73 Ta 180.9479		75 Re 186.20		

A Renewed Vision

Greetings,

It has been some time since you have seen the *J. Chem. Tenn.* and for that I apologize. The Department has undergone many changes since the last publication of *J. Chem. Tenn.* and I, in the spirit of renewal, would like to take the time to reconnect with all of you. I have begun another term as Department Head with a new vision strengthened by our faculty, staff, and students. Most of you may be pondering the question; "How is the Department doing these days?" Pretty well in fact but always striving to do better. The success of a research active department like ours depends on a number of factors: the quality of its faculty, its students, graduate and undergraduate alike, and its support staff. We have been able to replace all faculty who have retired in the last five years. This is a good sign since this has not always been the case in the past. While renewing and maintaining our faculty is a strong show of confidence by the university administration in the Department we anticipate that faculty retirements will continue at this pace for at least the next five years. Four new hires in the last five years and at least five more to come represent a turnover of almost 30% of our total faculty. It also represents an investment of well over four million dollars by the University in startup and lab renovations alone. In this context, you can see why we must continue to be seen as an excellent investment for the University in its future.

The success of a research active Department depends equally on the quality and number of graduate students within its program. As most of you who obtained degrees here will remember, you did most of the real research work while also playing a major role in our parallel mission of teaching undergraduates the wonders of chemistry. That fact has not changed. However, the new faculty already on board and those anticipated to arrive soon will require that our graduate program grow significantly in the next five years. Furthermore, we, like departments across the nation, are competing for a limited number of students interested in careers in chemistry and the sciences. This is a major challenge that all of us face and one that we are addressing in



Professor Craig Barnes
Head of the Department of Chemistry

more and better ways every day. These are the major reasons why the Department hired a full-time staff member, Mr. Josh Streufert to bring to life a major new recruiting effort that has begun in the department. More discussion on recruiting and outreach will be found inside.

All of the things described represent a few of the challenges we have faced over the past couple of years. But what about the future? There is again much to be optimistic about. The University President Dr. John Petersen has stated that the research missions of ORNL and UTK have and will become even more aligned in the future. The Department sits at a nexus of such initiatives with the development of the Governor's Chairs in the sciences, the Joint Institutes of materials, biology, computation, and neutron science between UT and ORNL which represent excellent opportunities for the Department. We will continue to play a leading role in these initiatives as they expand. It has been about 10 years since the Department has sat down and asked, "What's new and where are we headed?" i.e. a Strategic Plan. It is time we go through this exercise with the involvement of current faculty, students, and staff as well as alumni. Inside this newsletter you will read more about our immediate plans and our vision for the future. If you have ideas or comments that you think are appropriate to these plans, please let us know.

Craig



Honors Day 2006

April 27, 2006

As another year passed the department again recognized outstanding students, faculty and staff in the Chemistry department for their achievements. Graduate and undergraduate students alike received awards based on research, academic achievement and excellence in various areas of chemistry. In addition, many faculty were recognized for their achievements and appointments which occurred throughout the year.

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For errors, omissions, general inquiries and comments please contact Josh Streufert at jstreufe@utk.edu

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E-mail:chemistry@utk.edu

Graduate Awards

Carol Moulton ACGS Service Award

Kasey Hill - Nathan Henry - Nahla Abu-Hatab - James Gurley - Gary Wynn

John E. Bloor Award in Physical Chemistry

Jinbo Cao

D.A. Shirley Graduate Award in Organic Chemistry

Medhanit Bahta

Anthony T. Balchunas Award

Amber Wellman

UT Scholarly Activity Research Incentive Fund Research Assistant

Dejin Li - Jenny Oran

East Tennessee Section, ACS, Graduate Fellow

Amber Wellman

Hilton A. Smith Graduate Fellowship

Jeffrey Steill

First Year Achievement Awards

Meredith Cable - Julia Covington - Royce Dansby-Sparks - Chi-Linh Do-Thanh - Xueguang Jiang

The C.W. Keenan Outstanding Graduate Teaching Award

Deepli Kumar

Outstanding Teaching Award

Andi Barbour - Scott Borella - Dustin Collier - Amanda Jones

Research Merit Awards

Jinbo Cao - Samson Francis - Ming-Yung Lee - Dejin Li - He Qiu - Yu Zhu

The Burchfield Burrige Warner Graduate Fellowship in Chemistry

Peter Chapman

Gleb Mamantov Graduate Chemistry Scholar

Jenny Oran

Eugene John Barber Fellowship in Chemistry

Nathan Carrington

For a list of Undergraduate Award recipients visit www.chem.utk.edu/honors.html

Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
55.845	58.933	58.933	58.933	63.546	65.38	69.723	72.64	74.922	78.96	79.904	83.80
Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te			
101.07	101.07	106.42	107.868	112.411	114.818	118.710	121.757	127.60			
Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po		
186.207	190.23	192.22	195.084	196.967	200.59	204.38	207.2	208.98			

New Faculty Additions in 2004, 2005 & 2006



Dr. Youngmi Lee joined the faculty at Tennessee in 2004 as an assistant professor of analytical chemistry. She received her B.S. ('94) and M.S. ('96) from Ewha Womans University in Seoul, Korea. She earned her Ph.D. in Analytical Chemistry from University of Texas at Austin in 2001. Lee then performed post-doctoral research in chemistry at the University of Michigan in Ann Arbor.

Dr. Lee's research is in the development of new electrochemical microsensors.

Read more on Dr. Lee's research on page 13.



Dr. Frank Vogt joined the Chemistry Department in 2005 as an assistant professor of analytical chemistry. He completed his B.S. and Ph.D. in physics in 1997 and 2000, respectively, at the Technical University Karlsruhe (Germany). After spending one year as a research scientist at the FGAN-Institute of Optronics and Pattern Recognition located in Ettlingen, Germany he began a post-doctoral research fellowship at the School of Chemistry and Biochemistry at Georgia Institute of Technology. From 2003 to 2005 Vogt held a faculty research associate position at Arizona State University, Department of Chemistry.

Dr. Vogt's research interests are interdisciplinary and focus on optical sensing techniques and statistical data analysis.



