

Jayhawk Chemist

The Newsletter of The Chemistry Department
at The University of Kansas

A publication for alumni and friends - established 1966

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MRB IS OPEN FOR RESEARCH



Alumni returning to Lawrence in 2006 won't want to miss seeing the latest addition to KU's emerging West Campus complex: the Multidisciplinary Research Building (MRB). This \$40 million, three-story, 106,000-square foot building is located northwest of the intersection of Iowa Street and Clinton Parkway. After just 15 months of construction, the MRB opened in December 2005 and was formally dedicated March 6. Among those participating in the ceremony were Chancellor Robert Hemenway, Regent President Donna Shank, Professor of Pharmaceutical Chemistry Susan Lunte, and fourth-year chemistry graduate student Heidi Doyen.

More than 200 scientists, students and other research staff will work in the building when it is fully occupied. Research at the MRB covers a range of subjects, including bioanalytical chemistry, drug discovery

and delivery, bioinformatics, stable isotope geology, and nanoscience. Funding for the project is provided by the KU Center for Research, using the indirect cost reimbursement generated by KU research grants.

The MRB will house the Adams Institute, a group of labs on the second floor named in honor of the late Ralph "Buzz" Adams, a member of the chemistry faculty from 1955 until his death in 2002. An event formally designating the Adams Institute is being planned, along with the announcement of the first Adams Distinguished Professor of Chemistry.

"The MRB is designed to encourage collaborative research," said Jim Roberts, vice provost for research. "It's flexible space that we can adapt to meet the changing needs of researchers over time. In most campus buildings, faculty have to adapt to the space. Here it's the other way around."

In her remarks at the dedication, Doyen said,



"The MRB provides an energetic atmosphere that helps encourage active research. Besides the updated labs, MRB is a great place to promote collaborative efforts. The ability to walk down the hallway and form a new collaboration or discuss scientific findings with someone in a different field is an invaluable resource in research."

Laboratory spaces on the outside of the building wrap around a shared core of research equipment and facilities, including bio-safety level 3 labs, a mass spectrometry lab, and "clean" rooms. Faculty offices are clustered in the corners of the triangular building. There are no classrooms in the MRB, but the halls are lined with whiteboards and corkboards that invite impromptu note writing, conversations, and the sharing of ideas.

While the building is efficient and functional, it's also beautiful. The front of the MRB is a curtain of dark, energy-efficient glass. Behind it is a dramatic stairway that connects all three floors.

"Modern, well-equipped research space helps us recruit top people to KU," Roberts said. "Several of the people who will occupy the MRB this year are here primarily because we were able to promise them this kind of facility."

Chemistry professors Craig Lunte, Mario Rivera and Bob Dunn have laboratory space on the first, second and third floors of the building.



From left to right: Dale Seufferling, President, KU Endowment; Heidi Doyen, Graduate Research Assistant; Susan Lunte, Professor of Pharmaceutical Chemistry; Donna Shank, Chairperson, Board of Regents; Robert Hemenway, Chancellor, KU; Congressman Dennis Moore, U.S. House of Representatives; James Roberts, KU Vice Provost for Research



The MRB is part of a planned, multiyear expansion of KU's research facilities on the West Campus. The Structural Biology Center (SBC), completed in 2004, is nearby, as is the Higuchi Biosciences Center. An additional phase of the SBC was approved in January by the Kansas Board of Regents for completion in 2007.

BEHIND THE LINES

MRB.....State of the Art Research Building	1
Notes from the Chair	4
Microburst Hits KU Campus	8
Scientific History -- Got Milk?	8
Chemistry Professors in the News	10
Centennial of Historic Helium Isolation	12
Transitions	13
New Faculty Profiles	13
Boroviks to Move to UC Irvine	13
A Chemistry Department First	14
In Memory	14
All My Giants Are Gone	16
Marsi Endowment	17
Ralph N. Adams Institute	17
Student Awards	18
Alumni News	20
Chemistry Donors 2004-2005	21
Alumni Information Update Form	22
Donation Information	23

NOTES FROM THE CHAIR



Greetings from the KU Chemistry Department

My first six months as chair have been full and engaging. I think some of my colleagues would joke that I have begun to acquire that haunted look that many chairs seem to wear after a few months on the job. In reality, I feel much the same way that I did when I wrote about beginning this appointment last year. It is an incredible privilege to work with the gifted and committed students, faculty and staff that we have at KU. So much has changed during the past year, and we look forward to so many positive changes in the coming year that I am going to be hard pressed to get all of the information into this column.

Facilities

As you can tell from the story on the front page, 'Mr. B' (KU's new Multidisciplinary Research Building) is a reality. Three of our senior bioanalytical faculty, Professors Craig Lunte, Bob Dunn and Mario Rivera all moved their research groups into Mr. B within a period of three weeks. This was an extremely busy time for their groups, as it is now for the junior faculty and established research groups that are expanding into the space they vacated in Malott.

The first impression Mr. B makes is stunning. Though the Structural Biology Building (see last year's alumni bulletin) which stands close by Mr. B was completed first, Mr. B has begun to reshape the appearance of the research infrastructure on West Campus. For one thing, the building is visible from Iowa Street, and, next to the smaller campus of pharmacy buildings, really leaves the impression that a much larger, interdisciplinary endeavor is at work in that area. Driving down the new road cut into the scrub, one can imagine further construction that will transform the area into a state of the art center for life sciences research. And new construction *is* planned for the future. An expansion of the structural biology facility will occur within the next few years, and a new pharmacy research building is slated to be in place a few years after that. Inside, Mr. B lives up to the positive impression produced by the surroundings. An open design, with large windows and spacious laboratories make Mr. B a very appealing environment for researchers. The building will also be home to the new Adams Chair in Chemistry (more about that later).

The construction of the building has been self-funded by the university. Jim Roberts, Vice Chancellor for Research, David Shulenburger, Provost, and the staff of the Provost's office deserve much of the credit for conceiving the project. Professor George Wilson (bioanalytical chemistry), Assistant Vice Provost for Research, has been involved in developing a plan to occupy the building. George has been busy with the seemingly endless number of last minute modifications and repairs that accompany such an endeavor. The analytical group is looking forward to contributing to the scientific environment in MrB for many years to come.

