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Spring has arrived in Berkeley—tulips and daffodils decorate the streets and the fruit trees are in glorious bloom. And with the arrival of the warmer weather of April and May, we near the end of another academic year. The College Commencement exercises will be held on Saturday, May 24, in Zellerbach Auditorium at 7:00 p.m. The Commencement Speaker this year is Gabor A. Somorjai, University Professor and recipient of the 2002 National Medal of Science, who will speak about “Leadership, Opportunities and Responsibilities Vested in the Berkeley Degree.”

Around the college, finishing touches are being put on a new ‘College of Chemistry Coffee Corner,’ a takeout service that will provide gourmet coffee, cookies, pastries and other refreshments. The Coffee Corner is located on the B-level of Hildebrand Hall, on the southwest corner of the lower courtyard. Although our outstanding college shop crew is highly experienced in building new offices and laboratories, this was their first foray into the complex world of food service, so things have taken a little longer than anticipated! Nevertheless, our fearless crew has pushed ahead, and we expect to obtain our new sanitation license soon and have the new takeout coffee service available in early May.

We will soon begin construction of a new 900-square-foot laboratory for Biochemical Engineering, ChemE 170L. The course is currently housed in room 205 Gilman Hall, a room that is both antiquated and inadequate in size. We anticipate that, in addition to serving 40 undergraduate chemical engineering students each year, the new laboratory will also serve a similar number of undergraduates in the new chemical biology major that will soon be offered by the chemistry department. The budget for this project is $375,000, of which $200,000 is a bequest from alumnus Chester Clark (B.S. ’27, M.S. ’29), $125,000 is a minor capital improvement grant from the University of California, and $50,000 is from the campus Instructional Equipment Replacement Fund. In addition to creating a new state-of-the-art laboratory, the project also includes full renovation of 205 Gilman into two new offices that will house other college functions. This is part of our overall plan to relocate all laboratory functions from Gilman Hall, which will be converted in stages into an office building.

As we go to press, we are busily preparing for our kick-off event for the newest of our alumni ‘era’ groups, the CHEMillennium alumni (graduation years from 1980 through 1999). We will have a reception followed by a panel discussion on “Science and Technology in the New CHEMillennium: Personal Perspectives from College of Chemistry Alumni,” featuring our own professor Carolyn Bertozzi, Steve Fodor, chairman and CEO of Affymetrix, and David Soane, Adjunct Professor of Chemical Engineering and Chairman of Alnis, as well as CSO of Nano-Tex. We have had an outstanding committee working on the launch of this group: Deanne Krenz (B.S. ’94 Chem), Tom Gadek (Ph.D. ’86 Chem) co-chaired the group, with Mark Ellsworth (Ph.D. ’93 Chem) taking the lead on the logo. Other members include Marilee Brooks (M.S. ’88 ChemE), Paul Burke (B.S. ’81 ChemE), Joel Burley (Ph.D. ’91 Chem), Daisy Joe Du Bois (Ph.D. ’94 Chem), Maria Fardis (Ph.D. ’98 Chem), Fred Lam (B.S. ’83 ChemE), Susan Miller (Ph.D. ’83 Chem) and her husband, Walter Moos (Ph.D. ’82 Chem), Alyssa Roche (B.S. ’87 ChemE), Steve Sciamanna (B.S. ’79, Ph.D. ’86 ChemE), Wilfred Tang (B.S. ’92 Chem), Mike Yang (B.S. ’92, Chem and ChemE), and Sheila Yeh (B.S. ’80, Ph.D. ’85...
Chem). The college really appreciates the help and involvement of these dedicated alums. See page 23 for further details about this exciting new alumni group.

The college’s alumni association has been very busy recently hosting events, including Cal Day and the Cupola Era alumni annual luncheon. More information about these events can be found in the alumni association news column on page 22.

Finally, I would like to congratulate Professor Charles B. Harris, who has been appointed Chair of the Chemistry Department and Joel Henry Hildebrand Distinguished Professor of Chemistry, effective July 1, 2003. I and my colleagues express our sincere gratitude to outgoing Chair Judith Klinman for her leadership of the department over the last three years.

**Recent events**

Recent events include (left) the unveiling of banners on Telegraph Avenue in honor of Berkeley Nobel prize winners, including William Giauque, which will remain flying until December; (below) the demolition of Stanley Hall in April to make way for the new Center for Health Sciences and Quantitative Bioengineering, a cornerstone of the Health Sciences Initiative; (bottom left) the selection of chemical engineering professor Jeffrey Reimer for the Distinguished Teaching Award from the University; and (bottom right) chemistry professor Angy Stacy wowing the crowds at Cal Day with her chemistry demonstrations.
The campus community returned from the holidays, and it seemed that the spring semester was upon us in a flash. This year, the hustle and bustle of the beginning of the semester was particularly welcome as it prevented us from thinking too much about budgetary shortfalls and allowed us to focus attention on the pleasant tasks associated with undergraduate and graduate education. As you know, the state of California is in the midst of a period of large budget deficits, and the University is confronting associated challenges. The costs associated with research and teaching are increasingly derived from federal and private, rather than state, support. Fortunately, thus far, because of your support and the hard work of the faculty and staff, cuts in the state budget have not compromised the core elements that enable the teaching and research missions of the department.

In the spirit of constant improvement, we are in the process of recruiting for a newly endowed Distinguished Professorship in the department. The Hubbard Howe Distinguished Professorship will allow us to attract a distinguished engineer in the field of biochemical engineering to join our faculty. We are very excited by this opportunity, as it will further enhance our already strong program in biological engineering.

Many of you may remember Professor Charles Wilke as a distinguished researcher and a great teacher. Charlie also served as the founding Chair of the department, and our international prominence today derives largely from the directions that Charlie set for the department during its formative years. Thanks to some rather generous contributions from some of Charlie’s former colleagues, we have initiated a fund-raising drive to establish a Charles Wilke Professorship in Chemical Engineering. We believe that this is an appropriate way to mark Charlie’s enormous contributions to the department. If you are interested in contributing, please contact Jane Scheiber at jane@chem.berkeley.edu or 510/642-8782.

In response to the changes that occur in the field, the department continues to evolve its undergraduate and graduate curriculum. Constant effort and vigilance in this regard will allow us to serve the best interests of the students and prepare them in the best possible way for the challenges of a career in the twenty-first century. Currently, we are examining whether a more rigorous specialization in specific areas (e.g., biochemical engineering, microelectronics processing) is desirable. We would be most interested to hear your views on this issue. Please email me at ChemEngChair@chem.berkeley.edu.

After two years of selfless service to the department, Professor Susan Muller has decided to step down from being Vice Chair of Graduate Studies. The graduate students and faculty greatly benefited from her fine work in this capacity, and we all owe her our gratitude. Effective July 1, Professor Roya Maboudian will take over Susan’s responsibilities. Roya brings a lot of enthusiasm and is sure to do a fine job.

The faculty members continue to win awards and accolades for their excellence in research and teaching. Professor Jeffrey Reimer won the campus’ Distinguished Teaching Award. This is a rare honor.

We are raising funds for the Charles Wilke Professorship in Chemical Engineering.
With only three months remaining of my tenure as Chair of Chemistry (but who’s counting!), this will be my last column for the NewsJournal in this capacity.

I am delighted to tell you that last fall the department voted to promote Professor Jeffrey Long to tenure. Jeff is an inorganic chemist with interests in the design of molecules with unique electronic and magnetic properties.

The department has also been active in recruiting new faculty. A number of outstanding candidates were interviewed for an Assistant Professor position and, in the end, we are pleased to announce that Dr. Chris Chang, currently a postdoctoral fellow at MIT, will be joining the faculty in July 2004, after completing his postdoctoral research. Chris is interested in synthesis from a physical inorganic perspective. His thesis work involved the design of models for the conversion of water to $\text{O}_2$ (as occurs in photosynthesis) and the reduction of $\text{O}_2$ to water (as occurs during respiration). For the future he plans to move in the direction of neurochemistry, for example, in the development of methods for the detection of metal ion gradients at synapses. The department also made an offer to Dr. Melanie Sanford, a talented organic and inorganic chemist currently doing a postdoc at Princeton University. However, she decided to begin her career as an assistant professor at the University of Michigan, and we wish her much success.

Space continues to be at a premium and will be so until completion of the Stanley Hall replacement building. Demolition of the old Stanley Hall is in progress - with the “big demolition” taking place on April 3rd, as camera buffs clicked away. Given that budget reductions are in full swing, it is fortunate that we have successfully completed so much of our recruitment in the last three to four years. The hope and expectation is that the budget outlook will improve at about the same time that the new Stanley Hall construction is completed.

As of this coming July, Professors Herbert Strauss and Paul Bartlett will be retiring. They have both had long and distinguished careers in their research activities. Professor Strauss has served as Associate Dean for Undergraduate Affairs for eight years, providing guidance to innumerable undergraduate students during this time. Professor Bartlett served as Chair of the Department, as my immediate predecessor, and was instrumental in beginning the initiative to hire faculty at the interface of chemistry and biology. As part of our newly instituted Monday faculty lunch research series, Professor Bartlett delighted us with his summary of “Thirty years (of research) in thirty minutes.” Please join me in wishing them much pleasure and success in this next phase of their lives.

We are now completing the second year of our graduate chemical biology program. This year a total of eleven students were given the opportunity to perform three ten-week rotations in laboratories in both the Chemistry and Molecular and Cell Biology departments. The organization of a poster session at the end of each ten-week rotation provides a wonderful social and scientific forum for the faculty and these students. In an exciting development, the department has also just voted to introduce a new major at the undergraduate level, a Bachelor of Science in Chemical Biology. Professor Ken Sauer, working with members of the Chemistry Department, has assembled a curriculum that maintains the rigor of our traditional B.S. in Chemistry, while making it possible to incorporate modern aspects of biology that include the structure and molecular mechanisms of macromolecules. In implementing this major, we will be

(continued on page 9)
It’s hard to say whether Paul Bartlett grew up to be an avid lover of chemistry because of or in spite of a daredevil streak. Armed with a Gilbert chemistry set, “the kind that are no longer available due to fears of litigation,” he noted with a laugh, Bartlett sat for hours on the hearth in front of the fireplace entertaining himself. “Lots of little explosions, turning mixtures different colors, it was fascinating.”

His love of chemistry took a turn toward the more dangerous when, as a senior in high school, he blew himself up three days before graduation. “I went to a prep school outside of Boston, where chemistry was my favorite subject. Both my roommate and I had some impressive model rockets, which we launched from the football field. The first one took off fwoosh, soared high out of sight and was never seen again. This obviously made us determined to keep track of the second one. We got the brilliant idea to replace the cotton wadding at the top of the propellant cartridge with some homemade gunpowder so that when the rocket went up, there would be a nice explosion and we could see how high it flew.”