Dr. Michael Best joined the faculty at Tennessee as an assistant professor of organic chemistry in 2005. He received his B.S. in chemistry from Boston College in 1997, where he worked with Prof. Lawrence T. Scott on the synthesis of fullerene derivatives. He received his Ph.D. in 2002 from the University of Texas at Austin, where he worked on the de-

sign and synthesis of fluorescent sensors for biomolecules in the lab of Prof. Eric V. Anslyn. Following this, he performed post-doctoral research with Prof. Chi-Huey Wong at The Scripps Research Institute.

Dr. Best's research generally involves the design and synthesis of molecules that can be implemented for studies or applications pertaining to biological systems.



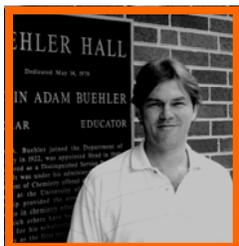
Dr. Shane Foister joined the faculty in the Fall of 2006 as an assistant professor of organic chemistry. Foister received his B.S. in Chemistry from the University of Kentucky in 1998, working in the laboratories of Professor Arthur Cammers on predictive aspects of peptide secondary structure. He completed his Ph.D. at the California Institute of Technology in 2003, under the supervision of Professor Peter Dervan, in the field of nucleic acid recognition. Dr. Foister then pursued postdoctoral studies at the University of Pennsylvania with the guidance of Professors Ralph Hirschmann and Amos B. Smith III.

Dr. Foister's research interests reside at the interface between chemistry and biology where the vast arsenal of synthetic organic chemistry can be directed by biophysical insights.

Read more about faculty members in the Faculty Update section located on pages 14-18.



4 Research Faculty Additions



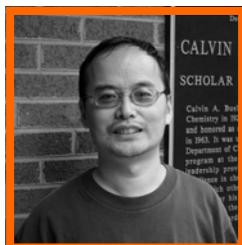
Dr. Carlos Steren - Director of NMR Facilities

Ph.D., University of Rosario, Argentina (1990)

Current NMR instrumentation available:

- A Varian INOVA 600 narrow-bore broadband system is used for multinuclear, multidimensional high-resolution NMR studies.
- A Varian INOVA 400 wide-bore system is used for solid-state multinuclear, multidimensional NMR studies.
- A Bruker Avance wide-bore system with micro-imaging accessory is dedicated to multinuclear, multidimensional high-resolution NMR experiments and to micro-imaging studies.
- Routine ^1H and ^{13}C NMR experiments are carried out using our Bruker AC250 spectrometer.
- A Varian Mercury 300 spectrometer is used in undergraduate and graduate courses; it has ^1H , ^{13}C , ^{19}F , and ^{31}P capabilities.

A firm foundation for research!



Dr. Ligu Song - Director of the Center for Mass Spectrometry

Ph.D., Lanzhou Institute of Chemical Physics, Chinese Academy of Sciences

Instrumentation in the University's Mass Spectrometry Center (housed in the Chemistry Department):

- Two Applied Biosystems mass spectrometers
- A QSTAR XL (quadrupole/TOF hybrid)
- A Voyager-DE Pro (MALDI-TOF).
- A Micromass Quattro-II triple-quadrupole mass spectrometer with electrospray capabilities
- A VG ZAB-EQ hybrid (magnetic sector + quadrupole) high-performance spectrometer with extended mass range (10 kDaltons), high-resolution (120 k), and full MS/MS capabilities.

40	27	28	29	30	31	32	33	34	35	36
Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
55.847	58.933	58.69	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
Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
101.07	102.905	106.42	107.868	112.411	114.818	118.710	121.757	127.60	126.905	131.29
75	76	77	78	79	80	81	82	83	84	85
Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At
186.207	190.23	186.21	195.084	196.967	200.59	204.38	207.2	208.98	209	210

Undergraduate Labs undergo *Measurable* Improvements

Spring 2006 saw the beginning of the improvements to the Undergraduate Laboratories in Buehler Hall. Although there was no Ty Pennington and the students did not shout “Move that bus!” in front of the building, Phase I of the project is being called a success.

The Department of Chemistry, with seed funding from the College of Arts & Sciences, began the renovation initiative to bring technology into the undergraduate chemistry labs. Prof. Jeffrey Kovac, Director of Undergraduate Studies, says “This technology appealed to us because it takes the tedium out of data collection and allows more data to be collected and more interesting experiments to be performed.” The technology he is referring to is the MeasureNet system. The MeasureNet system is a network-powered data collection system which dramatically decreases data collection times and increases lab efficiency. This system utilizes bench top consoles networked together to a master unit which can be connected to various instrumentation.

The MeasureNet system is the brain-child of Robert Voorhees, Paul McKenzie and Dr. Estel Sprague, a UTK alumnus who graduated in 1971 with a Ph.D. in Chemistry. An internal proof-of-concept grant at the University of Cincinnati funded the initial development and testing of MeasureNet. Major funding was then awarded by the U.S. National Science Foundation Instrumentation and Laboratory Improvement Program and the Procter & Gamble Curriculum Development. The MeasureNet technology can now be found in vocational and secondary education settings as well as 4-year college programs across the country.

“We take great satisfaction being chosen by the University of Tennessee’s Department of Chemistry,” commented MeasureNet President Robert Voorhees. “They have a superior reputation and produce an impressive stable of graduates who go on to perform valuable

research in the sciences.” The University joins Tennessee State in Nashville and the University of Memphis as major university programs that employ MeasureNet across the state.



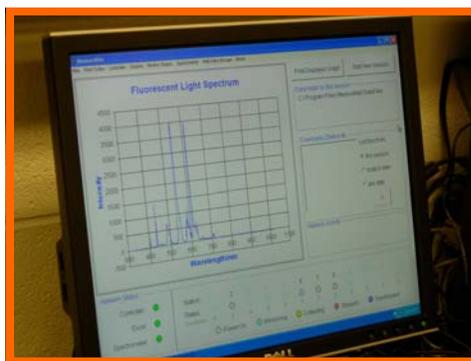
Above: Dr. Jeff Kovac works with a student to extract data from her MeasureNet station.

