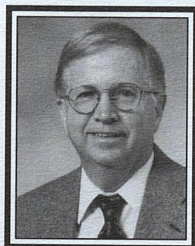




# ChemNews

Department of Chemistry, University of Kentucky, Spring 1998

## MESSAGE FROM THE CHAIRPERSON, BOYD E. HALEY



As I sat pondering an introductory line that would reflect the energy, enthusiasm and success of the current Department of Chemistry, I was reminded about the recent advertisement which stated, "This isn't your father's Oldsmobile." Chemistry, as a research science in pursuit of new knowledge, must continually change its focus to remain on the cutting edge. The intent of this message is to tell our alumni that, while the faculty in the Department of Chemistry have changed considerably, you will still find us a very friendly, congenial department and we would encourage you to visit or get back in touch with us. You will find that the Department has been keeping pace with modern teaching and research. I think you will be quite proud of the current Department and its accomplishments within the academic teaching and research programs made possible by the efforts of both present and past faculty.

Recently, the normal turnover of faculty due to retirements has required the replacement of four positions. In a scenario that will repeat itself over the next few years, there will be other replacements due to retirements. On the downside, this represents a loss of experienced, high-quality faculty who have served the Department well for many years; their contributions will be greatly missed. On the positive side, it allows the Department to change focus. As an older faculty member myself, I recognize the advantages of youth and recent training. Several factors such as the combined computer assisted molecular modeling of compounds and data reduction parameters from NMR, mass spectrometry, IR, X-ray crystallography, etc. are handled totally differently than just a few years ago. I was raised using a slide rule. Our younger faculty were raised with computers and, thus, represent a new era in using powerful computer technology to enhance chemical experimentation. The Department can be proud of its young professors, many of whom have already received external grants and prestigious awards.

Recently, the relatively new field of fullerene, or Buckyball, chemistry, has emerged as a major research area of extreme importance in materials science. With the advent of molecular biology and molecular modeling, chemistry has found an important role in such diverse biomedical research areas as computer assisted drug design and the combination of chemistry with molecular biology/biochemistry to develop medical treatments and diagnostic tests not possible before. This represents a research intensive area called biological chemistry, and its importance is acknowledged by the American Chemical Society in requiring introductory courses in this area for all future accreditation. It is these two areas, materials science and biological chemistry, that the faculty of the Department of Chemistry have chosen to enhance. The recent hiring of Robert Haddon, an internationally recognized scientist from Lucent Technologies, represents a major addition to the materials science program, has greatly strengthened the area of fullerene chemistry, and has led to significant external funding. My appointment in the Department brings additional expertise to an already very strong biological chemistry group that is well funded by grants from NIH, NSF, DOE, and other external sources.

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The Department was also very successful in its last recruiting efforts in which our top two candidates have accepted the positions offered. Dr. Dong-Sheng Yang, a physical chemist, will enhance our physical chemistry program and comes to us from Canada as an assistant professor. Our second hire was at the associate professor level and represents a strong addition to our inorganic chemistry program. Prof. David Atwood brings an impressive set of teaching and research credentials and a well-funded research program. These are notable young scientists but most impressive was the major reason they gave for choosing our Department. It was not our resources, the equipment, or the quality of our facilities. Instead, it was our faculty that impressed them most. The collegial atmosphere of the Department is what I also consider its strongest point, and this is not a new development. If this had not existed before I would not have considered taking the position of Chair. Both current and past faculty of the Department should take pride in the attitude they have fostered that makes this Department special and unique. However, I would be remiss if I did not point out that providing significant start-up funds and recent help with major equipment purchases from the upper administration was also a key factor in our ability to attract such outstanding faculty.

A recent charge to the University of Kentucky from the governor of the state is to become a "top twenty" public research institution by the year 2020. This led to an internal review of many departments and programs to identify those that had the potential to achieve national prominence if they were given additional support. The Department of Chemistry did very well in this review as did the Materials Science Program, which includes several of our faculty. In other places in this newsletter you will see that our faculty are very well funded and have received numerous national and local honors. The Department has done very well with the resources it has been provided. Because it takes resources to attract the best graduate students and new faculty, I hope, as do all of our faculty, that the Commonwealth of Kentucky follows through and provides the resources necessary to take our Department, and the entire University, to a greater prominence. The future quality of a Department is directly dependent on the quality of the new faculty and students.

The generosity of the alumni and others, as represented by Colonel Sidney Behrman, has allowed the Department to recruit better graduate students. This past fall, Drs. Selegue and Brock introduced an outstanding group of new graduate students to the Department. These students were recruited as a result of their tireless efforts and funds made available by the Behrman Fund, a University endowment account founded by a very generous gift from Colonel Behrman for the purpose of enhancing graduate education in the Department of Chemistry. When one is in the position of chair of a department, a



**Rule Number 129** in the 1883-84 "Annual Register of State College of Kentucky" (corresponding to our University Catalog) says: "Students are forbidden to take or have in their quarters any

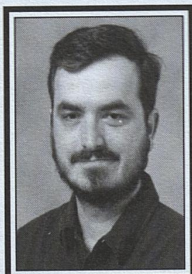
newspapers or other periodical publications without special permission from the President. They are also forbidden to keep in their rooms any books except textbooks, without special permission from the President."



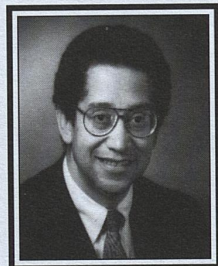
great deal of appreciation develops for the endowment funds that can be used for the enhancement of quality education. I never met Colonel Behrman, but I and other faculty, as well as numerous students, owe him a great debt of gratitude for the major positive impact that he has had on the academic quality of our Department. I would encourage all alumni to consider contributing to our Departmental Endowment Fund. It is a gift that gives forever, and what better use of our riches than to contribute to the education of our youth.

The Department would like to thank the alumni who have in the past contributed to our Endowment Fund and would greatly appreciate a visit from any alumni when you are in the Lexington area. The Chemistry-Physics Building has undergone some remodeling and likely many of the faculty you knew may be gone. Like the "Oldsmobile" we have changed in many ways, but we think that you will like most of these changes. However, we are still the same friendly Department. We welcome your visit.

### NEW FACULTY

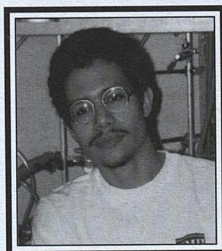


**John E. Anthony.** John joined us in August of 1996. A California native who performed his undergraduate work in Oregon at Reed College where he met his wife, Sara, John migrated back to California for his doctoral and postdoctoral studies with Professors François Diederich and Yves Rubin, respectively, at UCLA. In completing his doctoral research, he spent more than a year with Diederich at the ETH-Zürich, Switzerland synthesizing and characterizing novel carbon-rich materials. As a graduate student at UCLA, John distinguished himself by receiving awards for both teaching and research. His research interests lie in synthetic organic chemistry applied to problems in materials science.



**Fitzgerald B. Bramwell.** Jerry, Vice-President for Research and Graduate Studies at the University of Kentucky, joined the faculty as a Professor of Chemistry in 1995. He earned his B.A. degree in 1966 at Columbia College with Dr. Harry Gray, and his M.S. and Ph.D. degrees in physical chemistry at the University of Michigan under Dr. Julien Gendell and Dr. Thomas Dunn. His research has resulted in over 200 abstracts, papers, and invited talks in the areas of

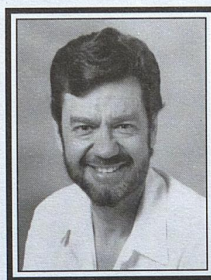
organotin chemistry, multidimensional organic conductors, and the structure and reactivity of photoexcited radicals. His educational efforts have resulted in four general chemistry laboratory manuals which have been adopted nationally and internationally, significant contributions to major American Chemical Society precollege educational initiatives, and in publications in chemical and general science education. He was honored in 1996 in the book "Distinguished African American Scientists of the 20th Century" for his career achievements as a research scientist.



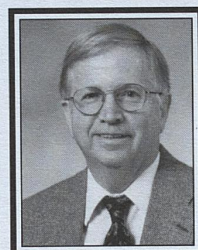
**Arthur Cammers-Goodwin.** Art joined our faculty in August, 1995 as an Assistant Professor following a stint as a NIH Postdoctoral Associate at MIT with Professor Daniel S. Kemp. He received his B.S. degree from the University of Wisconsin-Eau Claire and his doctoral degree from the University of Wisconsin-Madison, working with Professor Edwin Vedejs in the area of synthetic methodology of carbocyclic

ring-expansion and ring opening reactions. His current work focuses on the design of functional molecules on the basis of predictable con-

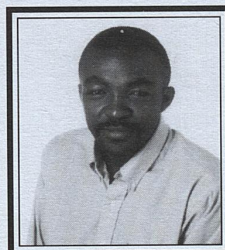
formational preferences. He and his wife, Michele, an attorney, have a 3-year-old daughter, Sage.



**Robert C. Haddon.** Robert joined the faculty as Professor of Chemistry and Physics, after serving as a member of the Materials Chemistry Research Department at Bell Laboratories. He received a B.Sc. (Hon) degree from Melbourne University, and a Ph.D. in organic chemistry from the Pennsylvania State University. His research is directed toward the synthesis, theory, electronic structure and properties of molecules and materials, with particular emphasis on transport, magnetism, superconductivity, device fabrication and miniaturization, and the discovery of new classes of electronic materials. He is best known for the prediction and discovery of superconductivity in alkali-metal doped  $C_{60}$ .

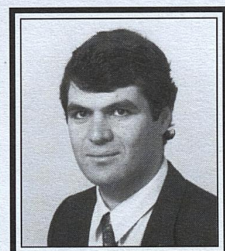


**Boyd E. Haley.** Boyd joined the faculty as Professor of Chemistry and Chairperson of the Department in the summer of 1997. He came to us by way of the College of Pharmacy where he is still Professor of Medicinal Chemistry. Boyd received his B.A. degree from Franklin College, his M.S. degree in organic chemistry from the University of Idaho and his Ph.D. in chemistry and biochemistry from Washington State University. Prior to joining the College of Pharmacy at the University of Kentucky, Boyd was a member of the faculty of the Department of Biochemistry at the University of Wyoming. His research interest centers on biochemical and biomedical problems involving control at the molecular level. Specifically, he is interested in biological systems regulated by protein-nucleotide interactions where the bioenergetics involved are expressed through site-specific nucleotide binding of high affinity or through protein substrate phosphorylation. Boyd has frequently commented that he is happy to be "back at home" in a chemistry department. We are fortunate to have someone of Boyd's caliber to carry on the outstanding leadership tradition of the Department.



**Folami T. Ladipo.** Fola is an inorganic chemist with current research interests centered around the development of new materials and catalytic processes. He received his B.S. degree, Magna Cum Laude, from Stillman College and then pursued the doctoral degree at VPI with Professor J. S. Merola. After postdoctoral work at the University of Missouri at St. Louis and the University of Vermont, he joined our Department in January of 1995. At least for now, Fola is a bachelor.

### PROMOTIONS

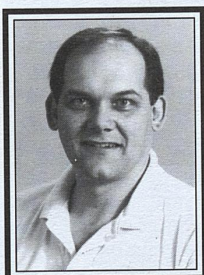


**Leonidas G. Bachas.** Leonidas joined our department in the fall of 1986 after receiving his Ph.D. from the University of Michigan. He was promoted to Associate Professor with tenure in 1991 and to Professor in the spring of 1995. Leonidas is a bioanalytical chemist who specializes in the development and evaluation of analytical methodologies for the determination of biologically and environmentally important compounds by taking advantage of the molecular recognition prop-



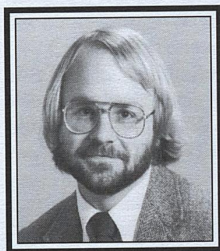
erties of host-guest chemistry. He and the members of his group are interested in using highly specific ion-ionophore and antigen-antibody interactions in the development of competitive binding assays and biosensors.

