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College of Chemistry, University of California, Berkeley
SPRING 2005, VOLUME 13, ISSUE 1

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**DEAN’S DESK**

**LOOKING AHEAD**

*Welcome to Harris and on to QB3*

General Douglas MacArthur told the Congress more than 50 years ago, “Old soldiers never die, they just fade away.” The same can probably be said for deans. After I turn over the college to the able hands of incoming dean Charles Harris on July 1, 2005, I will take up a new position as Chief Scientist of Berkeley QB3, one of the three branches of the California Institute for Quantitative Biomedical Research.

**QB3 and the College**

Berkeley QB3 will be housed mainly in Stanley Hall, a grand new research facility that is nearing completion in the Northeast quadrant of campus. Stanley Hall will face the Hearst Mining Circle (which is currently occupied by construction trailers, but which will eventually be returned to its former splendor as a reflecting pool). The new building will provide research space for about 40 research groups and will also contain several important core facilities, including nuclear magnetic resonance and mass spectrometry. The research groups will come from many departments: Bioengineering, Chemical Engineering, Chemistry, Molecular and Cell Biology, and Physics. The goal of QB3 is to bring together the expertise in basic sciences and engineering at UCB and UCSC with the medical sciences at UCSF to attack problems that have been simply unapproachable before, setting the stage for fundamental new discoveries, new products and new technologies for the benefit of human health.

A number of College of Chemistry faculty are involved with Berkeley QB3. Some, including Mike Marletta, Alex Pines, Jamie Doudna-Cate, Jennifer Doudna, John Kuriyan, David Schaffer, Dave Wemmer, and Jay Groves, will move their research labs to Stanley Hall next year when the building is completed. Others will retain their current research labs but will be heavily involved in the new collaborations that will be forged as our programs develop. Since the occupancy list is not fully developed, there may be others, including one or more chemists or chemical engineers, who will be joining our faculty between now and the time the new building is completed. It will be up to Harris and the new department chairs, Alex Bell in chemical engineering and Mike Marletta in chemistry, to hash out the final details.

The various moves into Stanley Hall in the fall of 2006 will open a good deal of space in the traditional College of Chemistry buildings and permit both our departments to make several faculty appointments to reach our new targets of 50 faculty members in the chemistry department and 20 in the chemical engineering department. (Currently we are well below our targets, mainly because of shortage of space for research laboratories and offices.)

**Update on renovations**

In addition to this upcoming “scientific fruit basket turn over,” we continue to renew our older facilities. During the past year we completed two major renovation projects in upper Latimer Hall that provided more research space for assistant professors Dirk Trauner and Dean Toste, and we have just begun a similar project that will provide research space for assistant professor Richmond Sarpong.

We are also making steady progress in our “Gilman Hall Renewal Project.” Gilman Hall is a beautiful old...
building (constructed in 1917) listed on the National Register of Historic Buildings because of the important Manhattan Project that was carried out there in the 1940s (plutonium was first isolated and characterized in room 307 Gilman Hall). It was rated “good” in the 1999 SAFER seismic evaluation of all the buildings on campus. The building does not have the infrastructure (power, ventilation) for modern laboratory research work. However, it is ideally positioned to serve as the “front door” to the college. Therefore, we are steadily transforming Gilman Hall into an office and classroom building. The first steps were taken in 1999-2000, when the basement was converted into the Pitzer Center for Theoretical Chemistry. Since that time, we have renovated about two-thirds of the second floor into comfortable faculty offices and a conference room. This summer, we will relocate the College of Chemistry Building Management team to renovated offices on the ground floor of Gilman. In the fall we will begin an ambitious renovation of about 60 percent of the third floor of Gilman, to which College of Chemistry Building and Administrative Services (BAS) will move early in 2006. The moves of Building Management and BAS to Gilman will open up a large area on the fourth floor of Latimer Hall that will eventually be renovated to provide more space for the chemical engineering department, which is badly in need of more modern research and office space.

Private funding always helps

I should say that much of these facilities improvements were made possible by gifts from alumni and friends of the college. Although many donors have contributed to these projects, I would like to single out three gifts that were especially valuable: a bequest of $2.9 million from the estate of Ann Schiffler, and gifts of $1 million and $500,000 from Bristol-Myers Squibb and Novartis, respectively. It is impossible to exaggerate the impact that gifts of this sort have—without them we would not be able to continue to provide the sort of quality education that our students deserve. If we let our educational reputation slide it not only hurts our current and future students, but it also devalues the degrees of our former students.

Thank you and farewell

Finally, since this really is my last message to you, I want say how much fun it has been to lead the College of Chemistry these last six years. It has been an immense honor to have been associated with such an amazing number of brilliant teachers and researchers, with such a talented support staff, and with such a loyal group of alumni and friends of the college. To quote the #1 Californian, “Hasta la vista, baby.”

“it has been an immense honor to have been associated with such an amazing number of brilliant teachers and researchers, with such a talented support staff, and with such a loyal group of alumni and friends of the college.”
DEVELOPING OUR POTENTIAL

Spring is the season of renewal and rededication. While budgetary shortfalls remain a subject of concern, our faculty has continued to move forward in its efforts to provide our students exciting educational and research experiences. The bright light just ahead is the Governor’s compact with the President of the University of California, which promises to restore some of the lost state support. In the meantime, the department’s faculty members continue to gain recognition and to Academy of Engineering (NAE) and will be inducted into the Academy next October. This high honor is given in recognition of Harvey’s excellent research and leadership in the field of biochemical engineering. With his election, the total number of NAE members in the department now stands at six.

Synthetic Biology

Professor Jay Keasling will benefit from a $43 million grant from the Bill and Melinda Gates Foundation to develop a more affordable approach to the synthesis of artemisinin, an antimalarial drug for use especially in the third world. Efforts on this project will be carried out at Berkeley in partnership with the Institute for OneWorld Health, the first non-profit pharmaceutical company in the U.S., and Amyris, a new biotech firm. OneWorld Health will perform the drug development and regulatory work to demonstrate the bioequivalence of microbially-produced artemisinin derivative to the drug’s natural form, whereas Amyris will develop the process for industrial fermentation and commercialization. Jay’s work in this area was recently singled

New Department Chair(s)

After nearly four years of service, Professor Arup Chakraborty decided to step down from his position as department chair. We all owe a debt of immense gratitude to Arup for his tireless efforts during a period of budgetary challenges for the University and the department. Thanks to his fine work, the department has not suffered and remains exceptionally strong. The University has appointed Professor Jeffrey Reimer to become the new chair; however, he will not assume this position until July 1, 2006, since he plans to take a sabbatical leave during the 2005-2006 academic year. To fill the gap, I have agreed to serve as chair for the 15-month period between April 1 of this year and June 30 of next year.

National Medal of Science

Professor John Prausnitz was selected to receive the National Medal of Science, the nation’s highest honor in science and technology, in recognition of his pioneering work on the development of molecular thermodynamics and its application to a broad range of industrial problems. The Medal was presented to John at a ceremony hosted by President George Bush on March 14 at the White House. While John retired formally from the department on July 1, 2004, he has been appointed as a Professor of the Graduate School and remains highly active in research.

NAE Election

Professor Harvey Blanch was elected to the National
out as one of the “10 Emerging Technologies That Will Change Your World” by Technology Review magazine. With the addition of this extremely exciting research program, Jay’s research group will exceed its laboratory space in Latimer Hall, and so Jay and his team of fifty coworkers have moved to new laboratories on Potter Street in Berkeley.

**LBNL Director of Physical Biosciences Division**

Professor Keasling has just been appointed Director of the Physical Biosciences Division by LBNL Director Steve Chu. Jay succeeds chemistry professor Graham Fleming, who founded the division in 1997. Fleming recently became the LBNL’s Deputy Director.

**Charles R. Wilke Professorship**

The Wilke Chair was established last year to honor Professor Charles R. Wilke, the founding chairman of the department. After considerable discussion and deliberation, the department decided to use this Chair to support the work of our junior faculty members. The first Wilke Chair holder is David Schaffer. Support from the Wilke Chair is helping David develop an exciting research program in gene therapy. Also, as we go to press, David’s promotion to associate professor has just been approved, effective July 1.

**Faculty Awards**

Our faculty members continue to receive recognition for their research and teaching accomplishments. Nitash Balsara will receive the Stine Award of the AIChE for his outstanding accomplishments in the area of polymer science. Enrique Iglesia has been selected as the Robert Burwell Lecturer by the North American Catalysis Society and as the Valdimir Ipatieff Lecturer by Northwestern University. At commencement, he will also receive the Donald Noyce Prize, given to a faculty member in the physical sciences by the College of Chemistry for outstanding performance as an undergraduate teacher. The prize honors the long-time undergraduate dean of the college.