This year and next, we plan to develop a firm foundation of new experiments centered on the MeasureNet system. This represents an extensive redesigning of our general chemistry laboratory experience to make it more interesting and “exciting” to beginning students at UT. Within the next two years, we will submit to the University Administration a plan to extend the MeasureNet system to all general chemistry classes. Although the expansion of Phase I (now only Honors Chemistry Classes) to Phase II is in the planning stages it looks to be a promising avenue to bring technology to the lab and better equip our students for careers in Chemistry. For more information on the Undergraduate Lab renovations or the MeasureNet System contact Dr. Jeff Kovac at jkovac@utk.edu or call (865) 974-3141.



Left: Students work together to use the spectrometer—one of numerous instruments designed for use in the MeasureNet System.

Right: The results of an experiment posted on the main terminal for data analysis.





6 Alumni Updates

The Department would love to hear what you are doing now! Have you changed jobs? Married? Moved? Climbed Mt. Everest? Let the Chemistry Department know what you are doing and what changes have occurred since you graduated. Please send an e-mail with your updated information to chemistry@utk.edu.

Britni Ratliff (B.S. 2006) entered the Ph.D. program at the University of Chicago in the Fall of 2006.

Lee Brogan (B.S. 2006) entered the Ph.D. program at the University of California at Berkeley in the Fall of 2006.

Robert Sacci (B.S. 2006) has entered the Ph.D. program at the University of Victoria in British Columbia, Canada.

Eugene DePrince (B.S. 2005) is pursuing a Ph.D. degree with David Mazziotti at the University of Chicago.

Dr. Tim Lillestolen (Ph.D. 2005) is now pursuing postdoctoral research with Richard Wheatley in the Department of Chemistry at the University of Nottingham.

Dr. James Mancillas (Ph.D. 2005) is employed at the Southwest Research Institute in San Antonio, TX working on simulations of the transport of groundwater near Yucca Mountain.

Dr. Lee Warren (Ph.D. 2005) is currently pursuing postdoctoral research at Oak Ridge National Laboratory with Robert Harrison.

Brandy (Underwood) Belue (M.S. 2005) is now employed as a Principal Chemist in the Analytical Division of research and product development at Cott Beverages in Columbia, GA.

Kristy (Pickett) Homberger (M.S. 2006) is currently teaching science, ecology and chemistry at Doris A. Walker Academy in Knoxville, TN.

Dr. Paul Davis (B.S. 1995) is currently an Assistant Professor of Chemistry at Pacific Lutheran University in Tacoma, Washington.

Dr. Brandon Farmer (Ph.D. 2006) has taken a position with SRS Technologies in Huntsville, AL as a Polymer Scientist.

Dr. Andy Fisher (Ph.D. 2006) has taken a postdoctoral position at Oak Ridge National Laboratory.

Dr. David Rodman (Ph.D. 2005) is employed with Vintage Pharmaceuticals in Huntsville, AL.

Dr. Kathleen Giesfeldt (Ph.D. 2005) is employed with Exxon located in Baton Rouge, LA.

Dr. Nicie (Conley) Murphy (Ph.D. 2005) is currently employed with Siemens Medical located in Oak Ridge, TN.

Jamie Molaison (M.S. 2006) is employed in the Experimental Facilities Division of the Spallation Neutron Source at Oak Ridge National Laboratory.

Dr. Laurie Morton (Ph.D. 2005) is now pursuing postdoctoral work at Villanova University in Pennsylvania.

Dr. Steve Wargacki (Ph.D. 2005) is currently at a postdoctoral position at Wright Patterson Air Force Base in Ohio.

Dr. Scott Fontana (Ph.D. 2005) is now employed with the Food and Drug Administration.

Dr. Asif Rasheed (Ph.D. 2006) has accepted a postdoctoral position at Georgia Institute of Technology in Atlanta, GA.

Dr. Michael Arlen (Ph.D. 2003) is currently at a postdoctoral position at Wright Patterson Air Force Base in Ohio.

Dr. Charles Obrien (Ph.D. 2004) is now employed with the Food and Drug Administration.

Dr. Nathan Crawford (Ph.D. 2005) is currently pursuing postdoctoral research at the University of Tennessee, Knoxville with Dr. Jamie Adcock.

Dr. Pradeep Kumar (Ph.D. 2004) is currently conducting postdoctoral research at Oak Ridge National Laboratory.

Dr. Kevin Bennett (Ph.D.) has been granted tenure and named Chair at Hood College in Frederick, MD.

Dr. Benji Prebyl (Ph.D. 2003) completed law school at Franklin Pierce Law Center and took the Bar exam this summer. Results of the Bar were pending at last contact.

Dr. Shaolian Zhou (Ph.D.) accepted a position from Thermo and will be stationed back in his home country of China, realizing a long-term goal.

Dr. Cara Nygren (Ph.D., 2005) is currently pursuing postdoctoral work at Brandeis University in the Petsko Group.

Dr. Sylvia McClain (Ph.D., 2004) is completing her Nation Science Foundation international postdoctoral fellowship at the ISIS spallation neutron source (UK) and will begin a joint postdoctoral position between the University of Oxford and ISIS upon completion.

Michelle Dolgos (M.S. 2005) is currently a Ph.D. candidate at The Ohio State University in the Woodward Group.

We'd love to hear from you!

Mn	Fe	Co	Ni	Cu	Zn	Al	Si	P
54.938	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

Chemistry Graduate Student chosen to attend 56th Annual Lindau Meeting

For over 50 years the Lindau Nobel Laureate Meetings have brought Nobel Laureates together with students and young researchers. This year, sponsored by Oak Ridge Associated Universities, Scott Borella attended the 18th Lindau Meeting in Chemistry June 25-30, 2006. Scott is a third year graduate student doing research in the Kabalka group.

The Lindau Meetings bring together graduate students and Nobel Laureates from around the world and offers them a forum to communicate about chemistry. Nobel Laureates such as Prof. Richard Schrock and Prof. Sir John Walker participate in plenary sessions, round table debates, small group discussions and informal social activities bringing them together with students.

Scott was the second graduate student from the Department of Chemistry to attend the Lindau meeting. In 2002, Maggie Connatser attended the 52nd Lindau Meeting.



