

# THE NEWSLETTER OF THE UNIVERSITY OF KANSAS DEPARTMENT OF CHEMISTRY

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## TWO APPOINTED TO DISTINGUISHED PROFESSORSHIPS



The Chemistry Department was honored this year by having two of our colleagues, Susan M. Lunte and Kristin Bowman-James, elevated to the rank of Distinguished Professor at KU.

Dr. Susan Lunte is the new Ralph N. Adams Distinguished Professor of Chemistry and Pharmaceutical Chemistry. During her years rising through the professorial ranks in KU's School of Pharmacy, Sue maintained very active collaborations with her colleagues in the

Chemistry Department. Sue formally accepted a split appointment in Chemistry and Pharmaceutical Chemistry to accept this position. Her research focuses on the application of new separation and detection strategies to Bioanalytical problems. One aspect of her work includes the development of analytical methods to better understand peptide transport and metabolism across the blood-brain barrier (BBB). Most of this focus has been on substance P, an

*(see Distinguished Professors p. 16)*

Dr. Kristin Bowman-James was just this month appointed as a University Distinguished Professor of Chemistry. This appointment results from a University-wide competition for which many of Kristin's coworkers, current students and alumni provided letters of recommendation. Only four individuals, including Kristin, received this acknowledgement from across all of the departments at KU. Our Department is very grateful to the individuals who helped us champion her case to the University. Kristin's



research can be thought of as a unique marriage of her passions for coordination chemistry, the application of macrocycles to the broadest possible range of problems in chemistry and the design of molecules that are foundational to understanding systems of biological and environmental importance. Her initial studies on arrival at KU focused on the formation and reactivity of macrocycles bound to late transition metal species. During a sabbatical leave in the group

*(see Distinguished Professors p. 16)*

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## NOTES FROM THE CHAIR



Dear Chemistry Department Alumni,

Another year has passed, and it has been an eventful one. Following my pattern of being most excited about recent developments, I want to highlight three very recent events that are indicative of the upward trajectory of the Chemistry program.

As you will note from the front page story, the Chemistry Department has its first two female distinguished professors! Early this spring, Susan Lunte gave her inaugural address as the Ralph N. Adams Distinguished Professor of Chemistry. Many of you will be aware that Sue's research focuses on Bioanalytical Chemistry, particularly microanalytical methods for the investigation of the transport and metabolism of peptides across the blood-brain barrier, separation-based sensors employing on-line microdialysis coupled to microchip electrophoresis, cell-based assays on chips, and microchip-based diagnostics for cardiovascular and metabolic diseases. We have also just learned that Kristin Bowman-James was named as a University Distinguished Professor. This appointment resulted from an internal competition among candidates nominated by many departments and units. Kristin was one of four individuals, all as it turns out scientists from the College of Liberal Arts and Sciences identified for this honor. Kristin's research interests focus on macrocyclic chemistry, molecular recognition and anion coordination chemistry. These two individuals follow in the tradition of excellence established by such chaired notables as Paul Gilles, Ralph Adams, Dick Schowen, Tak Higuchi, Ted Kuwana, George Wilson, Daryle Busch and Shih-I Chu. We are very pleased to welcome them to the company of these leaders in Chemistry.

Second, four of our junior faculty—Jon Tunge, Heather Desaire, Misha Barybin and Cindy Berrie—received tenure and were promoted to the rank of associate professor. In addition, Krzysztof Kuczera, who holds a joint appointment with Molecular Biosciences was promoted to the rank of professor.

Third, Stephanie Hill, an undergraduate chemistry major and participant in the Chem Scholars program, received a Barry M. Goldwater Scholarship.

Fourth, Misha Barybin received a DuPont Young Faculty Award, and Kristin Bowman-James received a career creativity award from NSF.

What these accomplishments indicate is that KU is an incredibly dynamic place for undergraduate and graduate students to study chemistry. We draw into our graduate and undergraduate programs those who are among the very best in the nation. The department has a growing and highly successful faculty which is making an important mark in the respective disciplines. We are achieving our goals to become among the best chemistry programs in the country, and our faculty, students, staff and alumni are all crucial partners in this effort.

**Personnel.** There is more good news about the future of the department. We succeeded this year in hiring two talented new assistant professors. Timothy Jackson will join the Inorganic Chemistry division this year. Tim received his doctorate at the University of Wisconsin and is currently

completing postdoctoral study at Minnesota. He plans to use spectroscopy to study the structure and function of manganese-containing enzymes. David Weis joins the Analytical division after a brief stint as an Assistant Professor at Skidmore College and a year as a Visiting Assistant Professor at the University of New Mexico. David plans to use mass spectrometry of isotopically labeled proteins to study the structure and function of some membrane bound enzyme systems. Both of these young scientists will bolster a strong group of researchers studying protein structure and function. This is a vital area that has the promise to make inroads into understanding and treating ailments linked to genetic and hormonal abnormalities, as well as diseases that result from aging.

Two other additions to the University staff will be very important to the future of Chemistry and all of the science programs at the University:

Joe Steinmetz has come from Indiana University to become the new Dean of the College of Liberal Arts and Sciences. Joe started his academic life with a degree in Chemistry, and proceeded to transform himself into a neuroscientist. He holds a joint appointment in the Departments of Psychology and Molecular Biosciences at KU. Joe understands that it is the role of a major university like KU to provide excellent educational opportunities for undergraduate students, even as it seeks to excel in graduate education and research. He also has a clear vision of how a major unit like the College of Liberal Arts and Sciences can contribute key leadership to the research and graduate education missions of the university.

Richard Lariviere joins KU as its new Provost after a period as Dean of Arts and Humanities at the University of Texas. Richard began his career as a Sanskrit scholar, studying business and legal relationships in ancient Indian culture. Through these experiences and his contacts in India, he had the opportunity to participate in the recent economic expansion and technological boom that has been sweeping south Asia. His enthusiasm and optimism, along with his experiences in management and in building international relationships will bring an important dimension to the growth of KU's research, graduate and undergraduate programs.

**Funding and graduate programs.** The department has also had enormous success this year with federal funding agencies. Our junior faculty were particularly well-represented among those gaining major Federal grant support. Misha Barybin and Heather Desaire both had Career Award proposals funded by the National Science Foundation. Misha is working on the development of molecular components that can self assemble to form nanomaterials. Heather is developing methods for using mass spectrometry to determine the structure of the glycogen components of glycoproteins. Julian Limburg, Paul Hanson and Jon Tunge all received funding from NIH this year. This is an important achievement because of ongoing budgetary challenges at NIH. Julian will be studying a quinoidal zinc peroxidase, Paul is applying metathesis to the preparation of new cyclic phosphonate therapeutic agents, while Jon is applying his decarboxylative coupling methodology to the synthesis of natural products.

Misha Barybin and Ward Thompson were responsible for writing a successful proposal to re-establish the Department's NSF Research Experiences for Undergraduates (REU) program. The REU program provides funding to bring about 8 talented undergraduate students from schools around the country to KU for a 10 week summer research experience. Students have come from Puerto Rico, Washington, Michigan and Texas to participate in the program. The summer activities, which include research talks, poster sessions, and a seminar series specifically designed for the REU participants, provide students with an intimate look at KU and what it is like to pursue graduate study. The activities also provide a framework of programming that KU undergraduate students supported on fellowships or grant funding to participate in summer research are also free

to attend. This program has been one of the Department's most effective vehicles for recruiting talented graduate students, and has helped to enhance the diversity of our student population. KU has qualified for this program, with the exception of 2006, since Barbara Schowen, chemistry professor emeritus, was successful in getting the Department's first REU program funded in the early 1990's.

The Department participated in the National Research Council's ten-year assessment of doctoral degree-granting programs. This was a non-stop data gathering marathon! While the results of this assessment are still pending, we learned that the Chemistry Department ranked as the top NRC-evaluated KU program in the production of doctoral degrees over the three year period of the study. This is consistent with an NSF survey from 2005 that showed KU among the top 40 producers of Chemistry Ph.D.s for that year.

**Challenges and needs.** It would not have been a normal year if we had not faced some major challenges in the Department. Rich Givens' story tops the list. Rich was lecturing in Physical Organic Chemistry one morning in 2005 Malott, when a sudden water leak from the ceiling prompted some of the students sitting in the front row to move to seats further back in the room. Exhibiting a lack of caution that is uncharacteristic of his usual behavior in the laboratory, Rich reached out and placed his hand in the flow, which he quickly determined to be sewage leaking from a ruptured pipe in the crawl space above the classroom. Needless to say, the remainder of that class was cancelled, and a range of courses scheduled to use that room over the next week and a half had to be moved. A chronic blockage in one of the sewage pipes finally caused enough backup that one of the old clay drainage pipes that still exist in Malott Hall failed. The only bright spot (sorry for the pun) in this story is that the problem occurred right about the time when the Kansas legislature was arguing about whether the state could afford to fund some part of the \$600 million in deferred maintenance that is needed at the state's universities. The issue gave a new perspective to the urgency of the maintenance issue, and, perhaps, added impetus to the legislature's decision to pass a measure providing something around 1/3 of the overall need to address maintenance issues. This provides a start to addressing these problems, and we are all very grateful to the legislature for taking this step. The entire incident, along with several others that have occurred over the past year, emphasized for us that Malott Hall is an old building, with an aging infrastructure and a floor plan that is not always supportive of modern research needs.