**Product Development Program**

The department has been working on implementing a Product Development Program for the past couple of years. The aim of this effort is to expose new graduate students to what is required to develop a new product and bring it to market. Students enrolled in the program will take a year of graduate courses in chemical engineering and business administration, and will then spend the summer months in two internships in local industry. A director for the program is soon to be appointed, and the department will begin developing the program in earnest during the coming academic year. If all goes according to plan, we hope to have the first cadre of students enter the program in the fall of 2006.

**Congratulations to Graduates**

In May another group of students will graduate and become alumni of our department. Congratulations to these wonderful young men and women, and my best wishes for success as they start their careers. My colleagues and I look forward to seeing them on campus in the future for various alumni events.

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ENDOWED CHAIRS. “Support from the Wilke Chair is helping David [Schaffer] develop an exciting research program in gene therapy.” Shown above is the expression of the green fluorescent protein (GFP) in the hippocampal region of the brain of an adult rat after the injection of an adeno-associated virus (AAV) gene delivery vehicle carrying the GFP gene. The image on the right is that of GFP protein in a large number of neurons one year after the injection, meaning that this gene delivery was highly efficient and allows for sustained gene expression.

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NATIONAL MEDALIST. Professor John Prausnitz was selected to receive the National Medal of Science, the nation’s highest honor in science and technology.
There is fascinating science taking place at the intersection of a variety of disciplines, and I believe that materials chemistry will join chemical biology as one of the cornerstones of chemical research and education. We have started to think about the kinds of course requirements that would serve as the foundation of an undergraduate degree program, looking at materials chemistry from as broad and interdisciplinary a perspective as possible. I don’t want to take a parochial view of the field. I envision structuring the materials chemistry program along the same lines as the chemical biology program. At the undergraduate level, we are developing two new courses, with professors Jeff Long and Ken Sauer taking the initiative, and we would like to initiate the courses in spring of 2006. We have decided to place the first course, “An Introduction to Materials Chemistry,” in the spring, just after the first semester of freshman chemistry, which would be a pre-requisite. I believe that putting it further along in the curriculum—a student’s second year or later—would be too late to attract students from other departments. The second course is being developed for the second or third year of the student’s tenure.

We are also looking to hire another faculty member in the general area of materials chemistry next year, and I will keep you posted on that search. Of course, the availability of space is an ever-present concern, and we need to make sure that we have room for all of our existing and new chemistry faculty and students. Once the new Stanley Hall comes online in the next year, we will have an easier time with space constraints.

Leadership from the department to the hill

Chemistry professor Graham Fleming has been appointed the Deputy Director of LBNL. A distinguished researcher, teacher and administrator who has been in the department since 1997, Fleming is a world leader in the field of time-resolved spectroscopy. His campus service has included positions as co-director of the California Institute for Quantitative Biomedical Research (QB3), and faculty lead and advisor to the chancellor on the Stanley Hall replacement building. In addition, chemistry professor Paul Alivisatos has been appointed as a new Associate Laboratory Director (ALD) for physical sciences. Alivisatos, who has served as Materials Sciences division director since 2003 and heads the Lab’s Molecular Foundry project, is recognized internationally as one of the “major figures” in nanoscience. I am sure that LBNL will benefit from our faculty members’ experience and ideas.

And congratulations to current Dean Clayton Heathcock, who will lead Berkeley QB3 activities as Chief Scientist beginning July 1. In his new QB3 role Heathcock will help develop new scientific programs across the three QB3 campuses and with LBNL. Poor Clayton: he keeps trying to retire, but we keep luring him back to campus.

Faculty honors
Our faculty continues to accrue honors, and while this is due mainly to our excellent people, it is also due in part to the database that was established for all major awards. We now track our awards submissions and deadlines to ensure that our outstanding faculty members are noticed and honored as much as they deserve to be. Robert Bergman and Christine Rutkowski in my office helped to establish the database, with Stephen Leone taking over as the chair of the awards committee this year. All involved have done great jobs.

First, Berkeley won many of the major ACS awards this year. Paul Alivisatos won the Award for Colloid and Surface Chemistry; David Chandler won the Irving Langmuir Award; Enrique Iglesia (in chemical engineering) won the George A. Olah Award in Hydrocarbon or Petroleum Chemistry; Stephen Leone won the Peter Debye Award in Physical Chemistry; Jeff Long won the National Fresenius Award; Luciano Moretto won the Glenn T. Seaborg Award for Nuclear Chemistry; and Peidong Yang won the Award in Pure Chemistry. I send my congratulations to all of these faculty members.

And kudos to Carolyn Bertozzi for her recent election to membership in the National Academy of Sciences. Her election, for her well-regarded work in cell glycosylation, brings the number of active NAS members in the department to 23.

In addition, Carlos Bustamante won the Richtmyer Award from the American Association of Physics Teachers for conveying physics to public audiences and received the 2004 Hans Neurath Award of the Protein Society. Arup Chakraborthy was elected to the National Academy of Engineering. Christopher Chang received a Camille and Henry Dreyfus New Faculty Award. Graham Fleming was honored with the 2004 Porter Medal in honor of his life-long work in the field of photochemistry. Jean Fréchet has been named the recipient of the 19th Gustavus John Esselen Award and has received an honorary doctorate from the University of Ottawa. Clayton Heathcock won the 2004 Paul Gassman Distinguished Service Award from the ACS. Sung-Hou Kim was named an honorary member of the Korean National Academy of Sciences. William Lester was profiled for The HistoryMakers, a video oral history archive that is headquartered in Chicago and dedicated to preserving African American history. Richard Mathies won the Ellis R. Lippincott Award. Norman Phillips won the Hugh M. Huffman Award of The Calorimetry Conference. Richard Saykally won the 2004 Edward Mack Award from Ohio State University. Dirk Trauner won a 2004 NSF CAREER Award. Peter Vollhardt received an honorary degree from the University of Rome. Evan Williams received a 2004 Amgen Faculty Award.

And finally, as we go to press, I have received word that Kristie Boering has received tenure and will be promoted to associate professor, effective July 1. Congratulations!
Studying nuclear decay

A nuclear chemist, Cerny and his graduate students and postdocs have devoted a lot of experimental effort toward discovering new modes of radioactive decay and the properties of highly unstable nuclei. Radioactivity itself was discovered in 1896 by Henri Becquerel when a sample of a uranium compound kept in the dark was found to expose photographic plates. The mysterious radiations were later shown to be helium nuclei (alpha particles), electrons (beta particles) and photons (gamma rays). Radioactivity is the conversion of an unstable nucleus of an atom to relatively more stable ones and ultimately to one of the 265 known stable isotopes. Research on radioactive nuclei, primarily using particle accelerators such as the cyclotron or using nuclear reactors, has led to the discovery of some 2,600 artificially produced isotopes, many with highly unusual neutron to proton ratios. This field remains of intense interest, since nuclear theorists have predicted that three to four thousand additional radioactive nuclei should exist (however fleetingly).

Cerny has discovered numerous radioactive isotopes and a new mode of radioactive decay, and he has worked out new pathways in complex radioactive decay. He was honored with the E. O. Lawrence Award by the U.S. Atomic Energy Commission in 1974 for the discovery of proton emission as the fourth fundamental mode of radioactive decay and for his investigation of the limits of nuclear stability of a number of light elements. The theory for proton radioactivity parallels that for alpha-particle radioactivity, but is a simpler process and gives more direct evidence of the basic nuclear structure of the decaying nuclide.

In an influential paper in 1983, Cerny and his collaborators reported a complex new type of radioactive decay that occurs in extremely proton-rich nuclei. This decay is initiated by beta-particle emission from the parent nuclide, but the daughter state is so highly excited that it decays by sequentially emitting two protons, which can be detected in coincidence. Currently Cerny is using the 88-inch cyclotron at LBNL to look for direct evidence of an even rarer process: the simultaneous emission of two protons, which was first indirectly observed in France in 2002. “Studies of nuclei very far from the stable isotopes continue to reveal highly unusual nuclear radioactivity,” noted Cerny.

BEARS project

He has recently been instrumental in establishing the BEARS project at LBNL—the Berkeley Experiments with Accelerated Radioactive Species (BEARS). By utilizing two cyclotrons, his group developed a light-ion, proton-rich radioactive beam capability that provides experimenters with the opportunity to perform a wide range of measure-
ments in nuclear science and nuclear astrophysics. Short-lived radioactive isotopes, such as carbon-11 with a 20-minute half-life, are produced at the Biomedical Isotopes Cyclotron, rapidly transported as carbon dioxide gas through a 350-meter capillary to the 88-inch Cyclotron, injected into its main ion source and finally accelerated as an ion beam. BEARS also has the only oxygen-14 beam (half-life 71 seconds) in the world. This very proton-rich beam is particularly of interest for nuclear astrophysics experiments related to the relative abundances of the isotopes of the lighter elements.

**Entering a hot field**

Born in Alabama, Cerny received his B.S. in chemical engineering from the University of Mississippi in 1957. Following a year at the University of Manchester, England, as a Fulbright Scholar, he decided to focus on nuclear chemistry, and his undergraduate advisors encouraged him to attend Berkeley for his doctorate.

