

# SCS Alumni Newsletter

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## School of Chemical Sciences

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### Among our Outstanding Alumni: Leon J. (Jack) Thomas of Kodak



**D**r. Thomas has just taken on a new assignment. In addition to his position as Senior Vice-President of Eastman Kodak he has been named Chairman of Sterling Drug Inc., a wholly owned subsidiary, acquired in the spring of 1988. Sterling is a leading manufacturer of prescription drugs and over-the-counter products such as Bayer aspirin, Phillips' Milk of Magnesia, and household products including Lysol disinfectants and cleaners. Sterling has lacked critical mass in Research and Development but Dr. Thomas is determined to fix this. He brings considerable expertise to the new enterprise.

Dr. Thomas started at Kodak in 1961, with a new Ph.D. in Chemical Engineering from the U. of I. He still remembers nostalgically the halcyon days of Sputnik with unlimited resources for support of the sciences. In those days, when one made ten job applications he received ten offers plus several that were unsolicited. He recalls that, back then, recruiters would call his wife in the evening in hopes of influencing his choice.

When Thomas joined the firm, Kodak had many chemists doing research but virtually no chemical engineers and did not realize what engineering had to offer the research program. His early work was in color photography and in 1967 he received his first management assignment as head of the color physics and engineering laboratory. From then on, he moved steadily through the ranks and in ten years, was named director of the entire Research Laboratories and Vice President of the company. His laboratory invested in electronic imaging and the clinical diagnostics markets and developed new techniques for blood analysis using photochemical principles and processes which were similar to those used for the manufacture of photographic film.

Thomas built up the Life Sciences at Kodak. As manager of the Life Sciences Division, to which he was appointed in 1984, he broadened Kodak's base beyond photography to give the company a growing presence in the pharmaceuticals and biotechnology industries.

## The Infinite Possibilities of Bioengineering

His enthusiasm for the potential of biotechnology is genuine and infectious. As the 1988 commencement speaker at Worcester Polytechnic Institute he described the fantastic revolution that has occurred in the last few years.

In 1973 the first successful gene splice had been made and less than 10 years later—the first medical product using this technology was on the market. That was human insulin—for the treatment of diabetes. Since then, other proteins with promise for therapy have been approved...including human growth hormones for the treatment of dwarfism and interferon, which has certain anti-viral properties.

These exotic materials are produced using different host organisms—bacteria... yeast... fungi... and actual mammalian cells. Producing these is giving rise to a whole new industry which combines this new biology with chemical engineering.

A critical part of making this new industry economically viable depends on developing new and improved processes for separating these valuable proteins from the fermentation broth in which they are produced... In 1986, a report of the National Research Council predicted that products from this new biochemical engineering industry could add between 40 and 100 billion dollars per year to the U.S. economy.

Under Thomas' direction Kodak moved beyond internal R & D into a series of joint ventures and equity investments with small biotechnology firms, especially firms that had products nearly ready for clinical trials, backing their efforts with Kodak's huge resources. Dr. Thomas coordinates Kodak's many life science ventures. He is now responsible for all of Sterling.

## The Diminishing Home-grown Talent Pool

As head of the Life Sciences at Kodak, Dr. Thomas has been very concerned with the diminishing talent pool of bright young people entering scientific fields. He points out that college graduating classes of students majoring in the sciences are smaller than they were in the 70s.

As he says, "For too long we have shied away from the awkward facts, counting foreign students among our graduates and assuming that they would stay in the USA. However, foreign students increasingly return home after they have completed their education, making it imperative for us to develop home grown talent."

He enthusiastically endorses and supports programs that encourage youngsters to study science and engineering, including students from minority groups and impoverished backgrounds who need extra help to develop their potential. He sees trained manpower as a critical success factor to keep the US competitive. He emphasizes that there is a lot of talk about the growing importance of the service industries but it is the manufacturing companies that spell the difference between winning and losing the global competition.

## He Finds Time for the U. of I.

He is very well satisfied with the education received in the chemical sciences at the U. of I. and is actively working to maintain the quality of the program. He was the first chairman of the Resource Development Committee of the Department of Chemical Engineering. He sees fund raising as very important even though time consuming. Most donors need time before they will commit themselves to large contributions and must be given good information about the program, as disseminated by a quality newsletter.

Dr. Thomas has received considerable recognition for his many contributions. In 1984 he was elected to the National Academy of Engineering. He holds an honorary Doctor of Engineering degree from Worcester Polytechnic Institute. In 1988 he received an Alumni Honor Award from the University of Illinois, College of Engineering, for Distinguished Service in Engineering.

He is proud of his contributions but he looks to the future. As he said to the Worcester graduating students, "Biotechnology is still early in its life cycle—perhaps where electronics was at the time of the development of the vacuum tube". To a Wall Street Journal reporter he said that he wants to become more than a major player in the world pharmaceuticals market. He'd like to be "in the top 10 by the late 1990s." And considering his success in the past, he probably will.

## Leonard Awarded Honorary Degree



At the May, 1988 commencement, Nelson J. Leonard, Reynold C. Fuson Professor of Chemistry Emeritus, received an honorary Doctor of Science degree from the University of Illinois in honor of his achievements over more than 40 years of service. His citation read, in part,

Your insight and work in synthetic organic probes has led to significant advances in organic chemistry, biochemistry and molecular biology... You have earned numerous recognitions, including membership in the National Academy of Sciences and a foreign membership in the Polish Academy of Sciences... (and) numerous medals from the American Chemical Society. As the thesis advisor of 120 graduate students, you have single-handedly trained a sizable portion of the future generation of chemists. You are recognized as an excellent teacher by your students and as an individual who has stood for the highest principles of academia by your peers.

The photo shows Professor Leonard with Sir Derek H.R. Barton of Texas A & M University, who gave the Nelson J. Leonard Distinguished Lecture Series in 1988.

