ALUMNI NEWS
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Biochemistry Department Receives a Very Welcome Series of Gifts

When Professor John Gerlt took over as Head of the Biochemistry Department in 1994, the first item on his agenda was to recruit faculty to build up the Department. A recent series of significant gifts will turn that dream into reality.

William Rutter

The William Rutter Endowed Chair in Biochemistry

Dr. William Rutter, University of Illinois Professor of Biochemistry from 1955-1965, received an Hon. D.Sc. Degree from the U. of I. in 1995 for his outstanding scientific contributions. After leaving the U. of I. and a short interlude at the University of Washington, Rutter became Head of the Department of Biochemistry and Biophysics at the University of California at San Francisco. He built up a large department focused on genetic structure and function which became the premier department in the nation and attracted some of the foremost biochemical researchers. Finally, in 1981 Dr. Rutter and two other scientists founded Chiron, which has become one of the largest and most successful biotech firms. Dr. Rutter was elected to the National Academy of Sciences in 1984 and to the American Academy of Arts and Sciences in 1987.

As Chiron expanded, Dr. Rutter retained his friendship for the U. of I. and he has now set up an endowment for the William Rutter Chair in Biochemistry. Professor Gerlt anticipates that the Chair will be used primarily to recruit new faculty "of William Rutter

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Faculty as Entrepreneurs

Introduction

Entrepreneurship and technology transfer are at an early stage at the University of Illinois. The private universities on the coasts have led the way and the state universities in the midwest are learning to follow. Excerpts from the remarks by Arnold Beckman, MS '23, one of our most famous chemistry alumni, on receiving the 1987 Vermilye Medal for outstanding contributions to the Science of Industrial Management from Philadelphia's Franklin Institute, demonstrates that entrepreneurship at universities is not new. Beckman's remarks, excerpted below, were published by the Franklin Institute, [reprinted with permission].

The Franklin Institute is special to me because Ben Franklin and I have something in common: We both liked to fly kites. Franklin's famous kite flying episode was hardly a stunt. It was a serious piece of research that contributed to man's knowledge of electricity. It led to Franklin's invention of the lightning rod and to his subsequent election as a

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Biochemistry Department Receives a Very Welcome Series of Gifts

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quality", who will enhance the stature of the Department. The inaugural incumbent will be Professor Lowell P. Hager, who guided the department for the first twenty years of its existence as an independent entity.

Lowell Hager

The Lowell P. Hager Fellowship

The Department has received seed money for an endowment to fund a fellowship in honor of Professor Lowell P. Hager. Professor Hager is an internationally recognized enzymologist and protein chemist. In recognition for his work, he was elected to the National Academy of Sciences in 1995. He joined the faculty of the University of Illinois in 1960. From 1967-1969, he served as head of the Biochemistry Division and became the first Head of the Department of Biochemistry when the Department became a free standing unit in 1969. From 1973-1983 he was Director of the Cell and Molecular Biology Training Program and from 1987-1995 Director of the University of Illinois Biotechnology Center. In addition to the above, Professor Hager has carried out diverse editorial responsibilities. He was Editor of the *Archives of Biochemistry and Biophysics*, 1965-1969, and Editor of the *Foundations of Modern Biochemistry Series*, 1967-1977.

Gregorio Weber

The Gregorio Weber Fellowship

Seed money for an endowment has been received to fund a fellowship in honor of Gregorio Weber, Emeritus Professor of Biochemistry and Biophysics. Professor Weber's research has been directed to elucidation of physico chemical aspects of proteins. He has focused on characterizing the thermodynamics of protein-protein and protein-ligand interactions using optical spectroscopy. He has investigated dynamic aspects of proteins using fluorescence methodologies, including polarization and time resolved techniques.

Weber has been a Professor of Biochemistry at the U. of I. from 1962 until his retirement in 1986. In 1971 he was appointed to the Center for Advanced Studies, the campus' highest honor. He was elected a Fellow of the American Academy of Arts and Sciences in 1968 and became the first National Lecturer of the Biophysical Society in 1969. In 1975, he was elected to the National Academy of Sciences and received the Rumford Premium of the American Academy of Arts and Sciences in 1979. In 1983 he received the ISCO Award for excellence in Biochemical Instrumentation and in 1986 he became the first recipient of the Repligen Award for the Chemistry of Biological Processes given by the American Chemical Society.

Under the terms of the agreements establishing these endowments, the Biochemistry Department undertakes to match the donations. The Department is optimistic that this will prove a successful undertaking given the incentive provided by this exceptional series of gifts. The additional resources for faculty and graduate students are expected to expand the Department and to raise its standards to rank among the best in the nation.

To reach your editor...

Thanks to modern technology, you can now reach our office by e-mail at **scsnews@uiuc.edu** and by FAX directly 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.

The First Carter Fellow to be Named

Because the endowment drive is within striking distance of its final goal, Professor John Gerlt, Biochemistry Department Head, will name the inaugual Carter Fellow in October, at a banquet celebrating the successful drive.

Herbert Carter

We want to thank the many contributors to the drive who are making this happy event possible. Herbert Carter has many friends who have honored him by helping to establish the first named fellowship in the Biochemistry Department. Because of his many contributions to the Department and to the field of Biochemistry, it is appropriate that the first fellowship bear the Carter name. With the gifts still coming in, we hope that the full endowment will be available very soon to cover the costs of the stipend.

Professor Emeritus Charles Sweeley, a member of the Carter "family" and chairman of the drive, deserves enormous credit for the success of this undertaking. Many thanks also to members of the drive committee for their hard work. Many of them willingly did far more than fulfill their assignments. Their efforts have been repaid handsomely. The tributes to Carter received along with the checks demonstrate that Carter's humanity as well as his teaching and research enriched the lives of countless students and colleagues and made the Carter Fellowship a reality.

Charles Sweeley

Faculty as Entrepreneurs

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member of the prestigious Royal Society of Sciences of London.

I found that launching a business or new product is a lot like flying a kite: Your idea is held together by a flimsy framework. You put it out at the end of a string of hope, while you run like hell. Tattered rags hang on to your tail. And only when the wind is blowing just right do you experience the thrill of flight and success.

Arnold Beckman

I have experienced the distress of failure many times and survived. Failures can provide valuable lessons. By taking risks one makes progress. I was never averse to taking risks.

As an assistant professor at Caltech, I faced a collective sponge of bright young student minds, an exhilarating experience. I shared my knowledge with them, but I got back something quite unexpected, a career in the instrument business.

As some of you may know, a classmate, Glen Joseph, working for a local fruit growers association, approached me at Caltech for help in measuring the acidity of lemon juice that had been heavily dosed with sulfur dioxide. My chemistry background and the smattering of electronic knowledge acquired at Bell Labs led to the invention of the Beckman glass electrode pH meter. With it, Dr. Joseph processed his lemon juice, and I launched what became a billion dollar a year business. These and other experiences taught me a lesson: Take risks, crosstrain and when life gives you lemons, make lemonade.

If you want to encourage R&D in your organizations, take a tip from old Ben Franklin: Tell everyone to go fly a kite. The results may very well be spectacular.

FACULTY ENTREPRENEUR

Sweedler's Company Exploits Novel Technology

Jonathan Sweedler, Professor of Chemistry, is a founder of Magnetic Resonance Microsensors Corporation (MRM), a company that has reached the "break out" point and is ready for some serious growth. It is based on a revolutionary technology that uses submillimeter receiver coils (microcoils) to study very small samples using NMR spectroscopy.

Jonathan Sweedler

The company is an outgrowth of a multi year, interdisciplinary research project by a group of chemists and engineers working at the Beckman Institute. Sweedler's expertise with small samples, including the preparation of single neurons, and his work with small capillaries, allowed him to demonstrate how the microcoil apparatus could be applied to the srudy of mass limited, nanoliter volume samples.

Sweedler also demonstrated the application of microcoil NMR technology to separation studies using capillary electrophoresis (CE) and liquid chromatography (LC). As a complement to the more traditional CE and LC detection schemes, (e.g. fluorescence, optical, etc.), NMR enables chemical characterization of the molecular structure of the individual constituents, on-line.

At present, separation studies may be the most promising type of application for the product but new applications are constantly being investigated and prototypes are being constructed in the laboratories. For instance, the new apparatus requires only a small magnet, which constitutes the major expense of NMR instruments. With microcoils, both the size and the complexity of the magnet can be decreased, which, in turn, will reduce the cost of the instrument to a level where researchers will be able to afford desktop systems dedicated to specific applications. Another obvious application is for NMR measures of "precious" samples. For example, a researcher who wished to analyze a hormone produced by a snail will be able to test the tiny sample in pure strength and avoid diluting the material in a test tube.

Of course, Sweedler is the first to point out that this was truly a joint project that would not have come to fruition without the collaboration of several outstanding engineers who helped solve the numerous technical problems posed by the project. Professor Richard Magin, Adjunct Assistant Professor Timothy Peck and Assistant Professor Andrew Webb, all faculty in the Department of Electrical and Computer Engineering at UIUC, are co-founders of the company.

The microcoil technology is an outgrowth of Peck's Ph.D. thesis, supervised by Magin. Peck now serves as President of MRM, with a less than halftime appointment in the Department of Electrical and Computer Engineering. Webb's role has been primarily one of bringing NMR expertise to this collaborative group. Other significant company players include James Norcross, a UIUC Physics Ph.D., and Dean Olson, a postdoctoral associate working for Sweedler. Norcoss holds a 100% appointment with MRM, whereas Olson's company appointment is part time.

During the process of development, the group wrote patents on the product with the support of the University. So far, three patents have been filed that are owned by

the University but with an exclusive option for license by the company. The company has been awarded three federal grants: one SBIR (Small Business Innovative Research) grant from the NIH and two STTR (Small Business Technology Transfer Research) grants from both NIH and NSF. At present, two of the grants are at the end of the first phase, designed for demonstration of feasibility. The third grant has just been awarded within the past month.

Looking to the future, the company is seeking industrial support and venture capital. The company is already negotiating the sale of alpha version microcoil-based NMR detection probes to several front line pharmaceutical and biotechnology companies. According to Peck, "With a demonstrated market and a product with proven feasibility, we are now ready to move forward quickly towards manufacture." Peck is quick to point out that although the government grants have played a critical role in the early stages of product development, the next step is to acquire capital to expand, plan marketing strategy, and to solve remaining technical problems. The company rents space at the Illinois Technology Center, a technology incubator in nearby Savoy. The mission of the center is to facilitate technology development, and they are very committed to working with companies like MRM to accomplish this mission.

The University is very supportive of this activity. The University's Technology Transfer Office has attracted new staff with experience in this area. Interest in the growth of private companies that exploit faculty expertise has been expressed by the entire administrative hierarchy, including the recently appointed University President. He hopes to foster a more entrepreneurial culture at the U. of I. and to catch up with other big ten institutions that have generated substantial income from patents. Alumni and friends of the U. of I. who would like additional information on the company may contact either Professor Sweedler (217-244-7359) in the School of Chemical Sciences or Dr. Timothy Peck (217-352-6644) at Magnetic Resonance Microsensors.

FACULTY ENTREPRENEUR

Hager's Company Provides Products and Services

It isn't a Merck yet or a Chiron but Lowell Hager, Professor of Biochemistry, hopes that his company will hit a growth spurt soon. Hager and his wife started Chirazyme three years ago in the Technology Commercialization Laboratory, the incubator building sponsored by the College of Agriculture (now ACES).

