Chemistry and Chemical Biology

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The Chair's Notebook

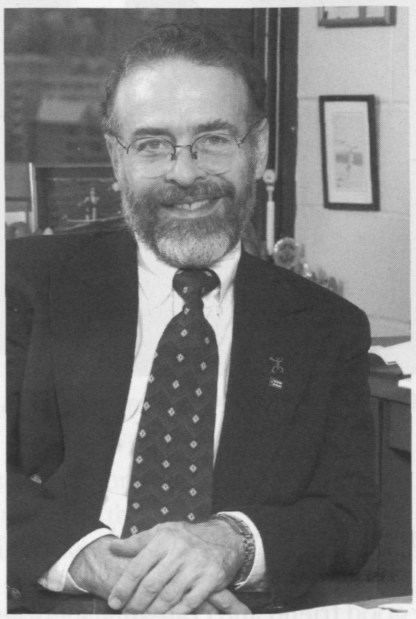
Saludos

For those of you who remember the rudiments of Spanish 101 (Spanish for scientists!; akin to chemistry for poets!), *saludos* has not only the connotation of a greeting (as well as goodbye) but also a wish of well-being to your interlocutor. After all, the word has its origins in the word for "health," salud (also used to toast), which is based on the equivalent Latin word for "health." In that sense, I would like to convey a sense of saludos to all of you. The last 10 months (since I became chairman on July 1, 2004) have been full of activity and accomplishments on the part of our colleagues and students. It is now May, a time in the academic calendar that is always full of changes, challenges, and opportunities; often closely intertwined. During this time we have final exams and commencement and for those who graduate—undergraduates and graduates alike—the start of a new stage of their lives. With some luck, it may even signal the end of winter. At a more personal level, this time also brings me close to the end of my first year as chairman of the department.

My term began with neither a bang nor a whimper, but rather with the sound of freshly made espresso. I am happy to report that the espresso experiment has been a great success —we have the best coffee service, including the best coffee (Café Madre Isla), of any department on campus, and the Dean of Arts and Sciences has wisely followed our lead.

Last July, two supremely talented assistant professors: Jón Njarðarson (organic) and Garnet Chan (theory) joined our ranks (see a description of their research interests in this issue), and as this newsletter goes to print I am happy to report that Peng Chen (currently a post-doc with Prof. Sunney Xie) will join us this summer. Peng brings a great deal of expertise in single-molecule spectroscopy and a future issue of the newsletter will feature his work.

Also on the subject of faculty, our colleagues continue to garner awards and recognition. Paul Chirik received a Packard Fellowship as well as a 2005 Stephen and Margery Russell Distinguished Teaching Award. Tyler McQuade received the Rohm and Haas New Faculty Award and was also recognized as one of the world's top 100 Young Innovators by *Technology Review* magazine. He was also the first place winner of the 2005 Business Ideas Competition sponsored by the Johnson Graduate School of Management. Brian Crane was selected as an Alfred P. Sloan Fellow for 2005. Geoff Coates received a New York State Office of Science, Technology, and Academic Research grant to develop biodegradable plastics. Our award winners were not restricted to those under 40. Fred McLafferty received the Lavoisier Award from the French Chemical Society, and Jerry Meinwald was the recipient of the Roger Adams Award in Organic Chemistry from the American Chemical Society. In addition, Jack Freed was honored by the *Journal of Physical Chemistry* with a Festschrift issue last July 8.



Héctor Abruña *(Jon Reis Photography)*

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In Memorium

George H. Morrison *(Jon Reis Photography)*

George H. Morrison (1921-2004)

Our good friend and colleague George H. Morrison died peacefully in his sleep on June 11, 2004 in Delray Beach, Florida, and was laid to rest in Ithaca, New York. He is survived by his loving wife of over 50 years, Annie; three children, Stephen, Katherine, and Althea; and five grandchildren. He was immediate past Editor of *Analytical Chemistry*, serving this publication with distinction through the years 1980–1990.

George, a proud native New Yorker, was born on August 24, 1921 in Brooklyn. He received a BS from Brooklyn College in 1942 and was drafted into military service soon afterward. He was assigned to work at Princeton, New Jersey on the chemical purification of uranium for the Manhattan Project, an effort that led to an outstanding commendation from the U. S. Army for his contributions to the successful conclusion of World War II. George earned a PhD from Princeton in 1948 at a time when it was one of the leading institutions for analytical chemistry, under the direction of N. H. Furman. There he met many of the individuals who, like himself, would lead and define analytical chemistry for decades.

George was an internationally recognized authority in the field of trace element analytical chemistry and materials characterization. He was a leader in the development of modern physical methods, including ion microscopy, solids mass spectrometry, neutron activation analysis, and atomic spectroscopy and their application to important solid state, cosmochemical, biological, and medical problems. He was one of a very select group of analytical chemists who made important contributions to both classical wet chemical methods of analysis and modern instrumental methods.

During his 10 years as head of inorganic and analytical chemistry at GTE Laboratories, he made great contributions to methods for the characterization of semiconductor materials, which advanced the development of solid-state devices. During this time and together with James Cosgrove, he developed the technique of instrumental neutron activation analysis, which became one of the most effective tools of nondestructive trace element analysis. In 1957, he co-authored with Henry Freiser *Solvent Extraction in Analytical Chemistry* which was translated into more than a dozen languages and became the primary reference book in the field for decades.

George joined Cornell in 1961 as a professor of chemistry and director of the Materials Science Center Analytical Facility and continued his pioneering research in trace analysis. He received the ACS Award in Analytical Chemistry in 1971 for performing the most complete and detailed analysis of the Apollo lunar samples, an accomplishment of which he was especially and rightfully proud. As editor of *Analytical Chemistry*, he not only maintained and enhanced the leadership position of the journal but also advanced the stature of the field world-wide. The last decades of his research career were directed toward biomedicine, and his analytical innovations led to new concepts in the cell biology of calcium, boron, fluorine, and isotopically labeled therapeutic anticancer agents.

As a scholar and mentor, George trained generations of analytical chemists who went on to most successful careers in academia and industrial and government labs. To his students and research group members, he was unfailingly loyal and generous with his time. He co-authored over 400 professional articles, many of which represented seminal contributions. In addition to the ACS Award in Analytical Chemistry, George received numerous awards for his scholarly achievements, including a Guggenheim Fellowship (1974–75), the Eastern Analytical Symposium Award (1986), and the Pittsburgh Analytical Chemistry Award (1990).

As a colleague, George was gracious and generous. His former colleagues, students, and members of the wider community of chemists mourn his departure but celebrate his contributions. His dignity, good humor, and wise counsel on matters beyond the world of ions and molecules will be deeply missed.

H. D. Abruña
F. W. McLafferty
H. A. Scheraga
J. T. Brenna
S. Chandra

Betty R. Miller, 95, wife of our late colleague, William T. Miller, died Thursday, January 20, 2005 at Kendall at Ithaca. Betty was born on March 25, 1909 to William and Elizabeth Stewart Robb, a pioneer Seattle family; her mother had been born on the Oregon Trail. When she graduated from the University of Washington in the Depression and was unable to find employment, Betty started a business sewing clothing, including wedding dresses, with her friend Florence Fahey (Hoard). Later, Betty became a buyer of women's clothing at the Franklin and Marshall Department Store of Portland, Oregon. She made twice yearly buying trips to New York City and often came to Ithaca to visit Florence and Lynn Hoard. In July 1951, Betty married William T. Miller, Lynn's colleague in the Cornell Chemistry Department, in the Hoard home at 42 Cornell Street.

In Ithaca, Betty contributed greatly to the community through the Service League (including its move to the Women's Community Building), the committee that built McGraw House, the Ithaca Garden Club, the Northeastern Rock Garden Society, the Drama Club, and the Campus Club (she was president). The Miller Grove in the Cass Park Waterfront Trail illustrates her love for Ithaca's natural beauty. Betty and Bill were generous hosts to many Cornellians in the house they built at 100 Sunset Park.

Contributions in Betty's memory may be made to the Cornell Plantations, in care of Nancy Kusumano, 1 Plantations Road, Ithaca, New York 14853.

Garnet Chan and Jón Njarðarson Join the Department as Assistant Professors

Garnet Chan joins the faculty after completing his Junior Research Fellowship at Christ's College, Cambridge. Prior to that, he was a Miller Research Fellow at the University of California, Berkeley, in the group of Professor Martin Head-Gordon. His graduate and undergraduate degrees were obtained at the University of Cambridge.

Chan's work focuses on the development and application of theoretical algorithms to solve the quantum mechanical equations that govern the properties of matter. Using these equations, his group is able to predict and explain the behavior of complex chemical systems in materials science and biology.

Chan lived in England, Hong Kong, and California, before moving to Ithaca. Born in London, he moved to Hong Kong at the age of five to begin school. At an early age, he had an aptitude for mathematics, taking the British university entrance exam at the age of 12. Not wishing to leave home at a young age, he continued his school studies in other areas, and his interests shifted increasingly toward chemistry. This culminated in a return to England to study Natural Sciences at Christ's College, Cambridge University.

As an undergraduate, Chan had originally hoped to be a synthetic organic chemist. However, after some disastrous lab experiences, he was persuaded that his talents had to lie elsewhere. After being captivated by quantum mechanics, he decided that theory was the way for him. Graduating at the top of his class in 1996, he decided to stay at Cambridge to work in the group of Professor Nicholas Handy (now retired), in the area of electronic structure theory.