“At that time nuclear chemistry was a hot field [no pun intended], and Berkeley was the place to be. Glenn Seaborg had recently arranged for a highly innovative new cyclotron [the 88”] to be built at LBNL, and new equipment was continually coming online.” He received his Ph.D. from Berkeley in 1961, using Lawrence’s last cyclotron on the Berkeley campus (located about where Pimentel Hall is now), and joined the faculty that same year.

**Administrative positions**

Cerny began his distinguished administrative career as chair of the chemistry department, serving from 1975 to 1979. One of his more interesting experiences as chair was presiding over the first-ever review of chemistry by the Graduate Division. He was then chosen to help lead LBNL, serving as an Associate Director as well as the head of its Nuclear Science Division from 1979 to 1984. He moved back down to the campus after a sabbatical to hold simultaneously the positions of Vice Chancellor for Research and Dean of the Graduate Division from 1985 through 2000.

**Improving postdoc affairs**

As the Graduate Division Dean, Cerny became involved in postdoctoral affairs and has been instrumental in advancing the cause of postdocs at Berkeley, improving the stature and working conditions of these important but transient appointees. He helped to establish the Berkeley Postdoctoral Association and has worked at the national level to recommend standardizing the pay and treatment of postdocs. “At most universities, responsibility for postdoctoral fellows lies with either the vice chancellor for research or the graduate dean. In my opinion, leadership at this level is critical for substantial progress to be made in regularizing postdoctoral education. Since I held both of these positions at Berkeley, it was very clear to me whose job it was,” Cerny has noted. Through his leadership, postdocs received improved recognition by the campus (the systemwide University has now created an academic personnel category for postdocs), obtained general access to health care coverage, and received more equitable compensation.

“At most universities, responsibility for postdoctoral fellows lies with either the vice chancellor for research or the graduate dean....Since I held both of these positions at Berkeley, it was very clear to me whose job it was.”
RESEARCH MATTERS

Nanoscience Imitating Nature

by David Pescovitz

It’s tough to build things that are 100,000 times smaller than the diameter of a human hair. Biology has had a few billion years to perfect the craft of building from the bottom up. That’s why UC Berkeley nanoscientist Matthew Francis collaborates closely with Mother Nature. Francis and his research group use organic chemistry to assemble nanoscale devices with unprecedented capabilities that could revolutionize cancer treatment or lead to the development of highly efficient solar cells.

“Our goal is to address a big challenge in nanoscience, which is how to position objects with exquisite resolution so that the exciting components people are developing can be combined into functional devices,” Francis says.

In recent years, he explains, materials scientists have developed a wide array of impressive building blocks for nanoscale systems, from computer components fashioned from single molecules to promising drug delivery systems. The problem, though, is constructing useful devices from these materials. Some of the new nanoparticles are too small for current lithographic techniques like those used to fabricate integrated circuits. Others are a bit oversized for precise “bottom up” positioning using organic chemistry.

“Biology has an enormous number of proteins that self-assemble into structures with feature sizes that are at exactly the right length scales,” Francis says. “So we can use proteins as positioning scaffolds to place these interesting components into functional arrays.”

For example, the researchers have transformed the shell of a bacteriophage called MS2 into a capsule that could deliver anti-cancer drugs only to tumor cells. First, the group developed a method to remove the viral genome so that an anticancer drug can be stored inside. Once the drug was in place, the viral shell could then be coated with a polymer that protects the cargo from triggering unwanted side effects or degrading prematurely as it travels through the body to the tumor site. Finally, the linkage attaching the drug might be functionalized to release the anticancer agent only when the nanocapsule reaches the tumor.

The first step though, Francis says, is developing the tools of organic chemistry.

“Our specialty is designing reactions that can link the nanoparticles and organic molecules to the proteins to make these new hybrid structures.”

One of his favorite examples of nature’s own nanoengineering, he says, is the photosynthetic light harvesting system that enables plants and certain bacteria to convert sunlight into organic energy. In plants, an array of molecules called chromophores form a “collector antenna” that gathers the photons from the sun and transfers the energy to a central engine that does the energy conversion.

Research groups have already synthesized artificial chromophores with tunable optical characteristics. The goal is to devise solar cells that convert sunlight into electricity far more efficiently than today’s technology. Artificial or not, though, these kinds of chromophore-based light harvesting systems function properly only if each molecule is approximately three to five nanometers away from its neighbor. How can scientists possibly achieve such a precise pattern? One answer, of course, is to go back to nature.

In recent experiments, Francis and his research group have functionalized the tobacco mosaic virus, harmless to humans, so that its shell can be used as a template for the self-assembly of a wide-variety of nanomaterials. Indeed, Francis says, the rod- and disc-like shapes of the obtained assemblies are particularly well suited as a chassis for a light harvesting system inspired by nature.

“For me, the real excitement of nanoscience is that it allows you to build devices with functions that simply don’t exist now and can only occur at the nanoscale,” he adds.

This article originally appeared in the March issue of ScienceMatters@Berkeley, a monthly online publication produced by the Colleges of Letters & Science and Chemistry. The magazine can be read in its entirety at http://sciencematters.berkeley.edu
NMR Goes Mobile

Homeland security experts may soon be getting a valuable new tool for identifying the chemical constituents in suspicious substances. A portable device makes it possible for the first time ever to take high-resolution NMR spectroscopy—one of the principal tools for chemical analysis—out of the laboratory and into the field for use on samples of any size.

“Our device does not compete with the superconducting magnets that are used to study proteins, but there are many applications, besides homeland security, where you can’t bring samples from the field to the laboratory, including medical diagnosis, archaeological analysis, or the exploration of objects in space, like planets or moons,” said chemical engineering graduate student Vasiliki Demas, one of the co-authors of a paper describing the portable NMR device, which appears in the April 8, 2005 issue of the journal Science. Demas is a member of the research groups of chemical engineering professor Jeffrey Reimer and chemistry professor Alexander Pines.

Other principal authors of the Science paper were Bernhard Blümich, Federico Casanova and Juan Perlo, of the Aachen Institute, and Carlos Meriles, a physicist now at City College of New York, in addition to Reimer and Pines. Blümich is the co-inventor of the NMR Mobile Surface Universal Explorer, Reimer is an expert in NMR technologies for materials engineering, and Pines is one of the world’s foremost authorities on NMR spectroscopy.

NMR is a phenomenon involving the atomic nuclei of molecules in which at least one proton or neutron is unpaired. The imbalance causes such nuclei to spin on an axis like miniature tops and gives rise to a magnetic moment, which means the nuclei act as if they were bar magnets with a north and south pole. When a sample is exposed to a strong external magnetic field, these spinning “bar magnets” attempt to align their axes along the lines of magnetic force. The alignment is not exact, resulting in a wobbly rotation about the force lines that is unique for each type of nuclei. If, while exposed to the magnetic field, the nuclei in a sample are also hit with a radiofrequency (rf) pulse, they will absorb and re-emit energy at specific frequencies according to their individual rates of rotation. These frequencies show up in an NMR spectrum as distinct peaks of varying height that, like a set of fingerprints, can be used to identify the sample’s constituent nuclei.

Because the rate at which resonating nuclei realign themselves with magnetic field lines is heavily influenced by their neighboring nuclei, NMR can also be used to provide detailed information on the structural, dynamic, and spatial relationships of atoms in a sample. Deviations from reference peaks on the NMR spectrum, called “chemical shifts,” reflect different concentrations of a sample’s constituent nuclei and can be used to positively identify the molecular composition and chemical nature of the sample.

Until recently, high resolution NMR spectroscopy could only be done by placing a sample inside the bore of a very large stationary magnet that produces a strong, uniform magnetic field. Portable NMR systems with open, single-sided probes, have been built, but the lack of uniformity in their magnetic fields limits them to low resolution.

The scientists applied the ex-situ technique in a portable single-sided sensor device, which, for these experiments, was configured for high resolution NMR spectroscopy. Two concentric U-shaped permanent rare earth magnets (Neodymium-Iron-Boron) were arranged to create a magnetic “sweet spot” about seven millimeters above the active magnet surface. In this sweet spot, the static magnetic field is parallel to the plane and reaches a field strength of 0.2 Tesla. The rf pulses were generated through a rectangular rf coil that is shaped and positioned with the inner of the rare earth magnets to optimize the interaction between the static magnetic field and the magnetic fields generated by the rf pulses. When a sample is placed in the sweet spot and hit with a carefully orchestrated series of rf pulses, the result is an NMR spectrum with a sharp enough resolution to reveal chemical shifts of eight parts per million within three minutes after sample testing begins.