Leonidas' research has been amply funded almost from the day he joined our department, and he has amassed over three million dollars in research grants as principle investigator or Co-PI since 1986. He has served as mentor for nine Ph.D. students, two M.S. students, and thirty-four undergraduate researchers. Leonidas and his group have produced more than sixty research publications since his arrival at UK. He was the recipient of the American Cyanamid Award in 1992 and the 1993 Young Investigator Award of the Society of Electroanalytical Chemistry. Leonidas is married to Sylvia Daunert, who is an Assistant Professor of Chemistry at UK, and they have two children, Stephanie and Philip. The Bachas-Daunerts direct two dynamic research programs in our department, but they somehow manage to spend quality time as a family.



**F. James Holler.** In the spring of 1995, Jim was promoted to the rank of Professor. He joined the department in the fall of 1977 following completion of his Ph.D. at Michigan State University. He was promoted to Associate Professor with tenure in 1983. During his early career, Jim was very active in research in analytical chemistry with special emphasis on chemical instrumentation and kinetic methods of analysis. His research group produced six Ph.D.'s, one M.S., and two undergraduates who went on to earn Ph.D.'s elsewhere.

As his career evolved, Jim spent increasing time on matters related to teaching and less time on fundamental research in analytical chemistry. He is co-author of five editions of two textbooks on undergraduate analytical chemistry and author of a book that teaches *Mathcad* to analytical chemists. His dedication to teaching was rewarded in the spring of 1993 when Jim became the fourth recipient from our department of the UK Alumni Association Great Teacher Award. Jim and his wife Vicki live and work in a log home near Stamping Ground that they built with their own hands.

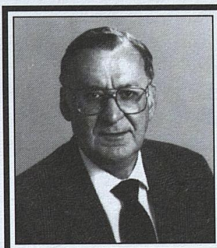


**Mark S. Meier.** Following six years of hard work, Mark was promoted to Associate Professor with tenure in 1996. He began work in our department in the fall of 1990 after completing his Ph.D. at the University of Oregon and a postdoctoral position with Marye Anne Fox at the University of Texas. Mark's research interests include fullerene chemistry, the development of methodology for selective functionalization of

fullerenes, and the strong electric field associated with helical peptides. Mark is author or co-author of 16 research publications from work at UK, and his research has been funded by The Petroleum Research Fund of the American Chemical Society, Centaur Pharmaceuticals, and the National Science Foundation. He and Jack Selegue developed the very first published method for purifying fullerenes using gel-permeation chromatography.

Mark's consummate skill as a lecturer in undergraduate organic chemistry is well known. His students appreciate his ability to convey the concepts of the field, his good humor, and his enthusiasm. Mark's promotion is excellent news for the department; he will be a valued colleague for many years to come. Mark's wife Jennifer is a member of the chemistry faculty of Centre College. Their son, Maxwell Stephan, is nearly two years old.

## RETIREMENTS



**William D. Ehmann** retired and became Emeritus Professor of Chemistry in January, 1995. Bill is a native of Madison, Wisconsin. He received B.S. and M.S. degrees from the University of Wisconsin at Madison, and his Ph.D. from Carnegie Institute of Technology under the direction of Truman P. Kohman. After a postdoctoral fellowship at Argonne National Laboratory, he joined our faculty in 1958, where he

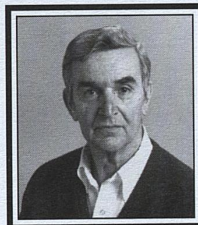
became Professor of Chemistry in 1966. Bill has served as Chairman of the Department of Chemistry, Associate Dean for Research in the Graduate School, Councilor for Oak Ridge Associated Universities, and is an Associate of the Sanders-Brown Center on Aging here at UK. Bill Ehmann's long and distinguished service is greatly appreciated by the University and the Department.

Bill has published over 200 research articles, directed 28 Ph.D. and 11 M.S. theses, and worked with numerous undergraduates, postdoctoral fellows, and visiting scholars. His research has emphasized innovative approaches to trace element analytical chemistry using nuclear methods. He is one of the world's leaders in the application of activation analysis to a wide variety of analytical problems. His long-standing interest in geochemistry and cosmochemistry led to his work on trace analysis of meteorites, tektites, and terrestrial rocks. He was among the first group of scientists to analyze the returned lunar samples for NASA. His work in recent years has been primarily in the application of activation analysis and related techniques to the determination of trace elements in biological tissue.

Bill's many honors include the 1994 Herty Medal, awarded by the ACS Georgia Section, the 1987 Sturgill Award for Contributions to Graduate Education at the University of Kentucky, the 1982 Distinguished Kentucky Scientist Award from the Kentucky Academy of Sciences, 1977 University Research Professor, Fellow of the American Association for the Advancement of Science, and Fellow of the Meteoritical Society. He was a Fullbright Scholar at the Australian National University.

Bill's career was recently capped by his receipt of the 1996 ACS Award for Nuclear Chemistry. The citation reads: The American Chemical Society commemorates the 1996 presentation of the ACS Award for Nuclear Chemistry to William D. Ehmann for his pioneering work in radioanalytical chemistry, including the development of neutron activation analysis methods for the determination of trace elements in meteorites, lunar samples, and biological tissue, and his innovative work with other radiochemical methods.

Even more recently, Bill was honored by the American Nuclear Society, which recently created the Ehmann Award in recognition of excellence in the field of radioanalytical chemistry and related nuclear methods of analysis and, as might be expected, named Bill as the first recipient.



**Paul L. Corio** retired and became Emeritus Professor of Chemistry in May, 1997. Paul, a native of New Haven, Connecticut, received his B.A. from Columbia College, New York and his M.A. and Ph.D. degrees from Columbia University. Following a two-year tour of duty in the U.S. Navy, Paul joined Mobil Oil Company as a research chemist in 1957. After six years as Group Leader of the Central Research Division in Princeton, New Jersey, Paul joined the chemistry faculty of the University of Kentucky as an Associate Professor in 1970. He was promoted to the rank of Professor in 1974.

Paul's early work was in the analysis of nuclear magnetic resonance spectra and his 1966 textbook "Structure of High-Resolution NMR Spectra" is considered to be one of the seminal texts in the



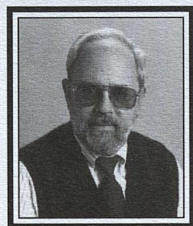
field. His more recent research interests centered on the theory of reaction mechanisms, with special reference to the functional relations between reaction components, intermediates, mechanistic steps, the stoichiometric relation, and the nature of the restrictions imposed by the addition or deletion of mechanistic steps.

Paul emerged as a highly respected and very popular teacher. Along with his deep knowledge of chemistry was a facility for making connections with other subjects and with the everyday experience of students. He was a gifted speaker and was able to bring clarity to difficult concepts. He had high expectations for student performance, and, in exchange was able to bring out the best in students. While he now has more time to pursue his love of literature and music, his presence will be sorely missed by faculty and students alike.



**Robert W. Kiser** retired and became Emeritus Professor of Chemistry in May, 1997. Bob, a native of Rock Island, Illinois, received his B.A. degree from St. Ambrose College in Davenport Iowa, and his M.S. and Ph.D. degrees from Purdue University under the direction of William H. Johnston. Immediately following his graduate studies, Bob joined the faculty at Kansas State University in 1957 where he became Professor of Chemistry in 1966. One year later, Bob and Barbara made the move from the amber waves of grain to the bluegrass of Kentucky when he joined our faculty. During his time at the University of Kentucky, Bob served as Chairman of the Department, Director of Graduate Studies for the Department, Director of the University Mass Spectrometry Center, and Director of General Chemistry.

Bob has published over 70 research articles, directed 20 Ph.D. and 8 M.S. theses, and worked with numerous undergraduates. While his early work was in the field of radiochemistry, the majority of Bob's research has been in the development and application of mass spectrometry. He was a pioneer in the mass spectrometry of metal carbonyl complexes and his book, *Introduction to Mass Spectrometry and Its Applications*, introduced many students to the field. His most recent research efforts in mass spectrometry may be subdivided into ionic fragmentation, including metastable and collision-induced dissociations, and the energetics of ionic species; mass spectra and molecular structure correlations, including multiply-charged positive and negative ions; and artificial intelligence and graph theoretic applications in mass spectrometry. His long and distinguished service is greatly appreciated by the University and the Department.



**Stanford L. Smith** retired and became Emeritus Professor of Chemistry in May, 1997. Stan, a native of Detroit, received his A.B. from Albion College, Michigan and his Ph.D. from Iowa State University. Following a semester as an instructor/postdoctoral fellow at Iowa State, Stan joined the chemistry faculty of the University of Kentucky as an Assistant Professor in 1962. He was promoted to the rank of Associate Professor in 1968 and to the rank of Professor in 1984. During his time at the University of Kentucky, Stan served as Director of the Department's NMR Program from 1962 until his retirement and as the Director of Instrumentation for UK's Magnetic Resonance Imaging and Spectroscopy Center from 1985-1990. He also served the academic community as president of the UK chapter of the American Association of University Professors and as a United Nations Consultant.

Stan has published over 60 research articles, directed 6 Ph.D. and 8 M.S. theses and worked with numerous undergraduates. His more recent research interests lay in the use of magnetic resonance imaging to determine the structure of biologically relevant molecules, for *in vivo* and *in vitro* metabolic studies, and for *in vivo* spectroscopy.

Stan was actively involved in the classroom. His enthusiasm for chemistry was clearly evident in his spirited and enlightening presentations in introductory-level courses, laboratory recitations, and advanced undergraduate and graduate courses. Recent innovations introduced by Stan included the use of computer-based exercises that provide practice in the logic behind organic qualitative analysis and the use of discovery based exercises in introductory organic laboratories. He now has more time to pursue his love of diving and sailing, and he keeps us regularly informed of the pleasures of retirement through his e-mail messages.

## EMERITUS FACULTY



**Dr. Audrey L. Companion** (Ph.D., Carnegie Mellon University, 1958), born 1932 Tarentum, PA, educated at Carnegie Mellon University, taught at Illinois Institute of Technology. At UK 1975-92. Physical Chemistry.

**Dr. Paul L. Corio** (Ph.D., Columbia University, 1957), born 1928 New Haven, CT, educated at Columbia College and Columbia University, worked for Mobil Oil Company. At UK 1970-97. Physical Chemistry.

**Dr. William D. Ehmann** (Ph.D., Carnegie Mellon University, 1957), born 1931 Madison, WI, educated at the University of Wisconsin-Madison and Carnegie Mellon University, postdoctoral fellow and consultant for Argonne National Laboratory. At UK 1958-95. Department Chairman 1972-76. Radiochemistry.

**Dr. Robert W. Kiser** (Ph.D., Purdue University, 1958), born 1932 Rock Island, IL, educated at St. Ambrose College and Purdue University, faculty member at Kansas State University. At UK 1967-97. Department Chairman 1968-72. Inorganic Chemistry.



**Dr. Kurt Niedenzu** (Dr. rer. nat., University of Heidelberg, 1956), born 1930 Fritzlar, Germany, educated at the University of Heidelberg, worked for U.S. Army Research Office, Durham, NC and for Wintershall AG, Germany. At UK 1968-92. Inorganic Chemistry.

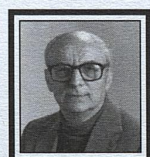


**Dr. John M. Patterson** (Ph.D., Northwestern University, 1953), born 1926 Vineland, NJ, educated at Virginia Military Institute, Wheaton College, and Northwestern University. At UK 1953-93. Organic Chemistry.



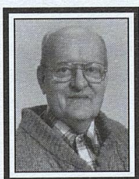
**Dr. Paul G. Sears** (Ph.D., University of Kentucky, 1953), born 1924 Somerset, KY, educated at the University of Kentucky, worked at Monsanto Chemical Co. At UK 1954-57 and 1959-90. Special Assistant to the President, 1971-90. Physical/Inorganic Chemistry.

**Dr. Stanford L. Smith** (Ph.D., Iowa State University, 1961), born 1935 Detroit, MI, educated at Albion College and Iowa State University, postdoctoral fellow Iowa State. At UK 1962-97. Organic Chemistry.



**Dr. Walter T. Smith, Jr.** (Ph.D., Indiana University, 1946), born 1922 Havana, IL, educated at the University of Illinois and Indiana University, worked at Mallinckrodt Chemical Works, and the Ethyl Corporation, taught at the University of Iowa. At UK 1953-92. Organic Chemistry.

