Department Of Chemistry
IOWA STATE UNIVERSITY

ALUMNI NEWSLETTER FALL 2003

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QUICK DETECTION

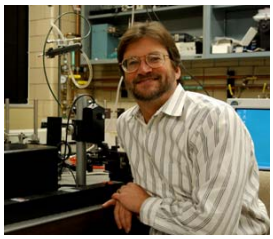
CHEMISTRY PROFESSOR MARC PORTER RECEIVES R&D 100 AWARD FOR NEW PROCESS

Currently it takes the medical profession at least two hours to receive a diagnosis of diseases like HIV, hepatitis C, smallpox, botulism, tularemia and the plague once a blood sample has been obtained.

Thanks to a new development by Marc Porter, professor of chemistry, and Bob Lipert, associate scientist at the Microanalytical Instrumentation Center, that wait can be dramatically reduced down to a diagnosis time of less than one minute.

The pair, along with Concurrent Analytical, Inc., of Kailua, Hawaii, have developed a new generation of immunoassay system, the Ramanprobes™'s System, for detecting and labeling antigents—proteins that serve as the body's natural defense system against infectious agents.

Ramanprobes™ consists of a new line of Extrinsic Raman Label (ERLTM) reagents developed by Porter



Marc Porter

and Lipert and a compact, lightweight fiber-optic Raman microscopy system, Nanoraman™ 1 Instrument, developed at Concurrent Analytical, Inc.

"What we've tried to do here is develop a system that will potentially reduce costs and reduce the limits of detection of infectious diseases," said Porter, who is also the director of the Combinatorial Discovery Institute at Iowa State.

What Porter, Lipert and Concurrent Analytical, Inc., have also done is win a 2003 R&D 100 Award, which have been called the "Oscars of applied science." Sponsored by R&D Magazine, the R&D 100 Awards honor the top 100 products of technological significance marketed or licensed during the previous calendar year. The award winners were honored at a banquet in Chicago in October.

Porter and Lipert say the potential applications of Ramanprobes™ are limitless. In the medical field, the instrument can be used for toxicology and infectious disease applications. Where antibodies exist for the target molecule, the use of Ramanprobes™ will allow for quick detection and identification of many emergency medical applications.

Ramanprobes™ has the ability to detect down to 100 molecules in less than 60 seconds.

The process ultimately provides results that serve as a "fingerprint" for various diseases, according to Lipert.

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EDWARD YEUNG PLANS TO USE FUNDS FROM NEW WRIGHT CHAIR TO PURSUE OUT-OF-THE-ORDINARY RESEARCH

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INSIDE THIS ISSUE:

SCIENCE HAS ALWAYS BEEN THE KEY TO SUCCESS FOR DOW CORNING'S NEW CHIEF OPERATING OFFICER STEPHANIE BURNS

The "Glass Ceiling" that can keep women out of the top corporate jobs was never an impediment for Stephanie A. Burns, 48, the new president and chief operating officer of Dow Corning.

For her, "there was no magic" in reaching a position that puts her next in line to eventually succeeding Gary Anderson, the firm's 57-year-old chairman and chief executive officer. "I'm driven by the science and technology of the company. It's in my blood," she says.

Burns, in fact, has a Ph.D. in organic chemistry from Iowa State University, where she specialized in organosilicons. Her interest in the subject led her to complete postdoctoral studies at the University of Organometallic Chemistry Languedoc-Rousillon in France.

"It's great to have a Ph.D. silicon chemist back at the helm," Anderson says. The last one to steer the company was Shailer L. Bass, a silicon chemist with a Yale University Ph.D. who was chairman and CEO from 1967 to 1971. In placing Burns in charge of day-to-day operations, Dow Corning revives the position of chief operating officer last occupied by Larry Reed in 1993.

Burns says she had good role models to prepare her for her career. Both her parents were professionals who juggled careers and raised four children. Burns has a married daughter and two young grandchildren.

Neither of her parents was a scientists. "My mother was in real estate and managed to balance her family and career," she says. "My father was a Ph.D. from the University of Michigan with a background in history and English. His last job was as dean of continuing education at Florida International University." Both encouraged her to get a good education.

Partly because of her parents' emphasis on education and because of her own interest in science, Burns says she is "disturbed that we are not able to attract many women to a career in science. We know that young girls are interested in science during their early years in school, but by the time they get into high school, they lose interest. We have to put more emphasis into making science fun at the high school level."

Stephanie Burns

Burn's own interest in science led to her first job with Dow Corning, miles away from the executive suite. About 20 years ago, she joined central research and there began her effort to "provide markets with the benefits of silicon chemistry." Staying focused on that goal and doing the best job she could, she says, eventually led her to assume several product development, marketing, and business management positions. Burns assumed her most recent job, executive vice president, two years ago.

She has also been deeply involved in the nitty-gritty issues that threatened Dow Corning's very existence. From 1994 to 1997, she was director of women's health issues and a member of company's bankruptcy management team when it filed for reorganization in 1995.

"My role was to reach out to women's groups and to the Food & Drug Administration to talk about our research and the health and safety of silicone breast implants. The good news," she says, is that scientific studies "continue to show the lack of any relationship between silicone implants and disease."

However, the bad news is that despite the scientific data Burns cites, the weight of women's lawsuits charging that the implants made them ill forced the firm to offer $3.2 billion to settle their claims. The money will provide "finality" for women, Burns says, once the courts approve the company's $4.2 billion reorganization plan now expected sometime in 2004.

