Chemistry and Chemical Biology

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The Chair's Notebook

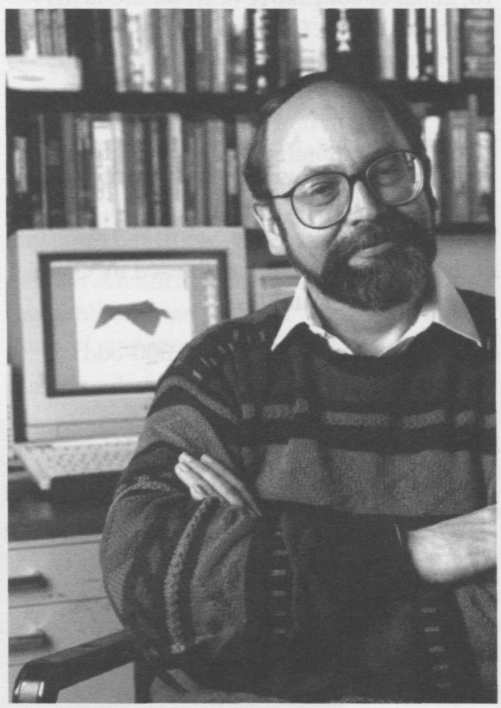
Highs and Lows

One of the highlights of the 2002–2003 academic year for the department was the presentation of the inaugural Moses Passer Lecture by Cornell President Emeritus Frank Rhodes. Moses Passer obtained his PhD in organic chemistry from Cornell in 1948, under the direction of A.T. Blomquist. After postdoctoral work at the University of Illinois, he started his career as an assistant professor at the University of Minnesota, Duluth. He was promoted to tenure and left as a full professor in 1964 to begin his career as educational secretary of the American Chemical Society. During his more than 20-year tenure with the ACS he oversaw a dramatic increase in the chemical education component of the society. When he retired as director of education, he had built an educational enterprise that formed a model for other scientific societies around the world. Following Moses Passer's death in 1999, his widow, Dorothy, completed the endowment of the lecture series bearing his name. The lectureship is intended to bring distinguished figures in the fields of science education and policy to the department. Few could argue with the inaugural lecturer's qualifications in that arena.

In addition to having been a professor of geology and university president, Frank Rhodes is a deep thinker and most recently an author on the topic of the role of the research university in America. In his lecture, delivered in September to a packed Baker 200, he challenged the audience to bring their knowledge and creativity to bear on some of the enduring problems facing the world, some of which scientists themselves have inadvertently helped to create. Anyone who has ever heard Rhodes speak will certainly remember the brilliance of his oratory. This lecture was certainly no exception; it will be a tough act to follow for the next speaker. We have, however, selected someone who will be up to the challenge—Professor Charles P. Casey of the University of Wisconsin, Madison—president-elect of the American Chemical Society.

Planning is proceeding briskly for the new building in the Physical Sciences complex, about which I have written in previous columns. Two major milestones in the project occurred during the past year: we were given a budget ($85M) by the university administration, and we picked architects to conduct the planning and site-selection phase. The firm, Burt Hill Kosar Rittelmann Associates, is working in conjunction with Koetter Kim and Associates for our project. Between them these firms have impressive portfolios of science research buildings in both the private sector and at educational institutions. I will provide more details in the next newsletter, which should be appearing in the fall.

continued on page 10



Barry Carpenter

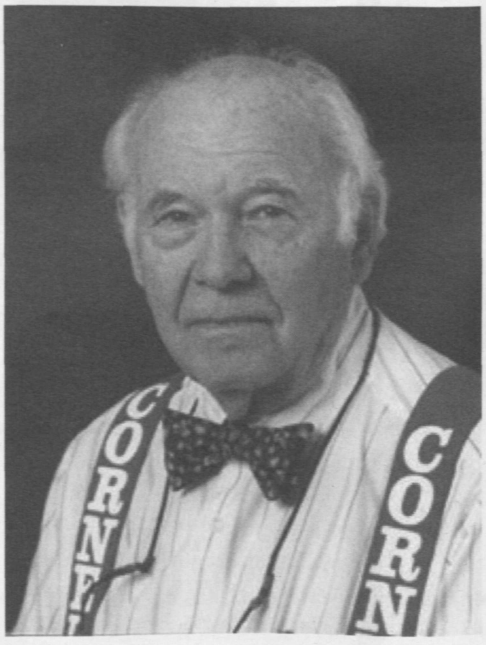
Our Next Issue:

- Commencement and Reunion 2003
- Paul Houston elected to American Academy of Arts & Sciences
- Melissa Hines selected as Russell Teaching Award winner
- Fred McLafferty's 80th Birthday Symposium report and American Society for Mass Spectrometry Award
- James Engstrom and Derek Tan elected as members of the field

All are invited to the Cornell Chemistry–sponsored continental breakfast at the 226th National ACS Meeting in New York City—see back page

Walter C. McCrone Jr., 86; Microscopy Giant Debunked Validity of Shroud of Turin

Chicago Tribune, Chicago, Ill., July 21, 2002, James Janega, *Tribune* staff reporter; reprinted with permission



Walter C. McCrone, Jr., 86, an artist with a microscope who confirmed for the Vatican that the Shroud of Turin was created 13 centuries after Jesus Christ was buried; used a lock of Ludwig van Beethoven's hair to identify lead poisoning as the cause of the composer's death; and poured cold water on suspicions that Napoleon Bonaparte was poisoned with arsenic, died Wednesday, July 10, 2002, of congestive heart failure in his Near South Side, Chicago, home.

An energetic man with a love of feeding squirrels and making paradigm-shattering pronouncements, Mr. McCrone boasted that under his microscope he could identify on sight individual tree pollens, fly ash, aspirin, TNT, cholesterol, calcite, wool, and remnants of the singular blue pigment used by Claude Monet to paint water lilies.

He said all were among the 30,000-odd substances he'd seen beneath his lenses in a 60-year-plus career; he confided that he debunked the authenticity of formerly priceless works of art for the thrill of the chase.

Along with a seventeenth-century microscope built by Antony van Leeuwenhoek and a rack holding dangling bow ties, it wasn't unusual to find in Mr. McCrone's office an original Vincent Van Gogh or a puzzling bit of crime scene evidence. His laboratories in Chicago and Westmont played host over the decades to everything from lunar dust to fragments of Leonardo da Vinci's "Last Supper."

"Most of the world never sees what I see," he told the *Tribune* in 1998. "It is more beautiful than anything outside the microscope."

He was, in the words of many professional microscopists, a giant in a very small world, publishing 600 papers on microscope work and 16 books and book chapters, including *The Particle Atlas* in 1970, still recognized as one of the best handbooks for materials analysts.

"Anyone who's gone through a graduate program in art conservation knows him, his name, has his pigment handout, or their teacher was taught by him," Eugena Ordonez of the Museum of Modern Art in New York told the *Tribune* in 1998. "In your first year, it's McCrone, McCrone, McCrone."

A native of Wilmington, Del., Mr. McCrone hoped to follow his father into civil engineering but flunked engineering classes at Cornell University. Shifting gears after a course under legendary microscopist Emile Chamot, Mr. McCrone wound up with a chemistry degree in 1938, a PhD in organic chemistry in 1942, and two years of post-doctoral work, all at Cornell.

Beginning in 1944, he did research and taught microscopy and materials science at what is now the Illinois Institute of Technology, leaving in 1956 with his mind set on becoming an independent consultant. He met the former Lucy Beman on a consulting visit to Massachusetts; they were married in 1957.

Beginning in 1956, he based his operations from McCrone Associates, an industrial problem-solving lab, on the Near South Side, and opened research and teaching laboratories in London and Chicago. He later founded McCrone Accessories and Components in Westmont to aid others in the design of microscopes. Before long, he was the premier investigator of all things tiny.

"It's a very direct method, and you can see things happening. You can see solutions to problems. You can see answers to questions," his wife said. "He loved it. He took pleasure and satisfaction in solving problems."

In 1978 he joined the team of 30 scientists who analyzed the Shroud of Turin, the 3-by-14-foot piece of cloth believed by many to be Jesus Christ's death shroud.

Mr. McCrone was the first to conclude through scientific experiments that pigments on the cloth were red ochre, not blood, and dated to 1355. He regarded it as "a beautiful painting by an inspired medieval artist."

Other findings followed: The Vinland Map, reputed to show the New World as discovered by Leif Ericson centuries before Columbus sailed from Spain, contained a pigment that didn't exist until 1920. A hair snipped from Beethoven's head after his 1827 death contained a high concentration of lead. A similar investigation of Napoleon's locks found very little evidence of arsenic, helping establish, to the chagrin of conspiracy theorists, that he probably wasn't poisoned after all, at least not that way.

Mr. McCrone helped tie Wayne Williams to the Atlanta murders of 29 young men and boys in 1982 and won awards for such work, including the 1982 Certificate of Merit from the Forensic Science Foundation.

He also received the 1999 Emile Chamot Award and the 2002 August Kohler Award from the State Microscopical Society of Illinois, and the American Chemical Society National Award in Analytical Chemistry in 2000 for his study of the Shroud of Turin, among numerous professional accolades.