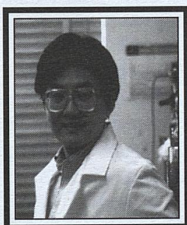




**Dr. William F. Wagner** (Ph.D., University of Illinois, 1947), born 1916 Canton, MO, educated at Culver-Stockton College, the University of Chicago, and the University of Illinois, worked for Illinois State Geological Survey and taught at Hanover College. At UK 1949-83. Department Chairman, 1965-68 and 1976-83. Analytical Chemistry.

## OBITUARIES

**Mrs. Lucile Sanders Dawson** passed away on June 10, 1995. She was the wife of Professor Lyle Dawson who was Head of the Department of Chemistry during the developmental years of the Department's Ph.D. program. Lucile served as a gracious "First Lady" of the department for many years. She called on all the new faculty and made them feel welcome. The monthly "Chemistry Wives" bridge parties helped develop close friendships. She kept scrapbooks on all her travels and in later years was the historian for Mayfair Manor where she lived. Her grandchildren and great grandchildren gave her great joy. Everyone who knew her admired her.



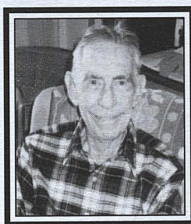
**Dr. Haibin Deng**, Assistant Professor of Chemistry, died of a heart attack on December 29, 1994. He was thirty-one years old. He left his wife, Jian Tan, and three-year-old son, Aaron Deng. Dr. Deng was a native of China, and a graduate of Fudan University. He earned his Ph.D. at Ohio State University in 1991, and he held a postdoctoral appointment at Cornell University from 1991 to 1994.

We became aware of Dr. Deng in the fall of 1993, when we were searching for exceptional talent to fill a faculty vacancy in inorganic chemistry. He joined our faculty in August, 1994.

Haibin's one semester with us was a busy one. He taught a large section of CHE 105, where the students observed that Dr. Deng was "a very smart man who really knew the material, and he was a very nice man who really cared about his students." Haibin took his teaching duties seriously, and he also worked industriously to establish his research program. At the time of his death, experiments and reactions were underway in his laboratory, grant proposals were under consideration, and plans were in place for an illustrious career.

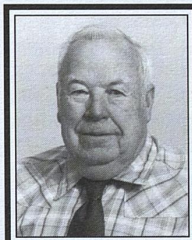
Our perceptions agree with those of the students. Haibin Deng was an excellent scientist. And he was a nice person, with a fine sense of humor and a collegial disposition. He was at the University of Kentucky only one semester, but we are glad and proud that at least for that period Haibin was our colleague and our friend. It is always painful to lose a colleague, and a friend. In this case, our sorrow is made more intense by awareness of the promise unfulfilled and the potential unrealized.

**Dr. Pete Glavinovs**, was a chemistry undergraduate and punter on the UK football team. He went from here to Pharmacy where he received his Ph.D. Pete died of cancer of the liver. He was working at W. G. Johnson in New Jersey but asked to be returned to Lexington for funeral and burial. His illness apparently came on suddenly and developed rapidly. Services for Pete were held at the Newman Center.



**Dr. Jacob Meadow**, died August 8, 1997 in Albuquerque, New Mexico. He was born in 1903 in Shaw, Michigan and was educated at Arkansas College, the University of Arkansas, New York University and received his Ph.D. from Johns Hopkins University in 1933. He worked at DuPont de Nemours and at Socony Vacuum Oil and taught at the University of Arkansas, Arkansas College and Southwest-

ern College prior to joining the faculty at UK in 1945. He was with the University of Kentucky for 24 years and served as Director of General Chemistry and Assistant Dean of the College of Arts and Sciences. His sabbatical year in Indonesia gave him close bonds with the students from that country who came to UK. In later years he developed a talent for painting scenes from his favorite global travels. He was respected as a compassionate teacher and student mentor, a keen bridge player, and a caring gentleman.



**Dr. William Kennedy Plucknett** was born near DeWitt, Nebraska December 20, 1916 to Albert Sidney and Cora Kennedy Plucknett. He grew up on his family farm located on the Big Blue River south of DeWitt. He married Evaline West in 1942. He is survived by his wife, three children, Ellen O'Laughlin, Albert Plucknett and Bruce Plucknett, four grandchildren, Tom Denberg, Aaron Denberg, Evans Winner and Keri Winner, and three sisters,

Bonita Binegar, Dorothy Elwood and Eleanor Crosier.

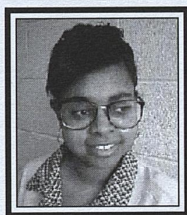
He attended Peru State College, Peru, Nebraska and received a doctorate degree in Chemistry from Iowa State University in 1942. During WWII he worked for Shell Oil Company in a position considered important to the war effort. He taught briefly at the University of California at Berkeley, worked for the Atomic Energy Commission in Ames, Iowa from 1947 to 1950, and taught at Fordham University in New York from 1951 to 1953. He joined us in 1953 and remained at the University of Kentucky until his retirement in 1983.

After retiring, he was active in farming, carpentry, genealogy and helping others. He was a devoted family man and an outspoken civil rights advocate. He fought for academic freedom during the McCarthy era, and championed many humanitarian causes. He belonged to the ACLU, Amnesty International and The Optimist Club.

He will be remembered for his generous spirit and sense of humor. He was a loving husband, father and grandfather, an inspired teacher and caring friend.

**Dr. W. Reid Thompson, II**, died April 22, 1996 at the Cayuga Medical Center, Ithaca, NY. Reid was born March 2, 1952 in Mackville, KY, graduated in 1969 from Washington County High School, and was awarded a B.S. in Chemistry by the University of Kentucky in 1973. He received an M.S. in Chemistry, Astronomy and Space Sciences and, in 1984, a Ph.D. in Astronomy and Space Sciences from Cornell University. Since 1984 Reid had been employed by Cornell University, and held the position of Senior Research Associate in the Laboratory for Planetary Studies and the Center for Radiophysics and Space Sciences. He made many scientific contributions, some of which were co-authored with Carl Sagan. He was a member of the imaging team of the NASA Voyager II and the Galileo spacecraft used for planetary explorations. He was active in AAS/AGU, Division for Planetary Sciences, the International Society for the Study of the Origin of Life, and the Society of the Sigma Xi.

## NEW FACES AROUND THE DEPARTMENT

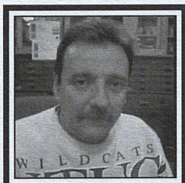


**Yvonne Beatty-Warner**. A new member of the Business Office staff, Yvonne began in March of 1997, replacing Pat Shuey. A Lexington native, Yvonne is also a new mom. Married last year, she and her husband Terry, are the proud parents of a baby girl, born January 29, 1998. Her older daughter, Norel, is happy about her new little sister.





**François Botha.** A native of South Africa, François received his undergraduate education in chemistry at Potchefstroom University and his Ph.D. at the University of Bath, England. Following a brief research career at Sasol Technology, where he headed a research program on activated carbon development, and teaching experience at Lees College, he became the Supervisor of the General Chemistry Laboratories in August 1995. His wife, Vicki Bell, teaches at Asbury College.



**Miguel Gomez.** A new addition to the Department staff, Miguel began part time in July 1996, but is now full time. A political refugee from Cuba, he and most of his family were exiled to the United States in 1993. Miguel is a welcome addition to the Stockroom staff.



**Amy Kirkpatrick.** Our new Business Manager replaced Debra Shambro in November, 1996. She is originally from Nashville, TN, and received her B.A. in psychology from the University of Kentucky. For nine years, she was the Business Officer and Secretary/Treasurer for an independent oil and gas company, based here in Lexington. Before joining the Chemistry Department, Amy spent 4½ years as a Clinical Research Assistant with the Stroke Program, part of UK's Sanders-Brown Center on Aging, involved in neuro-behavioral research. She has an 8½ year old son, Marshall.



**Manjiri Patwardhan.** Our new Supervisor of the Organic Chemistry Laboratories comes to us with excellent credentials. After receiving her B.Sc. and M.Sc. degrees at the University of Pune, India, she worked with Professor Robert Guthrie of our Department in performing high-energy radiolysis studies of organic molecules in solution for her Ph.D. degree in 1994. In addition to Anuj, their 5½ year old son, Manjiri and her husband, Abhijit, have a daughter, Urvi, who is now 2 years of age.



**Terence Todd.** After many years without a Lecture Demonstrator, we are pleased to have Terry in this position. He received a B.A. degree in chemistry from Berea College and a M.S. degree from Eastern Kentucky University before joining us in August, 1995. In addition to his duties of assisting in many teaching capacities, Terry has become the departmental computer guru. His considerable experience in this area, a year's work as a computer technician, and his willingness to work with computer novices have made him a valuable member of the Department.



**Nicole von Wiegen.** Our new receptionist in the main office has a degree in Applied Science and Secretarial Arts from the Katharine Gibbs School in Boston, Massachusetts. Nicole accompanied her father, who is an attorney, to Kentucky in 1994. She enjoys horseback riding, snorkeling, and scuba diving and has earned an open-water diving certificate. She has travelled to many countries and we are delighted to have her in our Department.



**Nora Warren.** The newest member of our Business Office joined us in December. Nora is originally from Detroit, MI, but moved to Lexington during her high school days. She comes to us from McCoy & McCoy, an environmental consulting firm, where she was a Business Manager and in charge of Accounts Receivable for its subsidiaries. She has 2 children and 1 grandchild.

## ETHERNET AND THE WORLD WIDE WEB

Our department made the jump into the fast lane on the information superhighway when Ethernet connections were installed in all faculty and staff offices. These high-speed connections enable us to connect quickly to virtually any internet server in the entire world and to utilize the vast quantities of data and information that are available at a keystroke or click of a mouse.

Our department has become a leader on campus in the use of the Web for instructional purposes and for providing information to the world regarding our department and our programs. Rob Toreki has spearheaded our efforts and is the designer of our Web site and the departmental home page, which you can find at <http://www.chem.uky.edu/>. As you will see if you surf our site, Rob has done a beautiful job of providing a wealth of useful information about the department including faculty profiles, course syllabi, information about the Chemistry-Physics Building, departmental procedures and the graduate program. Potential graduate students can fill out an on-line form and submit electronically a request for an application to our program.

Several of our faculty have been using the Web in their classes. Bob Grossman has prepared a complete set of notes, including structures and diagrams, for his rendition of CHE 230 (<http://www.chem.uky.edu/courses/che230/RBG/>). In addition, Bob's new book, "The Art of Drawing Reasonable Organic Reaction Mechanisms," is on-line and can be found at <http://www.chem.uky.edu/courses/che538/textbook.html>.

Rob Toreki has produced a number of interesting Web applications, but the neatest by far is his on-line periodic table quiz. Rob is one of those hard-nosed characters who insists that his students memorize the periodic table, so he has created an interactive table into which students type the symbols for the elements in table locations. When they finish, they press a button, and their efforts are graded within a few seconds and errors are reported. Students may repeat the quiz as many times as necessary. The hyperperiodic table is located at <http://www.chem.uky.edu/misc/periodicquiz.html>. You might also want to take a look at his *The Organometallic HyperTextBook*, which is an on-line textbook for his CHE 614 course, located at <http://www.chem.uky.edu/courses/che614/HyperTextBook/>.

Jim Holler uses the Web in all of the courses that he teaches. Web-weaving began for him in the spring of 1995 when he and Bob Kiser decided to teach an experimental unit on nerve gases in the middle of CHE 107. Since there was little information on nerve gases in the textbook, Bob and Jim gathered readings and hyperlinks to other Web sites and published them on the Web at <http://www.uky.edu/~holler/nervgas.html>. The Web page provided the students sufficient background to complete their study of nerve gases and convinced Jim and Bob of the power and potential of the Web as a teaching tool.

## CHEMISTRY/PHYSICS MICROLAB

In the summer of 1993, the University installed a microcomputer lab in renovated room CP-148. Jim Holler and John Christopher of the Department of Physics and Astronomy wrote a proposal for the lab to the Vice President for Information Services. The request for



the lab was granted, and funds for renovation and equipment were appropriated from the technology fee paid by all students during each semester. The lab included thirty-nine 486-based workstations and a few Macintosh machines interfaced via Ethernet to a server, a scanner, two high-volume printers, and miscellaneous other equipment.

