

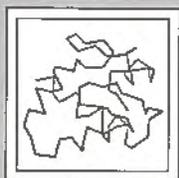
School

Fall 1991

of Chemical Sciences

University of Illinois
at Urbana-Champaign

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"Folkers was a pioneer in medicinal chemistry and nutritional biochemistry."
Citation excerpt, U. of I. Alumni Achievement Award, May, 1986

"For his discoveries and leadership in combining basic chemical research and clinical medicine to achieve new treatments of diseases which have enhanced the quality of life and extended survival rates for countless people."

Citation, President's National Medal of Science, 1990

For almost 60 years Karl Folkers, B.S. with Honors, 1928, has conducted research on the role of vitamins in the treatment of disease. At 85 years of age, when others have long since retired professionally, Folkers still works full time to support and guide his research group, and to persuade the FDA, the medical profession, and the media that vitamins have significant therapeutic value in the treatment of disease. The public-at-large unknowingly believes that vitamin supplements are not necessary when people eat a "nutritionally balanced diet." Folkers believes that there is no proof of this popular belief. His research on Vitamin B₆ and B₁₂, and especially his work on Vitamin Q₁₀ (CoQ₁₀), demonstrates that these have important therapeutic value and should be utilized as supplements for the treatment of disease.

His former colleague, Dr. Emile Bliznakov, describes Folkers as "the true 'father' of CoQ₁₀ research in the United States, Europe, and Japan." CoQ₁₀ is an indispensable vitamin that affects the body's entire bioenergetics system. Folkers has concluded that a deficiency of CoQ₁₀ is an important contributory and dominant molecular cause of heart failure, today's #1 fatal disease.

Although the concept that vitamin deficiencies cause disease is not new, such deficiency has rarely been associated with a widespread disease, like heart failure. For instance, berri berri is associated with a deficiency of vitamin B₁, scurvy with vitamin C and pernicious anemia with vitamin B₁₂. During his 28 years at Merck, Folkers and his coworkers were the first to elucidate the structure of vitamin B₆ and to isolate and characterize crystalline vitamin B₁₂. B₁₂ was a very important



Karl Folkers receiving the Medal of Science from President Bush

achievement although it does not have the significance of his research on CoQ₁₀, because of the relative infrequency of pernicious anemia compared with cardiac failure.

Since 1973, Karl Folkers has been the Ashbel Smith Professor of Chemistry at the University of Texas at Austin and Director of the Institute for Biomedical Research. Since last spring, he has been President of the Karl Folkers Foundation for Biomedical and Clinical Research, which was recently established to support further research with funds from royalties and donations. All of these might be considered "post retirement" positions, after he had retired from Merck & Co. in 1963 and from the Stanford Research Institute in 1968.

continued on page 2

Early Years

Folkers began his career as a pure organic chemist, having become interested in chemistry in high school. One thing he learned early was that in order to become a chemist, you had to go to college. So he went. He attended the University of Illinois because he had grown up in Decatur, and the U. of I. was nearby. At Illinois he worked hard. "You weren't there to fool around but to do your best." He was fortunate to benefit from two tremendous teachers, "Speed" Marvel and "Jack" Johnson. He described Marvel as "the dominant teacher in my life, who also had enormous goodwill for students and influenced their lives long after they left the university."

To help meet expenses, he held a variety of jobs. As a freshman, he washed dishes in a "greasy spoon" restaurant and earned one meal for each hour of dishwashing. As a sophomore, he waited on tables in a fraternity. In his junior and senior years, he worked nights in the chemistry library as an assistant to the legendary librarian, Sally Sparks.

He attended Wisconsin for graduate studies because Speed Marvel recommended him to Homer Adkins and "I never questioned his suggestions." Folkers was still an organic chemist and received his Ph.D. in 1931 for work on hydrogenation of compounds. His big success occurred on a Sunday. He had arrived at the lab between 8 and 9, charged up the bomb with an ester and a brand new catalyst, turned on the hydrogen and gone to church. He returned to find that the pressure had dropped exactly the calculated amount. The keynote of his thesis was the discovery of a new catalyst that could convert esters to alcohols.

As a postdoctoral associate at Yale, he worked with Professor Treat B. Johnson, who suggested that he use his chemical background to work on disease-related problems. "I took to it like a duck to water," was Folkers's recollection. After three years at Yale, he was offered two excellent positions, one at General Electric to work on polymer chemistry and one at Merck for research on pharmaceuticals in a new Laboratory for Pure Research. "It was an easy decision," Folkers said.

During his 28 years at Merck, Folkers ascended the corporate ladder and retired in 1963 as Vice-President for Exploratory

Research. He worked on a whole series of vitamins, steroids and antibiotics, and helped make Merck a leader in the manufacture of natural products.

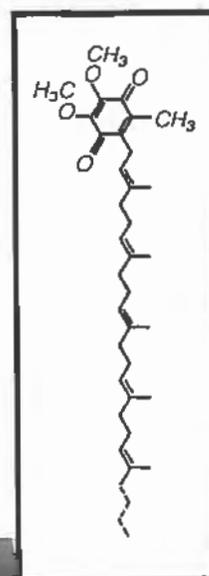
Research on CoQ₁₀ began in 1957 after its accidental discovery at the University of Wisconsin. Folkers continued the CoQ₁₀ research at Merck, and subsequently, at Stanford and at the University of Texas, for a total of 34 years.

Post "Retirement" Posts

His five years at the Stanford Research Institute were rewarding. He enjoyed the opportunity to be president of several thousand people working in a variety of fields including engineering and physics in addition to chemistry. He lived a double life. In the daytime, he worked on administrative matters in the president's office. At night and during weekends, he continued his work on CoQ₁₀ with about 25 postdocs.

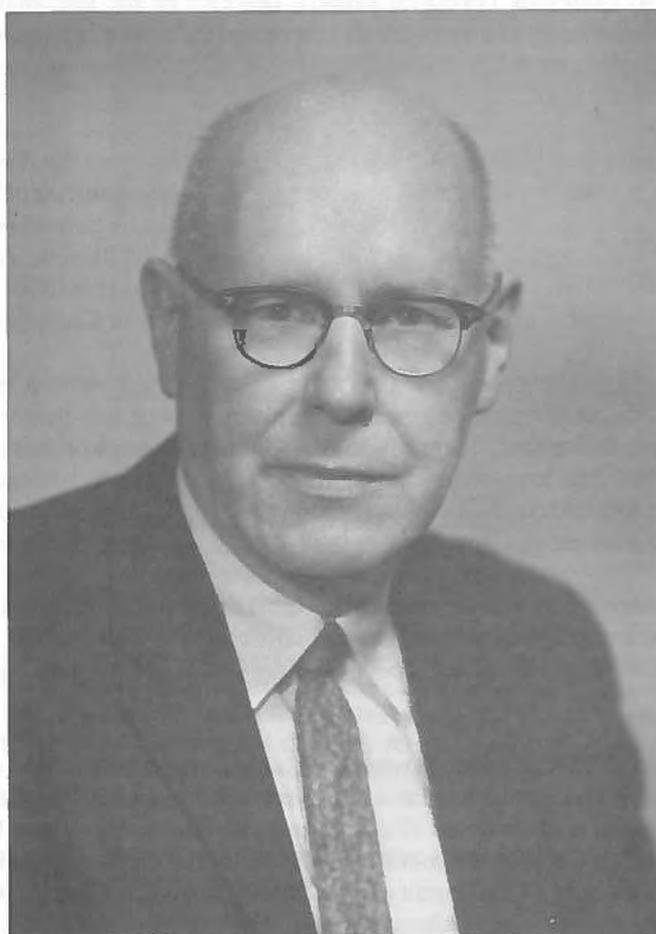
Dr. William Shive, then head of the Chemistry Department at the University of Texas at Austin had been urging Folkers to come to Texas ever since he heard that he was leaving Merck. The position remained open after Folkers went to Stanford. In 1968 Folkers was persuaded to make the final move. As an incentive, the President of the University of Texas had offered to establish an institute for Folkers. A luncheon at a local restaurant, the Night Hawk, gave birth to the name, the Institute for Biomedical Research, and Folkers has been its director ever since.