“Now, in those days, my chemistry teacher didn’t pay much attention to what went on in the lab, so gathering the ingredients for this gunpowder was pretty easy. One day in the lab I saw a bottle of red phosphorus. Being a studious chemist, I knew that phosphorus was flammable and, ever the experimentalist, thought it would be interesting to see what would happen when it was added to the gunpowder: perhaps it would give it a nice ‘kick’.”

“So I ‘liberated’ 100 grams of the material and went to work. There I was in my dorm room on a hot summer day, clad in shorts and a tee shirt, mixing in the phosphorus to a shoebox containing an inch-deep level of gunpowder. At this time I did not appreciate the fact that reactions can initiate in the solid state,” he said with amusement. “The stuff in the box ignited with a tremendous flash. I burned my face, hands, and thigh. The bed caught fire, the rug caught fire, and the room was full of black smoke. It was scary, but it could have been worse. And to top it off, a few days later I had to go through graduation all bandaged up. I still liked chemistry, though.”

Bartlett continued his studies, without the fireworks, at Harvard, where he received his bachelor’s degree. “I discovered organic chemistry when I was an undergraduate. I like to make things, and organic chemistry allows me to design and build molecules. I think if I hadn’t been a chemist, I would have become an architect,” he smiled.

During his graduate studies at Stanford, he became fascinated with the idea that one could create biologically active molecules. “I was convinced I was going to be a medicinal chemist in industry. I even persuaded my advisor to let me intern at a pharmaceutical company one summer (a rare occurrence back then). Although academia turned out to be the right environment for me, I think the internship was one of the most important experiences of my graduate career. I guess the fact that I would be my own boss was the winning attraction of an academic position.”

Arriving at Berkeley as an assistant professor and his own boss in 1973, Bartlett pursued two avenues of research: traditional synthetic chemistry and what is now called bioorganic chemistry. “I was convinced I was going to be a medicinal chemist in industry. I even persuaded my advisor to let me intern at a pharmaceutical company one summer (a rare occurrence back then). Although academia turned out to be the right environment for me, I think the internship was one of the most important experiences of my graduate career. I guess the fact that I would be my own boss was the winning attraction of an academic position.”

Arriving at Berkeley as an assistant professor and his own boss in 1973, Bartlett pursued two avenues of research: traditional synthetic chemistry and what is now called bioorganic chemistry. “I wanted to use the ability to make molecules that help us to understand biological problems.” The bioorganic projects soon replaced the traditional synthetic projects.

“My group focused on making enzyme inhibitors, both by building transition state analogs and by using
structure-based design methods,” Bartlett said. As the crystal structures of important biological enzymes were solved, scientists could use the structural data to design a specific inhibitor. “It was like knowing the lock pattern first and then designing the key.”

For one project involving the design of peptide mimics, his group ran into a big obstacle. “We wanted to find molecules that would hold functional groups—side chains—in a specific orientation relative to each other. We knew exactly what we wanted to do, but there was no 3D search program that would do it and we knew nothing about programming.” But as luck would have it, Bartlett found some people with computer science and programming experience who were able to tackle the problem and who were excited about working with a group of chemists. “The result was the program CAVEAT, along with a number of three-dimensional structural databases.”

Outside of the lab, Bartlett adventures included skydiving—he has leapt out of perfectly good airplanes over 1200 times! “Once, some students in my group and the Heathcock group all got together to make a jump. We tried to convince Clayton to join us but he was much too sensible,” Bartlett said. He claims he could tell skydiving stories even more hair-raising than his high school experience, but insists they had nothing to do with why he stopped jumping in 1980. Today, he sticks with the more sane activities of bicycling, skiing and scuba diving. Maybe he’ll jump again, though? “Not likely,” he chuckled.

After 30 years of teaching at Berkeley, Bartlett will become professor emeritus in July. Even though he is retiring from active duty, Bartlett is not going to disappear completely. He will still perform research and will continue to lead the Center for New Directions in Organic Synthesis (CNDOS), which he conceived and has directed since its inception in 1997. “I plan to keep some research space and my office, since I will continue to train postdocs.” He will also be frequently to look after the monster plants that dominate his office. “The big one is a common split-leaf philodendron known as Audrey II, and the small one (small being a relative term here) is an avocado I grew from the pit. I got the first plant about 30 years ago and it just grew outstandingly well here—lots of light and fertilizer. In the late 1970s, I put the rain forest wallpaper up to make it feel more at home, and my office has been a jungle ever since,” he laughed.

Pondering the future of chemistry in his homemade jungle, Bartlett remarked, “What I find dazzling is the breadth of imagination of the new generation of synthetic chemists. They don’t just think about making discrete molecules, but entire systems, using the cellular machinery the way I used reagents or creating materials that integrate every kind of ‘synthetic’ chemistry you could name. There truly are no boundaries to the field of synthesis!” he said.

A one-day scientific symposium in his honor will take place in Pitzer Auditorium on Saturday, June 7, 2003. This special event will include a day full of scientific presentations from former Bartlett group members, in both industry and academia, from all over the world.
Making the system work.

“I have always been interested in science,” said Herbert Strauss. “I focused on chemistry in high school, which is ironic since I had good biology and physics teachers, but a bad chemistry teacher.”

Strauss is taking the first step toward retirement this summer. “I think it is time for me to do new things,” he explained.

He will no longer teach, but Strauss intends to stay on as the Associate Dean for Undergraduate Affairs in the college. “I really love this position. Being the associate dean allows me to solve problems because part of my job is to make the system work for students. Sometimes the rules don’t mesh well, or special circumstances crop up and I can help. I can legally change a transcript, I can waive rules so that students can graduate. It is very fulfilling,” he smiled.

However, Strauss will miss lecturing. “I’ve always enjoyed teaching all levels of students. When I first started at Berkeley, all of the junior faculty members in the department had to teach freshman lab sessions on Saturday mornings. We had to wake up very early to face the students. Of course, one of the advantages was that the senior faculty members would never arrive in the morning so we could run the labs as we wished,” he said.

Strauss has also taken his teaching on the road. “In the late ’60s, I spent a year teaching at the Indian Institute of Technology, Kanpur, on the Ganges in northern India. My wife, Carolyn, and I had long wanted to do something different in our lives and the opportunity arose for me to teach abroad with a program run by the US Agency for International Development. We just knew that this was what we were waiting for. We packed up our three very young children and went. It was an incredible change and a very gratifying experience.” In addition to India, Strauss has also taught in China, France and Japan.

After leaving his native land of Germany at the age of two in 1939 (“we were very lucky”), Strauss grew up in New York City. Continuing there for undergraduate and graduate work at Columbia University, Strauss did research and served as a teaching assistant. “Then after graduation, the summer after Carolyn and I got married, we hopped on the Queen Elizabeth II and sailed to England, where I did a yearlong postdoc at Oxford.”

Strauss returned to the States and came to Berkeley because the chemistry department was looking for someone to do far infrared spectroscopy. “I was very keen on building my own equipment, which was encouraged here,” he noted. “My group was able to build a working far-IR system and immediately took some spectra that helped settle a scientific feud in Berkeley’s favor, a feud that had been brewing between Berkeley and other institutions. Berkeley is an exciting place to do research.”

“My research has been a great source of intellectual stimulation,” said Strauss. His group has studied the structure and dynamics of molecules in crystals and other condensed phases.

One research project uses infrared light to move molecules around in a crystal. “This is known as laser ‘hole-burning’ because we are burning a hole in the spectrum,” explained Strauss. The ‘hole’ arises because the molecule that has been moved is no longer there to absorb a specific
Faculty Profile: Herbert Strauss continued

Recently, Strauss and his colleagues have tried to combine these two projects by looking at hole burning in ammonium fatty acids and ammonium salts of ionic polymers. “Once I retire, I will continue studying these systems in a theoretical manner. We have a new method to calculate electronic structure and explore questions theoretically,” he said.

News from Chemical Engineering, continued from page 4

reserved for the campus’ most valued teachers. This is the fifth time in the department’s history that a faculty member has received this coveted award and we are thrilled for his recognition. (Previous recipients from the department were Donald Hanson, David Lyon, Clay Radke and Mike Williams.) Prof. Clay Radke was awarded the ACS award in Colloid Chemistry at this spring’s ACS meeting in New Orleans. Prof. Alex Bell will be the Burrell Lecturer in Catalysis, which will take Alex on a lecture tour to eight universities and national research facilities around the country. Prof. Jay Keasling is one of two co-primary investigators on the single largest research grant awarded by the U.S. Department of Energy from its Genomes to Life program.

We are looking forward to graduation ceremonies in May when another class of students will receive degrees and will join that very special group of professionals who are Berkeley alumni. Congratulations to all graduating students!

News from Chemistry, continued from page 5

Dean Toste received a Research Innovation Award (Research Corp.) and Boehringer-Ingelheim New Faculty Award; Robert Bergman received the Sigma Xi Monie Ferst Award; Peidong Yang was awarded a Beckman Young Investigator Award; Clayton Heathcock received the H. C. Brown Award from the ACS; Jeff Long won the Wilson Prize; Gabor Somorjai was named University Professor; Don Tilley received the ACS Award in Organometallic Chemistry; and Birgitta Whaley was awarded a Miller Professorship. Jean Fréchet was appointed to the Henry Rapoport Chair in Organic Chemistry, Michael Marletta was named the Aldo DeBenedictus Distinguished Professor, Robert Bergman is the new Gerald E. K. Branch Distinguished Professor, Peidong Yang is the new holder of the ChevronTexaco Chair, and I was appointed to the Joel H. Hildebrand Distinguished Professorship.

In closing, I’d like to mention a few of my thoughts on being Chair. The downsides for me have been having too little time to interact with students and postdocs and being “on call” virtually all the time. I am also disappointed by our failure to further diversify the department during my tenure. The upsides have included the opportunity to represent the department in the larger context of the University, a first-hand appreciation of the enormous effort expended by the departmental staff, and the opportunity to help shape the growing biology-chemistry interface within the department and College of Chemistry.

“I also spend a lot of time on a statewide University committee that is studying how to align the curricula of community colleges, state colleges and the UC system,” he continued. “It is very tricky and there is a lot of academic politics involved, but it is very important to ensure that the education system serves all students, especially those who transfer among the colleges.”

As always, our faculty continues to garner many honors. Recently, introducing new upper-division lecture and laboratory courses.

frequency of light. “By comparing spectra before and after the molecule has been hole-burned as a function of time, we can study molecular dynamics. One of our most interesting findings is that we can move around the ammonium ions and amino groups in amino acids, which has led to some fun experiments. The hole-burning is used to determine the environment of the amine group in both amino acids and in small polypeptides.”