## HIGHLIGHTS FALL '88

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# Highlight of 1987/88

## The Undergraduates

Although it's too early for definitive news on how well our 200 students are doing in the "real" world, preliminary information suggests that they are receiving a warm welcome from graduate schools and employers. Recruitment has been up both in employer visits and in number of offers made. As of June 10, 81 candidates had already accepted positions. Salaries are up significantly over last year and those of U. of I. candidates exceed national levels in all categories, undergraduate and graduate, chemistry, biochemistry, and chemical engineering.

Good results should not be surprising because chemical science students have high caliber potential and receive excellent training in the course of their studies. The number of co-op placements is increasing every year and so is the number of co-op employers. We now have a total of 47 coop placements with 15 employers.

Four students won NSF fellowships for graduate study and two other students won national awards, one from Eastman Kodak and one from the Chemical Industries Council (See below).

There were 13 chemistry students who graduated with distinction as well as 23 chemical engineering and 6 biochemistry students. Most of these students completed a significant research project in addition to their coursework, often to test their interest in research before committing themselves to graduate studies.

More than 20 students were accepted into Bronze Tablet, the highest all university award, given to students who had achieved at least a 4.5 (B+) overall grade point average and ranked in the top 3% of their college's graduating class. At least 13 students were elected to Phi Beta Kappa, 7 of them from Chemical Engineering.

The president of the U. of I. Engineering Council last year was **Brian Davison**, a chemical engineering student. The chemical engineering students received many awards at the Engineering Open house. Of the 17 departments represented, this department was fourth best overall and its central exhibit won third place.

The Department of Chemistry created a new prize this year to recognize excellent undergraduate research by students who elect to complete a senior thesis. The **Marvel Prize** consists of a certificate and a \$250 cash award. The first winners were **Nathaniel Finney**, **Timothy Grinsteiner**, and **John Folkers**. Other undergraduate awards are listed in alphabetical order.



*Chemistry/Biochemistry undergraduate award winners (from left): Mike Ranin, Mike Smith, Stephanie Wengert Watts, and Nat Finney.*

*American Institute of Chemical Engineers Award to Kevin L. Fransen (Chemical Engineering).*

*American Institute of Chemists Awards to John G. Peterson (Biochemistry), Andrea Marino (Chemical Engineering), and Michael E. Smith (Chemistry).*

*The Dow Outstanding Junior Award went to Scott W. Goffinet (Chemical Engineering).*

*Eastman Kodak Scholarships were awarded to Jocelyn F. Bautista (Chemistry) and Cheryl Meravi (Chemistry).*

*The Donald E. Eisele Award went to Brian C. Davison (Chemical Engineering).*

*The Reynold Clayton Fuson Award was given to Feroz R. Papa (Biochemistry).*

*Junior Alumni Awards were given to Tony J. Hurtado (Chemical Engineering) and Gerhard W. Matzen (Chemical Engineering).*

*The Donald B. Keyes Award was given to Sheri R. Snider in (Chemical Engineering).*

*Merck Awards were given to Raja Sharma (Biochemistry), Dan G. Coronell (Chemical Engineering), and Martin R. Hastings (Chemistry).*

*NSF Fellowships were won by Louis John Boschelli (Chemical Engineering), Karl Robert Krause (Chemical Engineering), Michael Edward Smith (Chemistry), and Jonathan Walter Stocker (Biochemistry).*

*Worth Huff Rodebush Awards were given to Michael T. Ramm (Chemistry) and John R. Folkers (Chemistry).*

*The Senior Alumni Award went to Karl R. Krause (Chemical Engineering).*

*The Thomas O. Sidebottom/ROLM Corporation Awards went to Feroz Papa (Biochemistry) and Katherine Schaefer (Biochemistry).*

*Arthur W. Sloan Prizes were won by Scott C. Brun (Biochemistry), Carla Davidson (Chemical Engineering), Thomas M. McCanna (Chemistry), and Kimiko Suzue (Chemistry).*

*The Phi Lambda Upsilon/Arthur W. Sloan Prize went to Lisa Warda (Chemical Engineering).*

*The Bruno H. Wojcik Memorial Scholarship Award went to Stephanie M. Wengert (now Watts) (Chemistry).*

Many of these awards, such as the Alumni Awards, the Donald E. Eisele, R.C. Fuson, Donald B. Keyes, Worth H. Rodebush, Thomas O. Sidebottom and Bruno H. Wojcik Awards were established and are maintained by the generosity of our alumni and friends of the School of Chemical Sciences. These awards are extremely important to reward excellence and to maintain the high standards in which we all take great pride.

### The Graduate Students

A record number of new students joined the U. of I. School of Chemical Sciences last year. Graduate student enrollment was at an all time high, particularly in Chemistry. A total of 69 students received their Ph.D. degrees in the 1987/88 academic year and 50 received MS degrees. The number of postdoctoral students continued at an all-time for the second year in a row.

A very special prize went to **Sangeeta D. Ramamurthi** who won the Graduate Student Award of the Materials Research Society. Her thesis work under Professor Walter Klemperer has been on "Molecular Growth Pathways in Silica Sol-Gel Polymerization". She came here four years ago from the Indian Institute of Technology and is planning to complete a post doctoral fellowship with Professor David Payne in the Material Science Department of the University of Illinois after she finishes her Ph.D. in December, 1988.

Among the other outstanding students was Dr. Faulkner's student, **Ingrid Frisch-Faules** who entered the graduate Chemistry program from the University of Utah with an NSF fellowship for 1985-1988, and won a fellowship from the Analytical Division of the American Chemical Society for Fall, 1988.

Another chemistry student, **David Conrad** won a J.S. Richards Summer Fellowship from the Electrochemical Society for the summer of 1988.

Five chemical engineering students carried fellowships won in national competitions. **Joan Brennecke** was a National Science Foundation fellow and so was **Michael Ekart**. **Alan Hansen** won a national fellowship awarded by the Link Foundation and both **Daniel Klingenberg** and **Gregory Muldowney** won national fellowships from the Hertz Corporation.