With the hiring of new faculty and the expansion of existing research groups, Malott seems to be in a perpetual state of renovation. Work is nearly complete on laboratory renovations for Minae Mure (bioorganic) and Heather Desaire (mass spectrometry), and are close to completing a new joint chemistry/physics space for our servers and computing clusters. This will also be a space in which Bob Timberlake, who in his role as the department's network guru saves our skin on a daily basis, and his counterparts in physics. Work is about to begin to retro-fit some of the laboratory space vacated by Mario Rivera and Craig Lunte to make new

laboratory space for Michael Johnson (bioanalytical) and Michael Rubin (organometallic synthesis), both of whom joined the department this Fall. Other dominoes will continue to fall in these moves, with Brian Laird, David Benson, Helena Malinakova, Ward Thompson, Rich Givens and Jon Tunge all moving part or all of their research activity in an effort to make better use of Malott's limited space. Plans still exist for a multidisciplinary chemistry, biology, physics teaching and research building next to Malott Hall on the main campus, which would greatly enhance our ability to serve the educational and research needs of our undergraduates, and to meet the demands caused by our expanding research programs. This plan has not moved forward because the legislature has not seen fit to provide a significant contribution of resources to the project.

Before I leave the subject of facilities, Professor Paul Hanson (organic synthesis) would want me to pass along that he intends to continue his one-man crusade to replace the floor tile in Malott Hall. For those of you who remember Malott Hall in the 50's, you will remember what this floor tile looked like...except that today it looks 50 years older. We are trying to rally the administration behind Paul's effort to spruce up Malott's appearance.

Research

This has been a remarkable year for the faculty in research. Led by the younger faculty, the department has added \$4,200,000 in funded research within the past 6 months. This accounts for the increased pressure on our space resources in Malott Hall. I want to highlight the accomplishments of a couple of our faculty in this area.

Professor Heather Desaire recently received an R(01) award from the National Institutes of Health. Professor Desaire is in her fourth year on the faculty. Heather's research focuses on the use of mass spectrometry to study a variety of molecules, from large glycoproteins to simple bi-functional organic molecules. Structural information about the molecules is obtained using *tandem* mass spectrometry. In a tandem mass spectrometry experiment, the compound of interest is isolated inside the mass spectrometer; then, in a second step, it is fragmented. When the fragments are detected, a significant amount of structural information about the original compound is obtained. Projects in the Desaire laboratory include the examination of the structure of polysaccharide units that are involved in immune response and cell recognition, and the characterization of mass spectrometric fragmentation patterns in simpler organic molecules. In the former project, Heather is studying how HIV changes the structure of its surface carbohydrates to avoid detection by the immune system.

Professor Jon Tunge, who is in his fourth year on the faculty, received a Career Award Funding from NSF this year. Professor Tunge is an organometallic chemist, applying late transition metal catalysts to the development of new carbon-carbon bond forming reactions. Jon's Career Award is developing catalysts for the transformation of carboxylic acids to useful organometallic reagents by catalytic decarboxylation (i.e. decarboxylative metalation). These reactions are surrogates for transmetalation reactions that are ubiquitous in catalytic cross coupling reactions. While transmetalation requires stoichiometric use of highly basic, toxic, and expensive reagents, decarboxylative metalation uses readily available carboxylic acids and produces CO₂ as the only byproduct.

Professor Misha Barybin, a coordination/organometallic chemist in the Inorganic group, has been at KU for five years. He also received funding for his Career Award this year from NSF's Inorganic, Bioinorganic and Organometallic Chemistry program. His research is undertaking a multifaceted exploration of the synthesis, chemical reactivity and physical properties of a new class of hybrid metal-organic ensembles based on the electronically unusual azulenic motif (a nonbenzenoid aromatic framework involving fused 5- and 7-membered carbon rings). The research is expected to deliver new platforms for fabricating azulene-containing liquid crystal devices as well as provide strategies for improving electron delocalization in hybrid metal-organic systems relevant to applications in molecular electronics and nanotechnology.

Fifth-year theoretician, Professor Ward Thompson, received two grant awards this year. One of these is a new award from NSF, while the other is a new project funded by the Department of Energy (DoE). In

the DoE project, Dr. Thompson's group is addressing how reactions occur differently in a nanoconfined solvent than in a bulk solvent. The research focuses on reactions that are strongly coupled to the solvent (e.g., proton transfer); this work will help in developing design principles for nanostructured materials such as microporous and mesoporous catalysts. The NSF project is studying vibrational spectra and energy transfer in confined solvents. These are common experimental probes of local environments but little is known about the molecular-level mechanisms of energy transfer in porous media (i.e., what is actually being measured). This work is important in interpreting data obtained from various characterization tools, as well as for understanding how energy transfer occurs in technologically important nanostructured materials (which are dominated by interfaces).

Passings

We are saddened to report the loss of two alumni who were also great friends and supporters of the department. George Walrafen graduated from KU with a B.S. degree in 1952. His undergraduate work with Paul Gilles set him on the path toward a research career. After completing his PhD and a successful career with Bell Laboratories, George joined the faculty at Howard University, where he built his international reputation as an authority on the structure and properties of water and aqueous solutions. KU was fortunate to have George return to campus and continue his research after his retirement from Howard.

Ken Marsi completed his graduate degree at KU in 1960. He embarked on his academic career at Long Beach State University immediately thereafter, and remained an active organic researcher, ACS member, and KU supporter until his retirement. Both individuals were strong supporters of the KU Chemistry Department who have endowed fellowships in graduate education. They will be missed.

Priorities

The department has many priorities for growth and change. I wanted to share some of those ideas with you.