Another research project is the study of long hydrocarbon chains, such as those found in lipids and polymers. “The CH₂ groups in these chains can be stretched out in an all-trans formation, or kinked if they contain gauche bonds,” Strauss said. “We discovered that infrared spectroscopy is very sensitive to these gauche bonds and allows us to map out what happens when the hydrocarbon chains twist, and where these twists occur. We are studying alkanes at low temperatures, where they are all trans, and then slowly heat up the system and watch the bonds become gauche.”

We are looking forward to graduation ceremonies in May when another class of students will receive degrees and will join that very special group of professionals who are Berkeley alumni. Congratulations to all graduating students!

...
The Incredible Shrinking Science
Taking science to a whole new level

The next big thing in science and engineering is small—really small. Almost unbelievably small. Nanoscience and nanotechnology involve the precise control of the molecular composition of materials down to the level of a few nanometers. This new field is expected to yield products with unparalleled properties and power.

Within the College of Chemistry, researchers span the entire research cycle of nanoscience: theory, modeling and simulation, imaging and analysis, synthesis and fabrication. Our scientists and engineers are working to create the building blocks, learn how to assemble them into useful devices, and interface them with various biological materials.

So what does nano mean and how small are we talking here? Nano is a prefix that means one-billionth of a unit. One nanometer is one-billionth of a meter, an incomprehensibly small length. One nanometer is to one meter like one good night’s sleep is to 14 million years—it pales in comparison. But at this Lilliputian scale, exciting science is occurring.

Rethinking the Computer Chip
For the past 35 years, microcircuit manufacturers have been able to double the number of transistors on a silicon computer chip every 18 months—a phenomenon known as Moore’s Law, named after Intel Corporation’s cofounder and College of Chemistry alumnus, Gordon Moore. The smallest features of today’s transistors now measure about 10 nanometers across (about four millionths of an inch), but within a decade entire transistors are expected to shrink to this size. That may be as small as microtechnology can get.

Chemists in the college are working to redefine computing as we know it, focusing on ways to extend Moore’s Law to the atomic level and beyond.

Birgitta Whaley is investigating the feasibility of large-scale quantum computing. Whaley, a theoretical chemical physicist, is an expert in quantum information processing. Her group is working to design practical schemes for protecting quantum information from decoherence while still being able to manipulate and compute with it. (See story on page 11.)

Stephen Leone, an experimental physical chemist, is also studying quantum information processing for quantum computing, looking at possible materials that could transition into molecular states suitable for holding information. “We are working with lithium dimers, a simple material that can potentially store a lot of data. We hope to eventually understand how polyatomic molecules function in the quantum state because they contain more states to store information,” he said.

Jeffrey Long has a different approach to help computers extend Moore’s Law. An inorganic chemist,
Long is rethinking the universal computer hard drive. He is developing methods to assemble large inorganic molecules packed with various metals to create a host of novel materials for use in nanotechnology. His first target is the molecular magnet, a chemical structure whose electrons can be set spinning in synchrony by a magnetic field. Molecular magnets represent a potential replacement for the increasingly crowded metallic films that constitute computer hard drives. Each molecular magnet could represent one bit of memory, enabling storage densities a thousand times greater than those of the best existing films. Currently, his best clusters can be magnetized only at temperatures close to absolute zero—not practical for use in your average desktop. But every day brings Long a step closer to his goal.

**CREATING THE ESSENTIAL ELEMENTS**

“There are two basic approaches to creating functional nanodevices, bottom-up and top-down,” said chemistry professor Paul Alivisatos. The bottom-up approach involves manipulating atoms and molecules to form nanostructures, a process that involves a large amount of basic research. The complementary top-down approach uses complicated patterning techniques to fabricate nanostructures with progressively smaller dimensions and is an approach favored in industry.

Scientists in the college are focusing on the bottom-up approach, creating the basic building blocks of nanodevices, including nanodots, nanowires and nanotubes. For example, Stephen Leone has studied the formation of germanium nanodots on silicon using atomic force microscopy. “We are working to understand the formation of InN (indium nitride) nanodots within InGaN material,” said Leone. “It is an exciting project because of its connection to energy efficient lighting.” In the future, tiny lights called light emitting diodes can work in unison to light up the electronics in the world around you.

**Quantum Computing in the Whaley lab.**

Birgitta Whaley is working on theoretical issues that could bring quantum computers closer to reality.

In the world of computers and technology, smaller and faster equals better. Every part of the computer has shrunk considerably as fabrication techniques continuously improve. “The average logic device on a computer chip has gone from 7000 electrons per device down to the current 50 electrons per device. Today’s devices are much more dense and therefore more numerous on the same size chip.

However, we will soon reach the limit of scalability. By 2010, each device will be ~10 electrons and will enter the realm of quantum mechanics,” Whaley said. “We will need to redefine computing with quantum computing.”

But this is much easier said than done since quantum mechanics can often be counterintuitive. Entities that are normally thought of as particles (such as electrons) can behave like waves in certain situations, while entities that are normally considered waves (such as light) can behave like particles.

Therefore it is not surprising that computing in the quantum mechanical realm can quickly become confusing. Take a computer bit, for example. Classical computers work by performing operations on bits, which store a single state, either a 1 or a 0. As computers get smaller, however, the ability to distinguish between the two states becomes difficult.

In quantum computing, the calculations are performed on logic units known as qubits, which can exist in an infinite number of superpositions of two quantum states! “This is the most powerful aspect of quantum computing,” explained Whaley. “We can generate quantum states, operate on them and then measure them, in theory.” There is also a powerful characteristic of quantum states known as entanglement, where the product of multiple states cannot be decomposed into individual particle states. This allows parallel computing within a single system with many computations performed simultaneously.

“Quantum computing will compute much faster and be far more secure than the standard computers and encryption,” noted Whaley. Mathematicians have already worked out the algorithms that can be used for large-scale quantum computers, and IBM has built one that contains seven qubits. But to really be effective, quantum computers will need to contain thousands of qubits. “It is very hard to isolate that many qubits and operate on them,” said Whaley. The qubits would also have to be protected from decoherence to maintain their quantum state. “Interaction with the environment from even a slight vibration or a stray photo could destroy the quantum state. And in the real world, nothing is isolated.”
Nanowires and nanotubes are being hailed as the next-generation building blocks for electronic circuits a thousand times smaller than today’s semiconductor circuits. Assistant professor of chemistry professor Peidong Yang has made headlines with his nanowires. In 2001 he fabricated the world’s smallest lasers using nanowires of zinc oxide (ZnO) that could produce ultraviolet laser light at room temperature. Yang’s standard technique to make nanowires creates millions of them at a time in arrays that look, under an electron microscope, like the quills of a porcupine. These tiny wires have such diverse applications as chemical and biological sensing and in electronics. (See story to left.)

Chemistry professor Angelica Stacy is also involved in nanoscience, in addition to her research in chemistry education and her duties as Associate Vice Provost for Faculty Equity. Stacy has a project that involves studying how varying the growth conditions of some of these building blocks can change their physical properties. One of her projects, the electrochemical deposition of nanowires, was featured in the Fall 2002 issue of the NewsJournal.

DESIGNING MATERIALS WITH BUILT-IN STRUCTURE

Several research groups in the college are designing nanomaterials by a different approach. Rather than creating individual one-dimensional building blocks for nanodevices, they are designing the materials themselves to have inherent useful structure. This approach gives scientists more flexibility in two and three dimensions and allows the materials themselves to play the starring role.

“All materials have an inherent structure,” said assistant professor of chemical engineering Alexander Katz. “The trick is to optimize the right compound under the right conditions to create the desired structure.”

“We create materials that possess a precise functional group arrangement within a pore whose size and shape is controlled over the length scale of several Ångstroms to nanometers,” said Katz. “This way our work is not limited to one dimension. The materials we create will have applications in the chemical industry, in adsorption, catalysis, and

**Nanotubes in the Yang Lab**

Peidong Yang is a pioneer in the young field of nanowires and nanotubes, tiny wires that have enormous potential. The wires that Yang is perfecting could serve as nanoscale light-emitting sources that would be the basis of novel optoelectronics, including lasers and light-emitting diodes. Nanowires could be assembled into intricate circuits and faster computer chips. They could even function as powerful sensors of chemical and biological agents, since contact with extremely low concentrations of these agents is enough to alter the electronic and optical properties of the nanowire.

“We are developing the building blocks for the nanoworld, one element at a time,” said Yang. “My group approaches this challenge from several directions. First we study the growth of nanocrystals and their evolution into one-dimensional building blocks.” Next they investigate the physical properties of these units, including light emission, electrical properties and chemical sensing.

“We then look at the collective properties of the assembled nanowires, which can differ quite substantially due to the coupling of the individual nanowires,” said Yang. “However, we can adjust the coupling of the individual building blocks to alter the material’s final properties.”

If these one-dimensional nanoscale building blocks can be ordered and assembled into functional two-dimensional or three-dimensional designs, they will offer opportunities for investigating the influence of size and dimensionality with respect to their collective optical, magnetic, and electronic properties, he added.

Yang and his colleagues have recently fabricated a new type of nanotube, made of gallium nitride (shown below), rather than the standard carbon nanotubes. These new nanotubes are perfect single crystals with interesting optical properties not seen in carbon nanotubes. “These hollow tubes can potentially be used as chemical sensors because it is easy to attach organic molecules to gallium nitride surfaces,” said Yang.

Since his initial experiments, Yang has succeeded in growing single nanotubes, and he predicts they will have great usefulness in microfluidics to move molecules from one microscopic chamber to another. A process called nanocapillary electrophoresis could separate molecules in the same way as do today’s microscale labs-on-a-chip.

“This opens up the possibility of using these very new nanotubes for nanofluidic applications,” said Yang. “For example, you could use them to...
chemical sensing.”

T. Don Tilley is also pursuing research that exploits molecular chemistry in the design of new materials. His group uses the chemistry of molecular precursors to prepare mixed metal oxides that have structure on the nanoscale. “In this endeavor, my group synthesizes compounds that may be readily converted to mixed metal oxides that have structure on the nanoscale,” said Tilley, a chemistry professor, in the Fall 2002 NewsJournal.

Chemist Gabor Somorjai is long accustomed to working on the nanoscale, having spent the last 40 years exploring the surface chemistry of many common materials. “The production of metal nanoparticles in inorganic matrices having pore structure of molecular dimensions has been a primary focus of catalyst preparation for decades since they may serve as an ideal high surface area model catalyst,” he said. “The idea is to prepare a catalyst with metal nanoparticles possessing a specific shape and a sharp particle size distribution,” he added.

**ANALYZING THE NANOWORLD**

Fabricating materials and devices with nanoscale dimensions demands powerful and novel imaging techniques. Scanning probe instruments such as atomic force microscopes (AFM) and scanning tunneling microscopes (STM) are the mainstays for much of this work. Often compared to a record player stylus reading the grooves of an album (long before compact discs), these machines can scan the surface of a material and reveal a sample surface precisely up to nanometer size in three dimensions.