Prof. Richard Schrock answers questions during a round table discussion.

For more information on this program please visit the Lindau Nobel Website at www.lindau-nobel.de.

Chemistry Majors Honored at Chancellor's Banquet



Senior Chemistry major Britni Ratliff was honored at the 2006 Chancellor's Banquet with the University of Tennessee's highest undergraduate honor - being named a Torchbearer. Torchbearers are seniors who have strived for excellence in academics, activities, service to the community, and contribution to the university. Britni, a chemistry major and math minor, was one of seven students honored with the rank of Torchbearer. Britni is now working on her doctorate in chemistry at the University of Chicago.

Undergraduate Chemistry major Lee Brogan also received an academic achievement award at the 2006 banquet. Lee is currently pursuing a Ph.D. in chemistry at the University of California at Berkeley.

Recent Graduates

2006

(Spring & Summer Only)

Britni Ratliff - B.S.

Lee Brogan - B.S.

Robert Sacci - B.S.

Katherine Frederick - B.S.

Kathline Langston - B.S.

Lara Turner - B.S.

Allyson Warren - B.S.

Justin Marlow - B.S.

Kristy (Pickett) Homberger - M.S.

Christine Shook - B.S.

Kashif Saleem - B.S.

Ian Reinemeyer - B.S.

Asif Rasheed - Ph.D.

Andy Fisher - Ph.D.

Jamie Molaison - M.S.

Xiao Ma - M.S.

Michelle Dolgos - M.S.

Chunlan Chen - M.S.

2005

Latasha Garrett - B.S.

Mary Ross - B.S.

Timothy Stortz - B.S.

Leslie Adamczyk - B.S.

Eugene DePrince - B.S.

Courtney Neel - M.S.

Joshua Bailey - M.S.

Megan Bragg - Ph.D.

Jason Clark - Ph.D.

Joey Dickson - Ph.D.

Scott Fontana - Ph.D.

Timothy Lillestolen - Ph.D.

James Mancillas - Ph.D.

Nicie (Conley) Murphy - Ph.D.

David Rodman - Ph.D.

Steve Wargacki - Ph.D.

Gary (Lee) Warren - Ph.D.

Xiang Yu - Ph.D.

Gang Dong - Ph.D.

Kathleen Giesfeldt - Ph.D.

Nathan Crawford - Ph.D.

Laurel Morton - Ph.D.

Chengdu Liang - Ph.D.

Joseph Burlison - Ph.D.

Scott Fontana - Ph.D.

Megan Bragg - Ph.D.

Jason Clark - Ph.D.

Cara Nygren - Ph.D.

Brandy Belue - M.S.

2004

Emily Blackwell - B.S.

Michael Bleakley - B.S.

Douglas Davis - B.S.

Daniel Fowler - B.S.

Jim Patton - M.S.

Sylvia McClain - Ph.D.

Conrad Kaczmarek - M.S.

Phil Stimac - Ph.D.

Charles Obrien - Ph.D.

Pradeep Kumar - Ph.D.

Marco DeJesus - Ph.D.

Angela Whisnant - M.S.

Adam Mullenix - Ph.D.





Research Funding

External support for research and education surpasses \$5 million over the 2006 fiscal year. Listed below are new or renewed awards of \$35,000 or more over the period from July 2004 through August 2006.

J.L. Adcock

Computational and Experimental Study of High Performance Lubricants in Extreme Environments; USAF; \$195,158; 5/05-5/08

D.C. Baker

Chemical Synthesis; Gryphus Diagnostics; \$98,341; 11/03-9/05

C.E. Barnes

Nanostructured Metal Oxide Catalysts via Building Block Synthesis; DOE; \$402,481; 11/04-10/07

Novel Aluminosilicate Solid Acid Catalysts Via Building Block; ACS; \$80,000; 4/05-3/07

J.E. Bartmess

Maintenance and Expansion of the Gas Phase Negative Ion Thermochemistry Database; NIST; \$48,129; 7/04-6/06

R.L. Compton

Multipole-Bound Negative Ions; NSF; \$391,810; 3/04-2/06

K.D. Cook

Hydrogen Exchange Studies on A-beta Amyloid Fibrils; NIH; \$303,044; 9/01-8/06

M.D. Dadmun

Multiple Bound Polymer Chains: Novel Chemistry for Improved Interfacial Properties; NSF; \$1,863,000; 7/05-6/07

C.S. Feigerle

Diamond Stripper Foil Research; NSF; \$37,408; 10/05-9/06

G.A. Guiochon

Separation of Highly Complex Mixtures By Two-Dimensional Liquid Chromatography; DOE; \$300,000; 7/04-7/07

Homogeneity of Adsorbent Surface; DOE; \$600,000; 3/88-7/07

Fundamental Studies in Non-Linear Chromatography; DOE; \$1.7m; 7/06-7/07

Fundamental Studies in Non-Linear Chromatography; NSF; \$479,985; 7/06-6/09

A. Hazari

Inquiry-Based Physical Science for Middle School Teachers; THEC; \$74,983; 1/05-9/05

R.J. Harrison

Collaborative Research: CAS-AES: An integrated framework for compile-time/run-time support for multi-scale applications on high-end systems; NSF; \$210,000, 8/05-8/07

R.J. Hinde

Spectroscopy and Dynamics in Molecular Quantum Solids; NSF; \$382,665; 8/04-7/07

G.W. Kabalka

Boron in Nuclear Medicine: New Radiotracers for Targeting Mutated Raf Protein for the Early Detection of Lung Cancer; DOE; \$766,065, 5/04-4/07

New Boron and Metal Halide Mediate Propargylation and Allylation; ACS; \$80,000; 9/04-8/06

J.Z. Larese

IMR-IMP: VISION-CED for a Neutron Vibrational Spectrometer for SNS; NSF; \$1.5m; 7/04-6/07

L. Magid, M. Dadmun

Science and Technology Center: Integrative Partnerships "NETI: Neutron Education & Technology Institute"; NSF; \$406,706; 7/05-7/06

J.W. Mays

New Sulfonated and Fluorinated Copolymers: Synthesis, Morphology and Properties; University of Mass.; \$148,430; 6/04-5/07