The campus is home to dozens of outreach programs and initiatives, all working with teachers and administrators from local schools, along with parents and community members, to improve educational opportunities from kindergarten to community college. Most programs work with students in the Bay Area, but UC Berkeley outreach has an impact that stretches throughout Northern California and the nation. Within the college there are people who take the message of science and engineering out to the community, demonstrating what these disciplines are and helping to convert students into future scientists and chemical engineers through outreach programs.

Chemistry in the Classroom

The Chemistry in the Classroom program began as a casual remark at a dinner party and has since blossomed into a thriving outreach program. A collaboration between chemistry graduate students and the nonprofit Community Resources for Science (CRS), the program uses graduate students as volunteer role models for elementary school teachers and students in order to improve chemistry education in local public elementary schools. “I knew Corrin Brown [the coordinator for CRS], and she happened to mention that she was looking to increase the level of science expertise in the classroom,” said chemistry professor Robert Bergman. “I brought up the idea at a Graduate Life Committee meeting, and it was embraced by two students, Amish Patel and Jacob Hooker, who volunteered both to teach and to organize students,” said Bergman. “We currently have more than thirty students working with CRS to get out into local classrooms and do scientific demonstrations.” To support its training of volunteers, the CIC program has recently received a grant from Dreyfus Foundation.

CRS helps graduate students select and develop demonstrations to illustrate complex scientific concepts. “Practicing with their staff members before going into the classroom helped me to feel confident that the students would learn something and that I would be expanding on their curriculum,” said volunteer Peter Pauzanshie.

The feedback from both the volunteers and the schools has been positive. According to Brown, “Children of all ages love to watch and participate in science demonstrations.” And although the Bay Area is brimming with scientists from many disciplines who would be happy to work with young students, these scientists don’t know how to establish a relationship with schools and also need assistance in
translating their technical knowledge into presentations that are appropri-
ate for elementary classrooms. "That is where we come in," said Brown.

Added Pauzanshie, "It's a perfect match because graduate students are
quite flexible and can make time to have some fun." Pauzanshie gets third
graders thinking about phase transitions and state change using both dry
ice and liquid nitrogen. "The children love the liquid nitrogen experiments,
since it looks like water but evaporates instantly when poured out of its
container." And to show the few skeptics that the liquid was indeed quite
cold, he dunked a flower in the liquid and proceeded to shatter it, to the
amazement and amusement of the onlookers.

Many of the demonstrations from the graduate students are focused on
larger issues, beyond pure chemistry, such as soil science and ecosystems, to
impart a broader perspective to the students. "Everything is related" is how
Amber Wise describes her message. She plays games with the children to
teach them about the circle of life. First Wise, a chemistry graduate student,
assigns everyone to be an object in the ecosystem. "They get to be things
like air, soil, water, people and plants. One child takes a ball of yarn, holds
the loose string, and tosses the ball to another child whose assigned element
connects with their own, such as tree connecting to soil, and then explains
the connection. In the end we make a big interlocking web, to illustrate
that everything is interdependent."

Not your grandma's high school

Connections are a big part of the Nano*High message as well, although
its lessons dwell more on interactions at the nanoscale. (The asterisk refers
to an interesting bit of information: "the human hair is 50,000 nanometers
across.") Nano*High at LBNL was started as a mechanism to get high school
students more interested in science, according to organizer Mark Alper,

LOVE LETTERS. Children from Cragmont Elementary
in Berkeley responded to Peter Pauzanshie’s
presentation of "Liquids, Gases, Solids and Goo." "It was
cool when you put the flower into the liquid nitrogen.
But the goo was the coolest. I am going to make it
at my house. When I grow up, maybe I want to be
a scientist. It would be cool."
The Deputy Director of the Materials Sciences Division at LBNL. “We thought that their hearing, live and in person, some of the world’s top scientists talk about their own exciting results in new fields of science might convince a few to become scientists themselves and others to at least realize that science is interesting.”

The organizers work with teachers and administrators in local schools to bring classes of students to the LBNL campus. The program is advertised in all local schools, with a specific focus on schools in disadvantaged areas.

Now in its second year, Nano*High at LBNL has 600 students enrolled this year; almost 200 students attend any given talk. Many of the program’s speakers have been from the College of Chemistry, including Carlos Bustamante and Jean Fréchet. Chemistry professor Carolyn Bertozzi has also been a frequent speaker and noted, “The students were engaged and enthusiastic, and there has been excellent attendance throughout the year. Several students approached me after my talk to ask about getting involved in summer research projects, even though they are still in high school.”

The program has proven extremely popular. “The best measure is that we fill our auditorium to overflowing—the kids vote with their feet and come here repeatedly,” said Alper. It’s a pretty simple assignment: just come, listen and be amazed.

Undergraduate Scholars

Listening to and absorbing information is a major part of what outreach participants do, especially when dealing with programs organized by the college undergraduate office. The undergraduate office is a natural home for outreach programs, since it serves as the front door for students looking to start their studies here. And there is a lot of enthusiasm among the undergraduates to talk with and mentor younger students; because they are nearly the same age as their audience, they can make an effective impression. Numerous undergraduate students have participated in the outreach component of the College Scholars Program, which was initiated in 1991 by chemistry professor William Lester, Jr., who at that time was the Associate Dean for Undergraduate Affairs. To date, the College Scholars Program has provided support to more than one hundred undergraduate students, including Ugonna Ihenacho, who has been on both sides of the outreach table. A third-year student in chemical biology, Ihenacho participated in an outreach program in her last two years of high school, followed by two years in the College Scholars Program, which offers an intensive discussion session for three hours each week in addition to regular lectures and laboratories. The program, funded in part by the Ford Motor Co., provides a support mechanism for students from diverse social, cultural and economic backgrounds to help them succeed in chemistry and engineering.

Ihenacho remembers the weekend “academy” sessions in high school as being a time to learn more about books and math, as well as preparing for college and learning more about the college-life experience. “It was definitely worthwhile. I learned a lot about how to learn and was inspired to take A.P. courses.” Ihenacho is now giving back to younger students, serving as a mentor through the Berkeley Scholars to Cal program at Stiles Hall. (Stiles Hall is a private, non-profit agency that aims to help low income, inner city youth stay in school and to connect UC students with meaningful community service.) She spends her spare time tutoring elementary school students, serving as the successful role model that she has now become.

Monica Jackson-Tribble, an undergraduate advisor in the college, has been the outreach coordinator for the College Scholars Program since its inception. “I coordinate all outreach activities as they relate to increasing the number of underrepresented students that make up our undergraduate student body,” noted Jackson-Tribble. She is also the college liaison to the Center for Educational Outreach, the umbrella organization for all the outreach programs on campus.
Much of her outreach activity takes place in April, when Jackson-Tribble helps newly admitted students who are in the process of deciding whether or not they should come to Cal and more specifically the College of Chemistry. She personally calls students and, with the rest of the undergraduate office, participates in Cal Day, the campus’s annual open house, where prospective students and the community can tour the campus and learn in depth about the various programs.

For the past four summers, she has been the point-person for the college’s participation in “Experience Berkeley” (EB), an outreach project for underrepresented students funded by the Office of Admissions. Last summer 120 public high school students from the Los Angeles area visited the campus and learned more about on-campus life. “They lived in the dorms and attended writing classes and various workshops that included information on the UC application process,” noted Jackson-Tribble. EB participants also visited the College of Chemistry for lab tours and faculty lectures. Additionally, if time permits, she holds an event for National Chemistry Week in October. “Usually I invite elementary school groups to the college to do fun laboratory experiments, hear lively talks and see demonstrations. Graduate students in various research labs usually host this event,” she said. “One year we did a very special outreach project entitled ‘Girls Just Want to Have Fun with Chemistry’ for 80 high school women. Encouraging young women scholars to come to Cal is a very important part of our outreach component.”

Expanding Your Horizons

Expanding Your Horizons (EYH) also works with young women and encourages them to take math and science courses in high school, part of its effort to increase the number of women in science and engineering fields. Sponsored by the nonprofit Math/Science Network, based at Mills College in Oakland, EYH offers the opportunity for girls to discover the excitement of scientific discovery and the career opportunities in science and math-related fields like computer technology, engineering and medicine. College members of Iota Sigma Pi, the national honor society for women in chemistry, consistently volunteer at the annual EYH event.

On a chilly March morning, Allison Caster, a graduate student in chemistry, guided middle-school girls through numerous experiments in the “Colorful Chemistry” session of EYH. “The girls burned metal salts to get great colors and to learn about the electromagnetic spectrum,” Caster said. “It was a blast.” In the session, participants do hands-on reactions, making polymers and “super” bouncy balls, distinguishing chemical compounds by the colors that they give off in a fire, flash freezing compounds and ending the session by “making liquid-nitrogen ice cream, which is always the most popular part of the program,” said Caster.