### New Faces among the Faculty...

In the Fall of 1987 Professor **Scott Kahn** joined the Chemistry Department after completing postdoctoral studies as a Fellow Commoner of Churchill College at the University of Cambridge from 1986/87. Dr. Kahn received his B.S. from Rider College in 1981 and his Ph.D. from the University of California (Irvine) in 1986.



*Chemical Engineering undergraduate award winners (from left): Andrea Marino, Brian Davison, Dan G. Coronell, Karl Krause, and Lisa Warda.*

His research efforts center around the development of new molecular modeling methodologies that utilize power computer graphics. Developed methodologies are then applied, along with existing techniques, e.g. molecular orbital theory, molecular mechanics, and molecular dynamics and simulations, towards a variety of problems in (1) reactivity and selectivity in organic reactions, and (2) molecular recognition in systems of biological significance.

The Chemical Engineering Department welcomed **Edmund G. Seebauer** in the year just past. Professor Seebauer is no stranger to Illinois. He received his B.S. here in 1983 along with many honors, including the Worth H. Rodebush Award from the School of Chemical Sciences, the All-University Bronze Tablet Award, Summa Cum Laude graduation honors from the College of Liberal Arts and Sciences, and the Highest Distinction honors in the Chemical Engineering Curriculum. He took his Ph.D. from the University of Minnesota where he won the American Vacuum Society Graduate Student Prize in 1985.

The focus of Professor Seebauer's research is to characterize the surface chemistry of chemical vapor deposition with methods that have, up to now, been employed mainly in studies of catalysis. These methods include adsorption, desorption, and reaction experiments at pressures ranging from 10 Torr to  $10^{-10}$  Torr.



### ...And Some Retired

Professor **David Y. Curtin** retired after 37 years in the Chemistry Department. Professor Curtin headed the Organic Chemistry Division (1963-1965), was Associate Head of the Department of Chemistry (1967-1972), and served as R.C. Fuson Professor in the Department. Since he is generally recognized as the father of solid state chemistry, his retirement was marked by the first Midwest Symposium on Solid State Chemistry on June 10-11, 1988.

**Joe Nemeth**, Director of the Microanalytical Laboratory, retired after 36 years of service. Until this Spring, he was the first and only director of the laboratory. Under his direction the lab became increasingly automated and expanded its services. Today, it provides analyses of metals and anions in addition to carbon, nitrogen and hydrogen.

Professor **Elizabeth Rogers** retired after 36 years in the General Chemistry Program of the Chemistry Department. Dr. Rogers was very active in the undergraduate teaching program and wrote three textbooks for introductory courses. She also chaired an annual conference for Illinois high school chemistry teachers, which was recognized as a very valuable contribution to chemistry education.

Professor **James W. Westwater** retired after 40 years in the Department of Chemical Engineering. He was Head of the Department from 1962-1980 and was responsible for the rapid expansion and strengthening of both undergraduate and graduate programs. His retirement was marked by a symposium on "Boiling and Condensation" on May 5-6, 1988.

Professor **Peter E. Yankwich** retired as Professor of Chemistry at the U. of I. after 40 years of service. He had served as Head of the Division of Physical Chemistry, Department of Chemistry and Chemical Engineering (1962-1967), Acting Director of General Chemistry (1974-1975) and Vice President for Academic Affairs for the U. of I. (1977-1982). (See "Former Faculty" for additional information on his current activities.)

### Faculty Honors

This article includes only those honors reported since the Summer '88 SCS Alumni Newsletter.

**Jiri Jonas**, Professor of Chemistry and Director of the School of Chemical Sciences, received a Senior Scientist award from the Alexander von Humboldt Foundation.

**Harry G. Drickamer**, Professor of Chemical Engineering, Chemistry and Physics, received the Elliott Cresson Medal of the Franklin Institute of Philadelphia.

**Robert B. Gennis**, Professor of Chemistry and Biochemistry, was awarded a Guggenheim Fellowship for 1988.

**Jonathan Widom**, and **Steven C. Zimmerman**, Professors of Chemistry, and **Edmund G. Seebauer**, Professor of Chemical Engineering, all received Presidential Young Investigator awards.

**Charles A. Eckert**, Professor of Chemical Engineering, received a Burlington Northern Foundation Faculty Achievement Award.

**Walter G. May**, Professor of Chemical Engineering, received the Tau Beta Pi Eminent Engineering Award for 1988.

**Linn Belford**, Professor of Chemistry, received the John R. Kuebler award from the national organization of Alpha Chi Sigma, for his technical achievements and services.

**Jonathan Widom**, and **Steven C. Zimmerman**, Professors of Chemistry were appointed Fellows in the Center for Advanced Study.

**Richard C. Alkire**, Professor of Chemical Engineering and Head of the Department, received the "George Washington Kidd, Class of 1836, Award" of the Alumni Association of Lafayette College.

**Rebecca Simon**, Director of the School Placement Office, received the Chairman's Award of the Cooperative Education Division of the American Society for Engineering Education.

## Two Receive 1988 National Medal of Technology

**Paul Lauterbur**, Professor of Chemistry and Medical Information Science was awarded the National Medal of Technology by President Reagan at the White House in July, 1988. He was recognized for his contributions in conceiving and developing applications of magnetic resonance technology for medical uses. With magnetic resonance imaging, cross-sectional images can be produced without x-radiation. The technique is widely used, especially for diagnosis involving the head and spine.

Professor Lauterbur also received a Doctor Honoris Causa from the Nicolaus Copernicus Medical School in Cracow, Poland.

**Dr. Arnold O. Beckman**, who received his B.S. degree in Chemistry from the U. of I. in 1922, also received a National Medal of Technology. He is an inventor and founder of the Beckman Corporation, recognized as manufacturer of the finest analytical instruments in the world.