The company has a product, an enzyme called chloroperoxidase, but also derives income by providing analytical services to small biotech companies and academic researchers who are experimenting with modified heparins. The enzyme chloroperoxidase, produced by a common soil fungus, catalyzes halogenation and chiral epoxidation reactions. Chloroperoxidase has significant potential as an industrial catalyst for the enantioselective synthesis of epoxides which can serve as intermediates in the synthesis of chiral drugs. Hager and one of his students, Eric Allain, have patented the use of chloroperoxidase for the synthesis of chiral epoxides and assigned the patent to the University of Illinois.

Hager in his lab

In the production of chiral epoxides, the enzyme takes an oxygen atom from hydrogen peroxide and stereoselectively inserts it into an olefinic double bond. Chirazyme's initial plans were to use chloroperoxidase for the conversion of cis-β-methylstyrene to its 1S, 2R epoxide in 96% enantiomeric excess. This epoxide can be converted to pseudoephedrine (common name, Sudafed) by reaction with methylamine.

The commercial production of Sudafed could have been a lucrative business because it is a common ingredient in most cold medicines and cis-β-methylstyrene is an inexpensive starting material. Unfortunately, the cis-β-methylstyrene that was to be provided by a collaborating company, contained small amounts (0.1%) of allylbenzene as a contaminant. Allylbenzene proved to be a suicide inhibitor of chloroperoxidase and the production of cis-β-methylstyrene, totally free of allylbenzene, was not commercially feasible. Goodbye Sudafed. In the meantime, Chirazyme continues to search for new chiral epoxides which can serve as intermediates in the synthesis of chiral drugs. In addition, Hager continues to make chloroperoxidase and sells it directly to any and all interested researchers. Chirazyme also produces chloroperoxidase for Sigma Chemical Company, which, in turn, repackages the enzyme and sells it to Sigma customers.

In the last two years, Chirazyme has applied the procedure for heparin disaccharide analysis, developed by Ed Conrad, Professor of Biochemistry Emeritus, to the characterization of modified heparins and heparin sulfates. In addition, there is now considerable evidence suggesting that modified heparins, which have lost their anticoagulant activity, have potential as therapeutic agents for a variety of medical problems. For example, Hager has been working with a biotech company which is testing a modified heparin for the treatment of cystic fibrosis. Preliminary tests indicate that this modified heparin can serve as a decongestant when sprayed directly into patients' lungs.

Another modified heparin is being tested as a preventative agent in the treatment of restenosis, which often follows angioplasty balloon surgery. Restenosis occurs when scar tissue forms on the arterial walls where the cholesterol plaques have been stripped away. In some instances, the scar tissue can present a

more serious blockage than the original plaque.

Professor Ed Conrad, Hager's longtime friend and colleague, suggested that Chirazyme provide a heparin disaccharide analytical service for researchers and small biotech companies interested in heparin chemistry and therapy. Heparin consists of a polydisperse mixture of highly sulfated polysaccharide chains made up of disaccharide units composed of one uronic acid unit and one glucosamine unit, which may be either N-acetylated or N-sulfated. Because the sequences of the disaccharide units differ in each mixture which contains multiple heparinoid chains, it is not possible to determine the precise sequence of disaccharides in these preparations. Instead, the heparinoids can be characterized in terms of their disaccharide composition using analytical procedures developed by Conrad and his students.

The analysis consists of complete cleavage of the heparin sample to disaccharides, reduction of the disaccharide mixture with sodium borotritide and high pressure liquid chromotography (HPLC) separation of the labeled disaccharides. Many small companies and academic researchers do not have the expertise and/or facilities to carry out the disaccharide analyses; hence the niche for Chirazyme in this developing field.

In the future, Hager hopes to get some of his chemistry colleagues involved in commercial chiral drug synthesis. He also wants to make the company grow by developing new auxiliary services. He is well aware that the big money lies in identifying a chiral epoxide intermediate that a large pharmaceutical company will find useful in the synthesis of a profitable new drug.

FACULTY ENTREPRENEUR

Oldfield is an Experienced Entrepreneur

Over the past 15, years Eric Oldfield, Professor of Chemistry, has established four different companies. Two have provided consultation for patents and expert witnessing, especially regarding data on industrial catalysts of interest to oil and chemical companies. Another was a company that built specialty probes for NMR spectroscopy. It was a good idea but was too capital intensive and the profit was too small.

Eric Oldfield

Oldfield's fourth company, and the winner among the group, is Spectral Data Service, started in 1985 to provide NMR testing services. It does business with 300-400 companies or customers. It is the major US NMR testing company and is both profitable and growing. Its mission is to provide "rapid, first class NMR data acquisition capabilities and data analysis to industrial, university, and governmental clients who either do not have modern high tech Fourier transform NMR spectrometers or who are plagued by extremely long in-house turnaround times."

A considerable portion of the company's business is in testing pharmaceutical products to provide spectra that prove that they contain the material claimed. The company brochure also shows their other major purviews: testing polymers and other plastics, represented by a sleek automobile, a flower represents their interest in natural products, and a cross section of rock represents their active participation with oil companies. The company has three spectrometers that are capable of solid state, liquid state and gas phase experiments. Data are collected under GLP, Good Laboratory Practice, and GMP, Good Manufacturing Practice regulations to insure quality raw data and proper documentation and validation. Turnaround time is usually one week or less.

Spectral Data Services, Inc. was started with Dr. Gary Turner, who has been the president since its inception. Gary has had a long association with Eric Oldfield, beginning with an undergraduate (Chemistry) student project in 1978. Turner received his Ph.D. from the University of Arkansas but retumed to Oldfield's lab as a postdoc in 1982 and then helped set up Spectral Data Service in 1985. There are now two additional spectroscopists and three support staff, one of whom is in charge of compliance.

Professor Oldfield is not planning a major expansion of the firm. When it started, his company charted new territory. Now the competition is growing with three others providing similar lines of service. He plans to stay at this level because the company is running smoothly, expansion would require a considerable capital infusion for more equipment, and he is ready to take more profits from the company, rather than to plough the extra cash back in for more equipment. Although, as he admits...you never can tell.

With a full time staff of six, Oldfield can concentrate on his university research and stay informed of developments at Spectral Data Services with telephone chats and a handtul of visits each year. The contacts he has made with customers and clients have led to some interesting collaborative research grants with industrial partners. This has helped to support his large research group at the University and to draw in worldwide awards and recognition. Oldfield has been recipient of the Royal Society of Chemistry's Meldola Medal, the Biochemical Society's Colworth Medal, the American Heart Association's Basic Science Research Prize, and the American Chemical Society's Award in Pure Chemistry. Last year he was awarded the Spectroscopy Medal from the Royal Society of Chemistry and was also named a Richard G. and Carole J. Clive University Senior Scholar.

Spectral Data Services, Inc. is thriving. None of his other companies has failed but this company has filled a very important niche. As Oldfield says, it is energy and time consuming to start a new business but the effort is well worthwhile when the company meets with success.

For further information, see the company's website at http://www.sdsnmr.com.

Faculty Research

Evolution of Lipoprotein Studies in the Jonas Lab

For over 20 years, Ana Jonas, Professor of Biochemistry, has been carrying out increasingly sophisticated studies on the structure-function relationship of lipoproteins. She has received honors and awards at the national and international level for her scientific creativity, and not merely because she has devoted herself to a "hot" topic. The dangers of excess cholesterol for human health have been widely publicized. According to the oversimplified, popular view, Low Density Lipoproteins (LDL) are the villains because they transport cholesterol to the body's tissues, whereas High Density Lipoproteins (HDL) are the saviors because they remove cholesterol from the tissues and transport it to the liver for storage and destruction. Jonas's studies are mainly of HDL and demonstrate that the topic has multiple ramifications.

Choice of Career Line

The series of studies commenced in the '70s when Jonas started to investigate protein lipid interactions in membranes and settled on blood lipoproteins as a simple model system that had not been adequately studied at that time. Not only were blood lipoproteins relatively simple, but they were also available in abundance, since she could commence her investigations with blood from beef and central Illinois has a large supply of cattle. For these early studies she relied mainly on fluorescence techniques which she had used in prior research on protein structure. Using the usual biochemical approach, she separated protein and lipid components into their constituent parts to study their properties and interactions.

One of her interesting findings was that the apolipoproteins can act as macromolecular detergents. They break lipid aggregates into small, water soluble particles which are able to circulate in the blood instead of merely clogging arteries and causing heart and vascular disease. Her studies of apolipoproteins, the purified protein components, provided important insights into lipid transport and molecular recognition. She and others found that the apolipoproteins can recognize cell surface receptors and blood enzymes that continue acting on lipids while they circulate in the blood.

Synthetic HDL

Her next series of major scientific contributions was to develop novel methods to reconstitute HDL from purified lipid and protein components derived from human or animal blood. Once it became possible to synthesize HDL, it became possible to alter it and to tailor it for special purposes. Surprisingly, she found that the main interactions were between the apolipoproteins and the phospholipids to form disclike complexes about 10 nm in diameter and 5 nm thick. The cholesterol was adsorbed into the complex and merely "went along for the ride."

Jonas's main interests in synthetic HDL were in fundamental questions of apolipoprotein structure and the physical chemical aspects of their interactions with lipids and other proteins. Figure 1 illustrates the structural organization of the synthetic HDL and relates it to the naturally occurring HDL. Other research groups were discovering that synthetic HDL also might have potential as therapeutic agents. The problem with this line of research was that synthetic HDL had to be made from apolipoproteins from human blood and large quantities of blood yielded only small quantities of apolipoproteins. Enter modern genetic engineering techniques. Thenceforth, she was able to synthesize apolipoproteins in bacteria and the quantitative problem disappeared. She was among the first to apply these techniques to the synthesis of HDL and to make

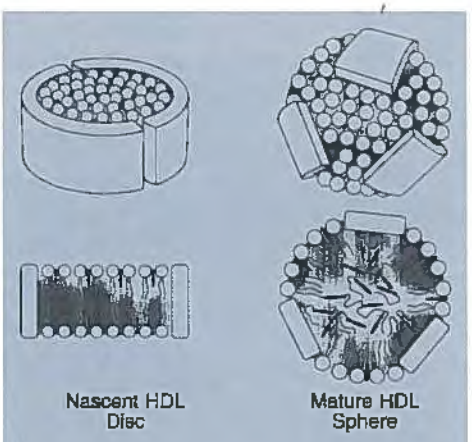


Figure 1. Research in Doctor Jonas's lab has delineated the overall structure of nascent and mature HDL (both shown in perspective and in cross section). The nascent HDL discs are essentially identical to synthetic HDL: they contain a phospholipid (open circles with two tails) bilayer with dissolved cholesterol (filled dots and ovals) stabilized by an apolipoprotein shell. The mature, spherical HDL arises from discoidal HDL by the action of enzyme lecithin cholesterol acyltransferase (LCAT). The enzyme converts C and phospholipid (lecithin) into CE (ovals with tails).

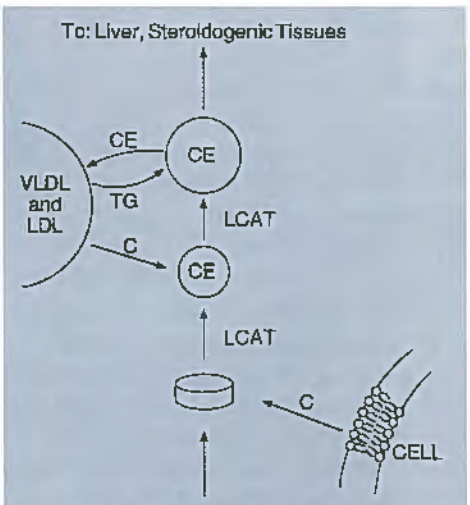


Figure 2. HDL, found in blood, and extracellular fluids, are represented as nascent discs and as spherical particles in the middle of the diagram. Cholesterol (C) from cells and larger lipoproteins (VLDL and LDL) move to HDL as the enzyme LCAT converts cholesterol (C) into cholesterol esters (CE). The bulk of the CE are then transported to the liver and tissues that synthesize steroid hormones by HDL.

mutants that would provide additional insight into the details of protein lipid interactions.