continued on page 10

Andreas C. Albrecht

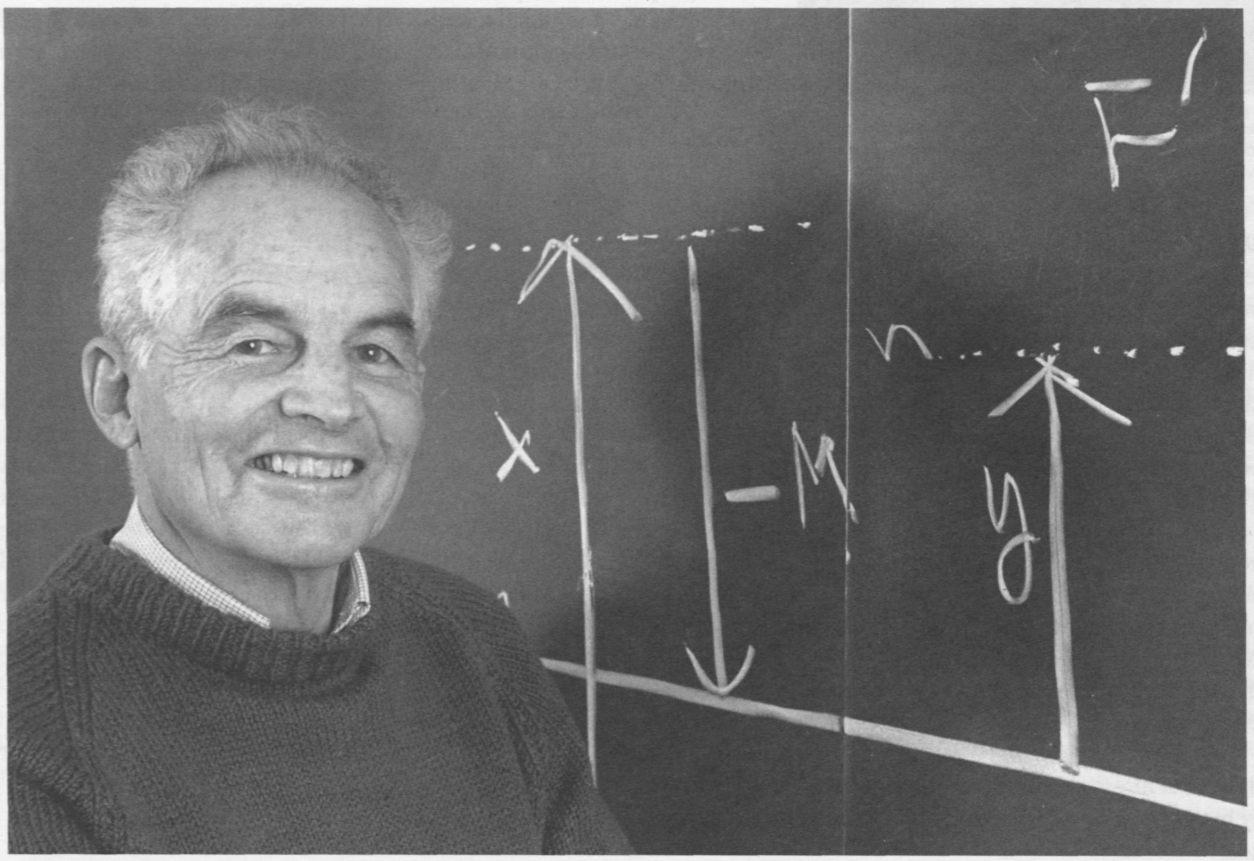
Andreas C. Albrecht, professor of physical chemistry, died in Ithaca, New York in September, 2002 at the age of 75. He was born in Berkeley, California, but spent early parts of his childhood in Vienna, where his father, an anthropologist originally from Germany, pursued his doctoral research. He earned the BS in chemistry from the University of California, Berkeley, in 1950, and the PhD in chemistry from the University of Washington in 1954. Following postdoctoral work at the Massachusetts Institute of Technology, he began his long career at Cornell at the rank of instructor in 1956. Progressing rapidly through the academic ranks, he was appointed professor of chemistry in 1965.

Andreas Albrecht built a highly distinguished career in the development of techniques in electronic and vibrational spectroscopy to determine the structures and motions of molecules. His work uniquely combined theoretical analysis with laboratory experiments to elucidate phenomena ranging from Raman scattering to photoconductivity in organic solids to nonlinear electronic spectroscopy performed with incoherent light sources. His most recent work, in progress at the time of his death, treated spectroscopic phenomena unique to chiral molecules.

His research accomplishments were recognized by numerous awards, fellowships, and lectureships. He was a fellow of the Japanese Society for Promotion of Science, a fellow of the American Physical Society, and a fellow of the American Academy of Arts and Sciences. He was a Frontiers in Chemistry Lecturer at Texas A&M University and the Gillespie Lecturer of the Royal Society at University College, London. He received the 1986 Polychrome Corporation Award from the New York Academy of Sciences, the 1988 E.R. Lippincott Medal for Spectroscopy from the Optical Society of America, and the 1990 Earle K. Plyler Prize from the American Physical Society.

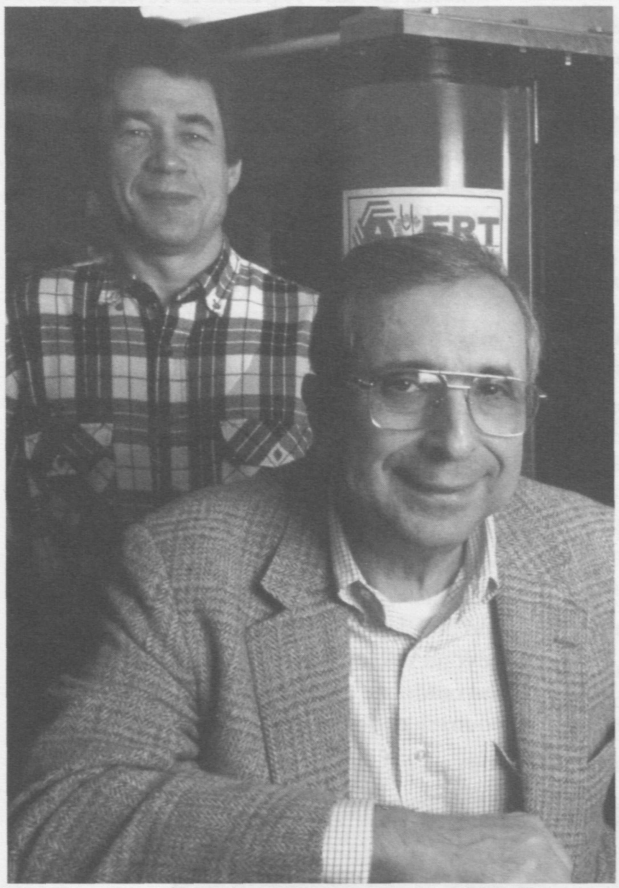
He took an interest in the practice of scientific research under more difficult circumstances than those prevailing at Cornell, in countries including the Soviet Union and Cuba. He was several times an exchange scientist in the United States–USSR Academy of Sciences Program.

A long list of graduate students, postdoctoral associates, visiting scientists, collaborators, and Cornell colleagues have benefited from his warmth, gentle humor, and keen scientific intuition. An outstanding teacher in the classroom and in the laboratory, he guided the undergraduate and graduate careers of generations of Cornell students. His discussions with coworkers and colleagues characteristically went beyond scientific matters to include music, the outdoors, and politics. His enthusiasm, counsel, and insight will be missed.



New Way of "Visualizing" Proteins Is Reported by CU Biomedical Lab

David Brand, Cornell News Service



Professor Jack Freed, right, director of the National Biomedical Center for Advanced ESR Technology at Cornell, and Associate Director Peter Borbat. Robert Barker/University Photography

A newly established national biomedical center at Cornell is reporting its first major advance: a new way of measuring, or "visualizing," proteins. The new technique will hasten the transformation of the human genome project's blueprints of life into a comprehensive view of the biochemical and physiological circuitry that interconnect to form entire organisms.

The technique, which determines the structure of a protein by measuring the distances between atoms in the molecule at greater separations than previously possible, is an important development, says Jack Freed, professor of chemistry and chemical biology, who is director of the National Biomedical Center for Advanced ESR Technology (ACERT), established at Cornell last year by the National Institutes of Health. "This is in the spirit of seeing the whole forest of the protein, whereas before we have been seeing the trees one after another," says Freed.

Freed and his collaborators, Hassane Mchaourab, professor of molecular physiology and biophysics at the Vanderbilt University School of Medicine, and Peter Borbat, associate director of ACERT, reported on the new method for protein structure determination in the *Journal of the American Chemical Society* (*JACS*) (May 22, 2002).

The new method for seeing the structure of the protein uses ESR (electron spin resonance), a technology for studying the bonds, structures, and molecular mechanisms of chemical and biological materials, such as membranes and proteins. Basically, the technique elucidates how molecules move, react, and interact with one another. The protein studied for the *JACS* report, T4 Lysozyme, is one of the proteins of a bacteriophage, or virus, that is parasitic within a bacterium. The protein degrades the bacterial cell wall to enable the virus's exit.

Previously Freed's group pioneered technology that enables ESR methods to unravel the complex dynamics of biosystems such as proteins and membranes. The research group has adapted this technology, dubbing it DQC (for double quantum coherence), to deliver pulses of microwave radiation in appropriate sequences in order to measure the distances between two spin labels. These are molecular subunits, each containing an unpaired electron, inserted at precise sites in the protein. DQC-ESR "interrogates" the spin labels for their weak interaction, the magnitude of which depends on the distance between them. By measuring such distances, the overall structure of the protein can be revealed.

Until now, protein structure has been determined primarily by two widely used methods: X-ray crystallography and nuclear magnetic resonance (NMR) spectroscopy. The X-ray method, however, requires crystallization of the protein, and as Freed explains, a protein is not just a single crystal or a frozen object but is in constant flexing and tumbling motion. NMR visualizes the molecule in its normal environment and is based on measuring many small distances between adjacent, or nearly adjacent, atoms, like going from tree to tree. The new technology reported in the *JACS* paper, which needs only very small amounts of protein, gives researchers a comprehensive view of the molecule, "like being able to see the topology of the entire forest," said Mchaourab.

He noted that 30 percent of the proteins encoded by a genome and 50 percent of pharmaceutically important receptors are membrane-embedded proteins "that are not so easily studied by the two main structural techniques, X-ray crystallography and NMR."

In a larger context, the new technology will aid "the rush" to transform genome sequencing projects' blueprints into broad views of protein function, said Mchaourab. "Central to this endeavor is structural biology that will transform these one-dimensional strings of DNA sequences into three-dimensional visual frameworks of how catalysis, ion conduction, and energy transduction are carried out by proteins," he said. Structural biology and structural genomics are aimed at creating a catalog of the entire complement of unique proteins encoded by a genome.