As Dow Corning waits to leave court supervision behind, a top priority for Burns is to urge the company's scientists to develop innovative products and expand businesses built on the company's core of silicon-based chemistry R&D, as the percent of sales was at 6% in 2002, high compared with other specialty chemicals companies, down from the 7% of sales the firm put into R&D in 2001, but just right for now, she says.

Researchers are going beyond the tried and true and focusing more on high-growth areas with the greatest new product potential. Burns' list includes photonics, battery and solar energy applications. An alliance formed two years ago with Genencor to develop biotechnology applications for silicon is bearing some fruit, she says, but is a longer term prospect. Beyond research, Burns plans to enlarge the company's presence in emerging markets like India, China, Eastern Europe, and Russia with elastomers plants and applications labs.

As Burns sees it, there is no ceiling blocking her own—or Dow Corning's—advance.

CHIRALITY MEDAL 2003
TO CALDWELL PROFESSOR DANIEL ARMSTRONG

The Chirality Medal Honorary Committee elected Professor Daniel W. Armstrong, Iowa State University, as the recipient of the Chirality Medal 2003.

The Chirality Medal was instituted by the Societa Chimica Italiana in 1991 to honor internationally recognized scientists who have made a distinguished contribution to all aspects of chirality.

The medal was presented at the 15th International Symposium on Chirality (ISCD-15) on October 20-23, 2003 in Sizuoka, Japan, and the awardee gave the Chirality Medal Award Lecture at the symposium.

Professor Armstrong's current research involves chiral recognition, specific separation and detection of enantiomers, cyclodextrin chemistry, investigation of biologically active molecules, macrocyclic antibiotics, high efficiency microbial analysis, and use of room temperature ionic liquids in chemical analysis and separations.

Professor Armstrong is considered the "Father" of micelle and cyclodextrin-based separations. He elucidated the first chiral recognition mechanism by cyclodextrins. He also first developed macrocyclic antibiotics as chiral selectors. He is one of the world's leading authorities on the theory, mechanism and use of enantioselective molecular interactions. Over 30 different LC and GC columns originally developed in his laboratories have been commercialized and/or copied worldwide. His work and columns were in part responsible for the chromatography and electrophoresis-led revolution in chiral separations over the last two decades. This work provided the impetus for the FDA's regulatory changes regarding chiral drug development in 1992. More recently, he has developed rapid, high efficiency, microfluidic methods for analyzing microorganisms and colloidal particles. He also developed the most comprehensive salvation and characterization models for room temperature ionic liquids (RTILs). According to Scientific Citation Index, he is one of the more highly cited chemists in the world. He has over 330 publications including 20 book chapters, one book (use of *Ordered Media in Chemical Separations*) and eight patents. He has given over 350 invited seminars and colloquia worldwide.

He is the Separations Associate Editor for *Analytical Chemistry* and was the Editor of the international journal *Chirality*, a section Editor for *Amino Acids*, and a member of the Editorial Board of many other journals.

Daniel Armstrong

Caldwell Distinguished Professor of Chemistry

Professor Armstrong is considered the "Father" of micelle and cyclodextrin-based separations

WOMAN IN SCIENCE

A pact with a friend brought Kathleen Trahanovsky to Iowa State's Department of Chemistry 40 years ago.

While that friend didn't stay long on campus, Trahanovsky did, completing her master's degree is chemistry.

"My intention was only to get a master's degree," she said. "I went back to Boston after I completed my degree."

In Boston, Trahanovsky taught some courses and found she enjoyed being a teacher. So it was back to Iowa State, where she began working on a Ph.D. in organic chemistry and serving as a teaching assistant in the Department of Chemistry.

On her first day back in Ames, she met a young new faculty member (Walter Trahanovsky) and that relationship led to marriage, children and when her husband earned tenure, an uncertain job future for Kathleen Trahanovsky.

"There were no other real employment opportunities for me if I wanted to continue to be a chemist," she said. "The (chemistry) department would add a section or a faculty member would go on leave and they would call me up and ask me if I wanted to teach."

For the first few years, Trahanovsky said that arrangement was fine. Her children were young, requiring a flexibility that a full-time position wouldn't have allowed.

The trouble was there was no future, no security, no status," she said. "I was never evaluated and from semester to semester, I didn't know if I would have a position. I could have been a free postdoc, but that didn't appeal to me."

During that time frame, Trahanovsky thought she was in a unique situation. Then she found out that other women chemists at research universities across the country were in the same boat.

At a meeting of the Women Chemists Committee of the American Chemical Society, Trahanovsky decided to see if anyone could give her some advice on the situation.

"I stood up and told the group that I had been temporary teaching for eight to ten years and I was bothered by my status," she recalled. "The room responded almost as one. Everyone either had gone through the same situation or knew someone like me."

Trahanovsky stayed involved with the Women Chemists Committee, chairing that ACS group from 1989-91. During that time and since then, she has become an advocate for raising the consciousness of academic departments, particularly in the sciences, about hiring more female professors. She remains a frequent speaker on encouraging women in science.

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NEW FACULTY JOIN ISU

Ethan Badman
Associate Professor

Dr. Ethan Badman joined the faculty in August 2003 as an Assistant Professor. He received his Ph.D. from Purdue University in 2001 and was a joint-Postdoctoral Associate at Indiana University and Purdue University from 2001 to 2003.

Mass spectrometry (MS) is a technique widely used for analytical applications including organic structural analysis, environmental monitoring, and peptide identification, but its application to the analysis of large, complex biological species and their non-covalent complexes is still in its infancy. Non-covalently bound species can be ionized from solution and observed by MS, but the full extent to which MS and gas-phase methods can be used to analyze these biologically important complexes is not fully understood.