Some industrial concerns, such as Pharmacia are using Jonas's technique to make large amounts of HDL and to test it for commercial applications. They have found some success in using the material to clean up artherosclerotic plaques in animals and are beginning pilot studies on humans. Other possible applications are for drug delivery systems, the treatment of septic shock and as thrombolytic agents.

Dr. Jonas had been engaged in a series of collaborative investigations of the protein structure of synthetic HDL particles, using mutants produced in bacterial systems. Together with Professor Klaus Schulten of the Physics Department she is working on molecular modeling. Studies with Professor Stephen Sligar, a colleague in the Biochemistry Department, are using new methods such as atomic force microscopy to improve structural visualization. Recently, she has begun attempts to crystallize synthetic HDL to characterize its structure at the atomic level. This is an extremely difficult undertaking and, as Dr. Jonas says, "If I could do that, I would retire happy." Since retirement is not imminent, she may accomplish this feat and more, provided that funding by NIH since the project's inception in the '70s, continues uninterrupted.

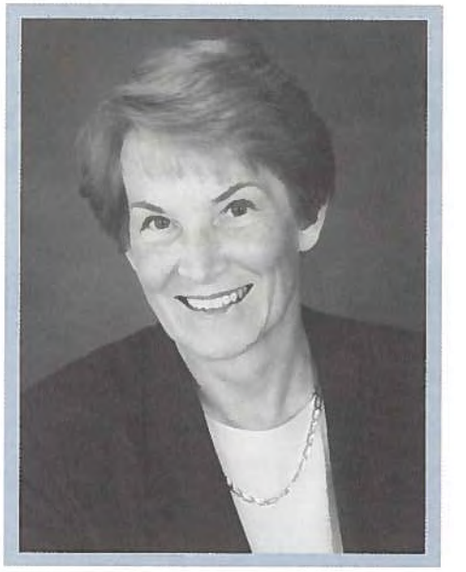
The Enzyme Lecithin Cholesterol Acyltransferase

Since the mid '80s, the Jonas lab has been investigating the role of HDL as a substrate for the conversion of cholesterol into cholesterol esters. This is a key step in the removal of cholesterol from tissues in normal metabolism, and is critical for the prevention and regression of atherosclerosis. The enzyme that catalyzes this reaction is lecithin cholesterol acyltransferase (LCAT). It converts cholesterol into cholesterol esters on the surface of HDL and thus pulls cholesterol from the tissues. The cholesterol as ester does not remain on the surface of HDL but sinks to the middle of the particle and builds a spherical core of cholesterol ester in HDL. In fact, most of the cholesterol transported in blood is present in the form of cholesterol esters which arise from this enzymatic reaction. Figure 2 depicts the central role of LCAT in the metabolism of cholesterol and of HDL.

Dr. Jonas had been investigating the structure and enzymatic mechanisms of LCAT, isolated from human blood. One of the major problems with conducting these investigations has been to acquire sufficient quantities of LCAT, which is found only in blood plasma. Two liters of human plasma yield 1 mg of enzyme. Fortunately, genetically engineered LCAT can now be produced from animal cell expression systems that yield 5 mg of enzyme easily. These larger quantities permit the Jonas team to study native LCAT and to make mutants, substituting different amino acids and experimenting with other permutations to study aspects of structure and function of this important enzyme.

Protein Folding and Unfolding

Since the late '80s, Dr. Jonas has been investigating fundamental questions of protein folding and lipid dynamics that are also relevant to HDL structure and function. The group has looked at well characterized small proteins by different NMR methods to determine what structural changes result from the use of high pressure techniques. They have found that high pressure can produce stable protein intermediates in the process of unfolding and that different parts of a protein will unfold at different pressures. Using pressure, investigators can reduce the melting point of water and cause unfolding of proteins to occur at low temperatures. The advantage of using high pressure is that it is more gentle than other unfolding techniques, and Nuclear Magnetic Resonance (NMR) methods allow the study of the proteins at the atomic level.



Ana Jonas

Renown and Recognition

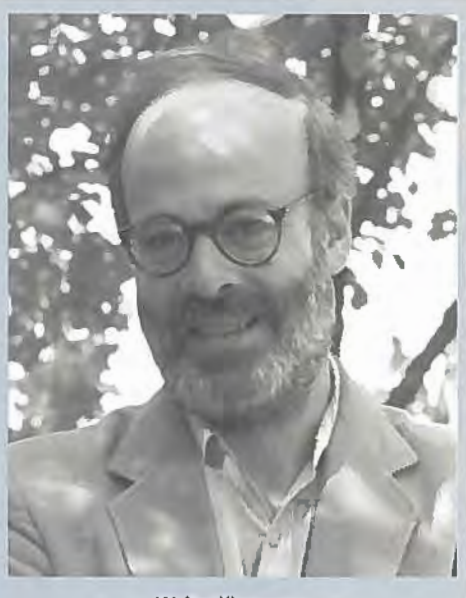
Dr. Jonas's techniques have been widely adopted in the scientific community and she has received both national and international attention and recognition for her research. She was awarded a Fogarty International Fellowship in 1981 and an Established Investigatorship of the American Heart Association in 1974-1979. She was elected to chair the Gordon Conference on Lipid Metabolism in 1990, an honor reserved for leading scientists in the field. She is the recipient of the 1996 Lyman Duff Memorial Lectureship Award of the Council on Arteriosclerosis.

Her appointment to the National Research Committee of the American Heart Association (1993-1998) and to chair the Lipid and Lipoprotein Metabolism Review Committee (1993-1998) as the representative of the 2000 member Council on Arteriosclerosis, attest to the importance of her research contributions in the field of cardiovascular research and to the high regard of her scientific peers.

Gewirth and Klemperer Study Self-Assembled Monolayers

An article in the June 14 *C&EN* describes recent research by Professors Gewirth and Klemperer showing that certain kinds of inorganic molecules can form self-assembled monolayers on metal surfaces. Self-assembled monolayers of organic molecules have been known for over a decade, due in part to work pioneered by Professor Ralph Nuzzo. However, the self-assembly of inorganic molecules, while recognized as an important objective due to the potentially greater stability and mechanical strength of inorganic monolayers, had remained an elusive objective.

Andrew Gewirth



Walter Klemperer

The Illinois chemists showed that silicotungstate anions spontaneously form adherent, ordered arrays on silver surfaces. The silicotungstate anion, $SiW_{12}O_{40}^{4-}$, contains a central silicon core surrounded by a series of tungsten-oxygen cages, as shown in the Figure 2. The molecule presents oxygen atoms to the silver surface, and it is the affinity of silver for these atoms which drives the self-assembly process. Recent studies suggest that the silicotungstate monolayer will assemble not only on silver surfaces but also on copper and it is anticipated that the molecule will assemble on other oxophillic surfaces (such as Al, Ni, and W) once the native oxide layer is removed.

The scientists have also studied the different structures adopted by the silicotungstate anion monolayers. As shown in Figure 1, complex patterns are observed that reflect an interplay between the metal lattice structure, the structure of the silicotungstate anion, and the resultant adlayer structure. Future research will relate these different structures to differences in reactivity. Practical applications of this research originate from the properties of polyoxometallates. These molecules are known to function not only as superacids, but also as ion exchangers, corrosion inhibitors, electron transfer reagents, catalysts, and photochemical oxidants. Since they can accommodate a wide range of organic, organometallic, and inorganic functional groups, Gewirth and Klemperer anticipate widespread exploration of these and other classes of inorganic molecules as self-assembled monolayers.

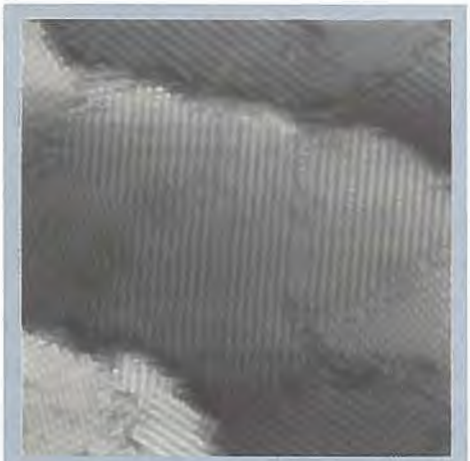


Figure 1. Complex patterns are observed that reflect an interplay between the metal lattice structure, the structure of the silicotungstate anion, and the resultant adlayer structure.

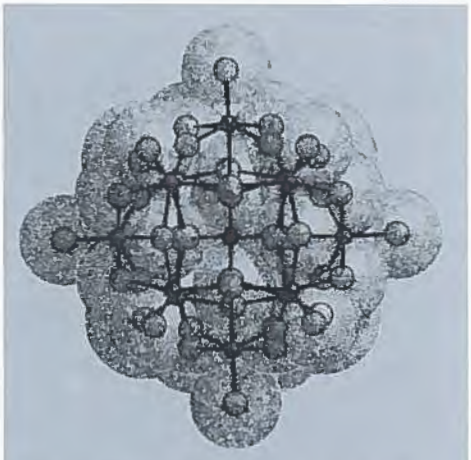


Figure 2. The silicotungstate anion, $SiW_{12}O_{40}^{4-}$, contains a central silicon core surrounded by a series of tungsten-oxygen cages.

Notes

Gruebele Successfully Traces First Steps of Protein Folding

A news article in *Science* describes Professor Martin Gruebele's pioneering work in tracing the first steps in protein folding. His work helps theorists to address one of the fundamental debates in the field: the nature of the intermediate states formed en route to the folded protein. The difficulty is not a lack of high speed chemical tracking techniques but to achieve synchronous folding of identical protein molecules.

Gruebele and his students studied folding in an oxygen carrying protein called apomyoglobin for which the final, 3D structure is known. Their first step was to denature (unfold) the protein by "supercooling" the sample in a few drops of ultraclean liquid water that could be chilled to –10 degrees C without freezing. To prompt the proteins to refold, they quickly heated the water, using a laser that fires a single 8 nanosecond pulse of infrared light. The water absorbed the light pulse almost immediately, transforming the light energy to heat. Within just a few nanoseconds the solution heated up by an average of 20 degrees, enough to trigger the protein to begin refolding.

To watch the process, Gruebele and his students used a second laser to fire a series of femtosecond pulses of ultraviolet (UV) light at the protein solution. Some of the UV photons were absorbed by the amino acid tryptophan, which converts part of the energy into heat and re-emits the rest as a photon of longer wavelength UV light. Conventional detectors pick up this fluorescence, which provides a clue to the tryptophan's location because its brightness is influenced by its neighbors. If the amino acid methionine is nearby, tryptophan's fluorencence is dimmed as the methionine steals tryptophan's light energy and converts it instead to invisible vibrational and electronic energy.

Gruebele and his students used this dimming effect to track protein folding by using genetically engineered Escherichia coli bacteria, provided by the groups of Stephen Sligar and Richard Baldwin, with tryptophan and methionine amino acids at different places in the protein sequence. They ran the experiment repeatedly on different versions of the protein, guaging how the fluorescence changed when folding began. They found that tryptophan stopped fluorescing after a 5 microsecond delay, suggesting that it is at this point that the A and H helixes converge (see figure 1). Using a similar scheme, they concluded that the A helix winds itself into a coil in less than a single microsecond.