1. **Planning.** The current department long-range plan runs through this year, by which time we will have achieved many of the objectives laid out in this five-year old document. As I look back, these goals included achieving 30 full-time faculty, 120 graduate students and over \$4,000,000 per year in funded research. We have accomplished those objectives! The department now has the opportunity to envision goals for the next 5 years that are certain to include increased modern research space, faculty additions in target areas, better definition of emphasis areas, and improved undergraduate programs. Our plan is to hold some preliminary planning sessions in May. This effort will help define the future shape of the department.
2. **Faculty retention.** KU is a wonderful place to be an undergraduate or graduate student. Students find that their experiences and preparation in our B.A., B.S., and Ph.D. programs prepare them to compete as well as students from any other institution for top flight scientific and professional positions. A critical factor in defining this quality of life and scholarship are the extremely talented, dedicated faculty who work in our program. Our faculty truly enjoy teaching classes, mentoring students and helping their co-workers discover the excitement of research. We need to keep these outstanding young scientists at KU by ensuring that they see no barriers to their career growth in our department. For these reasons, I am aggressively pursuing opportunities to nominate faculty for national awards and have identified faculty development as the top funding priority for development with the KU Endowment Association.
3. **Improving the undergraduate curriculum.** The preparation our undergraduate students receive in chemistry courses and laboratories allows them to compete effectively with

students from any other school in the nation. But, let's face it, the chemistry curriculum as it is implemented across the country has gotten stale. Despite new developments in the field and new directions at the forefront of research, relatively little has changed for 30 years. We intend to follow up on some initial attempts to modernize the curriculum begun by Paul Hanson, Janet Robinson, George Wilson, Carey Johnson and Cindy Larive, developing new courses and laboratory experiences that will connect students with the excitement and significance of chemistry curricula.

4. **Increasing interactions with other departments.** Chemistry and Molecular Biosciences (formerly Cellular and Molecular Biology and Biochemistry) have been in discussions for some time about making a concerted effort to develop interdisciplinary courses, research efforts and faculty positions in chemical biology. This type of interdisciplinary effort would capitalize on the department's strengths in addressing biological problems and position both Chemistry and Molecular Biosciences to make a stronger contribution to the state's Biosciences Initiative.
5. **Upgrading the departmental website.** Our department has a history of communicating with the outside world through IT. We were among the first KU departments to post course materials on the web and to have its own web presence. Our current web site, which was innovative in its day, is badly in need of an overhaul. We are currently working on ideas about what we need to include in the new site. Please let us know what types of features you would find interesting.
6. **New research and teaching spaces.** We desperately need modernized research and teaching spaces for all of the students and researchers occupying Malott Hall. The plan for a new Molecular Sciences teaching/research building remains alive, though the price tag for the project has more than doubled since it was first proposed 12 years ago. Our 50 year old home is truly straining with the effort to support our current level of activity. Campaigning for new space between Malott and Haworth Halls remains an important priority for our department.

As you can tell, the Chemistry Department is an exciting, growing place. We are proud of the contributions we are making to KU students, the state and the nation. Thank you for your past participation in this endeavor, and for the continuing support you lend to our department.

—Joseph A. Heppert

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A few things to remember while playing with unknown chemicals

1. Hydrochloric and sulfuric acid may look like water but they sure don't taste like it.
2. Tasting is not a scientifically correct practice of determining unknowns
3. Red hot metals really are HOT!
4. Putting all the "left overs" in a tub is not a healthy practice
5. Yes, some things do explode when put in an open flame
6. Aqueanet (the hairspray) IS the most flammable product known to man.

A Microburst You Say?

Yes, what is called a microburst with 80 mile per hour winds, hit Lawrence and the KU campus at about 8:00am on Sunday, March 12. The storm caused roof damage, broken windows, splintered trees and many trees completely uprooted. In addition, electric lines were down leaving much of the campus, Lawrence and even outlying areas without power.

Although clean up began immediately following the storm, and many people came to help, classes were canceled and campus closed on the following Monday; only emergency personnel were asked to report for work. Due to the phenomenal efforts by various departments and



Danforth Chapel sustained major roof damage – Mike Krings, Doug Koch/University Relations



This 2 ton AC unit on the roof of Malott Hall was blown off its mountings – Mike Krings, Doug Koch/University Relations



Cars damaged by roofing material & other debris – Mike Krings, Doug Koch/University Relations



Dyche Hall, which houses the Museum of Natural History – Mike Krings, Doug Koch/University Relations

volunteers, campus activities resumed normally on Tuesday. Clean up has largely been completed, but repairs to buildings are continuing. Roofs bore the brunt of the damage; initial estimates were as high as \$7,000,000.

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Scientific History – Got Milk?

Elmer McCollum (b. 1879) was an American biochemist who originated the letter system of naming vitamins. He discovered vitamins A, B and worked with others on vitamin D. He performed extensive research work in nutrition and growth. He was the first in the U.S. to establish a colony of white rats as laboratory animals to be the subject of his nutrition experiments. In the 1910's, he recognized that a healthy diet required certain fats, and he named the essential component "fat-soluble A," as distinct from another he named "water-soluble B." Although at first he thought each was a single compound, he later showed that they were in fact

complexes. He researched how certain minerals were as important as nutrients, including calcium, phosphorous, fluorine, manganese and zinc.

McCollum was born on a farm near Fort Scott, Kansas. At the age of 17 he went to Lawrence, Kansas, where he intended to enroll in the University of Kansas. He was disappointed to learn that four years of high school were required to entering the university. He enrolled in high school in Lawrence and did well. While in high school he worked at various jobs including lighting and extinguishing gas lamps on the streets of Lawrence and selling newspapers to regular employment on the Lawrence Journal-World. This

continued until his senior year at the university when an assistantship in the chemical laboratory relieved him from the necessity of outside work.

When he entered the university, McCollum fully expected to study medicine and did two years of pre-medical course work as a part of his studies. He became so enthusiastic about chemistry that he decided to pursue that instead. After completing his degree at Lawrence, he remained for one year of graduate work and during that year assisted in several courses of chemical work. He left the university with a credit of 16 courses in chemistry, which was all the university could offer.

He then decided to go to Yale University for further graduate work in chemistry. He left Lawrence, in the fall of 1904 and arrived in New Haven with \$82 in cash and no visible means of securing other funds. He remained at Yale for three years doing graduate work, receiving his degree of Ph.D. in 1906. His first two years' study was under the direction of Dr. T. B. Johnson, a professor of organic chemistry. His third year was spent with Professor LaFayette Mendel and Professor Russell H. Chittendon, who was then director of the Sheffield Scientific School. In 1907 McCollum accepted a position at the University of Wisconsin as an instructor.