Within the college, chemistry professors Richard Saykally and Alex Pines are developing imaging techniques that should help characterize the properties of many nanoscale materials.

The Saykally group develops novel optical imaging techniques to characterize chemical interfaces, such as biological membranes and nanostructured films and materials. Their work combines the high spatial resolution of near-field scanning microscopy (NSOM) with the environmental and chemical specificity of nonlinear laser spectroscopy. Their research has led to the discovery of the first known tunable and reversible metal-insulator transition (in a film of silver nanoparticles) and a novel optical storage system through a collaboration with a group at UCLA, as well as the characterization in 2001 of the world’s smallest lasers, zinc oxide and gallium nitride nanowires built by Peidong Yang’s group.

Alex Pines, a pioneer in applying nuclear magnetic resonance (NMR) spectroscopy to solids, is working on...
Nanoscience and Nanotechnology

ways to image nanocrystals. A recent coup in his group involves new ways to resolve the spectra of disordered solids such as surfaces and catalysts that could allow a new set of materials to be characterized by NMR.

ASSEMBLING THE PUZZLE

“Scientists have been able to fabricate promising new components for optical and electronic device construction,” said assistant professor of chemistry Matt Francis. “However, the organization of these materials into functional assemblies remains extremely difficult, in part because the small size of nanocrystals is below the spatial resolution of most lithographic techniques.”

Researchers in the college, including Jean Fréchet, Matt Francis, Nitash Balsara and Arup Chakraborty, are working on this issue.

Fréchet and Francis are both organic chemists who work with self-assembling biological compounds and their applications in nanomaterial assembly. Francis’s strategy involves attaching new functional components to specific locations on structural proteins, and then controlling the self-assembly of these conjugates into new types of materials.

“One of our projects involves attaching nanocrystals to specific sites on the surfaces of fiber-forming cytoskeletal proteins, such as actin, and controlling the actin polymerization. This technique yields defined locations that can be connected with wire-like arrays of functional materials. These arrays could then be converted into conductive linkages, thus providing an entirely new method for nanoscale circuit construction,” Francis said.

Fréchet, who holds the Henry Rapoport Chair in Organic Chemistry, bases his approach to nanoscale assembly on dendrimers, which are synthetic polymers built up from branched monomers, with new branches added in steps until a tree-like structure is created.

“Many macromolecules such as proteins or synthetic polymers have sizes in the nanometer range,” said Fréchet, who is the director of the Organic, Polymer/Biopolymer Synthesis Facility of the Molecular Foundry.

In recent years dendrimers have emerged as a major new family of well defined nanoscale building blocks. They are globular, almost spherical in shape, and the placement of their functional groups within the mole-
molecules can be accurately controlled. “My group develops new ways to prepare dendrimers and to incorporate specific functionalities,” said Fréchet. “In some cases we organize the reactive sites to achieve cooperative effects, while in other cases we insulate these sites from each other, or restrict their access by external groups, which imparts novel properties to the final compound.”

Chemical engineering professor Nitash Balsara has an alternative approach to assembling nanostructures. His group studies soft microstructures that self-assemble from the liquid state. “The self-assembled nature of the structures that we study has important consequences. These microstructures form spontaneously and do not require machining or microlithography,” he said.

Arup Chakraborty, the Warren and Katharine Schlinger Distinguished Professor of Chemical Engineering and a theoretical chemist, as well as the chair of the chemical engineering department, collaborates with Balsara, providing theoretical expertise. Chakraborty and his group are attempting to exploit features of long chain molecules that can be manipulated to control observable properties, such as chain architecture and sequence distribution. “Branched copolymers can now be built with unprecedented control over the location, chemical composition, stiffness and length of the branches. Our group is creating self-assembling branched copolymer materials for applications that require a precise and reversible response to external conditions.”

**CHALLENGES AT THE NANOSCALE**

As devices get smaller, problems like friction crop up. And as technology moves toward machines on an atomic scale, researchers must grapple with the unpredictability of atomic interactions, which can make accurate and reliable measurements of the material properties nearly impossible. Chemical engineering professor Roya Maboudian studies these issues.

“Researchers struggle with the fact that atoms and particles interact differently on a small scale than on a large scale. Everything changes on the nanoscale,” she said.

“Measuring material properties on a small scale is also problematic because properties such as elasticity, stress, friction, hardness, and density cannot be measured for a nanoscopic sample using a humanscale apparatus,” she continued. To overcome these challenges, the Maboudian lab uses ultra-sensitive measurement and imaging techniques like electron microscopy and x-ray diffraction. Using these methods, Maboudian and her colleagues have been able to measure the elastic modulus (the ability of a material to resist bending) of a silicon lever just 125 microns long—only 2.5 times the width of a human hair, though many orders of magnitude larger than the nanoscale.

“Another major obstacle in nanoscale research is interfacing materials on the nanoscale with microscale devices,” said Peidong Yang. Since we live on the relatively huge humanscale, all of these nanodevices eventually have to interface with something potentially much larger in order to be useful.

Chemistry professors Carolyn Bertozzi, the director of the Biological Nanostructures Facility at the Molecular Foundry, and Jay Groves are working to interface biological materials into nanoscale devices. Bertozzi is devising new ways to engineer sugar markers on cell surfaces. These molecules can control cell adhesion to materials used in biomedical implants and in the walls of bioreactors, and to electronic devices that could sense environmental toxins.

Groves studies the role of physical arrangements in cell recognition and signal transduction, focusing on lipid membranes. His group specializes in the reassembly of a functional membrane on a slide support for imaging reactions.

**WHAT LIES AHEAD**

The future of nanoscience and nanotechnology promises to be spectacular, enabling the productions of goods that transform our everyday lives, from sensors that can detect pathogens in our blood to power supplies that can be painted on to any surface. And as the changes take place, expect the scientific and engineering breakthroughs at the College of Chemistry to help make the impossibly-small scale relevant to our humanscale world.
On May 24, the College of Chemistry comes together to celebrate the achievements of our graduating students.

The graduating class this year (students finishing their requirements from summer 2002 to spring 2003) breaks down as follows:

- B.S. Chemistry—66
- A.B. Chemistry—7
- B.S. Chemical Engineering—79
- M.S. Chemistry—5
- M.S. Chemical Engineering—3
- Ph.D. Chemistry—68
- Ph.D. Chemical Engineering—15
This year’s commencement speaker is Gabor A. Somorjai, professor of chemistry at UC Berkeley. Somorjai received his Ph.D. from Berkeley in 1960 and worked at IBM for four years before returning to Berkeley as a faculty member.

Somorjai has spent almost 40 years studying the chemistry of surfaces and is known as the father of modern surface science. He began his career by working with simple surfaces—those of a single, uniform metal crystal—and determining how chemical reactions occur on them. He then extrapolated his findings to more complex surfaces like those used in industrial reactions. He found that atoms on a crystal surface rearrange into geometries that are different from those in the bulk of the material and that this occurs in such diverse substances as platinum, gold, ice and sodium chloride.

Part of his research focuses on polymer surfaces to learn their mechanism of stretching and their surface chemistry when used as implants in the human body.

Somorjai is the author of more than 850 scientific papers in the fields of surface chemistry and heterogeneous catalysis, and he has written three textbooks. He has mentored 120 graduate students and more than 150 postdoctoral fellows in his tenure at Berkeley.

Somorjai has been highly decorated for his research innovations and has received numerous honorary doctorates from universities worldwide. He received the Wolf Prize in Chemistry in 1998 and the National Medal of Science in 2002; he was elected to the National Academy of Sciences in 1979 and to the American Academy of Arts and Sciences in 1983. He was appointed a prestigious University Professor of the UC system in 2002.

Student Reflections

I want to take this chance to tell my friends how grateful I am because I did not do this alone. The class of 2003 deserves the heartiest congratulations.
Elim Yeoh
B.S. Chemical Engineering

I really enjoyed my classes taught by Clayton Radke. He has an infectious enthusiasm about the material.
-Edwin Chin
B.S. Chemical Engineering

I can’t get enough of this place. I was ready to start another year. But after five years of school, including one of co-oping, my father begged me to let him retire!
Audrey Ko
B.S. Chemical Engineering

My most memorable experience was ambushing Professor Saykally with water guns on the last day of Chem 1A. Unfortunately, he had been tipped off and came PREPARED!
-Katherine Hutches
B.S. Chemistry

I can’t imagine a better place to go to graduate school. It took some time to adjust to the shock and awe I felt upon arrival, but after six years and numerous “Chem Kegs”, I feel that Berkeley is now a part of me.
Sean Ferree
Ph.D. Chemical Engineering
Graduation Rates Increasing

Undergraduate graduation rates at UC Berkeley are at an all-time high, with more students obtaining their bachelor’s degrees and doing so in record time. Among the students who entered as freshmen and graduated in the 2001-02 school year, 73 percent of them did so in eight or fewer semesters. Also, 81.4 percent graduated in five years, up from 78.6 percent the previous year. The average “time to degree” for entering freshmen is currently a record 4.31 years, down from 4.34 years for the previous year. For transfer students, the average time to degree was 2.36 years, down from 2.40 years for the previous year.

SETI@home Taking a Second Look

After more than a million years of computation by more than 4 million computers worldwide, the SETI@home screensaver that crunches data in search of intelligent signals from space has produced a list of 150 candidate radio sources that will get a second look. SETI@home is a computer program disguised as a screen saver that pops up when a computer is idle and analyzes radio telescope data in search of strong or unusual signals from space. The candidates for re-observation are particularly strong signals or ones that have been observed in the same spot more than once, some of them five or six times. The results of the re-observations should be known within two to three months. More information about SETI is at http://setiathome.ssl.berkeley.edu/

Swimmer Natalie Coughlin Garners Awards

For the third consecutive year, junior Natalie Coughlin won the 2002-03 Pac-10 Swimmer of the Year award. She also won the 2002-03 Honda Award for Swimming and Diving for the second straight year, making her eligible for the Honda-Broderick Cup to be presented to the Collegiate Woman Athlete of the Year in June. In 2002 Coughlin shattered the world record in the 100m backstroke with an astonishing 59.58 seconds, becoming the first female to ever post a sub-minute time. Coughlin currently holds three world records, twenty-seven American records and nine school records.

Male Fertility Examined

With each passing year, semen quality in adult men declines, suggesting that age plays a greater role in male fertility rates than previously thought, according to a study by researchers at UC Berkeley, and the Lawrence Livermore National Laboratory.

While age had an effect on semen volume, the more significant impact was on sperm motility, which researchers found decreased by 0.7 percent per year. That means the chance of sperm motility being clinically abnormal is 25 percent at age 22, 40 percent by age 30, 60 percent by age 40 and 85 percent by age 60. Unlike the female biological clock, which reflects a marked decline in fertility in a woman’s mid-30s, the male clock proceeds gradually, the researchers found.