Over the years, Folkers's work has attracted increasing attention and recognition. He has been a member of the National Academy of Sciences since 1948. He has received five honorary degrees including a D.Sc. from the University of Illinois in 1973 and an M.D. from the University of Bologna, Italy, in 1990. Among his more prestigious awards are the Perkin Medal of the Society of Chemical Industry in 1960, and the Priestley Medal in 1986. He was the first recipient of the Robert A. Welch International Award and Medal for Research on Life Processes in 1972. In 1986 the U. of I. awarded him an Alumni Achievement Award to thank him "for a lifetime of work that has benefited the health of millions."



Ubichinone ▶





John C. Bailar, Jr.

MAY 27, 1904 – OCTOBER 17, 1991

A memorial service will be held on December 14, 1991 at 2 p.m. at the McKinley Foundation, 809 S. 5th Street, Champaign, IL 61801.

In lieu of flowers, the family has requested that memorial contributions be sent to the John and Florence Bailar Fund. Checks should be sent to the University of Illinois Foundation, 1401 West Green Street, Urbana, IL 61801.

It is with a great sense of loss that we record the passing of one of our most beloved emeritus professors, John C. Bailar, Jr. According to Professor Theodore Brown, Director of the Beckman Institute at the University of Illinois, "Professor John C. Bailar has had an extremely important influence on the development of coordination chemistry in the United States. He, more than any other single person, was responsible for the advancement of inorganic chemistry in this country."

He was co-founder and chairman of the Division of Inorganic Chemistry of the American Chemical Society 1957-58, as well as President of the American Chemical Society, 1959. He was author of *The Chemistry of Coordination Compounds*, 1956 and Editor of *Inorganic Syntheses*, Volume IV, 1953, a series he helped establish. From 1941-1967 he was Head of the Division of Inorganic Chemistry at the University of Illinois. A highlight of his career was to receive the only Werner Gold Medal ever awarded, on the occasion of the 100th anniversary of the birth of the Swiss chemist, Alfred Werner, the recognized "Father of Coordination Chemistry."

Despite his accomplishments as a researcher, Professor Bailar's first love was teaching and working with students. At Illinois he did both, as director of general chemistry and of the student placement program. In describing the role of the teacher, Bailar said, "I agree with the Greek philosopher that the mind is not a vessel to be filled, but a pyre to be lit." His love of teaching was communicated to his students, a very large fraction of whom went into academia. Of the 90 chemists who received their Ph.D. degrees under Bailar's supervision, three became president of the American Chemical Society.

A colleague described Professor Bailar as someone who "had a way of bringing out the best in each of the students who came his way. John was a patient man, but demanded in the end that the result was one of high quality. He always looked to educating the students beyond mere chemistry. He was concerned that the whole person be educated."

Professor Bailar was born in Golden, Colorado where his father was a chemist and professor at the Colorado School of Mines. Chemistry came naturally to him and he received both his BS and MA degrees in chemistry from the University of Colorado. Bailar took his Ph.D. in organic chemistry under Moses Gomberg at the University of Michigan in 1928. Despite offers from industry he chose the University of Illinois where he would have an opportunity to teach. He joined the faculty in 1928 and stayed at Illinois long after his retirement in 1972. The only noticeable difference was that after retirement he spent seven hours daily in his office instead of twelve.

His work has received significant recognition world wide. Among his awards were the Priestley Medal of the American Chemical Society in 1964, the American Chemical Society Award in Chemical Education 1961, and the American Chemical Society Award for Distinguished Service in the Advancement of Inorganic Chemistry, 1972. He was the first University of Illinois Professor to receive the Frank P. Dwyer Medal of the Chemical Society of New South Wales in 1965 and the J. Heyrovsky Medal of the Czechoslovakian Academy of Science in 1978. He received honorary doctoral degrees from the University of Buffalo and the University of Colorado, both in 1959, from Lehigh University in 1973 and from Monmouth College in 1983.

Additional publications of which Professor Bailar was author/editor include *Chemistry* with several of his students, 1978 and 1984, *University Chemistry* with T. Moeller and J. Kleinberg, 1965, *General Chemistry for Colleges* with B.S. Hopkins, 1956, *Essentials of General Chemistry* with B.S. Hopkins, 1946, and nearly 300 research papers.

On the occasion of his retirement, Bailar's students and colleagues established the Bailar Lecture and Gold Medal at the University of Illinois. Among the distinguished speakers in this lecture series have been Nobel Laureate Henry Taube, Fred Basolo, Richard Holm, Earl Muetterties, George Parshall, Daryle Busch, Harry Gray, Robert Bergman, Jack Halpern, John Corbett, Larry Dahl, and Fred Hawthorne.

During his 80th birthday symposium, one of the speakers commented, "Only those who have worked closely with John Bailar over many years can fully appreciate his spirit of dedication that has inspired several generations of younger scientists. His impact on the chemical community is clear to all." Bailar's response at the end of the symposium was, "You have to think young," and he added, "I go along with Robert Browning, who said, 'The best is yet to be.'"

Zumdahl Appointed Associate Head of Chemistry Department



Steven Zumdahl

Last year, Professor Steven Zumdahl, director of general chemistry and chairman of the committee on courses and curricula, directed an extensive review of the entire undergraduate chemistry curriculum. It is expected that the review will result in an enrichment and updating of the curriculum, especially in the areas of synthesis and spectroscopy. Professor Zumdahl will oversee this effort in his new position as associate head of the chemistry department.

According to Professor Gary Schuster, head of the chemistry department, "This position will carry major responsibility and will demonstrate once again the emphasis on excellence in undergraduate education in chemical science at the University of Illinois." In the future, Professor Zumdahl will oversee not just the general chemistry courses but the entire undergraduate curriculum, working closely with faculty in the program areas.