Over the ensuing three years, the computing equipment in the microlab became obsolete to the extent that there were many applications that could not be run on the machines. In response to the demand, Information Services upgraded the machines to Pentiums with 8 MB of memory, added three new machines to the lab, and provided a campus-wide super server that greatly facilitates the use of various software packages such as Mathcad, TableCurve, and Comprehensive Chemistry from any of the more than fifteen microlabs on campus.

### INNOVATIVE TEACHING INITIATIVES

In the fall of 1995, Joe Wilson introduced an experimental program called ChemExcel to help students succeed in the general chemistry program. In this program, students work together in small groups under the direction of a mentor to master the basic problem solving skills that are fundamental to general chemistry. ChemExcel differs from the classical recitation period in that the student leader or mentor does not take the traditional authoritative teaching role in front of the class. Instead, the leader facilitates an environment in which the students teach each other. The students who participate in ChemExcel attend a two-hour session each week in which they solve fifteen to twenty challenging chemistry problems. In the first two years of the program, graduate students were employed as the leaders and 25 students participated in ChemExcel each semester. In the fall of 1997 it was possible to increase the size of ChemExcel to include 45 students each semester by using outstanding undergraduates as mentors, an innovation recently pioneered by the University of Rochester and the City University of New York. Students are admitted to the program on a "first come, first served" basis. As you can imagine, any program that helps students perform on average one whole letter grade better than the rest of the class is in high demand. In the fall of 1997 the class average of ca. 1200 students in CHE 105 was 71.1 while that of the ChemExcel students in the same course was 80.3. Originally, the NSF and Kentucky EPSCoR program provided funding for the new program. While the College of Arts and Sciences is currently funding ChemExcel, we are pleased to report that Professor Wilson was recently notified that the National Science Foundation will fund an expanded version of ChemExcel for two years beginning in the fall of 1998. The funding from NSF will allow us to extend the program to ca. 150 students per semester.

While it is certainly true that one of the best ways to learn chemistry is to do chemistry, the large class sizes required for general chemistry have made it difficult to assign and collect homework problems from students on a regular basis. This changed last fall when Bob Kiser, Joe Wilson and Dave Robertson introduced students in CHE 107 to Computer Assisted Personalized Approach. The CAPA software, which was developed at Michigan State University, allows faculty members to assign individualized homework problems to students in large classes like CHE 105 and CHE 107. Every student is given a sheet of ten individualized problems in class each week and the students record their answers by entering them in the computer through the campus network. Many of the students found CAPA to be very useful in making them be disciplined in their study of chemistry. Moreover, there was, as one would expect, a direct correlation between performance on the CAPA homework and course grade. One of the greatest unexpected benefits of introducing assigned homework back into general chemistry was the large increase in the number of students that regularly participated in the "out of class" chemistry help sessions. It was not uncommon for 1/3 of Dave Robertson's class (40 to 45 students) to show up for a 2-hour chemistry study session every Monday afternoon. This is in stark contrast

to the 10 or 15 students that would participate in a help session the week before an exam. CAPA is now being used in both CHE 105 and CHE 107.

The NSF Summer Research Program for Undergraduates, which has been in operation for several years at the UK Chemistry Department, provides opportunities for students from other colleges and universities to become engaged in research. For many of these students, this experience is their first introduction to the research laboratory, and the Chemistry-Physics Building comes alive under their enthusiasm for discovery. This very successful program, which Sylvia Daunert directed for several years, is now in the capable hands of Joe Wilson.

### ORGANIC LAB RENOVATIONS

The undergraduate organic teaching laboratories have undergone their first phase of renovation. The new bench tops and drawers have increased our overall student capacity by about 50%. Each individual workstation has a bench area for setting up experiments; an additional area for recording data; water, vacuum and air lines; and a small cup sink and a larger sink. In the second phase of the renovation, hoods will be installed for individual workstations. The second phase of renovation will begin in summer of 1998 and will continue until December 1999. The renovations will make the organic experiments safer, cleaner, and, hopefully, more enjoyable for the students. We also have a new GC/MS for undergraduate students in the organic chemistry laboratories and the SQUALOR computer program for student exercises in qualitative analysis of organic compounds.

### FEATURING ALUMNI FROM 1970 - 1974

Since 1980, ChemNews has featured news of alumni from five-year periods, starting with graduates in 1920. Alumni from the classes of 1970-74 were asked to describe their careers since leaving UK. News from people who missed the deadline is always welcome.

**Joseph B. Bogardus**, B.S. 1970. "My current position is Executive Director of Pharmaceuticals Research and Development at Bristol-Myers Squibb. I am responsible for about 80 scientists involved in physical chemical characterization, pharmaceutical formulation development, and scale-up of new products developed or licensed by the Company. Although I have worked in Syracuse for eleven years, I am moving in July 1995 to work in our New Brunswick, New Jersey, research facility. [Address: P.O. Box 191, New Brunswick, NJ 08903-0191.] Before joining Bristol-Myers Squibb, I was Assistant Professor at the UK College of Pharmacy (1979-1984) and Senior Research Scientist at Pfizer (1973-1979). I received my Ph.D. in Pharmaceutical Chemistry from the University of Kansas."

**Robert Fraas**, Ph.D. 1972, is a Professor of Chemistry and teaches chemistry and forensic science courses at Eastern Kentucky University, Richmond, KY. He has been the Director of the Forensic Science Program since it was initiated in 1975. Over 100 students have graduated with the B.S. degree in Forensic Science from Eastern Kentucky University.

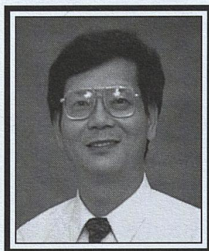
**Jim Gum**, B.S. 1972. "After leaving UK I worked at the Pabst Brewery in Peoria Heights, IL for about a year as a laboratory technician. I then entered the University of Texas Graduate School of Biomedical Sciences in Houston majoring in biochemistry and molecular biology. I obtained M.S. and Ph.D. degrees in 1976 and 1980. I then did postdoctoral research in the Department of Biochemistry at The University of Wisconsin-Madison. In 1984 I started work as a research biochemist at the VA Medical Center in San Francisco, studying the structure and expression of colonic mucins. I am also an adjunct assistant professor in The Department of Anatomy at UCSF, teach-



ing histology and cell function to medical and pharmacy students. I married in 1974, and currently live in Pacifica, CA with my wife Elizabeth and my 14 year old son James III.

"I enjoyed reading about Reid Thompson in a recent news letter. It would be nice to hear news of Messrs, Phillips and Parker, friends at UK I used to study with. It was also nice to hear about Tom Hearn, a favorite TA, and Dr. Plucknett, whose physical chemistry classes I particularly enjoyed.

"I look back at my years as an undergraduate in the Department of Chemistry with fondness and would like to thank all of my very patient teachers. I always look forward to receiving the newsletter and reading news of people and graduates of UK."



**Chang Samuel Hsu, Ph.D. 1974.** Received a Ph.D. degree in Physical Chemistry under the supervision of Professor Robert W. Kiser, after receiving a Bachelor of Engineering degree in Chemical Engineering in Taiwan. He is currently a Research Associate at Corporate Research Laboratories of Exxon Research and Engineering Company, Clinton, NJ, in charge of the Mass Spectrometry Lab. He is also an Adjunct Professor of New Jersey Institute of Technology since 1991. Last year he was elected by the Chinese American Chemical Society as President-Elect and will be the President for 1997 and 1998. He is also an Alternate Councillor of the North Jersey Section of American Chemical Society and a Board Member of Chinese American Cultural Association.

Dr. Hsu's expertise is in petroleum and petrochemical areas utilizing mass spectrometry. He has 5 patents and over 130 internal and external publications including articles in Encyclopedia of Analytical Science and Kirk-Othmer Encyclopedia of Chemical Technology. He is listed in Who's Who in Science and Engineering. He is a former chairman of ACS North Jersey Mass Spectrometry Topical Group of more than 300 members. He has been section chairperson at several professional meetings.

**Ed Montgomery, Ph.D. 1971.** "The week after my final orals, I entered active duty in the US Navy. The last twenty-four years have been spent primarily in building and repairing nuclear submarines. Along the way I spent three and a half years in Guam as Repair Officer on the submarine tender *USS Proteus*.

"I returned to the mainland in 1988 as project officer for construction of *Los Angeles* Class submarines at the Supervisor of Shipbuilding in Groton, CT. In 1991 I reported to the Naval Sea Systems Command in Washington, DC as Assistant Program Manager in the Attack Submarine Program Office. I returned to Groton in August 1994, this time to take command as the Supervisor of Shipbuilding. The Supervisor's office oversees submarine construction at the Electric Boat Shipyard in Groton. We currently have six ships under construction, including the first two *SEAWOLF* (SSN 21) Class submarines. With the exception of two years on the chemistry faculty at the US Naval Academy, it's all been a long way from chemistry." (**Editor's Note:** Dr. Montgomery has the rank of captain.)

**Earl R. Price, B.S. 1973.** "I am currently the Technical Services Manager for Yuasa-Exide Inc.'s (YEI) Richmond, Kentucky Lead Acid Industrial Battery Manufacturing Facility (19 years). Yuasa Corp. is a worldwide manufacturer/distributor of batteries and energy products. (Dr. Sears would be proud of the Electrochemistry I learned and applied from attending his classes!) Since graduation I have held several positions with YEI, primarily in areas of technical support and management. I returned to college while pursuing my professional career and obtained a Masters in Business Administration (EKU, Finance, 84').

"My wife of four years, Gail, and I live in Richmond. My youngest daughter, Kelly, plans to attend UK. She entered in '96 and is a

sophomore. Unfortunately, my oldest daughter Christy and Gail's son, Craig Faulkner, crossed the border and attended UT.

"Again, it was pleasing to hear from you and I look forward to the upcoming issue of ChemNews."

**Henry S. I. Tan, Ph.D. 1971.** "After graduation I joined the College of Pharmacy of the University of Cincinnati Medical Center as Assistant Professor of Pharmaceutical Chemistry (1971). I was promoted in 1976 to Associate then to Full Professor of Pharmaceutical Chemistry in 1982.

"I served as Acting Chairman of the Division of Pharmaceutics and Drug Delivery Systems of the University of Cincinnati Medical Center College of Pharmacy (1987-1994).

"I have been actively involved with the American Association of Pharmaceutical Scientists (AAPS) where I was Chairman of various committees. The most recent were as Chairman of the Awards Committee (1991) and of the Membership Committee (1992, 1993) of the AAPS Analytical and Pharmaceutical Quality Section as well as the parent AAPS organization.

"I was elected to the Committee of Revision of the United States Pharmacopoeia (USP), Washington, DC, to serve on the Antibiotics and Veterinary Drugs Subcommittee for the 1990-1995 term. Re-elected to the committee of Revision for the 1995-2000 term to serve on the Antibiotics Subcommittee. The USP is the agency, that in cooperation with the US Food and Drug Administration, sets legally-enforceable standards for drugs used in the USA and in some other countries of the world.

"I was appointed to the USP Drug Standards Executive Committee and to serve as the Chairman of the Antibiotics Subcommittee for 1995-2000.

"I was elected to serve as Delegate to the USP for the University of Cincinnati College of Pharmacy for the terms 1985-1990, 1990-1995, and 1995-2000.

"I have published over 60 research papers, mainly in the area of Pharmaceutical Analysis, in refereed journals with international circulation."

**Gary R. Weisman, B.S. 1971.** "It's hard for me to believe that it's been 24 years since I left Kentucky with a B.S -- it seems like yesterday! I remember my time there very fondly, especially the three years I spent doing research in Bob Guthrie's lab. Bob was a true mentor to me, teaching me directly and by example what a good scientist and teacher should be, and inspiring me to want to be a college professor myself. I feel fortunate to have been taught by so many excellent teachers at Kentucky: Bill Ehmann, Stan Smith, Bob Guthrie, and the incomparable Bill Plucknett (the best lecturer I have ever heard, to this day) are names that come readily to mind. I really enjoyed my contact with all of the faculty and the students -- I feel that I was treated like family and received a first-class education that has served me well.