According to Professor Peter Wolynes, these studies are a crucial first step towards understanding the rules of protein folding. By observing how the intermediate structures form under a variety of conditions, the new experiments should give researchers clues to just how critical these intermediates are.

Martin Gruebele

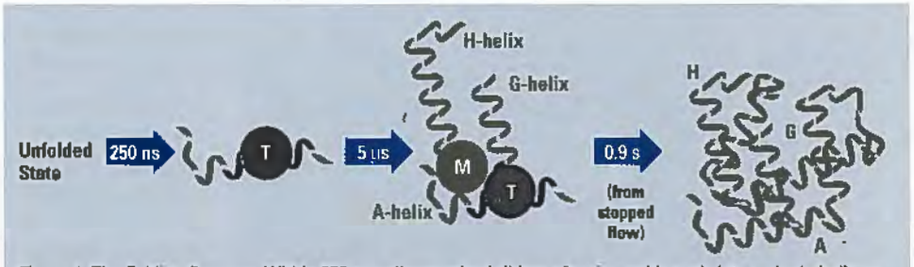
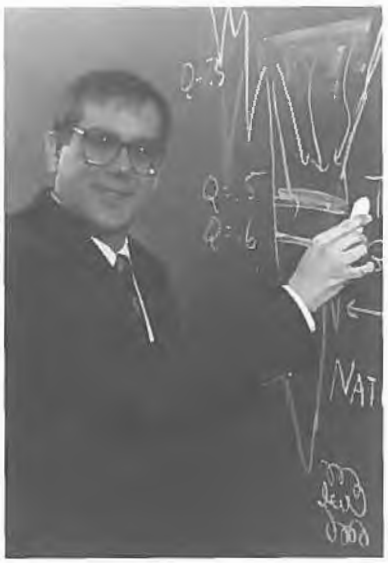


Figure 1. The Folding Process: Within 250 ns a disorganized ribbon of amino acids curls into a single helix as seen at left. 5µs later it acquires some 3D structure, as seen in the center of the figure, before folding into its final shape, as shown on right. This process can be observed by tracking fluorescent tryptophan (T), which is influenced by methionine (M).

Wolynes Inaugural Incumbent of Eiszner Chair

The Eiszner Chair was endowed by Mrs. Joyce Eiszner in memory of her husband, Dr. James Eiszner (B.S. '50 Chemistry), Chairman and Director of CPC International, a well known Fortune 500 company. It is the first fully endowed Chair established in the Chemistry Department at the University of Illinois. Professor Peter Wolynes, selected as the first holder of the Chair, will set a very high standard for that distinguished honor.



Peter Wolynes

Professor Wolynes has made seminal contributions to theoretical chemistry for more than twenty years, in diverse areas ranging from quantum dynamics of small molecules through the study of fundamental aspects of reaction dynamics and molecular motion in liquids through the study of biomolecular dynamics and protein folding. His leadership in these areas has dramatically changed the practice and conceptual framework of theoretical chemistry and greatly influenced developments in experimental physical chemistry.

His recent contributions have revolutionized the theoretical approaches to protein folding, which some consider the most central problem of molecular biology. Wolynes and his colleagues have shown how an unfolded protein starts out with many possible shapes and, through a series of parallel steps, narrows down its options to obtain a final natural structure. In stabilizing itself, the protein moves through an energy "funnel" which guides it through many potential shapes to the one that minimizes its energy.

Since he joined the Illinois faculty in 1980, Wolynes's work has received increasingly important forms of recognition. He received the ACS Award in Pure Chemistry in 1986, the Fresenius Award of Phi Lambda Upsilon in 1988, and an Honorary D.Sc. from Indiana University in 1988. In 1991 he was elected to the National Academy of Sciences and became a Fellow of the American Academy of Arts and Sciences. In 1993, he received the William H. and Janet Lycan Professorship in Chemistry.

Professor Wolynes is eminently qualified to fulfill the promise that Stephen Sligar, Director of the School of Chemical Sciences made to Mrs. Joyce Eiszner in thanking her for the Chair: "You can rest assured that holders of the Chair will share your husband's leadership qualities, as well as his commitment to ethical conduct and the highest scientific standards. The holder of the James R. Eiszner Chair will help us to maintain and improve the very highest standards for education and training of the young people whom we prize and will add to the reservoir of knowledge that will hasten the evolution of our science."

Two Outstanding Chemists Receive Swanlund Chairs

Maybelle Swanlund, who graduated from the U. of I. in 1932 has been a major contributor to the University. At her death in 1993, she provided an endowment of $12 million in honor of her husband, to establish 10 faculty chairs "to attract leading figures in the arts and sciences to the university or to recognize outstanding scholars already on the faculty." The chemistry department has attracted two of the chairs for Professors John Katzenellenbogen and Samuel Stupp, scholars of exceptional quality who are currently on our faculty.

Professor John Katzenellenbogen

During his 27 years in the Chemistry Department, Professor John Katzenellenbogen has been a pioneer in exploring chemical approaches to biological problems. At the time that he began to work on biological and medicinal problems, Katzenellenbogen was far "ahead of the game." He says he was fortunate to work in an enlightened department that "encouraged wide vision while it demanded quality" because even in his early years he was clearly not a chemist in the traditional mainstream. His application of chemical techniques to biological problems has been widely adopted by researchers after biological problems could be studied at the molecular level and chemical techniques could be used to identify and characterize enzymes and receptor systems.

John Katzenellenbogen

Katzenellenbogen is particularly well known for his work on the topography of the active sites of steroid receptors. This project has involved the synthesis of steroidal and nonsteroidal hormone analogs, radiolabeling, photochemistry, and biological characterization of the receptors. He has developed techniques to isolate and purify high affinity binding proteins that function as receptors. He has explored molecular details of the action of steroid hormones and has used the steroid receptors to develop novel medical diagnostic procedures, especially useful for breast and prostatic cancers.

As recognition for his work, Katzenellenbogen has been the Roger Adams Professor of Chemistry from 1992-1996. He is a Fellow of the American Academy of Arts and Sciences, and a University Scholar. Last year he received the prestigious Paul C. Aebersold Award for Outstanding Achievement in Basic Science Applied to Nuclear Medicine.

Professor Samuel I. Stupp

A pioneer in materials chemistry, Professor Stupp joined the faculty at the University of Illinois 15 years ago when the field barely existed. In the intervening years, Stupp has put materials chemistry "on the map" with a number of diverse contributions. He describes his work as finding rules to program molecules to create supramolecular structures. The challenge, he says, is not to make molecules but to make materials that are complex structures with defined properties which give them a purpose. These struc-

Samuel Stupp

tures are self assembled once the initial molecules are identified and the rules for association defined. One of the structures for which he is well known, looks like a giant mushroom that aggregates to form a material with many interesting properties. For example, the material looks like a piece of plastic but can transform infrared light to green, which could have practical applications in the communications industry. It also acts spontaneously like an adhesive on one side but not on the other, a property that may prove useful in applications ranging from composite materials design for the transportation industry to vascular surgery.

Professor Stupp has made important studies of hybrid materials, usually mixtures of semiconductors or ceramics and organic materials in specified arrangements. He expects that the materials will prove useful for solar cells and will help create new kinds of batteries. Some may be capable of converting water into hydrogen and oxygen which has potential for development of energy sources.

Most recently, Professor Stupp has become very interested in biomaterials, which he describes as a "most challenging field." He has designed a variety of materials to repair human tissues. For instance he has designed a material that can function as artificial bone, that contains the minerals and some of the amino acids normally present in bone structure. This material can induce bone to grow and can be used to coat the metal of implants for joint reconstruction. Eventually, he hopes that the material can be designed to function as an adhesive. A physician will be able to use it to stabilize a fracture and induce the bone to mend while the adhesive will eventually disappear. His most recent venture in bioengineering has been to develop organic materials to repair human cartilage, a most difficult undertaking since cartilage does not normally grow in a mature human. He is looking for a material that will affect the environment of the impaired cartilage so that it will regrow as it does in young children.

Professor Stupp is a Fellow of the American Physical Society. In 1991 he won the Department of Energy Prize for Outstanding Scientific Accomplishment in Materials Chemistry. In addition to the Swanlund Chair, Professor Stupp has been selected as the 1997 Joliot Curie Professor at the Ecole Superieure de Physique et de Chimie in Paris. The two chemists who were honored with a Swanlund Chair clearly fulfill the requirement of outstanding scholarship, as specified by the donor.

New Book on Carothers

Enough for One Lifetime: Wallace Carothers, Inventor of Nylon by Matthew E. Hermes has been published jointly by the American Chemical Society and the Chemical Heritage Foundation. Wallace Carothers, Ph.D. '24 (Chemistry with Adams) is one of our most famous alumni. The DuPont company, where he worked, recently observed the 100th anniversary of tus birth.

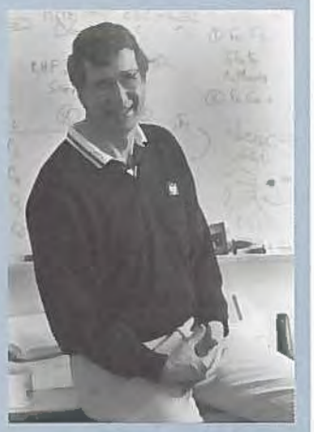
Scherrer Elected to 3M's Carlton Society

Robert Scherrer

The Carlton Society is 3M's highest honor and Robert Scherrer, Ph.D. '58 (Chemistry with Corey) was one of only four to be chosen in October '95. Scherrer is division scientist in the Pharmaceuticals Division and was honored for his outstanding scientific skills and contributions to organic and medicinal chemistry and for his service to 3M as a scientific collaborator, advisor and mentor to many colleagues.

Scherrer joined 3M in 1967 after working for Parke Davis & Co. He became a member of the 3M biochemistry group that merged with Riker Laboratories and is now part of the Pharmaceuticals Division. Currently, his main responsibility is to find compounds that can be used to treat asthma. He has carried out research regarding biological antioxidants that have potential to protect the body against cancer and radiation damage. He has done important work in the area of quantitative structure activity relationships which has led to the development of new compounds. Most recently he has developed a methodology for delivering drugs transmucosally with a patch that adheres to the upper gum. The patch holds promise as an alternative to drug delivery by injection, for selected drugs, and to allow drug delivery to patients who are unable to ingest drugs given orally. Under development at present is a patch for delivering hormones such as melatonin.

Bowers Receives Mass Spectrometry Award



Michael Bowers

Michael T. Bowers, Ph.D. '66 (Chemistry with Flygare) has received the ACS Frank H. Field and Joe L. Franklin Award for Outstanding Achievement in Mass Spectrometry. Professor Bowers has been a professor of chemistry at the University of California at Santa Barbara since 1969.

The award recognizes his many outstanding research contributions including his studies to determine the gas phase basicities of organic compounds by measuring proton transfer equilibria in an ion cyclotron resonance machine. His group also was the first to make and observe the even numbered polyhydrogen ions H_4^+ and H_6^+, postulated as the intermediates in reactions of H_2 and H_2^+. Most recently, Bowers has worked on activation of C-H and C-C σ-bonds by transition metal ions and the mechanisms of fullerene formation by assembly of intermediate structures from atomic carbon.

Bowers is editor of the *International Journal of Mass Spectrometry & Ion Processes* and an associate editor of the *Journal of the American Chemical Society*. He is a fellow of the American Physical Society and of the American Association for the Advancement of Science. In 1989, he received a Nobel Laureate Signature Award and in 1995 a Guggenheim Fellowship.