CU Scientists Create Single-Atom Transistor with a "Designer" Molecule

David Brand, Cornell News Service

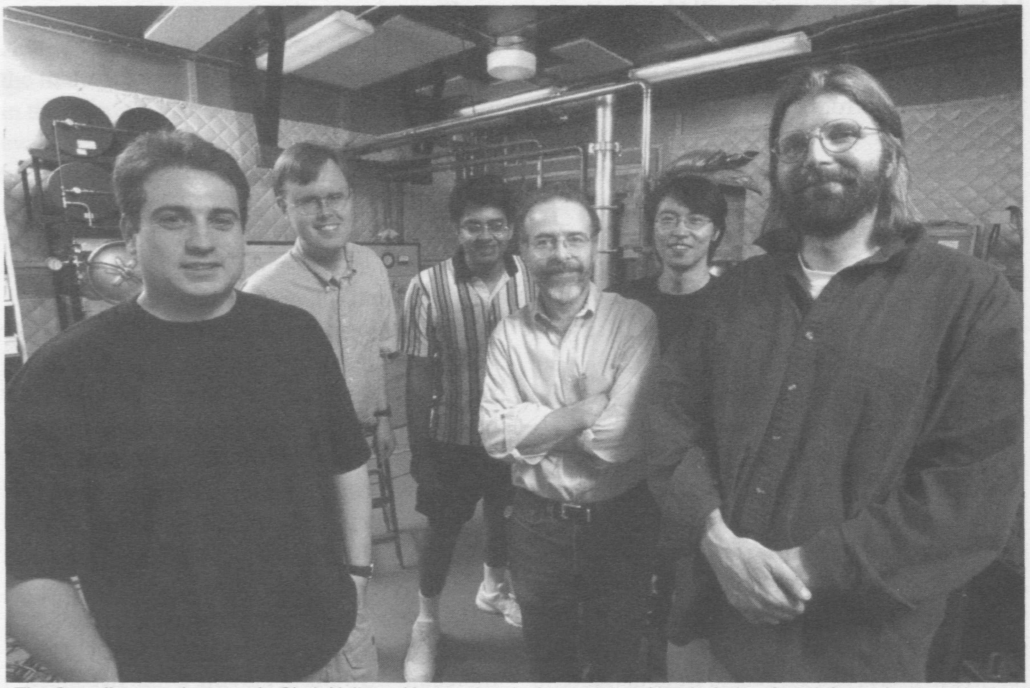
A long-sought goal of scientists has been to shrink the transistor, the basic building block of electronic circuits, to smaller and smaller size scales. Scientists at Cornell have now reached the smallest possible limit: a transistor in which electrons flow through a single atom.

The Cornell researchers have created a single-atom transistor by implanting a "designer" molecule between two gold electrodes, or wires, to create a circuit. When voltage was applied to the transistor, electrons flowed through a single cobalt atom within the molecule. Paul McEuen, professor of physics at Cornell, describes the process by which electrons pass from one electrode to the other by hopping on and off the atom as "a virtual dance of electrons."

McEuen and his colleagues at Cornell's Center for Materials Research, including Dan Ralph, associate professor of physics, and graduate students Jiwoong Park and Abhay Pasupathy, report on their creation of a single-atom transistor in the June 13, 2002 issue of *Nature*.

McEuen cautions that the device cannot yet be described as having all the functions of a traditional transistor, such as amplification. But he sees a potential application for the new transistor as a chemical sensor because a change in the environment around the molecule could cause a measurable alteration of the conductance of the device.

At the heart of the Cornell group's transistor is the "designer molecule" synthesized by Héctor Abruña, professor of chemistry and chemical biology, and graduate student Jonas Goldsmith. At the molecule's center is a cobalt atom surrounded by carbon and hydrogen atoms and held in place on either side by molecular "handles" made of pyridine, a relative of benzene. On their outer side, the "handles" are attached to sulfur atoms, which act like "sticky fingers," to bond the molecule to the gold electrodes. Two different molecules were studied, one with longer "handles" than the other. The shorter molecule was found to be a more efficient conductor of electrons.



The Cornell research group, in Clark Hall, working on the single-atom transistor includes, from left, graduate student Jonas Goldsmith, Associate Professor Dan Ralph, graduate student Abhay Pasupathy, Professor Héctor Abruña, graduate student Jiwoong Park and Professor Paul McEuen. Nicola Kountoupes/University Photography

"As chemists, we can deliberately design and manipulate molecules to achieve a specific function," said Abruña. "This is very important because we are now able to incorporate the properties of these molecules into electronic devices."

The challenge faced by the Cornell researchers was to place a molecule less than two nanometers long (about the length of five silicon atoms) between two gold electrodes. To do this they used a technique called electromigration, by which an increasingly large current is run through a gold wire, forcing the atoms to migrate until the wire breaks. The molecule is then "sucked" into the gap by the high electric field present, and the sulfur "sticky fingers" bond the molecule to the gold. "Using this technique you can very reliably get wires with a gap on the order of one nanometer," or about three silicon atoms, said McEuen.

The technique was invented by McEuen and his former postdoctoral colleague, Hongkun Park, when both were researchers at the University of California-Berkeley. Park, now at Harvard University, reports in the same issue of *Nature* on a similar development in molecular electronics, using a different molecule. Both teams were able to start and stop the flow of electrical current by adjusting the voltage near the bridging molecule.

Although the single-atom transistor demonstrates the potential for shrinking the size of components well beyond what is possible using conventional lithographic techniques, said McEuen, there are major technological hurdles to be overcome in order to build such a transistor for electronic applications. One problem to be solved, for example, is gain, the ability to amplify a small signal.

continued on page 11

National Cancer Institute Grant Establishes Recombinant Protein Expression Laboratory at Cornell

Lissa Harris, Cornell News Service

Molecular biologists at Cornell University have established a Recombinant Protein Expression Laboratory with a five-year, $986,000 grant from the National Cancer Institute.

Located in the Department of Chemistry and Chemical Biology, the centralized facility will produce proteins for cancer-related research throughout Cornell's Ithaca campus as well as at the Weill Medical College of Cornell and its Tri-Institutional Collaboration partners (Rockefeller University and Memorial Sloan-Kettering Cancer Center) in New York City.

At first the facility will produce milligram quantities of naturally occurring proteins for structural analysis with X-ray crystallography and nuclear magnetic resonance (NMR), using bacterial (*E. coli*) and insect cell systems. Subsequently, as rational design identifies molecular targets to treat disease, the facility can scale up to produce larger quantities of proteins for clinical trials in the Comparative Cancer Program of the College of Veterinary Medicine and at other cancer centers.

Another goal of the new Cornell facility is to move beyond bacterial and insect cell-based production systems to the much more difficult — but potentially useful— process with mammalian cells, according to Danny Manor, assistant professor of nutritional sciences and director of the laboratory.

"Biomedical research benefits tremendously from being able to understand the three-dimensional structures of relevant proteins," Manor explains. "Such molecular-level pictures can open the door for educated design of intervention strategies by modifying the protein's biological activity."

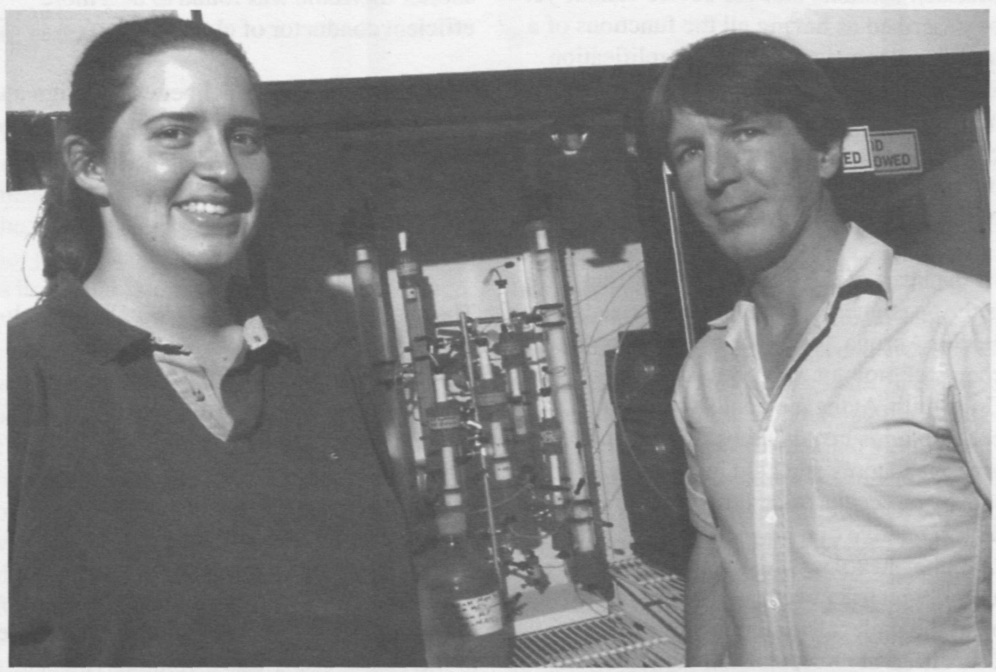
But a bottleneck in structural determination of proteins often is the limited supply of highly purified proteins, Manor notes. "A centralized facility, where the necessary resources (equipment, personnel and know-how) are available, achieves three objectives: access for researchers who are not able to prepare such proteins on their own, reducing the cost associated with large-sale protein production, and expert help and training for interested investigators."

One cancer researcher who understands the difficulty of producing purified proteins and welcomes the new facility is Richard Cerione, a professor in the Departments of Molecular Medicine and Chemistry and Chemical Biology. His studies of molecular "switches" and other signaling components during malignant transformation of cells are aimed at eventually developing intervention strategies. But first he must determine the structure of numerous proteins functioning in complex, and that requires quantities of purified proteins that have been made, with considerable difficulty, in his labs.

"Our ideal goal, if we know the structure of a molecule we think is playing a role in cancer, is to make a small molecule in chemistry that can affect the protein's activity, then test the small molecule in clinical trials," Cerione said. "The first step is to be in a position to obtain molecular information about these important proteins. The advantage of a specialized, centralized facility is to bring together a lot of diverse groups on campus and in New York to expedite getting detailed information about cancer-relevant proteins."

Regarding clinical trials of treatments that are developed from basic-science studies, Rodney L. Page, director of the Comparative Cancer Program and professor of clinical sciences, says, "It could be quite a while before that happens. But the hope is that by identifying a protein and being able to determine the structure, we can modify it to make it work better or inhibit its function. Then we might be able to develop a research program and test in various systems, from in vitro systems up to the animal models."

The new facility has been producing proteins from bacterial systems for several months, and capabilities for insect-cell production are about to be added, Manor reports, "but structural determination of proteins produced in mammalian cells is not something that is done yet, anywhere, so that is a goal to look forward to."



Shown in the Recombinant Protein Expression Laboratory in the S.T. Olin Laboratory are co-managers of the new facility, Cynthia Kinsland, left, research associate in the Department of Chemistry and Chemical Biology, and Stephen Campbell, research support specialist in the Department of Molecular Medicine. Frank DiMeo/University Photography

Cornell Chemist Explains How Acrylamide, a Possible Carcinogen, Might Be Formed When Starch-Rich Foods Are Fried or Baked

Blaine P. Friedlander Jr., Cornell News Service

Last April Swedish scientists discovered high levels of a potentially cancer-causing chemical called acrylamide in wide range of starch-containing foods that are fried or baked, particularly french fries, potato chips, and crackers. The announcement received worldwide publicity. But at the time, no one knew where the acrylamide came from, how it was formed, or, indeed, if there is a link between acrylamide in food and cancer. The findings were quickly confirmed by the British Food Standards Agency. Earlier this autumn the source of the acrylamide was identified independently by researchers at the University of Reading in England, Nestlé in Switzerland, and Procter & Gamble in the United States. They showed that acrylamide is produced when asparagine, an amino acid abundant in cereals and grains, is heated above 100 degrees Centigrade (212 degrees Fahrenheit) with either of two sugars, glucose or 2-deoxyglucose.