He remained there until 1917 when he was invited to Johns Hopkins University to take the professorship of biochemistry in the school of hygiene and public health of that institution. Here he began working with Professor E. B. Hart. It was at this time that McCollum conceived the idea of using small animals to solve the problems of nutrition. With the simplest kind of homemade equipment, he finally succeeded in establishing a colony of what he calls "sanitary rats." It was necessary to develop rats that were free from disease or any conditions that would interfere with or impair the results sought by the use of varied diets.

It took nearly five years of experimental work on innumerable combinations of diets before McCollum finally demonstrated that a diet with butterfat would produce growth in young animals and that the same food mixture would not induce growth when lard, vegetable oils, and certain other fats and oils were used in place of butterfat. This was the first definite scientific determination that butterfat contains some element or principle essential to growth not found abundantly in any

other food fat.

During this period it was also determined that the fat in egg yolk and of the vital organs of animals produced similar effect on growth. The discovery of the importance of this growth promoting principle of vitamin A in butterfat opened up a vast field of research as to the importance generally of milk in the diet of the human race. Leading nutrition scientists, following this



E. V. McCollum

lead, have done and are still doing a large amount of investigational work on the importance of milk and its products in the diet. As a result it has been found that milk not only furnishes the most available and abundant supply of vitamin A through its butterfat content, but also contains in a lesser quantity the other vitamins, as well as a very high quality of protein and an abundance of mineral matter, such as calcium and phosphorous, necessary for building bones and sound teeth in the young and their maintenance in adult life.

McCollum was a member of many scientific societies and organizations and received several medal awards in addition to the degrees he has received from the Universities of Kansas, Yale and Cincinnati. He was a worldwide dietary authority and the author of several works prominent among which is "The Newer Knowledge of Nutrition" published in 1918. In 1919 he published "The American Home Diet" and in 1925 "Food, Nutrition and Health."

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Department of Chemistry

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CARLSON NAMED 'ONE OF THE GREAT TEACHERS OF CHEMISTRY'

Many of Robert Carlson's students probably could have told you years ago: He's considered one of chemistry's great teachers. *Chemistry* magazine agrees. Carlson, professor of chemistry, is featured in the winter issue of *Chemistry* in an article titled "Some of the Great Teachers of Chemistry."



"There are some absolutely fantastic teachers on that list," Carlson said. "I was stunned to be included with some of those names."

Other names on the list include Harry Gray of the California Institute of Technology, pioneering photochemist George Hammond and the late George Pimentel, who taught at the University of California-Berkeley.

Carlson has taught organic chemistry to undergraduate and graduate students at KU for more than 40 years. After completing graduate school, he took a job teaching at the university and hasn't looked back.

He said it was an honor to be featured in the magazine, which focuses on news in the world of chemistry, academic and industrial. The notation has earned him comments from students and colleagues.

"I've heard from quite a few colleagues both here and from around the country," Carlson said.

The section of the article featuring Carlson quotes a citation from one of the many awards he has won, saying he "has pushed his students to master the material not by mere memorization but by analyzing, questioning and applying the concepts."

When asked for a career highlight from his KU tenure, Carlson pointed to the achievements not of himself, but of his students.

"I've been blessed with having some incredibly talented students in my classes and laboratories," he said. "It's been a fun 43 years."

— OREAD, February 20, 2006

KU REPRESENTATIVES HELP EFFORT FOR GENDER EQUITY IN CHEMISTRY

Kristin Bowman-James, director of Kansas Experimental Program to Stimulate Competitive Research and professor of chemistry, was a member of the steering committee of a workshop aimed at increasing gender equality in the field of chemistry in Arlington, VA.



"Building Strong Academic Chemistry Departments Through Gender Equity" was held in late January and featured 55 chemistry department chairs from universities across the United States and 60 other academic, government and national chemistry leaders. Joseph Heppert, chair of the chemistry department, and Jeffrey Aubé, professor of medicinal chemistry and director of KU Chemical Methodology and Library Development Center of Excellence, also attended.

The National Science Foundation, U.S. Department of Energy and the National Institutes for Health sponsored the workshop.

While the number of women undergraduate and graduate students in chemistry has increased over the last 25 years and one-third of chemistry doctorates are now awarded to women, the number of women in faculty at major research universities has remained low. Participants at the workshop examined causes for the gender disparity and made recommendations for action to change it.

Kristin Bowman-James is no stranger to encouraging gender equity in chemistry. She arrived at KU in 1975 as the department's only female faculty member. As department chair from 1995 to 2001, she helped recruit other women to the department and by 2002, the seven female faculty members represented 29 percent of the 24 faculty members. The national average is only 12 percent.

— OREAD, March 6, 2006

DESAIRE REWARDED FOR RESEARCH WITH HIV

Heather Desaire, assistant professor of chemistry, has won the American Society for Mass Spectrometry's research award for new faculty for her work on how HIV hides from the human immune system. She will be presented with the \$25,000 award in May.

Desaire's research project, "Glycoprotein Engineering for Vaccine Development," studies molecules of HIV. The molecules are glycoproteins, and they resemble spikes. The spikes are the first part of the virus to interact with human cells.



One of the leading strategies in developing potential HIV vaccines is to give people the glycoprotein spikes, which are a nontoxic part of the virus. Once people develop immunity to this molecule, they will, in theory, be immune to HIV. One of the problems is the spikes are part proteins and part carbohydrates and researchers are currently unable to control the carbohydrates that are present on the synthetic forms of the spikes, which are grown in hamster cells.

Desaire and her research group are working to show the carbohydrates in HIV molecules are different from those grown in hamster cells. They are developing methods to study what the carbohydrates are and what kinds of carbohydrates are in potential vaccines.

The award is based on the second step of Desaire's research. When her group knows what the carbohydrates in the virus are, they could potentially produce them in a vaccine that would more closely resemble the spikes on the virus, thereby making a vaccine more effective.

Desaire, who has been at KU for four years, received a grant from the National Institutes of Health last August to study the carbohydrates of HIV molecules, which helped fund the initial stages of the research.

"We've been picking up the pace on the first stage since getting the funding," she said.