Self-Assembly of Polyelectrolyte Structures in Solution: From Atomic Interactions to Nanoscale Assemblies; UT-Battelle; \$49,182; 7/06-12/06

Materials World Network-Molecular Engineering of Polymers for Processing Performance and Properties; Virginia Polytechnic Institute and State University; \$328,110; 5/06-4/09

Neutron Reflectometry Studies of the Structure of Polyelectrolyte Thin Films Subject to Shear; UT-Battelle; \$60,876; 12/04-9/06

Molecular Design of Hyaluronan with Polypeptide Branches of Controlled Structure; University of Utah;

V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
43	44	45	46	47	48	49	50	51	52	53	54	55	56
Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe		
73	74	75	76	77	78	79	80	81	82	83	84	85	86
Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn		
101	102	103	104	105	106	107	108	109	110	111	112	113	114

**J.W. Mays (cont'd)**

Poly(cyclohexadiene)-Based Polymer Electrolyte Membranes for Fuel Cell Applications; DOE; \$1.2m; 4/06-3/11

J.L. Musfeldt

Spectroscopic Studies of Complex Materials in High Magnetic Fields; DOE; \$583,554; 6/01-7/09

Single Magnetic Molecules - A Controlled Route to Nanomagnetism; AMES; \$60,000, 10/02-9/06

Low-Energy Optical Spectroscopy as a Probe of Structure/Property Relations in Organic Solids; NSF, \$360,000; 5/06-5/08

M.J. Sepaniak

Nanostructured Materials as Transducers in Micro-fluidic Platforms for Chemical Analysis; DOE; \$95,000, 8/05-7/06

Microcantilever Transducers: Next Generation of Gas Diagnostics; BWXT; \$200,000; 11/04-10/06

Nanostructured Fiber Optic Cantilever Arrays and Hybrid MEMS Sensors for Chemical and Biological Detection; Luna; \$100,000; 1/06-12/07

Z. Xue

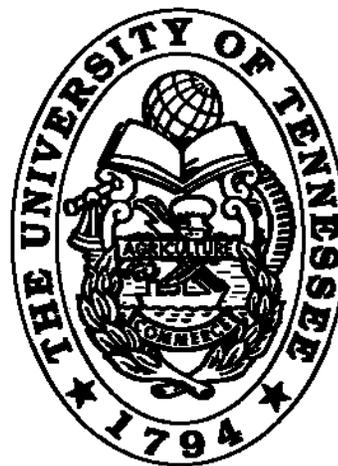
Novel Method for Chromium Analysis in Biological Fluids;

NIH; \$362,500; 4/04-3/06

Probing Novel Reactivities of Transition Metal Complexes and Mechanistic Pathways in the Formation of Microelectric Materials; NSF; \$270,000, 8/05-8/07

B. Zhao

Doubly Thermosensitive Block and Star Copolymers form the Living Radical Polymerizations: Synthesis, Phase Transitions, and Application; NSF; \$285,000; 6/06-5/07



Dedicated Staff Strengthens Department

The staff of the Department are an integral part of making everyday a success and to continually work towards excellence in the University, Community, and the world of chemistry. We would like introduce you to just two of the most vital members of our staff.



Mrs. Eva Ortiz-Smith joined the Department in 2005 as a windswept victim of Hurricane Katrina. Since joining us she become the foundation of the front office as the new Office Supervisor. Prior to taking the position in the front office Eva was the know-all do-all faculty secretary.

Eva is the point of contact for any question you should have regarding the Chemistry Department. We invite all of you who have questions regarding the Department to contact Eva at osmith@ion.chem.utk.edu or call (865) 974-3141.



In this era of "compliance" within the University of Tennessee Ms. Sharon Marshall has taken the reins of the business office.

Sharon and her staff are responsible for all orders, shipping and receiving in the department as well as managing the one hundred or so proposals and grants that are active at any time in the department. Sharon, along with Melissa Walker and Jocelyn Miller have taken a cradle-to-grave philosophy in helping faculty prepare proposal budgets, manage the finances during a project and closing the account properly. As indicated above, understanding and complying with the rules of the university and the different funding agencies is the new era within which we live.



10 Outreach & Service

Building a foundation for Chemistry

The Student Affiliates of the American Chemical Society (SAACS) and the Association of Chemistry Graduate Students (ACGS) are organizations with a long-standing presence in the Chemistry Department. Over the years these groups have taken on the responsibilities of educating the community about chemistry through programs offered year-round.

Each year members of the ACGS help to host Research Open Houses in the Spring, allowing potential students to visit the Chemistry Department and speak with faculty and students about the research that is conducted here and the graduate program in chemistry. ACGS members also assist in the annual Chemistry Camp during the Summer and help to supply first-year chemistry students with locks and goggles for a safe laboratory experience.

SAACS is the undergraduate student chemistry

organization and also continues to work to build its ranks. SAACS may be most notably known for its annual sale of organic chemistry model kits, but SAACS plays a large role in outreach to the community. SAACS works each Spring to provide area high school students the opportunity to visit the Chemistry Department and learn about the wonders and depth of Chemistry in everyday life. In addition, SAACS hosted a booth at the 2006 Homecoming festivities prior to the Homecoming football game.

Both the ACGS and SAACS attended the Math and Science Regional Center Exposition where the Department hosted a booth to educate regional high school and middle school students.

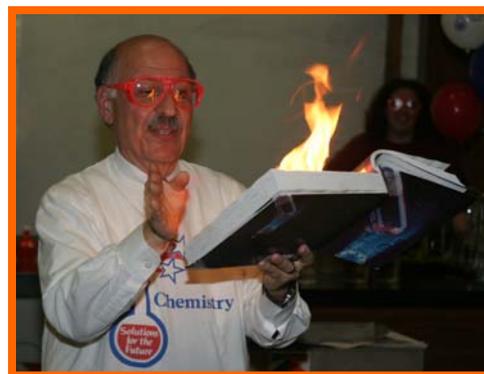
The Department would like to recognize the great work that these groups do each and every year!