Now Bruce Ganem, Franz and Elisabeth Roessler and J. Thomas Clark Professor, has offered a more detailed chemical explanation about how acrylamide is produced when starch-containing foods are fried or cooked at high temperatures. His theory is proposed in a letter, "Explaining acrylamides in food," in the December 2, 2002, issue of *Chemical and Engineering News.*

Acrylamide is a polymer that is widely used in the treatment of drinking water. It also is used in the manufacture of plastics. It was first evaluated as probably carcinogenic to humans in 1994 by the International Agency for Research on Cancer. But it was not known to occur in high levels in fried or baked foods before this year's Swedish study.

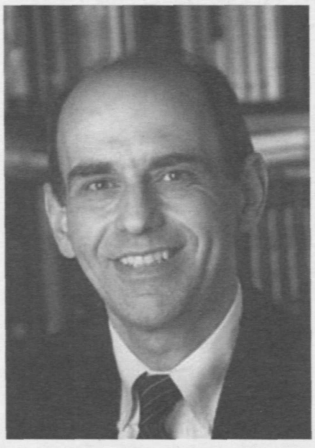
"The organic chemistry of what happens is not very well understood," Ganem says. "Everyone agrees that a molecule of carbon dioxide must be lost in order to form acrylamide, but it was unclear how that might happen." The British and Swiss research teams invoked the Maillard reaction to explain the formation of acrylamide, but they did not propose any chemical details. The Maillard reaction, also known as non-enzymatic browning, was first observed in 1912 by Louis Camille Maillard. It involves the reactions between proteins and carbohydrates that cause food to turn brown when cooked. The reactions result in the formation of many products, most of which have some impact on the flavor and appearance of cooked food.

Procter & Gamble scientists noticed that acrylamide also was formed from a combination of the amino acid asparagine and the sugar 2-deoxyglucose. "This is interesting because 2-deoxyglucose lacks a key molecular feature needed for the Maillard reaction," says Ganem.

"That's where my letter to *Chemical and Engineering News* comes in. By focusing on explaining how carbon dioxide might be released, I recognized another plausible reaction pathway — not involving the Maillard reaction — that could account for the formation of acrylamide. My idea was based on how some biological systems achieve decarboxylation, which means the loss of carbon dioxide. That connection provided a big clue that led to the step-by-step chemical mechanism I present in my letter."

Instead of undergoing the Maillard reaction, fried or baked foods, Ganem suggests, undergo an alternative chemical pathway that results in the loss of carbon dioxide through natural metabolic processes, known as enzymatic decarboxylation.

"The asparagine is the actual source of acrylamide," Ganem says. "The pathway I presented probably would not occur under normal biological conditions, but it's important to recognize that we're talking about temperatures well above 100 degrees Centigrade while the food is being cooked."

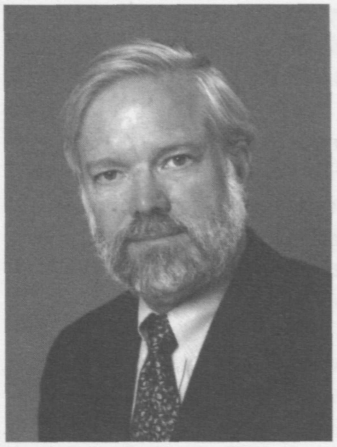


Ganem Elected to the Harvey Society

In April 2003, Bruce Ganem was elected to the Harvey Society, Inc., a society for the diffusion of knowledge of the medical sciences. The Harvey Society was founded in 1905 with the purpose of fostering the diffusion of scientific knowledge in selected chapters of the biological sciences and related areas of knowledge through the medium of public delivery and printed publication of lectures by men and women who are workers in the sujects presented, and to promote the development of these sciences.

Paul Houston Appointed Senior Associate Dean in Arts and Sciences and is One of Six Named to AAAS

Franklin Crawford and David Brand, Cornell News Service



Last July, Paul L. Houston, professor of chemistry and chemical biology, was appointed senior associate dean in the College of Arts and Sciences. Houston joins Dean Philip E. Lewis and Senior Associate Dean Jonathan Culler as a chief academic officer of the college.

Houston is a distinguished member of the College of Arts and Sciences faculty, with an international reputation for research in the fields of materials and physical chemistry. He also has distinguished himself at Cornell by his excellence in teaching and advising at both the undergraduate and graduate levels. He served as chair of the Department of Chemistry and Chemical Biology from 1997 to 2001. In commenting on the appointment, Dean Lewis praised Houston's interdisciplinary research efforts across campus. "As a researcher Paul Houston has developed collaborative relations with faculty in the College of Engineering and the College of Agriculture and Life Sciences," Lewis said. "These connections in both the physical and the life sciences will be of great benefit to the university as Paul assumes his role in overseeing the activities of many departments and programs in Arts and Sciences and representing the college in diverse campus venues. Paul has also been an exemplary faculty citizen whose experience in the conduct of faculty business in the Arts College has prepared him well for his new responsibilities."

Houston earned his BS degree at Yale University in 1969 and his PhD at the Massachusetts Institute of Technology in 1973. He held a postdoctoral fellowship at the University of California-Berkeley before coming to Cornell as an assistant professor in 1975. By 1985 he was a full professor, and in 1999 he was named the Peter J.W. Debye Professor of Chemistry. He has held visiting scientist positions at the Max-Plank Institute for Quantum Optics and at the Institute for Molecular Science in Okazaki, Japan. He is a fellow of the American Physical Society (APS) and has been an Alfred P. Sloan Research Fellow and a J. Simon Guggenheim Fellow. He served as senior editor of the *Journal of Physical Chemistry* from 1991 to 1997 and on the advisory boards of that journal (1988–1990) and the *Journal of Chemical Physics* (1989–1991). He was honored with the Camille and Henry Dreyfus Teacher-Scholar Award in 1980 and with the Herbert P. Broida Prize of the APS in 2001.

Houston heads an active research group in chemistry, pursuing three main lines of investigation: photodissociation dynamics, dynamics of molecules on solid surfaces, and crossed molecular beam studies of reactions. He serves on the executive committee of the biocomplexity and biogeochemistry initiative and recently was the lead investigator on a National Science Foundation application with 20 other Cornell scientists for funds to establish an Environmental Molecular Sciences Institute at Cornell. The list of publications emanating from the Houston group reflects frequent appearances in every major journal in the field.

Association for the Advancement of Science (AAAS)

Six members of the Cornell University faculty have been named fellows of the American Association for the Advancement of Science (AAAS). They are among 291 researchers chosen to receive the prestigious award this year.

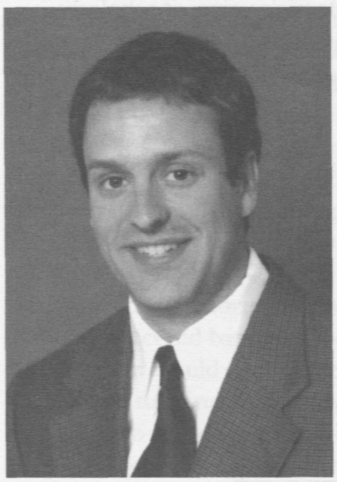
One of the six, Paul L. Houston, was cited by the AAAS for his outstanding contributions to molecular dynamics and spectroscopy, including seminal work on vector correlations, co-invention of the product imaging technique and important applications to iodine, ozone, and HCO, the formyl radical that plays important roles in hydrocarbon combustion and atmospheric chemistry. Houston's current research uses tunable lasers that can excite molecules to selected electronic, vibrational and rotational levels. He is studying how photodissociation reactions and bimolecular reactions depend on and produce molecular degrees of freedom such as vibration or rotation. He also is using laser tools to investigate the electronic and optical properties of molecular materials.

The six Cornell faculty members were named, in a tradition going back to 1874, for their efforts toward advancing science or fostering applications that are deemed scientifically or socially distinguished. They were presented with an official certificate and a rosette pin at the fellows forum during the 2003 AAAS annual meeting in Denver, Colorado, in February.

Founded in 1848, the AAAS represents the world's largest federation of scientists and has more than 134,000 members from 130 countries.

D. Tyler McQuade Wins 3M and Watson Awards

David Brand, Cornell News Service



D. Tyler McQuade, assistant professor of chemistry and chemical biology, has won a Nontenured Faculty Award from 3M Co. The award carries a check for $15,000.

This is McQuade's second major award since joining the Cornell faculty last year. Last fall he won a New Faculty Award from the Camille and Henry Dreyfus Foundation.

McQuade's research group is investigating a biomimetic approach to materials research. Building on the tools acquired through the synthesis of small molecules, the group is attempting to create well-defined polymeric and molecular-based assemblies that mimic the complexity and function of biological materials, from enzymes to organs.

The award, which can be used for any purpose in McQuade's basic research in the physical and/or biological sciences, is funded by the 3M Contributions Program.

Watson Award

McQuade has also won a $200,000 early career award from the New York State Office of Science, Technology and Academic Research (NYSTAR) for research that strives to create polymers that mimic biological materials.

The award is one of 10, totaling $2 million, given by the research agency to scientists across the state who are performing their research in the life sciences, biomedical sciences or in other life science–enabling disciplines, such as materials science and chemistry.

The awards were made by NYSTAR under the James D. Watson Investigator Initiative, which is part of the $225 million Generating Employment through New York State Science (Gen*NY*sis) program, created to maximize the potential of life sciences research being conducted at New York State research institutions.

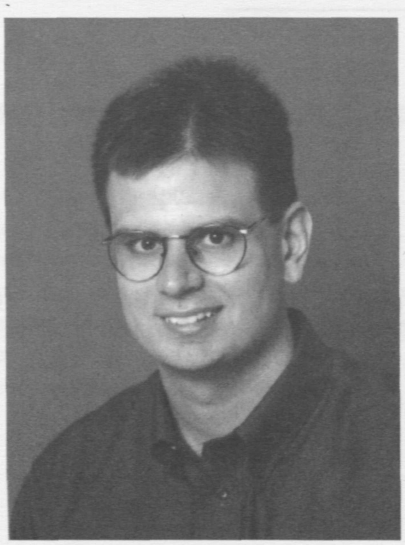
Russell W. Bessette, executive director of NYSTAR, said the awards "will encourage these early career biotechnology scientists to stay and conduct their critically important research here in New York State. In doing so, these scientists will be positioned to make the important advancements in biotechnology that will lead to the state's future economic growth."