Our success in nominating Kristin Bowman-James for a Distinguished Professor position reminded me of how many deserving colleagues we had not been able to put forward for similar recognition. I am very concerned about the number of distinguished professor positions in the Department. At one time, the KU Chemistry Department boasted seven active faculty with chaired positions or distinguished professor appointments. Counting our two newest Distinguished Professors; we have now only come back up to five chaired faculty in the Department. This not only represents a substantial loss of input at the highest levels of the University's research endeavor, it means that we have lost ground in the fight for resources that will help us retain the bright young scientists who have begun to build their careers at KU. Fortunately, I am pleased to announce that Dr. Keith D. Wilner, B.A., has established a planned gift to endow a chair in the department. He states that this gift is made in honor of Professors Ralph Christofferson and Richard Givens. This gift will be an enormous help in sustaining the careers of talented young scientists who have made their careers at KU.

These discussions bring me around to the perennial question of what are the key needs that the Department has been communicating to the University administration. But, before I begin that

discussion in earnest, I want to say THANK YOU to all of the other loyal alumni who have stepped forward to provide help, support and advice to KU during the past year. We genuinely appreciate the affection, enthusiasm and generosity that you have shown for the Department of Chemistry at KU. Your help, participation in the numerous alumni events we have held over the past year, and financial support have been a great help to the Department. We could not undertake all of the efforts to enhance student access to learning and research opportunities, initiatives to enhance the careers of existing faculty and plans to hire new faculty without your support. You REALLY make a difference!

The Department has sent a clear message to the administration that support for mid-career faculty development is our top priority. This might initially sound like a nebulous goal, but the availability of funds to recognize, support and enhance the career opportunities of the gifted young faculty in our department will be a crucial factor in convincing them that staying at KU will place no boundaries on their career potential. Faculty development resources can come in small chunks — resources for young investigators to attend a critical meeting, purchase an essential piece of equipment or hire a postdoctoral associate to open a new research area — or in significant chunks — resources to renovate an entire suite of laboratories, endow a lectureship or a distinguished professorship in a key research area. Many times, these resources flow directly back to graduate or undergraduate students, helping to fund research experiences from the discretionary resources available to a young investigator.

Our second priority has recently been graduate fellowships and scholarships. We do need resources for all types of fellowships, but particularly to support talented, underrepresented and foreign students who want to study at KU but do not initially qualify to the Graduate Teaching Assistantships that many American-born students can receive. Some of these individuals have prior connections to the Department through mentors in their home institutions who studied at KU in the past. We would like to provide more opportunities to bring these individuals to KU so that they can experience the unique research environment in our programs in Chemistry.

As you can tell from my previous discussion, a rapidly rising priority for our department is the need for new, modern and expanded space. A new science teaching/research building has been a top University and Board of Regents priority for over 15 years. This major new building project has achieved a ranking equal to our need for faculty development funding because many of our facilities are in critical condition, we need the added space to ensure that our best young faculty can continue to grow their research programs unimpeded, and we have saturated Malott Hall's capacity to teach Chemistry to undergraduate students. We have taken the first tentative steps to ally with the College of Liberal Arts and Science to focus a fundraising campaign around establishing a major Chemistry building and renovation fund. This effort cannot come soon enough for Chemistry, Molecular Biosciences, Physics and many of the other science programs in the College.

Finally, our Department must focus on soliciting unrestricted donations to support efforts to recruit the best undergraduate and graduate students to KU. These individuals are our future and the future of the profession, and we feel that KU is an exceptional environment for them to spend their formative years in the study of science.

On behalf of my colleagues and our students, I want to thank you all again for your help and support. Please enjoy the rest of the news about new initiatives in our Department and don't hesitate to send us information that can be used in future editions of this publication.

**Joe Heppert**  
Professor and Chair

## CURRENT RESEARCH

### *Kansas Center of Excellence in Chemical Methodologies & Library Development (KU-CMLD)*

The mission of the University of Kansas Center of Excellence in Chemical Methodologies & Library Development (KU-CMLD) is to design and synthesize libraries that: (1) utilize new principles of scaffold design (and especially the incorporation of multiple scaffold cores into a single library), (2) are likely to have pharmacological activity based on sound drug design principles, and (3) are likely to have drug-like characteristics. Research is carried out both in a state-of-the-art facility to be located in the Life Sciences Research Laboratory at KU and in the laboratories of individual investigators at KU, the University of Missouri B Kansas City, Iowa State University, the University of Minnesota and at Deciphera Pharmaceuticals.

**Jeffrey Aubé**, Professor of Medicinal Chemistry, and a Courtesy Professor in Chemistry at the University of Kansas is the Principal Investigator and Director of the KU-CMLD. Professor Aubé received his B.S. in Chemistry magna cum laude from the University of Miami in 1980, and his Ph.D. in Organic Chemistry from Duke University in 1984 under the direction of Professor Steven W. Baldwin. After postdoctoral study with Professor Samuel Danishefsky at Yale University as an NIH Fellow, he joined the University of Kansas as an Assistant Professor of Medicinal Chemistry in 1986. Professor Aubé has received fellowships from Eli Lilly, American Cyanamid, and the Alfred P. Sloan Foundation. He has also been honored for outstanding teaching at KU through the 1995 HOPE and 1997 Kemper awards. He was the recipient of the 2001 Olin Petefish Award for excellence in the Basic Sciences.

The key personnel in the program are:

**University of Kansas:** Jeffrey Aubé, Professor of Medicinal Chemistry and Director KU-CMLD; Frank Schoenen, Associate Director KU-CMLD; Brian Blagg and Apurba Dutta, Assistant Professors of Medicinal Chemistry; Richard Givens and Paul Hanson, Professors of Chemistry; Gerald Lushington, Director, Molecular Graphics/Modeling Laboratory; Helena Malinakova, Associate Professor of Chemistry; Elias Michaelis, Director, Higuchi Biosciences Center; Lester Mitscher, University Distinguished Professor of Medicinal Chemistry; Jon Tunge, Associate Professor of Chemistry; David Vander Velde, Director, Nuclear Magnetic Resonance Laboratory; Todd Williams, Director, Mass Spectrometry Laboratory

**University of Missouri B Kansas City:** Keith Buszek, Associate Professor of Chemistry

**Iowa State University:** Richard Larock, University Professor of Chemistry

**University of Minnesota:** Gunda Georg, Robert Vince Endowed Chair and McKnight Presidential Chair in Medicinal Chemistry

**Deciphera Pharmaceuticals LLC:** Daniel Flynn, President. Additional personnel include approximately twenty-five graduate students and postdoctoral scientists.

## An HIV Vaccine...How cool would that be?

Heather Desaire, Associate Professor



Heather Desaire is an associate professor of Analytical Chemistry, and her group is working on HIV vaccine development. "People often ask me why I am doing AIDS research," Desaire explains. "It's really for three different reasons. First, I think it's an important cause that isn't getting enough attention by pharmaceutical companies. Most of them have decided to focus on making drugs to treat HIV positive patients instead of making a vaccine that would prevent infection."

"The second reason is because it's one of the most challenging problems our scientific community is facing. Scientists have been working for more than 20 years on a vaccine, and we still don't have one. The sheer magnitude of the problem is exciting," Desaire explains. "Finally, it turns out that my group has a very unique expertise that could contribute significantly to vaccine development."

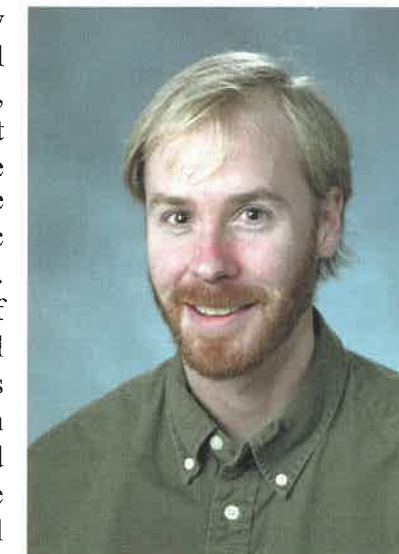
The Desaire group's expertise is glycoprotein analysis. They study proteins that have carbohydrates attached to them -- these proteins are called glycoproteins -- and they use mass spectrometry to identify what the carbohydrates are and where they are attached to the glycoprotein. This analysis is useful for HIV vaccine research because many believe that a successful HIV vaccine will be a synthetic form of the glycoprotein that covers the surface of the HIV virus. Desaire's group is currently characterizing the carbohydrates on several synthetic forms of this glycoprotein.