The day includes a talk encouraging girls to persist in mathematics and science courses, and two varieties of workshops: participating in experiments and listening to role models discuss what their jobs involve on a daily basis. This was Deborah Michiko Aruguete’s second year to

EXPERIENCE BERKELEY. Through a program sponsored by the Office of Undergraduate Admissions, high school students get an up-close look at research and life in the College, meeting with current students and learning from professors such as chemical engineering professor Alex Bell.
volunteer at the event. "I think it’s important for people to be exposed to science at an early age," said Aruguete, a chemistry graduate student. "Sometimes small things can influence what a student will ultimately study. Plus the event is a lot of fun, and the girls all enjoy the experiments. I’ll definitely do it again."

Caster agreed, noting that the event helps reinforce the idea that science is cool, especially at an age when many girls seem to lose interest in science and math. "I think that seeing us and having us as role models might inspire them to take science courses and maybe even science careers, although the girls really think they are there to have fun." And with super-cold homemade ice cream at the end, who can blame them! Outreach programs offer young women the chance to see successful women chemists as role models and, it is hoped, ignite an interest to follow in their footsteps.

BGESS

Many members of the Black Graduate Engineering and Science Student group hope to inspire a similar curiosity about science by working with high school students from across the Bay Area. After two months of mentoring and advising by college students, the advisees took part in the ninth annual BGESS-sponsored Science Fair. Seventy high school students sat in the Wozniak Lounge in Soda Hall on Cal Day, waiting for the winners to be announced. Twenty-five projects had been judged, and though the winning projects were eventually announced—"What Plant Transpires the Most?" and "Aviation"—in reality, all of the participants are winners. "Some of the schools that we targeted did not have good facilities and the students were lacking in role models and science leadership," said Nerayo Teclemariam, a chemical engineering graduate student. "We went in knowing that we had our work cut out for us, but the students were exceptionally bright and motivated, coming up with projects on their own, testing out their hypotheses. It was a great experience."

BGESS hosts the annual science fair in hopes of sparking an interest in science and engineering in students from underrepresented minorities. BGESS also helped found the Summer Undergraduate Program in Engineering Research at Berkeley (SUPERB), which offers research opportunities to outstanding engineering students to prepare them for graduate school. The number of black students in engineering and science at Berkeley is quite low, with 23 enrolled in the college—12 as undergraduates and 11 in the two graduate programs, so there is room for improvement.

Increasing the number of underrepresented students at Berkeley is a main concern of Chancellor Birgeneau, whose vision for Berkeley embraces the themes of leadership, connection, and inclusion. On the entire campus, only 108 African American students enrolled as freshmen this year, down from 260 in 1997, the year before Proposition 209 went into effect. Birgeneau has said he won’t defy Proposition 209—a voter-passed initiative that banned affirmative action in education—but instead will work within the system to change the admissions picture, including speaking out on the issue. "Inclusion covers financial as well as social, cultural and religious diversity. . . . It is self-evident that we can neither achieve true excellence here at the University of California nor fulfill our public mission unless we access fully the entire talent pool," Birgeneau said at his recent inauguration.

For more information:
Community Resources for Science: http://www.crscontent.org/
College Scholars Program: http://chemistry.berkeley.edu/ugrad_info/cocsp/
Stiles Hall: http://www.stileshall.org/
BGESS: http://bgess.berkeley.edu/
Birgeneau’s inauguration: http://cio.chance.berkeley.edu/chancellor/Birgeneau/
Berkeley degrees

In a recent survey, UC Berkeley was the first in preparing students who go on to earn their doctorates in the United States. Berkeley awarded 2,175 undergraduate degrees to students who received Ph.D.s between 1999 and 2003. A total of 203,929 U.S. doctorates were awarded during that time period. According to the report, Berkeley was also the top-ranked school in awarding doctorates in 2003—767 doctorates, or 2 percent of all U.S. doctorates awarded. Berkeley also leads in both baccalaureate degrees leading to doctorates and in doctorates granted to women and minority students.

“It is not surprising that UC Berkeley produces the most Ph.D.s since they have wonderful role models. Our faculty is outstanding and so are our graduate students,” said Mary Ann Mason, dean of UC Berkeley’s Graduate Division. “Our undergraduates like what they see and are eager to pursue a life of research.”

Staff members to have seat on regent committees

The UC Board of Regents recently voted to include a staff member or non-Senate academic employee from the UC campuses on each of two regent committees for the next two years. While students and faculty each have a formal representative on the Board of Regents (the student regent as a voting member, the faculty regent as a non-voting member), staff as yet do not, and this is a step in that direction. The proposal faces several obstacles, including the fact that it would require a change to the state constitution.

McCredie to retire

John W. (“Jack”) McCredie, associate vice chancellor for information technology and the campus’s chief information technology officer, will retire from UC Berkeley this summer after almost 13 years. McCredie has been responsible for leading central computing and communications activities, including coordinating information technology planning and policy-making, and guiding the campuswide deployment of information technologies in the service of teaching, research, and administration.

UC retains lab contract

UC and LBNL’s six-decade relationship will continue for at least another five years, with the awarding of a contract through the DOE. Announced in April, the new “award-term” contract contains a number of innovative provisions intended to provide incentives for superior performance. This contract award is the first involving a major DOE science laboratory in response to Congressional legislative direction in 2003 to accept proposals for five Science and Defense Laboratory contracts that were awarded more than 50 years ago without competition. LBNL’s unique research facilities, which attract scientists from all over the world, include the Advanced Light Source, the Biomedical Isotope Facility, the National Energy Research Scientific Computing Center and the National Center for Electron Microscopy. The Molecular Foundry, a national nanoscience research center, is currently under construction and is expected to be up and running in 2006.

Chancellor Birgeneau inaugurated

Robert Birgeneau was feted as the ninth Chancellor of the Berkeley campus during the occasion of the 137th Charter Anniversary festivities in April. Birgeneau, who replaced Robert Berdahl in September of 2004, has made the issue of inclusion a top priority of his tenure, pledging to provide leadership and create a diverse environment.

“As the current chancellor, I feel a moral obligation to address the issue of inclusion head-on,” Birgeneau said. “Ultimately, it is a fight for the soul of this institution.”

Artist’s rendering of the Molecular Foundry building at LBNL, scheduled to open in 2006.
On May 21, the College of Chemistry gathers to celebrate the achievements of our graduating students.

The graduating class this year (students completing their degree requirements from summer 2004 to spring 2005) is composed of the following:

- B.S. Chemistry — 63
- A.B. Chemistry — 4
- B.S. Chemical Biology — 27
- B.S. Chemical Engineering — 96
- M.S. Chemistry — 10
- M.S. Chemical Engineering — 3
- Ph.D. Chemistry — 58
- Ph.D. Chemical Engineering — 19
Golden Memories

Commencement speaker: Charles Shank

This year’s commencement speaker is Dr. Charles V. Shank, a renowned scientific leader and professor in the Departments of Chemistry, Physics, and Electrical Engineering and Computer Sciences. A co-author of over 200 publications, he leads a research group in the study of physical processes, such as energy storage and transfer in molecules and materials, that occur on a femtosecond time scale.

Dr. Shank obtained his B.S., M.S. and Ph.D. degrees in electrical engineering from the University of California, Berkeley. Following graduation in 1969, he became a member of the technical staff at AT&T Bell Laboratories, where his interests shifted towards chemistry and physics. He studied ultrafast events and co-invented the distributed feedback laser, which led to advances in integrated optics and fiber optic communications. Dr. Shank held many leadership positions at Bell Labs, including Director of the Electronics Research Laboratory.

Dr. Shank came to the campus in 1989, serving as Director of Lawrence Berkeley National Laboratory from September 1989 until August 2004. During his tenure the laboratory experienced impressive scientific growth, especially in the areas of astrophysics, supercomputing, genomics and nanoscience. He was the longest-serving director of any of the Department of Energy’s sixteen national labs.

Dr. Shank’s achievements have been recognized with awards such as the R.W. Wood Prize of the Optical Society of America, the David Sarnoff and Morris E. Leeds Awards of the Institute of Electrical and Electronics Engineers, the Edgerton Award of the International Society for Optical Engineering, the John Scott Award of the city of Philadelphia, the Edward P. Longstreth Medal of the Franklin Society, and the George E. Pake Prize and the Arthur L. Schawlow Prize from the American Physical Society. In addition, he holds memberships in the National Academy of Sciences, the National Academy of Engineering, and the American Academy of Arts and Sciences, and is a fellow of the American Association for the Advancement of Science, the American Physical Society, the Institute of Electrical and Electronics Engineers and the Optical Society of America.