The scientists said that changes in semen quality with age may be due to various physiological factors, including age-related narrowing and sclerosis of the testicular tube, degeneration of germ cells, and normal changes in the prostate, or to increased probability of exposure to disease or environmental agents.

New Assistant Vice Chancellor for Public Affairs

Award-winning journalist George Strait is the new assistant vice chancellor for public affairs. A former correspondent with ABC News, Strait will oversee University Communications, Media Relations, Government Affairs, Cal Parents and Visitor Services.

Atkinson to Retire

UC President Richard Atkinson is retiring, effective October 1, 2003. A search committee has been appointed to choose a successor.
Alumni Questionaire

Today's date _____________

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Preferred mailing address (☐ Home  ☐ Work)  

Preferred email address:  

☐ Home  ☐ Work  Name and address of someone who will always know how to contact you:  

For Class Notes (Tell us your news: recent promotions, family additions, exciting trips...)

My signature grants permission for the use of this information in College of Chemistry publications and the alumni directory.  

☐ I do not grant such permission.  

Signed

☐ I want to join the Alumni Association (It's free!) and receive announcements

I want to help by:  

☐ Participating in future planning for the association  

☐ Planning events in my area (with the assistance of the college)  

I am interested in participating in the following:  

☐ Lectures or symposia  

☐ Social Events  

☐ Career Networking  

☐ Graduate student recruitment

for office use only:  

☐ DR  ☐ CN  

☐ AC  ☐ AA  

☐ DE  ☐ CR

http://chemistry.berkeley.edu
University of California  
College of Chemistry  
College Relations Office  
420 Latimer Hall, #1460  
Berkeley, CA 94720-1460
Elizabeth Harrold Kendall has always been a trailblazer. The only female in her 1928 class, she had already breezed her way through high school. “I spent the first few years of my life in Panama and was very cocky when I returned to the United States. The school system was trying to make me attend seventh grade. But I marched straight to the principal at Tamalpais High School and told him that I already knew everything and wanted to be a freshman instead,” she laughed.

She must have made a strong impression because the principal took her up on her boast, allowing her to graduate from high school early. “I was only fifteen at the time and was too young to attend college. Since I had been a good student, my high school chemistry teacher gave me a job teaching chemistry and caring for the chemistry lab and the swimming pool. It was fun and the students listened to me since I was the same age as they were and could relate well to them.”

As an undergraduate at Berkeley, she became interested in food science. “It seemed like chemistry was the best way to understand food science in those days. I majored in chemistry so that I could apply my classwork to something in the real world,” she noted.

Kendall’s first love was the avocado, and she spent a few years after graduation doing research on the fruit both in California and Hawaii. “In Hawaii, I was involved in research that led to guacamole, but there was no quick freezing process at the time, so you had to eat all the guacamole quickly!”

After returning to California to continue avocado research, she got married in 1930. “When my husband, Hal, went out east, I followed along and taught at Columbia University and in the New York public school system.” She soon earned an M.S. in chemistry from Columbia and continued her interrupted career in food chemistry, working at various labs.

Kendall had a brush with fame by being peripherally involved in the creation of Gatorade. “I was at Harvard doing research on heat cramps and why they occur. We were looking for ways to lessen the pain they caused. We found that adding electrolytes to the drinks helped avoid the excruciating cramping in the heat. Some of the researchers eventually moved to Florida and made history with their invention.”

She currently lives in Florida with her husband, Harold. They maintain an active role in the food industry, with a packaging business known as ‘The Farmer’s Wife’. “We have always been farmers,” she noted. “We live below Miami now in a country house. My four children grew up riding horses. We raise avocados, limes and mangos, and have a plant nearby that makes frozen juice.”

But she can still surprise herself. “Fairly recently I discovered that I had a talent for design and made jackets and vests that were very popular. They were very colorful, with lots of patchwork and embroidery. It was fun, and a big change from the food industry,” she laughed.

Kendall has many fond memories of Berkeley. “I loved being in the College of Chemistry in the 1920s. Professor Hildebrand was a truly wonderful teacher; even the students from the College of Letters and Science enjoyed his classes,” she remembered. “And being the only woman in all of my labs and classes didn’t seem odd then; it had always been that way for me. I am proud to have been one of the first and am certainly thrilled that many women these days choose to study the wonders of science.”

Kendall enjoys attending the G. N. Lewis Alumni Era luncheon each year and has not missed it yet, despite the distance. She invariably wins the distinction of being from the earliest class and having traveled the furthest. “I plan to be there in November, listening to faculty members talk about their research and supporting the college,” she said.
Dear Fellow Alumni,

As always, time seems to be traveling faster than I can, making it difficult to keep up! Our Alumni Association Steering Team has been busy planning programs and activities that will be of service to our alumni and the college.

Berkeley in Silicon Valley
Our 3rd annual “Berkeley in Silicon Valley” Faculty Forum and Networking Event, co-sponsored with the College of Engineering, was held on March 1 at Sun Microsystems’ Santa Clara campus. The keynote address was given by Eric Schmidt, CEO of Google. The program for the day included nine research presentations by Berkeley faculty members, and a four-person panel discussion on “Homeland Security” followed the lunch and networking session. College of Chemistry faculty included Kristie Boering, Arup Chakraborty, and Jean Fréchet; and Charles Shank participated as a panel speaker. This event provided an exciting venue for Berkeley alumni in the South Bay to come together to network and to renew their relationship with faculty and students, several of whom presented posters about their research. More than 185 people attended this year’s event.

Cupola Era luncheon
Another exciting alumni event was the “Cupola Era” alumni luncheon on March 15 in the Heyns Room of The Faculty Club. More than 55 alumni and faculty gathered for this annual luncheon and heard an exciting talk by chemistry professor Carolyn Bertozzi about her research on the chemistry and biology of carbohydrates.

Cal Day, April 12
Although the weather didn’t cooperate on Cal Day, April 12, the college’s various programs were packed with standing room only while chemistry professor Angelica Stacy demonstrated the “Magic of Chemistry” in Pimentel Hall. Angy and Lonnie Martin offered a wide array of chemical demonstrations that had the crowd of more than 300 “ohhing” and “ahhing.” It was a lively presentation, with a lot of interaction and audience participation. The college’s newly admitted students and their parents were able to take tours of various undergraduate labs in both chemistry and chemical engineering being led by current students, who were also available to answer questions about “campus and college” life at Cal. (Our thanks to Alpha Chi Sigma and AIChE for supplying the student leaders, and to chemical engineering graduate students Troy Cellmer, Ian Drake and Jon Eide.) Associate Dean Herbert Strauss and several undergraduate advisors held a session with the newly admitted students to discuss the undergraduate programs.
CHEMillenniums

We are very enthusiastic about the formation of our newest alumni era group, the “CHEMillenniums”, which include the attending years of 1980-99. The committee has been meeting for almost a year, and the kickoff event will be on Wednesday, May 21, 6:30 - 8:30 p.m. in the McCollum Room of Tan Hall. (Many thanks to the committee—see the Dean’s column on page 2—for your diligent and continued participation!) This will be a great occasion for all of us CHEMillenniums to reconnect and network. For further information about this inaugural event, check out the site at: http://www.chem.berkeley.edu/editor/Alums/chemmillenniums.html.

Homecoming Weekend, October 3-4

Homecoming & Parents’ Weekend is coming up on October 3-4. Stop by on October 4, 8:30 - 9:00 a.m., in the Tan Hall lobby for a complimentary cup of coffee or tea and pastry. Then attend a lecture from chemical engineering professor David Schaffer on “Stem Cell Engineering for Neural Regeneration.” This is a hot topic and his research is fascinating. Let Camille Olufson (colufson@chem.berkeley.edu) know that you will be stopping by so that she can plan to have enough refreshments on hand!

Free Radicals

We are currently planning the fall annual event and are discussing the possibility of holding it on a weeknight from 6:30 to 8:30 p.m., instead of on a Saturday morning. All interested Free Radicals, please let us know of your preference by contacting colufson@chem.berkeley.edu.

Stay connected

I strongly encourage you to attend an upcoming college event. It’s a fine way to meet, reconnect and network with fellow alumni and faculty. With this economy, we need to take advantage of every possible opportunity to establish and maintain connections! Another great way to do this is through the @cal online community program, which is continuing to grow. If you have not yet joined, I suggest you do so by logging on to http://chemalum.berkeley.edu. Also, the college’s alumni website is full of news and events, at http://www.chem.berkeley.edu/editor/Alums/

Please don’t hesitate to contact me at sfsc@chevron.com or Camille at colufson@chem.berkeley.edu if you have any questions or ideas about future programs. I’ll see you at an upcoming event!

G. N. Lewis now has a street named in his honor in his hometown of Weymouth, MA, thanks to Harold Paretechan. Mr. Paretechan is dedicated to publicizing the benefits of science to the world and has corresponded with numerous Nobel prize winners to learn more about Lewis and scientific advances that impact society.
1941

B.S. The prestigious new Frank H. Westheimer Prize has been awarded to Daniel Koshland (Chem), recognizing his distinguished work in the field of chemistry, as reported in the C&EN last December. Koshland, who is professor in the Graduate School of Biochemistry and Molecular Biology at Berkeley and a member of the College’s Advisory Board, has had a long and interesting career. Following graduation, he worked on the Manhattan Project before earning a Ph.D. under Prof. Westheimer at the University of Chicago. In 1951, he took a position at Brookhaven National Lab. Prior to coming to Berkeley in 1965, he served on the faculty of Rockefeller University. From 1985 to 1996, he was editor of Rockefeller University. From 1985 to 1996, he was editor of Science magazine. He has been a major force in reorganizing the biological sciences at Berkeley and in the formation of the Health Sciences Initiative.

1943

B.S. An astrophysicist at the Lawrence Livermore National Laboratory since 1952, James R. Wilson (Chem) (1952 Ph.D. Physics, UCB) is currently working on the effect of neutrino oscillations in the production of heavy chemical elements in supernova explosions.

1945

B.S. Donald J. Simkin (Chem) See 1949 M.S. ChemE.

1949

M.S. UC is all in the family for Donald J. Simkin (Chem) and 1945 B.S. Chem. His son Michael has a 1970 B.A. and a 1974 M.B.A. from UCB; his son David graduated Magna Cum Laude in 1984 from UC Irvine; his wife, Natalie, earned her B.A. from Cal in 1942, while a sister, Barbara, graduated from UCB in 1934. And now there’s a grandson, Benjamin, working toward a 2006 chemical engineering degree from UC Santa Barbara. Donald continues to enjoy his retirement from Boeing, taking trips abroad from time to time.

1950

B.S. James Y. Tong (Chem) See 1951 M.S. Chem.