— OREAD, March 6, 2006



MARLIN HARMONY, PROFESSOR EMERITUS OF CHEMISTRY AT KANSAS UNIVERSITY, talks about the element Helium during a birthday celebration to commemorate the discovery of the element at KU. The element was first discovered at KU's Bailey Hall on December 7, 1905, by professor Hamilton P. Cady and assistant David F. McFarland. [See story page 12]

— Mike Yoder/Journal-World Photo

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PROFESSOR'S DISCOVERY HELPED FLOAT AN INDUSTRY

On December 7, 1905, the professor, Hamilton Cady, and assistant David McFarland, found a staggering amount of helium in a sample of natural gas taken from a well-head in Dexter – 1.84 percent, according to KU emeritus chemistry professor Grover Everett. It was far more than the mere traces extracted 10 years before from a uranium mineral called cleveite, Everett says. And it was enough, in fact, to lead to its eventual use in products of greater utility than balloons, and for purposes more profound than making a voice sound squeaky.

Yet Cady and McFarland “had no ideas for its commercial use,” says Everett.

The story starts with the residents of Dexter whooping it up in May 1903, when a newly drilled well spewed natural gas. Soon, they found something was wrong with their gas. When a burning bale of hay was pushed into the plume of the gaseous geyser, the gas didn't ignite. KU geology professor Erasmus Haworth, also Kansas state geologist at the time, brought samples of the gas to Chemistry Hall at KU – today called Bailey Hall. Two years later, Cady and McFarland found that the gas contained 15 percent methane, 72 percent nitrogen and about 10 percent other inert gases besides helium.

In 1907, Everett said, Cady presented the research results, declaring that “helium is no longer a rare element but a common element existing in goodly quantities for uses yet to be found for it.” Through the years, those uses were found – and an industry founded.

A commercial helium plant that could churn out liquid helium in quantity was established in 1965 in Otis – 165 miles, as the crow flies, from Dexter. By 2002, 3.5 billion cubic feet of helium gas would be extracted annually from natural gas taken from fields worldwide, according to www.answers.com.

The first popular use for helium was to float blimps. Though helium was only 92 percent as buoyant as hydrogen, it would not burn. In World War II, Everett said, listening devices lowered into the ocean from these blimps could detect enemy submarines up to five miles away.

Helium is useful to scuba divers, Everett said. When their tanks contain a mix of nitrogen and oxygen, they risk the bends if they surface too quickly. A helium-oxygen mix doesn't create the same problems.

Some 20 percent of all the helium collected is liquefied for use in magnetic resonance imaging, Everett said.

HELIUM TRIVIA

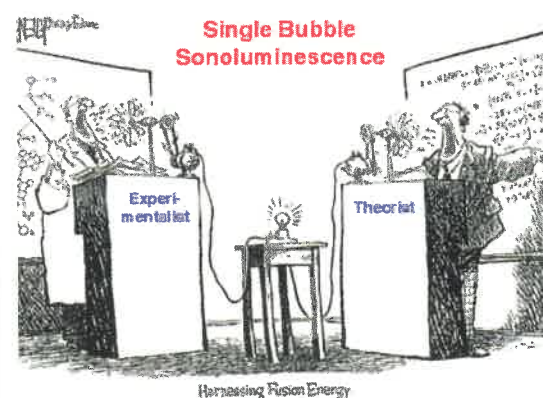
Q: Why does helium make your voice squeak if you inhale it?

A: It speeds up the velocity of sound made by your throat about 2.5 times. The frequency of the sound waves goes up, too. When the sound comes out of your mouth and hits the air, it slows down, but the frequency remains high. Presto. You sound like Donald Duck.

Source: Roger Martin, Kansas University

— Roger Martin, OREAD November 21, 2005

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TRANSITIONS

We welcome two new faculty members!



Assistant Professor Michael A. Johnson came to KU in August 2005 from the University of North Carolina at Chapel Hill. He received his B.S. degree from the United States Air Force Academy in 1988, and his Ph.D. from the University of Virginia in 2002. His research interests encompass bioanalytical chemistry, microsensor development, electrochemical detection of neurotransmitters, fluorescence microscopy, neurological disorders and oxidative stress. His current areas of research are Huntington's disease, oxidative stress and neurotransmission, mechanisms of drug action, and microsensor development.

Assistant Professor Michael Rubin also came to KU in August 2005 from the University of Illinois in Chicago. He received his B.S. in 1994 from The Moscow State University, Moscow, Russia, and his Ph.D. degree in 1998 from the same institution. One of the aspects of his research concerns the development of novel and adaptation of existing transition metal-catalyzed methodologies to supercritical fluids (SCF). Chemistry in supercritical fluids offers tremendous technical advantages as it solves environmental issues by eliminating organic solvent wastes and cuts the cost for solvent evaporation. It also allows for easy integration of reaction processing with product isolation.



Professor Andrew S. Borovik leaves Jayhawk country for the University of California - Irvine.



It is with great regret that we report that Chemistry Professor, Andy Borovik and his wife, Kate Loudon, will be moving to the University of California Irvine this coming Fall. Andy left Kansas State University in 1998 to join the faculty at KU. At the same time, Kate joined the faculty in Entomology (later renamed Ecology and Evolutionary Biology). Andy was promoted to Associate Professor in 1998, and to the rank of Professor in 2002. Andy has been a marvelous contributor to the department, working with outstanding graduate students in inorganic, organic and analytical chemistry. He has held grants from NSF, NIH and the Department of Energy. His work in mentoring junior faculty has had a lasting affect on the Department. He and Kate will be sorely missed.

Staff member retires.



Richard Fritts retired from the department on June 17, 2005, after working in Chemistry for almost 14 years. Richard had the ability to make just about anything you could imagine. One of our faculty members said that if she was ever stranded on a desert island – she would want Richard there because he could make a boat from rubber bands and duct tape to get them home.

At his retirement party many of the faculty gave rousing accounts of Richards' abilities to do his job. They also commented on his ability to help with a good practical joke. The department told him he had to go on a great journey to the sea and catch a lot of fish since he was retired now. This is an early picture of him salmon fishing on the Columbia River near Portland, Oregon. He took our advice and returned in October of this year to fish again.

Richard's smile and presence will be missed but the department wants to wish him all the best in his retirement.

A KU Chemistry First!!