The vaccine candidates Desaire's group is studying are designed to mimic the glycoprotein on the actual virus. The strategy is to "trick" the body into recognizing this glycoprotein as something harmful. Then, if people get exposed to HIV later, the body will already know that this is something it needs to destroy. One of the main problems with this strategy, according to Desaire, is that nobody knows what the carbohydrates on this glycoprotein vaccine should be. And this could be a pretty big problem, because the carbohydrate is half of the mass of the molecule. "We would never make a drug like aspirin by only worrying about half of the structure of the molecule; we would optimize the whole structure. It just makes sense," Desaire explains. "But in HIV vaccine research, most people are ignoring the carbohydrate half of the molecule, and I just don't think that's going to work."

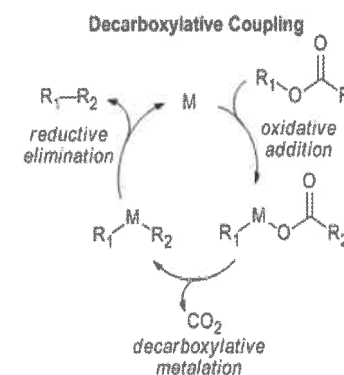
By performing mass spectral analysis on different types of vaccine candidates, both promising ones and unsuccessful ones, Desaire's group hopes to determine what types of carbohydrates would be most beneficial for the vaccine. "Optimizing the carbohydrates on the vaccine is just one of the many things that still needs to be accomplished, before we will have something that will prevent HIV infection," Desaire explains, "But if my group can figure out this carbohydrate part ... How cool would that be?"

## Green Synthesis Via Decarboxylative Coupling And C—H Functionalization.

Jon Tunge, Associate Professor



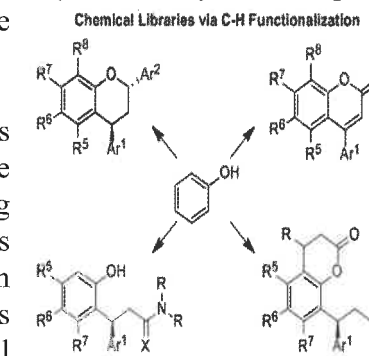
With natural resources dwindling, it is imperative that new synthetic methods are developed that provide highly useful chemical building blocks, proceed in high yield and selectivity, yet generate little waste. Catalyst development, such as that being conducted in the Tunge group, will play an essential role in approaching this challenge. Ongoing research in the Tunge laboratory is focused on developing mild, waste-free, catalytic methods that facilitate the synthesis of useful small molecules. In addition, they are engaged in detailed mechanistic studies of catalytic processes with the goal of advancing the fundamental knowledge of the chemical sciences. Thus research projects in the Tunge group span several traditional disciplines with catalysis as the central theme. In particular they are interested in the application of the principles of catalysis toward selective synthesis of biologically active small molecules, combinatorial synthesis, and potential large-scale production of fine chemicals.



Currently, a major research thrust of the Tunge group is the development of environmentally friendly methods for cross-coupling reactions. While catalytic cross-coupling reactions have made a significant positive impact in the synthesis of chemically-complex small molecules and natural products, such reactions typically require expensive, toxic, or highly basic reagents. Moreover, these reagents produce stoichiometric quantities of hazardous byproducts that are often difficult to remove from the product. With this in mind, the Tunge group is developing catalytic synthetic methods that capitalize on CO<sub>2</sub> release as a driving force for the formation of reactive organometallics intermediates. This strategy utilizes ubiquitous carboxylic acids as substrates and avoids the use of expensive, toxic, or highly basic reagents. Ultimately, decarboxylative coupling is an environmentally benign method that allows access to a wide variety of important chemical "building blocks."

Chemical Libraries via C-H Functionalization

In addition to decarboxylative coupling, the Tunge group is investigating the functionalization of arene C-H bonds to provide products analogous to those produced by well-known cross coupling reactions. Like decarboxylative metalation, such a strategy avoids expensive and/or toxic reagents and minimizes the production of hazardous waste. Since C-H bond functionalization obviates the formation of byproducts, it is ideally suited for combinatorial chemistry, where the purification of large chemical libraries by traditional methods is not feasible. These strategies are being applied to the parallel synthesis of libraries of privileged biological scaffolds such as coumarins and chromans.



## Extreme Science and the KU Instrumentation Design Lab

Ken Ratzlaff, IDL Director

Antarctica, we are repeatedly told, is the highest, coldest, driest and windiest continent on earth, and the South Pole is the most remote inhabited location on earth. But these features have created compelling reasons why dozens of scientific projects are located at the Pole. For the third time, equipment designed and built by the Instrumentation Design Laboratory is being deployed there, this time for AURA – the Askaryan Under-Ice Radio Experiment in Antarctica, a neutrino observatory. Dave Besson of KU is PI.

AURA is deploying an array of antennas in the ice to detect the highly directional but very faint radio pulse which occurs as a result of an extremely rare collision of a cosmic neutrino with an ice molecule. The radio pulse must be detected with multiple antennas a few hundred meters to a kilometer apart to be sure that it is a real event. If we then time-stamp that event with precision and accuracy, we can reconstruct a trajectory of the incoming neutrino back through the earth and far into the cosmos.



We went from Christchurch, NZ, to McMurdo Station in Antarctica on a US Air Force C-17 jet. There were about 120 passengers and a bunch of freight, about a quarter of which was headed on to the pole. Here we have just landed on Pegasus field in McMurdo, an ice runway that stays solid year around.

As opposed to visible light, for example, neutrinos very rarely interact. They are not absorbed or refracted in their path.

Consequently, they are the only radiation reaching earth that originates from the furthest reaches in the cosmos. Those detected by radio, are also the highest energy particles reaching the earth, on the order of  $10^{20}$  eV. (See <http://kuhep4.phsx.ku.edu/~iceman> for more details.)

The remoteness and cold make the South Pole a good site for AURA. Because of prolonged cold, the precipitation that has fallen or blown there has accumulated so that now the South Pole sits on a block of relatively pure ice 9300 feet thick which is very clear for radio waves. The remoteness minimizes interfering rf noise so that faint pulses can be detected.

The challenges are myriad:

- The input antennas and amplifiers must detect a signal barely above the thermal noise.
- Once detected, a single antenna cluster with 4 antennas has a few microseconds to determine that a neutrino and not, for example, the spark plug of a snowmobile has triggered it.
- Then when that filter has identified an event, the time must be established, good to under a nanosecond, no mean feat given the distances.
- The results from a single cluster are then compared with those from other clusters to see if there are enough coordinated detections to determine that there was a neutrino.
- In addition, the signal for each neutrino candidate must be digitized at over a gigahertz to a resolution of 12 bits in order to study the physics of the generation of the neutrino.

AURA is deploying its first test clusters in conjunction with IceCube, a \$270M experiment that utilizes light emission from neutrino events. IceCube drills holes 2500m into the ice and deploys a string of optical detectors. (Drilling in ice and building for survivability in that environment is an additional fascinating subject.) AURA is deploying its modules on two of those strings at a depth of 1400m. In addition, a third, shallower module will be placed at 250m.



The deployment team has successfully mounted the first AURA Digital Radio Module (DRM) to an IceCube cable. IceCube goes down to 2500m into the ice; our module will be at 1400m. Outside there is a brutal wind and -45F windchill (note snow on the floor), but things go well inside. Three of us on the design and development team for AURA participated in deployment: Albrecht Karle (IceCube, University of Wisconsin), Hagar Landsman (IceCube, University of Wisconsin), and Ken Ratzlaff (Kansas). We are pleased to see the fruits of a year's labor being deployed.

The Instrumentation Design Laboratory has been responsible for the early steps of the processing of incoming signals and for the *rf* shielding. Working with colleagues at the University of Hawaii, we have built a board to amplify, filter and detect the signals and to digitize them at a gigahertz. Hawaii also supplied additional input filters and amplifiers developed for another experiment. A second board extracts the data from the first, performs the filtering described above, and notifies a board provided by IceCube which timestamps the event and handles communication to the surface. Sprint in Overland Park made their anechoic chamber available for tests of antennas, amplifiers and shielding.

Both of the boards built by the IDL require extensive programming of FPGAs -- Field Programmable Logic Arrays. These are integrated circuits which contain hundreds of thousands of logic gates each which are connected through programming. No computing system could achieve the performance required; like a modern CPU, the FPGA allows steps to occur at over a gigahertz rate, but the FPGA can handle more specialized operations and be programmed to do many different things in parallel.

Two keys to this development were our people. John Ledford is a gifted engineer, quick learner and talented FPGA programmer. He designed much



Each DRM has 4 antennas and high-sensitivity amplifier modules which are placed in high-pressure modules. The copper antenna is just heading into the hole.



We had to test the DRMs, and our transportation that day was this sled pulled by snowmobile. The DRM had to be carefully balanced so as not to damage the points of penetration into the glass pressure vessel.