"All molecules are held together with bonds, and all bonds are made of electrons. Electronic structure theory is the name given to quantitative and qualitative theories of bonding in molecules," Chan explains. During his thesis work, Chan investigated aspects of a particular model known as density functional theory, a theory for which Kohn and Pople were awarded the chemistry Nobel Prize in 1998. "It was great fun to work on this as there was much excitement in those days. Nicholas Handy was at the forefront of density functional theory in chemistry, which allowed people to compute properties of molecules at a mere fraction of the cost of previous models. This revolutionized what kind of things people could study with theoretical methods," Chan explains.

In 1998 Chan was awarded a Junior Research Fellowship at Cambrige, which gave him the chance to pursue independent research. At a conference in Rome in the following year, he became aware of the work by Cornell alumnus Steve White, a professor at the University of California at Irvine, which demonstrated how renormalization group theory could be applied to electronic structure problems. Some years before, Kenneth Wilson, White's former adviser and a Cornell alumnus and Nobel laureate, already had argued strongly for the use of renormalization group ideas (which he had helped invent) as a framework for understanding chemical problems.

In 2000, Chan decided to intermit his Cambridge fellowship to take up a Miller fellowship at University of California, Berkeley, determined to start a program of research developing renormalization group–inspired ideas for chemistry. "To model the complex ways in which electrons interact in molecules, we typically simplify the equations in order to solve them. The strength of the renormalization group approach is that we have an extremely general and systematic way in which to do this, which appears to be applicable to all areas of chemistry, says Chan. "Chemists are not interested in the details of the simultaneous motions of hundreds of thousands of electrons, but rather quantities that we measure and observe, e.g. a molecule's charge density. In the renormalization group approach, we can systematically reduce the amount of information that is contained in the detailed

Garnet Chan *(Jon Reis Photography)*

equations of matter, to obtain much simpler equations for quantities we are actually interested in."

While at Berkeley, he developed one of the first renormalization group programs in chemistry, and following his return to Cambridge, at a meeting in Germany in 2003, he was able to show how renormalization group techniques enabled him to calculate the largest ever molecular solutions of the quantum mechanical equations.

As an assistant professor, he is currently developing a comprehensive set of renormalization group tools so that chemists can study materials with any kind of bonding behavior, no matter how complex. "We strongly believe that these theories are the way forward, and that in the future, they will form the basis of all electronic structure computations," says Chan. In addition to their method development work, his group is currently focused on two specific problem areas: energy and electron transport in nano-scale devices and photoactive biological systems, and unravelling the mystery of high-temperature superconductivity through first-principles calculation. Much of this work is facilitated by the existing strengths of the Cornell experimental groups in chemistry and physics in these areas. Adds Chan, "I am delighted to join a department and a university with such a strong atmosphere of collaboration, and I hope to forge many new and lasting partnerships here."

In the summer of 2004 **Jón Tryggvi Njarðarson** joined the Chemistry and Chemical Biology faculty. His research group focus is on the development of new synthetic organic methods and the total synthesis of architecturally inspiring anti-cancer and anti-malarial natural products. Njarðarson was born and raised in the small town of Akranes, Iceland. He had aspirations in high school to pursue a bachelor's degree in chemistry. After graduation, he left his hometown and moved to Reykjavik to start his studies at the University of Iceland. During his first year at the university he became fascinated by the wonders of organic chemistry, a fascination that has continued ever since. As an undergraduate, Njarðarson worked in the laboratory of Professor Jón K. F. Geirsson on the synthesis of antifungal agents and methoxy-carbonylation of -phosphono carbanions. After graduation, he worked at the University of Iceland Science Institute in addition to serving as a teaching assistant at the university. Njarðarson then followed in the footsteps of his Icelandic ancestors and moved west, to America. This journey brought him to New Haven, Connecticut, where he chose to pursue a graduate career in organic chemistry at Yale University. While at Yale, he joined the research group of a newly hired assistant professor (John L. Wood) after becoming affected by his enthusiasm and energy. During his doctoral studies Jón worked on the total synthesis of the nonadride natural products CP-225,917 (Phomoidride A) and CP-263,114 (Phomoidride B). In addition to his work on natural products, Jón developed a novel oxidative dearomatization protocol. At the end of his graduate studies Jón was presented with the irresistible offer of moving to New York City to work in the laboratory of Professor Samuel J. Danishefsky at the Memorial Sloan-Kettering Cancer Center. While in the Danishefsky group, as a General Motors Cancer Research Scholar, he completed the total syntheses of the natural products epothilone 490 and migrastatin. The novel route designed for epothilone 490 opened the door for the development of novel epothilone derivatives, one of which is now in phase I clinical trials. The work on migrastatin resulted in the discovery of highly potent cell-migration inhibitors that are structurally much simpler than the parent natural product. The therapeutic potential of these novel agents is currently being evaluated. The main focus of his research group is the development of new synthetic methods and synthesis of intriguing natural products with promising biological profiles. Today's molecular architects need at their disposal tools that are general, predictable, economical, and efficient in assembling their desired molecular frameworks. Natural products, in addition to being excellent lead structures for the development of new biological probes and therapeutic agents, serve as an ideal training ground for tomorrow's molecular architects.

Jón Njarðarson *(Jon Reis Photography)*

CU Researchers Focus on Proteins Important in the Making of DNA

Sarah Davidson, Cornell News Service

Cornell researchers, who are trying to understand how proteins evolve and function by looking at their structural features, have uncovered the crystal structure of a protein involved in making the building blocks of DNA correctly.

The protein is AIRs kinase and, to the researchers' surprise, its shape is similar to other members of the riboside kinase family, proteins that are important in making DNA and RNA, the molecules that make up genes. As a result, the research group now has nine members of the riboside kinase family that are thought to have evolved from a common protein ancestor.

Writing in a recent issue of the journal *Structure,* Steven Ealick, professor of chemistry and chemical biology, and graduate student Yan Zhang report that revealing the structure of AIRs kinase is another step in deciphering what proteins look like, a major goal of the National Institutes of Health, which funds the Ealick research group's work.

"Often, two proteins with the same function have no sequence similarity," says Ealick, whose research group works with crystallized proteins, the building blocks of all living organisms, and has solved 50 protein structures over the past 20 years. "From knowing the genetic sequence alone, we wouldn't necessarily guess that two proteins play a similar role in an organism."

Zhang took just two months of trial and error–an unusually short time–to get the AIRs kinase protein to crystallize. Then, using the Northeastern Collaborative Access Team (NE-CAT) beamline at the Advanced Photon Source at Argonne National Laboratory and the Cornell High Energy Synchrotron Source, two of only five sources of high-energy X-ray beams, she obtained the protein's "optical transform," the intermediate stage between the crystal and the ultimate model of the structure.

Ealick explains: "Optical transform is what happens when you scatter light from a microscope onto a specimen, but until you have an objective lens that refocuses that light, you can't actually see an image." Structural protein chemists don't have the equivalent of a microscope's objective lens, so they "refocus" the image using computers.

When the Ealick group compared the AIRs kinase protein to other known protein structures, they found that the shape was similar to other members of the riboside kinase protein family. Ealick explains that even though the family members don't have appreciable sequence similarity, they all contain three invariable amino acids. The similar shapes of the proteins position these three important pieces at the right place in the protein, and as a result they all have a similar function—the addition of a phosphate group to a DNA or RNA precursor.

"When we saw how very similar these proteins look, we began to ask whether there might be a common ancestor or whether proteins might evolve using similar kinds of rules that whole organisms use to evolve," Ealick explains. In fact, his group is finding numerous of examples of this.

"I view this like the drawing you often see in textbooks on human evolution that first shows a primitive chimpanzee, and then you go through various morphological changes until you finally get to modern man," he says. "You can see the same sort of trends in the evolution of protein shapes."

The primitive protein began as a general kinase, playing many roles in the cell, he says. Eventually, it evolved and diverged into a group of different proteins, each of which could focus on a specialized task.

Ealick's group now hopes to a design a broad specificity riboside kinase as a laboratory tool for testing anticancer drugs and other pharmaceuticals. The group also is working to get the structure of other riboside kinase family members in order to be able to predict the proteins' function.

A computer monitor in the Spencer T. Olin laboratory of Yan Zhang, left, and Steven Ealick displays their idea of how a protein in the riboside kinase family may have evolved, much like humans evolved from a primitive chimpanzee-like ancestor through morphological changes. *(Robert Barker/University Photography)*

Putting the Squeeze on Petroleum: Chemists Make Plastics from Oranges

Sarah Davidson, Cornell News Service

A Cornell research group has made a sweet and environmentally beneficial discovery — how to make plastics from citrus fruits, such as oranges, and carbon dioxide.

In a September 2004 issue of the *Journal of the American Chemical Society,* Geoffrey Coates, professor of chemistry and chemical biology, and his graduate students Chris Byrne and Scott Allen describe a way to make polymers using limonene oxide and carbon dioxide, with the help of a novel "helper molecule"—a catalyst developed in the researchers' laboratory.