In recent years, Dr. Beckman has also become renown for his philanthropy which includes a gift of 40 million dollars to the U. of I. for the Beckman Institute for Advanced Science and Technology. The mission of the Center is to link the efforts of researchers in the field of human and artificial intelligence.

In addition to the National Medal of Technology, Dr. Beckman has also been named recipient of the 1989 Charles Lathrop Parsons Award which recognizes public service by a member of the American Chemical Society.

## The Mass Spec Lab: Well-Hidden, Well-Known and Crowded



In a remote corner of the Noyes Lab basement, the Mass Spectrometry Laboratory supplies a full range of sophisticated services to the School of Chemical Sciences, the wider University community, and researchers as far away as India, Japan, Israel, Hawaii and New Zealand. The laboratory is perhaps the most crowded in the School with five mass spectrometers fitting like jigsaw puzzles into one room. Presiding over the Lab is Director Richard Milberg. He has been with the Lab for 14 years and is familiar with every inch and every idiosyncrasy of the five machines that constitute his bailiwick.

Dr. Milberg speaks with justifiable pride of his Laboratory as a pioneer among those offering comparable services. In 1962, at the instigation of Professor Kenneth Rinehart, Faculty Director, the U. of I. Lab was the first US purchaser of an Atlas (MAT) CH<sub>4</sub> mass spectrometer with an advanced direct probe inlet system for non-volatile components. The Lab was the first US user of field desorption mass spectrometry and remains one of the few labs that provides accurate mass, high-resolution field desorption data.

The techniques developed in the laboratory facilitated the study of complex peptide antibiotics in the late 1970s. The methodology developed for those peptides in turn proved crucial to the Rinehart group in the structure assignment of didemnin B, a cyclic peptide isolated from sea squirts, which is now in National Cancer Institute-sponsored Phase II clinical trials as an anticancer agent.

### The Latest Technology...

Recently, the fast atom bombardment (FAB) technique in which a sample, dissolved in a liquid matrix such as thioglycerol, is ionized by an energetic (8 keV) beam of xenon atoms, has been stressed in the laboratory. FAB, too, has been very successful with peptides. It has allowed, for instance, the determination of the sequences of amino acids in 12 different peptides in one day.

In addition, the tandem mass spectrometry (MS/MS) technique, in which two mass spectrometers are employed in tandem, has allowed the assignment of amino acid sequences for sub-microgram quantities of a number of insect-derived, neurologically active peptides. When combined with a liquid chromatograph, the FAB technique (LC/FAB) is especially powerful, providing structure assignments on-the-fly to even trace components of mixtures of peptide antibiotics.

In the last five years the Lab took giant steps with the acquisition of two state-of-the-art machines. In 1982, NIH and NSF grants allowed it to purchase a VG ZAB HF spectrometer, which was upgraded in 1984 to a ZAB-SE with 15000 mass range at 8 kV. In 1987 the lab acquired the first VG 70-SE 4F,

a four-sector tandem mass spectrometer which is being used for establishing peptide structures by the previously mentioned MS/MS technique.

### ...And Outstanding Service

The Lab is run by a hardworking group of three staff, augmented by several visiting scientists, post doctoral fellows and graduate students, who are usually members of the research group of the Lab's Faculty Director. The staff have maintained an outstanding turn-around record of three days, or less, so that faculty in the School of Chemical Sciences as well as other U. of I. staff who require mass spectrometry measurements need go no further than the quad.

The rapid service is due to the staff's ability to maintain the machines and keep them running, even those that are about twenty years old and long past their prime. Dr. Milberg keeps close track of instruments at other labs, not just to keep pace with the competition, but also to obtain resurctable parts from machines that have been discarded or died of old age.

The Laboratory is supported by grants from the federal government (National Institute of General Medical Sciences, Division of Research Resources, NSF), private industry, salary support from the School of Chemical Sciences, and modest user fees to cover materials, supplies and expenses directly associated with a user's request.

A main item on the current needs list for the Laboratory is new routine instrumentation, which was last purchased almost twenty years ago. If funds, recently requested from the Division of Research Resources NIH, are approved for a new instrument, the old and increasingly unreliable MAT 311A instrument will be retired with honor and dismantled for parts. The Lab will become more efficient in its analyses, especially when only minute quantities of a material are available for study.

With the growing interest in biotechnology, the ability to produce accurate measures of unknown compounds is essential to the analysis of pesticides, pollutants, drug metabolites, and to the myriad other chemical problems being studied by faculty at the School of Chemical Sciences. Professor Rinehart, the Faculty Advisor of the Laboratory since its inception 25 years ago, has become so expert in the interpretation of spectra that he can usually name the compound and its components directly, even without resort to modern man's best friend, the computer. For those in the know, the "mass spec lab" may be "out of sight" but certainly not "out of mind."

## Turbulence Research in Chemical Engineering

by Thomas J. Hanratty



Research on fluid turbulence has been invigorated during the last ten years by the development of new optical techniques and of supercomputer simulations of flow fields. Professor Thomas J. Hanratty and his graduate students in the chemical engineering department share the optimistic outlook of the turbulence research community. Their particular interest is turbulence generated by a fluid moving over a solid boundary, such as the flow in a pipeline.

Everyone has a picture of turbulence as similar to the motion of smoke emerging from a chimney. Yet, a quantitative physical understanding of this haphazard flow remains an unsolved problem. Even for the simple case of flow in a straight pipe, we do not understand the mechanism by which energy associated with the pressure gradient is transferred to the turbulent fluid motion.