Alumni News

'40s

R. Byron Bird, B.S. '47 (Chemical Engineering) has received an honorary doctor of engineering degree from Kyoto University.

Joe H. Clark, Ph.D. '40 (Chemistry with Adams) reports thet he has been retired for over 19 years.

James O. Corner, Ph.D. '42 (Chemistry with Marvel) has retired from DuPont. He attended the 100th enniversary observance of the birth of Wallace Carothers, Ph.D. '42 (Chemistry with Adams), the inventor of nylon.

David Hacker, B.S. '49 (Chemical Engineering) retired from Amoco Corporation in '95 and recently organized a new thermophysical measurement facility at BIRL at Northwestern University.

Robert Penneman, Ph.D. '47 (Chemistry with Audrieth) has received the 1994 Seaborg Actinide Separations Award. He has retired from Los Alamos where he worked for 37 years on R/D and technical management. He was co-author with Seaborg of *The Chemistry of the Actinides*.

Klaus D. Timmerhaus, Ph.D. '52 (Chemical Engineering with Drickamer) has received the 47th Institute Lecture Award from AIChE. He is on the University of Colorado staff, serving as Associate Dean of the College of Engineering, Director of the Engineering Research Center, Acting Chairman of the Aerospace Engineering Sciences Department, and Chair of the Department of Chemical Engineering. He was named to the Patten Chair in '86 and was President's Teaching Scholar in '89.

'50s

Richard T. Hawkins, Ph.D. '59 (Chemistry with Snyder) retired from Brigham Young University where he served as a professor of chemistry for 36 years.

Paul R. Jones, Ph.D. '56 (Chemistry with Fuson) has retired as Professor and Chair of the Chemistry Department at the University of New Hampshire after 39.5 years of service. He has "visiting scholar" status at the University of Michigan and is editing the *Bulletin for the History of Chemistry* out of that Department.

Alumni News continues on the next page

Translating Dreams Into Reality

by Charles Zukoski, Head, Chemical Engineering

About a year ago, I described in the Alumni Newsletter, my long range dreams for the future. The scope of my visions will require far more than one year to realize, but I will take this opportunity to briefly summarize how far we have progressed.

To meet the requirements of an upgraded curriculum, structural alterations were essential. Today, plans are in place and a major renovation of the central core of our building will begin this Fall. A new first floor in the old crane bay will provide more space for instructional laboratories. The new unit operations lab will be available to let students practice their engineering skills on large equipment. A new controls lab will be available to teach students control concepts such as the control of chemical reactions. Finally, there will be a senior projects lab where students will design and build experiments to fulfill their curriculum requirements. These three labs will be closely associated with the computer lab on the ground floor. This major structural project will be funded jointly by the Department and the School of Chemical Sciences. We expect to engage in some forward spending in order to fund these projects, but we are a very creditworthy unit and expect to repay borrowed funds on schedule.

We are very grateful to several chemical companies for their generous support for the bricks and mortar that made this renovation possible. One of the reasons for Nalco's interest in us was that we gave them an opportunity to talk to our undergraduates about possible careers in chemical sales. They need to recruit good students for their chemical sales positions and we gave them the opportunity to talk about a new type of career to students who are at the point of planning their futures.

This brings us to the second part of my vision that is beginning to become a reality. I believe firmly that the most rewarding type of relationship between corporations and ourselves is a long term partnership. The idea is not a new one and was discussed at length at the "Rebalance Meeting" two years ago. The consensus at the meeting was that the envisioned partnerships can benefit the education of our faculty and the corporations' technical staff and aid the companies to recruit our students.

Charles Zukoski

The participants at the "Rebalance Meeting" agreed that our main product was not our research but our students. The corporations do not see an urgent need to support our research because there is plenty of basic research available from which they can extract useful ideas to meet their technical needs. What the corporations need is a channel by which to expose our faculty to new industrial niches where the expertise of the faculty can be very helpful, i.e. biomechanical problems, or fluid mechanical problems associated with the pharmaceutical and pulp and paper industry. We envisioned a two-way exposure. We suggested that the corporations invite one or more faculty to visit their sites, give seminars on subjects that fit their needs and get acquainted. The other approach is to ask industries to sponsor a corporate day here on campus where their technical people would describe to our faculty the role of chemical engineers in novel types of industrial sectors, such as the paper and pulp, pharmaceutical and electronic industries.

The positive outcomes of such efforts are subtle but they gradually build stronger one-on-one relationships which can grow into consulting situations, support of research initiatives and finally, and,

perhaps most importantly, increase the general awareness of students and faculty in new career possibilities. Faculty are more likely to use instructional examples from industries that they recently visited, will suggest to students seeking employment that they consider these types of industries and will arrange student internships with staff whom they know through informal exchanges.

In the long term, such partnerships may lead to distance learning. Some industries need short, intense, focused courses on specific technologies for which our faculty have exceptional expertise. The details have not been worked out but it is possible that one or a consortium of companies could supply seed money to enable our faculty to develop short courses that could be transmitted over the web, or by other means.

The success of long range partnerships depends on our identifying the companies that want to have a relationship with Illinois because they want our expertise and a higher profile with our students, as an aid to recruiting. For instance, our students are barely aware that Intel and NEXT hire chemical engineers and that these are good places in which to work. To develop such partnerships takes time but I firmly believe that the potential results are well worth the investment required to grow and strengthen our partnerships with current and future industrial friends. Of course, more staff and more funds would help these projects; but we are moving as far and as fast as we can with what we have and hope to grow to make more of our visions come true.

Teaching Awards

Back row (left to right): Renée Blanchard, Rachel Porter, Gretchen Peterson, Matthew Ravn, Daryl Meling. Front row: Dave Graham, Steve Wanaski, and Professors Jim Lisy and Ed Seebauer

Alumni News

Howard Littig, Jr. B.S. '53 (Chemistry) retired after 37 years as a chemistry and mathematics professor at a California Community College. He also spent 10 years as a part time professor of chemistry at California State University at Northridge. He received an M.S. from UCLA in '56.

Benjamin Mosier, Ph.D. '57 (Chemistry with Laitinen) is President of the Institute for Research, Inc. in Houston, TX. His company performs research funded by government contracts from NASA and by large chemical companies like Dow Chemical or Rhone Poulenc.

Roger Schmitz, B.S. '59 (Chemical Engineering) has returned to teaching and research as the Keating Crawford Professor of Chemical Engineering at the University of Notre Dame. He had been Vice President and Associate Provost at the University since '87.

'60s

Dennis R. Arter, B.S. '69 (Chemistry) is owner and trainer of Columbia Audit Resources. He has been named a Fellow of the American Society of Quality Control, Quality Audit Division. His company specializes in instruction in the field of management auditing.

David V. Boger, Ph.D. '66 (Chemical Engineering with Westwater) has received the '95 Walter Ahlstrom Environmental Prize. He is a professor at the University of Melbourne, AUSTRALIA.

Allan Buchholz, Ph.D. '67 (Chemistry with Rinehart) is Director of Product Support at Tremco, Inc. in Beechwood, OH.

Stanley Crouch, Ph.D. '67 (Chemistry with Malmstadt) has won the '96 ACS Analytical Division Teaching Award.

Thomas Fisher, Ph.D. '64 (Chemistry with Martin) has received the '96 Graduate Level Teaching Award sponsored by the Mississippi State Alumni Association. He has been professor of chemistry at the University since '66.

H. Scott Fogler, B.S. '62 (Chemical Engineering) has received the Lewis Award, the top educational award presented by AIChE. He teaches at the University of Michigan and is the author of one of the most popular textbooks in reactor engineering.

Alumni News continues on the next page

Alumni News

Stan Kosiewicz, B.S. '67 (Chemistry) has received two Los Alamos National Laboratory Awards this past year: for Distinguished Performance and for Waste Minimization.

Robert Madix, B.S. '61 (Chemical Engineering) has been appointed The Charles Lee Powell Professor in the School of Engineering at Stanford University.

Walter B. Panko, B.S. '65 (Chemistry) has been appointed head of the newly created School of Biomedical and Health Information Sciences at the U. of I. at Chicago College of Associated Health Professions. He was formerly a professor in the School of Information and Library Sciences at the University of Michigan. He will also serve as Assistant Vice Chancellor of Health Informatics in UIC's office of the Vice cCancellor for Health Services.

T.R. (Tom) Stein, B.S. '64 (Chemical Engineering) has been promoted to Vice President, Mobil Technology Co. and General Manager, Strategic Research Center at the Mobil facility in Paulsboro, NJ.

Ho Yu, B.S. '67 (Chemical Engineering) received the Pittsburgh Intellectual Property Law Association's '95 Inventor of the Year award for his patented aluminum ingot casting method. He is Senior Technical Specialist of the Molten Metal Processing Division, Alcoa Technical Center.

'70s

Timothy Felthouse, Ph.D. '78 (Chemistry with Hendrickson) is a Senior Research Associate with the Huntsman Corporation in Austin, TX.

Curtis W. Frank, Ph.D. '72 (Chemical Engineering with Drickamer) has been appointed the William M. Keck, Sr. Professor in Engineering at Stanford University.

Sidney Hecht, Ph.D. '70 (Chemistry with Leonard) received an Arthur C. Cope Scholar Award for his contributions to chemistry, biochemistry and molecular biology. He is described as the "world authority on bleomycin—an antitumor antibiotic—from practical total synthesis to the mechanism of DNA cleavage." Hecht is John W. Mallet Professof of Chemistry and Professor of Biology at the University of Virginia in Charlottesville.

Alumni News continues on the next page

Former Students Salute Harry Drickamer

The initiative came from Dr. Walter Robb, '51, who "assembled the troops" (other former students) to honor Drickamer on his "non-retirement" after 50 years of service to the University of Illinois. Drickamer has a different explanation, "They wanted to do something for me and they were tired of waiting for me to retire."

The students agreed to raise an endowment of a million dollars and let Drickamer decide how the funds should be used. Robb felt strongly that they wanted a fund that could be used right away while the endowment was still growing. They did not look for bequests because they did not wish to have to wait for someone to die in order to make the funds available.

Drickamer devised an unusual system for use of the funds. Since he had been a member of the faculty of several departments, collaborated on research with colleagues in those departments and been honored with awards in all three fields, he decided to establish graduate research fellowships distributed among the departments of Chemical Engineering, Chemistry, and Physics. He also established a ratio of fellowships for the three departments as 3:2:1 and devised a cycle in which the fellowships were to be awarded. Administration of the fellowship program will be assumed by the Vice Chancellor for Research and Dean of Graduate Studies, and the campus, college, or departments will contribute a tuition and fee waiver to each "Drickamer Research Fellow."

Drickamer's students welcomed this opportunity to honor their former research advisor, who they felt had given them a sense of excellence in research and they, in turn gave him credit for their outstanding success. Six of Drickamer's former students had been elected to the National Academy of Engineering and one to the National Academy of Sciences. Examples of his notable students include **Albert Leslie (Les) Babb** Ph.D. '55, inventor of the first portable dialysis system, who was elected a Fellow of the Institute of Medicine, as well as to the National Academy of Engineering and received an Alumni Association Achievement Award from his Alma Mater.