Our lab develops and applies gas-phase methods of analysis to biomolecules and their non-covalent complexes (for example, protein-protein and DNA-drug complexes). Because these systems are complex and their gas-phase properties are not well understood, mass measurements alone are often not enough to analyze them completely; therefore, we develop tandem gas-phase techniques, ion mobility and mass spectrometry, as well as ion chemistry to (1) explore the properties and reactivity of gas-phase biological ions, (2) understand the relationship between solution and gas-phase biomolecules, and (3) develop gas-phase methods to analyze solution-phase non-covalent interactions in a rapid, selective, and sensitive manner.

This research involves a number of inter-related projects, including instrumentation and methods development, and both solution and gas-phase reactions to probe biomolecules. We are developing unique ion mobility/MS instrumentation with multiple ion sources to allow us to interrogate the complexes we generate, whether from solution or in the gas phase. Multiple ion sources give us independent sources of reagent ions for gas-phase chemistry, such as generating gas-phase complexes and as probes of biomolecule structure and reactivity. Ion mobility gives us information about the conformation of the bio-ions, and is thus important to our understanding of these species and the solution to gas-phase transition. MS is used in tandem with ion mobility measurements to verify the identities of the ions whose conformations are measured.

Hans Stauffer
Associate Professor

Dr. Hans Stauffer joined the faculty in August 2003 as an Assistant Professor. He received his Ph.D. from Cornell University in 2000, was a Postdoctoral Associate at the National Institute for Standards and Technology, and University of Colorado from 2000-2002, and a Visiting Postdoctoral Associate at the University of California-Berkeley, from 2002-2003.

The goal of using light to selectively break chemical bonds, and more generally to guide molecular processes via quantum interference effects, has been pursued since the development of the laser. A great deal of recent progress has been made in this direction, and examples of ultrafast laser control of coherent molecular state superpositions ('wave packets') have begun to extend beyond model two-atom systems to both gas- and solid-phase polyatomics. Recent years have also brought many technological advances in this field, including the advent of elegant ultrafast pulse shaping techniques and the implementation of feedback-controlled learning algorithms. These advances allow manipulation of molecular systems even in cases where the controlled molecule is too complex to reasonably model with theory.

We will apply these experimental ultrafast techniques to several small (~3-10 atom) neutral molecular systems to exert control, through well-timed pulse sequences and cleverly designed pulse shapes, over the excitation and dissociation of these molecules. By combining these ultrafast laser techniques with molecular beam techniques, these coherent control experiments will begin in the isolated molecule regime, with experiments directed toward selectively breaking specific chemical bonds. Ultimately, however, we are interested in discovering how our ability to control these processes is affected by interaction with surrounding media. Therefore, we will quickly direct experiments towards more complex regimes in which the controlled molecule is either embedded within an isolated cluster of solvent molecules, or completely dissolved into solution.

Andrew Hillier
Associate Professor

Dr. Andrew C. Hillier, Associate Professor of Chemistry and Associate Professor of Chemical Engineering. Dr. Hillier received his B.S. in chemical engineering from the University of Nebraska in 1990 and his Ph.D. in chemical engineering from the University of Minnesota in 1995. Prior to coming to Iowa State University, Dr. Hillier was a postdoctoral researcher in the Department of Chemistry and Biochemistry at the University of Texas at Austin working with Allen J. Bard. He started his academic career in 1996 at the University of Virginia as Assistant and then Associate Professor in the Department of Chemical Engineering. In 1996 he received the Camille and Henry Dreyfus New Faculty Award followed by the Young Electrochemical Scanning Probe Microscopist Award in 1997. In 1999, he received a National Science Foundation Early Career Development Award. The Office of Naval Research Young Investigator Award was given to Dr. Hillier in 2000 with the Young Investigator Award by the Society of Electroanalytical Chemistry being awarded to him in 2002. Dr Hillier was also named Memminger Faculty Fellow at the University of Virginia in 2002. Dr. Hillier is currently on a joint appointment with the Departments of Chemistry and Chemical Engineering at Iowa State University.

Our research activities are focused on studying the solid-liquid interface and include the broader topics of interfacial engineering, materials synthesis and characterization, and electrochemistry. We perform exploratory experimental studies of polymer thin films and membranes, metal electrocatalysis, electro-active macromolecules, and self-assembled monolayers. Our goal is to develop new and improved materials for applications that include electrochemically-driven separations, chemical and biological sensors, chemical barrier and controlled delivery systems, and fuel cells. We also perform fundamental studies of the solid-liquid interface in order to gain a better understanding of interfacial properties such as non-contact forces, adhesion and interfacial friction as well as chemical properties including reactivity detection and combinatorial materials screening, assembly and testing of polymer-sensor arrays, and design of electrochemically-

FACULTY HONORS

Daniel Armstrong

- Kenneth A. Spencer Award of the ACS Kansas City Section
- Chirality Award

Tom Barton

- Director of the Year, Federal Laboratory Consortium for Technology Transfer

James Espenson

- ACS Award for the Advancement of Inorganic Chemistry

Tom Greenbowe

- Outstanding Faculty Member, Interfraternity Council

Mei Hong

- ACS Award in Pure Chemistry
- ISU Foundation Award for Early Achievement in Research/ Creativity, 2003
- Promoted to Associate Professor with tenure.