I remember back in organic chemistry, when Professor Ahamindra Jain knew every single person’s name before the class started—almost 150 people!
Edward Bellfield
B.S. Chem Bio, May 2005

Taking Chem 120A opened my eyes to the beauty and possibility in physical quantum chemistry, and I’m going to graduate school now to follow that possibility. Also, I just wanted to say that Professor Richard Mathies is a Mack Daddy!
Lana Lau
B.S. Chem, May 2005

The professors were always passionate about their students’ learning and advancement. Dr. Alex Bell, the professor who has influenced me the most, provided me with countless opportunities to prove and improve myself while working in his research group.
Tanguy My Chau
B.S. ChemE, Dec. 2004

I’ve really enjoyed meeting grad students at Berkeley. They were always supportive about my research and always ready to have some fun. My lab mates were especially wonderful, and I doubt I’ll have another opportunity in the future to work with so many great friends.
Yoshie Kimura
Ph.D. Chem E, May 2005

I remember thinking that peptide chemistry was hopelessly complicated (so many sidechains with different functional groups!) and that research moved at a snail’s pace. And now my research is moving faster than I can keep up. I am starting to feel like a real scientist.
Cleo Salisbury
Ph.D. Chem, May 2005
Chemistry 108—Inorganic Synthesis and Reactions—is not your typical undergraduate laboratory course. Rather than perform standard experiments each week by following a “recipe” from a chemistry “cookbook,” third- and fourth-year chemistry majors learn what it is like to carry out original scientific research. Working in small groups, they design their own projects and experiment in the laboratory to create new materials of their own choosing. According to chemistry professor John Arnold, by the end of the semester “students coming out of this course are ready to walk into a research lab.”

Guided by Arnold in the fall and Professor Richard A. Anderson in the spring, students spend the first part of the semester learning the necessary principles and techniques to be able to synthesize inorganic compounds. They acquire practical skills, such as the use of dry boxes and schlenk lines, and characterize compounds with NMR and other types of spectroscopy. Students get to try their hand at glassblowing and receive substantial safety training, which is necessary due to the hazardous nature of some of the materials they handle.

They also have a chance to refine their research skills outside of the laboratory. Chemistry Librarian Mary Ann Mahoney leads the class in a library tutorial, teaching students how to search the literature and use online databases. There is also a heavy written component: throughout the course the students are required to write six manuscript-quality reports.

After all of this preparation, the students are ready to dive into their own research projects. They start by studying real research papers and choosing a topic that interests them. Using their chemistry knowledge, the groups of students find ways to build upon the published synthetic methods to create novel materials. For example, in fall 2004 some of the students worked on the compounds used to make light emitting diodes (LEDs). Found in traffic lights and displays for electronic devices, these compounds have the special property of emitting light when a current passes through them. Students tweaked a process used by previous researchers to produce LEDs that emitted light of different colors.

Other students in the class worked on ferromagnetic fluids—liquids that can be controlled by a magnet. These are basically solutions of magnetic particles suspended in a liquid medium, and when placed near a magnet, they take on the three-dimensional shape of the magnetic field. In some instances, this can cause the liquid to stand up and form spikes along the lines of the field. Their unique properties allow the fluids to be used in applications such as forming airtight seals around rapidly moving parts, moving drugs in the bloodstream, and damping audio speakers.
Both types of materials were chosen because of current interest in their potential applications, and because, according to Arnold, “it allows the students to have the experience of making a compound which is useful.” Neither compound has been studied previously in Chem 108.

“Each year we try to do something new to rejuvenate the course,” continued Arnold. “This year we added a theory component, so students did calculations to understand the structure and bonding of the compounds. We also expanded upon the materials chemistry.”

During the final class period, students present their results in a poster session. The best projects will likely be included in next year’s laboratory manual. Thus the course is always changing, and the material stays fresh and exciting.

It is clear that all involved parties enjoyed the experience. The professors welcome the chance to work closely with the students. “It is one of the few courses in the department where you have a high degree of interaction with the undergraduate students. You get to know them very well,” noted Arnold.

The students agreed. Kaori Kitano, a fourth-year chemistry major who took the course last fall, liked working in a small group and collaborating with classmates. Another student, Blueray Curtis, added, “I think the independent projects are an excellent idea and my favorite thing that I’ve done in four years. I strongly prefer a course with more independent projects and fewer assigned labs.”

In fact, the students would have liked to spend even more time experimenting in the lab and perfecting their poster presentations. The graduate research instructor, Stephen Kaye, noticed the students’ enthusiasm and was impressed with their efforts. “They certainly worked really hard,” he remarked.

An ultimate goal for the future is to publish one of the projects in the Journal of Chemical Education, an American Chemical Society journal that keeps educators updated with the latest innovations in research and teaching methods. This hasn’t been tried yet, and would require a student to work beyond the end of the semester. It could be a challenge for upper division students to find time to commit to such a project, but it is hoped someone will tackle it soon.

“I think the independent projects are an excellent idea and my favorite thing that I’ve done in four years.”
William Haseltine: pioneer in healthcare

Knowledge for the betterment of human health

The lessons from his Berkeley experience run deep with William Haseltine. He entered the University over forty years ago, a self-described “conservative kid from a military background” with an eye on becoming a doctor. Four years later he emerged a product of the Free Speech Movement and an innovative program known as Extraordinary Students, intent on doing science to solve societal and medical problems.

A gifted scientist, Haseltine (B.A. Chem, ’66) entered Berkeley in 1962 and was quickly taken under the wing of senior chemists in the College. “I became a scientist because of George Pimentel,” notes Haseltine fondly. “Pimentel referred to himself as a fisherman for scientists, and I was one of the fish that he hooked. He diverted my career into science.”

Back in the early 1960s, all of the senior chemistry professors were required to spend an hour a day in Chem 1A with the undergraduate students, and they brought to the chair’s attention any young scientist who they believed had potential. Haseltine was quickly recommended to a special summer program run by Pimentel. “The fifteen participants read the papers of one of the top UC chemists at that time—Chamberlin, Calvin, Urey, for example—and then spent a day with him. We did this once a week over 10 weeks. It was quite a privilege for all of us young scientists, meeting and talking with such distinguished chemists. It was a completely open environment and made quite an impression on me.”

During his second year, as part of the program, Haseltine did independent research with senior faculty members, beginning in Pimentel’s group. “He was designing the infrared spectroscopy analysis equipment for the first Mars flyby. I personally created an artificial Martian atmosphere in the lab in order to examine it spectroscopically, and we wrote up the findings for Science magazine—my first publication,” says Haseltine. “This was an exciting project that pushed the limits of our knowledge. We had to come up with a definition of life so that we could distinguish between life and nonlife, and had to consider all contingencies. We came up with what I still think is the best definition of life that is out there: a self-replicating system that is error prone and capable of reproducing its errors. This is a great definition because it allows for evolution, and it also tells us that life is not really a chemical difference, just an organizational difference.”

Other undergraduate projects of Haseltine’s at Berkeley resulted in more journal papers. Under the direction of C. Bradley Moore, he investigated the use of lasers for communications between earth and vehicles in outer space. “I built an isotopically shifted carbon dioxide laser (using CO\(_{18}\)) to penetrate the atmosphere. I could shine it to San Francisco without any problems. Also, working with Ignacio Tinoco, I measured the solubility of guanosine in preparation for his later extensive work on confirmation analysis of polynucleotides.”

Berkeley affected Haseltine’s political leanings as well. He was deeply involved in the Free Speech Movement, in which students protested against the administration, demanding the removal of the ban on on-campus political activities and recognition of the students’ right to free speech and academic freedom. “I was the first guy to jump in front of the police car when they tried to arrest Jack
Weinberg [a former graduate student who had set up a table in front of Sproul Hall in defiance of the administration’s ban]. “The car was surrounded by [about 3,000] protesters, and we sat there for three days.”

Today, if you go to the famous colorful mural on Telegraph Avenue, Haseltine is among one of the students you can see memorialized in the mural, kneeling in front of the police car.

Haseltine’s Berkeley sensibility stayed with him as his career advanced, first as a graduate student at Harvard, where he earned a Ph.D. in biophysics in 1973. “During this period I wrote three anti-Vietnam War articles for the New Republic, one of which broke the Agent Orange story detailing the discovery that the defoliant—widely used in Vietnam—caused development malformations in utero.

While he was having an impact in the political world, he was also working to get the best scientific training possible. He performed his graduate work under the direction of two of the giants of molecular biology—James D. Watson and Walter Gilbert—because, as he notes, he “wished to receive the most advanced training in fundamental biological research then available as a foundation for my later medical research.” He did his post-graduate studies at the Massachusetts Institute of Technology with David Baltimore before joining the faculty at Harvard in 1976.

As a professor at Harvard Medical School, Harvard School of Public Health and the Dana-Farber Cancer Institute for almost 20 years, Dr. Haseltine made fundamental contributions to the understanding of cancer and AIDS, including the first sequencing of HIV, and published more than 250 papers in the scientific and medical literature.

“I left Berkeley wanting to do science for medicine and for society. At Harvard I quickly realized that molecular biology was the new hot field, and I decided to devote my career to the creation of new knowledge for the betterment of human health,” he explained. “I learned chemistry, physics, math, and biology, so that I could have all tools, and this education has served me extremely well.”