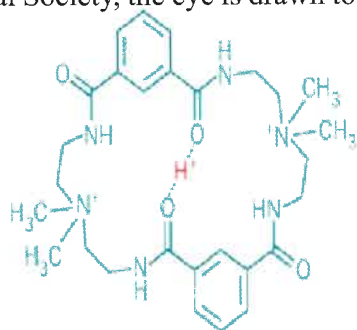
of the system and oversaw the construction of much more. Jeff Worth is a skilled electrical engineering tech. He can solder down chips with spacing of only a millimeter, so close together some of us can barely see them. These and other skills make the manufacture of our modules possible.

Our collaborators on this project come primarily from the University of Hawaii (amplifier, filter and ADC electronics) and University of Wisconsin/IceCube (infrastructure, communication system and user interface, deployment systems, engineering support and more). Other participants are University of Maryland (simulations, front-end amplifier testing and packaging), Penn State (FPGA code) and University of Delaware (power supply components).

## Macrocycle-Encircled Proton

C&EN News, July 2, 2007, Volume 85, Number 27, p. 24

Gazing down the contents list of the Journal of the American Chemical Society, the eye is drawn to the concise, provocative title, "Encircled Proton." The paper, it turns out, describes the "strikingly unusual occurrence" of a proton that is encircled by a dicationic macrocycle and also hydrogen-bonded to two inwardly oriented carbonyl oxygen atoms of amide groups (J. Am. Chem. Soc., DOI: 10.1021/ja0724745). Because the distance between those two oxygen atoms is only 2.45 Å, the hydrogen bonds in the O...H...O bridge are unusually short and very strong. According to **Victor W. Day, Kristin Bowman-James**, and coworkers at the University of Kansas, Lawrence, scientists have postulated that "such bonds exist within protein interiors, and although still subject to debate, these symmetrical amide O...H...O bonds may be an important component of transition-state stabilization in enzymes." Their discovery was serendipitous: When they treated the macrocycle with a few drops of concentrated sulfuric acid, they produced and crystallized a complex containing three HSO<sub>4</sub><sup>-</sup> counterions. An X-ray crystal structure and NMR spectra led them to the surprising conclusion that a lone proton had taken up residence in the macrocycle's cavity.



(cont. from p. 1) **DISTINGUISHED PROFESSORS.....Susan M. Lunte**

important neuropeptide that is involved in nociception and depression as well as many other disease states. Her group has also focused on the development of separation-based sensors that can be used for both in vivo and in vitro monitoring of molecules with biological, pharmaceutical or environmental importance. These sensors have a large range of applications, including the peptide transport studies mentioned above, monitoring the release of neurotransmitters and determining the pharmacokinetics of drugs as well as process monitoring in biotechnology. Recently, Sue's research group has coupled microdialysis to microchip electrophoresis. The use of a microchip analytical system, as compared to a conventional electrophoresis system, provides several advantages, including fast analysis times (for good temporal resolution), potential portability (due to its small size), and the possibility for mass fabrication. Sue's group is pushing this technology to perform single cell analysis on a chip. (An example of her work in this area was highlighted in the January 22, 2007 edition of C&E News in an article on career prospects in Analytical Chemistry.) Such analyses are accomplished by cell sorting followed by lysis and analysis of the cellular contents by electrophoresis. Sue is applying this approach for the detection of nitric oxide metabolites in macrophages, glial and endothelial cells. Her group has developed an assay for the detection of peroxyxynitrite on chip. This strategy allows the electrochemical detection of peroxyxynitrite in less than one minute. The ultimate goal of these studies is to be able to directly detect peroxyxynitrite produced in a macrophage or other cell on chip.

(cont. from p. 1) **DISTINGUISHED PROFESSORS.....Kristin Bowman-James**

of Professor Jean-Marie Lehn, her research began to focus on the use of hydrogen bonding polyammonium macrocycles as receptors for the binding of anions. This work quickly led to her recognition that polyammonium macrocycles can act as catalysts, mimicking the activity of ATPases and facilitating the dephosphorylation of nucleotides. Building on these seminal investigations into the coordination chemistry of anions, Kristin has led in the development of the systematic coordination chemistry of these traditionally ignored omnipresent negatively charged ions. For both simple monatomic anions and for oxo anions, her research program has engaged in extended studies of the structural motifs that recognize and bind them. Highly symmetrical oxo anions of, for example those of sulfur, nitrogen and phosphorus, are pervasive environmental contaminants that are difficult to properly detect, immobilize and remediate. Her recent studies of polycyclic amide based ligands as hosts for halide species are important in the same general context. Her group's recent development of a synthetic receptor for bifluoride is the culmination of an effort to encapsulate this highly challenging anion. In addition to defining the coordination chemistry of individual anions, Kristin's studies have resulted in the isolation, characterization and systematization of stacked anion complexes, including tritopic complexes similar to Lehn's cascade complexes of transition metals.

Kristin and Sue are both internationally known scientists whose contributions to their scholarly disciplines are widely recognized and appreciated. In addition to their scholarly accomplishments, both have demonstrated leadership and service in their disciplines on a national level and both are known for their activities in mentoring and supporting young scientists, particularly women embarking on careers in the Chemical Sciences. As leaders in the Chemical Sciences, Sue and Kristin are examples of individuals who are raising the profile of the KU Chemistry Department. The entire Department is delighted to see their accomplishments recognized in this manner.

## *KU Local ACS Section Sponsors Town Hall Meeting on Competitiveness*

The University of Kansas Local Section of the American Chemical Society and the KU Center for Science Education recently sponsored a town hall meeting on competitiveness, at the Robert J. Dole Institute of Politics on the Lawrence campus. The keynote speaker for this event will be the Honorable Nancy Boyda, Congresswoman from Kansas 2<sup>nd</sup> Congressional district. The intention of this event was to stimulate discussion among various members of the state and local government, the private sector and the academic communities about how the citizens of Kansas can contribute to placing the state in the forefront of the effort to raise our national competitiveness and develop an entirely new generation of high-technology jobs that will benefit Kansas' future. The National Academies' "Rising above the Gathering Storm" report (<http://www.nap.edu/catalog/11463.html>) has clearly identified the challenge our nation faces through international competition for leadership in high-technology enterprises.

One of the main backdrops for discussion at this meeting was federal legislation intended to help the nation meet the competitiveness challenge raised by strong investment in mathematics, science and engineering education in Asia, and the accompanying surge in science and technology based businesses. Many bills intended expand federal funding for programs in scientific, technological and engineering research, as well as backing substantial enhancements to K-20 education programs have already passed the House of Representatives. Prominent among these bills are H.R. 362, the *Ten Thousand Teachers*, *Ten Million Minds Act* and the *NSF Authorization Act of 2007*.



Joe Heppert, Professor and Chair of Chemistry;  
Katie Mitchell-Koch, Graduate Student, Chemistry;  
Congresswoman Nancy Boyda;  
Jim Roberts, Vice Chancellor of Research

Additional speakers at the event were Mr. Tracy Taylor, President and CEO of the Kansas Technology Enterprise Commission (KTEC) who discussed the role of the state in fostering technological -competitiveness, and KU Vice Provost Jim Roberts, who addressed the role of the Universities as partners in nurturing science and technology-based economic development. A highlight of the event turned out to be a brief speech that concluded the formal session of the event presented by Ms. Katie Mitchell-Koch, a fourth-year graduate student in Professor Ward Thompson's research group. Katie provided a brief and very

compelling description of how integral federal funding had been to the development of her career as a scientist. (A copy of Katie's talk is appended to the end of this article.)

The meeting concluded with informal discussion during an hour long poster session/ reception

attended by the Congresswoman. Posters and participants represented a variety of initiatives supported by regional institutions to enhance mathematics and science research and education. Some of the groups represented at this session included the KU Cancer Center, the Higuchi Biosciences, the Center for Environmentally Beneficial Catalysis, the Center for Science Education, the Center for Remote Sensing of Ice Sheets, the Information and Telecommunications Technology Center, and the Center for Research on Learning. Participants responded positively to the informal dialog about how federal and state governments can partner with the universities and private sector to foster economic growth and expand the nation's competitiveness.

### *Text of Katie Mitchell-Koch's Remarks*

Good afternoon. My name is Katie Mitchell-Koch, and I am a doctoral candidate and 4<sup>th</sup> year graduate student in chemistry. I started out as an undergraduate student at KU in the fall of 1998. The Robert Byrd scholarship, which is funded by the federal government, helped fund my undergraduate education. When I began doing undergraduate research in chemistry my sophomore year, I began to feel like a member of the chemistry department. And I really started to feel at home in chemistry the summer between my sophomore and junior years, when I participated in the National Science Foundation's Research Experience for Undergraduates- or REU- program. As part of the REU program, I did full-time research and presented my findings in the program's research symposia, giving an oral presentation on my progress and presenting a final poster. My REU experience showed me what it was like to be a scientist, and that's how I really got hooked on chemistry, and knew that I wanted to become a chemist. Later in my undergraduate career, I received research funding from the National Institutes of Health Kansas Biomedical Research Infrastructure Network- now K-INBRE- which provided funding for another summer of research in an area of chemistry that was new to me. What was most memorable about that program was the research symposium they held at the KU Med Center where students presented posters, and a number of leading scientists from the region presented their work in biomedical research.