Nenad Kostić

- Iowa Regents Faculty Excellence

George Kraus

- Team Achievement Award, ISU Extension, 2002

Richard Larock

- ACS Organic Division Edward Leete Award
- ACS Arthur C. Cope Award
- Paul Rylander Award

Victor Lin

- NSF Early CAREER Award

Gordon Miller

- Visiting Scientist, MPI-Stuttgart, Germany

Jacob Petrich

- Award Honoring Iowa State University Inventors, April 2002

Nicola Pohl

- Research Corporation Cottrell Scholar

Marc Porter

- McElvain Lecturer, University of Wisconsin-Madison, 2002

Kathleen Trahanovsky

- ISU Alumni Association Faculty Citation, 2002

John Verkade

- Visiting Professor, Universidade Federal de Minas Gerais, Belo Horizonte, Brazil, 2002

Keith Woo

- Promoted to Professor

Edward Yeung

- Honorary Professor (first ever), Hunan University, 2002
- Burroughs Welcome Distinguished Lecturer, East Carolina University, 2002
- Award in Separation Science, Eastern Analytical Symposium, 2003
- Named Chair, Robert Allen Wright Endowment for Excellence

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Marc Porter and Bob Lipert

"While there is a potential use in the detection of weapons of mass destruction, it's the medical applications where we're spending most of our time".

Quick Detection

cont'd. from page 1

"We want to eventually develop a chip that will have simultaneous diagnosis of 15 or so different cancers," Lipert said. "We have that potential with Ramanprobes™."

In the initial testing of Ramanprobes™, studies centered on early cancer detection, in particular prostrate cancer. Porter said that the reliability of cancer detection went from 30 percent to 60 percent with Ramanprobes™.

But the potential doesn't stop here. Porter and Lipert have received funding from the National Defense Center of Excellence for Research in Ocean Sciences (CEROS) on the assumption that the instrument can be used for detection of weapons of mass destruction. CEROS is funded by the Defense Advanced Research Projects Agency. While antibodies exist for chemical weapons such as sarin, mustard, and Vx, this detection scheme could be used to monitor for these agents at levels close to single-molecule detection.

"We want to produce a device that is a low-cost, affordable instrument that can actually read a blood sample at, say, McFarland Clinic or Mary Greeley Hospital here in Ames," Porter said. "While there is a potential use in the detection of weapons of mass destruction, it's the medical applications where we're spending most of our time".

The vision is pretty cool, he continued. "The idea that you can prick a finger, read that sample with this instrument and get a result this quickly—it's pretty exciting.

Ramanprobes™ System

THANK YOU

Abbot Laboratories Fund, Dr. Roger Adams, ADM Corn Processing, Robert and Cheryl Allen, AstraZeneca, Mrs. Diane Banasiak, Neal and Judith Baty, Dr. Joseph Beckman, Dr. Eleanor Behrmann, Dr. Michelle Bernaski, Dr. Lisa Berreau, Richard Biddle, Jorjan Borlin, Dr. William Boulanger, Dr. David Boylan, Dr. Horace Brown, Caltech Industries, Dr. Leslie Carpenter, Mr. Christian Casper, Chevron Phillips Chemical Co., Dr. Andrew Clausen, ConocoPhillips Foundation, Corning Incorporated Foundation, Dr. Adrian Daane, Dr. Lawrence Dahl, DaimlerChrysler Corp. Fund, Dr. Neil Danielson, Dr. Douglas Denton, Dr. Thomas DeVore, Penelope DeYong, Dow Chemical Co. Foundation, Dow Corning Corp., Wilma Eaton, Dr. Gilbert Eian, Equistar Chemicals LP, Alice Evens, Exxon Mobil Foundation, Dr. William Fellows, Dr. Patrick Flash, Dr. Bruce and Mrs. Carole Foxman, Dr. Richard Gingerich, Robert Goldberg, Dr. Jack Guillory, Dr. Clarence and Marlene Habermann, Hach Scientific Foundation, Dr. Peter and Kathryn Hansen, Robert Harris, Bryce Harthoorn, Dr. James Hershberger, Alan Himstedt, Drs. Darleane and Marvin Hoffman, Dr. Julian Honeycutt, Jon Isenhart, Arelene James Revocable Trust, Richard Jarbeau, Robert Johnson, Steve Johnson, Donald Johnson, Dr. Joseph Kaczvinsky, Dr. Robert Karraker, Dr. Robert Kinney, Dr. James Koerner, Dr. Thomas Lees, Hiram Levy, Dr. Joseph Lutkenhaus, Martha Mackin, Dr. James Malandra, Dr. Herbert Malkus, Dr. Dale Margerum, Celia McClinton, Merle McCoid, Dr. Stephan McLain, Dr. Jean Merrick-Mack, Dr. Mark Midland, Dr. Fredrick Miller, Dr. Kenneth Miller, Minnesota Mining & Manufacturing Co., Dr. Gary Molander, Donald Morgan, Dr. Charles Myers, Dr. Leo and Judy Ochrymowycz, Paul Oksnee, Osram Sylvania Inc., Bernice Paige, Dr. Richard Palmer, Barry Parks, Dr. Eugene Paschall, Dr. John Paxson, Dr. Gerald Payton, Dr. Richard J. Phillips, Dr. Joseph Picken, Dr. Benjamin Plummer, Arthur and Ada Potratz, Dale Powers, PPG Industries Foundation, Steven Richter, Dr. Robert Rolih, Dr. Martha Russell, Dr. Gerald Scheppers, Robert Schmitt, Dr. Joseph Schoeb, Dr. Sara Scott, Shell Oil Co. Foundation, Dr. William Shore, Dr. James Smith, Dr. Robert Smith, Nancy Spencer, Dr. Gerald Spielholtz, Roger Strassburg, Dr. E. Thomas and Charlotte Strom, Dr. Arthur and Ruth Tevebaugh, Dr. Robert and Sally Todd, Yvette Vinson, Ronald Vredeveld, Arthur Wahl, Dr. John Walters, Dr. Thomas Webb, Philip and Donna Whittle, Patrick Wisor, Gary Wulfsberg, Dr. Siu-Yeung Yu, Dr. Susan Zawacky, Dr. Ernest Zuech

ON AND IN DEMAND

NSF AWARDS CHEMISTRY'S VICTOR LIN AN EARLY CAREER AWARD TO DEVELOP CONTROLLED RELEASE DRUG DELIVERY APPLICATIONS

He hasn't even perfected the technology yet, but two East Coast companies are already looking at Victor Lin's future endeavors.