"Donna Christianson and I were married the summer after graduation and we went off to the University of Wisconsin at Madison together, where she finished her B.S. in Nursing and I did my Ph.D. in Organic Chemistry, working with Steve Nelsen on tetraalkylhydrazine conformational analysis and redox chemistry. Steve was another fine mentor, and I have been fascinated with conformational problems and dynamic NMR ever since. I then had a postdoctoral appointment with Don Cram at UCLA during the early golden days of his host-guest work. It was a heady time and I can tell you that I was pretty excited later when Don got the Nobel Prize, and one of my papers with him was cited. In 1977 I accepted a tenure-track appointment at the University of New Hampshire, where I am now Professor of Chemistry. UNH has allowed me to balance my career between teaching and research. My research has mostly been concerned with the chemistry of macrocyclic and polycyclic polyamines as well as with a variety of projects in organic stereochemistry. This



year I have been honored as the Outstanding Faculty Teacher of the College of Engineering and Physical Sciences at UNH.

"Durham, New Hampshire is a beautiful place to live and work. We're very close to the inland tidewaters of Great Bay and only a couple of hours from the White Mountains, where we enjoy hiking. Donna has continued her work in nursing; after many years of emergency nursing, she now specializes in gastroenterology. Donna and I have three children: Christopher (19), Kurt (16) and Emma (12). All three are accomplished musicians; Chris will be starting school at UNH this fall in music.

"I look forward to reading the letters from other members of the classes of 1970-1974, many of whom were close personal friends. I'd love to make contact with some of those folks again."

## MORE NEWS OF ALUMNI AND ALUMNAE

**Becky Timmons**, B.S. (biology) 1985, B.A. (chemistry) 1985, is Director of Quality Assurance at Alltech Biotechnology Center in Nicholasville, KY.

**Ronald D. Weddle**, B.A. 1969, M.D. 1973, is a physician at the Southend Medical Clinic in Louisville, KY.

**Judith York Smith**, A.B. 1966, is Coordinator of Secondary Education for Durham, N.C. Public Schools. She has an M.A. in Chemistry Teaching, and is Adjunct Lecturer at Duke University.

**Michael S. Lupin**, Postdoctoral Fellow (R. W. Kiser) 1968-69, is a Senior Research Chemist at IMI Institute for Research and Development, Haifa Bay, Israel.

**Dana Evans**, B.S. 1986, M.S. (Eastern Kentucky University) 1993, is Principal Chemist in the Kentucky Department of Transportation.

**Hence F. Brank, Jr.**, B.A. 1967, M.D. (Louisville) 1976, is presently living in Henderson, KY, following his discharge from the Air Force.

**Donald Showalter**, Ph.D. (Ehmann) 1970, was one of two teachers chosen to receive the Joyce Erdman Regents Teaching Excellence Award in the University of Wisconsin System. The award includes a \$5000 prize.

**Daryl Sharp**, B.A. 1968, is Senior Chemist in the Kentucky Department of Transportation.

**Mansor B. Ahmad**, B.S. 1982, is now lecturer in the Department of Chemistry at the University Pertanian, Malaysia. E-Mail: mansor@fsas-dk.cs.upm.my.

**Glen G. Possley**, Ph.D. 1969, is senior vice president for research at Ramtron International Corporation, Colorado Springs, Colorado. As a graduate student at UK, Glen worked with Professor Hartley C. Eckstrom. During his professional career, Glen has been affiliated with Texas Instruments, Motorola, and Philips Semiconductor. He cites his most important career achievement as the introduction of high-resolution photo lithography for high-speed semiconductor devices and epitaxy-fill techniques for semiconductors. Both processes are patented.

**Amy Compton**, B.S. 1994, is working for her Ph.D. at the University of North Carolina, Chapel Hill.

**Nabeel F. Haidar**, Ph.D. (W. T. Smith and J. M. Patterson) 1970, is Vice-President of the Lebanese American University in Beirut. He was in Lexington for a brief visit in January, 1998 while in this country to discuss the start up of the Debakey Medical College at the Lebanese American University.

## RESEARCH SUPPORT

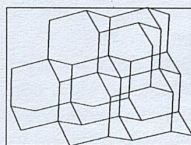
Most chemistry students, undergraduate as well as graduate, are involved in chemical research, and, since these activities play such a significant role in chemical education, monetary support is important to our Department. Our current funding level of \$1,066,000 per year arises primarily from faculty grants from such traditional federal funding sources as the National Science Foundation, the Department of Energy, the Environmental Protection Agency, and the National Institutes of Health; however, faculty also receive industrial

support--e.g., from the Upjohn Company and the Chevron Petroleum Technology Company. In addition, "starter grants," such as those provided by the Petroleum Research Fund of the American Chemical Society, are important in initiating the research programs of new faculty.

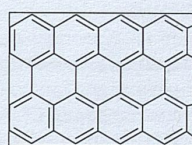
Following is a brief description of the research programs of three of our young faculty members. John Anthony joined the Department in 1996 while Robert Grossman and Sylvia Daunert came on board in 1994. It should come as no surprise after reading about their research that each of these individuals has already gained national recognition for their work. John was awarded a Camille and Henry Dreyfus New Faculty Award in his first year with the Department; Bob was just awarded an NSF Faculty Early Career Development Award; and Sylvia, in addition to major funding support from NSF, NIH, DOE, and DOD, has recently been awarded the Research Corporation Cottrell Scholar Award and the Eli Lilly Award in Analytical Chemistry.

## RESEARCH NEWS

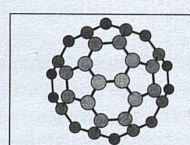
**John E. Anthony.** The importance of materials to the advancement of society is evident in the way we describe humankind's progress through the ages: Stone Age, Bronze Age, Iron Age, etc. The late 20th century will likely be called the Silicon Age, because of the rapid growth of computers based on silicon semiconductors. The question our research group is attempting to answer is: What next? Our hope is that the 21st century will be known as the Carbon Age. Carbon, in its natural forms, is already ascribed a number of superlatives: Diamond is one of the hardest substances known, while graphite is the most stable form of carbon. Both of these compounds are industrially important materials, with uses as diverse as coatings for extra-hard cutting tools and battery cores. In their natural form, the allotropes of carbon are already important industrial commodities.



Diamond



Graphite



Fulleroid

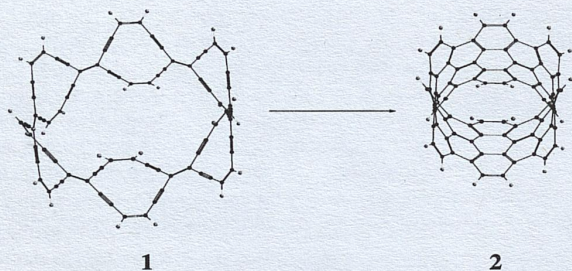
At extremely high temperatures, graphite produces interesting new all-carbon molecules. These recently discovered molecular allotropes of carbon, fullerenes and nanotubes, take graphite from a two-dimensional solid into three-dimensional shapes, and this transformation brings with it a host of new properties. Doped or modified fullerenes have been shown to be superconductive, ferromagnetic, and exhibit fascinating optical and optoelectronic properties. It is these *electronic* properties of carbon that can be exploited to form the next generation of materials. The more recently discovered nanotubes are also predicted to possess remarkable tensile strength, which should lead to the production of very lightweight, ultra-strong fibers. While these more naturally occurring forms of carbon have enticing properties, they are not yet suitable for wide-spread application. Just as a steel could not be produced until a method for refining naturally-occurring iron ore had been discovered, these new carbon materials will not be useful for technological applications until they can be prepared in large quantities, and with sufficient purity and functionalization.

Two different approaches can be taken toward the preparation of functional carbon materials. One method, which we call the "top down" approach, relies on the use of the naturally available material, and modifying it by doping or chemical functionalization. Many groups have had great success with this method (e.g., the Meier and Haddon groups here at UK). Our approach is to begin with very small molecules, and construct the desired material piece-by-piece. This "bottom-up" approach is certainly slower than the top-down



functionalization, but has several distinct advantages. The top-down approach relies on "naturally occurring" carbon fragments -- we have no such restrictions -- and one could argue that the molecules with the most interesting properties are likely to be the ones that are not formed naturally! The bottom-up approach also allows us to tailor the molecules we prepare for a specific application. For example, we can incorporate additional functionality during construction of the material that will impart properties such as solubility, a certain color, modifications of electronic properties, or the propensity to self-associate in a particular manner. We are working on bringing the development of carbon structures to a new level: We are not just *finding* new materials, we are *designing* them.

In order to prepare these new carbon-based materials, we need to develop an entirely new synthetic methodology -- a "tool box" -- which is general enough to allow us to fabricate a broad array of fused aromatic systems. Few methods are available for the synthesis of such systems. This is not surprising -- aromatic molecules are famous for their low reactivity, which means it is no simple matter to just "glue" these rings together. Our approach is to begin with more reactive systems consisting of carefully arranged alkyne units, construct the desired shapes (1), and then thermally fuse these systems into their aromatic counterparts (2).



**Sylvia Daunert.** The research interests of my group lie at the interface between analytical chemistry and molecular biology. More specifically, my group employs recombinant DNA techniques to understand biomolecular recognition events and to design new molecular biosensors. These systems couple the selectivity provided by native or genetically designed biomolecular recognition with the sensitivity associated with fluorescence and bioluminescence detection. This research is supported by three separate grants from NSF, and grants from NIH, NIEHS-Superfund, NASA, the Department of Energy, the Department of Defense, Eli Lilly, and the Research Corporation through a Cortrell-Scholars Award.

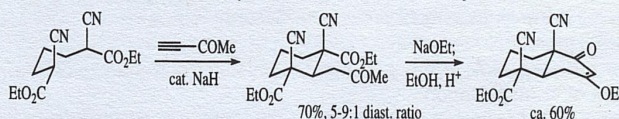
Aequorin and obelin are photoproteins that can be detected at subattomole levels. In our laboratory, we use genetically engineered aequorin and obelin as bioluminescent labels in the development of highly sensitive and selective competitive binding assays for biomolecules. Understanding the effect of chemical and biochemical stimuli on different cells is important in cancer research and drug design. In order to perform these studies, methods are needed that can monitor cellular components within the small volume of a single cell. The studies with recombinant aequorin performed in our laboratory demonstrate that bioluminescence from this photoprotein is a powerful means for sensing low levels of biomolecules, and the detection limits obtained are sufficient to sense these molecules within single cells. Moreover, through micromachining we have designed arrays of picoliter-volume vials and have demonstrated that they can be used to sense molecules in picoliter volumes by employing luminescent proteins.

Another area of research within my group involves studying the molecular recognition events associated with hinge-motion proteins and, in general, proteins that undergo significant conformational changes as a result of an interaction with a specific molecule. Genetically engineered fusions of these binding proteins with target pro-

teins are employed to develop rapid and facile purification of recombinant proteins from cellular lysates. Further, we are site-selectively labeling the binding proteins with environment-sensitive fluorophores to develop highly selective molecular biosensors for molecules of interest. We are also interested in investigating genetically designed bacterial systems that are engineered to bioluminesce only when a targeted molecular species is present. Our strategy involves coupling the genes of proteins capable of molecular recognition with reporter genes, such as luciferase. These bacteria-based sensing systems are extremely selective and sensitive, and find applications in environmental analysis.

**Robert B. Grossman.** Even today, when it sometimes seems that molecules of almost any size and complexity can be synthesized, there is a continuous demand for new and improved synthetic methods. Synthetic methods that proceed in a highly convergent manner, that require only catalytic amounts of reagents, and that give few and/or environmentally benign by-products are in high demand.

We have discovered a highly convergent double annulation procedure for the synthesis of *trans*-decalins and other fused bicyclic compounds. Two good carbon acids connected by a two- to four-atom tether are allowed to undergo two sequential Michael reactions to an ynone to give a cyclohexane in what is formally an [n+1] annulation. A Dieckmann-like reaction follows to give a second, six-membered ring. Three new carbon-carbon  $\sigma$  bonds, two or three new stereocenters, and two or three new quaternary centers are formed in this two-step process, and the products have a very high degree of substitution and functionality. The double annulation of diethyl 2,6-dicyanopimelate and 3-butyne-2-one is illustrative. The double Michael reaction proceeds in about 70% yield, and although three diastereomers are possible, one diastereomer is obtained predominantly. (The minor diastereomers are easily separated from the major one.) The Dieckmann reaction then proceeds in about 60% yield.