The KU Chemistry Department has recorded another first! Professors Minae Mure and Julian Limburg are pleased to announce the birth of their daughter Chloe Luella Mure-Limburg at 8:03 am on Valentine's Day. Chloe weighed in at 6 lbs 6 ozs and is 18.5 inches long. Both Minae and her new daughter are doing fine. Professor Mure is the first person to have a baby while on the Chemistry faculty! We are all delighted for Julian and Minae, and hope that the entire KU Chemistry family will join in congratulating them!



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IN MEMORY



Dr. Kenneth L. Marsi died Saturday, August 20, 2005 in Dana Point California.

He was 76 years of age. Dr. Marsi is survived by Irene, his wife of fifty years, his four children Marianne, Scott, Brian and Teresa, their spouses, and eight grandchildren.

Kenneth Larue Marsi was born on December 13, 1928 and raised in Los Banos, CA. Dr. Marsi met Irene Gutschenritter of Nortonville, Kansas while in graduate school at Kansas University. They were married in 1955. Dr. Marsi distinguished himself as a devoted husband and father, and was an active and involved participant in the Episcopal church in Long Beach and Dana Point, California, and was a leader in the scientific business and education communities in Long Beach. He was an avid gardener and a lover of music.

Dr. and Mrs. Marsi opened up their home to a number of CSULB students without financial means so that they could pursue their educations. At his retirement Dr. Marsi, faculty, family and friends established the Kenneth L. Marsi Scholarship at California State University at Long Beach to assist outstanding junior and senior chemistry or biochemistry majors. He also established an endowment at the University of Kansas to aid students seeking degrees in chemistry [see Marsi Endowment page 16].

Dr. Marsi was a graduate of San Jose State University and went on to receive his Ph.D. in organic chemistry from the University of Kansas. Most of Dr. Marsi's professional career was served as a faculty member at California State University at Long Beach, where he was a professor of chemistry for thirty five years and chairman of the CSULB Chemistry Department for twenty one years until his retirement in 1996. During this time Dr. Marsi was the author of 32 publications, co-authored a textbook, authored more than 60 book reviews, and presented 40 papers at scientific meetings. He was sought for the review of textbooks and scientific papers prior to their publication. His expertise and advice were sought by colleges and universities across the country to review chemistry departments for improvement recommendations and in preparation for accreditation. As an educator and advising professor he introduced organic chemistry to over 11,000 undergraduate students and mentored and supported sixteen graduate students who went on to received master's degrees under his guidance. In 1984 he was named University Outstanding Professor, and then statewide Trustees Outstanding Professor in 1985. He received the TRW Distinguished Professor Award, and was twice the recipient of the College of Natural Sciences and Mathematics Mayfield Outstanding Professor Award.

* * *

Dr. George Edouard Walrafen, 76, Lawrence, died October 17, 2005 as a result of injuries from an accident in Gaithersburg, MD. Dr. Walrafen was born May 28, 1929 in Topeka, the son of George L. and Henria Saut Walrafen. He was a graduate of Topeka High School and was inducted into the school's Hall of Fame in 1998. He earned his B.S. in Chemistry at the University of Kansas and then M.S. and Ph.D. in Chemistry at the University of Chicago. From 1958-1971 Dr. Walrafen worked in the Chemical Physics Department of Bell Labs, and from 1972-1974, as a professor of Physical Chemistry at the University of

Marburg in Germany. From 1975-1997 he was a graduate professor of chemistry at Howard University. He has published over 130 scientific papers and holds two U.S. patents. He moved to Lawrence in 2001 and joined the University of Kansas as an adjunct professor, emeritus, with the Department of Chemistry.

Dr. Walrafen served his country in the U.S. Army. He was married to Linda Glasser Walrafen for 40 years until her death December 5, 2000.

* * *

Charles M. Judson.....It is with some sadness, but not unexpectedly, that I am providing more information on the passing of Charles M. Judson, or Charlie. Charlie was the first director of the KU mass spectrometry lab from about 1980 until I arrived in 1989. KU was Charlie's last professional situation as he reached mandatory retirement age while living in Lawrence. He was the first professional mass spectrometrist hired by KU to direct a facility, and his hiring was driven by the grass roots efforts of the Medicinal Chemistry and Chemistry departments. It might be interesting to note that hiring Charlie and creating the mass spec lab, among others, foreshadows early efforts across Universities in the US to establish interdepartmental core facilities. Charlie executed this role with characteristic dedication, professionalism, enthusiasm and a penchant for being a curmudgeon.

Charlie made an effort to overlap with my arrival in the lab to train me on all the facility instruments and get me up to speed on lab protocols. I learned a lot from him in this effort and I've been grateful for it. I, in turn, offered him emeritus office space, access to instrumentation time and encouragement in projects to allow him to pursue his passion for mass spectrometry. He happily pursued his professional hobbies for about three years. His daughters, Ellen and Molly, report that he was grateful to work in an academic setting and came to appreciate his KU experience.

He had been in Presbyterian Manor for about five years and a stroke about two years ago significantly slowed him down. He did, however, outlive the projected working life of the pig heart valve he had installed about ten years ago. He was stubborn, too. He was under hospice care for about three weeks and Friday evening his caregivers called his daughter, Ellen, to report he was running a fever. He passed away that Saturday morning.

— Todd D. Williams
Senior Scientist/Director
Structural Biology Center
Courtesy Professor Chemistry &
Medicinal Chemistry

Howard A. Stoltenberg died September 1, 2005 at Lawrence Presbyterian Manor. He was born January 12, 1912, in Holyrood, the son of Gustave and Hanna Ohlemeier Stoltenberg. He graduated from Kansas Wesleyan University with a BA in Chemistry in 1935, and received an MS in Chemistry from Kansas University in 1938.

Mr. Stoltenberg was chief chemist in the environmental laboratory at the Kansas Department of Health and Environment. He retired in 1975. He was formerly an assistant professor of civil engineering at KU from 1946 to 1970, and was a member of Alpha Chi Sigma professional fraternity. He was also a member of the American Water Works Assn., Kansas Public Health Assn., and Kansas Water Pollution Control Assn.