Discussing his new responsibilities, Professor Zumdahl commented on chemistry education at Illinois and nationwide, as follows:

*I am pleased that, in contrast to data showing declining interest in chemistry by undergraduate students across the country, our undergraduate program has never been healthier. A recent article in *Chemical and Engineering News*, May 20, 1991, indicated that the UIUC is the only major producer of BS chemists to show an increase in the number of graduating chemistry majors over the last five years. In addition to the encouraging numbers, our graduates are very high quality.*

Although our undergraduate program is healthy, it is not without problems. Our labs are generally crowded and out of date. As additional space becomes available, we need to secure funds to remodel our facilities for undergraduate instruction.

Even in the face of budget difficulties, our undergraduate program continues to be innovative and effective. We hope to do even better in the coming years.

Last Year Illinois Added Four Faculty and Record Number of Graduates



Scenes from May, 1991 graduation ceremonies



In a concert hall of the Krannert Center, one block from 100 Noyes Lab, with comfortable seats for all graduating undergraduates and their visitors, Professor of Chemistry Eric Jacobsen congratulated the new graduates "because it is harder now to get a degree than ever before." Yet, at the University of Illinois an impressive number achieved that milestone. The number of chemical engineering and chemistry BS graduates in ACS approved curricula was higher than any year since 1985/86, and so was the number of Ph.D.s in chemistry, despite the nationwide trends reflecting lowering enrollments in the hard sciences.

Incomplete salary data suggest that our graduates are still greatly in demand. Reported average salary offers for Illinois graduates have risen in virtually all categories despite the overall slowdown in the economy. The number of reported offers has increased substantially especially among those receiving their BS degrees. More than twice as many different companies hired at least one chemical sciences student compared with the year before.

The high quality of our students is reflected in some of the national awards received. For example, **Scott Stevens**, one of this year's graduating undergraduates, received research support from the NSF last summer. His senior thesis research was supported by a Colgate-Palmolive Fellowship and he was co-recipient of the Thomas O. Sidebottom Award for the best senior thesis in biochemistry.

David Selinger, graduate student of Biochemistry Professor Jo Ann Wise, received a Monsanto Fellowship to support his work in Cell and Molecular Biology. Dave was also selected as a speaker at a Yeast Genetics and Molecular Biology meeting, and his trip was funded in part by the Genetics Society of America. **Consuelo Alvarez**, a graduate student in the Department of Biochemistry, has been supported by a Fulbright Fellowship.

Where Do You Work? What Do You Do?

At present, we have the answer to that question for only a select few. We need it for everyone in order to update our database.

So, **PLEASE** take a moment to tell us. A return reply envelope is enclosed. You can use the **KEEP IN TOUCH** section of the newsletter or write us a note.

Wolynes Elected to National Academy of Sciences for Ground Breaking Theoretical Work

In the various lines of research that comprise his work, Peter G. Wolynes, professor of chemistry, likes to be in at the beginning, rather than in the end game. One of his great satisfactions is seeing others get interested in and develop a line of research that he initiated. He recalls that when he started working on a new statistical approach to protein folding, his first paper in 1987 elicited the comment, "Now this is really mickey mouse." Two years later, this paper is already being referenced more than 10 times per year and has spawned a new community of scholars using his ideas to study both the motions and evolution of proteins.

Wolynes's interest in physical chemistry began with a book from the Museum of Science and Industry in Chicago about chemical thermodynamics. Thermodynamics raised but did not answer such questions as: How do molecules reach up to and cross chemical barriers? How does a solvent affect a chemical reaction? Under what circumstances do molecules cross over a chemical barrier and when do they tunnel through? Why does a chemical reaction take so long when the movement of molecules taking part in the reaction is so fast? He remembers puzzling about these things during summers at the beach on Lake Michigan.

This line of questions led Wolynes to examine the relation between the rate of a chemical reaction and the viscosity of a fluid. If the molecules move rapidly across the barrier, viscosity apparently has no effect. If the molecules move slowly across, the rate and viscosity seem to vary inversely. Why, in some situations, do the viscosity and rate of reaction vary together? The transition state of reactions in liquids is still not fully understood, but the efforts, both experimental and theoretical, motivated by his early work, have greatly enhanced the level of debate.

His study of chemical reactions in liquids led to his interest in the formation of glasses. Glasses present an interesting form of chemical dynamics because the changes in glass are incredibly slow compared with the vibrational movement of molecules which take part in the transformation. In glasses the system is trapped in a local minimum energy configuration. There are many unsolved questions about the dynamics of motion in glasses but the approaches taken by Wolynes and coworkers are stimulating new experiments.

Biological reactions have been especially interesting to Wolynes because they are relatively fast and there is a closer fit between the time scales of the environment and the reaction. His work on reaction dynamics contributed to understanding electron transfer and

other processes like the binding of ligands to hemoglobin. The study of glasses, however, logically led him to the protein folding problem. The problem was to predict the structure of proteins from their folding sequences which are the consequence of intermolecular forces. Computer simulations did not provide insight into folding because of the limitations of computer time. With today's fastest computers, a protein's motions can be simulated for up to a nanosecond whereas the folding process in the test tube requires at least milliseconds. Thus, simulations always led to trapping in a local minimum, like a glass. It was necessary to find a "folding code" to speed up the process.

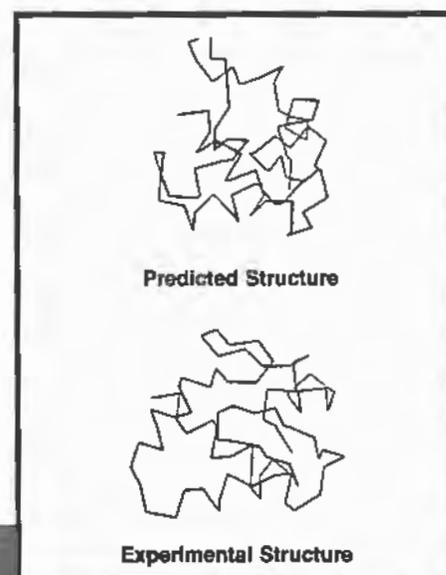
Experimental studies of proteins suggest that the code is very degenerate and robust. Many errors can be made in a sequence pattern without affecting the final structure. This suggests an analogy to brains and neural networks where very fuzzy patterns can be recognized. Wolynes proposed that the determination of energy functions describing the folding code of proteins could be found via a strategy like that used in neural biology where perceived patterns reinforce certain interactions between neurons and weaken others. The new models are schematic but contain enough elements of reality that for some systems the protein folding process as simulated by the Cray computers can now be carried out within the nanosecond range.

The goal of the work, not yet achieved, is to reliably determine the structure of any protein from its sequences alone. But in its current form, one gets insight into how proteins themselves can carry out this daunting computational task. The work may have practical benefits as well. Protein structure prediction from sequence is important in any design and

in realizing the potential of the human genome project. Defects in the folding process have been implicated in a variety of diseases, including Alzheimers and diseases caused by prions, such as "Mad Cow" disease in Britain.

One common element in these three types of problems is that they all revolve around slow processes. Faster processes, experimentally the hardest to study, are more easily understood theoretically. For glasses, the ultimate state is still unknown. It might turn out to be a crystal or an aperiodic structure. Again, in the study of proteins, the problem is that the long time process of folding must be inferred from fast processes like conformational transitions, which are the only ones that can be studied with a computer.

