

ALUMNI NEWS

School of Chemical Sciences

UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

SPRING-SUMMER 2000

Department of Chemistry seeks to expand Chemical Biology area

The field of chemistry is changing, and the Department of Chemistry is changing with it. "Traditionally, there have been four areas of chemistry," said Steven C. Zimmerman, Professor of Chemistry, Interim Head of the Department. "Analytical, inorganic, organic, and physical." But the advent of biotechnology, he said, has created both an interest in and the need for a fifth area—chemical biology. Accordingly, the Department of Chemistry added a Chemical Biology area in 1998 and a graduate curriculum, one of only a handful of departments nationwide to do so.

How does chemical biology differ from biochemistry? "Biochemists are biologists using chemical methods to study biological systems," explains Martin Gruebele, Professor of Chemistry and Biophysics and a member of the Chemical Biology area, "while chemical biologists are chemists who use chemical methods to study biological systems."

Chemists now have the tools and techniques to look at life processes at the molecular level, Gruebele said. In the last five years, over twenty genomes from organisms belonging to all three domains of life—bacteria, archaea, and eukaryotes—have been sequenced and deposited in national databases. Researchers expect to complete sequencing of the human genome within a year.

We may soon reach the point, he said, where we will have the complete picture of at least some organisms. "We'll know what the genes look like, we'll know what the proteins encoded for by those genes look

like, and we'll begin to understand how those proteins and genes really interact." Obviously, the biomedical and technological implications of such knowledge are staggering.

Translating genomic data into new therapeutic approaches to disease or environmentally friendly microbial "factories" is, of course, a tall order. And that's where the tools and methods of chemistry come in. For example, scientists such as Peter Wolynes, Eiszner Professor of Chemistry, use computational methods to determine the three-dimensional structure of a protein from the DNA sequence that codes for it. Eric Oldfield, Professor of Chemistry, uses NMR spectroscopy and quantum chemical methods to determine the structure of parasitic proteins that might be drug targets. Wilfred van der Donk, Assistant Professor of Chemistry, combines molecular biology, synthetic organic chemistry, and protein chemistry to study the biosynthesis of clinically promising antibiotics. In total, 27 Chemistry faculty have strong interests in the Chemical Biology area.

There is a growing awareness and interest in Chemical Biology among students, Gruebele said. Eight graduate students were accepted into the area in 1998, "even though we had done no recruitment that year;" ten entered the program in 1999. During the last year, the area had an active seminar schedule, and five courses at the undergraduate and graduate levels were offered. 🏠

Richard Alkire awarded Charles J. and Dorothy G. Prizer Chair

Richard C. Alkire, University of Illinois Professor of Chemical Engineering, was awarded the first Charles J. and Dorothy G. Prizer Endowed Chair in Chemical Engineering.

Alkire's research focuses on the deposition and dissolution of surfaces, especially metal surfaces. These phenomena are critical in the manufacture of many materials, including circuit boards and semiconductor devices. "Both of these are characterized by events that occur all the way from the molecular level to the large scale application," Alkire said. "From an engineering point of view, it's a challenge to integrate all that's going on. In essence what I'm doing is developing a broad integrated systems approach for doing chemical engineering."

For example, Alkire pointed to the problem of copper deposition in the manufacture of wafers used in electronic devices. The unique formation of copper deposition is controlled by additives which "direct traffic" at the molecular level. But the chemical engineering tools that design these processes, Alkire said, have blind spots in the very region where the additives function—in the molecular region. "It's



Richard Alkire

Mark your calendars, alumni and friends of the Chemical Engineering and Chemistry Departments! The Noyes Laboratory will be 100 years old in 2002. We are planning an on-campus centennial celebration for the venerable building, tentatively scheduled for mid-September of that year.

Continued on page 2

Richard Alkire awarded Prizer Chair, continued

important to couple molecular chemistry to engineering tools," he said.

Alkire is working closely with the National Computational Science Alliance and the National Center for Supercomputing Applications to develop a web-based approach to solving chemical engineering problems like these. He's working to develop collaborative tools that can be used by academic and commercial researchers alike.