Pictures (L to R): Prof. Al Hazari demonstrates the magic of chemistry to visiting area high school students whom SAACS hosts every Spring to introduce them to chemistry as a college major. SAACS member Febi Pangoli setting up a demonstration of chemistry at the SAACS booth at Homecoming 2006. Graduate Students speak with visiting potential students during one of the Research Open House poster sessions that occur every Spring.

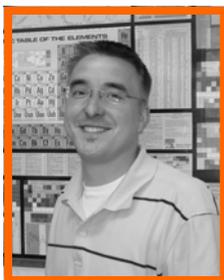
Al Hazari, Director of the Undergraduate Chemistry Labs and Lecturer in Chemistry, has been very active with plans to upgrade the General Chemistry Lab program. A proposal for funds to equip the labs with two *MeasureNet* networks was successful. The 24-station system, installed in the Honors General Chemistry Lab over Summer 2006 will provide students with advanced measurement instrumentation and data-handling technology (see page 5 for more information).

Al still teaches two courses for non-science majors (*Chemistry & Society* and *Chemistry & the Home*), is involved with the East Tennessee Section of the American Chemical Society (ETS-ACS) that just celebrated its 75th anniversary, and does Chemistry Magic shows. As a faculty advisor to the Association of Chemistry Graduate Students (ACGS), he helps out with the fund-raising and the conducting of the annual summer chemistry camp for area middle school students, entitled *Adventures in Forensic Chemistry*. Last Summer, Hazari held two one-week workshops (*Inquiry-Based Physical Science for Middle School Teachers*) in Knoxville and in Memphis. The workshops were sponsored by the Tennessee Higher Education Commission with *No Child Left Behind* funds.



Dr. Al Hazari displays the wonders of chemistry through his Chemistry Magic Shows.

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

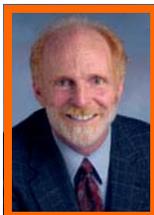
The University of Tennessee Department of Chemistry has unparalleled support from the University administration, many members of which are also chemists. Dr. Clifton Woods has been on the Chemistry faculty since 1974 and for several years has been the Vice Chancellor for Research at UT, Knoxville. In 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.

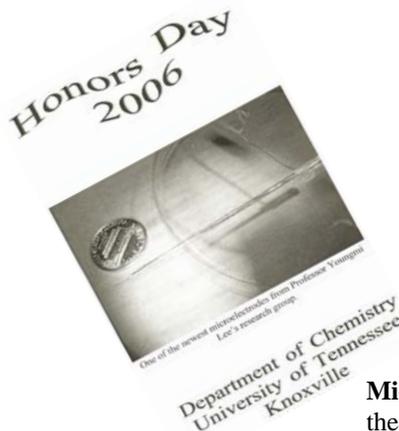
President of the University of Tennessee and Chemist,
Dr. John Petersen



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	Sb	Te	I	Xe
98	101.07	101.07	106.42	107.868	112.411	114.818	118.710	121.757	127.60	126.905	131.29
75	76	77	78	79	80	81	82	83	84	85	86
Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
186.207	190.23	192.22	195.08	196.967	200.59	204.38	207.2	208.98	210	210	222



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.

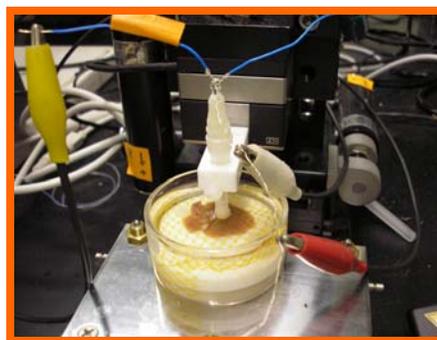
Research in Dr. Lee's group is focused on electroanalytical approaches to the investigation of various unknown biological and physiological processes with a particular emphasis on the development of novel electrochemical micro-(nano)-sensors. She describes her research as follows:

"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.

Continued on page 16



The Hinde Group has seen two new members join in the past year. Patrick Moehlen (B.S. University of Maryland) joined in 2005 and Brent Magnusson (B.S. Gustavus Adolphus College) joined the group in 2006. Both are working on problems related to the infrared spectroscopy of solid hydrogen crystals containing chemical dopants. They both presented posters at the March 2006 national ACS meeting in Atlanta.

In August 2005, Dr. Hinde received a travel award from the National Research Council to attend the biennial meeting of the International Union of Pure and Applied Chemistry (IUPAC) and a satellite meeting on physical chemistry education. In January 2006, he began a two-year term as the U.S. representative to IUPAC's Commission on Physicochemical Symbols, Terminology and Units. He will spend a six-month sabbatical in 2007 at the Department of Chemistry at the University of Helsinki working with an experimental spectroscopist (Markku Rasanen) and a theoretical chemist (Lauri Halonen) on problems related to the infrared spectroscopy of molecules in cryogenic matrices.

It has been a busy year for the **Kabalka group**. Kabalka and his students have made presentations at:

- 12th International Congress on Neutron Capture Therapy Meeting, Takamatsu, Kagawa, Japan, October 2006
- Boron in the Americas 10th International Meeting, San Juan, Puerto Rico, August 2006
- International Isotope Society Meeting, Edinburgh, Scotland, July 2006
- 232nd American Chemical Society National Meeting, San Francisco, California, September 2006
- Society of Nuclear Medicine Annual Meeting, San Diego, California, June 2006
- 231st American Chemical Society National Meeting, Atlanta, Georgia, March 2006

In the past year seventeen journal articles have appeared summarizing the results of the students' thesis work.

Dr. Jeffrey Kovac has also been a busy member of the faculty. Being the Director of Undergraduate Studies he spearheaded the Phase 1 technology upgrade for the undergraduate laboratories. Also, in August of 2005 Dr. Kovac was the general chair and organizer of the Summer Symposium of the International Society for the Philosophy of Chemistry hosted at the University of Tennessee, Knoxville.

Dr. Kovac's book "The Ethical Chemist" was translated into Japanese in 2005 and in 2006 an article in the Fall 2006 ACS Graduate Education magazine named it a "must have" book on ethics in chemistry.