Since entering graduate school, my doctoral work has been funded by a Hertz Foundation Fellowship and the National Science Foundation's Graduate Research Fellowship Program. The NSF program has provided for my tuition and a stipend, and has allowed me the flexibility and freedom to pursue my research interests. A highlight of my graduate career was a trip funded by the National Science Foundation and Oak Ridge Associated Universities to attend the 55th meeting of Nobel Laureates and students in Lindau, Germany. At this meeting, Nobel Prize winners from chemistry, physics, and medicine gave lectures on their research and lives as scientists. The Lindau meeting was attended by students from all over the world. The US delegation hosted dinners for us to meet as a small group with the laureates, and also hosted lunches and an evening social for students from the US to meet with young scientists from other countries. It was the opportunity of a lifetime, and I left the meeting very much encouraged to keep working as a scientist and to pursue the most important research problems.

*(continued on page 17)*



# KU WELCOMES NEW ADMINISTRATORS!

## *Steinmetz Named CLAS Dean*

Doug Koch, Summer Oread 2006

Joseph Steinmetz, executive associate dean of the College of Arts and Sciences at Indiana University, Bloomington, has been named the new dean of KU's College of Liberal Arts and Sciences. He will start July 1.

"I'm delighted that Joseph Steinmetz has agreed to lead KU's College of Liberal Arts and Sciences, and I'm very confident he will be an outstanding leader for the university," said Provost and Executive Vice Chancellor David Shulenburg. "Dr. Steinmetz generated a remarkable degree of enthusiasm among the KU faculty within the college. His colleagues at Indiana spoke with great admiration for his talents and vision."



Chancellor Robert Hemenway said other universities actively recruited Steinmetz.

"Other universities wanted Joe Steinmetz, but KU was his choice," Hemenway said. "We are delighted that he will assume a key leadership position within the KU community."

Steinmetz said he felt the position at KU was the best that was open among universities this year.

"The College (of liberal arts and sciences) is a big part of the institution, and the institution is first-rate," he said. Out of all the dean positions that were open this year, this was by far the best."

He said he was intrigued by the KU position because of the mix of humanities with liberal arts, social science and other science disciplines within CLAS, which is a strong academic formula, he added.

Steinmetz began his academic career at IU in 1987, when he joined the Department of Psychology as an assistant professor. He was promoted to associate professor, tenured in 1991 and promoted to full professor in 1995. In 1999, IU recognized his research and teaching contributions by awarding him the Eleanor Cox Riggs professorship in psychology. He also is a core faculty member of two interdisciplinary programs at IU, in cognitive science program and in neural science, as well as a member of the University Honors Faculty. From 1995 to 2005, Steinmetz was chairman of IU's Department of Psychology. During his last year as department leader, he was senior adviser to the dean of the College of Arts and Sciences for long-range planning. In that role, he oversaw external reviews that the college conducted for key departments as part of its strategic planning

processes, and he conducted a study of the general organization of university arts and sciences colleges around the country with an eye toward assessing IU's organization.

In 2005, Steinmetz assumed the duties of executive associate dean for the college. His major responsibilities included day-to-day management of the college's budget; leading the college's promotional committee, overseeing the office staff, overseeing faculty recruitment and hiring and representing the college on several campus-wide committees involved mainly in faculty development, financial matters and college fund raising.

Over the years, Steinmetz has taught a variety of courses in experimental psychology, neuroscience and cognitive science. At IU, he trained 14 graduate students and nine postdoctoral scholars and has worked with more than 100 undergraduates in his laboratory. His research program has produced more than 160 publications and more than 150 published abstracts, conference proceedings and invited presentations. He said he plans to bring his research lab with him to KU. He said the lab, which studies how the brain encodes learning and memory, is made up of postdoctoral researchers and graduate students. Some have said they plan to follow him to Kansas.

In 1996, the National Academy of Science selected Steinmetz for the Troland Research Award to recognize his research contributions to the fields of experimental psychology and neuroscience. Last year, he was elected a fellow in the prestigious Society of Experimental Psychologists. He also received the 2000 Indiana University College of Arts and Sciences Distinguished Faculty Award.

Steinmetz said he is anxious to start his new position. He looks forward to "the prospect of going to work with great people, and making a fresh start. I was very impressed with the administration there as well."

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*(MITCHELL-KOCH continued from p. 15)*

I am just one of so many graduate students in the chemistry department at KU whose education and research have been impacted by federal funding. The immediate benefits of funding for scientific research and education can be evinced by a conversation with any one of my peers about their current work and future aspirations. But federal funding is also an investment with benefits that will be reaped in the future- after we leave the university as students- as we use our educations to develop new technologies, educate others, and innovate.

Thank you.

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## *Provost sets down Kansas roots, articulates a... GLOBAL OUTLOOK*

Doug Koch, Oread, Fall 2006

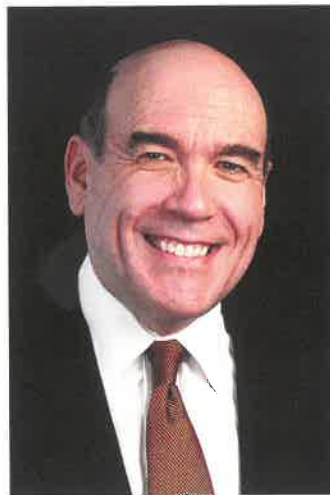
New Provost and Executive Vice Chancellor Richard Lariviere took office this summer. As he begins his first academic year at KU, he took time to answer questions submitted from around campus.

You came here from Texas. How are you finding life in the Heartland?

We are deeply touched that y'all have arranged for Texas weather the past few weeks, but we are looking forward to something a little cooler, please.

At the end of the week, after continuing the tradition of excellence at KU, what do you do to kick back?

I haven't really had much time to kick back since we arrived in Lawrence. When we do get a little time, (wife) Jan and I enjoy being outdoors. We are looking forward to doing some fishing in Kansas.



Five years from now, what do you hope will be your top two accomplishments as provost?

If KU has a truly first-class information technology infrastructure, has a new, effective admissions regime that only admits students capable of succeeding here (but looks at more than test scores and GPA for evidence) and understands its rightful role in the national and international research arena five years from now, I will be a happy provost.

Your professional service reflects strong international ties and you speak French and Hindi. What does KU need to do to prepare students for today's global economy?

I was deeply impressed at my first Board of Regents meeting when Nelson Galle, the chairman of the board, challenged us to make it possible to give every single student at KU a study abroad experience. I can think of nothing that would be more effective at preparing students for the global economy in which they will be working.

What experience do you have in promoting diversity and equal opportunity?

I have had considerable – successful – experience as dean of the College of Liberal Arts at the University of Texas-Austin. Because of the commitment and vision of the faculty, we hired more African-American faculty during my time as dean than any other dean in the history of the institution. The challenge for everyone in higher education is the pipeline into our institutions. They are very leaky in some sectors of our society. There is good evidence that we begin to lose students in the third grade. This is a problem larger than KU, but we need to do what we can at both the theoretical and the practical levels to find remedies for these phenomena. KU needs to insure that our faculty and our student body bring the widest range of perspective and experience possible to our inquiries. Universities sometimes – no, often – neglect to think about this when looking at the credentials of the people they hire.

Race, ethnicity, gender, social class, life experience, etc. can all be additional values that we should consider from the perspective of how these qualities can enrich our research and teaching.

At the University of Texas-Austin, you demonstrated a deep commitment to making a college education possible for students from various segments of our society. Do you plan to continue that work at KU? If so, how?

There is nothing more important to the quality of education at a major research institution than a diverse community. In many conversations, diversity is often restricted to issues of race and ethnicity. Diversity for me means that and much more: diversity of socio-economic background, political views, life experiences, cultural values, etc. The richer the mix, the richer the educational experience.

What is KU's role in economic development?

KU is a wealth-generating machine. Every graduate of this university goes on to make money, pay taxes and lead in his or her community. Their contributions are hard to measure precisely, but they are large. We are also working on streamlining the relationship between our best and most productive research labs and those who are able to effectively take intellectual property to market.

The Greater Kansas City Community Foundation, in its 2005 "blue ribbon" report, *Time to Get It Right: A Strategy for Higher Education in Kansas City*, stated "Kansas City needs a world-class research university" and concluded that KU-Lawrence does not serve that function. (Neither does KUMC or UMKC.) How do you feel about that conclusion, and what might you do to address it?

I disagree with that conclusion of the panel. The report gives the example of Princeton not being "the world class university" of New York City. This is specious reasoning. From sitting at my desk on the Lawrence campus to sitting down in the office of the dean of the Medical Center in Kansas City takes 45 minutes. It takes longer than that to drive across town in Austin, Texas. Surely, in this moment of blindingly fast changes in communication, the mere 40 miles between Lawrence isn't an inhibition to our contributing to the flourishing of Kansas City.

Some universities provide free tuition to the children of full-time faculty and staff members. Would it be possible for KU to provide this benefit?