McQuade said his research group makes small molecules and polymers that are designed to have a variety of functions, including catalysis (mimicking enzymes), recognition elements (mimicking antibodies), well-defined polymers (mimicking tendons) and highly responsive sensors (mimicking senses). "The fruits of my group's labor will hopefully produce, for example, sensors for detection of chemical warfare agents and in vivo catalysts for use as selective, low-dose drugs," he said. "The NYSTAR money will fund my most pragmatic projects with the goal of using the results of my research to create job opportunities for New Yorkers."

This is McQuade's third major award since joining the Cornell faculty last year.

Paul Chirik Wins National Research Award

David Brand, Cornell News Service



Paul J. Chirik, assistant professor of chemistry and chemical biology at Cornell University, is one of this year's recipients of a Faculty Early Career Development Program grant from the National Science Foundation (NSF). Chirik will receive a five-year grant of $520,000 to support his research.

Early Career awards are the NSF's most prestigious honors for new faculty members, recognizing and supporting teacher-scholars who are considered most likely to become the academic leaders of the twenty first century.

Before joining the Cornell faculty in 2001, Chirik spent a year as a postdoctoral research fellow at the Massachusetts Institute of Technology with chemistry professor Christopher Cummins, a Cornell alumnus. Chirik obtained his PhD in chemistry at the California Institute of Technology in 2000 and his BS in chemistry at the Virginia Polytechnic Institute and State University in 1995.

He and his research group are investigating the use of transition metal complexes to

continued on next page

The Chair's Notebook, continued

As you will learn on the accompanying pages, our faculty members have continued to distinguish themselves through their research accomplishments. And so have our alumni. In our "News from Alumni and Friends" section you will read about a promotion and generous gift to the department by Steven Baxter; a promotion for Angela Galiano Roth; a Pfizer award for Karen Musier-Forsyth; and many other exciting notes both personal and professional.

However, these high spots for the department were accompanied by occasions of real sadness. During the months covered by this newsletter, the department lost two close friends. One was Andreas Albrecht, a faculty member in the department since 1957. The other was Walter McCrone, who obtained his undergraduate and graduate education in this department, and following a highly distinguished career in chemical microscopy, returned as an educator and benefactor. Their obituaries can be found on pages 2 and 3. These were men of distinctly different temperament but similar adherence to principle. They influenced many people throughout the world, not only through the traditional academic's venue of scholarly publication, but also by the examples of their personal convictions and humanity. We miss them both.

Chirik Wins National Research Award, continued

expand the scope of synthetic chemistry to include molecules that usually do not participate in chemical reactions. In addition to uncovering the basic chemical principles that control transition metal reactivity, these studies also could provide new building blocks for the construction of more complex molecules. Chirik and his group recently have discovered a new method for activating atmospheric nitrogen with early transition metals, such as zirconium.

Ultimately he hopes to use this approach to prepare a range of nitrogen-containing molecules that could be used as pharmaceuticals, fuels and dyes. The researchers also have been exploring a series of rhodium compounds that selectively break carbon-carbon bonds in common organic molecules. These reactions eventually could provide new tools for the synthetic chemist.

Chirik said he will use the NSF award to support graduate students interested in these research areas as well as to convey the nature of his research through outreach activities for undergraduate students and the Ithaca community.

His previous awards include the Herbert Newby McCoy Award while at Caltech and an American Chemical Society Petroleum Research Fund starter grant for his research at Cornell.

Walter C. McCrone Jr., continued

Though he prided himself until last year on working 15-hour days, 365 days a year (he walked to work as early as 3:00 a.m. and kidded as "lazy" his wife of 45 years, a microscopist who herself worked 80 hours a week), he had a soft heart and a keen social conscience that led him to civic volunteerism.

He had been on the board at Ada S. McKinley Community Services since 1951 and was its president from 1964 until 1995. The agency dedicated a new facility to Mr. McCrone in 1997.

His wife is his only immediate survivor.

His memorial service was held at the facility, 1863 S. Wabash Ave., September 9, 2002.

Rhodes Promotes Coalition to Harness Science to End Global Problems

Lissa Harris, Cornell News Service

Cornell President Emeritus Frank H.T. Rhodes, speaking on campus September 9, 2002, outlined a vision for an international version of the land-grant university, in which government support and university science would unite to help solve some of the globe's most pressing problems, from poverty and hunger to health care and sanitation.

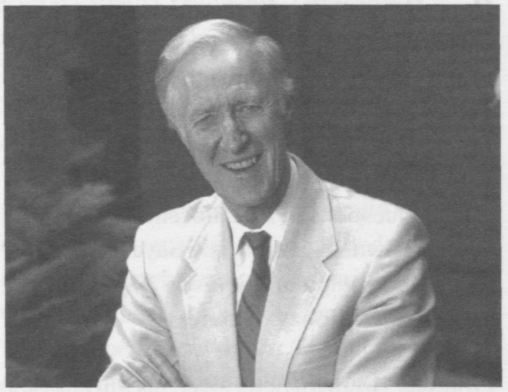
"I wonder if half a dozen leading universities of the world could band together in a coalition that would devote itself to the whole question of sustainable development," said Rhodes, who was delivering the inaugural Moses Passer Lecture, "Science and the Academy." The lecture, hosted by the Department of Chemistry and Chemical Biology, was held in 200 Baker Laboratory.

Rhodes noted that the United States currently spends about $8.5 billion annually on international aid. Ten percent of the international aid budgets of participating nations, he said, would support a multinational venture of the proposed scale. Cooperation of this sort between universities in the developed and the developing nations, he said, would allow science to address global problems in the way that publicly funded university science now addresses national problems.

Rhodes, who was president of Cornell from 1977 to 1995, has long been involved in public service to science and education, chairing, among others, the American Association of Universities and the National Science Board. Currently he is chairman of the Atlantic Foundation and a principal of the Washington Advisory Group. He recently published the book *The Creation of the Future: The Role of the American University.*

A proposal for such an international coalition could meet with opposition from both governments and universities, Rhodes admitted, adding that the potential benefits could outweigh the risks: "Can we afford to assume that there is no benefit in the kind of cooperation that has produced such magnificent results for science in our own country?" Science, he said, has brought enormous benefits to society, from staggering increases in food production and the harnessing of energy to technological marvels in health care and sanitation.

However, he pointed out, the very success of science has created its own problems for society, and it is now the responsibility of science to help address them. Current problems of overpopulation and environmental degradation, said Rhodes, have come about in part because of technological



President Emeritus Frank H.T. Rhodes speaks in Baker Laboratory, Sept. 9. Nicola Kountoupes/University Photography

advances made possible by scientific discovery. He said he has come to believe that the way science is done in universities must change radically if science is to successfully meet the challenge of developing technologies for a sustainable society.

"Science has to accept a larger role in addressing the problems that confront us as a contemporary society—not just within our own nation, but beyond it," said Rhodes. "The real question is: Do scientists in the universities have any responsibility for addressing the problems that the success of science has created?"

Single-Atom Transistor with a "Designer" Molecule, continued

The Cornell group plans next to focus on engineering a molecule with two different geometries (or shapes) that could act as a switch, changing between the two forms with the application of a voltage. "No one has yet put a single molecule in a circuit and activated it electronically," McEuen observed.

Other collaborators on the *Nature* paper, titled "Coulomb blockade and the Kondo effect in single atom transistors," are, at Cornell, James Sethna, professor of physics; postdoctoral associate Yuval Yaish; and graduate students Connie Chang and Jason Petta; and Oberlin College undergraduate Marie Rinkoski. The research was funded by the National Science Foundation, the Department of Energy, the Department of Education, and the Packard Foundation.

Spring 2003 Lecture Series

Bayer Lectures

Hans-Herbert Brintzinger, University of Konstanz, Konstanz, Germany, visited the department in early March to deliver the Spring 2003 Bayer Lectures, titled "Catalyst Models and the Development of Metallocene Catalysts," and "Recent Results and Unsolved Questions in Metallocene-Catalyzed Olefin Polymerization." The Bayer Lectures, focusing on polymer chemistry, began in 1987 as the Bayer/Mobay Lectures.

Professor Brintzinger received his PhD in 1960 from the University of Basel under the guidance of Professor Hans Erlenmeyer. In 1965, he became a member of the chemistry faculty at the University of Michigan, and in 1972 became professor of chemistry at the University of Konstanz. Professor Brintzinger is a member of the Swiss Chemical Society , the American Chemical Society, and the German Chemical Society.

He received the Karl Heinz Beckurts Award in 1991, the Alwin Mittasch Medal, Dechema in 1995, the J. C. Bailar Jr. Medal from the University of Illinois in 1996, the Walter Ahlström Prize from the Finnish Academies of Technology in 1997, the Award in Organometallic Chemistry from the American Chemical Society in 1999, the Dr. phil. honoris causa from the University of Helsinki, and the Karl-Ziegler Prize, Gesellschaft Deutscher Chemiker in 2000.

At present, Professor Brintzinger and the collaborators of his research group are involved in first-year chemistry courses for chemistry majors. During their first year of chemistry studies, students are expected to clarify for themselves whether they are sufficiently gifted for and attracted by chemistry to pursue this science as a professional activity thus important goals for the first-year chemistry courses are—besides first exposures to theoretical concepts and experimental methods of present-day chemistry—the development of attitudes and competencies that are essential for a successful career in this field, such as the capability to accept responsibilities for the learning process, to engage in productive cooperation with colleagues and to work creatively toward goals set for oneself or agreed upon with others. The development of didactic methods suited for these goals is a central task in our teaching activities.

For third- and fourth-year students, special-topics courses are offered by Professor Brintzinger. These include, besides a research-related course on organometallic chemistry and homogeneous catalysis, courses in which the traditional limits of the chemistry curriculum are transscended to bring students in contact with fields that are relevant for their later professional identity, such as courses on the historical development of technical chemistry or on chemical aspects of ecology. These courses are being developed together with colleagues from other faculties.

The research activities in the group of Professor Brintzinger are aimed at the synthesis of organometallic compounds and at investigations of their reactivities, e.g., as catalysts for polymerization reactions. An essential task in this regard is the elucidation of reaction mechanisms in these (often highly complex) catalyst systems by modern analytical methods and modeling tools. By solving problems of this kind, graduate students can prepare themselves for professional work in related research fields.