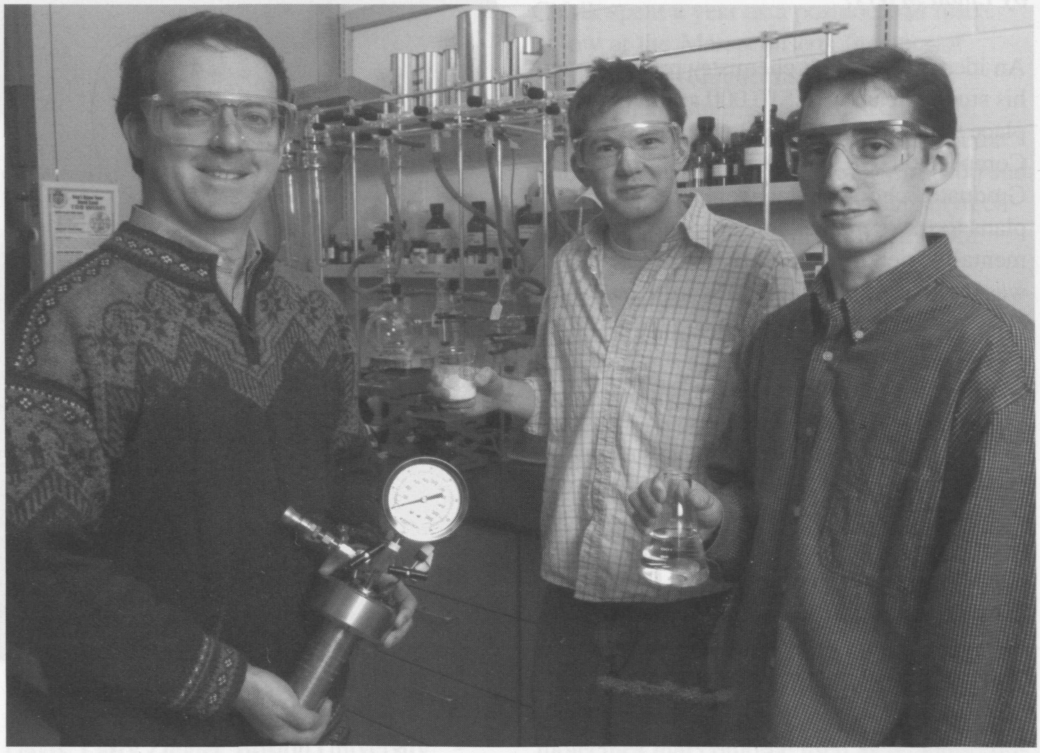
Limonene is a carbon-based compound produced in more than 300 plant species. In oranges it makes up about 95 percent of the oil in the peel.

In industry, Coates explains, the orange peel oil is extracted for various uses, such as giving household cleaners their citrus scent. The oil can be oxidized to create limonene oxide. This is the reactive compound that Coates and his collaborators used as a building block.

The other building block they used was carbon dioxide (CO_2), an atmospheric gas that has been rising steadily over the past century and a half—due largely to the combustion of fossil fuels—becoming an environmentally harmful greenhouse gas.

By using their catalyst to combine the limonene oxide and CO_2, the Coates group produced a novel polymer—called polylimonene carbonate—that has many of the characteristics of polystyrene, a petroleum-based plastic currently used to make many disposable plastic products.

"The polymer is a repeating unit, much like a strand of paper dolls. But instead of repeating dolls, the components alternate between limonene oxide and CO_2—in the polymer," says Coates. Neither limonene oxide nor CO_2 form polymers on their own, but when they are put together, a promising product is created.



From left, Professor Geoffrey Coates holds the reactor he used to make a polymer using a citrus fruit extract and carbon dioxide, as postdoctoral chemistry associate Scott Allen and chemistry doctoral student Chris Byrne display other ingredients essential to the novel process. Byrne is holding a flask of limonene oxide (oxidized orange-peel oil), and Allen holds a beaker containing the polymer they created using a catalyst. *(Nicola Kountoupes/University Photography)*

"Almost every plastic out there, from the polyester in clothing to the plastics used for food packaging and electronics, goes back to the use of petroleum as a building block," Coates observs. "If you can get away from using [petroleum-based] oil and use readily abundant, renewable, and cheap resources instead, then that's something we need to investigate. What's exciting about this work is that from completely renewable resources, we were able to make a plastic with very nice qualities."

The Coates research team is particularly interested in using CO_2 as an alternative building block for polymers. Instead of being pumped into the atmosphere as a waste product, CO_2 could be isolated for use in producing plastics, such as polylimonene carbonate.

The Coates laboratory is made up of 18 chemists, about half of them striving to make recyclable and biodegradable materials out of cheap, readily available, and environmentally friendly building blocks. "Today we use things once and throw them away because plastics are cheap and abundant—it won't be like that in the future," says Coates. "At some point we will look back and say, 'Wow, remember when we would take plastic containers and just throw them away?'"

The research was supported by the Packard Foundation Fellowship program, the National Science Foundation, the Cornell Center for Materials Research, and the Cornell Center for Biotechnology.

Idea for Sustainably Made Drugs Wins $10,000 in Business Idea Competition

by Linda Myers

An idea by a Cornell chemistry professor and his student team won $10,000 as the first-place winner in the 2005 Business Ideas Competition (BIC) at Cornell's Johnson Graduate School of Management. The team plans to make medications through environmentally friendly processes that create less waste and cost less than standard generics. A low-cost version of the antidepressant drug Prozac will be the first product.

The yearly competition is sponsored by BR Ventures (BRV), a student-run venture capital group at the Johnson School that invests in early-stage businesses. In addition to $10,000 from BRV, the winner gets 20 hours of free legal assistance—an estimated $4,000 value—from Cornell's Entrepreneurship Legal Services (ELS), a group staffed by Cornell law students who help start-up businesses.

The idea for the winning business, to be called Sustainable Pharmaceutics, was put forth by Tyler McQuade, an assistant professor in chemistry and chemical biology, and his research team of graduate students: Kristin Price, Steve Broadwater, Muris Kobašlija, and Brian Mason.

In the world of drug manufacturing, for every pharmaceutical agent made, 25 to 100 kilograms (53 to 220 pounds) of waste is produced, according to a recent article in *Green Chemistry,* said McQuade. "We've come up with a process that's expected to reduce waste by five-fold and costs by two-and-a-half-fold," he said.

"Pharmaceutical companies claim they can recycle waste, but recycling is enormously energy intensive and, in my opinion, a bad model because it creates so much waste and gives people a false sense" that they are not harming the environment," says McQuade. "Why not, instead, cut back on wasteful processes?"

"Solvents are where most of the waste is generated," he explains. To cut back on their use, McQuade and his team developed a technology in which catalysts in the manufacturing process are encapsulated—not unlike catalysts in natural biological processes—to prevent them from harming other catalysts. The results: less waste and less money spent getting rid of the waste.

McQuade explains that he was inspired to create a sustainable manufacturing process when he read a book about it, *Cradle to Cradle: Remaking the Way We Make Things,* by William McDonough and Michael Braungart. "It got me thinking about how to be an environmentally conscious innovator," he says.

The second-place winner in the competition went to an idea for a business dubbed Illuminaria, of Ithaca, which aims to manufacture portable biosensors for point-of-care diagnostics that can quickly detect biological threats, including pathogenic bacteria such as anthrax. The team, led by Scott Stelick, a Cornell master's of engineering graduate, received $2,500.

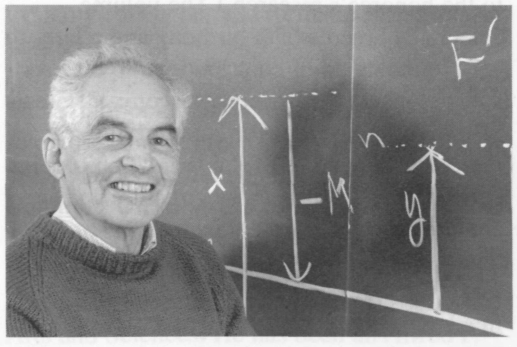
The third-place winner was a plan for OTS Diagnostics of Ithaca, which seeks to make hand-held electronic kits that diagnose different diseases simultaneously and instantly. The team, led by current Johnson School MBA student Andreas Wankerl, received $1,000.

The winners were selected from seven semifinalists by a panel of venture-capital industry experts. Entrants were asked to submit a two-page description of their business ideas. Judging was based on the viability of the ideas and their attractiveness to investors. This year 103 entries were received, 16 from outside the Cornell community.

BRV members are second-year MBA students who are well-versed in venture capital and entrepreneurship. The Cornell law students who staff ELS are led by Zachary Shulman, the J. Thomas Clark Senior Lecturer of Entrepreneurship and Personal Enterprise at the Johnson School. The Johnson School also runs a business incubator, the Big Red Incubator (BRI). The triad of entrepreneurial services, considered unique on a college campus, may lead to many innovative, viable new businesses in the upstate New York region.

Abruña Delivers Su Lecture at the University of Rochester

In April, Héctor Abruña, E.M. Chamot professor and chair, visited the University of Rochester's Department of Chemical Engineering to deliver their Su Distinguished Lecture entitled "Ordered Intermetallics as Fuel-Cell Electrocatalysts." In addition to the honor of presenting the lecture, Professor Abruña was able to meet and dine with alumna Irene Su So, AB '61 (see "News from Alumni and Friends"). The lecture is named after Irene's late father Dr. Gouq-Jen Su, who had an active 50-year career as a professor in the Department of Chemical Engineering at the University of Rochester.



Andreas Albrecht Tribute

On June 26, 2004 the Department of Chemistry and Chemical Biology held a symposium to honor the late Andreas C. Albrecht, who was professor of chemistry at Cornell when he died September 26, 2002. He earned his PhD at the University of Washington and came to Cornell as an instructor in 1956, becoming an assistant professor a year later. He was named a full professor in 1965.

Albrecht is most widely known for his contributions to the science of photochemistry, particularly his theoretical and experimental advances in resonance Raman spectroscopy of biologically important molecules. In 1971 he formulated his theory of preresonance Raman dispersion, which today is routinely and widely used in analyzing a variety of materials.