The “radical” fire that had been ignited in him at Berkeley still burned, however. During his years on the Harvard faculty he was a tireless educator of undergraduate and graduate students, creating and teaching a course for many years on the social implications of biological science to non-science Harvard undergraduates. He was a pioneer in AIDS research, establishing the first academic department devoted to finding a cure and vaccine for AIDS. He played an important early role in public awareness of AIDS, helping to obtain both public and private financing for AIDS research, founding amfAR (American Foundation for AIDS Research) and organizing the efforts of pharmaceutical companies to invest in treatments for AIDS. Dr. Haseltine has served on the board of many charitable foundations and as an editor of a number of scientific journals.

His business career has been just as distinguished. Beginning in 1982 with Cambridge BioSciences, Haseltine founded seven biotechnology companies, all in different areas of healthcare. As an advisor to HealthCare Ventures, Inc., a venture-capital company, he helped to create another twenty biotechnology companies. “I started creating companies because I could take knowledge and use it to patients’ benefit quickly.”

He founded Human Genome Sciences (HGS) in 1992 and helped spearhead the genomics business field. HGS has been the first to isolate most of the human genes and has decoded the sequence of several infectious disease organisms. “With HGS, our idea, which turned out to be a revolutionary one, was to separate genomics from genetics. We considered each gene as a unique entity, without thought to its inheritance. Then, by understanding what the individual gene product did, we could figure out its function and where it fits in cellular activities. This idea transformed the industry, and it’s been very satisfying to see this idea catch on. People copied it because it worked.”

Today, Haseltine is working to speed up the process of developing new knowledge to benefit patients. “It is too slow and inefficient, with the result that drugs cost too much and there is too little access.” He is currently working to change healthcare delivery in India through no-loss hospitals to deliver high-tech, high-quality, high-volume healthcare.

He is also helping members of the college fulfill their revolutionary healthcare goals, through his membership on the board for OneWorld Health, the nonprofit pharmaceutical company that has partnered with chemical engineering professor Jay Keasling to develop his malaria drug research and deliver it to the patients in affected areas—people who need it most and can least afford it. “Keasling is extraordinarily creative and innovative, and OneWorld’s mission is something that I am very interested in.”

Haseltine’s outstanding career has been facilitated by his first-rate training in chemistry at Berkeley, he fervently believes. “I just didn’t learn about chemistry. I learned how to do great science from great scientists,” he says. “I learned that the most important part of science is imagination, and the key is to know what to work on—find that one small problem that, when solved, can answer the big question.

“So, I learned that science is a combination of passion with intellect. And it’s the passion that you learn from the great scientists. No matter what the personality, when it comes to work they are all as passionate as any Italian diva.”

EXTRAORDINARY STUDENTS
Haseltine took part in a special seminar in 1963 run by George Pimentel and is shown here, on the left, next to Pimentel (center).
Dear Fellow Alum,

It's graduation time, one of the most festive times for the college. And in honor of newly graduating students, we have been distributing “College of Chemistry” mugs with a complimentary coffee certificate to the college’s “Coffee Lab.” This was done last year as well and has been very well received. There's nothing like a little caffeine to assist one through those last finals, and the mug serves as a favorable reminder of all the fun and dedicated times that the college years have afforded.

Several recent events provided both fun and fantastic networking opportunities for alumni.

The second annual Young Alumni and Graduating Student Reception was held on April 27. This year’s event was a huge success with many newly graduating students being congratulated by faculty and recent alums while enjoying a delectable selection of sushi. This is an exciting time of year for those receiving their degrees after many years of hard work and dedication, and I am thrilled that we were able to recognize and celebrate their achievements together.

The Berkeley Nanotechnology Forum 2005 took place on April 30. Organized by the Berkeley Nanotechnology Club and sponsored by the Colleges of Chemistry, Engineering, and Letters & Science, and the Schools of Business and Law, this forum brought together people from the campus and community with a common interest in all things super-small. The talks and poster sessions were stimulating, and Stephen Chu, who is the Director of LBNL and a Nobel laureate in physics, gave the keynote address.

We have had many others events this past year, including Cal Day, which was held on April 16 and is a campus-wide open house for newly admitted students and their parents and the general community. The event was a great success. Lecturer Mark Kubinec and Lonnie Martin gave a demonstration lecture on “Molecules, Materials and Us” that included explosive, illuminating demonstrations and examples of ChemQuizzes. I highly recommend that you consider bringing your children or grandchildren to this event next year. Mark and Lonnie have a way of intriguing the scientist in all of us! After this lecture, Associate Dean Herbert L. Strauss gave a welcome presentation to new and prospective students of the College of Chemistry and their parents, followed by an informal question and answer session. Prior to the lectures, students from AXE and AIChE and our undergraduate advisors were available in the Latimer lobby to answer questions pertaining to the

(continued on page 27)
course work curriculum and life in the college. We continue to be encouraged by the quality of students that Cal is continually able to recruit, which helps to maintain the outstanding program that is offered in the College of Chemistry.

The Cupola Era alumni luncheon was held on March 3. Chemistry Professor Rich Saykally talked about “What Makes Water Wet” to a group of 65 alumni, friends and faculty. We were delighted that there were more than 15 “new-timers” at this event.

The Real World Engineering event was held on February 3. Special thanks to the following chemical engineering alumni who participated as panelists: Jay Ackerman, MS ’63; Morgan Edwards, BS ’86; Carlos Hernandez, BS ’00; Clint Holzwarth, BS ’79; Jack Matkin, BS ’61; Laura Oliphant, PhD ’91; Larry Perry, BS ’76; Steve Sciamanna, BS ’79, PhD ’86; and Read Simmons, PhD ’99. More than 60 chemical engineering undergraduate students attended, and all seemed very glad to have had this opportunity to hear from “Real World Professionals.”

The Alumni of the G. N. Lewis Era luncheon on November 18 featured a talk by chemical engineering professor Clayton Radke on “Black Lines, Streaks, and Holes: The Dry Eye Syndrome” to more than 50 alumni, friends and faculty. This was a very interesting talk and gave us some “insight” into our eyesight.

The AIChE Annual Conference reception was held in Austin, Texas on November 9. With more than 200 alumni and friends in attendance, it was a great event for renewing connections and mixing with former colleagues, classmates and faculty.

The two alumni era groups Free Radicals and CHEMillenniums combined their event last year during Homecoming & Parents’ Weekend and held a brunch on October 16, following a talk by chemistry assistant professor Dirk Trauner. After the brunch, several of the guests attended a barbecue hosted by the campus, and then watched the Bears beat the Bruins! This was a fun event, full of warmth and camaraderie.

We are looking forward to another productive and festive year. Looking ahead to the fall, we have Homecoming & Parents’ Weekend on September 30 – October 1. All are invited to chemical engineering professor Doug Clark’s lecture, titled “From the Earliest Bacteria to the Latest Arrays: Old and New Opportunities for Biotechnology,” on Saturday, October 1, 9 - 10 a.m. in 180 Tan Hall. For all college alumni, this event is a terrific opportunity to bring your families back to campus and join with fellow Bears for a wide array of events throughout the weekend. The football game will be Cal vs. Arizona. There is the possibility of the Free Radicals and the CHEMillenniums alumni groups hosting a combined brunch on Saturday following Professor Clark’s lecture, and we will keep you posted. Prior to the lecture, join us from 8:30 - 9:00 a.m. in the Tan Hall lobby for a complimentary continental breakfast with an espresso bar.

Also taking place in the fall is the annual luncheon for the Alumni of the G. N. Lewis Era, which will be held on Thursday, November 17, noon - 2:00 p.m. in the Heyns Room at The Faculty Club. Alumni of this era, please watch for a separate mailing as the time draws closer to the event date.

The steering team is continuing to try to find new ways to further the participation of our fellow alums at the College of Chemistry sponsored events. My experiences with this team, and with other fellow alums, have been very favorable, and I am proud to be affiliated with such an awesome group of people.

I hope to see you at our next event!

Rebecca Zuckerman
Ph.D. ’00, Chemistry
1945

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

1949

B.S. J. D. Seader (ChemE) See 1950 M.S. ChemE

M.S. In October 2004, Donald J. Simkin (ChemE), still very active since his retirement from Boeing, traveled to Eastern Germany, Poland, Slovakia, Hungary, and the Czech Republic. He was pleasantly surprised to find that his fellow travelers from Australia and New Zealand, besides many Eastern Europeans he met, were aware of Cal and the chemistry department’s high standing. Also in 2004, his biography was added to Who's Who in Science and Engineering.

1950

M.S. J. D. Seader (ChemE) of the University of Utah, was co-recipient of the 2004 Warren K. Lewis Award of the American Institute of Chemical Engineers (AIChE), given for contributions to chemical engineering education. A symposium was also held at the AIChE Annual Meeting in Austin in honor of his selection for the 2004 CACHE Award for Excellence in Computing in Chemical Engineering Education. Dr. Seader was a student during the early years of the development of the chemical engineering department at Berkeley and has very fond memories of the “stimulating atmosphere and excellent education he received from Professors Bromley, Hanson, Tobias, Vermeulen, and Wilke.”