If I could wave a magic wand, tuition would be eliminated for every student, not just for the children of the immediate KU family. Not having a magic wand, we are constrained by the realities of our financial environment. I don't know what the financial cost of free or reduced tuition for children of KU faculty and staff would be for KU, but I know that this is a significant burden for our colleagues at private universities. Given what I know about the current fiscal situation at KU, it seems unlikely that we will be able to offer this benefit.

Do you foresee the development of a new strategic plan, including clear goals and objectives, for the university?

One of the reasons that I took this job was to be able to work with – and learn from – Bob Hemenway. When I took this job, I got congratulatory notes from a number of people who commented on how lucky I would be to be working with a person whose reputation among his peers is so high. His understanding of KU and its place

in higher education is completely coincident with mine. As for the goal and the plan – there isn't much that is new or unclear: The goal is to be the best university that we can be. The strategic plan is to hire the finest faculty possible and give them what they need to succeed.

How will you connect with various groups to gain feedback on some problem areas and to facilitate moving forward to continue to improve campus life for all?

This is a continuous challenge given the number and range of interests at a place like KU. I intend to use the structures of student and faculty governance as vectors of information and feedback, but I also highly value the opportunities to learn that come from individuals who contact me directly with suggestions and ideas. One of the great things about a community like this is the high concentration of smart people who are capable of generating ideas to solve problems.

What is the biggest challenge at KU and how will you address it?

*(continued on p. 27)*

## Faculty Achievements & Awards

### *Professor Carey Johnson Awarded Marie Curie Incoming Fellowship*

**Carey K. Johnson, Professor**

One of the pleasant perks of academic life is the opportunity for sabbatical leave, a chance to learn about new areas of research and to visit interesting places. During the 2005-2006 academic year I was on sabbatical in Würzburg, Germany, a beautiful city of about 130,000 on the Main River in the northern part of Bavaria. It has a rich university tradition. (X-Rays were discovered there by Wilhelm Röntgen in 1895.) I received a Marie Curie Incoming Fellowship from the European Union, which enabled me to extend my leave to a full year. We were also able to make the sabbatical a family affair. My wife Jean and two children, Elizabeth and Willie, joined me in Germany for the Fall semester. They were able to gain some German language skills, and of course, we took advantage of opportunities for travel.



My host in Würzburg was Professor Greg Harms at the Rudolf Virchow Zentrum for Experimental Biomedicine at the University of Würzburg. Greg was a Ph.D. student in my group, receiving his doctorate from K.U. in 1998. Greg is an expert in fluorescence imaging, a field of growing importance in cell biology and biomedicine. The methods used are related to current research in my laboratory at KU in single-molecule spectroscopy. My professional goal was to learn methods of fluorescence imaging in living cells and to apply them to detect single molecules in cells. A molecule of special interest in my lab is calmodulin, a calcium signaling protein, and we were able to demonstrate detection of single calmodulin molecules



for the first time in living cells. Now, back at KU, I am working to incorporate these new methods into my research program here.

Professor Greg Harms, far left, and his group. **Professor Johnson** is 4th from the left.

### *NSF Faculty Early Career Development Awards*

Each year the National Science Foundation (NSF) selects nominees for Presidential Early Career Awards for Scientists and Engineers (PECASE) from among the most meritorious new CAREER awardees. The PECASE program recognizes outstanding scientists and engineers who, early in their careers, show exceptional potential for leadership at the frontiers of knowledge. This Presidential Award is the highest honor bestowed by the United States Government on scientists and engineers beginning their independent careers.

In 2006 three of the Department's newly promoted associate professors received the NSF Career Award: **Mikhail (Misha) Barybin, Heather Desaire, and Jon Tunge.**



**Misha Barybin**



**Heather Desaire**



**Jon Tunge**

### *NSF Creativity Award*

**Professor Kristin Bowman-James** has been awarded a creativity extension on her grant entitled "Amide and Thioamide Macrocyclic Anion Receptors." A Program Officer may recommend the extension of funding for certain research grants beyond the initial period for which the grant was awarded for a period of up to two years. The objective of such extensions is to offer the most creative investigators an extended opportunity to attack adventurous, "high-risk" opportunities in the same general research area, but not necessarily covered by the original/current proposal. Awards eligible for such an extension are generally three-year continuing grants. Special Creativity Extensions are initiated by the NSF Program Officer based on progress during the first two years of a three-year grant.



## 2006 H.O.P.E. Award

The H.O.P.E. Award is the only honor given exclusively by students for teaching excellence. The 2006 recipient is chemistry **Professor Paul Hanson**. Winners receive a monetary award and recognition on a permanent plaque displayed in the Kansas Union. The Class of 1959 established the award to recognize outstanding teaching and concern for students. With one exception, only one award has been bestowed each year. In 1972, three professors tied and each received a H.O.P.E. Award: the late John Bremner in journalism, Arno Knapper in business and Elizabeth Schultz in English. Two professors have received the award more than once: the late **Clark E. Bricker in chemistry** received the award four times and the late Charles "Rick" Snyder in psychology won three times.



**Paul Hanson**, accepts the H.O.P.E. Award from Murtaza Khan, senior class president, at the KU-Kansas State Football game Saturday, Nov. 18, 2006. Photo by David McKinney, University Relations.

## KU College Of Liberal Arts And Sciences Honors Outstanding Faculty, Students

The College of Liberal Arts and Sciences at the University of Kansas honored outstanding faculty and students this spring with more than \$20,000 in teaching and student awards. The awards are made possible by the generous support of College alumni to KU Endowment. Among the awards given this year was the John C. Wright Graduate Mentor Award. This year the award was presented to **Professor Craig Lunte** of the Chemistry Department!



## University Honors Program Creates New Award



K. Barbara Schowen

A new award to recognize faculty research mentors was also given. Holly Storkel, associate professor of speech-language-hearing, was the first recipient of the **K. Barbara Schowen Undergraduate Research Mentor Award**, which is named for a former honors program director and professor emerita of Chemistry, and provides \$1,000 to use for research.

## DuPont Rewards Young Professors



This innovative grant program is designed to provide start-up assistance to promising young and untenured research faculty working in areas of interest to DuPont's long-term business. Initiated in 1968, DuPont has given over 500 of these awards. Many past award recipients have gone on to gain significant recognition in their chosen field from their scientific peers and colleagues. Each faculty member must be nominated by a member of the DuPont technical staff who agrees to serve as the liaison between the company and the faculty member. The decision for making the awards resides with the DuPont Fellows

Forum which includes the top scientists in the company. We congratulate **Misha Barybin** for being one of the the recipients of this prestigious ward!

## Wilson Wins Reilley Award For Research

Oread, November 20, 2006

Years from now, people with diabetes may be able to continuously monitor their blood glucose levels by using a tiny sensor, small enough to be injected under their skin. **George Wilson**, associate vice provost for research and a Higuchi Distinguished Professor of Chemistry and Pharmaceutical Chemistry at KU, has worked to develop that sensor for years. It is one of several career accomplishments for which he is being honored with an award named after one of his career mentors.

"I'm a little bit awed by the whole thing," said Wilson.

The Society of Electroanalytical Chemistry and Bio-analytical Systems is giving Wilson the Reilley Award, named for the late researcher Charles N. Reilley. Wilson is receiving the award for his contributions to the theory, instrument development and applications of electroanalysis. Reilley is considered one of the first modern analytical chemists of the mid-20th century. His work has contributed to electroanalysis, optical spectroscopy and instrumentation, among other aspects of analytical chemistry.

"This was a man who operated with unlimited perspective on things," said Wilson. "Instead of working in a box, he expanded his interest out into various fields."

Wilson said he has tried to do the same, not only in developing the blood glucose sensor, but in all aspects of his research. That work could not be successful, he said, without continued collaboration with researchers from various continents and disciplines, such as organic chemistry, bioengineering and medicine.



**George Wilson** receiving the award Feb. 28, 2007, at The Pittsburgh Conference Awards Symposium, which was held in Chicago. The Pittsburgh Conference and Exposition is the largest and most inclusive educational conference on laboratory science.

(continued on p. 24)

(WILSON continued from p. 23)

“He (Reilley) would be delighted with the way things are now, where the borders between various disciplines, such as chemistry and physics, are getting fuzzier all the time,” said Wilson. “He would have been energized by this sort of thing.”

Out of 23 Reilley Award winners, five have had some connection to KU, whether they earned degrees or worked at the university.

### *Taiwan Bestows Award On KU Chemistry Professor*



**Shih-I Chu**, Watkins Distinguished Professor of Chemistry, was recently elected as an academician of the Academia Sinica in Taiwan. This important award is Taiwan’s equivalent of being elected to the US National Academy of Science. Professor Chu was honored for his pioneering and innovative contributions in the development of numerous new theoretical formalisms and large-scale accurate computational methods for in-depth *ab initio* investigations of a broad range of chemical and physical processes of current significance in science and technology. His work has had a profound impact to the advancement of atomic and molecular physics in intense laser fields,

quantum chemistry, and chemical physics. He is the first academician elected in the area of theoretical atomic, molecular, and optical (AMO) physics since 1949. Professor Steven Chu, who was a previous academician in the AMO physics area, is an experimentalist, Nobel laureate, and the current director of Lawrence Berkeley National Laboratory. Only 6 scientists and engineers, most at American institutions, were elected academicians of Academia Sinica during this two-year cycle.