1951

M.S. Despite the stresses of the McCarthy era and a bout with tuberculosis that interrupted his studies while at UC, James Y. Tong (Chem) remembers his years at Berkeley as a wonderful time that gave him the strong science foundation that allowed him to finish his Ph.D. at the University of Wisconsin in two years. He did postdoctoral work in physical chemistry at the University of Illinois, Urbana, and joined the faculty of Ohio University in 1957. His work there included the creation of new courses in forensic chemistry, toxicology, and the chemistry of photography. He started a radiochemistry laboratory and established numerous programs, including a B.S. in Forensic Chemistry, WISE (Women in Science and Engineering), and science fairs and contests. He met his wife of 52 years, Harriet Radford Peebles, at the International House here at Cal. Now an emeritus professor, he recently established the James Y. and Harriet P. Tong Chemistry Award Fund for Cal Chemistry undergraduates who have done outstanding undergraduate research.

1952

Ph.D. Retired from Shell Development since 1984, Gregor H. Riesser (Chem) has 12 patents and some publications to his name. He now lives in Houston, does stock market arbitrages, and gives talks on investment topics such as options and closed-end funds. His first wife, Joanna McGorvin, died in 1992. His second wife, Edith Naparst, died in 1997. He remarried, in October 2001, to Marjory Patterson.

1954

B.S. John L. Ragle (Chem) writes that he retired as a professor of chemistry from the University of Massachusetts in 1998, and that he’s enjoying good health and a “looser (but still intense) affiliation with the world of science and technology.”

1958

Ph.D. After a career that started in 1959 at Oak Ridge National Laboratory, Kenneth S. Toth (Chem) retired as a senior scientist in 2000. He lives in Oak Ridge, TN with his wife, Roberta, and works as a part-time consultant.

1959

M.S. Mary F. Singleton (Chem) wrote that, now retired from the Lawrence Livermore Lab, she is moving to a small...
town in the northeast corner of New Mexico sometime this year. She hopes to stay involved in the Alumni Association. Her current focus is on the history of women in chemistry, and she remains active in the American Chemical Society, hoping to link up with a section in New Mexico. We will miss her frequent visits to campus.

1960

B.S. Dan Decious (Chem) gave the Livingston Lecture in November 2002 and was honored with the Livingston Award at California State University, Sacramento, where he is Professor of Chemistry.

1964

B.A. Sher Singh (Chem) is working in Kosovo, formerly an autonomous province in Yugoslavia. Following the 1999 conflict, when the U.N. took over administration of the region, the U.S. Agency for International Development hired him to develop regulations for the Kosovo water and wastewater sector. He is also part of a group working on drafting a water resources law for Kosovo. He writes that, although both tasks are far removed from chemistry, he still applies the principles of inquiry and research that he acquired as a student.

C. Bradley Moore (Ph.D. ’63, Chem), former chemistry chair and dean of the college, has been named vice president for research and professor of chemistry at Northwestern University. Moore’s research group uses lasers to produce and detect molecules in specific energy states. He has been VP for Research at Ohio State University for the past three years.

B.S. Carol A. (Mahon) Moenke (Chem), who earned her M.S. and Ph.D. from the University of Minnesota, retired from 3M in 2002 and moved to Roberts, WI.

M.S. Since retiring from Chevron in 1967, Kirk Beales (ChemE) and his wife, Joan, have been able to travel more, enjoy their six grandchildren, and play duplicate bridge. He is on the design review board of his town, Tiburon, CA, where views of the S.F. Bay are a big issue. He also volunteers through Whistlestop, helping seniors with their income tax returns.

1965

B.S. After earning his Ph.D. at the University of Wisconsin, Madison, Richard P. White, Jr. (Chem) spent 28 years in the polypropylene business and retired from ExxonMobil at the end of 2002. He and his wife, Monterey, have moved to the home they built for their retirement in Chappell Hill, TX.

Ph.D. Darsh T. Wasan (ChemE) received the 2002 Thomas Baron Award of the American Institute of Chemical Engineers in recognition of his outstanding technical and scientific accomplishments, which have made a significant impact in the field of fluid-particle systems. He is the Motorola Professor of Chemical Engineering and Vice President of the Illinois Institute of Technology.

Robert Bittman (Chem), Distinguished Professor of Chemistry and Biochemistry at the City University of New York, has been selected as the recipient of the 2003 Avanti Award in Lipids from the American Society for Biochemistry and Molecular Biology. The award is given biannually by ASBMB to an investigator who has made outstanding contributions in lipid metabolism, lipid enzymology, or lipids in membranes.

Richard A. Newmark (Chem) recently retired from his position at 3M. He and his wife, Joan Friedman Newmark (Chem), now make their home in Woodbury, MN.

1967

B.S. With an M.S. in Biochemical Engineering from Cornell and a J.D. from Loyola, Gary S. Smolker (ChemE) is an attorney in Marina del Rey, CA. His practice focuses on mold problems, representing owners and tenants in responding to mold contamination. He has developed a questionnaire that helps manage mold risk by identifying conditions that indicate the likely presence of mold and conditions that could lead to mold contamination. The questionnaire is available upon request.

Ph.D. After serving on the faculty in the Department of Chemical Engineering at the University of Colorado in Boulder for 32 years, William B. Krantz (ChemE) accepted the Rieveschl Ohio Eminent Scholar Chair at the University of Cincinnati, where he now teaches and directs the NSF Center for Membrane Applied Science and Technology.

Postdoc. After 26 years on the faculty of Montana State University, Bradford P. Mundy (Chem) spent another 11 years teaching at Colby College in Waterville, Maine. Now an emeritus professor, he lives in Waterville with his wife, Margaret. Their son, Christopher J. Mundy (1992 Ph.D. Chem), works at Lawrence Livermore Labs, and his wife, Marion, is a valued staff member here in the College of Chemistry.

1968

Ph.D. Retired from Argonne National Laboratory after nearly 20 years as manager of the Analytical Chemistry Laboratory, David W. Green (Chem) is now a visiting professor,
teaching and doing research at Albion College in Michigan, his undergraduate alma mater.

1970

Ph.D. Last year, George T. Preston (ChemE) left his position as vice president of the generation and storage division of the Electric Power Research Institute in Palo Alto, a position that he had held since 1991. He went on to start his own business, Auburn Candy Kitchen, in the Sierra foothills. He now makes his home in Auburn, CA.

1971

B.S. Norman F. Breitner (Chem), who holds an M.S. in Chemical Oceanography from the University of Washington, recently took a position as the information services manager of the Maine State Housing Authority in Augusta.

1972

Ph.D. Jacob Jorne (ChemE) celebrated 20 years of teaching chemical engineering at the University of Rochester. He and his wife, Judith A. Love (UCB 1985 Ph.D. Education), have three sons: Ari recently graduated from Boston University in acting and is working as an actor in Hollywood; Eli recently graduated summa cum laude from Dartmouth and is in his first year of graduate studies in physics at Caltech and attends film studies at UCLA; and Alex is in high school playing tennis.

1974

Ph.D. A retired senior scientist in the Nuclear Sciences Division at Lawrence Berkeley National Laboratory, Gordon Wozniak (Chem) has served as a planning commissioner for the City of Berkeley and, last fall, was elected to the Berkeley City Council. He recently arranged to provide air filters from Berkeley police cruisers for LBNL studies to detect whether harmful radiation is being released in the Bay Area.

Postdoc. Klaas Bergmann (Chem) recently visited campus and reported that the German Physical Society awarded him the 2003 Robert Wichard Pohl Prize for “outstanding work in physics that has made an impact on other fields of science and technology.” The prize includes a cash award of 5,000 EURO. He is also being honored by the Latvian University in Riga, which is bestowing an honorary doctorate upon him this year for his scientific achievements and his contributions to collaborative research done with their physics department since 1973. Bergmann is professor of physics at the Kaiserslautern University of Technology in Germany.

1975

Ph.D. Robert E. Blankenship (Chem) is the new chair of the Department of Chemistry and Biochemistry at Arizona State University. He recently published Molecular Mechanisms of Photosynthesis (Blackwell Science, 2002).

A press release from Penn State University announced that Barbara J. Garrison (Chem) has been elected vice chair of the American Chemical Society’s Physical Chemistry Division. She is currently serving as vice chair elect and will begin her term as vice chair this September. Beginning in September 2004, she will be program chair for one year and, in 2005, will assume the role of chair of the Division for one year. As a physical chemist, she has pioneered the use of computer modeling to simulate and understand chemical reactions on material surfaces. She uses computer models to study the effects of fast energy deposition and the resulting chemical reactions at solid surfaces. In 2002, she was named Shapiro Professor of Chemistry at Penn State.

1979

M.S. When Monsanto restructured the organization of its plant in Martinez, CA, Clinton C. Holzwarth (ChemE) had his title changed from Engineering Supervisor to Plant Engineer. His responsibilities also increased to encompass the maintenance department, in addition to environmental safety and health, project, and quality control.

Susan Solomon (see 1981 Ph.D. Chem)

1981

B.S. Andrew A. Shapiro (ChemE) simultaneously holds the position of principal engineer at Jet Propulsion Lab and that of assistant adjunct professor at UC Irvine. He has received five grants at UCI, where his research is in the environmentally friendly manufacture of electronics. He holds 9 patents and has 15 publications.

Ph.D. At General Electric’s Global Research department, Robert E. Colborn (Chem) is doing “fun catalyst work for monomers to be used in high temperature polymers.”

Many of us enjoyed seeing Susan Solomon (Chem M.S. 1979) on our PBS stations in January. Susan is the author of a new book about Robert Scott’s expedition to Antarctica, The Coldest March (Yale University Press), which was the basis for the TV program, “Tragedy at the Pole.” A senior scientist at NOAA’s Aeronomy Lab in Boulder, CO, Susan was honored with the National Medal of Science for 1999 for her “key scientific insights explaining the cause of the Antarctic ozone ‘hole,’ and
advancing the understanding of the global ozone layer.”

1982

**M.S. Marco H. Katz (ChemE)** has been with Fleetguard (a division of Cummins) in Belgium since 1993 as director of information technology for Europe, the Middle East, and Africa. He did a two-year assignment as a Six Sigma Black Belt (a “define-measure-analyze-improve-control” management methodology), then became director of logistics before taking his current position. He writes, “I have a fabulous wife (Cécile) and two marvelous daughters (Lydia, 15, and Audrey, 12).”

1984

**Ph.D. Steven D. Schwartz (Chem)** is now director of a center for theoretical and computational biophysics at the Albert Einstein College of Medicine in Bronx, NY. His wife, Jill Tardiff (UCB 1984 B.S. Genetics), has an M.D. and also teaches at Einstein. Their children are Sarah, 12, and Benjamin, 8.

1985

**B.A. Stewart H. Lecker (Chem)** is an instructor in medicine for Harvard Medical School at Beth Israel Deaconess Medical Center’s Renal Unit. He earned his M.D. and Ph.D. at UCLA in 1992.