Blomquist Lectures

The Blomquist Lectures are named after Alfred T. Blomquist, who arrived at Cornell in 1932 as a National Research Council postdoctoral fellow, subsequently serving as a professor of organic chemistry. Blomquist established an international profile for his work in the behavior of small-ring molecules, the chemistry of many-membered rings, and the synthesis of novel monomers and polymers. Blomquist himself was a warm and generous man and an empathetic teacher. This series of lectures is funded by Professor Blomquist's family, former students, and co-workers. **Karl Anker Jørgensen,** from the University of Aarhus, Denmark, was the 2003 lecturer.

Dr. Jørgensen was born in Århus, Denmark, in 1955. He was enrolled at the University of Aarhus, studying chemistry and physics, in 1975.

During this period his main interest was not science, but track and field. From 1974 to 1981 Professor Jørgensen was a member of the national team representing Denmark at international competitions, especially in decathlon and 110 meter hurdles. He won several Danish championships in decathlon, 110 meter hurdles and for teams, and in 1975 he won the Nordic Junior Championship in decathlon.

He obtained his Ph.D. in 1984 and doctor of science in 1989 from the University of Aarhus. In 1985 he was a postdoc with Professor Roald Hoffmann, where he was introduced to catalysis. The stay with Hoffmann also opened his eyes to "chemistry is more than chemistry."

Professor Jørgensen was appointed assistant professor at the University of Aarhus in 1985, associate professor in 1988 and professor in 1992. Since 1997 he has been the Director of the Center for Catalysis at the University of Aarhus. In 1995 he received the Bjerrum Medal, in 2000 the Villum Kann Rasmussen Prize, and the Lundbeck Foundation Nordic Research Prize. He is a member of the Royal Danish Academy of Sciences and Letters and the Danish Academy of Technical Sciences.

Jørgensen's scientific work includes both experimental and applied theoretical chemistry. In the late 1980s he contributed to the understanding of metal-catalyzed oxidations reactions using both discrete metal complexes and metal surfaces.

Since the early 1990s the main interest of his group has been the development of new catalytic asymmetric reactions. Since the mid-1990s he has published more than 100 scientific papers dealing with the development and understanding of new catalytic asymmetric reactions using both chiral metal complexes and organic compounds as catalysts. Several of the catalytic processes are being used in industry.

Laughlin Lectures

Frank S. Bates, Distinguished McKnight University Professor and department head at the University of Michigan, delivered the Frank and Robert Laughlin Visiting Professor of Physical Chemistry Lectures, "Block Copolymers—Intrinsically Nanostructured Materials" and "Macromolecular Surfactants" when he visited the department in April.

Professor Bates received a B.S. in mathematics from SUNY Albany in 1976 and MS. and ScD degrees in chemical engineering from MIT in 1979 and 1982. Between 1982 and 1989 he was a member of the technical staff at AT&T Bell Laboratories and then joined the University of Minnesota as an associate professor. He was promoted to professor in 1991 and named a Distinguished McKnight University Professor in 1996. Professor Bates conducts research over a range of topics related to polymers, with a particular focus on the thermodynamics and dynamics of block copolymers and blends. In 1988 he was named a Distinguished Member of the Technical Staff at Bell Labs. In 1989 he received the Dillon Medal and in 1997 the Polymer Physics Prize, both from the American Physical Society, of which he is a Fellow. In 2002 Bates was elected to the United States National Academy of Engineering.

The lecture series, endowed by Robert Laughlin, began in 1999. Laughlin earned his bachelor of science in chemistry from Purdue University in 1951 and his Ph.D. in organic chemistry under A.T. Blomquist at Cornell in 1955. After a year of postdoctoral work at Yale University with William Doering, he began working for Procter & Gamble where his research interests switched to phase science and physical chemistry.

The Frank and Robert Laughlin Chair of Physical Chemistry is intended to rejuvenate experimental phase science, an important subdiscipline of the field of physical chemistry, and to continue the pioneering spirit that has been a tradition at Cornell for 100 years. Until a suitable candidate is found, Laughlin has graciously agreed to allow some of the funds to be used to support a visiting professorship in this field. Previous lecturers were Professor Reinhard Strey from the University of Cologne, Professor H.N.W. Lekkerkerker from the Debye Institute, University of Utrecht, and Professor Heinz Hoffmann from the University of Bayreuth, Germany.

Aggarwal Lectures

The 2003 Aggarwal Lectures in Polymer Science were given on May 19, 20, and 21, with the first two lectures part of the Cornell Center for Materials Research Polymer Outreach Program (POP) Symposium.

Professor Matthew Tirrell, Richard A. Auhll Professor and Dean of the College of Engineering, University of California at Santa Barbarbara delivered the lectures, titled "Forces Between Layers of Polyelectrolyte Chains Tethered to Surfaces," "Biofunctionalization of Interfaces with Peptide-Lipid Conjugates," and "Issues in Chemical Processing by Self-Assembly."

Professor Tirrell received his undergraduate education in chemical engineering at Northwestern University and his Ph.D. in 1977 in polymer science from the University of Massachusetts. He is currently dean of the College of Engineering at the University of California, Santa Barbara. From 1977 to 1999 he was a member of the faculty of chemical engineering and materials science at the University of Minnesota, where he served as head of the department from 1995 to 1999. His research has been in polymer surface properties including adsorption, adhesion, surface treatment, friction, lubrication, and biocompatibilty. He has co-authored about 250 papers and one book and has supervised about 60 Ph.D. students.

Professor Tirrell has been a Sloan and a Guggenheim Fellow, a recipient of the Camille and Henry Dreyfus Teacher-Scholar Award and has received the Allan P. Colburn, Charles Stine and the Professional Progress Awards from AIChE. He was elected to the National Academy of Engineering in 1997, became a fellow of the American Institute of Medical and Biological Engineers in 1998, was elected fellow of the American Association for the Advancement of Science in 2000, and was named institute lecturer for the American Institute of Chemical Engineers.

Commencement 2002

New bachelor's degree recipients convened in Baker 200 with members of the faculty, friends, and family for the Department of Chemistry and Chemical Biology's diploma presentation on Sunday, May 26. The departmental ceremony and reception followed the 134th all-university commencement at Schoellkopf Stadium.

The new graduates were presented their diplomas by Professor and Chair Barry Carpenter who spoke on "Success."

August 2001 Graduates
Ihab Shaker Ghattas, Ekundayo Nigel Julian Spencer

January 2002 Graduates
Joshua Geoffrey Bales, Lauren Patricia Deflores, Wilfredo W. Parrilla, Joseph Paul Weber

May 2002 Graduates
Mohsin Saeed Ahmed, Maranatha Oreofe Ayodele, Jessica Marie Beegan, Scott Joseph Bergeron, Tim Joseph Biegeleisen, Robert John Bullwinkel, Audrey Chan, Robert Chen, Joseph Pei-Che Cheung, Philip Chun Ming Chin, Mariam Shaaban Elnaggar, Nathan Emmott, Jason Durbrow Farrington, Marcus Donovan Faust, Dennis Ho-Kong Gee, Randall Howard Goldsmith, Danielle Amalie Guarracino, James Steven Haas, Anthony Michael Heckmann, Jason Eric Hill, Yeu Min Hong, Ryu Iwase, Richard Forrest Kelley, Catherine Ngan Kha, John Safa Khoury, Yelena Koldobskaya, Nitawan Leophairatana, Richard R. Lierow, Carolyn Marie Lipke, Ewa Teresa Lis, Vanessa Del Carmen Lopez-Pajares, Jean-Philip George Lumb, Milton Kelly Macias, Joseph Peter Medendorp, Abigail Emma Miller, Tecla Estomih Mtui, Joseph C. Onyiah, Friedrich Popp, Benjamin Adam Steinberg, Annie Tam, Lanvin Fabian Taylor, Maurice Sek Liew Teo, John Simon Van Arnam, Stephen Andrew Wiseman, Betty Won

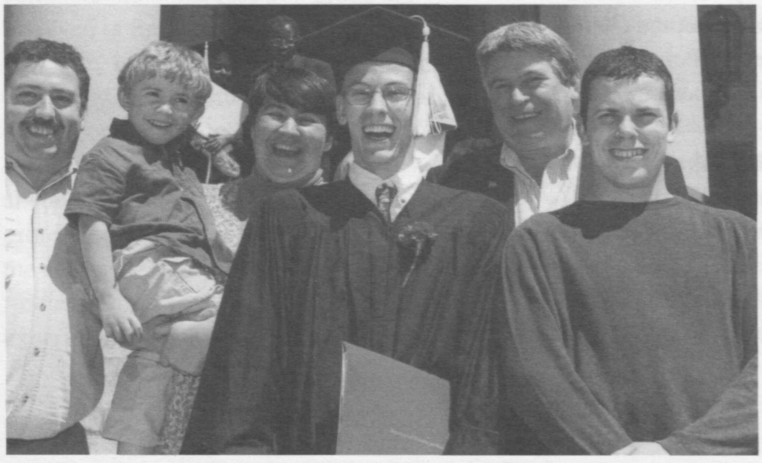
Class of 2002

Graduating with Honors

Summa Cum Laude
Jason Eric Hill, Yelena Koldobskaya, Friedrich Popp, Maurice Sek Liew Teo

Magna Cum Laude
Lauren Patricia Deflores, John Safa Khoury, Ewa Teresa Lis, Jean-Philip George Lumb, Benjamin Adam Steinberg, Annie Tam

Cum Laude
Randall Howard Goldsmith, Abigail Emma Miller



Commencement, a time of joy!

Photos by Jon Reis Photography

The Leo and Berdie Mandelkern Prize was established in 1991 with a gift from Leo Mandelkern, AB '42, PhD '49, and his wife, Berdie, and is awarded annually to an outstanding student of the senior class majoring in chemistry who will go on to graduate study in chemistry or biochemistry. The 2002 recipient was **Jason Hill**.