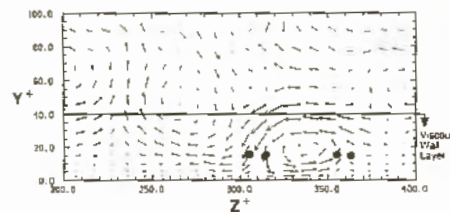
The presence of a wall in a turbulent field puts a constraint on the flow since all velocity components are zero at the wall. Measurements of the time-averaged velocity show changes from zero to a value close to the bulk velocity in a very short distance from the wall, typically less than a millimeter. This region, called the viscous wall layer because of the strong effects of viscosity, had been thought to respond to the fluctuations in the outer flow in a passive manner.

In collaboration with Phil Reiss, Ph.D. 1962, Jim Mitchell, Ph.D. 1965, and Kamelesh Kirkar, Ph.D. 1969, Hanratty developed electrochemical techniques which allowed the determination of the fluctuating flow in the immediate vicinity of the wall without interfering with the flow. Electrochemical reactions were carried out on electrodes flush with the wall under conditions that they are mass transfer controlled, (that is, polarized). Measurements of the fluctuating current could then be related to the fluctuating flow. With Larry Eckelman, Ph.D. 1971 and Myon Lee, Ph.D. 1975, Hanratty used arrays of these electrodes to identify eddy motions which produce turbulence by interacting with the wall.

With Hans Hogenes, Ph.D. 1979, he eventually combined measurements at the wall with measurements from a rake of probes in the fluid, so that the velocity was determined simultaneously at as many as thirty points.

The picture of the viscous wall layer that has emerged from these studies and studies in other laboratories is quite different from the motion of a passive region. Both the production and dissipation of turbulence are maxima but there is a net difference which results in a supply of energy to the outer flow, where there is a net dissipation. The viscous wall region is thus found to be the engine that drives wall turbulence. The main part of this engine is an eddy whose properties are determined by a feedback from the outer flow. This interaction is a main focus of current research.

The use of multi-probe laboratory methods to study this feedback has become outdated in the past five years by the development of large enough computers to calculate, from the Navier Stokes equations, the time-varying velocity and pressure field at two million points. A computer code describing flow in a channel has been developed with graduate student Steve Lyons and Professor John McLaughlin of Clarkson. It will be used this fall by the Hanratty group for production runs on the CRAY-2 at the University of Illinois National Center for Supercomputer Applications.



An example of computed velocity vectors in a plane perpendicular to the flow is shown in the accompanying figure. The dots indicate locations where large production of turbulence occurs. The eddy motions with which they are associated are the wall eddies identified with wall electrodes. The history of these eddies, their origin and fate, is now being studied.

The computer experiments outlined above are, at present, limited to low Reynolds number flows and to simple geometries. These, therefore, need to be supplemented with comparable laboratory experiments that do not have the obvious drawback of using intrusive probes. In collaboration with Professor Ron Adrian of the U. of I. Theoretical and Applied Mechanics Department, Hanratty is undertaking experiments this year in a turbulent flow channel constructed by Mark Niederschulte, Ph.D. 1988, especially for optical experiments. By pulsing a 1 mm thick laser sheet, double images of 5 micron particles in the flow field are recorded on a photographic plate. The analysis of these photographs gives the same type results on the velocity vector field as obtained in the computer experiments.

## Switzer New Head of Biochemistry



Professor Robert L. Switzer has been appointed head of the Biochemistry Department, succeeding Professor Lowell Hager, who has asked to be relieved in order to devote additional time to his research program and to the Biotechnology Center, of which he is Director.

Dr. Switzer has known the U. of I. Chemical Sciences for many years and from many different perspectives. He came to the University as an undergraduate and received his B.S. in Chemistry from the U. of I. in 1961. After graduate work at the University of California (Berkeley) and a postdoctoral fellowship at the National Institutes of Health, he returned as a faculty member in 1968 and has spent the last twenty years here except for a sabbatical year on a Guggenheim Fellowship in Freiburg, West Germany and a sabbatical last spring at the U. of California at Davis.

His research has focused on the regulation of metabolism through control of biosynthetic enzymes during growth and differentiation of microbes and on the active sites and mechanisms of catalysis of enzymes. He is co-author with John M. Clark Jr. of the second edition of "Experimental Biochemistry", published by W. H. Freeman. He is also chairman of the Biochemistry Study Section of the National Institutes of Health's Division of Research Grants and serves on the editorial boards of several professional journals.

Dr. Switzer lists his chief responsibilities as (1) recruiting and retaining excellent faculty and support staff, (2) providing superior research facilities, and (3) promoting an outstanding undergraduate and graduate educational program. He notes that chemistry and biochemistry at Illinois have a long tradition of excellence, which will require constant effort and strong support from the State of Illinois and friends of the department.

Dr. Switzer looks forward not only to working with congenial colleagues but also to welcoming alumni who have an opportunity to visit. He hopes that more alumni will return to see old friends and to become acquainted with exciting new research projects that are under way.

## Former Faculty

### Award to William J. Rutter

Former biochemistry professor, William J. Rutter is recipient of the Ernst W. Bertner Memorial Award at the 41st Annual Symposium on Fundamental Cancer Research. Professor Rutter was at the U. of I. from 1955-65, before leaving us for the University of Washington in Seattle. Subsequently, he was head of biochemistry at the University of California at San Francisco School of Medicine. He is currently Director of the Protein Hormone Laboratory at the University of California-San Francisco.

### Shakhashiri Named to NSF Post

Former chemistry professor, Bassam Z. Shakhashiri has been named Assistant Director for Science and Engineering Education at the National Science Foundation. Dr. Shakhashiri was at the U. of I. first as a postdoctoral fellow and subsequently as a faculty member from 1968-1970. In 1970 he was invited to join the faculty at the University of Wisconsin-Madison, a position he has held ever since. In 1983, he founded the Institute for Chemical Education at the University of Wisconsin and was appointed its first director.

### Yankwich Senior Executive Officer at NSF

Peter E. Yankwich, who retired as Professor of Chemistry at the U. of I. this year, will continue as Senior Executive Officer of the Directorate for Science and Engineering Education at the National Science Foundation, a post he has held since 1985. Dr. Yankwich is author of the widely acclaimed report *Tomorrow - The Report of the Task Force for the Study of Chemistry Education in the United States*, published by the American Chemical Society in 1984.