In this sense, Alkire says, Chuck Prizer was a valuable mentor. Mr. Prizer received a bachelor's degree in chemical engineering from the University of Illinois in 1944. He had a long and successful career with Rohm and Haas Company in Philadelphia. "He understood how to identify early science, and how to incorporate it into an industrial problem," said Alkire. "It was this understanding of the process—how to move an idea along a path, at a high rate of speed—that was critical. Chuck Prizer carried all of

those pieces out in his own head as he developed a given system. In many ways, we're just now learning how to do it on a larger scale.

"I've known and worked with Chuck for many years," Alkire added, "and so it's a special privilege for me to hold the Chair that bears his and Dottie's name." Mr. Prizer was also director of the ChemE 2000 fundraising campaign from 1992 to 1994.

Richard Alkire received his B.S. from Lafayette College in 1963 and his Ph.D. from the University of California-Berkeley in 1968. He joined the faculty of the University of Illinois in 1969. He was Head of the Chemical Engineering Department at the University of Illinois from 1986-1994, and U.I. Vice Chancellor for Research and Dean of the Graduate College from 1994 to 1999. He has received a number of awards and is a member of the National Academy of Engineering. 🏠

Graduation 2000

Relief, jubilation, and anticipation were the prevailing emotions on May 14, 2000 as students from the Departments of Chemical Engineering and Chemistry graduated from the University of Illinois.

The Chemical Engineering Department granted 77 bachelors degrees. Among these, four students were awarded the Bronze Tablet, the university's highest honor for graduating students. To be honored a student must be in the top 3 percent of the U. of I. college's graduating class. In addition, seven Departmental awards were announced: Siong Ming Ang, the Alumni Senior Award; Kyle Jensen, the AIChE award; Edward Lechner, the Bruno Wojcik Memorial Scholarship Award; Irina Gitlin, the Merck Award; Lynn Ludwig, the Phi Lambda/Arthur W. Sloan Award; and Jessica Defreese, the R. C. Fuson Award.

From the Department of Chemistry, this year's graduating class counted 80 students who will receive their B.S. degrees including one James Scholars, three Chancellor's Scholars, one Bronze Tablet Scholar, and six Phi Beta Kappa. Andrew Hejl received the inaugural John David Barnwell Memorial Award, and the Bailar Award for Undergraduate Research was presented to Michael Choi. John P. Schaefer (Ph.D. '60, Chemistry, Corey, advisor), President of Research Corporation and former President of the University of Arizona, gave the commencement speech. Schaefer emphasized that although Chemistry is indeed a critical subject, students should strive to cultivate broad intellectual interests. 🏠

To reach your editor...

You can reach our office by e-mail at scsnews@scs.uiuc.edu and by fax at 217-333-3120. Please continue to send your news and also include comments on the newsletter, alumni and development programs and any questions you may have on any of the above. We enjoy hearing from you.

Alumni News

Alumni Achievements, Awards, Transitions

E. Philip Horwitz wins ACS award

E. Philip Horwitz, M.S. '55, Ph.D. '57, (Chemistry, T. Moeller, advisor) won the American Chemical Society 2000 award in Separations Science & Technology. Horwitz was a scientist in the Chemistry Division at Argonne National Laboratory for 38 years, focusing on liquid-liquid extraction and ion-exchange chromatography applied to the separation of radioactive isotopes.

Horwitz has authored or co-authored more than 200 peer-reviewed articles, and holds 33 patents, 27 of which involve inventions related to separation processes in nuclear technology. He has received 11 awards for his research, including the University of Chicago Distinguished Performance Award, the Department of Energy Distinguished Associate Award, the Glenn T. Seaborg Actinide Separations Award, and three R&D 100 awards.

Horwitz left Argonne in 1998 to set up PG Research Foundation, which funds new programs in separations science and technology. He is also senior consulting scientist for Eichrom Industries in Darien, Illinois, and holds a visiting faculty position in the Department of Radiology at the University of Chicago Hospitals.