The reaction is considerably more general than the one example above. We have found that the three-carbon tether can be shortened or lengthened by one  $\text{CH}_2$  group to give a five- or seven-membered ring in the double Michael reaction. We have also found that the kind and location of the acidifying groups can be varied without affecting the reaction adversely.

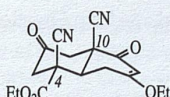
It seems remarkable that such a simple sequence of reactions wasn't discovered previous to our work. After all, both the Michael and Dieckmann reactions have been used extensively since the early part of this century. The reactions may have remained undiscovered because the requisite starting materials, the tethered acids, were either unknown or available only with difficulty. Before our work could begin in earnest, then, we needed to develop new methodology for preparing the starting materials. Happily, this effort bore fruit last fall with the discovery of a surprisingly simple solution (in hindsight), and we have now been able to begin investigating the double annulation more thoroughly.

Of course, a new synthetic methodology is useless if its products are uninteresting, but this is not the case for our double annulation. Our method delivers *trans*-decalins (two fused six-membered rings) with quaternary centers at C4 and C10, and *all three* substituents at the quaternary centers are *oxidized*. Many methods for the preparation of *trans*-decalins with quaternary centers at C4 and C10 are already available, but most of them give products in which no or only one quaternary center is oxidized. It is much more difficult to prepare decalins with two centers oxidized, let alone all three oxidized.

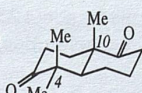
A wide variety of polyterpenoid natural products with interesting and useful biological activities have *trans*-decalin subunits in which two or three substituents at the C4 and C10 quaternary centers are



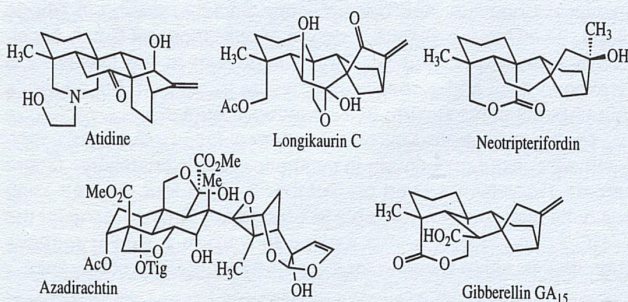
Typical immediate product of double annulation



Typical *trans*-decalin available using existing methodology



oxidized. Atidine (an antiarrhythmic compound), longikaurin C (an antibacterial compounds), neotripterifordin (a compound that inhibits HIV replication), azadirachtin (an insect antifeedant and antimalarial compound), and gibberellin GA<sub>15</sub> (a plant growth hormone) should all be amenable to assembly by our methodology. (The *trans*-hydrindane ring system of GA<sub>15</sub> can be prepared from the *trans*-decalins by a simple ring contraction procedure.) Neither the gibberellins nor azadirachtin show vertebrate toxicity, and atidine, longikaurin C, and neotripterifordin are biologically active at concentrations considerably below their toxicity thresholds. Some of these compounds have been prepared previously, but our methodology should allow them to be prepared more rapidly and with greater efficiency. Preparation of these compounds should facilitate understanding of how they exert their biological effects, perhaps leading eventually to simpler or more effective drugs for the treatment of human diseases.



### NEWS FROM THE DIRECTOR OF GRADUATE STUDIES, JACK SELEGUE

Our Graduate Program continues to thrive, despite cutbacks of University resources and the increasing difficulty of obtaining external funding. Our success can be attributed to the hard work of faculty, staff and students. Perhaps readers of *ChemNews* will be interested in operations in the DGS office since Jim O'Reilly abdicated in 1995.

Director of Graduate Admissions, Carol Brock, strives to identify and recruit top-quality graduate students. We receive about 350 applications per year. In 1996-97, the totals were 64 domestic and 273 international. Simply handling the flow of applications, GRE scores, letters of recommendation and student inquiries is nearly a full-time job for Carol and our secretary Yvonne Queen from about mid-December through March. Because predicting the acceptance rate of our offers is about as accurate as predicting the stock market, many in-course adjustments have to be made. Somehow, we manage to bring in about twenty new graduate students every year whom we feel have the potential to succeed in our Department.

Yvonne Queen is now working in the DGS office nearly full-time, which keeps the applications from getting out of hand. She handles the flow of traffic and paperwork through the office with a smile and (at least) a few kind words for everyone, even when the DGS makes himself scarce for a few days.

My job as DGS is to keep the Graduate Program afloat and on course. Much of this entails moving a never-ending flow of memos, lists and applications toward the Graduate School on time. Assuring an adequate supply of good teaching assistants, both graduate students and part-time instructors, within the TA budget handed to us by the College of Arts and Sciences is a time-consuming task at the beginning of each semester. Much time goes into advising and helping graduate students as they run the maze of coursework, choosing

an advisor, passing cumes, filing forms and scheduling oral examinations.

The Graduate Program has grown thanks to the successful efforts of our faculty in obtaining external support for their research. Every grant-supported research assistant adds another student to our program, which currently numbers over ninety students with about forty-two TA lines. The research groups of the bioanalytical powerhouses Bachas and Daunert have especially grown. As you can read in this newsletter, our Assistant Professors have managed to attract funding and students.

Finally, the real success of our program depends on the efforts of the graduate students themselves. Our Department graduated 12 Ph.D. and 6 M.S. students in 1996-97, **more doctorates than any other department in Arts and Sciences or Engineering**. I can attest from reading teaching evaluations that they are well appreciated as teaching assistants by our undergraduates. Our graduates have gone on to successful careers in academia, industry and government. I hope that they look back at their training at UK as an important step along the way.

### NEWS FROM FACULTY AND STAFF

**Leonidas G. Bachas:** He gave an invited talk at the ACS National Meeting in San Francisco in April 1997 on the use of recombinant DNA methods for the development of bioreactors and biosensors. He was also an invited speaker at the NATO Advanced Research Workshop on Biosensors for Direct Monitoring of Environmental Pollutants that was held in Smolenice, Slovakia, in May 1997. In January 1998, he was invited to give a research presentation in a workshop organized by NASA and the Center for Emerging Cardiovascular Technologies on sensors with improved stability and biocompatibility. In December, he and his wife, Sylvia Daunert, visited Spain where they collaborate with research groups at the Autonomous University of Barcelona, the University of Girona, and the University of Tarragona. An added responsibility this year is serving as Chair for the Lexington Section of the American Chemical Society for 1998.

**Carol Brock:** In Spring 1996 she gave invited talks at the Association of Crystallization Technology in Wilmington, DE (talked mostly with chemical engineers) and at the Congress of the International Union of Crystallography in Seattle. In 1997, she was an invited speaker at the international Symposium on Organic Crystal Chemistry held at Rydzyna Castle (founded in the 15th century although the current building is more modern), which is located in the countryside of western Poland. The best route to Rydzyna was through Berlin, which is very interesting because of all the new building in the space where the Wall used to stand. In June 1998, Carol will be an invited speaker at the Erice (Sicily) School of Crystallography (Title: Implications of Molecular and Materials Structure for New Technologies). Erice is a scenic hill town overlooking the Mediterranean Sea -- a wonderful place to spend a week. In October she will travel to Malaysia to give the "chemical" talk in a symposium marking the 50th anniversary of the International Union of Crystallography.

**Allan Butterfield:** He was named a Dow Chemical Distinguished Lecturer in 1995, and in 1996 was selected as a Site Visit Panelist for the National Institute on Aging of NIH to review grants on Alzheimer's disease. In addition, he was selected by the University of Ohio to review comprehensively their Ph.D. program, and based in part on his recommendations, their Ph.D. program has now focussed on their strengths in biological and analytical chemistry. Allan received the 1997 ACS Southern Chemist Award based on his professional contributions to the chemistry discipline. This award is presented annually to a chemist in the southern part of the United States. Allan was also named recipient of the 1997 William B. Sturgill Award for distinguished contributions in graduate education at Commencement in May 1997.



Allan's wife, Marcia, continues to work as a Brain-Injury Nurse at Cardinal Hill Hospital in Lexington, and their daughter, Nyasha, was named Teacher of the Year at her elementary school in Charlotte, North Carolina, where she was tenured this year. Most important, Nyasha and her husband Topher have their first child - Wyatt, making Marcia and Allan proud grandparents. Allan and Marcia plan to canoe, swim, and relax at the cottage on a lake in Maine in August.

**Arthur Cammers-Goodwin:** Art is in his third year at the University of Kentucky and his daughter just entered her third year of life. He taught Spectroscopic Characterization of Organic Compounds in the Fall of 1997 for the first time. Stanford Smith passed the torch to Art when he retired. His other major teaching responsibility is Synthetic Organic Chemistry.

Last year Art received the NSF Career Award for research designed to study aqueous conformation of organic molecules. Questions that the research is geared to answer have relevance to a variety of chemical pursuits from drug design to inquiry about biochemical mechanisms. His first paper from the University of Kentucky has been accepted in *J. Am. Chem. Soc.* Over the past year he has been an invited speaker at many institutions talking about the effect of aqueous cosolvent on peptide structure.

**Bill Ehmann:** Although formally retired, he still comes to the department about half-time, and continues his NIH-sponsored Alzheimer's disease studies with Dr. William R. Markesbery. Former students Charles Cornett and Mike Deibel, now professors at the College of Mount St. Joseph and Butler University, respectively, have returned to work with him on the NIH grant during the summer. Nancy and Bill have enjoyed traveling since his retirement. Trips last year included Arizona, New Mexico and cruises down the Mississippi River and up to the Canadian Maritime Provinces.

Their eldest son, Bill, has maintained the family academic tradition with a recent appointment as Assistant Professor of Biology at Drake University in Des Moines, Iowa. Jim recently graduated from UK in accounting and has passed the CPA exams. He works in Nashville. Kathleen is married and works as a dietitian in Lexington. John has worked for state government in the State of Washington and is looking forward to a move to Colorado.

**Bob Guthrie:** "Shortly after the start of the fall semester, I received the disconcerting news that I had developed a brain tumor which would "kill me if not taken out." Left with little choice I entered the UK hospital in late September and had it removed. I was relieved of classroom teaching for the balance of the term, although I have been able to do some one-on-one instruction, reading, writing, and most other chores expected of faculty. This spring, I am back at the chalkboard and, with the exception of a phenomenon "diagnosed" as "benign positional vertigo" which makes me a little unsteady on my feet, I am able to function normally. The students probably think that I hit the bottle. The removed tumor was not malignant so my prospects for a long life seem as good as those of anyone my age if I can keep from falling down stairs."

**Jim Holler:** He spent 1996 and 1997 revising and updating Principles of Instrumental Analysis with Doug Skoog of Stanford University and the late Timothy Nieman of the University of Illinois. The last changes were submitted in early July, and the book appeared just in time for fall classes at universities world wide. Jack Selegue and Jim continued to make progress on their Comic Book Periodic Table at: <http://www.uky.edu/~holler/periodic/periodic.html>. They presented a seminar and participated in a panel discussion on the relationships between pop culture and science at the Connections Conference on Pop Culture at UK in February 1997. Their discussion of the perception of science as portrayed in comic books included a WWW-based visual display of chemical images from the comics. They also teamed up to present uproarious Chemistry Demonstra-

tions for about 200 Grade School students from Fayette and Woodford Counties in May 1997.

**James E. O'Reilly:** Jim took a half-time position as Associate Dean in the Graduate School in Fall 1996, was there full-time in Spring 1998 when the long-term Dean, Dan Reedy, went back to the Spanish Department. This year, he is there half-time as Associate Dean for Graduate Admissions and Extended-Campus Programs.

**J. David Robertson:** He launched two new research initiatives over the last couple of years. His group has begun using nuclear methods of analysis to investigate the composition of artifacts from Native American burial sites in Western Kentucky and they have, in collaboration with Mark Lovell, begun using micro-PIXE analysis to look at possible imbalances of zinc in Alzheimer's disease. Lori Blanchard presented their work on mercury in coal and Dave presented initial results of their copper artifact analysis at the MARC IV conference in Kona, Hawaii last spring. In addition, Dave presented an invited paper on multielemental PIXE analysis at the October Federation of Analytical Chemistry and Spectroscopy Society meeting in Rhode Island. Upcoming events include the "Applications of Small Accelerators in Research and Industry" symposium at the Dallas ACS meeting in April and a special symposium in honor of his advisor's 60th birthday at the Boston ACS meeting in August.