The symposium featured Albrecht's colleagues and co-workers: Héctor Abruña, Cornell Chemistry incoming chair; Mostafa El-Sayed, Georgia Institute of Technology; Martin McClain, Wayne State University; Philip Johnson, State University of New York at Stony Brook; Dave Kliger, University of California, Santa Cruz; Richard Mathies, University of California, Berkeley; Ching Tang, Kodak Research Laboratories; Robin Devonshire, The University of Sheffield; Andy Albrecht, University of California, Davis; Larry Ziegler, Boston University; Gerald Korenowski, Rensselaer Polytechnic Institute; Paul Champion, Northeastern University; Joseph Melinger, Naval Resarch Laboratory; Andrew Shreve, Los Alamos National Laboratory; Taiha Joo, Pohang University of Science and Technology; Darin J. Ulness, Concordia College; Peer Fischer, Cornell University; Robert Harris, University of California, Berkeley.

Paul Chirik Awarded Packard Fellowship

Paul J. Chirik, assistant professor of chemistry and chemical biology at Cornell, is a recipient of a David and Lucile Packard Foundation fellowship in science and engineering. Chirik will receive an unrestricted research grant of $625,000 over five years.

Chirik was one of 16 promising young scientific researchers across the United States to be named a fellow this year. The Packard Foundation is a private, family foundation created by the late David Packard, cofounder of Hewlett-Packard Company, and his late wife in 1964.

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

Chirik's research group is investigating the use of transition metal complexes to 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 could provide new building blocks for the construction of more complex molecules. Chirik's group recently 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 the chemistry of iron to replace more toxic and expensive heavy metals such as platinum and rhodium in chemical synthesis. These methods could eventually lead to more environmentally benign catalytic reactions that can be used for the preparation of a range of fine chemicals and consumer goods.

Chirik's previous awards include a National Science Foundation Faculty Early Career Development Program grant, an American Chemical Society Petroleum Research Fund starter grant and a Cottrell Scholarship from Research Corporation.

Brian Crane Receives Alfred P. Sloan Foundation Fellowship

Assistant Professor Brian R. Crane has been selected as a 2005 Alfred P. Sloan Foundation Research Fellow.

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These awards are intended to enhance the careers of the very best young faculty members in specified fields of science. Currently a total of 116 fellowships are awarded annually in seven fields: chemistry, computational and evolutionary molecular biology, computer science, economics, mathematics, neuroscience, and physics.

Sloan Research Fellowships are by far the oldest program of the Sloan Foundation, although those who receive the grants are among the youngest researchers the Foundation assists. The fellowship program has grown in size and cost over the years and now includes several disciplines not covered in the beginning, but its purpose—to stimulate fundamental research by early-career scientists and scholars of outstanding promise—remains the same.

The Sloan Research Fellowships were established in 1955 to provide support and recognition to early-career scientists and scholars, often in their first appointments to university faculties, who were endeavoring to set up laboratories and establish their independent research projects with little or no outside support. Financial assistance at this crucial point, even in modest amounts, often pays handsome dividends later to society.

Over the first 17 years of the program, Sloan Research Fellowships were awarded in physics, chemistry, and mathematics. Additional fields were added in subsequent years: neuroscience in 1972, economics in 1980, computer science in 1993, and computational and evolutionary molecular biology in 2002.

Selection procedures for the Sloan Research Fellowships are designed to identify those who show the most outstanding promise of making fundamental contributions to new knowledge. Sloan Research Fellows, once chosen, are free to pursue whatever lines of inquiry are of the most compelling interest to them. Their Sloan funds can be applied to a wide variety of uses for which other, more restricted funds such as research project grants cannot usually be employed. Former Fellows report that this flexibility often gives the fellowships a value well beyond their dollar amounts.

Aside from the monetary aspect of the fellowships, less tangible benefits have been cited by former fellows. The early recognition of distinguished performance, that the fellowships confer, after years of arduous preparation, was said to be immensely encouraging and a stimulus to personal and career development. Twenty-six Sloan fellows have won Nobel Prizes later in their careers, and hundreds have received other honors.

Geoff Coates Receives $300,000 to Develop Biodegradable Plastics

"Green" plastics developed in a Cornell laboratory soon could become commercial products with the aid of a $300,000 grant from the New York State Office of Science, Technology, and Academic Research (NYSTAR).

NYSTAR's mission is to encourage economic development in New York State by supporting high-tech academic research that can form the basis for new businesses. The new grant supports research by Geoffrey Coates that will be exploited by Novomer LLC, a company Coates has co-founded. He has found ways to combine carbon dioxide from the air with natural materials, such as plant oils or materials called epoxides, to form biodegradable materials that could replace common petroleum-based plastics in applications ranging from packaging to biomedical devices.

What we commonly call plastics are, to a chemist, polymers—long chains of complex molecules linked together to form a solid, moldable material. Most commonly used polymers, such as polystyrene or polypropylene, are made from molecules built around carbon atoms, and the most common raw material from which they are made is petroleum, a dwindling resource. In addition, most of them are difficult to break down chemically.

Some organic chemicals, when mixed together, will spontaneously polymerize—the molecules link up on their own. Some epoxy glues work that way. But the natural materials Coates and his research group work with require help from a catalyst that encourages the chemical reaction but is not consumed by it. Through a combination of rational design and luck, Coates says, his group discovered a family of metal-based catalysts that polymerize carbon dioxide and epoxides into a clear, colorless, rigid plastic. Epoxides can be obtained either from petroleum products or from plant oils. Coates has, for example, made plastics from orange-peel oil.

The new polymers are biodegradable, meaning they will eventually break down into the natural materials from which they were made, rather than sitting for decades in landfills.

Novomer LLC is a specialty materials company formed in July 2004 by Coates, Scott Allen, a postdoctoral researcher in Coates's laboratory, and Anthony Eisenhut, president and CEO of KensaGroup, an Ithaca-based technology-commercialization company.

Jack Freed Honored by the *Journal of Physical Chemistry*

The American Chemical Society has paid tribute to the scientific accomplishments of Jack H. Freed, professor of chemistry and chemical biology at Cornell University, by dedicating the July 8, 2004 issue of the *Journal of Physical Chemistry B* to the internationally respected scientist.

The issue is titled the "Jack H. Freed Festschrift." (The German term, literally, "feast writing," is commonly used to celebrate a senior scholar's birthday with a special edition of original papers on topics relevant to the honoree's research.) The volume celebrates Freed's 65th birthday and relates to his groundbreaking contributions to electron spin resonance (ESR) spectroscopy, a state-of-the-art technology for studying the molecular properties of fluids and of biological materials, including the structure and complex dynamics of membranes and proteins.

In a lengthy forward to the papers, Naresh Dalal, chairman of the chemistry department at Florida State University and guest editor for the special volume, notes that Freed has been "at the forefront of essentially every area of ESR spectroscopy" over the past 40 years. "The many articles here [in the journal]

relate in more than one way to Jack's pioneering contributions to theory, instrumentation, and practice of ESR since the early 1960s when he first burst upon the ESR scene. . . . His first articles led to what is now known as the Freed-Fraenkel theory of ESR linewidths," writes Dalal.

Since 2001, when the National Institutes of Health provided funding of nearly $6 million, Freed has been director of Cornell's National Biomedical Center for Advanced ESR Technology (ACERT). Both at ACERT and in his research going back decades, Freed has become internationally recognized for developing techniques for the study of molecular properties of fluids and biosystems, including the structure and complex dynamics of proteins and membranes. Many contemporary applications of ESR would not be possible without the theoretical and simulation methods developed by Freed and his research group. He is also recognized for his development of new magnetic resonance methods and theory, time-domain electron spin resonance methods for the study of molecular dynamics in liquids, applications of ESR to surface science, and the discovery, with Cornell physics colleague David M. Lee, of nuclear spin waves in spin-polarized hydrogen atoms.

"I am grateful to the editorial board of the *Journal of Physical Chemistry* for this great honor and especially to the many colleagues from all over the world who contributed their excellent research articles on many topics of considerable interest to me. It is a great pleasure for me to receive this recognition from my colleagues and former collaborators," says Freed.

The author or co-author of more than 300 scientific papers, Freed joined the Cornell faculty in 1963 after obtaining his Ph.D. at Columbia University in 1962 and his bachelor's degree from Yale University in 1958. He is a fellow of the American Physical Society (APS) and the American Academy of Arts and Sciences. He has been an Alfred P. Sloan Foundation fellow and a John Simon Guggenheim fellow. He has served on the editorial boards of the *Journal of Physical Chemistry,* the *Journal of Chemical Physics* and of *Chemical Physics Letters* .

Freed has received a number of awards, including the APS Irving Langmuir Prize in Chemical Physics, the American Chemical Society's Buck-Whitney Award, the Bruker Award of the British Chemical Society, the Gold Medal Award of the International Electron Spin Resonance Society and the International Zavoisky Prize.

D. Tyler McQuade Receives Rohm and Haas New Faculty Award and Is Named Top Innovator

The Technical Community Organization at the Rohm and Haas Company has selected Professor D. Tyler McQuade as the first awardee of the Rohm and Haas New Faculty Award. This award is presented by the scientists of Rohm and Haas to a nontenured faculty member with outstanding potential for future research success. Professor McQuade stood out from the large pool of nominees based on his captivating research in the areas of catalysis, recognition, and encapsulation, all areas of interest to the scientists of Rohm and Haas.

Technology Review magazine has named D. Tyler McQuade one of the world's 100 Top Young Innovators in 2004. McQuade and the other 99 honorees—known as the TR100—were chosen by a panel of judges from a field of 650 final candidates under the age of 35 whose innovative work has transformed the nature of technology and business. *Technology Review,* published by the Massachusetts Institute of Technology (MIT), reports on the impact of emerging technology on business and society. McQuade was honored with the other winners at the fourth annual Emerging Technologies Conference at MIT last September and was profiled in the magazine's October 2004 issue.