Amazingly it has been almost five years since the **Larese** laboratories arrived in Buehler-Dabney Hall and at Oak Ridge National Laboratory (ORNL) from Brookhaven National

Laboratory. While the first neutrons have arrived at the Spallation Neutron Source at ORNL in midsummer 2006 our group continues to work at the spallation neutron source at ISIS just south of Oxford, England and the Institut Laue-Langevin in Grenoble, France. Our materials chemistry and neutron scattering group is currently investigating the synthesis of and molecular adsorption on nanomaterials. The applications of this research are numerous and will affect the cosmetic, oil, environmental, and pharmaceutical industries around the world. Funding for the group comes from the Department of Energy, Basic Energy Science, Materials Science Division and the National Science Foundation, Division of Materials Research.

In addition to work on nanomaterials, Prof. Larese heads an international team to design and build, VISION, the next generation neutron analogue of a vibrational spectrometer for the Spallation Neutron Source at ORNL. The project is continuing to be supported by the National Science Foundation. The Larese group's neutron work involving hydrogen dynamics on the MgO(100) surface was highlighted in the annual report of the Rutherford Appleton's ISIS Neutron Spallation Source and on the cover of this summer's DOE's Hydrogen Program Review document. Recent opportunities for the group's work to be featured and discussed on the world stage include invited presentations at: the DOE Hydrogen Conference, Washington, DC, the *CONTENT* neutron workshop at the Institut Laue Langevin in Grenoble, the Swedish Research Council Meeting on the European Spallation Source in Lund, Sweden and the XV International Materials Research Congress (IMRC), Cancún, Mexico on Neutron Opportunities and Obstacles for Nanoscience.

The Larese group continues to grow and currently consists of six graduate students and two post-doctoral research associates. All students have been coauthors on contributed presentations at the International Neutron Scattering Conference in Sydney, Australia, the American Physical Society Meeting in Baltimore, and the American Neutron Scattering Conference in Illinois over the last 10 months. Sami Chanaa (porous silica spheres), Michael Felty (nanometer scale porous anodic alumina), Lillian Frazier (hydrogen adsorption), and Peter Yaron (alkane adsorption) have all successfully passed both the cumulative exams and the Original Research Proposal (ORP) and are currently working on their Ph.D. dissertation projects involving synthesis, thermodynamics and neutron scattering. Andi Barbour (ethylene and dissolution of geo-related metal oxides) recently joined the group and is currently working on her ORP.

Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
55	56	57	58	59	60	61	62	63	64	65	66
43	44	45	46	47	48	49	50	51	52	53	54
Rc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
58	59	60	61	62	63	64	65	66	67	68	69
75	76	77	78	79	80	81	82	83	84	85	86
Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
75	76	77	78	79	80	81	82	83	84	85	86

Paige Landry (allene and the methyl amines) joined the group from last year's incoming class and spent part of her summer assisting Prof. Larese in mentoring two high school students through the Upward Bound Program. Richard Cook successfully defended his Ph.D. degree in August and will stay on with the group another year as a Post Doc. David Fernandez-Canoto (University of Vigo – Spain) has also recently joined the group as a Post Doc. Past group members include recently graduated Mary Ross (currently a graduate student at Cambridge University), Post-doc Thomas Arnold (currently staff member at Diamond Light Source, Rutherford Appleton Laboratory), Post-doc Andrea Freitag (currently staff member at Elkem Chemicals, Norway), Post-doc Siva Chinta (entrepreneur), Prof. Teresa Burns (summer researcher from Coastal Carolina Univ.), Prof. Jim LoBue (summer researcher from Georgia Southern Univ.) and Prof. S. K. Airee (summer researcher from UT Martin). For more information and to see a listing of our publications, please visit the group website at <http://materials.chem.utk.edu>.

The Lee group (started in Fall 2004) develops novel electrochemical microsensors for studying physiologically important endogenous molecules connected with the specific characteristics of various biological living cells. For instance, we are currently collaborating with Dr. Jim Hall's group and Dr. Rebecca Prosser's group in BCMB (Biochemistry, Cellular and Molecular Biology) department especially for the studies on brain cellular mechanisms involved in physiological clock rhythms of mammals. The recent accomplishment on simultaneous electrochemical detection of nitric oxide and oxygen was presented at the 232nd ACS National Meeting (September, 2006, San Francisco, CA).

Current graduate students in the Lee group are Clarissa Tatum (joined in Fall 2005), Jiyeon Kim (joined in Spring 2006), and Angela Whisnant (joined in Fall 2006). A new graduate student, Atogho Jude Abia, and a postdoc, Jun Ho Shim, will be joining the group in November 2006.

The Musfeldt Group is active in a variety of fields related to complex electronic and magnetic materials. Major discoveries include high-energy magneto-dielectric effects in layered antiferromagnets, substituted manganites, and frustrated multiferroics, molecular-level negative thermal expansion in fullerenes, and the effect of microscopic strain and curvature on covalency in transition metal dichalcogenides. Our team gave 6 talks at the American Physical Society March Meeting, Sonal Brown and Jan Musfeldt both gave invited talks on negative thermal expansion in nanocarbon materials and overviews of new opportunities in synthetic metal research at the Sixth International Symposium on Crystalline Organic Metals, Superconductors, and Ferromagnets, and Jinbo Cao is giving a poster on field-induced magneto-dielectric changes in manganites at the Solid State Chemistry Gordon Conference.

Prof. Musfeldt gave talks at a complex oxide workshop in Telluride, a complex materials symposium in Calcutta, India, and a Chemical Structure-Physical Property meeting in Bordeaux, France. Our team also made many working visits to the National High Magnetic Field Laboratory in Tallahassee, FL. Jongwoo Choi started work at General Electric, John Pigos (Honda) got married to a young lady from Art Epstein's group, ZhengTao Zhu accepted a faculty position at the South Dakota School of Mines, and Sonal Brown got married. In short, it has been a very good year.

Richard Pagni will retire at the end of the current academic year after 38 years of service to the University. He attended his last international meeting - 2006 EUCHEM Conference on Molten Salts and Ionic Liquids - in Hammamet, Tunisia in September 2006 where he gave a plenary lecture on organic reactions in molten salts and ionic liquids.