On the home front, Lois and Dave are pleased to announce their fourth successful experiment in synthetic organic chemistry. Grace Barbara Robertson arrived on October 3. The four children keep Lois quite busy, but she was able to accompany Dave to Kona for the MARC IV conference and is looking forward to a similar reprieve when they travel to Sweden for the International PIXE conference.

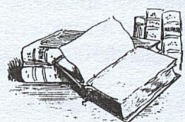
**Jack Selegue:** Jack continued as Director of Graduate Studies, Associate Chair of Chemistry and Principal Investigator of a multidisciplinary NSF-EPSCoR project on "Carbon-Based Materials." His research group continues to work on organometallic chemistry and fullerenes. Jack and his students gave several presentations in 1996-97, including the Gordon Research Conference on Organometallic Chemistry in Newport, RI, and the ACS National Meetings in Orlando and Las Vegas. He is also a member of the Committee of Examiners for the GRE Chemistry Examination and Councilor of the Lexington Section of the American Chemical Society.

Edith is employed in the Morris Library of the Gluck Equine Research Center at UK, and their son Paul will be entering Middle School in Fall 1998. Paul is active in Cub Scouts and all sorts of other activities, and is showing a definite bent toward science. Their 1996 family vacation trip was a 9-day cruise of the Inside Passage of Alaska in August. This intimate research voyage was discovered in a roundabout way via Mark Meier's glaciologist father. They cruised from glacier to glacier aboard the 35-foot Arcturus along with only seven other passengers including captain, cook and two glaciologists who served as guides while doing their own research. They fondly remember the creaks and crashes of the calving glaciers, the hikes in the muskegs, the cavorting whales and the spray of icy salt water as they raced the tide in a rubber raft. It will be hard to top this vacation of a lifetime! In June 1997 they drove across the Great Plains to visit Mesa Verde and Arches National Parks, as well as Dinosaur National Monument for Edith's family reunion. To his family's amazement, neither of these trips included a seminar stop.

**Steve Yates:** Steve and his wife, Linda, spent the first six months of 1997 in Los Alamos, NM. Steve was on sabbatical leave at Los Alamos National Laboratory working with the new GEANIE array of gamma-ray detectors. In July they will return to Los Alamos for another six months. Steve continues to serve on advisory committees for Lawrence Berkeley National Laboratory, Brookhaven National Laboratory, and Los Alamos National Laboratory, and is a councilor for the ACS Division of Nuclear Chemistry and Technology. His col-



laborations with colleagues in Budapest, Hungary and Stuttgart, Germany have led to his making a couple of trips each year to Europe. This summer Steve and Linda will be traveling to England for a conference and a tour of the British Isles. In April, their daughter, Michelle Lynne, will be married.



## NEWS FROM THE CHEMISTRY- PHYSICS LIBRARY, MAGGIE JOHNSON

Our most important recent acquisition is access to the Beilstein online database. Beilstein is a major structure and factual database covering organic chemistry. The organic substance records contain the critically reviewed and evaluated documents from the Beilstein Handbook of Organic Chemistry covering the chemical literature for the period 1779-1997. The database contains information on about 8 million compounds. It is in English, unlike the paper Beilstein in German many of you have used. It may be searched by structure, substructure, molecular formula, or any of 400 factual fields. A chemist may search by starting material to see what has been made from a compound, for synthesis of a specific compound or substructure, by molecular weight, by dipole moment.....the list goes on and on. Since this is a hyperlinked graphic system it is impossible to describe all a chemist can find and search. If you would like a demonstration, just let us know.

Will the Chemistry-Physics Library move? The answer to this question is a qualified yes. The University is in the preliminary planning stages of combining the Chemistry-Physics, Math, Maps, Geology, and Engineering Libraries into a Science-Engineering Library in the 1963 part of the King South Library. We will be the last of the libraries on campus to move because before we move the new Young Library has to open and King South vacated, Special Collections moves from King North to King South, and the Fine Arts Libraries move into King North. The earliest date for the move is the summer of 1999. We hope to gain seating for students and library users, computerized classrooms for instruction on electronic information tools, and space for our ever growing collections. Bringing all the physical sciences libraries together mirrors the interdisciplinary trends in science. If you have any suggestions on what you would like to see in the new library or pet peeves we can avoid, please let me know. And, of course, if you have any questions about our current facility or if I can help you in any way just give me a call at 606-257-5954 or email me at [mjohnson@pop.uky.edu](mailto:mjohnson@pop.uky.edu).

## GRADUATE DEGREES AWARDED

### Doctor of Philosophy

**John R. Allen** (Bachas) May 95, "Novel Polymer Membrane Ion-Selective Electrodes," Assistant Professor, Southeastern Louisiana University, Hammond, LA.

**Charles R. Cornett** (Ehmann) August 95, "Trace Elements in Alzheimer's Disease Tissues and Environmental Sources of Mercury," Assistant Professor, Mount St. Joseph College, Cincinnati, OH.

**Scott J. Cross** (Guarr) August 94, "Bioanalytical Sensing Applications of Polymer-Modified Electrodes," Medical Student, The Ohio State University, Columbus, OH.

**Satyajit Samuel Mohan David** (Haley) May 97, "A Comparison of Properties of Creatine Kinase in Alzheimer's Versus Non-Alzheimer's Brain: Correlation of Aberrant Enzyme Activity and Cytosol Membrane partitioning with Reduced Active Site Photolabeling and Nucleotidylation," Postdoctoral Fellow, University of Kentucky, Lexington, KY.

**Michael A. Deibel** (Ehmann) August 96, "The Evaluation of Trace Elements Related to the Oxidative Damage Hypothesis of Alzheimer's Disease," Assistant Professor, Butler University, Indianapolis, IN.

**Paul James DeLaLuz** (Watt) May 97, "Synthesis and Use of Photoactive Phenothiazines in the Study of Drug-Protein Interactions with Calmodulin and Calcineurin," Assistant Professor, Lees College, Cleveland, TN.

**Corinne C. Eloi-Deibel** (Robertson) August 95, "Investigations of Reactions of Carbonaceous Materials with Ion Beam Analysis," Assistant Professor, Earlham College, Richmond, IN.

**Rey I. Floresca** (Watt) May 95, "Synthesis of Photoactive Analogs of Natural Products and Drugs: Taxol and Phenothiazines."

**Angela Fultz** (Majidi) May 96, "Time- and Wavelength-Resolved Spectroscopic Methods and Their Applications for Chemical Speciation," Assistant Professor, University of the South, Seawee, TN.

**Nathan C. Hall** (Butterfield) May 95, "Ischemia/Reperfusion-Induced Alterations in the Physical State of Synaptosomal Membrane-Associated Proteins and Lipids: Relevance to Stroke," Medical Student, University of Cincinnati, Cincinnati, OH.

**Kenneth L. Hensley** (Butterfield) December 95, "Magnetic Resonance Studies of Free-Radical-Mediated Oxidative Stress in Brain: Relevance to Aging and Alzheimer's Disease, and Other Degenerative Neurological Disorders," Research Associate, Oklahoma Medical Research Foundation, Oklahoma, OK.

**Nathaniel G. Hentz** (Bachas) May 96, "Liquid Chromatography Systems Based on Bio-Recognition Properties," Eli Lilly Company, Indianapolis, IN.

**Richard S. Hutchins** (Bachas) August 95, "The Rational Design of Anion-Selective Potentiometric Sensors," Pfizer Inc., Groton, CT.

**Martha R. Joseph** (Majidi) December 94, "Time-Resolved Optical Emission Spectroscopy of Laser-Induced Plasmas on Copper and Aluminum Surfaces and in a Graphite Furnace," Assistant Professor, Westminster College, New Wilmington, PA.

**Hemant V. Joshi** (Meier) August 96, "The Effect of the Peptide Helix Macrodipole on the Chemical and Physical Properties of Pendent Functional Groups," Postdoctoral Fellow, College of Pharmacy, University of Kentucky, Lexington, KY.

**Shrong Shi Lin** (Richard) December 95, "On the Relationship Between Organic Structure and Reactivity in Alkene Forming Elimination Reactions."

**Donald S. MacLean** (Robertson) August 96, "The Development and Use of X-Ray Fluorescence (XRF) in the In-Vivo Monitoring of Controlled/Sustained Release of Proteins in Hydrogels, in Immunological Adjuvants, and in Transdermal Drug Delivery," Postdoctoral Fellow, University of Houston Medical Center, Houston, TX.

**Christopher A. McGrath** (Yates) August 96, "Gamma-Ray Spectroscopy of the Stable Xenon Nuclei," Postdoctoral Fellow, Lawrence Berkeley National Laboratory, Berkeley, CA.

**Michael Scott Morton** (Selegue) May 97, "The Synthesis, Characterization and Reactivity of Some Cyclopropenylidenes and Cyclopropenium Cations of Group 6-8 Metals," Postdoctoral Associate, University of Rochester, Rochester, NY.

**Qiyuan Peng** (Guarr) December 94, "Conductive Metallophthalocyanine Polymers: Properties and Applications," Postdoctoral Fellow, Indiana University-Purdue University, Indianapolis, IN.

**Robert T. Pogue** (Majidi) December 95, "Mass Spectrometric Investigations of High Temperature Reactions in Macromolecules," Postdoctoral Fellow, University of Dayton Research Institute, Dayton, OH.

**Judy L. Ratliff** (Holler) August 95, "Investigations of the Atomization Mechanisms of Selected Compounds in Electrothermal Atomic and Molecular Absorption Spectrometry," Assistant Professor, Murray State University, Murray, KY.

**Venkatasubramanian K. Rajagopal** (Guthrie) August 96, "Mechanistic Models for Coal Thermolysis Under Hydrogen and the Catalytic Activity of Fumed Silica," Postdoctoral Research Associate, National Research Council, Armstrong Laboratory, Tyndall AFB, FL.



**Sreekumar Ramakrishnan** (Guthrie) August 96, "Development and Hydroliquefaction Studies of Coal Model Compounds," Research Scientist, Hickory Specialties, Inc., Summer Shade, KY.

**Rupa Shivram Shetty** (Watt) May 96, "Synthesis of Geochemical Markers," Postdoctoral Fellow, Research Triangle Institute, Research Triangle Park, NC.

**Ramachandran Subramaniam** (Butterfield) May 97, "Electron Paramagnetic Resonance and Biochemical Studies of Biological and Biofunctional Membranes. Part 1: Structure-Function Relationship of Serine Protease Subtilisin: Strategies for Immobilization; Part 2: Toxicological Properties of Amyloid Peptides and Lipid Peroxidation Products: Relevance to Alzheimer's Disease," Postdoctoral Fellow, Case Western Reserve University, Cleveland, OH.

**Darrell N. Taulbee** (O'Reilly) August 94, "A Technique to Measure the Adsorption and Cracking of Hydrocarbons Over Processed Oil Shale Substrates," Chemist, Center for Applied Energy Research, Lexington, KY.

**Daniel J. Van Dalsem** (Ehmann) August 96, "Trace Element Determination in Biological Tissues with a Novel Neutron Activation Analysis Technique for Aluminum Measurement," Texas A&M University, College Station, TX.

**Alan Witkowski** (Bachas) December 94, "Competitive Binding Assays Based on Genetically Engineered Proteins," Project Director, Bioanalytical Systems, West Lafayette, IN.

**Amy S. Wong** (Robertson) August 94, "Proton-Induced Gamma-Ray and X-Ray Emission and Their Analytical Applications to Coal Resource Development," Staff Scientist, Los Alamos National Laboratory, Los Alamos, NM.

**Fuqiang Xu** (Guarr) August 94, "Chemistry of Conductive Polymer, Fullerene and Intercalation Compounds," Doctoral Student, Physiology and Biophysics, University of Kentucky, Lexington, KY.

**Ning Xu** (Majidi) August 94, "Transient Molecular Spectroscopy of Gas Phase Species in Electrothermal Atomizers," NRC Postdoctoral Fellow, Environmental Protection Agency, Ada, OK.

**Minfang Yeh** (Yates) May 97, "Search for Two-Phonon Octupole Excitations in  $^{208}\text{Pb}$ ," Postdoctoral Fellow, Washington State University, Pullman, WA.