Although Wolynes maintains his wide variety of interests in basic problems of chemical dynamics, he is very enthusiastic about his work on folding. "One advantage of working on protein folding is that there is a clear standard of performance," Wolynes says. "When



▲ Figure 1a.

▲ Wolynes, right, demonstrates a point to Zan Schulten, left and Richard Goldstein, center.



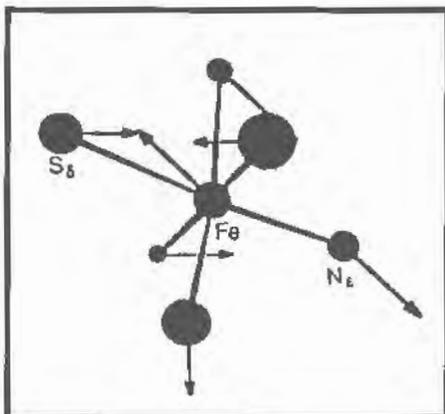


Figure 1b. One tunneling path around a heme center obtained from quenching

molecular biologists run your programs to calculate structures, you have achieved a standard for having solved it, at least in the engineering sense. This is probably the most exciting problem I've worked on," he added. "I really want to know the answer but the main point is that I get a lot of fun out of the entire process of doing the work."

Figure 1a shows the comparison of a cytochrome's predicted structure compared with the experimental result. This protein has only 27% sequence homology with other proteins in the structural database and thus lies in the "Twilight Zone" where standard protein structure predictions fail. This work is the result of a collaboration of Wolynes, Z. Schulten and Richard Goldstein, all here at the U.I.U.C. Figure 1b shows the quantum tunneling motion of the active site of a cytochrome molecule, undergoing an electron transfer reaction. This is the result of a collaboration of C. Zheng at Northern Illinois University, J. McCammon at the University of Houston, and Wolynes.

Wolynes's theories and models have helped create several communities of scientists interested in frontier problems of science. He works closely with colleagues here and elsewhere including three visiting faculty members, three postdoctoral associates, six graduate and two undergraduate students in his lab at the theory center.

In addition to his election to the National Academy in May, 1991, Wolynes has received numerous other honors. He is a fellow of the American Academy of Arts and Sciences and a permanent member of the Center for Advanced Study at the University of Illinois. In 1986 he received the ACS award in Pure Chemistry, and in 1988 the Fresenius Award of Phi Lambda Upsilon. In 1988 he was awarded a D.Sc. (hon.) by Indiana University, his Alma Mater. Yet his many contributions were made in just 15 years since he received his Ph.D. For the School of Chemical Sciences at the University of Illinois, his work demonstrates that the "golden age" of chemistry is not confined to the past.

Former Students Establish Scholarships to Recognize Harold Snyder

To his students, Harold Snyder was not only one of the four top chemists of the Golden Age, along with Adams, Marvel, and Fuson, but also a tremendous teacher who always "took the extra step" for his thesis students and helped them throughout their careers. For many years, the Snyder group met at the annual Fall ACS meetings for a dinner and an evening of reminiscences.

About two years ago, Dr. Wyvona Lane, one of the Snyder student group, sent a check to the U. of I. for the "Snyder Fund" and discovered that none existed. She decided to remedy this oversight. With the help of Dr. Robert Jones, a fellow Snyder student and chairman of this campaign, the group has raised over \$50,000, almost \$100,000 including pledges, for an endowment to fund future "Snyder Scholars."

The purpose of the endowment is to support undergraduate students with an interest in organic chemistry for a semester of research with a faculty member at the U. of I. Each student will receive a stipend and the endowment will cover laboratory expenses in addition. The purpose of the scholarship is to provide extra stimulation for young students so that the potential chemists will gain an appreciation of the challenges and satisfactions of scientific research and will continue their studies as graduate students. The first Snyder Scholar was selected last summer and spent a semester working with Professor John Shapley on the organometallic chemistry of C_{60} (see back page for additional information).

Professor Snyder was a classical organic chemist who has made important scientific contributions in the fields of amino acid synthesis, reactions of amines and quaternary ammonium salts, synthetic applications of polyphosphoric acid, indole chemistry, polymerization, the Diels Alder reaction, the Mannich reaction, the synthesis and study of new heteroaromatic systems, organoboron compounds and natural products.

Snyder was born in Mt. Carmel, Illinois and took his B.S. in chemistry at the U. of I. in 1931. After completing his Ph.D. at Cornell University in 1935 he spent a year at the Solvay Process Company. The letter from Roger Adams

inviting Snyder to Illinois said, in part, "I have just learned through Dr. Fuson that you have decided to give up industrial work and to look for an academic position. It seems likely that I shall have a post-Ph.D. Research Assistantship for the year 1936-37 which carries a stipend of \$2,000. The incumbent must work for eleven months and is not supposed to take advantage of the usual University vacations. Would you be interested in applying for such a position?" Harold Snyder was. In 1937 he joined the teaching staff at the U. of I. and became a full professor in 1945.

From 1957-1960 he was Associate Head of the Chemistry Department and from 1960 until his retirement in 1976 he took on added responsibilities as Associate Dean of the Graduate College and Secretary of the Research Board. During WWII, Snyder carried on work for the National Defense Research Committee, the Committee on Medical Research, and the W.P.B. Rubber Research Program.

In addition to supervising 125 successful Ph.D. candidates, he has been co-author of two textbooks and served on the editorial board of *Organic Reactions*. Snyder was a meticulous editor and his editorial responsibilities were very time consuming. Nevertheless, he found time to develop a special bond with each of his graduate students, fostered in the weekly research meetings in the "seminar room" in the basement of the Snyder home.



Harold Snyder

continued on back page

Alumni and Friends Enthusiastically Support Chemistry Library

On November 4, 1991 the chemistry library will celebrate its 100th anniversary with an old fashioned birthday party. As befits an elderly celebrant, the gift of the day will not be a collection of minor consumables but an endowment fund that will benefit the library forever.

Its effects are already visible. One of the first items purchased with interest from the endowment was the new edition of the *Kirk-Othmer Encyclopedia of Chemical Technology, 4th Edition*. The second edition, which was the most recent available in our library, was seriously out-of-date. Professor Suslick, who teaches a new course for non-science majors, has the students start with this encyclopedia for writing term papers and finds it a valuable reference work for all levels of study.

Professor Steve Zimmerman, chairman of the School's library committee, has noted a marked improvements as funds became available. "Over the past several years our monograph budget has virtually disappeared to maintain our serial collection. Many of the monographs that we have not been able to purchase are irreplaceable and the material is not available 'on line', like articles in journals. Our ability to purchase necessary monographs has been even more important for students than for faculty. Faculty can afford to purchase essential materials; students frequently cannot. The extra funds have already made a noticeable impact."