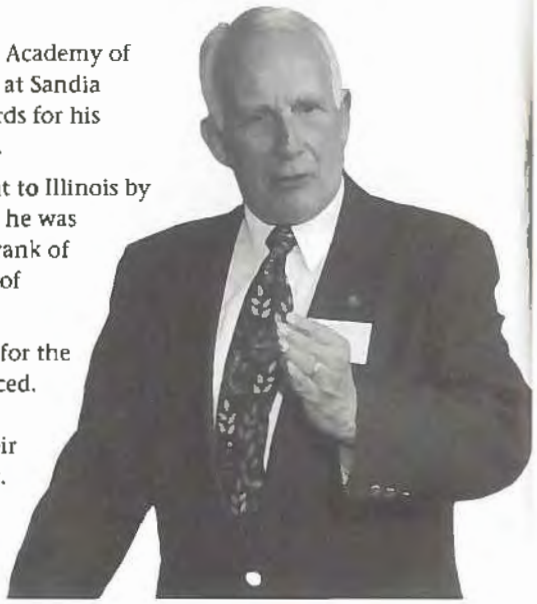
Walter Robb who supervised the development at GE of equipment to perform tomography and an apparatus for magnetic resonance imaging, received the National Medal of Technology and was elected to the National Academy of Sciences. He became Senior Vice President for Research and Development of the General Electric Company. Most recently, he founded and became President of Vantage Management Incorporated and is working with a number of small, developing enterprises.

John Sinfelt, Senior Science Advisor at the Corporate Research Lab of Exxon, is a member of both the National Academy of Sciences and the National Academy of Engineering. He has received many awards including the National Medal of Science Award for Industrial Applications of Science for his development of the catalyst used in making unleaded gasoline.

George Samara, a member of the National Academy of Engineering, is in charge of solid state science at Sandia Laboratory and has received a number of awards for his contributions to the national energy program.

Edward Giller, a World War II ace, was sent to Illinois by the air force to get an M.S. He did so well that he was encouraged to stay for a Ph.D. He rose to the rank of major general and was in charge of a number of aspects of the nuclear testing program.

About 20 students returned to the campus for the dinner at which the endowment was announced. Some who were unable to attend sent letters, recalling Drickamer stories and expressing their respect for the Doc's help and encouragement. For instance, **Elmer Dougherty**, Ph.D. '55, Emeritus Professor of Chemical and Petroleum Engineering at USC, wrote, "Nobody



Walter Robb

Back row left to right: Omar Salman, John Lang, Kevin Bray, Dario Cova, Fred Clark,Chuck Edge, George Samara, Dick Tischer, Doug Stephens, Klaus Timmerhaus. Front row left to right: Ed Giller, May Elizabeth Drickamer, Harry Drickamer, Walter Robb, Dreger Zbigniew.

ever said you were a slave driver but I like to use the line with which you sometimes greeted one of your students returning to campus after going away during a school break: 'Don't tell me! I'll get it in a minute! I remember when you used to go to school here.'" This line was particularly appropriate because of Harry's predilection for hard work, not just for his students but also for himself. After 50 years on the job he can still be found in his office seven days a week although the days may not be quite as long as they used to be.

Les Babb recalled in his letter that Drickamer rescued him from taking on a research project that literally had no satisfactory ending. He said, "I often joke with Walt Robb about it in the sense that I would probably still be a graduate student had it not been for Drickamer's rescue." He also remembered Drickamer picking him up at his rooming house to drive him to the lab. As he put it, "This was one way of ensuring that I attended your (Drickamer's) after dinner seminars dealing with the transport properties of gases, particularly dense gases. I really didn't know what was going on, but I took copious notes if for no other reason than to stay awake. At the time, it never entered my mind that I would later embark on an academic career and resurrect those notes."

John Sinfelt '54. added his comments to express the sentiments of the assembled group. He said, "Doc has been an outstanding teacher, both in the laboratory for students learning to do research and in the classroom as well....(Doc drew the students') attention to new types of activities and new areas of possible interest rather than consider only the material that had been the traditional province of chemical engineers. The message he gave them may be more important today than it ever was."

Elmer Dougherty summed up the occasion: "I don't know how many times I've had the pride of answering "Who was your Research Director?" with "I'm one of Drickamer's boys" and observe the respect that the answer engendered. Harry, you've been—you are—one of the dear and important people in my life. I have derived vicarious pleasure as you have piled up all those many awards. I hope that this is one of the happiest and most memorable days of your life." And Drickamer's pride as he describes the event and the gift of "his gang" shows that the comment was right on the mark.

Alumni News

Todd D. Porter, B.S. '76 (Biochemistry) received a Ph.D. in Pharmacology from UIC in '81. He was a postdoc at McArdle Laboratory for Cancer Research at the University of Wisconsin and an Assistant Professor in Biological Chemistry at the U. of Michigan. He is now an Associate Professor in the College of Pharmacy at the University of Kentucky. His research focuses on the cytochrome P450 system.

David S. Smith, B.S. '78 (Chemical Engineering) has been promoted to the position of Olefins Petrochemical Supply Chain Process Manager for Chevron Chemical Company's Olefins & Derivatives Division.

Todd K. Walker, B.S. '77 (Chemistry) is President and COO of Fairmount Chemical Co, Inc. in Newark, NJ. Fairmount is a specialty chemicel manufacturer concentrating in engineering plastic additives and imaging chemicals.

Yuen San Yee, MD, FACP, B.S. '78 (Chemistry) is a gastroenterologist/ hepatologist at Mountain View Medical Center in Bremerton, WA. He has been elected a Fellow of the American College of Physicians, the professional organization of internists. Dr. Yee is also a Clinical Assistant Professor in the Department of Internal Medicine, Division of Gastroenterology and Hepatology at the University of Washington.

'80s

Wendy Bedale, B.S. '87 (Chemistry) is a postdoctoral Fellow at Duke University in Durham NC.

Aleya Rahman Champlin, B.S. '87 (Biochemistry) is a petent attorney with the Pillsbury Company in Minneapolis. She earned a J.D. in '91 from the University of Minnesota.

Nancy Y. Chu, B.S. '89 (Biochemistry) is a patent attorney with Reed & Robins, LLP in Palo Alto, CA. She received a J.D. from UCLA in '95.

Patrick Collins, B.S. '81 (Chemical Engineering) is Product Support Manager (Greater China) with Motorola.

Alumni News continues on the next page

Alumni News

Chris Cramer, Ph.D. '88 (Chemistry with Denmark) was promoted to Associate Professor of Chemistry and Chemical Physics at the University of Minnesota. He was named an Alfred P. Sloan Research Fellow in '96-'98.

Kurt A. Gabbard, B.S. '85 (Chemical Engineering) was appointed Vice President of Finance and Operations at McCormick Theological Seminary in Chicago, IL. Mr. Gabbard earned an MBA at UIUC in '89.

Kira M. Glover, M.S. '88 (Chemistry) is a foreign service officer at the Foreign Service Institute in Arlington, VA. He has completed two years as Environmental Affairs Officer in New Delhi and is returning to Washington, D.C. to learn Russian. In Fall, '97 he expects to transfer to the American Consulate General in St. Petersburg, Russia.

Doram C. Janecek, B.S. '83 (Chemical Engineering) has taken a position as process engineer in the Chemical Catalyst Division with the Degussa Corporation in Calvert City, KY.

Frank Kitchel, B.S. '84 (Chemical Engineering) is Director of Marketing at EVAL Company of America in Libertyville, IL.

Keith Larson, B.S. '86 (Chemical Engineering) has been named Editor in Chief of *CONTROL Magazine*.

Thomas Lessaris, MD, B.S. '86 (Chemistry) has been named Director of the Emergency Room staff at Mason District Hospital. He received an M.D. degree from SIU at Carbondale and Springfield in '91. He served his residency at SIU in '95. He practices internal medicine and pediatrics.

Robert Mallin, B.S. '85 (Chemical Engineering) is a patent attorney with William, Brinks, Hofer, Gilson and Lione.

Edna Mennheim, Ph.D. '93 (Chemical Engineering with Alkire) is working for Intel in Jerusalem.

Thomas P. Moser, B.S. '81 (Chemical Engineering) is Technical Director of PGP Industries.

Alumni News continues on the next page

Hager's "Family" Celebrates His 70th Birthday

Lowell Hager

The Hager Event was celebrated with a day long symposium followed by a reception and banquet. Virtually all the talks at the symposium were by Hager's former students who gave credit to their mentor for his scientific wisdom and to his ability to pass it on to his students in and out of the laboratory.

The symposium was opened by Professor Emeritus **I.C. (Gunny) Gunsalus**. Hager was his first graduate student at Illinois. The first Chair of the symposium was **Paul Shaw**, Professor of Plant Pathology, University of Illinois, Hager's first postdoc. Other participants were **Jon Beckwith**, Professor of Microbiology and Molecular Genetics at Harvard, **David Morris**, Professor of Biochemistry, University of Washington, **Fred Brown**, V.P. and Director, TRW Space and Electronics Group, **Samir Deeb**, Research Professor of Medicine and Genetics, University of Washington, **Carol Cunningham**, Professor of Biochemistry, Bowman Gray Medical School of Wake Forest University, **Rick Theiler**, Worldwide Director, Mennen Global Technology, CP Mennen Company, **Paul Hollenberg**, Professor and Head, Department of Pharmacology, University of Michigan Medical School, **John Dawson**, Professor of Chemistry, University of South Carolina, **Rick Rutter**, Section Head, Process Support, Chemical Sciences Division, GD Searle, **Steven Blanke**, Assistant Professor of Biochemistry, University of Houston, **Michael Recny**, Director of Biochemical Sciences, Trimeris, Inc., and **William Rutter**, Chairman of the Board, Chiron Corporation.

William Rutter, Paul Hager

Professor Richard Gumport presided over the program at the evening banquet. Many of "Hager's Horribles", as his students were known informally, paid further tribute with emphasis on Hager's contributions outside of the lab. Hager was extensively roasted by students and colleagues alike especially for his athletic and musical prowess. Professor John Gerlt, Department Head, announced that Hager will be the inaugural holder of the William Rutter Chair, the first named Chair in the Biochemistry Department. Jon Beckwith, a former student, announced that, in addition, a Hager Fellowship will be established in the Department. As a fitting conclusion to a Hager celebration, the event ended the following morning with a golf tournament.

Vincent Massey, Susan Kingston, I.C. Guusalus

In Memoriam

George Austin, B.S. '36 (Chemical Engineering) has passed away. He was Professor of Chemical Engineering at Washington State University, serving as Department Chair for 22 years.

Robert Bannon, B.S. '50 (Chemical Engineering died in September, 1993. He had retired from Shell Oil Company in October, 1991 after more than 40 years of service.

Warren Childs, B.S. '40 (Chemical Engineering) died in April, 1996.

Herbert Corner, M.S. '31 (Chemistry) died in June, 1995. He was manager of beverage research at National Distillers from 1945-1974. A widely known expert in fermentation and distillation processes, Conner served as an adjunct professor of chemistry at Northern Kentucky University. After his retirement, he served on a number of projects with the International Executive Service Corps.

David Eggers, B.S. '43 (Chemistry), died in August, 1995. He received his Ph.D. from the University of Minnesota in 1947. He was professor of chemistry at the University of Washington until his retirement in 1990. He was internationally recognized for his expertise in infrared spectra species in the gas phase.

Helen C. Elder A.M. '29 (Chemistry) died in May, 1995.

Word has reached us of the death of **Gladys Fraser**, B.S. '20 (Chemistry).

Bernard S. Friedman, Ph.D. '36 (Chemistry with Adams) died in August, 1996. Dr. Friedman had been president of the ACS in 1974. He had worked for a number of chemical companies and retired from Sinclair Research Labs in 1969. After his retirement he became a professional lecturer at the University of Chicago from 1969-1973.

Belatedly, we have heard that **Arthur Hayford**, B.S. '20 (Chemical Engineering) died 12 years ago.