The judges for the 2004 TR100 included *Technology Review* editors and executives from two dozen universities and companies, including the California Institute of Technology, MIT, the University of Cambridge, Cornell, General Electric, Harvard Medical School, Hewlett-Packard, IBM, Microsoft, and Xerox.

Technology Review executive editor David Rotman says, "This year's winners were chosen after rigorous selection and judging ... the result is an elite group whose visions will shape the future of technology."

Fred McLafferty Receives Lavoisier Award

Peter J. W. Debye Professor Emeritus Fred McLafferty has received the Lavoisier Award, the highest honor of the French Chemical Society.

The award is named for the famous French chemist Antoine Laurent Lavoisier who has been called the father of modern chemistry for his pioneering research, which includes combustion, quantitative measurements, and the Law of Conservation of Mass.

According to a letter from the president of the French Chemical Society, the board of directors selected Professor McLafferty for the honor as a reward for his brilliant scientific career. The medal was presented October 18, 2004 in Paris.

Jerrold Meinwald Recipient of Roger Adams Award

Jerrold Meinwald, the Goldwin Smith Professor of Chemistry, has won the American Chemical Society's $25,000 Roger Adams Award in Organic Chemistry, a major international prize. Meinwald is the first Cornellian to win the Roger Adams Award in Organic Chemistry. Much of Meinwald's research focuses on elucidating the chemistry of insect and plant defense and communication mechanisms. He has been a member of the Cornell faculty since 1952. The prize was established in 1959 by Organic Syntheses Inc. and Organic Reactions Inc., and it continues to be sponsored by the two companies, as well as the Division of Organic Chemistry of the American Chemical Society. The award was established to "recognize and encourage outstanding contributions to research in organic chemistry defined in its broadest sense." Ten of the 23 previous recipients of the award are Nobel laureates.

Graduate Students, Jing Jin and Chandrani Roychowdhury, Win IPMI Awards

The board of directors of the International Precious Metals Institute (IPMI) has selected graduate students Jing Jin and Chandrani Roychowdhury in the Department of Chemistry and Chemical Biology to receive the institute's annual Student Award.
Jing Jin, in Professor Abruña's group, was selected for her work on the development of combinatorial methods for the high-throughput screening of potential electrocatalysis for fuel cell applications. Chandrani Roychowdhury, in Professor DiSalvo's group, was selected for her research into new synthetic methods to prepare nanoparticles of ordered intermetallic compounds that contain precious metals such as Pt, Pd, Ir, etc.

The prize of $3,500 was established to recognize and encourage outstanding work by a graduate or undergraduate student in precious metals research. The awards and certificates citing their work will be presented to Jin and Roychowdhury at IPMI's annual meeting in Orlando, Florida in June 2005.

Graduate Student, Catherine Oertel Named Discovery Corps Fellow

Catherine M. Oertel, a doctoral candidate in chemistry and chemical biology at Cornell University, has been named a new Discovery Corps postdoctoral fellow by the National Science Foundation (NSF) to study corrosion in Baroque-era pipe organs and to develop lesson plans about the physics, chemistry, and materials science of musical sound for middle and high school students.

Oertel is one of the first six fellows in the new Discovery Corps, an NSF pilot program that is exploring innovative ways for scientists to combine their research expertise with service to society.

A solid-state chemist from Oxford, Ohio, who also plays the organ, Oertel will work in the Cornell Center for Materials Research (CCMR) trying to understand the corrosion problem that plagues the great Baroque-era pipe organs.

"In the early 1700s, these organs were the highest of high technology," says Oertel, who expects her PhD in August. "They are the instruments on which Johann Sebastian Bach wrote much of his music. In the centuries since then, however, most of these organs have been lost to war or ill-conceived restoration attempts. Today, the few organs that remain are corroding badly, but for reasons that aren't completely clear."

Oertel, who received her BA from Oberlin College (1999) and MS in inorganic chemistry from Cornell (2002), synthesized novel tungsten-sulfide cluster complexes by solid-state and solution methods for her doctoral research. She is an NSF graduate teaching fellow in the Cornell Science Inquiry Partnership program and the co-author of six academic papers.

Her work with organs is part of Cornell's ongoing partnership with the Göteborg Organ Art Center and Chalmers University of Technology in Sweden—a partnership that ultimately will result in a new pipe organ to be built at Cornell in the Baroque style, specifically for the performance of Bach-era music.

Working with the CCMR, an NSF-funded Materials Research Science and Engineering Center well-known for its outreach programs to the community, Oertel will work with Shefford Baker, a professor in materials science and engineering and a respectable saxophonist. Baker notes: "Catherine found an excellent way to apply her research skills in a project that will provide a tremendous social service," says Baker. "From the fundamental science of very long-term corrosion, to preservation of cultural artifacts and promotion of art, to music-inspired science outreach projects, she put together exactly what the NSF was looking for in this program."

Oertel also will be involved with the educational outreach programs directed by Nev Singhota, the educational programs director of CCMR. "Catherine has been contributing to the center's educational programs for years now—she is a veteran leader," says Singhota. "Her new role as a Discovery Corps fellow will introduce innovative aspects to our ongoing programs and offer an opportunity for fresh activities and collaborations."

The two-year Discovery Corps postdoctoral fellowships are intended for recent PhDs who seek alternatives to the traditional postdoctoral experience of working in the research group of a senior principal investigator.

Saludos, *continued from page 1*

Our students also have been the recipients of prestigious awards. Jing Jin (Abruña) and Chandrani Roychadhouri (DiSalvo) were the recipients of the International Precious Metals Institute Award for their work on fuel cells through the Cornell Fuel Cell Institute, and Catherine Oertel was named a Discovery Corps postdoctoral fellow by the National Science Foundation to study corrosion in Baroque-era pipe organs and to develop lesson plans about the physics, chemistry, and materials science of musical sound for middle and high school students.

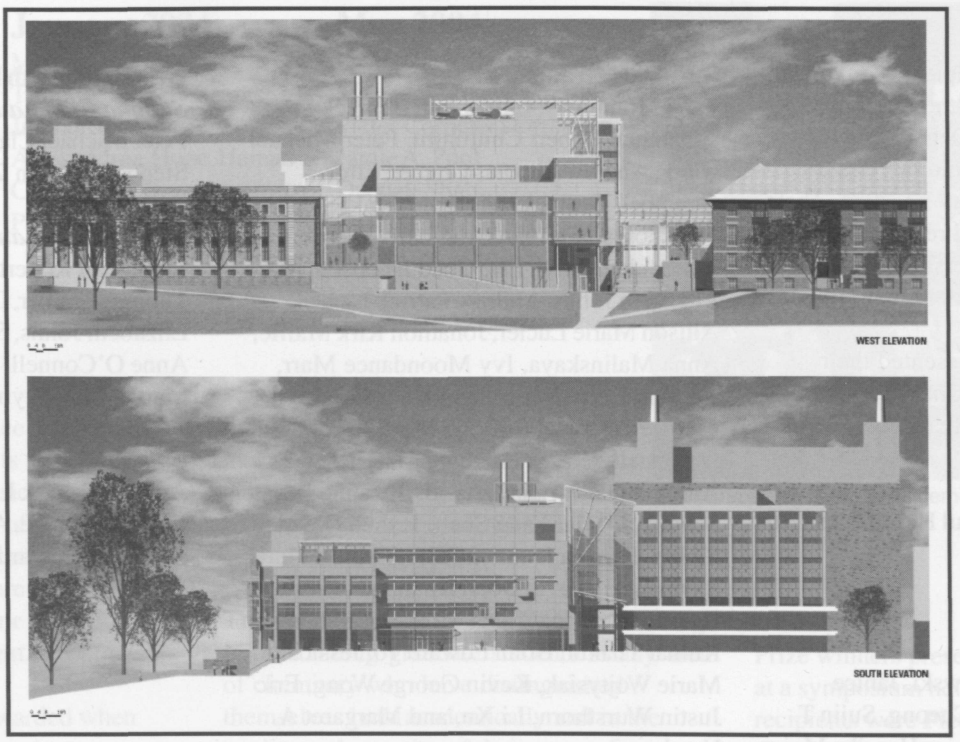
Over the past 10 months, the design and planning of the new building (shared with our friends and colleagues in Physics and Applied and Engineering Physics) has advanced nicely. We are now in the final stages of design (images below) and hope to forge ahead so as to break ground in 2007 and have building occupancy in the spring of 2010.

Unfortunately, the past year has also brought some sad moments that have touched us all. This past December, Simon Bauer and Mitzi moved away (after over 60 years) from their beloved Ithaca to California to be closer to family. Although this means that there is now an additional parking space at 7:30 in the morning, it also means that two good friends have left our midst. Our good friend and colleague of many years, George H. Morrison, passed away on June 11, 2004 (see memoriam in this issue). Betty Miller, wife, friend, and indefatigable supporter of the department died on January 20, 2005 at Kendall of Ithaca. They are all missed by what they brought and meant to all of us in the department.