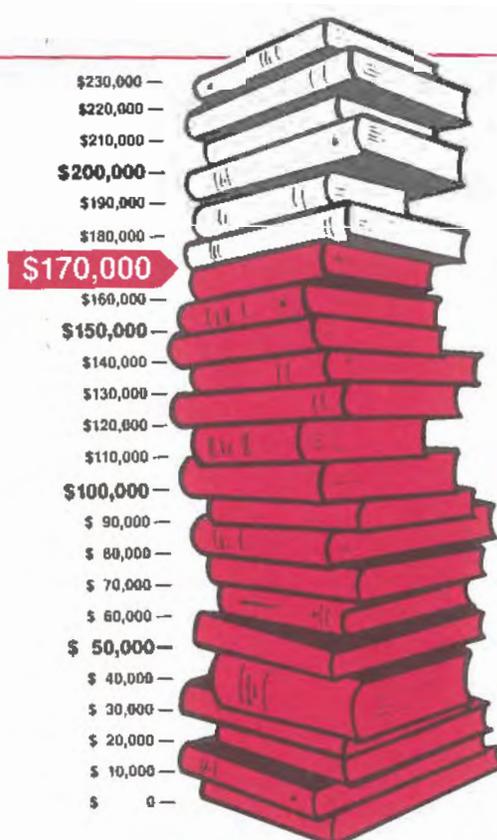
The appeal for library funds has elicited widespread support. As of August, 1991, when this report was compiled, over 12% of living alumni with known addresses as well as faculty and other friends, had made contributions to the fund. Several contributors have written to fund chairman, Dr. Lester E. Coleman, Chairman of the Board of Lubrizol Corporation, expressing their support along with their check.



Lester E. Coleman

Contributions to date have exceeded \$170,000. We hope that by the time of the birthday party when the endowment fund will be presented officially, or at least by the end of the anniversary year, that the full \$200,000 goal will have been reached. With the final \$30,000 in hand, the chemistry library will be able to count on an annual supplement of \$10,000 to give our library that margin of excellence that it has enjoyed in its first 100 years.

Supplementary checks made out to UIF/Chemistry Library Endowment Fund along with matching gift forms, where appropriate, will help us to reach our full goal, and can be sent in the prepaid envelope enclosed in this newsletter.



The Library Fund as of 8/91 exceeded \$170,000.

At this time, we would like to thank all our many friends and contributors. Dr. Coleman, chairman of the drive, will be presented a "key to the library" as a small token of our appreciation. To our contributors, listed below, we would like to express our gratitude on behalf of current and future students and faculty who will have the support of a premier library for their research and teaching.

Pilot Merit Workshop Targets High Risk Students

What does a program for high risk students call to mind? Easier problems, remedial instruction? Not in this case. Students in the chemistry merit workshop work on problems that tend to be more difficult than those in regular sections of Chemistry 101. The crucial difference is that workshop participants work in groups, not alone. The participants are 'at risk' not because they lack achievement potential. Their math ACT scores are generally at least 27. They are "at risk" because they come from isolated schools or, more typically, from inner city schools. For these students the university environment tends to be overwhelming, if not threatening. The merit workshops provide them a faculty-guided, study/support group where cooperative learning is the norm.

Does it work? African-Americans and Hispanics make up 10% of the UIUC undergraduate population. Thirty percent of the students who dropped out of regular Chemistry 101 sections last fall were from these two minority groups. In contrast, the pilot merit workshop in chemistry 101 lost only one of its 23 students.

The program is run by Patricia Plaut, an instructor in the general chemistry curriculum. This fall there will be two merit sections taught by teaching assistants under Patricia's supervision.

Workshop participants get one extra hour of academic credit for participating in the program. They take the same exams as other students in the course but learn exam taking



Patricia Plaut

skills, such as pacing, with mock exams which are given just prior to the real course exams. The program changes the "feel" of the university environment. "Academic requirements" become "interesting courses" offering wide horizons in scientific disciplines as potential career avenues.

Thanks To All Supporters!

The following alumni and friends supported our Chemistry Library
Endowment Fund campaign with gifts of \$1000 or more.

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Theodore and Audrey Brown
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Gilbert and Velta Burton
Herbert and Elizabeth Carter
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Lester E. and Kathleen Coleman
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Harry Sutherland
Ruth Trosset
Warren Walton
Thomas Warne

The following alumni and friends supported our Chemistry Library
Endowment Fund campaign with gifts of up to \$1000.

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Brenda Kesler Launched the "ETC" Program

In this case, "ETC" is not the tag end of a job description. The acronym stands for "Encouraging Tomorrow's Chemists." Working with a local high school science teacher, Brenda Kesler, a graduate student in organic chemistry, has persuaded fellow graduate students to help her bring chemistry into community schools. Using ideas from a science enrichment program developed in Tulsa, Oklahoma, the group has developed a series of simple experiments that are carried out by high school students under the supervision of Brenda and other graduate student volunteers.

Instead of giving demonstrations, Brenda and her group write up simple experiments for the students to carry out. These are approved by the school science teacher and carried out under careful supervision. At this time, four graduate students in addition to Brenda are involved in the teaching program. They are Donald Seielstad, who will head the program next year, Monica Baloga, Katrina Hughes, and Glenn Jirka

Now in its second year, the program is already so successful that colleagues of the science teacher, who initiated the collaboration with Brenda, are beginning to consider similar programs for their classes. Brenda hopes that, eventually, the program will be expanded to increase the number of experiments in each class and to reach out to



▲ Left to right: Glenn Jirka, Monica Baloga, Katrina Hughes, Brenda Kesler

younger children in junior high and elementary schools. "It is never too early to stimulate an interest in chemistry," is Brenda's view of the program. "Small children seem to have an innate interest in science. However, somewhere between kindergarten and high school that gets beaten out of them. That is why we think it is particularly important to work with younger students."

Professor Jacobsen, faculty advisor to the project, is an enthusiastic supporter. "Perhaps the most important aspect of the program," he says, "is not to instruct the students in any specific subject but to show

▼ Brenda Kesler working with high school students



them how neat and interesting chemistry can be and to do it in the context of applications that have meaning to them. The goal is to get more people interested at a critical time in their lives. Brenda and her group of volunteers have been remarkably successful. She has done an absolutely phenomenal job." Professor Jacobsen plans to apply for outside funding and hopes that the NSF or other sponsors will provide sufficient support so that the ETC community outreach program will compensate the student/teachers, as is done at MIT, where a similar program is in place.

KEEP IN TOUCH

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New Staff

Douglas Lauffenburger

Douglas Lauffenburger is an eminent chemical engineer who has returned home. After eleven years at the University of Pennsylvania, three as chairman of the department, he has accepted a position as professor of chemical engineering with joint appointments in the department of cell and structural biology and in the bioengineering program.

He is working on a number of different projects, all of which are directed toward modifying cell behavior based on mathematical analysis of cell structure and function. One of his current projects is the manipulation of cell migration through tissue. Using the excellent computer resources on this campus, including those at the National Center for Supercomputing Applications, he develops mathematical models of cells which enable him to predict migration behavior. Subsequently, genetic engineering can be applied to create molecular mutations that allow him to test the validity of his models.