We have learned of the death of **William Hicks**, B.S. '45 (Chemical Engineering)

We have learned of the death of **Allene R. Jeanes**, Ph.D. '38 (Chemistry with Adams).

Word has reached us of the death of **Reinhold J. Krantz**, M.S. '39 (Chemistry).

Oscar E. Kurt, Ph.D. '30 (Chemistry with Phipps) died in August, 1995. He was founder and president of Kurt Scientific Counselors, Inc. of Royal Oak, Michigan.

Edward Onstott, Ph.D. 50 (Chemistry with Laitinen) passed awary in February, '95. He had a distinguished career at Los Alamos Natinal Labs.

Stanley Simonsou, Ph.D. '49 (Chemistry with Clark) died in August, 1996. At the time of his death, he was Emeritus Professor of Chemistry at the University of Texas. His research dealt with the crystal and molecular structures of inorganic and organic compounds by single X ray diffraction methods.

We have learned of the death of **Ruth Swinney**, A.M. '33 (Chemistry).

Arthur D.F. Toy, Ph.D. '42 (Chemistry with Audrieth) died in July, 1996. In 1981, Dr. Toy retired as director of research at Stauffer Chemical Co. He was also active in the ACS and served on a number of committees. He was a member of the American Association for the Advancement of Science.

Sinfelt receives NAS Award

John Sinfelt, Ph.D. '54 (Chemical Engineering with Drickamer) has received the National Academy of Science Award for the Industrial Applications of Science, which is given only once every three years. He was recognized "for his discovery of the principle of bimetaillic cluster catalysis and the consequent development of the catalyst widely used in making lead free gasolines." Dr. Sinfelt is senior scientific advisor, corporate research science laboratories, Exxon Research and Engineering Co. The award was established by IBM in honor of Ralph E. Gomory and has been given only twice previously.

John Sinfelt

Alumni News

Martin Pomper, Ph.D. '89 (Chemistry with Katzenellenbogen) is an Assistant Professor in Radiology at Johns Hopkins University, Division of Neurobiology, in Baltimore, MD. He received a Scholars Award from the Radiological Society of North America, '96-'98, to study functional imaging of the central nervous system.

Timothy Stephan, B.S. '82 (Chemical Engineering) was recently promoted to Area Manager in the Maintenance Department at the Anheuser Busch Brewery in Williamsburg, VA.

Rondo Turner, B.S. '88 (Chemical Engineering) is an instrument engineer at The Pritchard Corporation in Overland Park, KS.

Mark Ulrich, B.S. '80 (Chemical Engineering) has been appointed Business Manager at Air Liquide America Corporation in Houston, TX.

Saad Nemeh, Postdoc '84-'85 (Chemistry with Suslick) is at SCM Chemicals in Baltimore, MD, working on new TiO_2 products for the coating industry.

Scott Sommer, B.S. '81 (Chemical Engineering), Vice President of the Delta Group, has recently purchased the company along with two other individuals. He is completing an MBA at the University of Phoenix.

Mark Ulrich, B.S. '80 (Chemical Engineering) is business manager at Air Liquide America Corporation in Houston, TX.

Huey-Nan Wu (Lin), Ph.D. '87 (Biochemistry with Uhlenbeck) is an Associate Fellow at the Institute of Molecular Biology of the Academia Sinica in Nankang, TAIPEI.

Robert Yui, B.S. '80 (Chemical Engineering) has earned an MBA at the University of Texas in Dallas.

'90s

Nicole R. Bush, B.S. '92 (Biochemistry) was awarded a Doctor of Pharmacy degree from UIC in '96. She graduated valedictorian of her class. She is currently a pharmacy practice resident at Barnes Jewish Hospital in St. Louis, MO.

Alumni News continues on the next page

Alumni News

Laura Dovalovsky, B.S. '95 (Chemical Engineering) is an engineer with Air Liquide America Corp. in Countryside, IL.

Nicholas F. Fell, Jr., Ph.D. '93 (Chemistry with Bohn) is an NRC-ARL Research Associate in the Optics Branch of the US Army Research Lab in Adelphi, MD.

Mark Grinstaff, Ph.D. '92 (Chemistry with Suslick) is an Assistant Professor at Duke University in Durham, NC.

James W. Janetka, B.S. '90 (Biochemistry) is an IRTA Postdoctoral Fellow at NIH in Bethesda, MD. He has received a Ph.D. in organic chemistry from the University of Wisconsin in Madison.

Shifang Luo, Ph.D. '93, (Chemistry with Rauchfuss) is a postdoctoral fellow at Exxon R & E Company in Annandale, NJ.

Scott A. Reid, Ph.D. '90 (Chemistry with McDonald) is an Assistant Professor at Marquette University in Milwaukee, WI. He received an Arnold and Mabel Beckman Foundation Young Investigator Award in '96.

Dianne Roggy, B.S. '91 (Chemical Engineering) is production superintendent at Zeneca, Inc. in Bucks, AL.

David Schwartz, B.S. '92 (Chemical Engineering) is an Associate Attorney in the Corporate Department of Jenner & Block in Chicago.

Philip S. Tsai, B.S. '90 (Chemical Engineering) received his Ph.D. from California Institute of Technology in 1995.

Janet Vallejo, B.S. '90 (Chemical Engineering) is working in the Commercial Graphics Division of 3M in St. Paul, MN.

Michael V. Williamson, B.S. '95 (Chemical Engineering) is a Wafer Feb Process Engineer at Texas Instruments in Houston, TX. He would like to make contacts with Illinois Graduates in the Houston area. His address is 2602 Westerland, #A48, Houston, TX 77063.

Nathan Yee, Ph.D. '91 (Chemistry with Coates) won a Golden Achievement Award at Boehringer Ingelheim Pharmaceuticals, Inc. in Ridgefield, CT. The award was given in recognition for his research and development of a large scale asymmetric synthesis of a drug candidate.

To Honor "Speed" Marvel

Howard Hetzner

Dr. Howard Hetzner, B.A. (Chemistry) '36, was a great admirer of the legendary Professor Marvel. To perpetuate the Marvel legacy, Hetzner has established an endowment to support fellowships for graduate students who teach for two semesters and receive a stipend during the summer. Since the fellowship stipends currently run $2,000 per student, $40,000 is needed to endow each fellowship. Dr. Hetzner has committed himself to support three students annually with Carl S. Marvel Fellowships and hopes that other Marvel stalwarts will expand the program so that more students will be able to benefit.

As an undergraduate at Illinois, Hetzner had only a nodding acquaintance with Professor Marvel until his junior and senior years when he began taking courses with Marvel and was invited to work on an undergraduate research project in his laboratory. Hetzner was an outstanding student, with Phi Beta Kappa and Bronze Tablet standing but he was unable to synthesize the compound that Marvel had assigned to him. He described it as an experience composed in equal parts of fun and frustration but remembers that the techniques he learned in the Marvel Lab were very helpful for his graduate studies at the University of Michigan. He credits Marvel for continuing his studies. As he says, "Marvel persuaded me to go to grad school. Without his support, I would never have gone to the University of Michigan for a Ph.D."

At Michigan, Hetzner was a pioneer. He was one of the first three graduate fellowship students to be admitted from outside the Michigan Chemistry Department. He completed his M.S. in '37 and his Ph.D. in '39.

From Michigan he went to Chevron, then the Standard Oil Company of California, where he spent his professional life, with the exception of a short break occasioned by WWII. He retired in 1977 as Manager of the Product Engineering Department. As he explained, at Chevron, as at other petroleum companies, Product Engineering is an important function because it provides an interface among the research, manufacturing and marketing departments in maintaining current product quality and in developing new products.

Since his retirement, Hetzner has been active in community affairs. He has served as a founder and as a board member of a successful Savings and Loan company and on the board of the local Planned Parenthood organization. He has even found time to bring out his clarinet and is enjoying this long dormant hobby. During his four years as an undergraduate at the U. of I. he played in the Concert Band, at that time the only band at the U. of I. As he eases off from some of his other activities, he hopes to devote more time to the clarinet and regain his old skills.

Hetzner has rarely returned to the U. of I. since he left in 1936 but still has vivid memories of Marvel, not merely of his scientific and teaching accomplishments but also of his bird watching exploits, in some of which Hetzner participated, both in California and in Arizona. He is certain that he is not the only one who has a great admiration for Professor Marvel and hopes that some of his other admirers will step forward to add to the Carl S. Marvel Fellowship Fund and provide supplemental fellowships for additional chemistry graduate students.

Basolo Receives 1996 Willard Gibbs Medal

Fred Basolo

Fred Basolo, Ph.D. '43 (Chemistry with Bailar) is Morrison Professor of Chemistry, Emeritus, at Northwestern University and a former ACS president (1983). The Gibbs Medal will be given in recognition of his work on ligand substitution reactions of classical Werner metal complexes, and of transition metal organometallic compounds.

Professor Basolo joined Northwestern University in 1946 after several years at Rohm and Haas Chemical Co. In addition to his other positions, Basolo is editor-in-chief of *Chemtracts* and of *Comments on Inorganic Chemistry*.

In addition to the Gibbs Medal, Professor Basolo has won numerous other awards including the 1990 Harry and Carol Mosher Award, the 1991 Padova University Medal, and the 1992 ACS George C. Pimentel Award in Chemical Education. In 1996 he will be the first lecturer for the Royal Society of Chemistry's Joseph Chatt Lectures. He is a member of the National Academy of Sciences and the American Academy of Arts and Sciences.

The Hole

The last stages of construction of the new building. The hole being created in Professor Oldfield's laboratory will hold a large magnet.

Martinez is New Assistant Professor of Physical Chemistry

Todd Martinez

Todd Martinez is a theoretical physical chemist whose major interests are electronically excited states of molecules and the electronic structure of biochemical molecules. Electronic excitation is of fundamental importance in photochemistry and chemistry at high temperatures and/or pressures. Biochemical molecules have resisted detailed understanding at the electronic level because of their size and complexity. An interesting junction of these two interests is photobiological processes such as vision, photosynthesis, and the formation of vitamin D. Even so, we lack a detailed understanding of reaction mechanisms in most cases. Martinez hopes to elucidate reaction mechanisms which involve electronic excitation, spanning the range from small molecules in the gas phase to photobiology. Additionally, he will study reactivity in metalloenzymes where electronic effects can be crucial.

Martinez chose to come to Illinois because of its strong pioneering effort at the interface of physics, chemistry, and biology. He is excited to be a part of this effort to understand complicated biological problems at a level customarily only achieved for small molecules. He expects to see "explosive growth" in our understanding of biochemistry as a consequence of the application of rigorous physical chemistry methods to biology. He anticipates working with a number of colleagues both in Chemistry and at the Beckman Institute.

Martinez received his B.S. from Calvin College in '89 and his Ph.D. from UCLA in '94. He has just returned to this country after two years of postdoctoral studies at Hebrew University in Israel. He has already won a number of awards, including most recently, a Fullbright Fellowship and a President's Postdoctoral Fellowship from the University of California for his studies in Israel. During his graduate studies, he was a Patricia Roberts Harris Fellow and an NSF Research Assistant. He also won an "Excellence in Research" award, given to the best graduate students in the UCLA Department of Chemistry.

Martinez is very pleased with his choice of the University of Illinois. He is especially impressed with the support of new faculty that he noted in his interviews. Even before unpacking his boxes, he is writing proposals and to attract a research group and hopes to have one in place before too long.

Exceptional Student Awards

Chris Bielawski Won Pfizer Undergraduate Research Fellowship

Pfizer is highly selective in awarding undergraduate fellowships following a national competition. Selected schools can nominate one or two candidates on the basis of the excellence of their research proposals. Chris started an undergraduate thesis project last Spring in the research laboratory of Professor Jeff Moore. With Moore's help Chris wrote a proposal last Spring and was awarded one of the coveted Pfizer fellowships for the summer.