## Dow Sponsors Symposium on Organometallics in Organic Synthesis

A symposium on applications of organometallic chemistry to organic synthesis, was held on October 29. Patricia Shapley, Professor of Chemistry, organized and chaired the conference. Topics of the symposium included organometallic reagents and catalysts that improve reactivity and selectivity in reductions, oxidations, and carbon-carbon bond forming reactions of organic molecules. A second focus was on chiral organometallic reagents that are used to impart stereoselectivity to organic reactions.



# PRIVATE SUPPORT PLAYS CRUCIAL ROLE

*We Depend  
on your  
Generosity*

Private support has always helped the School of Chemical Sciences to maintain and expand its tradition of excellence. Today, because of financial stringencies at the state level, this support is more important than ever. Costs are rising and state support is stagnant. The generosity of our industrial friends and private donors has never been more welcome. Private and industrial donations provide about (8%) of the total budget; state funds provide less than half; our largest supporter is the federal government, that responds to faculty research proposals.

A major part of our discretionary budget comes from your support. Probably the greatest need for those funds is to bring in new, bright, young faculty. Because modern chemistry is so capital intensive, successful recruitment of a new researcher can easily cost \$200,000 or more. An older, established researcher can cost \$1 Million plus in equipment and renovated laboratory space. Therefore, the "Young Faculty Support" category is crucial for maintaining a vigorous program that will provide a cadre of well trained students for industrial research and academic programs.

"Student support" includes outlays for students in excess of designated fellowships and scholarships. For instance, almost all the graduate students require some help with relocation expenses. Some fellowships, research assistantships, scholarship support, travel, as well as emergency loans come from discretionary funds. The reward of outstanding student performance is another very important facet. Many of the awards, such as the Eisele, the Tom Sidebottom and

the Keyes awards listed in the "Highlights of 1987/88" are supported by special funds, often set up as memorials to former students or other relatives.

"Educational expenses" is another very important category that primarily receives state support but the level of support is never enough. For instance, this year, we used private funds to purchase audio-visual equipment because of its effectiveness for undergraduate teaching laboratories.

Both "Laboratory Renovation" and "Research Equipment" expenses are primarily met from state funds and grant support. However, private support is a crucial extender that often makes the difference between a minimal and a well set up lab that stimulates the researcher to give the extra margin to the research project.

In addition to these various uses for discretionary funds, the School has a number of established Foundation accounts that are set up for one or more specified purposes. For instance, the Roger Adams, C.S. Marvel, R.C. Fuson, John Bailar, Nelson Leonard, Worth Rodebush, and the W.H. Flygare Funds have been set up to honor outstanding faculty. Several of these support an annual lecture or lecture series by distinguished outside faculty. The Marvel lecturer in 1987/88 was Professor Gilbert Stork of Columbia University; the Nelson J. Leonard Distinguished Lecturer was Professor D.H.R. Barton of Texas A & M, the Bailar lecturer was Professor Hubert Schmidbaur of the Technische Universität of München, and the Flygare lecturer was Professor Dudley Herschbach of Harvard University. Symposia and lectures supported by private indus-

try, including Dow, Monsanto, Procter & Gamble and Merck have added an important dimension to our chemical science program.

The Fuson Fund supports a professorship and a competitive travel award for graduate students to present their research findings at the National ACS meetings. The two or three students selected each spring and fall receive funding for all meeting-related expenses and are given an opportunity to present their papers at a departmental seminar as a practice session. The Adams fund is used largely for student support and for some equipment purchases. The Illini Chemists Fund is used for a variety of projects including expenses associated with printing this newsletter.

The needs of the School are many and varied and more pressing than ever. If you would like to donate money for a specific purpose, even one not listed on the reverse of this page, please let us know and we will work out a satisfactory arrangement. If those of you who supported a state tax increase for funding education would like to send those "saved" dollars to us directly, we would spend them according to your wishes on programs of which we can all be justly proud.

# HELP SUPPORT OUR EXCELLENT PROGRAMS

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More than ever, we need your help to maintain and expand our programs by supporting the School of Chemical Sciences. *Our needs list, including established Foundation funds does not include Chemical Engineering Funds since that department handles its own fund raising and reporting.* Please be as generous as you can and include a matching gift form if your company has such a plan.

Please mark the appropriate box or boxes and send a check made out to the School of Chemical Sciences. A self-addressed envelope is enclosed for your convenience.

- Young Faculty Support
- Student Support
- Educational Expenses
- Laboratory Renovation
- Research Equipment
- Roger Adams Fund
- Carl Shipp Marvel Fund
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- General Fund
- I would like to set up a new fund, details to be discussed.
- Other \_\_\_\_\_

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*Many Thanks For Your Support!*

## Schowalter Appointed U of I Engineering Dean



William R. Schowalter MS '53 and Ph.D. '57 in Chemical Engineering, will be returning to the U. of I. in the spring as dean of the College of Engineering. The past 30 years he spent at Princeton, from 1971-77 as associate dean of the School of Engineering and Applied Science.

At the time that his selection was announced, he was still in Paris, spending the academic year on a Guggenheim Fellowship at the Universite Pierre et Marie Curie. Dr. Schowalter is a widely respected scholar and leader in the field of engineering education. He is a member of the National Academy of Engineering and has served on a number of its committees, including a panel on engineering research centers. He was chairman of the awards committee.

Dr. Schowalter said that he was attracted to the position at Illinois because of the wide range of strengths in engineering and science at the University and the potential for significant further accomplishments. He is also impressed with the many opportunities for interdisciplinary research which exist at Illinois.