**Xueqing Zhao** (Companion) August 95, "Model Studies of the Interaction of CO with Iron Surfaces."

#### Master of Science

**Mohammad Abdullah Bahattab** (Guthrie) December 96, "Gas Chromatography Packed Columns."

**Jennifer L. Bianchi** (Butterfield) May 95, Non-thesis.

**Robert E. Bossio** (Majidi) August 96, "Exploring Metal Nitrate Salt Interactions with Graphite Using Differential Scanning Calorimetry, Thermogravimetric Analysis and Time-of-Flight Mass Spectrometry," Doctoral Student, Florida State University, Tallahassee, FL.

**Todd M. Branch** (Majidi) May 96, "Novel Optical Detection Schemes for Fiber Optic Probes and Capillary Electrophoresis."

**Keith A. Burberry** (Robertson) May 95, Non-thesis, Medical School, University of Kentucky, Lexington, KY.

**Cathleen J. Clark** (Bachas) May 95, Non-thesis, Merck.

**Pamela Sue Cole** (Butterfield) December 96, "Electron Paramagnetic Resonance and Circular Dichroism Studies of Cortical Synaptosomal Membranes and Micelle-Resident Amyloid Peptides: Relevance to Transient Ischemic Attacks and Alzheimer's Disease," Research Scientist, Department of Pharmacology, University of Kentucky, Lexington, KY.

**Laura R. Cross** (Robertson) August 94, "Light Element Analysis of Mineral Separates Using Proton-Induced Gamma Emission," Patent Examiner, U. S. Patent Office, Washington, DC.

**James L. French** (Clouthier) December 95, "High Resolution Infrared Spectroscopy of Formyl Chloride and Development of a Binary 397-427 NM Laser Dye Mixture," LECO Corp., St. Joseph, MI.

**Angela Fultz** (O'Reilly) August 95, "Methods of Enhancing Enzyme Immunoassays," Assistant Professor, University of the South, Seawane, TN.

**Harjanto** (Clouthier) December 96, "Studies of the Electronic Spectrum of Monobromosilylene and the Infrared Spectrum of Thionylimide."

**Beverly Jane Howard** (Butterfield) August 96, "Brain Synaptosomal Membrane Oxidative Damage Associated with Aging and Alzheimer's Disease," Analytical Chemist, Armour Foods, Springfield, KY.

**Taunya M. Jackson** (Yates) May 96, Non-thesis.

**Temba T. Maqubela** (Selegue) August 94, Non-thesis, Instructor, Phillips Academy, Andover, MA.

**Melissa W. McMahon** (Majidi) May 96, "Interactive Targets for Laser Desorption Mass Spectrometry."

**Linda R. Rupp** (Guarr) August 94, Non-thesis, Chair, Science Department, City Academy, St. Paul, MN.

**Jonathan Shaw** (Selegue) December 94, "Improved Chromatographic Separation Methods and Physical Characterization Studies of the Higher Fullerenes  $\text{C}_{76}$ ,  $\text{C}_{78}$ , and  $\text{C}_{84}$ ," Research Technician, Department of Toxicology, University of Kentucky, Lexington, KY.

**Robert G. Smith** (Majidi) August 96, "The Study of Transient Species in a Graphite Furnace Using Transient Molecular Absorption, TGA/TGA-MS, and DSC of Group II Metals (Except for Radium), and Cobalt and Nickel," Instructor, Georgetown College, Georgetown, KY.

## STUDENT AWARDS

### UNDERGRADUATE AWARDS

*Willard Riggs Meredith Award* to the outstanding senior in Chemistry. 1995: **Stephen L. Wang**; 1996: **Agatha Feltus**; 1977: **Erick J. Palmer**.

*Charles Hammond Undergraduate Service Award* for outstanding service to the department. 1995: **Julie Yates**; 1996: **Kerry Allen**; 1997: **Lori A. Watson**.

*Merck Index Award* for scholastic achievement in chemistry. 1995: **Laura Martin**; 1996: **Christopher Borths**; 1997: **Michael B. Green**.

*Undergraduate Award in Analytical Chemistry* for displaying an aptitude for a career in analytical chemistry. 1995: **Byron Miller**; 1996: **Brian Mulberry**; 1997: **Janet L. Mercer**.

*American Institute of Chemists Award* for scholastic achievement, leadership ability, and character. 1995: **Agatha Feltus**; 1996: **Stephen Wang**; 1997: **Jeffrey T. Vessels**.

*Freshman Chemistry Achievement Award* to a first-year chemistry major with a record of outstanding academic achievement in chemistry. 1995: **Janet L. Mercer**; 1996: **Lori Watson**; 1997: **Michelle D. Dudley**.

*Hammond "Excellence in Chemistry" Competition Award*. 1996: **Jane Bogdanov** (1st), **Agatha Feltus** (2nd), **Siew Y. Chow** (3rd); 1997: **Siew Y. Chow** (1st), **Christopher Borths** (2nd), **Harold Rosenbaum** (3rd).

*Stephen Harris Cook and Charles Hammond Undergraduate Summer Research Fellowship Award*. 1995: **Kathryn Ackley**; 1996: **Shane Foister**, **Chris Martin**, and **Jeremy Warner**; 1997: **Thomas A. Canada**.

*General Chemistry Excellence Award* to the student with the highest score in general chemistry each semester. **Steven M. Stogner** (Fall 1994 and Spring 1995); **Robert M. Dummitt** (Fall 1995); **Jamey D. Young** (Spring 1996); **Nicholas Lane Chapman**, **Todd Braden Reid**, and **Roy Wade Trumbo** (Fall 1996); **Nicholas Lane Chapman** (Spring 1997); **Christopher Arch Bradley** (1st), **Janna Marie Hackett** (2nd), **John Kindall Newcomb** (3rd), (Fall 1997).

*Thomas B. Nantz Memorial Scholarship*; tuition scholarship. 1995-1996: **Kenneth J. Randles** and **Sharif Zubair**; 1997-1998: **Harold Rosenbaum** and **Aaron Skaggs**.

*Wilbur L. Price Memorial Scholarship*. 1994-1995: **Eyvonne Lawson**, **Jeffrey Ponatoski**, **Shirley Claborn**, and **James Adams**;



1995-1996: **Aaron Skaggs, Ruth Stinetorf, Eyvonne Lawson, Shirley Claborn, Jeffrey Pوناتoski, and Lori Watson**; 1996-1997: **Travis Lyttle, Sophia Rozenzhak, and Aaron Skaggs**; 1997-1998: **Leslie Conger, Adrienne Ellis, James Henderson, Maranda Hutchins, Travis Lyttle, and Sophia Rozenzhak.**

#### GRADUATE AWARDS

##### Departmental and University Awards

*Franklin E. Tuttle Fellowships.* 1994-1995: **William E. Barnhill, Jennifer L. Bianchi, Todd M. Branch, Paul J. DeLaLuz, Warren J. Harper, Emily C. Hernandez, Jennifer C. Lewis, Michael A. Lloyd, David S. MacMillan, Douglas J. Rice, Melissa J. Wright, and Shelley D. Young**; 1995-1996: **J. Christopher Ball, Robert G. Bergosh, Todd Branch, Kimberly A. Kuhls, Melissa J. McMahon, and Jennifer A. Winger**; 1996-1997: **J. Christopher Ball, Robert G. Bergosh, Aaron J. Tomasek, and Jennifer A. Winger**; 1997-1998: **Robert G. Bergosh, David L. Eaton, Jeffrey L. Schwarz, and Aaron J. Tomasek.**

*Paul I. Murrill Fellowships.* 1994-1995: **Lori J. Blanchard, Michael A. Deibel, Angela Fultz, Christopher A. McGrath, Chad E. Wallace, and Brad R. Weedon**; 1995-1996: **Lori J. Blanchard, Chad E. Wallace and Brad R. Weedon**; 1996-1997: **Chad E. Wallace and Brad R. Weedon**; 1997-1998: **Chad E. Wallace and Brad R. Weedon.**

*Ashland Oil Foundation Summer Research Fellowships.* 1995-1996: **Michael S. Morton, Robert T. Pogue, and Chad E. Wallace**; 1997: **Chad E. Wallace.** Unfortunately, after 18 years of continuous support, the Ashland Oil Foundation has discontinued funding these fellowships.

*Graduate School Academic Excellence In-State Tuition Scholarship.* 1994-1995: **Anita Bhardwaj**; 1997-1998: **Jianquan Wang and Servet M. Yatin.**

*Thomas B. Nantz Memorial Scholarships.* 1994-1995: **Wei Huang, Rupa S. Shetty, and Ramachandran Subramaniam**; 1995-1996: **Lori S. Blanchard and Beverly J. Howard**; 1997-1998: **Dell Jensen and Oleg Ozerov.**

*Graduate School Lyman T. Johnson Minority Fellowship.* 1994-1995: **Paul J. DeLaLuz**; 1995-1996: **Alberto Carrillo, Marlon D. Jones, and Manuel Santiago**; 1996-1997: **Alberto Carrillo, Emily C. Hernandez, and Marlon D. Jones**; 1997-1998: **Alberto Carrillo, Marlon D. Jones and Thea J. B. Williams.**

*Graduate School Allocated Academic Year Fellowships.* 1994-1995: **Lori J. Blanchard and Wei Huang**; 1995-1996: **Robert T. Pogue and Aibing Xia**; 1996-1997: **Ramachandran Subramaniam, and Aibing Xia**; 1997-1998: **Warren W. Harper and Brad R. Weedon.**

*Graduate School Open-Competition Academic Year Fellowships* awarded in an all-campus competition. 1994-1995: **Christopher A. McGrath**; 1995-1996: **Zhihoa Zheng.**

*Graduate School Dissertation Year Fellowship.* 1994-1995: **Corinne C. Eloi**; 1995-1996: **Kenneth L. Hensley**; 1996-1997: **Paul J. DeLaLuz.**

*Otis A. Singletary Fellowship.* 1994-1995: **Gilbert L. Busby.**

*Presidential Fellowship.* 1994-1995: **Michael A. Deibel.**

*Quality Achievement Fellowship.* 1995-1996: **Gilbert L. Busby.**

##### Behrman Fund Awards

*Charles H. H. Griffith Outstanding General Chemistry Teaching Assistant Award.* 1994-1995: **Lyndon L. E. Salins**; 1995-1996: **Taunya M. Jackson and Melissa W. McMahon**; 1996-1997: **Linda L. Rulon.**

*Outstanding Teaching Assistant Award.* 1994-1995: **Julie H. Kuhr**; 1995-1996: **Pamela S. Cole**; 1996-1997: **Christopher M. Lauderback.**

*Fast Start Award* to the graduate student in their first or second year in the Department of Chemistry, who has made outstanding initial overall progress towards their degree. 1994-1995: **Warren W. Harper**; 1995-1996: **Brad R. Weedon**; 1996-1997: **Oleg V. Ozerov and Ranjit Shetty.**

*Outstanding Research Award* based on research accomplishments for the past year. 1994-1995: **Kenneth Hensley and Richard S. Hutchins**; 1995-1996: **Ramachandran Subramaniam**; 1996-1997: **Warren W. Harper.**

*100% Plus Award* to the student who shows the most exemplary professional attitude. 1994-1995: **Michael S. Morton**; 1995-1996: **Emily C. Hernandez and Mark T. Blankenbuehler**; 1996-1997: **Chad E. Wallace.**

##### External Awards

*Office of Naval Research Graduate Fellowship.* 1994-1995: **Kenneth L. Hensley.**

*Ford Foundation Fellowship.* 1994-1995: **Emily C. Hernandez**; 1995-1996: **Emily C. Hernandez.**

*Oak Ridge Associated Universities Traineeship.* 1994-1995: **Daniel J. Van Dalsem.**

## NAFF SYMPOSIUM ANNOUNCEMENT

Twenty-Fourth Annual  
Symposium on  
**Chemistry  
&  
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established in the memory of  
**Anna S. Naff**

*Toxicology of Environmental  
Chemicals that Act as Hormones*

#### SPEAKERS

Louis J. Guilette, Jr.  
Kenneth S. Korach  
Stephen H. Safe

Monday, April 13, 1998

Department of Chemistry  
University of Kentucky  
Lexington, Kentucky 40506-0055

**Editor:** J. David Robertson; **Editorial Assistant:** June Smith.



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