In addition, the National Science Foundation (NSF) has agreed to help fund his method of a controlled release drug delivery system.

That support is the prestigious NSF Early CAREER Award, which Lin, an assistant professor of chemistry, recently received as a five-year, $470,000 grant effective Feb. 1, 2003.

In his project, "Synthesis of Multi-Functional Mesoporous Silica Materials for Studying Intercellular Interaction and Controlled Release Drug Delivery," Lin will design mesoporous materials that are non-toxic, small in particle size, and can serve as non-invasive biosensors. Those materials can also be controlled release drug delivery carriers, which can interact with various cell types either *in vitro* or *in vivo* to study many important intercellular communications processes.

These include stem cell differentiation, neuron-glia interaction, cancer cell angiogenesis, and inflammatory immune response.

"Our long-term research goal is to develop a general method for producing multi-functionalized mesoporous materials with well-defined pore and particle morphology," Lin writes.

He is collaborating with Srdija Jeftinija in the College of Veterinary Medicine on this project.

This would ultimately allow drugs to be delivered to specific areas of the human body that need to be medicated.

"We think that this method would not only kill the bad cells, such as cancer cells," Lin said, "but actually deliver the drugs when and where we want to through a stimuli-triggered release."

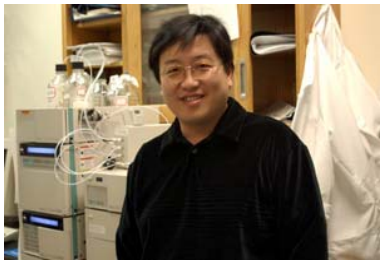
In order to do this, Lin, who has been a member of the Iowa State chemistry faculty since 1999, is proposing that his research group synthesize biocompatible, multi-functionalized nanoporous silica materials with well-defined particle morphology and study selective molecular recognition and controlled release events of drugs and neurochemicals inside the engineered mesopores.

"If I can ultimately build this system and find a way to inject and release the chemicals in the right amount, it will have some impact on the biomedical world," he said.

In addition to the scientific aspects of the project, all NSF Early CAREER awards require an educational component as well.

"As a new faculty member in the Department of Chemistry, I'm particularly interested in developing curricula and teaching methods that could integrate various state-of-the-art research activities into the courses to educate students with interdisciplinary knowledge and training," Lin says.

He plans on using such interactive teaching techniques as chemistry teaching modules and cooperative learning in all levels of courses he teaches at Iowa State. Lin will also develop and incorporate module topics that contain subjects and/or concepts from nanotechnology, materials and biology into traditional undergraduate chemistry courses.



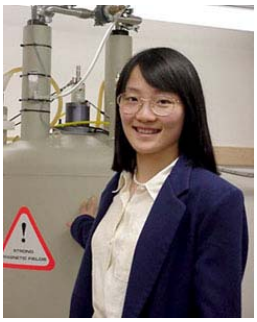
Victor Lin

Associate Professor

"If I can ultimately build this system and find a way to inject and release the chemicals in the right amount, it will have some impact on the biomedical world,"

I would like to introduce my research activities into an interdepartmental course (Advanced Neuroscience Techniques)," Lin said. That course is designed for students majoring in neuroscience, chemistry, biomedical science and biomaterials.

OLD HAT....
ANOTHER YEAR, ANOTHER AWARD FOR CHEMISTRY'S MEI HONG



Mei Hong
Associate Professor

This has started to become old hat for Mei Hong, associate professor of chemistry.

For the sixth year in a row, Hong has been honored for her work.

This time it was by the College of Liberal Arts and Sciences, who awarded Hong its Award for Early Excellence in Research/Artistic Creativity. The award recognizes faculty members who have demonstrated outstanding research activities usually early in their professional careers.

And, just recently, Hong will receive the 2004 American Chemical Society's Award in Pure Chemistry. This award recognizes and encourages fundamental research in pure chemistry carried out in North America by young men and women.

It's just the latest in a series of awards that Hong has received in recent years.

Gordon Miller, professor and chair of the Department of Chemistry, says Hong's creative research themes "combine development and applications of nuclear magnetic resonance (NMR), which will be utilized by chemists in several disciplines for years to come."

Hong's scholarly activity emphasizes the development of new NMR techniques and their applications to study structure-function relations in biological systems.

"Knowledge of the three-dimensional structure is the basis for understanding function," Hong said. "Solid-state NMR is a unique method for studying membrane proteins, because it allows you to investigate these proteins directly in their native environment, the lipid bilayer."

Specifically, Hong's group is investigating the structure and dynamics of a 22kDa antibiotic protein, colicin la chanell domain, with NSF CAREER funding.

EXPLORING OPPORTUNITIES IN FORENSICS SCIENCE

Patricia Thiel

Distinguished Professor of Chemistry

Flip through the channels most any night and you'll run across one of these television programs.