In addition to his research, Lauffenburger is about to start teaching a new course on "Cellular Bioengineering." He has been awarded one of the two Alumni Professorships of the Department of Chemical Engineering, which carries unrestricted research funds. Since coming to Illinois, he has also obtained an NSF equipment grant, a minicenter grant from the NSF biotech program, an NIH grant for research and two industrial grants that support his work.

Lauffenburger has already received significant recognition. He was one of the first group of scientists to receive a PYI award from the NSF and also received an NIH career development award in 1984. In 1988 he was awarded the prestigious Colburn Award of the AIChE and in 1989 he received a Guggenheim Fellowship. He serves on advisory committees for Duke and Carnegie-Mellon Universities and, this past spring, testified before a congressional panel on the state of American academic research.

Karl Dane Wittrup

In the two years since he came to the department of chemical engineering at the U. of I., Dane Wittrup has collaborated with biochemists and microbiologists in the study of the mechanisms of secretion in yeast to increase its efficiency as a manufacturing agent.

The possibilities of collaborating with other disciplines was a strong inducement for

Wittrup to come to Illinois. After having completed his Ph.D. at Cal Tech, he spent one year as a postdoc at Amgen.

He was made a Presidential Young Investigator and received a grant from the Biotechnology Research and Development Corporation in Peoria. An NSF grant for analytical equipment has come through and he is writing a further collaborative proposal with a colleague to the National Science Foundation.

Andrew Joshua Wand

Josh Wand has been lured from the Fox Chase Cancer Center in Philadelphia to join our biochemistry department by the opportunity to work in a university setting located in a very pleasant environment.

With a group that already includes four graduate students and a postdoctoral associate, he is studying the structure and function of complex molecules using state-of-the-art NMR technology. A short time ago he completed the analysis of a protein consisting of 177 amino acids and his plans call for extensive study of a number of other complex molecules.

Professor Wand's research is already showing exciting results because it continues lines of investigation begun in Philadelphia. Since completing his Ph.D. at the University of Pennsylvania in 1984, Wand was a postdoc at the NRC, Canada, 1984-85, and joined the Fox Chase Cancer Center in 1985 with an adjunct appointment at the University of Pennsylvania.

For the study of biological systems, he would like to bring in a 600 MHz spectrometer which would be used by his lab and a handful of others throughout the university. "Although the initial outlay will require about 1.4 million dollars," according to Wand, "this is essential for front line research and should generate many times that amount for the university in grants and overhead."

Peter Orlean

After completing his Ph.D. at Cambridge University in 1982 and postdoctoral research fellowships at the University of Regensburg and at MIT, Peter Orlean accepted a faculty position in our biochemistry department. His research interests are varied but generally focus on the modifications made to proteins by carbohydrates of one sort or another. At present, he is concentrating on glycolipid anchors by which certain proteins are attached to the surfaces of cells. Such anchors have been conserved in the course of evolution, but we know relatively little about them.



Douglas Lauffenburger



Karl Dane Wittrup



Andrew Joshua Wand



Peter Orlean

Orlean makes considerable use of radioactive labeled precursors and thin layer chromatography to monitor the synthesis of glycolipids in yeast cells. He has just been awarded a generous five year grant from NIH and has two graduate students working with him. He would like to expand slowly so that he can give his students plenty of supervision.

Faculty News

Professor Herbert Laitinen Dies at 76



Herbert Laitinen, Professor of Chemistry at the University of Illinois from 1940 until 1974, died on March 22, 1991 in Gainesville, Florida. From 1953 until his retirement from the U. of I. in 1974, he was head of the analytical chemistry division.

Professor Laitinen received his doctorate from the University of Minnesota in 1940. During World War II he was a group leader in synthetic rubber research. He lectured in Europe, Japan and China and was a visiting professor at the University of California at Los Angeles, and in England, China, Korea, and Germany. He was an exchange visitor to Yugoslavia. He also worked as a chemist at Russell Miller Milling Co. in Minneapolis and at DuPont in Cleveland, Ohio.

Dr. Laitinen was author or co-author of about 200 publications, including two books. From 1966 to 1976, he was editor of the *Journal of Analytical Chemistry*.

We appreciate the gifts that have been received by the Chemistry Library Endowment Fund in his memory.

Faculty Honors

Peter G. Wolynes, Professor of Chemistry, Physics and Biophysics, was elected to the National Academy of Sciences. Wolynes is also at the U. of I. Center for Advanced Study and at the Beckman Institute. He has been on the U. of I. faculty since 1980 and has been a Sloan and Guggenheim Fellow. (See p. 4 for a description of his work.)

Theodore L. Brown, Director of the Beckman Institute and Professor of Chemistry, has been appointed a member of the new Chemical Abstracts Service Governing Board.

Nelson Leonard, Professor Emeritus of Chemistry, won the 1991 George W. Wheland Medal. The award was presented at the annual George W. Wheland Award Symposium at the University of Chicago on March 4, 1991.

Among the symposium speakers were Professor Carl R. Johnson, a former student of Professor Leonard, and Professor Gregorio Weber, a colleague at the U. of I. and coauthor on several of Professor Leonard's papers.

Professor Leonard was also invited to become the Sherman Fairchild Distinguished Scholar at the California Institute of Technology for a three-month period during the Fall of 1991. He was elected President of the Organic Chemistry Division of IUPAC.

Walter G. Klemperer, Professor of Chemistry, has been selected to receive the ACS Award in Inorganic Chemistry, sponsored by the Monsanto Company.

Larry R. Faulkner, Professor of Chemistry and Dean of the College of Liberal Arts and Sciences, has been selected to receive the ACS Award in Analytical Chemistry, sponsored by Fisher Scientific Company.

Thomas B. Rauchfuss, Professor of Chemistry, received a Guggenheim Foundation Fellowship for 1991.

Patricia Shapley, and **Andrew J. Gellman**, Professors of Chemistry, have both received Sloan Research Fellowships for 1991.

Jonathan Sweedler, newly arrived Professor of Chemistry, has received a Camille and Henry Dreyfus New Faculty Award for 1991.

Eric Jacobsen, Professor of Chemistry, has been named to receive the Lilly Grantee Award.

Stan Smith and **Loretta Jones**, Professors of Chemistry, have jointly received the Joe Wyatt Challenge Award for their software entitled, "Interactive Video Learning Center in Chemistry."

William Pirkle, Professor of Chemistry, has received the Annual Merit Award in Chromatography from the Chicago Chromatography Discussion Group.

Douglas A. Lauffenburger, Professor of Chemical Engineering, received a Halliburton Award for teaching excellence.

Andrew Gewirth, and **Eric Jacobsen**, Professors of Chemistry, were appointed fellows in the Center for Advanced Study in 1991-1992.

Alumni News

In Memoriam

Joan Fessenden, B.S. '55 (Chemistry), well known organic chemistry textbook writer, died on March 24, 1991. Together with her husband, Ralph J. Fessenden, chemistry professor at the University of Montana, she wrote *The Basis of Organic Chemistry* in 1971, *Fundamentals of Organic Chemistry*, in 1990 and *Organic Chemistry, Fourth Edition* in 1990. The latter is considered one of the top college-level organic chemistry textbooks in the world.