### *Chemistry Professor Recipient of Award from Ireland*



The E.T.S. Walton Visitors Award was created to honor the legacy of E.T.S. Walton, Ireland’s 1951 Nobel Laureate in Physics. The program, which annually supports 5-6 researchers, brings international investigators from academia and industry to Ireland to strengthen the country’s connections to the research community. In 2006 the Walton Visitors Award enabled **Craig Lunte** to take a sabbatical in Ireland.

### *Research Article Gains Notoriety*

James Milne, Ph.D., the Publisher at Elsevier responsible for their organic and inorganic chemistry journals, recently informed **Professor Kristin Bowman-James** (photo on p. 1) that one of her articles has been recognized in the “Top-50 most cited articles.” That article is: Llinares, J.M., Powell, D., Bowman-James, K., “*Ammonium Based Anion Receptors*”, (2003) **Coordination Chemistry Reviews**, 240 (1-2), pp. 57-75.

### *Recognition for Distinguished Professor Susan Lunte*



Leadership is not taught. It is instead modeled. Real leadership is not about who gets the credit. It is instead about who empowers others to lead.”

– Dr. Emily Taylor

In tribute to Dr. Taylor, former KU Dean of Women (1956-1975), who inspired women to challenge the status quo and reach their potential. (April 13, 1915 – May 1, 2004), the KU Women of Distinction Calendar is published every year. **Ralph N. Adams Distinguished Professor of Chemistry, Susan Lunte**, was honored by being included on the calendar in 2006.

### *New Research Achievement Award Presented to Chemistry Courtesy Faculty Member*

**David Vander Velde** received the inaugural Research Achievement Award, established by the KU Center for Research to recognize academic staff for research excellence. The award includes \$10,000 in unrestricted research funds. Dave has co-authored 115 scientific papers, many with faculty and alumni of Chemistry. He has had a courtesy appointment in Chemistry since 1999. This summer will mark 20 years since Dave arrived at KU to take the position of Director of the NMR Laboratory. In that time, the lab’s summed megahertz has risen from 380 to 3,100.

Oread, 11/20/06

Photo by Kevin Boatright, KUCR



Provost and Executive Vice Chancellor Richard Lariviere presents the first KU Research Achievement Award to David VanderVelde, senior scientist and director of the Nuclear Magnetic Resonance Laboratory, at the KU research convocation, as Jim Roberts, vice provost for research, applauds.

### *Life Sciences Institute Awards a Dozen Research Development Grants*



Of the dozen, *only two Neuroscience Grants* were awarded, one of which went to our own **Assistant Professor, Michael A. Johnson**. His grant is titled “*Striatal Dopamine Release in Fragile X Syndrome*”.

## TRANSITIONS

### Promotions

Five of our junior faculty members were promoted this year. They are:



**Mikhail (Misha) Barybin**  
Associate Professor



**Cindy Berrie**  
Associate Professor



**Heather Desaire**  
Associate Professor



**Jon Tunge**  
Associate Professor



**Krzysztof Kuczera**  
Professor

### New Faculty Members

**Assistant Professor Timothy Jackson, Bioinorganic**, joins us

from an NIH Post-doctoral Fellowship in the chemistry department of the University of Minnesota. His areas of specialization are Bioinorganic Chemistry, Biomimetic Chemistry and Biophysical Chemistry. He will be teaching CHEM 737, Coordination and Organometallic Chemistry, this Fall.



**Assistant Professor David D. Weis, Bioanalytical**, left a position

as visiting professor in the chemistry department at the University of New Mexico. Dr. Weis' research interests lie in the areas of protein conformation and dynamics, protein-protein and protein-nucleic acid interactions, transcription factors mass spectrometry, H/D exchange, protein-protein cross-linking and data analysis software.



*(PROVOST continued from p. 20)*

It is still early days for me to give a definitive answer to this question, but one of the things that has struck me repeatedly is how much better this place is than the KU community appreciates. This is a world-class university with research programs that are internationally famous. We need to be a little less self-effacing about who we are.

What have you learned from our alumni?

I have learned that they are passionate about KU, that they care deeply about what happens on the campus and especially in the classroom. I have learned that they are generous and committed to raising KU's profile nationally. I have also learned that there are a lot of them!

Do you see a connection between the success of KU's mission and/or marketing efforts and its ability to retain qualified and loyal employees who are adequately compensated?

They are inextricably linked.

Are you planning to have a prominent role in fundraising, and if so, what might that look like?

Private funding is the margin of excellence for KU. The alumni base is strong and generous. I will do whatever I can to help them to understand how their giving makes the difference to our future.

Should KU actively encourage science and engineering faculty to be involved in technology transfer activities?

Yes.

What is KU's economic development role, in terms of staffing, other resources, and a "philosophy" about how this fits KU's mission?

KU has an important economic development role at a number of levels. The most fundamental is that every year we give to the world 5,000 new graduates who will go out and change the world. That, by itself, is a staggering contribution. We also work very hard to find the best researchers in the world to work here. Their work is of a fundamental nature, but often there are immediate commercial, industrial or social applications of their work that must quickly be brought into the marketplace. We need to be able to do this with speed and nimbleness and these are adjectives that are not often used to describe the working of major research institutions. We will constantly improve in this area.

Is it possible to have a rapid response (in the terms of funding) enabling schools and departments to increase faculty numbers in growing programs?

Yes.

The great thing about working at a place like KU is that every day each one of us contributes to one of the loftiest callings in history – creating new knowledge and sharing it with our students and the world.

## UNDERGRADUATE & GRADUATE NEWS

### *KU Chemistry Senior is the Recipient of an ACS Scholar Award*

Ryan Grigsby, a 5th year senior with a double major in chemistry and art history, is the recipient of an ACS Scholar award. Ryan hails from Tulsa, Oklahoma. He completed two years of study at Haskell University here in Lawrence, and then transferred to KU.

Ryan began doing research in the laboratory of Adams Distinguished Professor Susan Lunte's research group with support from an NIH-IMSD award. For the past three years, he has pursued research using microchip electrophoresis separation. His project examines constituents of tea, coffee and chocolate, including caffeine, theobromine, and theophylline, which are stimulants that are thought to have other beneficial properties.

Ryan is interested in combining his majors to pursue a career in art restoration. Microanalytical separation technologies are of increasing importance in art preservation.

### *A Chemistry Department Chem Scholar awarded a Barry M. Goldwater Scholarship*

**Stephanie Hill**, a chemistry major and participant in the department's Chem Scholars program, was one of four KU students chosen to compete nationwide for the prestigious Barry M. Goldwater Scholarships. She is a sophomore in chemistry and biochemistry.

The Barry M. Goldwater Scholarship and Excellence in Education Program was established by Congress in 1986 to honor Senator Barry M. Goldwater, who served his country for 56 years as a soldier and statesman, including 30 years of service in the U.S. Senate. The purpose of the Foundation is to provide a continuing source of highly qualified scientists, mathematicians, and engineers by awarding scholarships to college students who intend to pursue careers in these fields. 317 scholarships were awarded for the 2007-2008 academic year.

### *ACS Division of Analytical Chemistry Rewards Chemistry Graduate Student*

The purposes of these Fellowships are to encourage basic research in the field of analytical chemistry, to promote the growth of analytical chemistry in academic institutions and industry, and to provide recognition of future leaders in the field of analytical chemistry. **Kristin Price**, a 5th year graduate student, is the recipient of an ACS DAC Summer Fellowship. Her research project is to develop metabolomics approaches to studying oxidative stress resulting from stroke and heart attack by combining *in vivo* microdialysis sampling with NMR spectroscopy.

## ALUMNI NEWS

**Sachin Baxi, M.D., 2000.** "I received my M.D. from the University of Kansas in 2000, completed my pediatric training at Indiana University/Riley Children's Hospital in 2003, completed my fellowship in Allergy/Immunology at Children's Mercy Hospital in Kansas City, MO in 2006. This summer I will be joining the Allergy/Immunology faculty at Harvard Medical School and Children's Hospital Boston this summer."

**Dale L. Boger, B.Sc., 1975.** He completed his Ph.D. in organic chemistry at Harvard University in 1980. Boger's research achievements span multiple areas: natural products total synthesis, synthetic methodology, studies of naturally occurring DNA-binding agents and glycopeptide antibiotics, combinatorial chemistry, and drug-target validation.

"In recognition of contributions to the total synthesis of complex biologically active natural products and key analogs used to define their mode of action," (CEN January 1, 2007) Professor Boger is the recipient of this year's Ernest Guenther Award in the Chemistry of Natural Products.

**Bruce Campbell, BS. 1962; MA, U. S. Dakota, 1964; Ph.D., U. of Texas, 1967.** He is now retired and has just recently been listed in "Who's Who in the World".