We're not talking reality shows here, although some in the Department of Chemistry hope to make forensics science a reality at Iowa State.

According to Patricia Thiel, distinguished professor of chemistry, it's a hot area in popular chemistry, and has a lot of people thinking.

"There's so much of this type of programming on television that it's catching people's imaginations and many are thinking about forensics science as a career," she said.

Thiel estimates that nearly half of prospective Department of Chemistry undergraduate students, and a significant fraction of graduate students as well, are saying they want to explore being a forensic chemist.

Motivated also by the establishment of the Midwest Forensics Resource Center (MFRC) on campus, Thiel appointed an ad hoc committee to look into the possibility of building links between the Department of Chemistry and forensics science, while she was chair of the department.

That ad hoc committee came back with a variety of suggestions, including seminars, internships and even a graduate specialization.

"But no one had the time to follow up on these recommendations," Thiel said. "They wound up on the back burner."

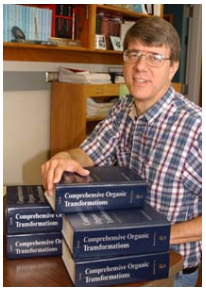
And they remained there until Thiel's term as chair of chemistry expired. Then she went to the new Chair, Gordie Miller, and he agreed that she should take this project on.

Last fall, Thiel became the university's "unofficial lightning rod" by coordinating an NSF IGERT preproposal, focusing on the physical/biological/mathematical aspects of forensics science. In so doing, she gained an appreciation of campus-wide forensic activities, not just activities in her own department.

Thiel hopes to establish internships at forensics labs across the country, perhaps even at Iowa's Department of Criminal Investigations (DCI). Some funding may become available for this from a bequest from an alumnus, Cal Rayburn, two years ago. Rayburn spent his career working at the DCI.

"I firmly believe it is important for the University to expand into this area because Iowa State is in a great position to do it, because it serves society, and because the interest comes from the bottom up."

ORGANIC HONOREE



Richard Larock

Professor of Chemistry

Since his arrival at Iowa State in 1972, Richard Larock has continually been recognized for his teaching and research efforts.

Early in his career, he was named a fellow of the Alfred P. Sloan Foundation and was a recipient of a DuPont Young Faculty Award. More recently in 1997 and 1998, he received Merck Academic Development Awards.

In 1998, the Board of Regents, State of Iowa, honored Larock with the Regents Faculty Excellence Award and a year later he was named a University professor of chemistry.

Along the way, Larock found time to author four books, write nearly 250 papers, produce more than 30 patents and make fundamental advancements in organopalladium chemistry that are useful in the pharmaceutical, chemical and agricultural industries and the development of novel new bioplastics.

So it should come as no surprise that the ACS Division of Organic Chemistry has recently named Larock as the recipient of the Edward Leete Award for outstanding contributions to teaching and research in organic chemistry. The award was presented to Larock at the ACS Fall meeting in New York City in early September.

The award is named in honor of Edward Leete, a former chemistry professor at the University of Minnesota who, through his contributions to science and education, fostered an appreciation and love for organic chemistry.

Continued on page 11

ENDOWED SCHOLARSHIP TOUCHES THE COLLEGE'S FUTURE

Esther C. Daniel

Recently the Chemistry Department received an estate gift of over $500,000 from Dr. Esther C. Daniel to establish the Esther C. and George E. Daniel Endowed Scholarship for the benefit of students majoring in Chemistry.

Dr. Daniel was a student of Dr. Henry Gilman and received her B.S. in 1923 and her M.S. in 1924 from Iowa State University. She went on to earn her Ph.D. from Johns Hopkins in 1941. She is still remembered in an exhibit at the entrance of Gilman Hall along with several other students who worked with Dr. Gilman. She enjoyed a long career as a biochemist working for the U.S. government. Dr. Daniel passed away in July 2002 at the age of 102.

Her generosity demonstrates the tremendous impact gifts received through bequests can have on organizations. Statistics show that only 7 out of 10 Americans have a current, updated will. Many have postponed what appears to be an unpleasant task. Others erroneously assume their assets are not large enough to justify a will. It is important that you have a will in place, so that you (rather than the laws that govern your state) determine how your assets are distributed at the time of your death.

In addition to remembering family and close friends in your will, you can also designate a gift to an institution or organization that has greatly affected your life just as Dr. Daniel did. A bequest is the most frequent form of estate planning largely because it allows you to make a significant gift to an organization without diminishing the assets available to you during your lifetime. Important tax savings can result from such contributions, since bequests to a non-profit organization may be deducted entirely from the taxable estate.

If you don't have a will or if you need to update your existing one, contact your attorney. If you'd like to find out how you can remember the Department of Chemistry in your estate plans, I'd be happy to visit with you. My toll free number is 866-419-6768. Good planning ensures that your assets will benefit the people and institutions you wish to support.

Alsatia Mellecker

Senior Director of Development

Alsatia Mellecker is a 1983 graduate of the University of Iowa with a B.A. in History and American Studies. She served as a development officer at the University of Iowa Foundation for 14 years representing Liberal Arts and Sciences, Nursing and Pharmacy. She is now the Senior Director of Development for the College of Liberal Arts and Sciences at Iowa State University. Prior to her work in higher education philanthropy, she oversaw the fund-raising efforts of the State Historical Society of Iowa.