Sylvan O. Greenlee, Ph.D. '39 (Chemistry with Shriner), who won the ACS Award in the Chemistry of Plastics and Coatings in 1968, died on January 29, 1991. Dr. Greenlee had resigned in 1968 as director of R&D at Guardsman Chemical Coatings to open his own laboratory, Greenlee Research Co. in Moline, Michigan.

Richard Willet Jackson, M.S. '25 (Biochemistry with Rose), retired head of the Northern Regional Research Laboratory in Peoria, Illinois, died on May 10, 1991. He had been with the laboratory from 1947 until his retirement in 1966. In 1957, the Department of Agriculture honored him for his contributions to protein and fermentation with a Distinguished Service Award.

William Krigbaum, Ph.D. '49 (Chemistry with Wall), and Professor Emeritus of Duke University, died on May 14, 1991. He joined the faculty at Duke in 1952 and was named James B. Duke Professor of Chemistry in 1969. He served as chairman of the department from 1976 to 1979. He was a member of the advisory board of *Polymer Science* and on the editorial boards of the *Journal of Physical Chemistry*, *Macromolecules*, and *Texture*. He won the ACS award in polymer chemistry in 1989.

Richard M. Lawrence, M.S. '31 (Chemical Engineering) died on February 6, 1991. During his career in chemical engineering, he had been associated with the U.S. Tariff Commission, Atlas Powder Co., Monsanto, Wyandotte Chemicals, A.E. Staley Manufacturing Co., and International Minerals. He was a member of the Illinois State Academy of Science and was a founding member of the American Chemical Market Association. As a hobby, he collected postage stamps commemorating famous chemists which probably became the largest chemical postage stamp collection in the world.

Alumni Honors

Krebs Wins Welch Award

Edwin G. Krebs, A.B. '40, (Chemistry) won the Robert A. Welch Award in Chemistry for 1991. Dr. Krebs, who is now Professor of Pharmacology at the University of Washington, Seattle, and Senior Investigator of the Howard Hughes Medical Institute at the University of Washington, received the award for his pioneering research on the role of protein phosphorylation in the regulation of metabolism and cell:cell communication. He shared the 1991 Welch Award with Dr. E.R. Stadtman of the National Institutes of Health.

Dr. Krebs has received many honors and awards, including election to the National Academy of Sciences, the 3M Life Sciences Award, and the Albert Lasker Basic Medical Research Award. In 1990 Dr. Krebs returned to the U. of I. to give the Ada Doisy Lectures in Biochemistry together with his long time colleague and collaborator, Professor Edmond Fischer. The Ada Doisy Lectures in Biochemistry are the department's most distinguished recognition for outstanding researchers.

Honors for Minor Coon

Professor Coon, Ph.D. '46 (Biochemistry with Rose) was honored at an FASEB (Federation of American Societies for Experimental Biology) satellite symposium held in his honor on April 21, 1991. The topic was "Cytochrome P-450: Advances and Prospects." Among the speakers were Dr. F. Peter Guengerich, a 1970 graduate of the University of Illinois and Dr. Paul F. Hollenberg, a former postdoctoral associate of Professor Hager (Biochemistry).

Professor Coon also received an honorary Doctor of Medicine degree from the Karolinska Institute of Stockholm for pioneering research in the field of cytochrome P-450 and biochemical toxicology.

Tung Received Two Highest Dow Awards



Lu Ho Tung

Dr. Lu Ho Tung, Ph.D. '51 (Chemical Engineering with Dric-kamer), a senior research scientist in Central Research at Dow, was named a Research Fellow. This award has been given only eight times previously. In 1987 Tung also received the Herbert H. Dow

Medal for his pioneering work in the characterization and understanding of the molecu-

lar architecture of polyethylene and his important contributions to anionic polymerization.

Eliel Receives Multiple Honors

An endowed professorship is being named for Ernest L. Eliel, Ph.D. '48 (Chemistry with Snyder). Dr. Eliel, the W.R. Kennan Professor of Chemistry at the University of North Carolina, has also received three other awards: the Herty Medal of the Georgia ACS Section, the Thomas Jefferson Award of the University of North Carolina, and the Southern Chemist's Award from the Memphis ACS Section.

Selbin Retirement Marked by Symposium



Joel Selbin

Basolo, Ph.D. '43 (Chemistry with Bailar) and Dr. Daryle Busch who received his Ph.D. in '54 (Chemistry with Bailar). After his retirement, Professor Selbin will be teaching at the Denver campus of the University of Colorado.

A symposium was held at Louisiana State University to honor Dr. Joel Selbin, Ph.D. '57 (Chemistry with Bailar) on the occasion of his retirement. Among the speakers at the symposium were Dr. Gil Haight, Emeritus Professor of the University of Illinois, Dr. Fred

The Classes

'30 Dr. P.N. "Butch" Burkard, B.S. '34 (Chemistry), received a Fellow Award from the Association of Analytical Chemists, of which he was a charter member. Dr. Burkard retired from BASF in 1976.

'40 Donald W. Bahr, B.S. '49 (Chemical Engineering) has been elected to the National Academy of Engineering. Mr. Bahr is manager of combustion technology for GE Aircraft Engines.

Fred Basolo, Ph.D. '43 (Chemistry with Bailar) received the George C. Pimentel Award in Chemical Education, given by the ACS and sponsored by Union Carbide Corporation. Dr. Basolo is at Northwestern University.

Robert Olvin Sauer, Ph.D. '41 (Chemistry with Adams) is a management consultant in Germany since retiring in 1977 as president of Entrepise International in Ottrott, France.

'50 Louis A. Carpino, Ph.D. '53 (Chemistry with Snyder) received the Ralph F. Hirschmann Award in Peptide Chemistry,

given by the ACS and sponsored by Merck Sharp & Dohme Research Laboratories. Dr. Carpino is with the University of Massachusetts.

Chia-Yung Chen, Ph.D. '51 (Chemical Engineering with Johnstone) has written a book on the University of Illinois, together with his wife. The book, which was published in China, is the fourth volume in the World Famous Universities Series. Dr. Chen is a professor at the Institute of Chemical Metallurgy of the Academia Sinica.

Paul R. Jones, Ph.D. '56 (Chemistry with Fuson), Professor of Chemistry at the University of New Hampshire, received a Fulbright Fellowship for 1991-92. This was his second. He received his first Fulbright in 1973 for work at Freiburg University in Germany. Professor Jones had received a University of New Hampshire Distinguished Teacher Award in 1982 and has been a National Science Foundation Faculty Fellow at the Max-Planck Institute in Göttingen and a visiting professor at the Institute for the History of Science and Technology in Munich.

D.W. McCall, Ph.D. '53 (Chemistry with Gutowsky) received the Earle B. Barnes Award for Leadership in Chemical Research Management. The award is given by the ACS and sponsored by Dow Chemical Company. Dr. McCall is with AT&T at Bell Labs.