Kenneth R. Jolls' software gets favorable review

Kenneth R. Jolls, M.S. '63, Ph.D. '66 (Chemical Engineering, T. Hanratty, advisor), now a Professor of Chemical Engineering at Iowa State University, has developed a computer program called *Phase*, which was favorably reviewed in a recent issue (October 15, 1999, p. 430) of *Science*. According to the reviewer, "It is a powerful tool for teaching chemical thermodynamics, allowing one to perceive changes in multiphase diagrams when temperature, pressure, or composition are altered, as well as to visualize the appearance, disappearance, and coexistence of phases."

Symposium Celebrates 65th Birthday of Professor William H. Pirkle

On October 2, 1999, an all-day symposium was held at the Beckman Institute for Advanced Science and Technology to mark William Pirkle's many achievements and contributions to the field of chiral recognition and chromatographic enantioseparation. Organizers of the event were three Pirkle alumni: Master of Ceremonies Bruce Hamper (Ph.D. '84), currently at Monsanto; Christopher Welch (Ph.D. '92), at Merck; and Peter Rinaldi (Ph.D. '78), professor of chemistry at the University of Akron.

Eleven speakers, all of them alumni of Pirkle's group, celebrated his work in talks organized around four major topics: chiral separations, pharmaceutical discovery, combinatorial chemistry, and NMR spectroscopy. Many speakers remembered anecdotes of their years with Pirkle, known affectionately as "Doc." They spoke fondly of their memories of the Pirkle "zoo," as the group was sometimes known. As Hamper said, "We were a hard-working group but we also had a lot of fun."



William H. Pirkle

Costs of the symposium were covered in large part by Regis Technologies, Inc., Merck & Co., Inc., Eli Lilly & Co., Monsanto Co., and Abbott Laboratories. 🏠

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Phase has been picked up by a number of academic departments worldwide, and is available without cost via FTP. Downloading instructions and documentation may be obtained by writing to jolls@eng.iastate.edu.

In addition to his scientific accomplishments, Jolls is a part-time professional musician, a jazz vibraphone player with experience in performing, arranging, and conducting.

Other News

Robert A. Penneman, Ph.D. '47 (Chemistry, L. Audrieth, advisor), received the 1999 Alumni Merit Award from Millikin University, Decatur. The award was based on his more than 50 years association with and publications in the field of actinide chemistry, plus long-time volunteer efforts as manager of income tax preparation for a senior citizen center. Penneman now resides in Albuquerque, New Mexico.

James Kaltenbronn, B.S. '57 (Chemistry). Kaltenbronn, who also received a Ph.D. from MIT in 1961, retired from Parke-Davis' Pharmaceutical Research Division in Ann Arbor, Michigan on January 3, 2000, after 40 years of service. A research fellow in the Chemistry Department, Kaltenbronn had an extraordinary scientific career at Parke-Davis, marked by major contributions to the discovery and development of two drugs, the non-steroidal anti-inflammatory agent Meclomen and the ACE inhibitor Quinapril. Throughout his career, Dr. Kaltenbronn has mentored many chemists and inspired them with his knowledge, creativity, and dedication.

Julia Butkus Klee B.S. '65 (Chemistry Teaching), has accepted a position with the United Nations' Compensation Commission where she heads up the UNCC Secretariat's work with the processing and evaluating of environmental claims filed against Iraq for environmental damages flowing from the consequences of Iraq's invasion and occupation of Kuwait. This shift comes after

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Excellence Needs Your Help

Help us to maintain and expand our programs by supporting Chemical Science Funds. We have listed below the most active funds in the three departments. If you would like to contribute to a fund not listed, please enter the name beside Other.

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- School Facilities Fund (35791/75930):** Upgrades infrastructure such as the chemistry library, visualization, NMR, microanalytical, and mass spectrometry labs.
- Chemical Engineering Instructional Leadership (30821):** Develops and maintains state of the art technologies and education in undergraduate instructional laboratories.
- Roger Adams Fund (45020/75100):** Funds teaching awards, relocation allowances, scholarships, and fellowships.
- Partnership for Chemistry (35790/75750):** Builds endowment support for new programs, e.g. the Materials Chemistry program.
- Department of Biochemistry Fund for Excellence (75420):** Supports fellowships and faculty start-ups.
- Other** _____

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Chemical Engineering Department Reaches Campaign Goal

The Chemical Engineering Department is proud to announce the successful completion of their Chemical Engineering 2000 campaign.