HIGH RISK RESEARCH

Edward Yeung

Distinguished Professor and Robert Allen Wright Chair

"The Wright endowment will allow us to look into high-risk, high-input research"

Edward Yeung, distinguished professor of liberal arts and sciences and professor of chemistry, has always pushed the envelope when it comes to conducting research.

Four times Yeung has received R&D 100 Awards, dubbed the "Oscars of Applied Science" by the *Chicago Tribune*.

His research activities have been honored numerous times including by the American Chemical Society for his work in chemical instrumentation (1987) and chromatography (2002). Last year, he was also honored with the International Prize of the Belgian Society of Pharmaceutical Sciences. In November, Yeung will be presented the 2003 Eastern Analytical Symposium, Inc. (EAS) Award for Achievements in Separation Science.

So when President Gregory Geoffroy named Yeung the first recipient of the Robert Allen Wright Chair at Iowa State earlier this summer, the distinguished professor knew exactly what he wanted to do.

"The additional research funding will allow us to more freely pursue ideas that might be far out from the traditional areas of research," Yeung said. "At the initial stages, most of these ideas may not be feasible, but the Wright endowment will allow us to look into high-risk, high input research."

Yeung and his research group have always pursued high-risk research projects, but obtaining funding was a challenge. That will change now.

"The Wright endowment will provide us with seed funding," Yeung said. "It will save us some time because we'll be able to start working immediately."

"Research is very competitive and many other researchers may have the same idea," he continued. "Hopefully this will give us a few month's edge."

The Wright endowment will allow for an additional two graduate assistants in Yeung's research group.

"The type of funding provides a very important educational value, specifically the training of graduate students and postdocs," Yeung said. "By exploring way out, unconventional problems, we'll be able to challenge graduate students to see if there are ways that we can improve on the current methods."

Yeung's research interests span both spectroscopy and chromatography. He has published in areas such as nonlinear spectroscopy, laser-based detectors for liquid chromatography, capillary electrophoresis, trace gas monitoring, single-cell and single-molecule analysis, DNA sequencing, and data treatment procedures in chemical measurements.

With the Wright endowment, Yeung hopes to develop a high resolution microscope for bioanalytical chemistry, which would be able to look at the finer details of a cell. There are portions of a cell that even with the best microscope, researchers can only see as a dot.

"If we can develop a microscope with 10 times the resolution, we'll be able to see what is inside the subcells," Yeung said. "Anytime you can look at a greater detail, you'll be able to discover new biological principles and recognize diseases that you can't see now."

The Robert Allen Wright Chair has been established from the Robert Allen Wright Endowment for Excellence. The $1 million bequest was made through the ISU Foundation for the purpose of building and enhancing the general excellence of academic programs at Iowa State. The appointment recognizes Yeung's teaching and scholarly endeavors in the Department of Chemistry.

Wright was a member of the Iowa State class of 1913 and was an ISU Foundation governor, a member of the ISU Foundation's Order of the Knoll and named Cy's favorite alum in 1976.

WOMAN IN SCIENCE

Kathy Trahanovsky

Adjunct Associate Professor

Continued from page 3

And in recent years, she has gained a permanent, full-time teaching position within the Department of Chemistry, first as a temporary assistant professor and currently as an adjunct associate professor. She also serves as the associate coordinator of general chemistry.

In 1993, Trahanovsky became director and an active member of Science Bound, a program for 8-12th grade students in the Des Moines School system whose mission is to increase minority involvement leading to enrollment in technical degree programs at Iowa State. Since 1999, she has also served as Principal Investigator for Pipelines, a NASA funded subcontract from Southern University in Baton Rouge, Louisiana, whose goal is to attract more minority students to research careers in science.

That activity and 30 years of teaching general and organic chemistry to Iowa State students have netted Trahanovsky several departmental and college awards for teaching.

The latest came this past fall, when the ISU Alumni Association named her a recipient of a Faculty Citation, which "recognizes ISU faculty for inspiring service to students, alumni, the university and the profession."

TOP DIRECTOR

Tom Barton, director of the U.S. Department of Energy's Ames Laboratory and a distinguished professor of chemistry, is the Federal Laboratory Consortium for Technology Transfer Laboratory Director of the Year.

The Laboratory Director of the Year award is given to directors who have made outstanding contributions supporting technology transfer activities at their laboratory. The award was presented in May, 2003 at the FLC National Meeting in Tucson, Arizona.

"It is an honor to be recognized by the FLC because this organization represents the best in efforts to help federal laboratories, such as the Ames Laboratory, strengthen ties with industry," said Barton. "These ties are essential if we are to help build Iowa's and our nation's economy."

"This is a well-deserved honor for Tom Barton," said Iowa State University President Gregory Geoffroy. "He has worked tirelessly in shaping the focus of Ames Laboratory and making sure that Ames Lab is accessible to industry. His efforts have helped make the laboratory a rich resource for Iowa business and industry, and it has helped generate economic growth for the state."

The FLC is a nationwide network of more than 700 federal laboratories and centers and their parent departments and agencies. The FLC's primary focus is moving federal laboratory research and technology into the mainstream of the U.S. economy.

"Because of the competitiveness and prestige of the award, being selected as a recipient is an honor which recognizes both the excellence of the director's efforts and the facility's technology transfer program," said Ann Rydalch, chair of the FLC.

Barton has been the director of the Ames Laboratory since 1988. The laboratory has a workforce of approximately 500 employees, more than half of who are scientists and engineers. Its estimated budget for 2003 is $29 million.