**B.S. Shelley Gaddie (Chem)** is founder and president of Project Corps in Seattle, WA.

1986

**M.S. At Georgia Power Company in Atlanta, GA, Gurdeep (Rick) Ranhotra (ChemE)** is now a process engineer doing industrial sales support for their marketing department.

1987

**B.S. Kurt Muetterties (Chem)** finished his M.D. at UC Davis in 2002 and is now a radiologist for Southeast Radiology Ltd. at the Crozer-Chester Medical Center’s Crozer Department of Radiology in Upland, PA. Beyond work, he is active in his local church, coaches hockey for an elementary school, plays hockey in a men’s league, and enjoys spending time with his family.

**M.S. With a Ph.D. in pharmacology earned from UCSF in 1997, Daryl K. Eggers (ChemE)** is now an assistant professor of chemistry at San Jose State University.

1988

**B.S. Frankie M. Wu (Chem)** is working as a senior software architect at Scimagix, Inc. in San Mateo, CA, where he has been since 1999. They are pioneers of “Image Informatics” (software that stores visual images of scientific data) for pharmaceutical and biotech research and development.

**Ph.D. Since moving from GlaxoSmithKline to Pfizer in Aichi, Japan, early this year, Ichiro Mori (Chem)** has been working primarily on 7-TM and ion channels in the gastrointestinal section of their Global Research and Development Department.

1989

**B.S. Hoa Van Pham (ChemE)** has served as a clinical assistant professor in the anesthesiology department of the UCSF School of Medicine since July 2000. He also recently opened a private practice in Fresno, CA.

**M.S. In June 2002, Alan Michiels (ChemE)** took the position of Principal Engineer, Biological Products at Bayer Corporation in Berkeley, CA.

1990

**B.A. Michael R. Carrasco (Chem)** wrote expressing his gratitude to College of Chemistry donor Alice Thompson for her help in starting his career in chemistry. Her generosity in establishing the Stanley Thompson Memorial Scholarship gave him the opportunity to study at Berkeley. He completed a Ph.D. at Columbia University and is now an assistant professor of chemistry at Santa Clara University in Santa Clara, CA. He recently received an NSF Career Grant and published two papers from his own laboratory, working only with undergraduates.

**B.S. Margaret M. (Lee) Guo (Chem),** with a Ph.D. from Johns Hopkins and an M.D. from SUNY Stony Brook, started a new position as a hospital bioterrorism preparedness specialist for Kaiser Permanente in Santa Rosa, CA.

**Pamela J. Leong (ChemE)** is working as an air quality engineer for the Bay Area Air Quality Management District, headquartered in San Francisco.

The year 1990 must have been a smoggy year in Berkeley since at least two alums have specialized in air quality control: **Brooke L. Hemming (ChemE)** went on to a Ph.D. at Stanford, a postdoc at Caltech, and a two-year Environmental Science and Policy fellowship sponsored by the American Association for the Advancement of Science in the U.S. Environ-
mental Protection Agency’s Office of International Affairs. She recently took a position as an atmospheric chemist, climate expert, and international air quality projects leader for the U.S. EPA’s National Center for Environmental Assessment in Durham, NC. She was also pleased to report that she recently bought her first house.

In 1996, Lucas R. Hoffman (Chem) married his high school sweetheart, Ellen Kuwana. Now, after completing an M.D., Ph.D., and a pediatric residency, he is a fellow in pulmonary medicine at the University of Washington’s Children’s Hospital and Regional Medical Center in Seattle.

Oliver K. Tse (Chem), after earning an M.S. in Materials Engineering from Cornell, has returned to UC Berkeley as a graduate student in the Financial Engineering master’s degree program at the Haas School of Business.

M.S. Roman Melnik (Chem) has been elected partner at the law firm of Irell & Manella LLP in Los Angeles. His practice focuses on intellectual property law, particularly patent and trade secret litigation. He and his wife, Amy Peng (Stanford ’92, UC Irvine M.D. ’97), live in L.A. with their two cats that, he writes, “are still trying to decide if they now need to treat [me] any differently.” Good luck with those cats, Roman!

1991

B.S. Robin L. (Moniz) Deaton (ChemE) enjoyed her first position, as a process engineer at Kelco in San Diego. In 1996 she married Larry Deaton, a nuclear officer in the U.S. Navy and, for a year and a half, relocated to Japan, where she worked on the base as an environmental engineer. Living near the ancient capital of Kamakura, she studied Japanese and traveled to many parts of East Asia. After returning to the U.S., they were stationed at a series of American bases, but they managed to stay in Virginia long enough for Robin to complete an MBA at the College of William and Mary. She took a position with Ford Motor Co. in business development and they settled in Dearborn, MI. They greatly enjoy their one-year-old daughter and are expecting a second child this summer.

Bristol-Myers Squibb announced that they have awarded a 2003 Unrestricted Grant in Synthetic Organic Chemistry to Justin Du Bois (Chem), who did his doctoral work at Caltech, his postdoc at M.I.T., and is now an assistant professor of chemistry at Stanford. He has established a research program there in chemical synthesis and reaction design, and he currently leads research in the development of metal-catalyzed atom-transfer processes and the application of these methods to the construction of complex alkaloid structures. He is married to Daisy Joe Du Bois (1994 Ph.D. Chem), a research scientist at Roche Palo Alto and a member of the CHEMillennium’s planning committee.

1992

B.S. In September 2002, Michael N. Liang (Chem) moved to London, England, to work with Advent Venture Partners, a venture capital firm. He and Dr. Shelley Brickson, a professor at the London Business School, are planning to be married this August.

1993

B.A. After completing a neurology residency at UC San Diego last year, Judy L. Chang (Chem) began a fellowship in sleep medicine at Stanford.

B.S. Dawn A. Shaughnessy (See 2000 Ph.D. Chem)

1994

B.S. Judith A. (Ballesteros) Fink (ChemE) reports that she and her husband, Jaime, welcomed a daughter, Kaita, into the world last October. Judith is an automation engineer with Genentech in South San Francisco.

1995

B.S. Jennifer Fujii (ChemE) finished her Ph.D. at M.I.T. in fall 2000 and took a position with the Boston Consulting Group, a management consulting firm. After two and a half years learning the business ropes, she is leaving BCG to lead a new non-profit aimed at using drug delivery technologies to eliminate tuberculosis and other infectious diseases from the developing world.

Ph.D. In 2001, Laura A. Smoliar (Chem) left her position with Seagate Recording Media to become engineering program manager at Lightwave Electronics in Mountain View, CA. Last October, she was on campus to give a talk to the Society for Women in the Physical Sciences (SWPS).

1996

B.S. Anne Yen-Chen (Fu) Brody (Chem) completed her Ph.D. at Caltech last year and has recently started an intellectual property consulting firm, IPCura, in San Clemente, CA, which specializes in patent prosecution, evaluation, and marketing. She writes, “This is going to be an exciting field as more and more intellectual properties will be coming out from the research of genomics and proteomics.”

Ph.D. A senior modeling engineer with Novellus Systems in San Jose, David G. Cohen (ChemE) was reelected in 2002 to the Santa Clara County Democratic Central Committee, representing the 24th Assembly.
Classnotes

District. He was also appointed to an 18-month term on the San Jose Library Commission. He and his wife, Shelli Bodnar, are expecting a baby in May.

After six years in the research lab of Ford Motor Company, Michael L. Greenfield (ChemE) joined the department of chemical engineering at the University of Rhode Island as a tenure-track associate professor and the Victor J. Baxt Chair of Polymer Engineering. He studies molecular simulation of fluids and polymers.

Postdoc. Jordi Marti (Chem) is professor of physics at the Technical University of Catalonia in Barcelona, Spain. His research is primarily on the physics of condensed matter and statistical mechanics.

1997

B.S. Felix Shang Chung Lai (ChemE) earned his Ph.D. from UC Davis in 2002 and early this year took a position as a research scientist for Impax Laboratories in Hayward, CA.

Sarah A. Tabacco (Chem) completed a Ph.D. at UC Irvine last year and is now an instructor and lecturer in organic chemistry at M.I.T.

1998

B.S. Keif Y. Low (Chem and ChemE) is the owner of Genova, a consulting firm for chemical cleaning and semiconductor capital equipment manufacturing processes, in Dublin, CA.

Currently working on a Ph.D. at UC San Francisco, Maya L. Ponte (Chem) is about two-thirds of the way through the M.D./Ph.D. program.

Postdoc. Jin Yong Lee (Chem) was recently appointed to a position as assistant professor at Chonnam National University in Gwangju, South Korea. His research is in theoretical and computational chemistry.

1999

B.S. Francis J. Allard (Chem) married his college sweetheart, Cara Ricketson (1999 B.A. Women’s Studies), in 2001 and they now live in Monterey. He was recently promoted to account manager for Argonaut Technologies in Foster City, CA, managing and selling consumable products used in purification and synthesis to pharmaceutical and biotech companies in the New England area.

Postdoc. Ulrich M. Abel (Chem) recently took a position as senior scientist, working in natural product synthesis at bioLead GmbH in Heidelberg, Germany.

Fabian Fischer (Chem) is a professor of chemistry at the University of Applied Sciences in Sion, Switzerland.

2000

Ph.D. Lawrence Livermore National Laboratory hired Dawn A. Shaughnessy (Keeney) (also 1993 B.S. Chem) in August 2002 as a staff scientist in the Stockpile Stewardship Radiochemistry Group in the Analytical and Nuclear Chemistry Division.

2001

B.S. Ellia Ciammaichella (ChemE) has been studying law at the University of San Diego since fall 2001.

Thejani E. Rajapaksa (ChemE) has started the Ph.D. program in Biomedical Sciences at the University of Southern California’s School of Medicine.

Amy L. Rosen (Chem) has been studying at Indiana University in Bloomington, IN, doing research to develop a time-of-flight mass spectrometer for simultaneous elemental and molecular information. She will receive her M.S. in chemistry this spring and will pursue a Master’s degree in education, starting this fall. She plans to teach high school chemistry.

Ph.D. Keren Jacobs (Chem) spent six months traveling in 2002. Last October, when she wrote to us, she was living in Saratoga, CA, and looking for a job.

Philip Wilk (Chem) is a research associate in nuclear chemistry at the Radiochemistry Institute of the Technical University of Munich.

Postdoc. Since January, Keehoon Won (ChemE) has been a senior researcher at the Korea Research Institute of Chemical Technology in Daejeon, South Korea.

A new academic position for Stephane Petoud (Chem): he is assistant professor of chemistry at the University of Pittsburgh.

2002

B.A. Giving back to the community, Daniel Morales-Doyle (Chem) is a teacher at Manley High School on the west side of Chicago.

B.S. Bayu Atmaja (ChemE) began the chemical engineering M.S. degree program at Stanford in fall 2002, and expects to finish in four quarters.
**Classnotes**

Mike M. Y. Chen (ChemE) recently took a graduate trainee position as a process engineer with Applied Materials in Sunnyvale, CA.

