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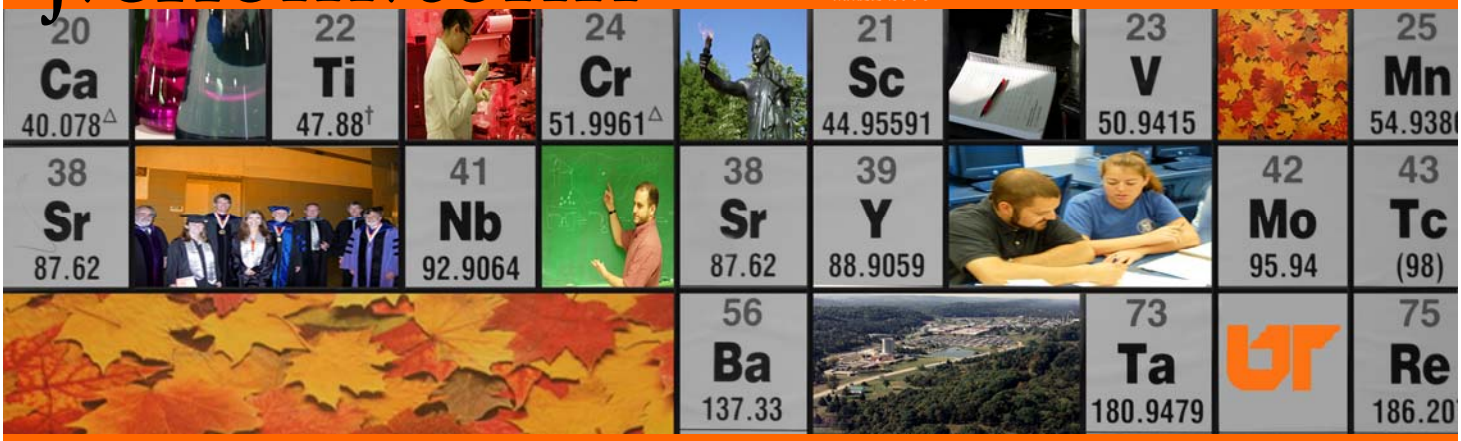
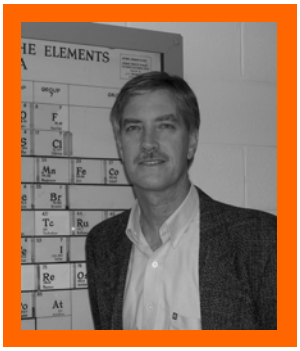
FALL 2006 www.chem.utk.edu



The Newsletter of the Department of Chemistry

THE UNIVERSITY of TENNESSEE

A Renewed Vision



Professor Craig Barnes
Head of the Department of Chemistry

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 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

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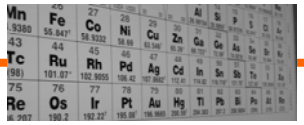
Fundamentals

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

Department of Chemistry
1420 Circle Dr, 552 Buehler Hall
Knoxville, TN 37996-1600
Phone:(865) 974-3141
Fax:(865) 974-9332
E-mail:chemistry@utk.edu



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.

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 Burridge 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

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 postdoctoral research in chemistry at the University of Michigan in Ann Arbor.

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

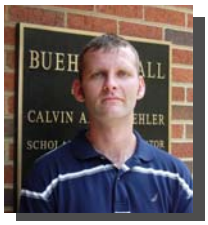
Read more on Dr. Lee's research on page 13.

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 postdoctoral 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 design 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 13C 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, 13C, 19F, and 31P capabilities.

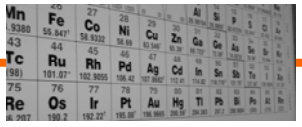
A firm foundation for research!

Dr. Liguo 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.



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 1 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.