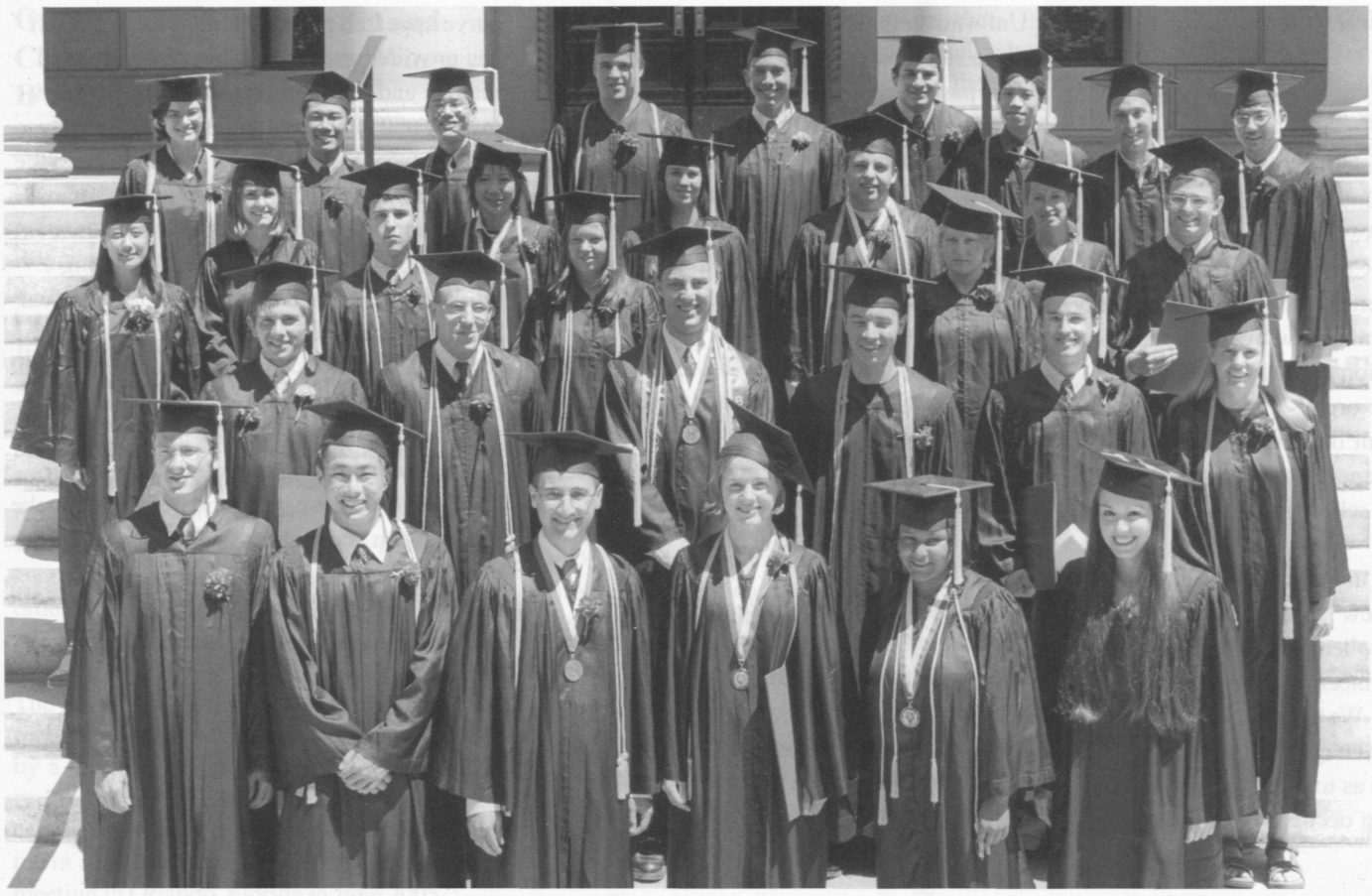
Before closing, I would like to express my thanks to all of those whose help has been invaluable for the past 10 months (and will be for the coming 26). I would like to thank Barry for all of his great advice and insight, especially in the beginning when the learning curve appeared to have infinite slope. Geoff has provided great advice and insight in all matters and has done a fabulous job organizing our teaching program. On a day-to-day basis, Joyce, Kelly, Cindy, and Micci keep the place running smoothly and with the utmost professionalism. On that note, a collective word of thanks to all of our staff. Having worked with other departments this past year has given me a new appreciation and perspective of how good, dedicated, and professional our staff is. Collectively, they really are the force behind the department. Finally, a personal note to thank to all of the members of my group whose work and dedication make it all happen and make it fun to come to work every morning.

I end as I started—Saludos a todos,

Tito



Commencement 2004



Undergraduate Class of 2004 *(Jon Reis Photography)*

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 30, 2004. The departmental ceremony and reception followed the 136th all-university commencement at Schoellkopf Stadium.

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

August 2003 Graduates
Wendi Cheng, Benjamin Paul Heroux, and Hoi Pan Huang

January 2004 Graduates
Christopher Michael Brodowski, Janice Kayan Chan, Clara Yujing Cheong, Sujin T. Lee, Kevin Soo-Hean Tan, Lisa Henrika Moira Van Eyndhoven, and Stephan Johann Zuend

May 2004 Graduates
David John Arty, Carrie Ann Bernecky, Johnathan Robert Chittuluru, Peter Michael Clark, Andrew Thomas Cramer, Ethan Campbell Dusto, Leslie Anne Fink, Stephen John Forest, Cristian Gradinaru, David Alexander Harris, Eric Chad Jacobson, Ria Elizabeth Johns, Andrew Patrick Lieben, Allison Marie Lucier, Jonathon Kirk Maffie, Anna Malinskaya, Ivy Moondance Marr, Thomas Larry Mastrangelo, Sara Kathryn Metzger, Edward Estomih Mtui, Karen Anne O'Connell, Jeremy S. Paige, Anais Rameau, Andrew Duncan Satterfield, Suzanne Krysten Schultz, Daniel Yang Shen, Joshua David Sibble, Pamela Jeannette Sung, Marta Maria Szymanski, Kevin Boon Kuan Tan, Chirisse Francisca Taylor, Yusuke Terasaki, Shantanu Kumar Thakur, Brian Edward To, Jessica Marie Wojtysiak, Kevin George Wong, Eric Justin Wursthorn, Li Xu, and Margaret A. Yacobozzi

Graduating with Honors

Summa Cum Laude
Peter Michael Clark, Cristian Gradinaru, and Stephan Johann Zuend

Magna Cum Laude
Johnathan Robert Chittuluru, Andrew Thomas Cramer, David Alexander Harris, Ria Elizabeth Johns, Sara Kathryn Metzger, Karen Anne O'Connell, Daniel Yang Shen, and Marta Maria Szymanski

Cum Laude
Andrew Patrick Lieben, Anna Malinskaya, Jeremy S. Paige, Andrew Duncan Satterfield, and Brian Edward To

Undergraduate Awards

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 2004 recipient was **Stephan Zuend**.

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 senior chemistry majors who have shown general excellence. The 2004 recipients were **Johnathan Robert Chittuluru, Peter Michael Clark,** and **Cristian Gradinaru.**

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 student who has shown excellence in courses and research and who has shown an interest in chemical molecular modeling. The 2004 recipient was **Zekeriyya Gemici.**

The Merck Index Award, which consists of a Merck Index with the name of the recipient imprinted in gold, is given by Merck and Company, and is presented to two outstanding chemistry majors in the senior class. The 2004 recipients were **Carrie Bernecky** and **Sara Metzger.**

The Harold Adlard Lovenberg Prize was established in 1939 with a gift from Mr. Oscar R. Lovenberg and is awarded annually to a student majoring in chemistry who has shown general excellence. The 2004 recipient was **David Wang.**

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, **Alyssa Wu,** 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 2004 recipients were **Jessica Urbelis** and **Robert Schombs.**

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 2004 recipients were **Chanin Choopojcharoen, Po Chee Chow, Matthew J. Thomas,** and **Daniel Treitler.**

Ph.D. Diplomas and Awards

August 2003

Guillermo Alberto Calero
Amitavikram Anand Dixit
Pradeep Gutta
Darrell Eugene Hurt
Songping Liao
Anthony Lane Michaud
Thomas Kent Reynolds
William James Smith
Rikard A. Wind

January 2004

Mihaela D. Bojin
Timothy Francis Briggs
Jianbo Di
Alyssandrea Hope Hamad
Christopher Bryce Hoffman
Pinjing Zhao

May 2004

Prabhakar Bhimalapuram
Matthew Eugene Cremeens
Pieter Cornelis Dorrestein
Jaime A. Pool
Deepak Shah
Orson Larry Sydora
Katherine Marie Tyner

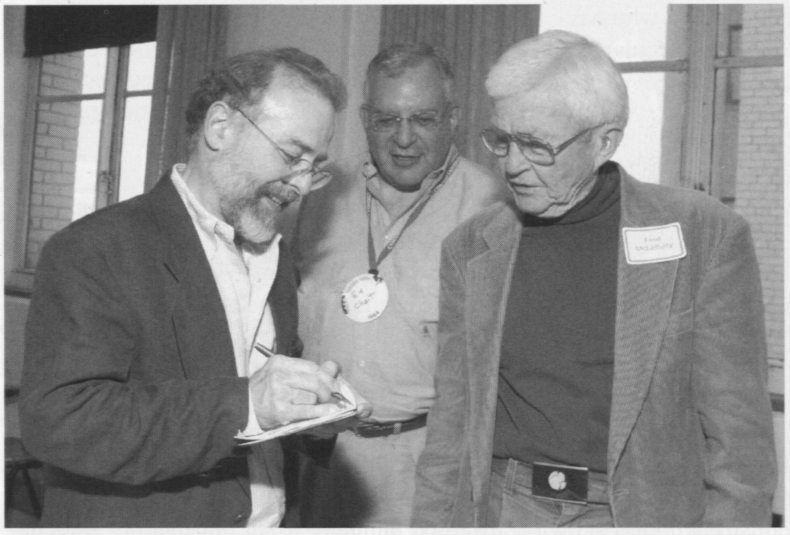
PhD Graduates at Commencement 2004 *(Jon Reis Photography)*