The laboratory's technology transfer program provides numerous opportunities for companies to collaborate with the lab, from contract research to licensing of patents. Since 1986, 136 U.S. patents have been issued on technologies resulting from Ames Laboratory research. In addition, Ames Lab research has been the basis for 14 start-up companies. The most recent of these is CombiSep, Inc., an Ames company that manufactures the MCE 2000, a sophisticated instrument for separating and measuring a variety of chemical compounds.

In addition to his duties as director of Ames Laboratory, Barton is also director of Iowa State's Institute for Physical Research and Technology, a position he's held since 1998. In 1999, Barton was elected a member of the National Advisors Group for the FLC. This select panel of approximately 15 people provides guidance to the FLC in pursuing its technology transfer goals and making the organization more effective. The group includes senior agency officials, laboratory administrators and industry leaders.

Ames Laboratory is operated for the Department of Energy by Iowa State University. The laboratory conducts research into various areas of national concern, including energy resources, high-speed computer design, environmental cleanup and restoration, and the synthesis and study of new materials.

Tom Barton

Distinguished Professor Ames Laboratory and IPRT Director

"These ties are essential if we are to help build Iowa's and our nation's economy"

More information about Ames Laboratory can be found at www.ameslab.gov

RICHARD LAROCK *continued from page 8*

"This is a very nice recognition," Larock said. "It tells me that my peers think I have contributed not only to research, but teaching as well."

Larock feels that his book, *Comprehensive Organic Transformations: A Guide to Functional Group Preparations*, is a major reason why he is receiving the Leete Award. Now in its second edition, the mammoth publication (over 2600 pages) has evolved from a series of handouts that Larock used when he first started teaching organic synthesis at Iowa State in the early '70s. *Comprehensive Organic Transformations* is used world-wide by organic chemistry students and career chemists in academia and industry. "It's very rewarding to know that not only researchers, but graduate students around the world are learning chemistry from my book."

"I enjoy the teaching part of my job, but I still get the most excitement out of research," he said. "I still get excited when a student comes in and says they got some new reaction to work."

IOWA STATE UNIVERSITY

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A NOTE FROM THE CHAIR

Dear Friends,

Gordon J. Miller

Greetings to the Iowa State University Chemistry family! It is the time of year when our new class of 33 graduate students begins to join research groups and our undergraduates prepare themselves for the projects and rigors of the end of an academic semester. The Department is flourishing and through the energy and dedication of our students, faculty and staff, our tradition of excellence continues to grow.

A few weeks ago, we honored two of our distinguished alumni at the annual Alumni Association ceremony in Ames. Marvin Caruthers (B.S., '62) received the Citation of Merit from the College of Liberal Arts and Sciences for his outstanding achievements and worldwide recognition in developing the chemistry of DNA synthesis. Prof. Caruthers is currently Professor of Chemistry and Biochemistry at the University of Colorado in Boulder, Colorado. The Hach Scientific Foundation and managing director, Bruce Hach, received the Distinguished Service Award from the College of Liberal Arts and Sciences for their outstanding contributions to our department that have furthered our educational mission. Through their support of the Hach Scholars program and the Hach Memorial Fellowship, our numbers of undergraduate majors have risen steadily over the past several years and we are attracting superb students into teaching and professional careers in Chemistry.

This year, we welcome two new assistant professors to our department. Ethan Badman is an analytical chemist whose research will involve ion trapping and mass spectroscopy to study protein-protein complexes. Hans Stauffer is a physical chemist who will use laser spectroscopy to manipulate wave packets to study dissociation pathways for various molecules and clusters. We continue to search for energetic and enthusiastic new faculty this year, so please look forward to many new faces the next time you visit Ames.

The year 2002-2003 was a fantastic year for recognition of our faculty. At the Spring 2004 American Chemical Society meeting, three of our distinguished faculty will receive national awards: Jim Espenson is the 2004 recipient of the Distinguished Service Award in Inorganic Chemistry; Mei Hong is the 2004 awardee of the ACS Award in Pure Chemistry and Richard Larock is a 2004 Arthur C. Cope Senior Scholar. We will be celebrating with them at Anaheim and hope to see some of you there. Marc Porter and his coworkers won an R&D 100 award in 2003 for developing a probe to detect and label antibodies. Ed Yeung is the Robert Allen Wright Distinguished Professor of Chemistry at Iowa State. Dan Armstrong received the 2003 Chirality Medal for his work to separate and purify various chiral molecules. And Nenad Kostić received the Iowa Regents Award and was recently elected into the Serbian National Academy of Arts and Sciences.

Our junior faculty have also received awards and honors. Victor Lin won an NSF CAREER Award for his research and teaching activities in the development of nanoscale silica for drug delivery and molecular recognition. Nikki Pohl is a 2003 Cottrell Scholar through the Research Corporation for her work in the synthesis of carbohydrates using biological catalysts.

Two of our undergraduate majors, Suzan Cox and Sanya Pudar, received prestigious Rockefeller Fellowships. Suzan worked with Surya Mallapragada on biological polymers and is currently working at Dow in Midland Michigan on a co-op, Sanya performs computational chemistry in the research group of Mark Gordon.

Other developments in the Department include the creation of new graduate and undergraduate scholarships established by the Esther and George Daniel Endowed Scholarship for Chemistry. Dr. Esther Daniel was a student of Prof. Henry Gilman and completed her Ph.D. degree in 1923. She is recognized for her work in biochemistry with the U.S. government. We are also gearing up to host the 18th Biennial Conference on Chemical Education, which will take place here July 18-22, 2004.

Overall, the Department is energetic, active and flourishing. If you have an opportunity to visit Ames, please stop by our Department – I look forward to meeting you and showing you our activities first-hand.

Best wishes,