In 1982 Dr. Schowalter received the William H. Walker Award from the AIChE in recognition for his contributions to chemical engineering literature. Dr. Schowalter is known for his work in fluid mechanics of polymer and colloidal systems. At Princeton he headed a research program dealing with the theoretical and experimental aspects of fluid mechanics.

## Basolo and Collman Receive Honorary Degrees

**Fred Basolo**, Ph.D. '43 (Chemistry with Bailar) Morrison Professor of Chemistry at Northwestern University, will receive an honorary doctorate from the faculty of sciences at the University of Turin, Italy, for his fundamental contributions to modern inorganic chemistry. Dr. Basolo has received a large number of important honors. In 1987 he was elected a foreign member of the National Academy of Sciences of Italy. He is also an honorary professor at Lanzhou University in the PRC and is a corresponding member of the Chemical Society of Peru. He received an honorary doctorate from Southern Illinois University in 1984. Dr. Basolo is a member of the National Academy of Science, and the American Academy of Arts and Sciences. He is also a former Guggenheim Fellow and a former president of the American Chemical Society.

**James P. Collman**, Ph.D. '58 (Chemistry with Fuson) was awarded an honorary Doctor of Science degree from the University of Nebraska on May 7, 1988. On October 5, 1988 he was awarded a "Docteurs Honoris Causa" from the University of Dijon, France.

## Heckert, of DuPont, Receives Alumni Achievement Award

Dr. Richard E. Heckert, Chairman and Chief Executive Officer of DuPont, received the U. of I. Alumni Achievement Award at the May Commencement ceremonies. Dr. Heckert, who earned his Ph.D. under Professor Harold Snyder in 1949, has devoted his entire career to DuPont, the world's leading chemical company.

Heckert joined DuPont as a research chemist and then moved into research management, primarily in the development of cellophane and mylar polyester film. He became a director and member of the executive committee in 1973, president and chairman of the executive committee in 1981, and finally, chairman and CEO in 1985.

Throughout the years, Dr. Heckert has maintained his ties to the University of Illinois. He is a member of the University of Illinois Foundation and of the Presidents Council.

## In Memoriam

**Jack Hine** Ph.D. '47 (Chemistry with Adams), Professor Emeritus of Chemistry at Ohio State University, died on July 6, 1988. In addition to his postdoctoral work at MIT and Harvard, he had taught at Georgia Institute of Technology where he was named Regent's Professor in 1958. He joined Ohio State University in 1965.

**Willis Theodore Maas** M.S. '36, died on February 29, 1988. He was a retired school teacher who had taught at Dupu, Illinois for 36 years.

## News of the Classes

### '36

**Vernon G. Parker**, B.S. '36 retired from Goodyear Tire and Rubber Company, in Akron, Ohio, where he had practiced as a patent attorney. He now golfs and gardens in Fort Pierce, Florida.

### '37

**Roy Hong**, B.S. '37 retired 8 years ago from practicing as a physician. He lives on the pine tree plantation he started in Wisconsin in 1946.

### '42

**Peter M. Bernays**, Ph.D. '42 (Chemistry with Clark) retired after almost 34 years with Chemical Abstracts Services. Most recently he had been a document analysis manager in physical-inorganic-analytical chemistry.

### '44

**Ming-chien Chiang**, Ph.D. '44 (Chemistry with Adams), is a member of the Division of Chemistry, Academia Sinica (Chinese Academy of Science) and is vice-chairman of the Scientific Council of the Institute of Chemistry, Academia Sinica. His book, "The Rule of Homologous Linearity of Organic Compounds", is now available in English. In 1982 the book was awarded the "Important Achievement Prize" and the "Natural Science Prize" by the National Commission of Science and Technology of the PRC.

**Zeno Wicks**, Ph.D. '44 (Chemistry with Adams) received the Roy W. Tess Award of the Division of Polymeric Materials: Science and Engineering of the American Chemical Society. Dr. Wicks is professor emeritus and former chairman of the Polymers and Coatings Department, North Dakota State University. He received a distinguished professorship in 1981, the Matiello lectureship in 1986 and four Roan Awards since 1975.

## '48

**Ernest L. Eliel**, Ph.D. '48 (Chemistry with Snyder), has been re-elected to serve as director-at-large of the American Chemical Society. He is professor of chemistry at the University of North Carolina at Chapel Hill. Professor Eliel is a fellow of the American Association for the Advancement of Science, a member of the National Academy of Sciences, the American Academy of Arts and Sciences, and the Royal Society of Chemistry.

## '52

**Donald S. Acker**, Ph.D. '52 (Chemistry with Adams) has retired from DuPont.

## '53

**A. Jerry Kresge**, Ph.D. '53 (Chemistry with Leonard) has received the 1988 Syntex award in physical organic chemistry from the Canadian Society for Chemistry and the 1988 Morley award medal of the Cleveland section of the ACS. Dr. Kresge is Professor of Chemistry at the University of Toronto. He is a fellow of the Royal Society of Canada and has been a Fulbright scholar, a Guggenheim fellow, a Killam fellow, a National Science Foundation senior fellow and a Yamada fellow.

## '54

**Daryle H. Busch**, Ph.D. '54 (Chemistry with Bailar) has left Ohio State University and will become the Roy G. Roberts Distinguished Professor of Chemistry at the University of Kansas.

**Stanley Kirschner**, Ph.D. '54 (Chemistry with Bailar), has been elected director-at-large of the American Chemical Society. Dr. Kirschner is professor of Chemistry at Wayne State University in Detroit. Among his honors are the Heyrovsky Medal of the Czechoslovak Academy of Science and the Catalyst Award for Teaching Excellence of the Chemical Manufacturers Association.

## '56

**Ogden C. Johnson**, Ph.D. '56 (Chemistry) retired from his position as senior vice president for Hershey Foods Corporation.

## '61

**James E. Dunn**, M.S. '61 is manager of technology - International Business - for McDonnell Aircraft Co. He handles technology transfer projects on offset programs in Spain, Australia, Canada, and Switzerland. He is also past chairman of the Missouri Industrial Energy Consortium.