The Bayer Teaching Excellence Awards are awarded 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 2004 were **Shridar Bale, Amy Haas, Anne Poduska, Jeffrey Rose,** and **Burak Ulgut.**

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 2004 was **Nancy Munkenbeck.**

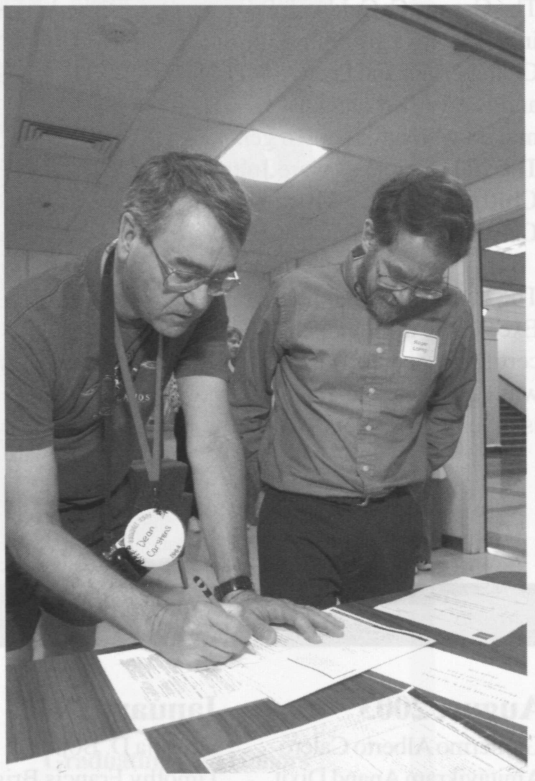
The Tunis Wentink Prize is awarded annually to outstanding graduate students in any area of chemistry who have distinguished themselves both academically and in the quality and quantity of their research. Prize winners present their research findings at a symposium held in the spring. The 2004 recipients were **Pieter Dorrestein, Simon Garcia, Yutan Getzler,** and **Anne McNeil.**

Reunion 2004



Professor Héctor Abruña, Ed Chait, AB '64, and Professor Fred McLafferty exchange ideas.

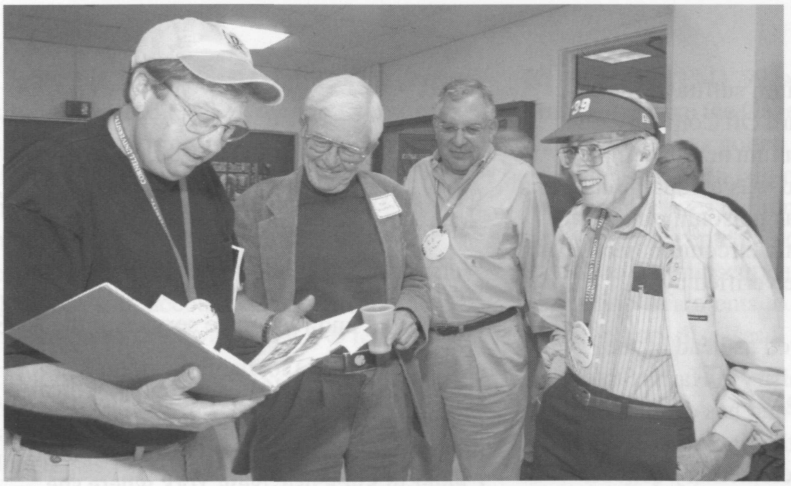
On Friday, June 4, 2004 the Department of Chemistry and Chemical Biology hosted an open house for returning alumni and friends in the faculty lounge of Baker Laboratory.



Professor Roger Loring (right) greets Dean Carstens AB '64 as he signs in.

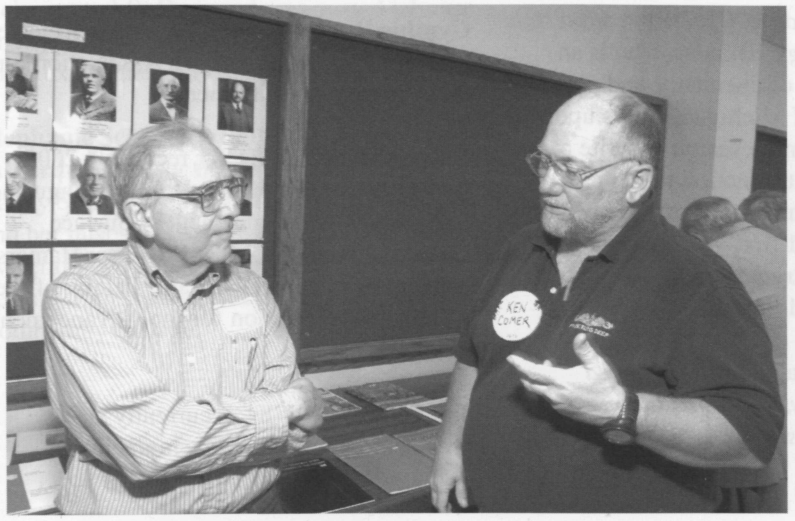
Laura Mitt McCann and Tim McCann, AB '79, (above and to the right) enjoy the open house displays.

Photos by Jon Reis Photography



Donald MacDonald, Professor Fred McLafferty, Ed Chait AB '64, and John MacDonald, BChem '39, look through old photos of the university.

Professor Jerrold Meinwald, Marie Low Hanson, AB '64, and Professor Charles Wilcox reminisce.



Professor Benjamin Widom (left) and Ken Comer, AB '74, chat during the open house.

40s

Lincoln Diuguid, PhD '45, has led quite a life of science since leaving the university. Now, even at 87, Dr. Diuguid conducts cancer research with no grant money. After receiving his PhD, he stayed at Cornell in the labs of Professor John R. Johnson where he developed a new method for synthesizing long, straight chain, odd-numbered di-basic acids via the ketene reaction in three steps, with 90 percent yields. He then did a second year of post-doctoral work with Professor Blomquist, where he worked out a procedure to increase yields to 79 percent—a procedure that B.F. Goodrich sold to Standard Oil at a very handsome profit. Despite the efforts of Professor Blomquist to get Lincoln hired by B.F. Goodrich, they denied him employment because they had a policy not to hire African-Americans. Several job opportunities were then turned down by Dr. Diuguid as they had specific rules about with whom he could have contact. In 1947 he bought and renovated into a chemistry lab a veterinary hospital in St. Louis, Du-Good Chemical Lab and Manufacturers. Over the last 30 years, Dr. Diuguid has conducted cancer research, during which time he has given a number of papers on the synthesis of potential anticancer compounds. The National Cancer Institute lists one of his compounds on the Internet. He has also developed a protein that has been tested on spontaneous tumors on mice and rabbits, with 100 percent remissions. Recently, he cured his 12-year-old dog of sarcoma of the soft tissue in the left hip area. Dr. Diuguid has also had success in industry, developing a method to recover paraffin from oil sludge waste, reclaiming paraffin from the waste oil sludge increased profits and reduced costs. He also worked with the Interterm Company to solve problems concerning their baseboard heaters, which after about six months to 2 years failed. He found that the rust inhibitor in antifreeze (2-mercapto-benzothiazole sodium salt) slowly decomposes about 230 degrees F, into hydrogen sulfide and benzothiazole, and both of these attack copper, slowly causing failure. He set up a new procedure for the production of the units using ethylene glycol, borax, and a small amount of sodium sulfite as the rust inhibitor. For Standard Oil Company, he synthesized the zirconium hemin complex, which they suspected was a contaminant in a cracking unit that was poisoning their catalyst. The synthetic zirconium hemin and the contaminant were verified by IR.

Dr. Diuguid has served as head of the Department of Chemistry at Harris State College for 34 years and has developed a course in chemistry that included skills to teach science in the elementary schools—these innovative teaching methods were presented at the National Educational Meeting in Kansas.

Dr. Diuguid has also developed a number of cosmetics and cleaners—most notably Kreaton Facial Cream, which clears up acne and is also effective in preventing scarring from abrasions and first- and second-degree burns.

Professionally, Dr. Diuguid was given a Salute to Excellence Award by his local ACS in 2000, his picture and biography are in the St. Louis Science Center, and he has received a Carver Civic Award. He has mentored over 100 students, published 35 papers, and been a member of the ACS since 1942. Dr. Diuguid has four children: David, Lewis, Renee, and Vincent.

50s

Seymour M. Blinder, AB '53, has recently published a textbook *Introduction to Quantum Mechanics in Chemistry, Materials Science, and Biology.* Blinder, who is an emeritus professor of chemistry and physics at the University of Michigan, draws upon 50 years of teaching and research to write a lucid, up-to-date introduction to the principles of quantum mechanics at the level of undergraduates and first-year graduate students in chemistry, materials science, biology, and related fields.

Blinder is also the author of *Advanced Physical Chemistry,* and *Foundations of Quantum Dynamics.*

60s

Paul Anderson, postdoctoral associate '63–64, received the 2004 Harry and Carol Mosher Award, which is given annually by the ACS to recognize and encourage outstanding work in chemistry, advance chemistry as a profession, and recognize service to the ACS.

Irene H.S. So, AB '61, is currently clinical assistant professor in the department of otolaryngology at SUNY Upstate Medical Center in Syracuse, New York where she continues her work as a surgical orthodontist with craniofacial and cleft lip and palate patients. After having been a research chemist and mother, she realized her interest in health care and children would be perfectly combined in the field of orthodontics, a field in which she has published several chapters including the three dimensional imaging of CT scans of complex craniofacial problems. She was a recipient of the Cornell University Frank H.T. Rhodes Exemplary Alumni Service Award for 2004 and has been a member of President's Council of Cornell Women since 1993. She has also been an active member of the Northern New Jersey Cornell Club, the University Council, Cornell Alumni Federation, and the Cornell Asian Alumni Association where she was president from 1995–97. She has enjoyed mentoring students and hosting externs with the College of Arts and Sciences and enthusiastically serves on the Library Advisory Council.