Michael C. Chin (ChemE and MSE) started work last year as a coating engineer at Plasma Technology in Torrance, CA, and is already launching into a big project that will be a major source of funds for the company. He and his family have moved to the San Gabriel area, where they have bought a house.

At Harvard University's department of chemistry, Param P. Dhillon (Chem) is studying theoretical chemistry in the graduate program.

Andrew L. Kim (ChemE) is considering becoming a missionary in China.

Chinmay Y. Majmudar (Chem) began work on a graduate degree in chemistry at the University of Michigan, Ann Arbor in 2002.

Darrel T. Y. Sin (Chem) has been a research associate with Nano-Tex, LLC in Emeryville, CA, since August 2002.

In March, Timothy K. Spence (Chem) took a position as a chemistry teacher at Terra Nova High School in Pacifica, CA. He teaches regular and advanced placement classes.

Ph.D. Joon-Hyung Lee (ChemE) is doing a postdoc at the University of Minnesota.

Benjamin Ted-Bing Liu (ChemE) is a postdoc at Lawrence Livermore National Laboratory.

Dean R. Wheeler (ChemE) is an assistant professor at his undergraduate alma mater, Brigham Young University, in Provo, UT. He started in January 2003.

In July 2002, Charles M. Blazey (Chem) took a position as a research scientist in the Medicinal Chemistry Division of Exelixis in South San Francisco, CA.

The geophysical laboratory of Carnegie Institution of Washington, DC, is where Michael R. Farlanetto (Chem) has been working as a research associate since September 2002.

Doing postdoctoral research at the University of Calgary in Alberta, Canada, Kristina K. (Haman) Hansen (Chem) works in the Dept. of Pharmacology and Therapeutics.

Since August 2002, Jed L. Hubbis (Chem) has been doing postdoctoral research at Harvard University's department of chemistry and chemical biology.

Another 2002 Chem Ph.D. doing postdoctoral work is Xanthipe J. Jordanides (Chem) -- she is an associate in Applied Physics at Cornell University.

Back at Harvard, we find Laura J. Kaufman (Chem) doing postdoctoral research in the department of chemistry and physics, having started there last September.

Craig R. Tewell (Chem) is a technical staff member at Los Alamos National Laboratory, doing rare-earth tritide science.

Postdoc. Patrick Betschmann (Chem) accepted a position as a senior scientist, doing medicinal chemistry research at the Bioresearch Center of Abbott Laboratories in Worcester, MA.

Yun-Hwan Cha (Chem) has been on the academic teaching staff of the University of Wisconsin's chemistry department in Oshkosh, WI, since last fall.

In February, Sun Hee Choi (ChemE) took a senior scientist position, managing the beam-
1931

Arthur A. Frost (B.S. Chem) passed away on April 28, 2002. He had been an adjunct professor at the University of Arizona and a regular donor to the college.

1932

William V. Medlin (B.S. Chem) earned a Ph.D. from Caltech in 1935. He was retired as head of the patents department of Shell Development Company and making his home in Houston, TX, when he passed away on September 20, 2002.

1933

A popular and highly respected lecturer in the UCB Geography Department since 1962, Daniel B. Luten (Ph.D. Chem) passed away on January 18, 2003. Although he worked for Shell Development Company for 26 years and had 50 patents to his name prior to his academic appointment, it is as a teacher that Luten found his true calling. Students remember his lectures as highly entertaining and edifying, and he is regarded by many as a pioneer who brought environmental issues to light long before they were commonly recognized as serious problems. His primary work, which grew out of his service as a resources adviser in Japan following World War II, was on population growth and its relationship to the overuse of natural resources. His analyses and predictions were the basis for much of the work that followed in this field. One former student recalls that in 1970, he was already talking about such topics as the connection between fossil fuels and national security, global warming, and the irreversible loss of plant and animal species. He was an official with the Sierra Club, served as president of Friends of the Earth, and was a regular donor to the college. He is survived by his wife of 16 years, Marion Sherk, and by a daughter, two sons, a grandson, and a great-grandson.

George "Clem" Oyama (B.S. Chem) passed away in San Francisco on February 30, 2003. He was an entrepreneur and inventor during most of his career, and invented such successes as the recording device, Message Minder, the tape that made Chatty Cathy chat, a refrigerator deodorant, and a self-watering planter for violets that is still on the market. His career as a businessman was interrupted when he and his wife and daughter were interned as Japanese Americans during WWII. In the camp and for the rest of his life, he was active in supporting the Japanese American community, and he and his wife received numerous awards for their volunteerism. He is survived by his wife, Shizu, two daughters, a son, many grandchildren, and one great-grandchild.

1937

On November 16, 2002, Guy H. Harris (B.S. Chem) passed away. His 60-year career as a chemist included work as an analytic and organic chemist for Shell Development Company and Dow Chemical Company and resulted in the granting of 51 patents in the field of mineral processing reagents. His expertise also led to his teaching at the University of Ghana and John F. Kennedy University, and consulting for numerous companies and universities, including the UC Department of Materials Science and Mineral Engineering, where he worked with Prof. D. W. Fuerstenau on a DOE contract to reduce acid rain produced by coal combustion. Numerous publications resulted from his research, particularly in flotation reagent synthesis, for which he was known worldwide. He was active in the Catholic community, and also made contributions to the College of Chemistry, which he visited regularly. He is survived by his wife, Elsie, four children, and two grandchildren.

1947

World War II intervened while Leon O. "Tom" Morgan (Ph.D. Chem) was pursuing his Ph.D. at the University of Texas. He was called to the Manhattan Project in 1943, where he worked in the metallurgical laboratory under the direction of Glenn Seaborg, evaluating the process chemistry of plutonium, and he is credited with the co-discovery of Americium. Following the war, he completed his Ph.D. at Berkeley with Seaborg. He took a faculty position at the University of Texas, Austin, in 1947. Until his retirement in 1993, he made significant scientific contributions, including initiating a program in nuclear and radiochemistry and pioneering the field of MRI. He regarded his teaching 40,000 undergraduates and graduates, many of whom went on to distinguished careers of their own, as his most important achievement. Beyond the university, he enjoyed hiking the mountains of New Mexico and Colorado, and was a supporter of the College of Chemistry. His death on July 29, 2002 marked a great loss for his loving family and devoted friends and colleagues. His wife of 60 years, Mary Elizabeth Boyd, survives him.

1948

On November 18, 2001, at the age of 80, Milton Lewis (Ph.D. Chem) passed away in Richland, Washington. He is remembered for his many contributions as a scientist, and for the integrity and kindness he brought to all of
In Memoriam

his dealings. We also appreciate the faithful support he and his wife gave the College of Chemistry. He married Rhoda Sussman in 1943, and during the war he served as a field engineer in anti-submarine research with the Office of Scientific Research and Development. During his career, he was a chemist at General Electric’s Hanford, WA, plant; a project manager for McDonnell Douglas Laboratories, working on the Betacel that powered the heart pacemaker; a project manager for Battelle Northwest on their steam generator project; and co-founder and president of Columbia Engineering Services, providing engineering consulting to Hanford and government contractors. After retirement in 1986, he became active in charitable and cultural organizations and other civic projects. He enjoyed boating, growing roses and traveling. In spite of a serious car accident in 1996 that resulted in his being confined to a wheelchair, he remained active in his community. He is survived by his wife, two daughters, a son, and a grandchild.

1950

After a 33 year career with Chevron, Aubrey L. McClellan (Pdoc. Chem) took early retirement in 1985. He enjoyed pursuing other interests such as philately, book indexing, amateur theater, and playing in a Dixieland jazz band (with his fellow alumni at the 1996 Cal Day!). He was a strong supporter of the fund to build the Pimentel Memorial Laboratory in Tan Hall. He passed away on August 20, 2002, and is survived by his wife, Virginia.

1957

One of the scientists who developed computing at Lawrence Livermore National Labs, Raymond E. DeSaussure (B.S. Chem), died October 28, 2002. He worked on a precursor to FORTRAN, guided several technologies (including an early computer game), and built up the graphics lab. He is survived by his wife, Barbara.

1962

Margaret Chengson, the widow of John P. Chengson (B.S. ChemE), informed us that he passed away on April 27, 2001. He lived in Martinez, CA.

1966

Over the span of his career, James Cummings-Saxton (Ph. D. ChemE) was a key contributor to the Apollo Space Program, using mathematical analysis to give the Lunar Module the ability to get the astronauts safely to the moon, for which he received NASA’s Apollo Achievement award. He subsequently worked at Argonne National Laboratory and as a partner at Industrial Economics in Cambridge, MA, where he was instrumental in calling world attention to the dangers of chlorofluorocarbons. Following the 1985 chemical accident in Bhopal, India, he pioneered environmental science that helped communities cope with toxic chemical releases and other hazards resulting from industry’s use of chemicals. He taught at Catholic University, American University, the Illinois Institute of Technology, and, at the time of his untimely death on November 15, 2002, from brain cancer, was doing research at Clark University in Worcester, MA. He is survived by his wife, Carolyn, a son, two daughters, and four grandchildren.

1973

Himanshu Vakil (1966 M.S. and 1973 Ph.D. ChemE) passed away on November 6, 2002, at age 59 following a six-month battle with cancer. He had spent his distinguished career doing research at General Electric Global Research in Niskayuna, NY. He made important contributions to advances in a wide variety of technologies including refrigeration, thin-film diamonds, high-efficiency lamps, and coatings for aircraft engines. Early in the 1990s, he was instrumental in developing the most energy-efficient commercially available incandescent light bulb. He received many awards for his achievements, including those from GE, the American Society for Materials (ASM International), and the Governor of New York. His wife, Eileen Julian, daughter Anjana, extended family members worldwide, and his colleagues and friends including Philip Kosky (1963 M.S. & 1966 Ph.D. ChemE) mourn his passing.

1987

Philip W. Morrison (Ph.D. ChemE) succumbed to cancer on November 4, 2002. He was a popular and acclaimed professor of chemical engineering at Case Western Reserve University in Cleveland, OH. A recipient of the “Top Prof” award at CWRU, he had been awarded NSF’s Career Award for his research on the use of spectroscopy to study plasma processing of materials. He also worked on hazardous waste disposal, the sequestration of carbon dioxide, and diamond synthesis. While doing his Ph.D. work as an NSF Fellow with Jeff Reimer, he was named an outstanding GSI for his teaching of undergraduate fluid mechanics. He worked at Advanced Fuel Research Inc. and North Carolina State University before joining the CWRU faculty in 1993. He enjoyed outdoor sports with friends and family, especially ultimate frisbee. He is survived by his wife, Nancy, daughter, Andrea, and son, Ian. Jeff Reimer, who notified us of his passing, said, “Phil was an extraordinary scholar, and a devoted father and husband.”