Thanks to the generosity of friends, alumni and corporations, the Chemical Engineering department was able to establish six new chairs and professorships, allowing the department to attract and retain the highest quality faculty members. Three new fellowships and a travel fund have been established for graduate students and post-doctoral chemical engineers. And the chemical engineering undergraduate education program received a tremendous boost with the renovation of key teaching labs, including the Unit Operations Laboratory, Computer Facilities, and a Process Control Lab. 🏠

Alumni News

many years of private environmental law practice.

Shifang Luo, Ph.D. '93 (Chemistry, T. Rauchfuss, advisor), was promoted to the position of Research Chemist at Exxon Mobil, in Paulsboro, New Jersey.

Roger L. Tanner, Ph.D. '69 (Chemistry, K. Sivier, advisor), is now principal scientist in the Atmospheric Sciences Department, TVA Environmental Research Center, Muscle Shoals, Alabama. He was co-chair of the ACS Environmental Chemistry Division Symposium, "Environmental Chemistry of the Atmosphere: 2000 and Beyond," in March of this year.

Len Cohen, Ph.D. '64 (Chemical Engineering, T. Hanratty, advisor), author and teacher, has opened his new website at www.e-memoir.com, an online memoir writing course.

In memoriam

Edward F. Jochen, B.S. '35 (Chemistry), died on December 5, 1999.

James E. George, Ph.D. '65 (Chemistry), died in October 1999. He was a student of John C. Bailar, Professor of Chemistry. George was Professor of Chemistry at DePauw University, where he taught for thirty-four years, and served as national secretary of Phi Lambda Upsilon, an honorary chemical society. He taught at Oberlin College prior to accepting an appointment at DePauw University in 1966. His wife Judith Jenkins George writes, "The fine education that he received at your institution permitted him to motivate the minds of our DePauw University students, and because of him many chose chemistry as their major." 🏠

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In Memoriam

Herbert Gutowsky

1919-2000

By Steven C. Zimmerman, Professor of Chemistry and Interim Head, Chemistry Department; and R. Linn Belford, Professor of Chemistry

Herbert S. Gutowsky, Professor Emeritus of Chemistry at the University of Illinois, died January 13, 2000 in Urbana, Illinois. He was 80 years old.

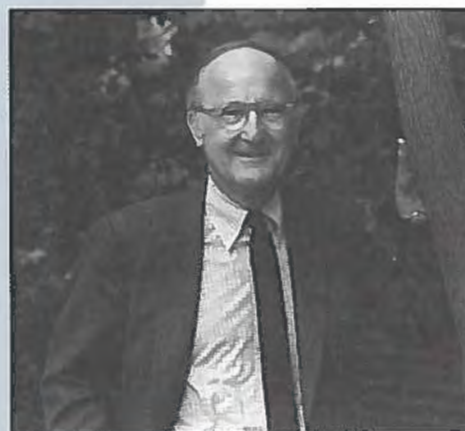
Gutowsky was a pioneer in nuclear magnetic resonance (NMR) spectroscopy, making breakthrough discoveries that made NMR one of the most important tools of chemical and biochemical research and industrial chemistry. His seminal work in this field has led to the development of experimental and theoretical tools for studying the structure and dynamics of molecules in liquids, solids, and gases. In many respects, Gutowsky was to NMR what Edison was to electricity.

The significance of Gutowsky's contributions was recognized by his election to the National Academy of Sciences, the American Academy of Arts and Sciences, and the American Philosophical Society. He received the Irving Langmuir Award (1966) and the Peter Debye Award in Physical Chemistry (1975), both from the American Chemical Society. Gutowsky was also awarded the prestigious National Medal of Science (1977) and the Wolf Prize in Chemistry (1983). He was appointed a fellow of the University of Illinois Center for Advanced Study in 1983. He is the recipient of the Pittsburgh Spectroscopy Award (1992) and the John Kuebler Award of the Alpha Chi Sigma professional fraternity.