**Ronald J. Clark, Ph.D. 1958.** "I am a graduate from 1948 (Jake Kleinberg) and have recently retired from the faculty of Florida State. I have taken up crystallography as a retirement hobby. It is clear that the department has changed almost totally since my days there. I did my undergraduate work and DIS in Bailey and graduate work in the then new Malott Hall. That was before Malott had AC. I remember that a flask of either would boil in the lab during summer months. The amazing thing is that we neither blew it up nor poisoned anyone!"

**Virgil Cope, Ph.D. 1968** has now retired after thirty-seven years of teaching at the University of Michigan-Flint Chemistry Department.

**Benjamin F. Farnes, BA 1955, LLB 1957** is semi-retired. He writes: "My law career has been a wonderful experience, including general practice, assistant city attorney, judge of the probate court, judge of the juvenile court, associate professor of law (Washburn University) and has spanned forty-nine years. However, my few years in the Chemistry Department [KU] were the best of times. It was a wonderful mixture of learning, awe, fear, and, most of all, deep respect for the brilliant professors. I'm still in awe of the great knowledge and ability of those men and women."

**Justin Hauxwell, BA Chemistry 2000.** He is currently a medical resident in Family Medicine and Psychiatry (dual program) at the University of Cincinnati Medical Center. He has been married to his lovely wife, Cynthia, a corporate trainer, for two years. Justin and Cynthia met while he was attending medical school at KUMC.

**Betty Austin Hensley, BA, 1944 (chemistry major).** She is a self employed flute teacher and performer.

**Nariman Mehta, Ph.D. 1952.** Nary writes: "I was a student at KU from January 1949 to August 1952, earning my Ph.D. under Dr. Bill McEwen working on the synthesis of Emetine. I am from Bombay, India, attended KU on a US Navy Fellowship, minored in chemical engineering, and worked in the then fifty year old Bailey chemistry building. In 1957 I joined the pharmaceutical company, Burrows Wellcome, Inc. In 1966 the company wanted me to work on neuropsychopharmacological potential drugs. I designed, synthesized and patented a single compound [BW 323U66] -- an entirely novel class of chemical structure for an antidepressant -- Bupropion. After twenty years in the spring of 1986, the FDA approved it. By now, GlaxoSK has sold over \$25B [Wellbutrin]. It was the first drug approved by the FDA for "Cessation of Smoking" [Zyban]. Bupropion has four physiological activities: 1) antidepressant, 2) stop smoking, 3) increase in libido (women), 4) mild weight loss. The chemical structure is very simple and has innocuous metabolites.

**Wing C. Poon, Ph.D. 2004** is working as a postdoctoral research associate in the Department of Medicinal Chemistry here at KU.

**Robert Sheldon, Ph.D. 1976** is now retired from the Nuclear Materials and Technology Division at Los Alamos national Lab, but does remain as a consultant for the laboratory. He and his wife, Pat, are enjoying life in the San Juan Mountains of Colorado.

**Kevin T. Sprott, Ph.D. 2001**, organic chemistry lives in Boston, MA with his wife, Kam (Ph.D. in Molecular Bioscience, 2001) and working for Microbia, Inc. They are expecting their first child in August and state they do miss Lawrence!

**Stephen E. Stephanou, Ph.D. 1949** lives in Newport Beach, CA and writes that he is now retired and enjoys very much reading our newsletter.

**Matthew Zart, Ph.D. 1005, and Leilani Welbes, Ph.D. 2005** were married in Lawrence on April 29, 2006. They are living in McPherson, KS. Matt is employed at Hospira and Leilani started a position as a chemistry instructor at Hutchinson Community College in August of 2006.

## 51<sup>ST</sup> ANNUAL AWARDS PRESENTATION

### Undergraduate Student Awards

#### *Max Barlow Book Awards*

#### *General Chemistry Students With Outstanding Records*

Todd C. Crawford    Brandon J. DeKosky  
Christopher P. Johnson    Patrick H. Mazzei  
Nikki R. Overton    Kathryn A. Reed

#### *Organic Chemistry, Superior Achievement*

Emily S. Prohaska    Jeffrey A. Robinson  
Joshua T. Wewel

#### *Analytical Chemistry, Superior Achievement*

Kevin P. O'Halloran

#### *Physical Chemistry, Superior Achievement*

SmithAnn M. Rasmussen

#### *The Owen W. Maloney Scholarship*

#### *Superior Performance in General Chemistry by a ChemScholar*

Stephanie A. Hill

#### *The Walter Gubar Scholarship, Outstanding Performance By A First-year Chemistry Major*

Jennifer M. Guerra

#### *The Leonard V. Sorg Scholarship, Outstanding Performance by a First-year ChemScholar*

Jennifer M. Guerra

#### *The Clark E. Bricker Scholarship, Outstanding Performance by a Second-year ChemScholar*

Jeffrey A. Robinson

#### *The Jacob Kleinberg Award*

#### *Chemistry Major Who Has Made Outstanding Progress In Research Prior To The End Of Their Third Year*

Timothy R. Welch

#### *The Fassnacht Fellowship, Advanced Student With A Major In Chemistry*

Timothy J. Quincy

#### *The Franklin Strain Fellowship*

#### *Fellowship To Undergraduate Chemistry Major Based On Merit*

Tyler S. McMillan

#### *American Institute of Chemistry Award, A National Award*

Atsushi Shiota

#### *Alpha Chi Sigma Awards*

#### *Outstanding Graduating Seniors In Chemistry And Chemical Engineering*

Chemistry                      Chemical Engineering  
Joshua A. Sebree                      Joel Abrahamson



## GRADUATE STUDENT AWARDS

*The Frank B. Dains Award  
Outstanding First-year Teaching Assistant*  
Melinda L. Toumi

*The H. P. Cady First-year Graduate Scholarship  
Excellent Performance By First-year Graduate Student*  
Jason A. Knight    Saroja Kumari Weeratunga

*The H. P. Cady Graduate Scholarship  
Excellent Performance By A Mid-career Graduate Student*  
Kenneth F. Stensrud

*The Ray Q. Brewster Award  
Advanced Graduate Teaching Award*  
Tiffany R. Maher    Joseph G. Nguyen

*The Snyder Award  
Graduate Student Of Considerable Promise*  
Shelli R. Waetzig

*The Adrienne Hiscox Mitchell Scholarship  
Scholarship To Outstanding Female Undergraduate Or Graduate Student*  
Mary L. Bandu

*The Ralph E. And Esther Weik Badgley Scholarship  
Scholarship To Outstanding Female Undergraduate Or Graduate Student*  
Tiffany R. Maher

*The Reynold T. Iwamoto Scholarship, Award Based On Academic Performance*  
Katie R. Mitchell-Koch

*McCollum Research Scholarship*  
James P. McParland    Trenton H. Parsell  
Chao Wang

*The J.K. Lee Scholarship In Analytical Chemistry  
Superior Academic Performance And Research Accomplishments  
By An Advanced Doctoral Student*  
Olivia L. Mooren

*The Frank B. Dains Scholarship In Organic Chemistry  
Superior Academic Performance And Research Accomplishments  
By An Advanced Doctoral Student*  
Erin C. Burger

*The Paul And Helen Gilles Award In Physical Chemistry  
Superior Academic Performance And Research Accomplishments  
By An Advanced Doctoral Student*  
Sang-Kil Son

*The Ernest And Marvel Griswold Award  
In Inorganic Chemistry  
Superior Academic Performance And Research Accomplishments  
By An Advanced Doctoral Student*

Paul J. Zinn

*The Higuchi Doctoral Progress Scholarship  
Superior Post-comprehensive Student In His Or Her Final Year*  
Alan Whitehead

*Ku Acs Local Section Outstanding Senior Award  
Presented On Friday, April 28, 2006*  
Joshua A. Sebree

## DEGREES GRANTED

### *Bachelor of Arts*

Khanh Thuy Chu	Jon K. Jones
Avid Eslamihaghighat	Chris J. Kim
Sumandeep Kaur Gill	Kevin B. Kritzer
Parul J. Gor	John W. Leese
Emilie B. Guenther	Alexis M. Vanasse
	Christopher D. Janish

### *Bachelor of Science*

Qing Chang	Atsushi Shiota
Kevin P. O'Halloran	Matthew A. Sullivan
John W. Leese	Christopher A. Wood
Joshua A. Sebree	

### *Master's Degree*

Jung-Ho Jun	Bailey N. Morgan
Luka Kapkiai	Hemamali Warshakoon

### *Doctorate of Philosophy*

Chris Damaso	Abraham Yousef
Doug Holub	Matt Zart
	Joseph Vilain

### *ChemScholars*

Rebecca Evanhoe	Lauren M. Rowland
Jennifer M. Guerra	Jennifer Thomas
Stephanie Hill	Timothy R. Welch
	Jeffrey A. Robinson

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The Chemistry Department wishes to thank  
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1251 Wescoe Hall Dr., Room 2010  
University of Kansas  
Lawrence KS 66045

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News, updates, comments or suggestions (feel free to enclose photos, news clippings, etc.):

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