Evelyn Chrystine Goodrich died November 30, 2005. She was born October 18, 1927, in Coalville, the daughter of Hubert and Goldie Miller Turner. She attended school in Stockton, Missouri and Visalia, California. She married Earl Goodrich in 1952. He died in 1985. Mrs. Goodrich was a secretary for the chemistry department at Kansas University for 33 years.

Willie Verleetta Stagg died January 24, 2006. She was born May 16, 1928, in Newton, Texas, the daughter of William "Bo" and Roberta Forward Bowie Woods. She graduated from the University of Kansas, and married Harold Stagg in 1947. He died in 1992. Mrs. Stagg was a laboratory technician in the Chemistry Department at KU for many years.

* * *

All My Giants Are Gone

Cal went too young. Jake, we loved, because he would kid with us. Dour Brewster, who asked me if I had stolen a 3-neck flask. I said no, because another guy reached through a broken partition, to get one for me, at the year-end check-out. Gilles, who gave me a "C", in P. Chem., my last semester at KU. I was looking for a bride (No luck). But, the gods of Chemistry had their revenge: that Fall, as a TA at MIT, I had to teach P. Chem. to Freshmen! I really learned it then!!

Reynolds never convinced us we would be analytical chemists: Too arduous a sample prep! Little did we envision the instrumentation coming. Davidson and Griswold were eminence grise.

Now, two buildings? Brilliant! Old Bailey, a disaster waiting to happen, with wooden floors and cabinets. Today's EPA would have fined KU millions: Rubber tubing, leading to the floor, for the heavy ether vapor, coming off the condenser, with all sorts of open flames, near-by! Making butyraldehyde, with a few of my fellow researchers, who spewed liquid to the ceiling. Everybody on campus knew who we were that day! I walked into my room, and my roomies, as one man, arose, telling me to shower, with my clothes on!

Cleaning out a carbonized flask interior with nitric acid, outside, by a tree, and yellowish fumes arising, because I had no money to replace. Grad students walked by, saying, "He's probably making TNT, and doesn't know it". That was nothing. I was using H₂ gas for my MIT thesis, and smoking in my lab. A fellow grad student walked in and asked me what I was doing. I told him, and he hastened out, sheer white!

Freshman football coach telling me I had to skip chem labs, to come to practice. I told him "Hell, no! I came here from overseas duty (to get the GI Bill) to get an education". I wouldn't have made the team anyway (Too slow, and too small for a lineman. Mike McCormack threw me into the backfield one day!). But, I had the best grades on the football squad!

--Tom Murphy, '52

KENNETH L. MARSII ENDOWMENT TO KU CHEMISTRY

Although Kenneth Marsi, chemistry Ph.D. '55, taught chemistry in his native California for 35 years, he never forgot the relationships he formed with his mentors at the University of Kansas. That's why shortly before his death in August, he and his wife, Irene Marsi, committed \$200,000 for a fund for KU graduate students in chemistry. Their gift to KU Endowment for the Kenneth L. and Gertrude Irene Marsi Chemistry Graduate Student Fund will provide tuition, research and fellowship support for graduate students majoring in chemistry.

"Ken wanted to be sure other students could have the kinds of experiences and opportunities he had as a KU graduate student," Irene said. "He remembered that his professors supported him whenever he got discouraged, and he formed lifelong friendships with them."

Ken completed his undergraduate degree at San José State University in San José, Calif., before coming to KU. He and Irene, a 1951 alumna of Baker University in Baldwin, KS., married shortly before he earned his doctorate in 1955. His teaching career included four years at Fort Hays State University in Hays, KS., before he returned to California. At California State University, Long Beach, he served 21 years as chairman of the Department of Chemistry. He earned several awards for his teaching, including being named University Outstanding Professor in 1984 and statewide Trustees Outstanding Professor in 1985.

"He especially enjoyed helping students understand the potential they had, helping them design a plan to reach their goals," Irene said.

The gift from the Marsi family will be managed by KU Endowment, an independent, non-profit organization that has served as the official fund-raising and fund-management organization for the University of Kansas since 1891.

* * *

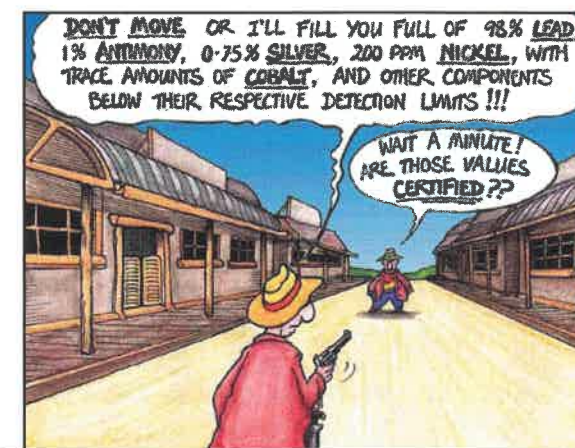
Ralph N. Adams Institute for Bioanalytical Chemistry

The Department's Analytical Division is pleased to announce its intention to establish the Ralph N. Adams Institute for Bioanalytical Chemistry. The Institute is named in honor of 'Buzz' Adams, the world renowned KU analytical chemist who is widely acknowledged as the father of neuroanalytical chemistry. The mission of the Adams Institute is to foster education and research in Bioanalytical Chemistry. Institute researchers will develop and use state of the art sampling, separation, detection and characterization techniques—microdialysis, mass spectrometry, single molecule imaging and spectroscopy, microchip analytical devices, electroanalytical techniques, and continuous monitoring of biological processes—to understand the molecular interactions that:

- Comprise life processes at their most basic level,
- Result in the development of disease states, and
- Define how drug therapies contribute to the restoration of health.

The vision of the Institute is to lead the development of research teams that are uniquely able to examine the chemical biology of major health threats such as stroke, cancer, AIDS and neurodegenerative diseases, and to develop new strategies to cure these afflictions. We anticipate that the dedication of the Institute will take place in mid to late September 2006. Alumni and friends of the department will be sent an announcement well in advance of the date of this event.