Herbert Gutowsky graduated from Indiana University with an A.B. degree in 1940. He served in the armed forces during World War II, and received an M.S. from the University of California, Berkeley, in 1946. He earned his Ph.D. under the tutelage of George Kistiakowsky at Harvard University, in 1949. He began his NMR research at Harvard in collaboration with George Pake, a student of Edward Purcell.

Gutowsky joined the faculty at the University of Illinois in 1948; from 1967 to 1970, he was the Head of the Department of Chemical Engineering and Chemistry. From 1970 to 1983, Gutowsky was the Head of the Department of Chemistry as well as the Director of the School of Chemical Sciences. After leaving his administrative post, he pursued research on microwave spectroscopy using many of the techniques pioneered by his friend, the late Bill Flygare.

Gutowsky married Virginia Warner in 1982; she survives. Also surviving are two sons from a previous marriage, Robb E. Gutowsky and Christopher C. Gutowsky; three grandchildren; and a sister, Esther Ruth Enyart of Denver. He was preceded in death by a son and five brothers. 🏠



Herbert Gutowsky

Symposium in honor of Dr. Gutowsky

The School of Chemical Sciences and the Department of Chemistry are sponsoring a symposium in honor of Dr. Gutowsky. The event will occur on June 24, 2000, which falls during the three-day span of a reunion of University of Illinois Physical Chemistry graduate students and postdoctorals from the late 1940s to the early 1960s.

Symposium speakers include: Charles Slichter, Professor Emeritus of Physics at UIUC; Jiri Jonas, Director of the Beckman Institute for Advanced Science and Technology, and Professor of Chemistry at UIUC; Cynthia Juan Jameson, Professor of Chemistry at University of Illinois-Chicago; Edward Stejskal, Professor Emeritus of Chemistry at North Carolina State University-Raleigh; and Clifford Dykstra, Professor of Chemistry at Purdue University-Indianapolis.

For more information on the symposium, look on the School of Chemical Sciences website, at <http://www.scs.uiuc.edu>. You may also contact the Department of Chemistry at 217-333-0711. 🏠

Exhibit of rare and interesting chemistry books

A new virtual exhibit showcases a collection of books from the University of Illinois Rare Book and Chemistry libraries that changed the course of chemistry—or made it more interesting. The exhibit, “From Alchemy to Chemistry: 500 Years of Rare and Interesting Books,” is curated by Tina Chrzastowski (Chemistry Librarian), Gregory Girolami (Professor of Chemistry) and Vera Mainz (SCS NMR Laboratory Director). The books in the exhibit document the major shifts in the study of chemistry as well as the ways in which chemists changed the way they talked about the field. “I think of alchemists as people who like to write about what they’ve done so that people know they’ve done it,” Mainz explained, “but they also write in riddles or codes so that other people can’t do what they’ve done. Chemists, on the other hand,

want people to be able to reproduce what they’ve done. They want people to give them more insight into the work they’re doing.”

The oldest book in the collection, Hieronymus Brunschwig's *Liber de Arte Distillandi* [*Book of the Art of Distillation*], was published in 1500 and is one of the earliest books on chemistry and *pharmacology*. The exhibit also includes *Traité Élémentaire de Chimie, Présenté dans un Ordre Nouveau et d'après les Découvertes Modernes* [*Elementary Chemistry Treatise, presented in a new order and after modern discoveries*], written in 1789 by Antoine Lavoisier, the father of chemistry.

Some of the books on display were selected for their human interest. “His Exposition of the Hieroglyphical Figures—His Secret Booke of the Blessed Stone called the Philosopher's,” was written in 1624 by Nicholas Flamel. Flamel is the alchemist who appears in the popular Harry Potter books as the creator of the philosopher's stone, an imaginary substance sought by alchemists in the belief it would change base metals into gold or silver.

View these and other rare and interesting chemistry books at <http://www.scs.uiuc.edu/~mainzv/exhibit>. 🏠



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