The George C. Caldwell Prize was established in 1913 with a gift from Mrs. Grace Caldwell Chamberlain and Professor Frank Caldwell and is awarded annually to two senior chemistry majors who have shown general excellence. The 2002 recipients were **Friedrich Popp, Sek Liew Teo,** and **Yelena Koldobskaya.**

The Hypercube Scholar Award for Scholastic Excellence in Chemistry, consisting of a certificate and copy of HyperChem software, was established in 1998 by Hypercube Inc. It is given to a graduating senior who has shown excellence in courses and research and who has shown an interest in chemical molecular modeling. The 2002 recipient was **Benjamin Steinberg.**

The Merck Index Award, which consists of a Merck Index with the name of the recipient imprinted in gold, is given by Merck & Co., Inc., and is presented to two outstanding chemistry majors in the senior class. The 2002 recipients were **Jean-Philip Lumb** and **John Khoury.**

The Harold Adlard Lovenberg Prize was established in 1939 with a gift from Mr. Oscar R. Lovenberg and is awarded annually to student majoring in chemistry who has shown general excellence. The 2002 recipient was **Ewa Lis.**

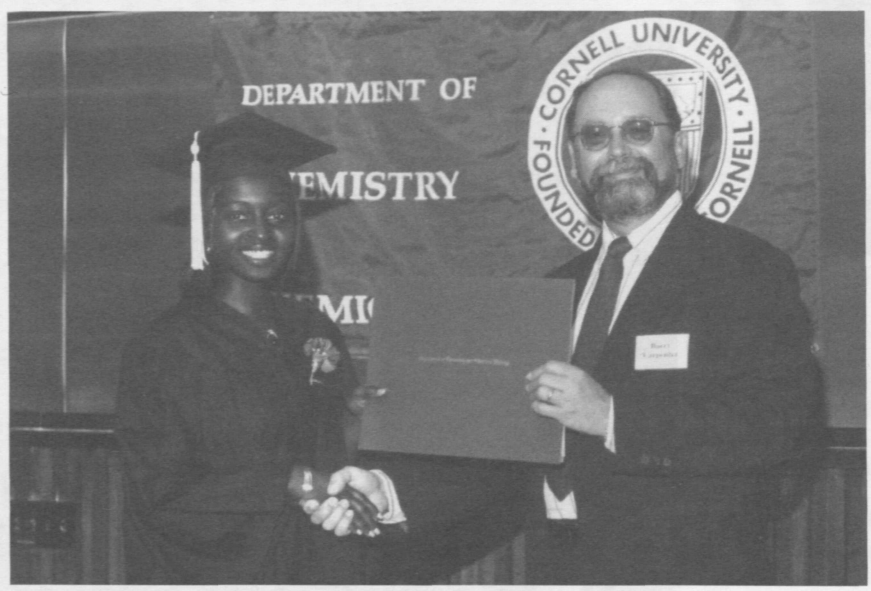
The ACS Analytical Prize is awarded to a student in the College of Arts and Sciences who has completed the third year of undergraduate study and who displays interest in and aptitude for a career in analytical chemistry. The recipient, **Zuleikha Kurji,** receives an eight-month (16 issues) subscription to *Analytical Chemistry.*

The CRC Press Chemistry Achievement Award is presented to two sophomore chemistry majors who do outstanding work in organic chemistry courses 357–358 or 359–360. The 2002 recipients were **Jennifer Basarab** and **Stephan Zuend.**

The A. W. Laubengayer Prize was established in 1966 with a gift from former students and colleagues of Professor Laubengayer and is awarded annually to an outstanding student in each of the introductory chemistry courses 103, 207, and 215. The 2002 recipients were **Andrew Lieben, Michael Nanaszko, Tam Thien Ngo,** and **Bridgit Nolan.**

Lauren DeFlores, recipient of the 2001 American Microchemical Society Undergraduate Awards, presented the results of her undergraduate research at the Eastern Analytical Symposium Undergraduate Research Poster Session in October 2001.

Ms. DeFlores conducted research with Prof. John Marohn investigating Magnetic Resonance Force Microscopy (MFRM). MFRM combines the mapping capabilities of scanning-probe techniques with the chemical characterization of NMR. Currently she is involved with the development of smaller, more sensitive mechanical force sensors for MFRM. She also conducted research isolating identifying metabolites from rat fluids at the American Cyanamid Metabolism Department in Princeton, N.J. Ms. Deflores plans to pursue a Ph.D. in instrumentation development.



Class of 2002 graduate **Tecla Mtui** was chosen as an UNCF-Merck Undergraduate Fellow.

Mtui, one of fifteen recipients for a 2001 UNCF-Merck Undergraduate Science Research Scholarship Award, received a monetary scholarship and two Merck Summer Internships where she was mentored by a Merck scientist.

Graduate Diplomas and Awards

August 2001 Graduates

Emily Joanne Baird
Matthew A. Clark
Diego J. Diaz
Ryan Zahn Hinrichs
Boaz Ilan
Ryan Aaron Mehl
Tina Marie Ovitt
Ryan B. Williams
Zhengtao Xu

January 2002 Graduates

Sean Fielding Brady
Tevye Clint Celius
Padma Gopalan
Samantha Glazier
Mingming Hao
Jun Xi

May 2002 Graduates

Song Jin
Ian J. Rhile
Cindy Renee Sinars

The Teaching Excellence Awards are awarded annually to teaching assistants who have demonstrated excellence in teaching and a desire to upgrade the quality of undergraduate education. Graduate students who received the prize for 2002 were **Jahan Dawlaty, William Kennerly,** and **Anne McNeil.**

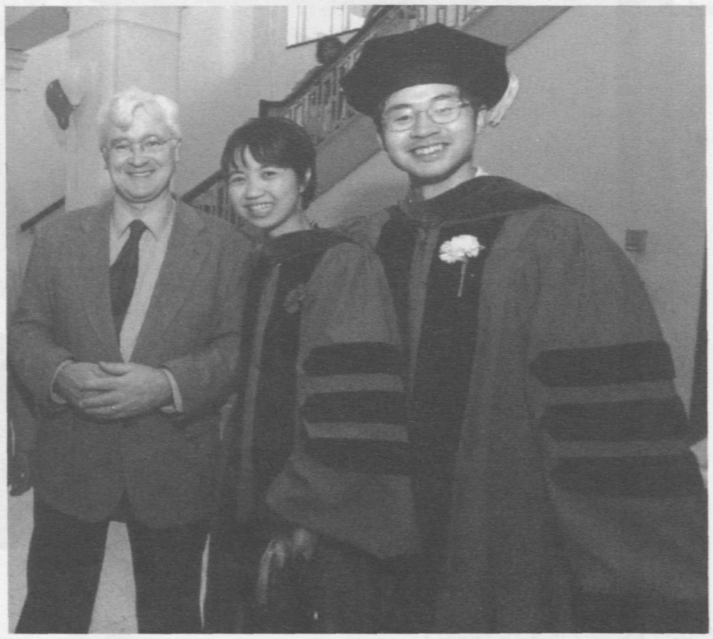
The Richard Evans Prize is awarded when faculty and students from introductory chemistry courses reach a broad consensus that there is a teaching associate who meets the high standards of service to the students set by the late Richard Evans. The honoree for 2002 was **Katie Gulliford.**

The Tunis Wentink Prize is awarded annually to outstanding graduate students in any area of chemistry who have distinguished themselves both academically and in the quality and quantity of their research. Prize winners present their research findings at a symposium held in the spring. The 2002 recipients were **Jonas Goldsmith, Phillip Hustad,** and **Rikard Wind.**

The Howard Neal Wachter Memorial Prize is given annually to a promising graduate student in physical chemistry who has demonstrated a potential to contribute to the profession. The 2002 recipient was **William Silveira.**

PhD graduates (front row, l-r) Armah Kpissay, Qian Xia, Ying Ge, Sung Jin (back row, l-r) Arun Gidwani, Zheng-tao Xu, Mi Jin, Adam Viege.

Adam Viege and family.



L-R, Professor Tadhg Begley, Ying Ge, and Sung Jin.

Photos by Jon Reis Photography

John (PhD '52) and Marjorie (BS '52) Backus chat with Professor Barbara Baird.

On Friday, June 7, the Department of Chemistry and Chemical Biology hosted an open house for returning alumni and friends in the faculty lounge of Baker Laboratory.

The tables in the lounge were filled with memorabilia to reminisce over and refreshments to replenish energy for walking around campus.

Martin (AB '55) and Gloria (AB '57) Sage chat with Professors Harold Scheraga and Simon Bauer.

Professor Ben Widom shares memories with current department members, Ken Koga and Ryo Akiyama.

Photos by Jon Reis Photography

30s

Alfred Bennett, AB '33, included this note with his Society of Cornell Chemists donation: "On September 8, 2002, I will be 90 years old. My current plan is to stay alive and active." Happy belated birthday, Alfred!

Ralph S. Emerson, M.D., AB '33, writes, "With Cornell University doing basic research and Weill Cornell Medical–N.Y. Presbyterian Hospital, Memorial S. K. Cancer Center, and Rockefeller University affiliates doing clinical research, Cornell will be the envy of the scientific world. Right on!"

John Macdonald, BChem '39, writes, "I continue with healthy retirement since 1983. Sorry I couldn't report a chemistry career, but chemistry assisted me in my 43 years of basic stock(?) making. As I have reported before, I had a special attachment to Baker Lab before I attended classes there. My dad was the architect's representative on the construction site in 1922–24 while I was preparing to enter first grade (Cayuga Heights School). As I attend '39 reunions usually, I drop in Baker for the alumni receptions (visit with Laubengayer earlier)."

40s

Cal Y. Meyers, BA '48, writes, "As a Cornell alumnus, I thought you, your colleagues, and other Cornell chemistry alumni would appreciate learning about another former Cornell chemist. He is Dr. Lincoln I. Diuguid, who received his Ph.D. in organic chemistry from Cornell in 1945. Now 84, Dr. Diuguid continues to work in his own lab synthesizing organic compounds that are potential anticarcinogens.

50s

Stephen R. Cohen, BChemEng '51, Ph.D. '56, writes "Since retiring in December 1996 from the position of research scientist with the New York State Office of Mental Retardation and Developmental Disabilities, a position in which I conducted fundamental research in biochemistry and physiology, I have embarked on a second career composing classical music. To date a CD of some of my piano music has been made, and on June 19, 2002, there was a concert of some of my music for piano, voice, unaccompanied flute, and unaccompanied violoncello.

Michael D. Colloms, AB '59, writes that after his undergraduate degree, he worked on his Ph.D. in molecular biology parallel to activity in FSM, civil rights, and anti–Vietnam war movement. After receiving his Ph.D. in 1966 from the University of California at Berkeley (his thesis was on structural modification of TMV protein by chemical methods), he spent the next four years as a postdoctoral associate: two years in Ben Papermaster's labs in the Immunology Department at Berkeley working with Mark Saifer trying to isolate a specific messenger RNA for IgG synthesis and two years at the University of Washington, Seattle, in biology working on the culture of salivary gland cells with a similar goal. Michael then turned to school teaching with occasional time off for research at the University of Edinburgh in the lab of M. Masters. There he worked on characterization of the *E. coli* pch gene. In June 2000, he retired from ASL high school where he taught science and chemistry.

Raymond A. Firestone, AB '51 (Ph.D. Columbia, 1954), writes that he has retired after 45 years of research in pharmaceutical chemistry but remains active in chemistry: reading, writing, consulting, and teaching.