George Williams, Ph.D. '56 (Chemistry with Gutowsky) was recipient of the University of Utah's Distinguished Teaching Award for his "excellence in teaching and dedication to learning at the U." He has been a member of the physics department since 1964.

Robert L. Wixom, Ph.D. '52 (Biochemistry with Rose), has received the College of Agriculture and Gamma Sigma Delta Teaching Awards at the University of Missouri at Columbia. He is Professor of Biochemistry in the College of Agriculture and School of Medicine.

'60 Dr. Paul A. Kittle, B.S. '60 (Chemistry) is president and founder of Rusmar, which was the subject of a lengthy article in the September 1990 issue of *Inc.* Rusmar is a company that has developed a foam that is used for waste management as a substitute for soil cover.

Mita Kubota, Ph.D. '60 (Chemistry with Brown) became Chairman of the Department of Chemistry at Harvey Mudd College in Claremont, California.

David L. Zellmer, Ph.D. '69 (Chemistry with Laitinen), has become Chairman of the Department of Chemistry at California State University - Fresno.

'70 John B. Covington, Ph.D. '78 (Chemistry with Beak) has been appointed Director of Research and Product Development at J.T. Baker Company in Phillipsburg, New Jersey.

Michael A. Fury, Ph.D., '78 (Chemistry with Jonas) has been named senior engineer manager in advanced personalization line support at IBM in East Fishkill.

Lydia E.M. Hines, Ph.D. '71 (Chemistry with Applequist) counsels teachers as a representative of the ACS and provides hands-on science education in elementary school classrooms in the Kalamazoo, Michigan area. Until 1985 she worked for the Upjohn Company.

Marsha L. Langhorst, B.S. '75 (Chemistry) has received the Vernon A. Stenger Award from the Dow Analytical Sciences Laboratory of Michigan Research and Development, where she is a research leader.

Terence M. Lenhardt, M.S. '75 (Chemistry with Belford) has taken a position as staff pathologist at the naval hospital in Bethesda, Maryland after completing a hematopathology fellowship. He was elected a Fellow in the College of American Pathologists in 1991.

Andrew Loh, Ph.D. '75 (Chemistry with Natush) has been promoted to Executive Director of Operations for Hybritech Inc.

Ronald D. Nelson, M.D., B.S. '71 (Chemistry) is a cardiologist with Cardiology Associates, Inc. in South Bend, Indiana. He received his M.D. degree from Rush Medical College in 1974. He is Chicago board certified in internal medicine and cardiovascular disease. He is also an Assistant Professor of Medicine at Indiana University.

G. Earl Peace, Jr., Ph.D. '71 (Chemistry with Jonas) is a Professor at the College of the Holy Cross in Worcester, Massachusetts. He has just completed an American Council on Education Fellowship during which he served as Assistant to the President at Bucknell University in Lewisburg, Pennsylvania.

Brian E. Polivka, B.S. '73 (Chemistry) has been promoted to consultant, quality management and compliance in the quality assurance operations department of Bristol-Myers Squibb Company.

'80 Andrew G. Chenelle, M.S. '87 (Biochemistry) is a neurosurgery resident at the University of Virginia. He graduated from the University of Chicago's Pritzker School of Medicine with honors and is a member of Alpha Omega Alpha Medical Honorary.

Greg Cosma, B.S. '81 (Biochemistry) is an Assistant Professor in the Department of Environmental Medicine of the New York University Medical Center. Dr. Cosma received his M.S. and Ph.D. (1986) in Pharmacology and Toxicology at the University of Kansas and completed a two year postdoctoral fellowship at the Oak Ridge National Lab.

Dennis Delfert, Ph.D. '84 (Biochemistry with Conrad) has been promoted to group leader in immunology at Abbott Laboratories in Chicago.

Lara L. Dennis, B.S. '89 (Chemistry) is a student at the U. of I. Medical School and co-chair of the Student Doctor Lung Patrol. The Patrol provides anti-tobacco education to over 700 elementary school students in the Rockford public schools.

Erika L. Hendricksen, B.S. '89 (Chemical Engineering) is a production engineer with Dow U.S.A. in Pittsburg, California.

Tom Herrinton, Ph.D. '84 (Chemistry with Brown) has been promoted to Associate Professor at the University of California at San Diego.

Michael Hill, B.S. '87 (Chemistry) has taken a position as coatings chemist for BASF, Inc., in Southfield, Michigan. Previously, he had been director of analytical services for Michigan Biotechnology Institute in Lansing.

Dr. Jody Kaplan Hirsh, B.S. '80 (Biochemistry) is a research assistant in the Department of Physiology of Rush Medical College in Chicago.

Gary A. Kaufman, M.D., B.S. '84 (Biochemistry) is joining a medical practice after completing a three year residency in internal medicine. He will also have a teaching position at Evanston Hospital in Evanston, Illinois.

Kurt A. Koppi, B.S. '88 (Chemical Engineering) is working on his Ph.D. in chemical engineering at the University of Minnesota.

Sangeeta D. Ramamurthi, Ph.D. '89 (Chemistry with Klempner), a scientist at Battelle Memorial Institute, was cited in the *New York Times* for her research on aerogels that may one day replace polyurethane foams.

Scott W. Sommer, B.S. '81 (Chemical Engineering) has become a general partner in the engineering firm of the Delta Group, Inc. in Cincinnati, Ohio.

Eleni Vassiliadou, Ph.D. '85 (Chemical Engineering with Hanratty) has been transferred from Shell Exploration and Production to Shell International Gas. She is working as a business analyst for the Far East and South Africa.

The Biochem Golf Tournament



▲ Randy Sigle, graduate student, was *low net* winner

▶ Lee Johnstone, Louise Cox and Frances Hager taking a break



Every year since 1950, the entire biochemistry department has been invited to a golf tournament, usually followed by a picnic, organized by the graduate students. This year, 34 faculty, support staff and students played in the tournament at Lake-of-the-Woods. Among the prior winners were two former heads of the department, a former and a current faculty member.

Snyder Scholarship

continued from page 5

Dr. James E. Brewster, one of his former students, describes Snyder's special contribution as follows: "Snyder regarded research as a learning experience for his students rather than as a training exercise or as a source of papers for himself. He would let us make our own mistakes, but he would also give us a chance to suggest new things to try. We were ready to go when the problem had become ours as much as his." In gratitude for his patience, counsel, and kindness, the Snyder students have established an endowment for the "Snyder Scholars" and hope that it will grow during the three years of the campaign so that it will fund three "Scholars" annually.



The first Snyder Scholar, Mark Hudgens came to the U. of I. for a semester of research after completing his sophomore year at Southwestern Oklahoma State University. He was selected by Professor Katzenellenbogen, representing the organic chemistry program, on the basis of exceptional references. For the summer semester, Mark joined a group in Professor John Shapley's laboratory, working on the organometallic chemistry of C_{60} . He received a stipend of \$2,000 and laboratory expenses were covered with an additional \$500. He is the first student to be supported by the Harold Snyder Endowment Fund.

SCS Alumni Newsletter
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