Chris is building host receptors, molecules that bind either in one site or in several sites with isophthalic acid, and he will measure the strength of the binding. The project is expected to require about 4 semesters of hard work. Chris is the only undergraduate student in the lab and is well accepted by the group.

The project is a lot of work, but Chris enjoys it. He reports that he has learned facets of chemistry that he does not get in his classes. As he put it, in a classroom everything is laid out for you; but in a research lab you are responsible for all phases, coming up with an idea of what to do and then figuring out how to do it. "It's really exciting when the project works out and the data starts to come in."

Now that he has become excited by chemistry, Chris hopes to continue to a graduate program. He likes the graduate program here, but thinks he should get another perspective by going elsewhere and is seriously considering Cal Tech and Berkeley. With this summer's experience, he feels confident that he has had a good pre-grad education and will not suffer the first year shock that seems to be common among incoming graduate students.

Chris Bielawski

The fellowship has amply fulfilled the hopes of the Group Director of the Pfizer New Lead Discovery and Development department. As he put it, "We at Pfizer hope this award will enable you to strengthen your interest and skills in science and to share the satisfaction that comes from asking and answering difficult questions...We trust your summer will be a great one." And so it was.

Margaret Hricko Won First DuPont Plunkett Student Award

The biannual DuPont Plunkett Student Award was established in 1994 for "Innovation with TEFLON®." Margaret, then a student at the University of Scranton, won the award the first time it was offered, for her concept of a metallized form of TEFLON® fluoropolymer resin that shields sensitive, expensive equipment from electromagnetic interference. Her chemistry instructor, with whom she had done undergraduate research, had suggested that she apply and that she strengthen her application with a prototype, a piece of copper plated TEFLON®, demonstrating the feasibility of her proposal.

Margaret Hricko

The award gave her valuable experience at the DuPont Experimental Station, where she worked for two summers and benefited not just from getting a foot in the door at the company, but also from a variety of practical experiences, many interesting contacts and a wider view of career options. Before her work at DuPont, when her experience had been limited to a college environment, she was convinced that her career would be in academia. Now she isn't so sure. As she says, "As a result of working at DuPont, I have a much better understanding of the benefits of industrial research and of the incredible resources within the corporate scientific community." Work in industry has become a viable career path.

Before she left Scranton, Margaret also won a Fulbright scholarship for a year's study in Spain at the University of Oviedo where she worked on a research project involving organometallic synthesis. She also improved her laboratory skills and is quite certain that the experience and knowledge base that she gained at DuPont and in Spain helped smooth her first year in our graduate program. She is doing well at the University of Illinois but thinks it would have been difficult to cope with the challenges of a big institution without the knowledge base, familiarity with scientific techniques, interactions with scientists and practical experience that she gained from the Plunkett and Fulbright Awards.

Graduate Student Received Numerous Teaching Awards

Aravind Immaneni, a doctoral candidate working with Professor Anthony McHugh in Chemical Engineering, has received recognition at the school, college and campus level for excellence in undergraduate instruction. He received his B-Tech in Chemical Engineering from IIT-Madras, India, in 1992. Already during his first two years in the graduate program, he received the School of Chemical Science Outstanding Teaching Assistant Award for excellence in Undergraduate Instruction. In 1996 he received the Award for Excellence in Undergraduate Teaching from the College of Liberal Arts and Sciences, the sole winner from the chemical sciences. In addition, he was a finalist for the Harriet and Charles Luckman Undergraduate Distinguished Teaching Award, given to outstanding teaching assistants throughout the campus.

Aravind Immaneni

He modestly says, "Teaching was my job and I just did the best job I could" but he also adds, "I have a love of teaching." His students' reviews demonstrate his outstanding success as a teacher. For instance, he developed a new series of review programs in which he distilled several weeks of work into nuggets on which his students could focus. He is known to be always available to his students and interested in their problems. His goal was to be the best teaching assistant and he seems to have succeeded. As one of his nominators wrote, "Aravind is one of the best TAs I have had in Chemical Engineering."

When he is not teaching, he studies the conformational properties of polymers under flow, using novel optical techniques. He hopes to finish his doctorate in May '97 and is looking for a challenging industrial position in research and development.

Gin Joins Organic Chemistry Faculty

David Gin

David Gin comes with ambitious plans. He is planning to build a strong organic synthesis program, focusing on complex natural products that are important to biological systems and extending these efforts to investigating related problems in biology and human medicine. At the core of this research program is the development of new synthetic strategies guided by both the understanding and the study of chemical reactivity and mechanism. From this target-oriented approach toward organic synthesis, several avenues of research can merge, including: (1) exploration of new synthetic methods, (2) investigation into mechanisms of biological activity, and (3) preparation of non-natural analogs for chemotherapeutic purposes or for use as biochemical probes.

One of the reasons that Gin chose the University of Illinois is because his work will complement that of other members of the department including Professor Rinehart, whose focus is on the isolation and identification of natural products. Also, Gin reports that he was very impressed with the camaraderie that he found in the chemistry department in general and especially in the organic group. He received a warm welcome and is looking forward to working with his new colleagues.

In addition, he appreciates the superlative facilities and services of the School, even compared with those in schools which he has known from the past. He finds that our facilities and services are managed efficiently and expects this infrastructure to facilitate his research.

Gin completed his undergraduate studies at the University of British Columbia where he received his B.Sc. in 1989. In 1993 he received a Ph.D. from Caltech and from 1994-1996 he completed postdoctoral studies at Harvard University. Along the way, he collected a number of significant awards beginning in 1989 with the Lefevre Medal and Prize in Honors Chemistry from the University of British Columbia, given to the best chemistry student at the University during that year. The Canadian National Science and Engineering Research Council (NSERC) awarded him a predoctoral Scholarship to study at Caltech, for '89-'93. The Scholarship is awarded by the Canadian government, and, with very few exceptions, must be utilized within that country. However, Gin demonstrated that he deserved the special honor by receiving the Herbert N. McKoy Thesis Award at Caltech in 1994 for the top chemistry thesis in that year. Finally, he was awarded another NSERC fellowship for postdoctoral studies at Harvard.

With his outstanding record, we are delighted to welcome David Gin to our chemistry department, and he is convinced that he made a good choice by coming to Illinois. As he says, "It's a great privilege to be here."

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.

Matching gifts from your company multiply your dollars. If your company has a matching gift plan, please include a form from your company along with your contribution.

Remember — your contributions make a GREAT difference!

Mark the appropriate box. If sending a check, please make it out to UIF/(fund name). A preaddressed envelope is enclosed for your convenience.

- ☐ *School Facilities Fund:* Upgrades infrastructure, such as the chemistry library, machine and electronic shops, NMR, micro analytical, and mass spectrometry laboratories.
- ☐ *Carter Fellowship Fund:* Supports the first named fellowship in Biochemistry.
- ☐ *Roger Adams Fund:* Supports the Roger Adams Professorship and funds teaching awards, relocation allowances, and undergraduate scholarships.
- ☐ *Marvel Fellowship Fund:* Supports fellowships for graduate students.
- ☐ *The ChE2000 Fund:* Supports educational enhancement in Chemical Engineering.
- ☐ *The Chemical Engineering Annual Fund:* Provides seed money, instructional and research support.
- ☐ *Unrestricted Fund/Chemistry:* Provides start-up funds for new faculty and for other vital needs.
- ☐ *Unrestricted Fund/Biochemistry:* Provides start-up funds for new faculty and for other vital needs.
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Faculty Honors

Jiri Jonas, Professor of Chemistry and Director of the Beckman Institute for Advanced Science and Technology, has been made a permanent member of the U. of I. Center for Advanced Study, the highest honor that the campus can bestow.

Richard Alkire, Professor of Chemical Engineering and Vice Chancellor for Research, has received the 1996 Edward Goodrich Acheson Award and Prize, the highest honor given by the Electrochemical Society.

Charles Zukoski, Professor of Chemical Engineering and Department Head, has received the Ralph K. Iler Award in the Chemistry of Colloidal Materials. The award is sponsored by E.I. du Pont de Nemours & Company. Professor Zukoski is the first chemical engineer to have received the award.

Charles Slichter, Professor of Physics and Chemistry, received the 1996 Oliver E. Buckley Condensed Matter Prize given by the American Physical Society.

Nancy Makri, Professor of Chemistry, has been selected for the 1995 Annual Medal of the International Academy of Quantum Molecular Science. She was recognized for the development of techniques to address the quantum dynamics of dissipative systems.

Nelson Leonard, Professor Emeritus of Chemistry, has been elected to the American Philosophical Society.

Kenneth Rinehart, Professor of Chemistry has received the Ernest Guenther Award in the Chemistry of Natural Products.

Cheng-Ming Chiang, Professor of Biochemistry, has been named a 1996 Pew Scholar in Biomedial Sciences. The Pew Scholars Program in Biomedial Sciences supports young investigators of outstanding promise in basic and clinical sciences relevant to human health.

Jeffrey Moore, Professor of Chemistry, has received an Arthur C. Cope Scholar Award of the ACS.

Steven Zimmerman, Professor of Chemistry, received an Arthur C. Cope Scholar Award

Jonathan Sweedler, Professor of Chemistry, received a Camille Dreyfus Teacher-Scholar Award for 1996.

Theodore Brown, Emeritus Professor of Chemistry, has been appointed to the ACS Governing Board for Publishing. This board will govern the Chemical Abstracts Service and the ACS Publications Division.

Yi Lu, Professor of Chemistry, has received a Beckman Young Investigator Award from the Arnold and Mabel Beckman Foundation.

Ana Jonas, Professor of Biochemistry, has been invited to present the 1996 George Lyman Duff Memorial Lecture at the American Heart Association's 69th Scientific Sessions.

James Lisy, Professor of Chemistry, has received a Fellowship from the Japan Society for the Promotion of Science.

Andrzej Wieckowski, Professor of Chemistry, was invited to give a Department Colloquium and the 9th Annual Procter & Gamble Lecture at the University of Cincinnati.

Waiting For Class at 100 Noyes Lab

Dedication Postponed to April 25

It will happen, just later than originally planned. We want you to come see our new building after the move has been completed and the labs are humming.

The opening ceremonies will begin early in the morning. University administrators and state representatives will cut the ribbon and address the audience. Tours of the building will be followed by a reception at the Krannert Center for the Performing Arts.

We hope that informal tours of other chemistry buildings can be arranged so that you will be able to visit your favorite haunts and see the changes that have occurred since your last visit. For further information, please call Dave Johnson in the LAS development office at 217-333-7108.

Play Ball, It's Friday

On Friday evenings, a group of chemistry graduate students, usually hard at work in lab and classroom, change "their spots" and turn into the Biohazard baseball team. They have played for more than five years but, previously, under a different name. They became the Biohazards this year because they liked the symbol which decorates their T-shirts.

Over the years they have played in a number of different leagues, usually with unspectacular results. This year, they sought a league in which they could shine and settled on T.K. Wendel, a bar at the edge of Urbana where they finished #4. According to Chad Elmore, team captain, "We did a lot better this year than in the past." As the photos show, the team seems laid back and having fun, the right remedy for a week of pressure.

The team from left to right are Andy Scribner, Marc Skaddan, Dan Pippel, Mike Curtis, Mike Koscho, Todd Spradau, Rich Cesati, Eric Hostetler, Chad Elmore, Chris Gross.

Below from left to right: Todd as catcher; Dan Pillel coaching at first base; Todd being put out.

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