Ellis Glazier, AB '51, writes that he is presently adjunct professor at the Universidad Autonomo Baja California Sur where he edits scientific papers written in English for publication and teaches a course on writing scientific work in English, both of which he has been doing for many years in Mexico.

60s

Patrick G. Barber, PhD '69, sent in this information: In his senior year of undergraduate study at Stanford University he completed a research project on the thermal expansion coefficients of paraffin hydrocarbons under Professor Paul J. Flory. He then attended graduate school in chemistry at Cornell under the direction of Professor Robert E. Hughes. Following graduation he worked as a postdoctoral associate with Professor Krigbaum at Duke University, then was hired by the newly opened Southside Virginia Community College. There he taught chemistry, mathematics, and computer sciences. For three years he served as chairman of the Division of Arts and Sciences, and for one of those years he served as chairman of the division on both campuses of the college. In 1978 he moved to Longwood College where he taught chemistry courses in the Department of Natural Sciences. He has served as director and co-director of the Chemistry Department for more than two decades. During the summers he travels to large laboratories to undertake a variety of research projects involving the structure of matter. He worked at the NASA Lewis Research Laboratory in Cleveland, Ohio, for two summers working on an improved battery for the electric car. For two summers he worked at the David Taylor Naval Research and Development Laboratory in Annapolis, Maryland, on the computer analysis of stress-strain data and on the thermodynamics of corrosion in marine gas turbine engines. Every summer between 1982 and 1998 he worked at the NASA Langley Research Center on the growth and analysis of semiconductor crystals. He also has developed an improved etching procedure for the analysis of these materials. These methods have been applied to semiconductor crystals grown in the normal gravity of earth as well as in the microgravity on the space shuttle. He and his wife, Patricia, have lived in Keysville, Virginia, for 30 years. Patricia is a registered dietitian working in the local hospital. They have two children, David and Dawn. David and his wife, Carol, live in Florida where David is on the faculty in toxicology at the University of Florida and Carol is a graphics artist. Dawn is finishing graduate school in speech, language, and pathology at Central Michigan University.

Donald B. Boyd, postdoctoral associate with Roald Hoffmann in 1967–68, writes, "For the last three years, I have served as the editor of the *Journal of Molecular Graphics and Modelling*, which is published in affiliation with the American Chemical Society's Computers in Chemistry Division (CONP). I also am editor of the book series *Reviews in Computational Chemistry*; volumes 15 and 16 were published in 2000."

Dave Bridgeman, AB '65, writes, "I retired from the Dow Chemical Company on June 30, 1998, after ten+ years of sales in epoxy-based vinyl ester resins (trademarked DERAKANE). Prior to that, I sold similar products for Interplastic Corporation, water-treating

chemicals for American Cyanamid, organic peroxides for Akzo Chemie, and various chemicals for Union Carbide Corporation. The living is good in San Jacinto, California, and I just had the pleasure of organizing a reunion for 95 of my Alpha Phi Delta fraternity brothers in Ithaca. My advice to all is to take the time to smell the roses along the path of life—after all, we're not just here for a dress rehearsal!"

David N. Harpp, postdoctoral associate 1965–66, received an honorary degree from Acadia University in 2000. David obtained his A.B. from Middlebury College, a Ph.D. from the University of North Carolina, followed by his postdoc with Professor Blomquist at Cornell. He has distinguished himself by the use of visual methods for classroom teaching. His material often portrayed simple animation using the lap dissolve technique anticipating web animations by some 30 years. David has received numerous awards recognizing his teaching as well as his research accomplishments in organosulfur chemistry. In addition, he has been honored by the government of Canada for science promotion to the wider community. He is currently professor and chairman of the Chemistry Department at McGill University. Dr. Harpp returned to Cornell Chemistry in 1991 to teach the World of Chemistry course.

Zafra Lerman, postdoctoral associate 1969–73, distinguished professor of science and public policy, and head of the Institute for Science Education and Science Communication at Columbia College in Chicago, has been selected by the ACS Board of Directors as the 2003 recipient of the Charles Lathrop Parsons Award in recognition of outstanding public service to chemistry. The Parsons Award is named after the executive secretary who helped create today's ACS.

Arno F. Spatola, AB '66, writes "Thanks for a fine newsletter. It was gratifying to read of departmental successes including those of former teachers such as Professor Meinwald. I was sorry to miss the Scheraga-Fest. . . .Kudos to the new faculty as well. . . .I hope to be back in Ithaca sometime."

George H. Wahl, Jr., postdoctoral associate 1963–64, turned 65 in 2002 and is still having fun teaching at North Carolina State University. He was president of Phi Kappa Phi last year and was on special assignment to do a strategic plan for their service learning effort. He also notes that he is trying his best to turn his undergraduate organic course into an online one.

70s

Paul J. Brynes, PhD '79, writes that he has retired from Abbott to become head of health sciences and biotechnology licensing at the University of Washington in Seattle.

Emily Haynes, BS '79, is currently a high school chemistry teacher in Lafayette, Colorado.

80s

Bob Chin, AB '80, writes "Wanted to drop a quick CV to update CU chem on where and what I've been up to. . .after 10 years in industry—I'm in academia?! I guess a lot of my old CU chem profs will be shocked and surprised, but you really never know about these things. Been involved with the UT Austin Bio/Chem Countermeasures Program for the past 24 months, and have been interacting with a number of famous CU alums—Professors Bob Shope and George Georgiou. . . .I am quite humbled by the opportunities that I have been able to experience. . . .IT ALL STARTED in Baker Hall. . . .and all of the chem faculty pushing us so hard."

Angela Galiano Roth, PhD '88, was promoted in February 2002 to section manager for Industrial Lubricants Product Development at Exxon Mobil Research and Engineering in Paulsboro, N.J. Angela has two children, Thomas and Amy, 10 and 5 years old, respectively.

Steve Baxter, PhD '89, writes that 2002 was a great year as he received a promotion at Rohm and Haas and was awarded the 2001 Otto Haas Award for Scientific Achievement. In 1980, the Research Division of Rohm and Haas Company introduced the awards program named in honor of Otto Haas, founder of the company. The Award for Scientific Achievement recognizes outstanding and significant contributions to Rohm and Haas Company, which are characterized by a combination of the excellence of the science and the scientific approach, the soundness of the scientific methods used, and the potential value to the company, and the special contributions of the individual to the accomplishment. As part of this award, Steve could also name an educational institution of his choice to receive a monetary award. Another thank you to Steve for choosing Cornell Chemistry and Chemical Biology!

Lawrence Meyers, AB '89, writes, "Following my graduation from Cornell's undergraduate program in 1989, I immediately put all of my chemistry experience behind me in pursuit of a career in the entertainment industry. In the ensuing 13 years, I graduated with an M.A. in film production from the University of Southern California, where I was also awarded the 1991–92 Jack Nicholson Scholarship for Excellence in Directing, and have written and produced over 25 hours of prime-time network programming including 'Picket Fences' (story editor), 'The Pretender' (executive story editor), 'Roar' (co-producer),'When I Grow Up' (producer), and multiple episodes of 'The Outer Limits,' 'Early Edition,' 'G vs. E,' 'Profiler,' 'Tales from the Crypt,' and 'The Net.' I am currently writing a feature film for Warner Brothers, have finished a first draft of a biography concerning one of upstate New York's most brilliant and enigmatic high school instructors, and occasionally teach screenwriting at the prestigious UCLA Writer's Extension Program. Since leaving the sciences, I have discovered that it is better to die of insanity resulting from dealing with Hollywood crazies than from all the toxic chemicals I would have been exposed to as a chemist. I enjoy the vast sums of money I am earning compared to the pittances I would have earned as a C+ student in the postgraduate world of chemistry. I regularly utilize the name of one famous, distinguished Cornell Chemistry professor as the villain in every show I write. This is my thanks for his callous and unprofessorial attitude toward me after I'd suffered serious injuries in a car wreck in 1986, which I have since recovered fully from. I enjoy living in warm and sunny southern California with my wife and ten-month-old daughter."

Karen Musier-Forsyth, PhD '89, associate professor of chemistry at the University of Minnesota, Minneapolis, has been awarded

the 2002 Pfizer Award in Enzyme Chemistry. The award is presented annually to an individual less than 40 years of age in recognition of outstanding work in enzyme chemistry. Karen's research focuses on RNA-protein interactions.

90s

Isabelle Kagan, AB '91, recently moved from Austin, Texas to begin a second postdoctoral position in Oxford, Mississippi where she is doing research at the USDA-ARS Natural Products Utilization Research Unit, which is in the Natural Products Center, part of the School of Pharmacy at the University of Mississippi. She has been working in the lab to analyze root extracts, and has been grateful for what she learned in her chemistry lecture and lab courses at Cornell. She is enjoying the project, the people, and the town.

Sarita L. Kenkre, MS '97, writes that things are going well—she is currently working for a logistics company that provides transportation services for chemical companies. She enjoys the work and is glad to still be involved in the chemical industry.

Sarah L. J. Michel, AB '95, writes, "I received my Ph.D. in inorganic chemistry with Professor Brian Hoffman at Northwestern University in December 2000 and am now an NIH postdoctoral fellow with Professor Jeremy Berg at the Johns Hopkins University School of Medicine in the Department of Biophysics and Biophysical Chemistry."

Zafiria Nomikou, PhD '92, is teaching the chemistry course in the International Baccalaureate Program at Athens College, in Athens, Greece.

Emily (Reines) Whelan, AB '97, is a patent attorney at Hale and Dorr in Boston.

Jim Shattuck, PhD '96, and his wife have moved into their first house and tell us that all is well in Hartford; he's glad to hear from the latest alumni newsletter that everything is going well in Ithaca.

Franck Tessier, postdoctoral research associate with Professor Francis J. DiSalvo 1997–98, writes that he has since had a postdoctoral research associate position with Professor Alexandra Navrotsky (University of California at Davis), and since the end of 1998 has been in a permanent research position at CNRS Institut de Chimie de Rennes (Université de Rennes 1, France) in the Laboratoire Verres et Céramiques.

In Memoriam

Richard Martens, AB '48, October 1999.
John C. Howard, PhD '53, December 2000.
Euguene G. Rochow, PhD '35, March 2002

Cornell Chemistry
Continental Breakfast
226th National ACS Meeting
New York City
September 9, 7:45 a.m.
Room 1E05 in the
Jacob K. Javits Convention Center

The Society of Cornell Chemists asks you to support the cost of printing and mailing this newsletter with your voluntary annual dues of $25. Please make your 2003 check payable to "Cornell Chemistry" and mail it to the Society of Cornell Chemists, Baker Laboratory, Department of Chemistry and Chemical Biology, Cornell University, Ithaca, New York 14853-1301.

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