80s

Cynthia Burrows, PhD '82, has been elected as a Fellow of the American Association for the Advancement of Science.

Robert Hamers, PhD '85, received a 2005 Arthur W. Adamson Award for Distinguished Service in the Advancement of Surface Chemistry from the ACS. Professor Hamers has also has been elected as a Fellow of the American Association for the Advancement of Science.

Jeff Kmetec, AB '84, is currently vice president of business development at

Lightwave, in California. Jeff has the responsibility for leading the company's business strategy, exploring new business opportunities, and for managing the company's intellectual property. With over 20 years of management, marketing, and engineering experience, his background includes product development, account management, and the invention of Lightwave's DCP® technology. He is an honors graduate of Cornell University and holds a PhD from Stanford University. Besides motivating the laser business, Jeff raises two daughters, chases two dogs, and rides a bike up any hill he can find.

Brian McKittrick, postdoctoral associate '84–85, was recognized by the ACS for improving health and well-being through the successful research and development of commercial biotechnology products that involved chemistry or biochemistry contributions.

90s

Craig Hawker, postdoctoral associate '90–92, received a 2005 ACS Award in applied polymer science.

Isabelle Kagan, AB '91, writes, "I have started a new job (hopefully permanent, but at least a non-postdoctoral position with the possibility of permanency) as a research plant physiologist at the USDA-ARS Forage-Animal Production Research Unit, located on the University of Kentucky campus. It has been quite interesting to do field work as well as lab work (my first experience in driving a pick-up truck!) Our newly renovated labs are finally up and running, and I hope to start some experiments soon."

Stephanie Schaertel, PhD '94, is currently an associate professor of chemistry at Grand Valley State University, Michigan. Stephanie and her husband, Tom Neils, PhD '90, have two children, Ruth (7 years) and Matthew (4 years). Tom is an instructor at Grand Rapids Community College.

Kevin Weber, PhD '99, writes, "Since graduating from the Ganem group in 1999, Kevin Weber has gotten married, adopted a daughter, and been laid off too many times. He currently lives in Fremont, California, and he recently accepted a position at Telik, a Palo Alto pharmaceutical company focused on finding treatments to cancer, diabetes, and inflammatory diseases."

00s

Chuck Nguyen, AB '00, writes that in 2004 he started his fourth year at the University of Southern California Medical School in Los Angeles, after which he plans to apply for a residency in anesthesiology.

Jesse McFarland, AB '00, finished his first year of graduate school in the Francis lab in the College of Chemistry at the University of California, Berkeley in 2004.

In Memoriam

Michael Laskowski, PhD '54, August 2, 2004.

Chava Lifshitz, postdoctoral associate '61-63 and '69, March 2005.

Gordon Arquit, PhD '52, who couldn't ignore his love for flying, died of heart failure while running his gyrocopter. After serving in World War II, Gordon earned a PhD in organic chemistry from Cornell University in 1952. He stayed in Ithaca as a postdoctoral student until 1956 to work with 1936 Nobel Prize winner Professor Peter J. W. Debye.

Then for the next 30 years, Gordon Arquit worked as a chemist and later executive vice president for British Oxygen Corp. in New Jersey.

After retirement, he turned to his love for flying and music to fill his time.

Phillip Adams, PhD '50, writes "I would like to acquaint the Cornell family of the death of Dr. **Edwin Whiting** (Weinstein) BS '45, PhD '50, on October 17, 2004, in Phillipsburg, New Jersey.

Ed and I have been friends since 1945 when we were both students of Professor A.T. Blomquist. I have many wonderful remembrances of Ed and Joan at Cornell. After graduation, they moved to Kalamazoo, Michigan, where Ed worked at UpJohn. He moved to Binghamton, New York in 1964 where Ellen and I would visit on the way to Ithaca. A few years later, Ed divorced Joan and found a permanent home at J.T. Baker in Phillipsburg, New Jersey While there, he married Marlene Member, and together they moved to Bethlehem, Pennsylvania. We used to meet them halfway on Route 78 for dinners. Ed was an avid golfer, an excellent musician, and a wonderful grandfather to Erin, the daughter of his daughter. In recent years, Ed had trouble with his heart and legs.

I will certainly miss Ed, a close friend and fellow chemist."

continued on next page

Lost Undergraduate Alumni M–Z

As in the past, the department asks for you help in locating the following individuals. If you know of any contact information, please e-mail Kelly Strickland at kss1@cornell.edu, or USPS mail to the address on the back page. Thank you.

Montes, Jose AB '84
Moreno, Ofir AB '89
Morgan, William AB '52
Morris, Lynn AB '62
Morrison, Chetley AB '87
Morss, Sydney AB '90
Motyka, Thomas AB '88
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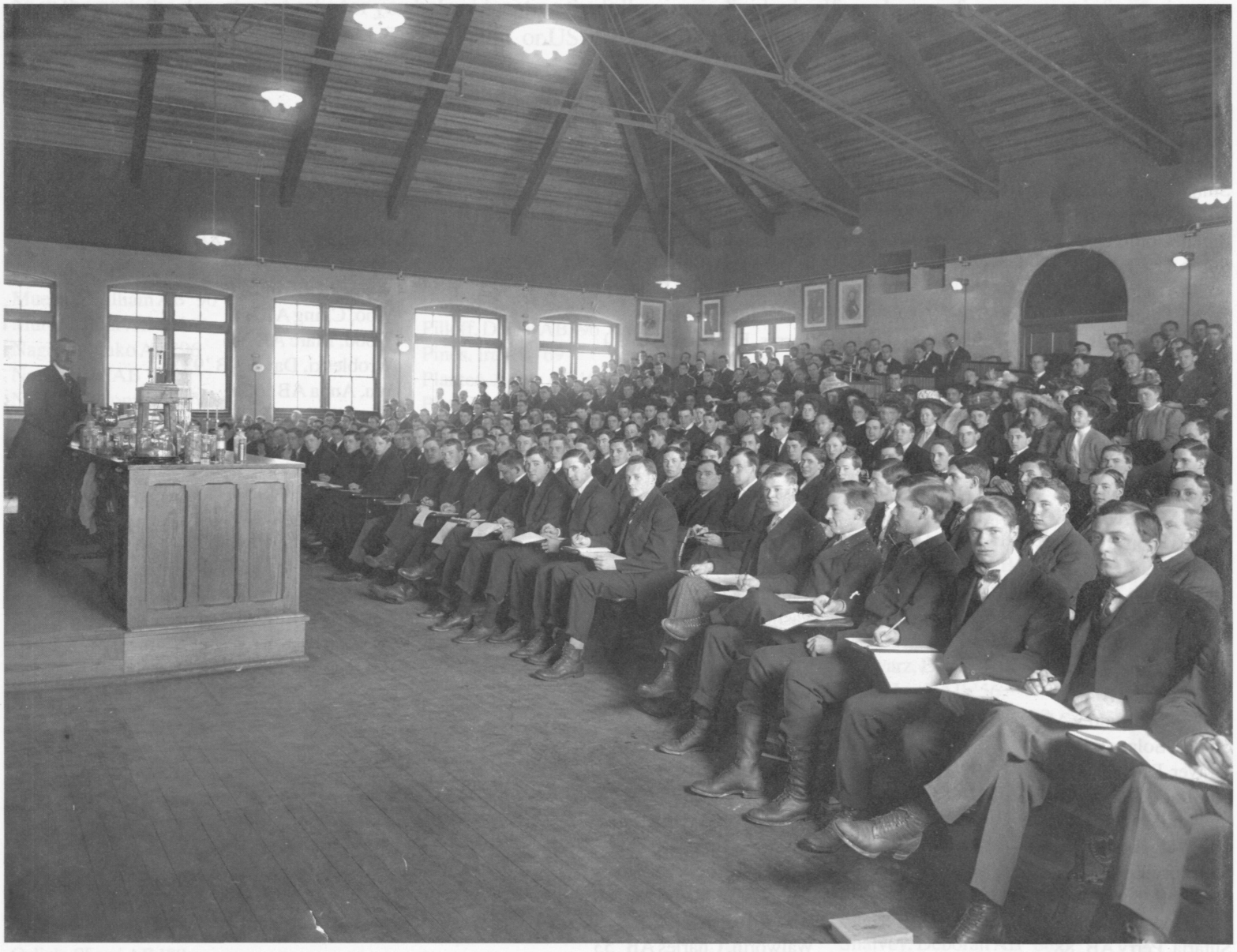

Freshman Chemistry Class 1907–08

This photo, donated by Ruth Harris, shows a freshman chemistry class in 1907–08 in Morse Hall. Ruth's father, Wayne H. Rothenberger (somewhere in the class) received his bachelor's and master's degrees from the College of Agriculture. He then bought a 170-acre farm in Palm, Pennsylvania, and became financial secretary of Perkiomen School in Pennsburg, Pennsylvania, where he remained until his retirement.

Full Name:_____

Preferred Salutation: ❑ Dr. ❑ Prof. ❑ Ms. ❑ Mrs. ❑ Miss ❑ Mr. ❑ none

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Position _____

Department _____

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E-mail: _____

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Alumni Information

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Degree Year: _____

Adviser:

_____

Friend Information

Position: ❑ Faculty ❑ Visiting Scientist ❑ Postdoc ❑ Staff (position _____) ❑ Recruiter ❑ Other:

_____

During what years:

_____

Principal investigator or supervisor:

_____

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