Michael Sepaniak's graduate research group was awarded a \$590,000 grant by the Environmental Protection Agency this past year to develop novel analytical methods to measure endocrine disrupting chemicals in the environment. Endocrine mimicking chemicals represent a major class of pollutants with long range impact on human health. The project involves the integration of unique nanomechanical sensors, microfluidics, and vibrational spectroscopies and is in collaboration with UT's Center for Environmental Biotechnology.

Jenny Oran in the Sepaniak group was awarded a UT Office of Research SARIF summer graduate fellowship for 2006. She is working with other group members to create surface enhanced Raman spectroscopy substrates using nanolithographic techniques. The Sepaniak group is one of only a few groups across the nation able to perform studies of this nature, thanks in part to the new multi-million dollar electron beam writer on UT's campus. This state of the art instrument allows the creation of substrates with precise nano-dimensional control of morphology.

The Turner group continues its research in a various areas of inorganic chemistry. Currently members of the group are working on project in arylamido titanium (IV) chemistry, small molecule activation and Ziegler-Natta style polymerizations, along with X-ray study of charge-density and hydrogen bonding, superacids, and various doped metal-fluoride complexes. Significant progress has been made in olefin polymerization catalysis with several highly active catalysts being discovered in the past couple of months. The group's research has been presented nationally by Megan, Andy and Mike at National ACS meetings.

Continued on page 18



Turner cont'd

The past year has seen a significant change in group membership in the Turner group; Megan Bragg (Ph.D, 2005), Cara Nygren (Ph.D, 2005), Michelle Dolgos (M.S., 2005) and Jamie Molaison (M.S., 2006) have all graduated. Former student Robert Sacci graduated and is now a graduate student in the Department of Chemistry, University of Victoria, Canada. Quianna Johnson took a position with Pfizer and Janine Teszarzik became a missionary in Germany. Ben Estes and Onome Swader joined the group as graduate students.

The current research group consists of Andy Colvin, Mike Blanchard, Onome Swader and Ben Estes (graduate students) and Elizabeth Jacobs, Roger Mason, Yuxi Duan, Mauricio Valenzuela, and Brad O'Dell (undergraduate students).

Both Elizabeth and Brad were admitted into the College Scholars program in the Fall of 2006.

The group continues to be involved in the MPS program and hosted Frank Wood (Central High School) over the summer in the lab. Recruiting trips were made to Erskine College and Florida Institute of Technology and a successful RSEC symposium was organized in August.

The group was visited by Prof Chick Wilson (University of Glasgow) and Dr. Thomas Proffen (LANL, Los Alamos National Laboratory). An invited talk was given at the University of Oxford (Physical and Theoretical Chemistry Laboratory) and there is a planned invited talk at the Spring National Meeting at Chicago for 2007.

Publication highlights, from the 8 for 2005-2006, included a paper in Nature Materials on magnetic silver fluorides, which was covered in the News and Views section, and a paper in Physical Review Letters on the dynamics of hydrogen fluoride. The papers are Magnetic behavior of layered Ag(II) fluorides McLain, S. E.; Dolgos, M. R.; Tennant, D. A.; Turner, J. F. C.; Barnes, T.; Proffen, T.; Sales, B. C.; Bewley, R. I. Nature Materials 5, 561-565 (2006) and

Evidence of the Presence of Opticlike Collective Modes in a Liquid from Neutron Scattering Experiments Bermejo, F. J.; Taylor, J. W.; McLain, S. E.; Bustinduy, I.; Turner, J. F. C.; Ruiz-Martin, M. D.; Cabrillo, C.; Fernandez-Perea, R. Physical Review Letters 96, 235501/1-235501/4 (2006)

Cara Nygren is now a postdoctoral research assistant at Brandeis University in the Petsko Group (protein modeling and crystallography) after spending a year with Prof. Philip Coppens at SUNY Buffalo (charge density). Michelle Dolgos is now a Ph.D candidate at Ohio State in the Woodward group and Jamie is a scientific assistant for the high pressure diffractometer at the Spallation Neutron Source. Sylvia McLain (Ph.D, 2004) is just about to finish her NSF international postdoctoral fellowship at the ISIS spallation neutron source (Rutherford Appleton Laboratory, UK) and has a postdoctoral position jointly between the University of Oxford (Tony Watts, Biochemistry) and ISIS (Alan Soper, Disordered Materials) working on biological structures in solution.

Dr. Xue and his group have seen some exciting times! In 2005-2006 the group experienced a large expansion when four new students joined - Julia Covington, Royce Dansby-Sparks, Brenda Dougan, and Tara Williams. In 2005, Dr. Xue's group received a NSF grant to study chemistry in the formation of microelectric materials. These microelectric materials include gate oxides and Si-containing diffusion barriers. The group has also been studying new reliable methods for the analysis of chromium in biological fluids to assess chromium deficiency and the effect of chromium as adjuvant therapy for type 2 diabetes. With support from the National Institutes of Health, this group has been developing a novel application of Advanced Oxidation Process in degrading biological/organic species in biological fluids, and converting chromium in different oxidation states.

In the past year Dr. Xue was awarded a British Royal Society Kan Tong Po Visiting Professorship and spent several weeks over the Summer of 2006 visiting Hong Kong University of Science and Technology.



Dr. Ben Xue with Dr. Anne Mayhew (ret.), Vice Chancellor & Dean of Graduate Studies and Dr. Bruce Bursten, Dean of the College of Arts & Sciences.

The Zhao group is steadily growing and pushing forward in its research. In the Summer of 2006 the Zhao group was awarded a 3-year NSF regular grant for \$285,000 to research "smart" polymers that are design to be thermosensitive in water. These responsive soft materials have the potential applications in smart coatings/adhesives. Triggered release of substances, catalysis, biotechnology, and nanotechnology. The Zhao group has also developed a unique strategy to synthesize well-defined mixed polymer brushes. These brushes have been demonstrated to respond to environmental changes, exhibiting different surface structures and properties. This project was supported by the ACS Petroleum Research Fund and the Ralph E. Powe Junior Faculty Enhancement Award.

The current group consists of four graduate students, one undergraduate student, and three visitors. We are looking forward to welcoming more graduate and undergraduate students to join us in the coming semesters.

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