* * *



Analytical Chemists in the Wild, Wild West

50TH CHEMISTRY HONORS RECEPTION

Undergraduate Awards

Max Barlow Book Awards

General Chemistry

students with outstanding records

Molly A. Aldrich Jeffrey A. Robinson
James J. Balough Randall S. Stryjewski
Melissa E. McDaniel Joshua T. Wewel

Organic Chemistry

superior achievement

Angela S. Boettcher Bryn M. Gardner
Kayce J. Seidel

Analytical Chemistry

superior achievement

Joseph E. Dratter

Physical Chemistry

superior achievement

Valerie Migicovsky Joshua A. Sebree

The Owen W. Maloney Scholarship

superior performance in General Chemistry by a ChemScholar
Jeffrey A. Robinson

The Walter Gubar Scholarship

outstanding performance by a first-year chemistry major
Conor T. McCartney

The Leonard V. Sorg Scholarship

outstanding performance by a first-year ChemScholar
Lauren E. Rowland

The Clark E. Bricker Scholarship

outstanding performance by a second-year ChemScholar
Jennifer M. Guerra Timothy R. Welch

The Jacob Kleinberg Award

chemistry major who has made outstanding progress in research
prior to the end of their third year
Parul J. Gor

The Fassnacht Fellowship

advanced student with a major in chemistry
Joshua A. Sebree

The Franklin Strain Fellowship

undergraduate chemistry major based on merit
Gideon D. VanRietten

The Ted M. Gardiner Chemistry Award

undergraduate research by a chemistry major
Joseph E. Dratter

American Institute of Chemists Award

a national award
Melinda L. Bretthauer

Alpha Chi Sigma Awards

outstanding graduating seniors in chemistry and chemical engineering

Chemistry Chemical Engineering
Brooke S. Barrett Brent L. Lee

Graduate Awards

The Frank B. Dains Award

outstanding first-year teaching assistant
Jeffrey W. Fischer

The H. P. Cady Scholarship

excellent performance by first-year graduate student
Chamani Perera Irine Saminathan

The Ray Q. Brewster Award

advanced graduate teaching award
Shelli R. Mellegaard

The Reynold T. Iwamoto Scholarship

award based on academic performance
Shelli R. Mellegaard Alan Whitehead

The Snyder Award

graduate student of considerable promise
Erin C. Burger

The Ralph E. and Esther Weik Badgley Scholarship

scholarship to a woman graduate student based on achievement
Olivia L. Mooren

McCullum Research Scholarship

Joshua D. Waetzig Chad D. Hopkins

The J.K. Lee Scholarship in Analytical Chemistry

superior academic performance and research accomplishments
by an advanced doctoral student
Elizabeth S. Erickson

The Ernest and Marvel Griswold Award in Inorganic Chemistry

superior academic performance and research accomplishments
by an advanced doctoral student
Thomas C. Holovics

The Frank B. Dains Scholarship in Organic Chemistry

superior academic performance and research accomplishments
by an advanced doctoral student
Abraham L. Yousef

The Paul and Helen Gilles Award in Physical Chemistry

superior academic performance and research accomplishments
by an advanced doctoral student
Jay R. Unruh

The Higuchi Doctoral Progress Scholarship

superior post-comprehensive student in his or her final year
Yuhong Zeng

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Jason M. Huntington Heather E. Shinogle
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Timothy M. Schmitt Howard O. Washington, Jr.
Ian T. Schuetz Misty L. Williams
Sokhwa Yun

Bachelor of Science

John S. Akin Brent L. Lee
Brooke S. Barrett Christopher G. Lee
Melinda L. Bretthauer Matthew A. Siemer
Jacob T. Will

Master's Degree

Lijun Wang

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* * *

ALUMNI NEWS

Dennis E Bissing, Ph.D. 1962, is now retired and living in Roswell, Georgia.

Benjamn Figard, KU chemistry graduate, received his MS in Chemistry at Oregon State University, December 16,2004. The title of his thesis was "The Analysis of Haloethylenes Using Resonance Electron Capture – Mas Spectrometry and Data Analysis Software."

Betty Austin Hensley, BA 1944, is a self employed flute teacher/performer. She is the only member from Kansas in the American Flute Orchestra, which toured China in May 2005. The performances were given in Beijing, Xi'an and Shanghai.

Rolande R. Hodel, MS 1994; Ph.D. 2005, is currently employed by AIDSfreeAfrica, Inc. AIDSfreeAFRICA is a community of professionals empowering peoples of developing countries to fight against the HIV/AIDS pandemic by producing HIV/AIDS drugs locally and investing in building capacity for greater participation of local communities of developing countries to find solutions to all aspects of the problem of HIV/AIDS. Her e-mail address is rhodel@aol.com.

Laura H. Lucas, Ph.D. 2004, is currently employed by Procter & Gamble. Her e-mail address is lhljayhawk@hotmail.com.

C. R. (Gus) Manning, Ph.D. 1969, President and Technical Director, Assay Technology, Pleasanton, CA. He can be contacted at gmanning@assaytech.com, business website is www.assaytech.com:

Richard W. Roberts, B.S. 1987, KU, Ph.D. 1993, Yale, is now an Associate Professor (tenured) at the University of Southern California in the Department of Chemistry and Department of Chemical Engineering/Materials Science.

Julio Mata Sebreda, Ph.D. 1975, was named to the Humboldt Professorship 2006. His duties during the next year are set as follows: 1) continuation of his project on initial entropy cost (but eventual savings) in TS-complex restricted internal rotation, in microenvironments such as enzyme catalytic sites; 2) projects on palm biodiesel as industrial solvent, lubricant or fluid for transmission of mechanical energy, 3) develop the pedagogical mechanism for teaching (at all levels) ethical attitudes of modern mankind about sustainability, but not as ideology or romanticism, but as a direct result of the Second Law. Also, a short reference textbook on the topic of rational use of energy will be written.

S. E. Stephanou, Ph.D. 1949, is retired and living in Newport Beach, California. "Enjoy receiving your newsy newsletter except that most of my contemporaries are gone as well as my wonderful professors".

* * *

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

We look forward to hearing from you!

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

May we include this information on the alumni website? Yes _____ No _____

Yes, but please omit the following information: _____

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1251 Wescoe Hall Dr., Room 2010
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tjohnson@kuendowment.org
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The Chemistry Department wishes to thank the KU Alumni Association and the KU Endowment Association for their many efforts on behalf of KU Chemistry and the university.