**Donald R. Hartter**, B.S. '61 has been named vice president of Air Products Pacific, Inc. in Osaka, Japan, a subsidiary of Air Products and Chemicals, Inc. Dr. Hartter, who received his Ph.D. from the U. of California at Berkeley, most recently served as director of research and commercial development for the company's industrial chemicals division.

## '64

**Frank Cardulla**, M.S. '64, was a winner of the 1987 Chemical Manufacturers Association's Catalyst Awards. He is a chemistry instructor at Niles North High School in Skokie, Illinois.

**Willard W. Harrison**, Ph.D. '64 (Chemistry with Malmstadt), has been named Dean of the College of Liberal Arts And Sciences at the University of Florida in Gainesville.

**Leonard V. Interrante**, Ph.D. '64 (Chemistry with Bailar), was chosen the first editor of the newest journal of the ACS, "Chemistry of Materials". Dr. Interrante is professor of chemistry at Rensselaer Polytechnic Institute.

## '68

**Stephen T. McLin**, B.S. '68 (Chemical Engineering), is president of American First Financial Corporation which has recently acquired the \$2.0 billion Eureka Federal Savings and Loan Association. He is president and CEO of Eureka.

**Brian W. Moores**, Ph.D. '68 (Chemistry with Belford), was appointed chair of the chemistry department of Randolph-Macon College in the Fall of 1988.

**Robert E. Tapscott**, Ph.D. '68 (Chemistry with Belford), was named Manager of the Advanced Protection Technologies Division of New Mexico Engineering Research Institute, the full-time research branch of the College of Engineering, University of New Mexico.

## '69

**Kamalesh K. Sirkar**, Ph.D. '69 (Chemical Engineering with Hanratty), professor of chemical engineering at Stevens Institute of Technology in Hoboken, NJ, received an honorary master of engineering degree from Stevens for his significant research on membrane separation.

## '71

**Thomas W. Fryzel**, B.S. '71 (Chemistry), became a partner in Peregrine Marketing Associates. The firm is a new venture, offering marketing consulting and production of marketing communication vehicles for technically oriented clients, and training in the use of in-house microcomputer systems for publications, presentations, and promotional material.

## '72

**Pak Tong Leung**, Ph.D. '72 (Chemistry with Curtin), is now senior group leader for research and development in the Adhesives Division of the Uniroyal Plastics Co. at Mishawaka, Indiana.

**Robert H. Suzuki**, B.S. '71 (Chemical Engineering) has taken a position with the Clorox Company as Manager of Corporate Health, Safety, and Environment to direct its domestic and international environmental, health and safety activities.

## '73

**Gregory Reinhart**, B.S. '73 (Biochemistry) has received an American Heart Association Established Investigatorship. He received his Ph.D. in Biochemistry from the University of Wisconsin in Madison and is Professor of Chemistry at the University of Oklahoma at Norman.

## '74

**Sang Heup Moon**, Ph.D. '74 (Chemical Engineering with Drickamer) has been named Associate Professor in the Department of Chemical Engineering at Seoul National University.

## '75

**Andrew Loh**, Ph.D. '75 (Chemistry with Natusch) has been named Director, Process Development and Manufacturing Technical Support at Hybritech, a wholly owned subsidiary of Eli Lilly Co.

'76

**Martin A. Cohen, Ph.D. '76** (Chemistry with Brown), has been appointed to the post of technical director at Lydall's Manning Division.

**Jimmy M. Davis, Ph.D. '76** (Chemistry with Stuckey), has been appointed the first dean of Union University's Memphis campus.

**Edward Younger MD, B.S. '76** is in private practice in orthopedic surgery after a seven year residency at the University of California at Davis.

'78

**John Seevers, B.S. '78** (Chemical Engineering) became a packaging engineer at Alcoa Foil Mill in Davenport, Iowa, in February, 1988.

'79

**Paul J. Casaletto, B.S. '79** (Biochemistry), has been promoted to director, pharmaceutical quality control for Bristol-Myers U.S. Pharmaceutical and Nutritional Group, headquartered in Evansville, Indiana.

**Thomas J. Daly, B.S. '79** (Chemical Engineering) became a partner with the Pasadena, California, law firm of Christie, Parker and Hale. The firm specializes in patent, trademark, copyright, and unfair competition law.

'80

**Lars Lindquist, B.S. '80** (Biochemistry/ Chemistry) has joined the Chemical Methods and Robotics Department of Waste Management, Inc. in Oak Brook, Illinois.

'84

**Tony Barnes, Ph.D. '84** (Chemistry with Nieman) is currently a strategic consultant for Booz Allen & Hamilton in Chicago, Illinois.

**Gary A. Kaufman, B.S. '84** (Biochemistry) just graduated from Rush Medical College and will do a three year residency in internal medicine at Evanston Hospital in Evanston, Illinois.

**Sean C. O'Brien, B.S. '84** (Chemistry), has received a Ph.D. in Chemistry from Rice University and will be a Robert A. Welch post doctoral fellow with Dean James Kinsey at Rice University.

'86

**Paul A. Keifer, Ph.D. '86** (Chemistry with Rinehart), has joined Varian Associates of Palo Alto, California, as an NMR applications chemist in the Varian instrument group.

'87

**James McComb, Ph.D. '87** (Chemistry with Wraight), has joined the Jet Propulsion Laboratory in Pasadena, California. He is involved in the development of the advanced solid rocket motor for the shuttle and advanced hybrid rocket systems.

'88

**Mathew Chad Tuttle, B.S. '88**, is employed as a chemist and lab supervisor at National Starch and Chemical Company at Meredosia, Illinois.

## KEEP IN TOUCH

Return to: Ellen Handler, Editor  
SCS Alumni Newsletter  
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BEST WISHES IN THIS HOLIDAY SEASON

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