1951

Attended The Northeastern Section of the American Chemical Society announced in October 2004 that Donald O. Rickter (Chem) received the 2004 Henry A. Hill Award for “distinguished service to the Section and the profession of chemistry.” Dr. Rickter earned his A.B. and M.S. degrees from UC Davis and his Ph.D. in organic chemistry from Michigan State University in 1964. Prior to working as a research scientist and information manager at Polaroid, he served in the U.S. Navy and taught high school and college chemistry in California. Dr. Rickter served on the ACS Presidential Task Force for K-12 Education in 2001. He is now an independent information consultant.

1958

B.S. T. Z. Chu (Chem) was presented with the distinguished Award for the Promotion of International Education, conferred annually by the European Council of International Schools for “exemplary voluntary contributions to enhance the scope and quality of international education worldwide.” Chu’s own experience with international education dates back to his childhood, when he was a student at the Woodstock School, Mussoorie, Uttarakhand, India, from which he graduated in 1952. Woodstock, in the Indian Himalayas, is one of the oldest and most highly esteemed international K-12 schools in South Asia, with a 150-year history and alumni active in almost every part of the globe. Since his retirement in 1997 from Hoefer Pharmacat Biotech, he has dedicated much of his time and personal resources to the pursuit of excellence in international education. Among other key involvements, he has made invaluable contributions in matters such as effective school governance, sustainable development, science education, and education for ethical leadership. He has been a major donor, fundraiser, board member, and is now President of Kodaikanal-Woodstock International, a non-profit organization that supports the two oldest International Schools in India. Chu is also a former trustee of the UC Berkeley Foundation, a former Advisory Board member for Berkeley’s College of Chemistry, and a major donor to the college.

M.S. James K. Koehler (Chem), who completed a Ph.D. in Biophysics at UC Berkeley in 1961, retired in 1997 after 35 years teaching and doing research in cell biology at the University...
of Washington, School of Medicine. As professor emeritus, he continues to teach part-time, but also enjoys fishing, reading, music, and his six grandchildren.

Ph.D. In March 2005, Rod J. O’Connor (Chem) had an article published in Environmental Forensics: “Transformations, Air Transport, and Human Impact of Arsenic from Poultry Litter.”

1960

M.S. Her recent retirement from a career with the National Institutes of Health, the Federal Drug Administration, and the National Academy of Sciences left June S. Ewing (Chem) “free to leave Washington D.C.” and settle in La Jolla, CA.

Ph.D. Liane Reif-Lehrer (Chem) and her husband, Sherwin “Sam” Lehrer (1961, Ph.D. Chem) both celebrated their 70th birthdays in 2004. Dr. Reif-Lehrer’s last book on proposal writing was published, and she is in the process of retiring and looking forward to finally getting a chance to read some of the non-science books she never had time for. Sam continues to do research. Their son, Damon, who paints and teaches painting, was married in May; and their daughter, Erica, passed her prelims in 2004 and expects to get her Ph.D. in cultural anthropology this academic year.

1962

Ph.D. Joe D. Goddard (ChemE) was on the chemical engineering faculty of the University of Michigan from 1963 until 1976, when he took the position of Fluor Professor and Chair in the Department of Chemical Engineering at the University of Southern California. Since 1991, he has been a professor of Applied Mechanics and Engineering Sciences at UC San Diego. His research deals with fluid mechanics, transport processes and the rheology of complex fluids.

1969

B.S. Richard Eiger (ChemE) is living in New Zealand and works as a senior process engineer with Fonterra Cooperative Group Ltd, consulting in dairy plant operation, evaporation, and drying processes.

Postdoc. Teiichiro Ogawa (Chem) made some major life transitions recently. He retired from Kyushu University in 1999 and began teaching at a local university in Fukuoka. He then decided to change careers: He recently passed his final exams and has already begun work as a patent attorney, which he finds gratifying, as he can help people protect their inventions and trademarks. Ogawa also relocated with his wife, Keiko, from Fukuoka, a growing trade center, to Kyoto, a city rich in Japanese history.

1972

Ph.D. L. Louis Hegedus (ChemE) is senior vice president of research and development for Arkema, Inc. (formerly Atofina Chemicals, Inc.), where he is responsible for all R&D in North America and R&D coordination between France and the U.S. Prior to joining the company in 1996, Hegedus was vice president of the corporate technical group at the Washington Research Center of W.R. Grace. Before his 16 years with Grace, he was affiliated with the General Motors Research Laboratories, where he managed research on the development of the catalytic converter for automobile emissions control. His honors include the Catalysis and Reaction Engineering Practice Award, the Professional Progress Award, and the R.H. Wilhelm Award, all from the American Institute of Chemical Engineers. He is a fellow of AIChE and a member of the National Academy of Engineering (NAE).

1973

B.S. James A. Trainham (ChemE) See 1979 Ph.D.

1974

B.S. Peter L. Foller (Chem) See 1979 Ph.D.

B.S. Ho-Yan Wong (ChemE) See 1976 M.S.

Postdoc. Klaas Bergmann (Chem), who is on the faculty of the Fachbereich Physik der Universität in Kaiserslautern, Germany, was elected to their “Hochschulrat,” a new body established to oversee and play an important role in strategic planning for the university. He was also in the U.S. this spring, speaking at the Atomic, Molecular, and Optical (AMO) Physics Seminar in March.

1975

Ph.D. Professor and chairman of Arizona State University’s chemistry and biochemistry department, Robert E. Blankenship (Chem) was elected a Fellow of The American Association for the Advancement of Science (AAAS) in 2004 for his distinguished contributions to understanding photosynthesis, including studies on antenna processes, primary photochemistry in reaction centers, and the origin and evolution of these processes.

1976

B.S. Don F. Kumamoto (Chem) has joined Fish & Richardson PC in Redwood City, CA, as “of counsel” in the litigation group of the Silicon Valley office. He was most recently vice president of intellectual property and IP litigation for Applied Materials Inc. Before that, Kumamoto worked as a litigation partner at Morrison & Foerster and a trial attorney for the U.S. Department of Justice, Antitrust Division. He earned a Ph.D. in theoretical chemistry from M.I.T in 1981 and a J.D. from UC Berkeley in 1987.
CLASSNOTES

M.S. Peter L. Foller (Chem) See 1979 Ph.D.

M.S. Ho-Yan Wong (ChemE and 1974 B.S.) just moved to the U.S. from Hong Kong after working in Hong Kong’s Environmental Protection Department for 24 years. He writes that he is “looking for a new challenge here!”

1979

Ph.D. Peter L. Foller (Chem and 1974 B.S. and 1976 M.S.) was promoted this year to Director of Research and Development of the Optical Products business unit at PPG Industries in Pittsburgh, PA. He writes that Optical Products, which includes Transitions Optical, is the fastest growing PPG business unit, and that “it’s always nice to have adequate funding!”

Ph.D. Also at PPG is James A. Trainham (ChemE and 1973 B.S.), chair of the College of Chemistry’s Advisory Board and a trustee of the UC Berkeley Foundation. He was recently appointed PPG’s vice president of science and technology. From 2002, he was chief technology officer with Invista, Inc. until its divestiture from DuPont Textiles and Interiors in 2004. The prior 25 years Trainham spent with DuPont, as a research engineer in polymer products, in central research and development, and in field units with responsibility for process and product technology. In 1992 he was appointed director of engineering research and, in 1996, became global technology director for Dacron synthetic fibers. He assumed responsibility as global technology director for Lycra synthetic fibers and Terathane polyether glycols in 1999, and was then appointed global technology director for apparel and textile sciences. He has been a member of the National Academy of Engineering since 1997.

1993

Postdoc. Sjoerd Harder (Chem) accepted a position as a professor of inorganic chemistry at the Universität Duisburg-Essen and has moved from Konstanz to Essen, Germany. He is very happy to be continuing his work as a teacher and researcher.

1996

B.A. In July 2004, Shana J. Sturla (Chem), who earned her Ph.D. at M.I.T. in 2001, took a position as assistant professor at the University of Minnesota’s Department of Medicinal Chemistry and Cancer Center. Her research applies organic chemistry and chemical biology to study chemical carcinogenesis. In October 2004, she married Kris McNeill (1997 Ph.D. Chem), a professor of chemistry at the University of Minnesota, whose research is focused on environmental chemistry.

B.S. Sonya (Jo) Meyers (ChemE) married Rob Meyers (UCB 1996 B.S. Computer Sci) in 2001, and “retired” from the software industry in 2003 to spend her pregnancy testing foreign language toys for LeapFrog Enterprises. In 2004, their son, Jason, was born and she was accepted to medical school, where she begins classes in fall 2005.

1998

Ph.D. Shortly after completing his degree here, Marcel P. Bruchez (Chem) co-founded (with Prof. Paul Alivisatos of the College of Chemistry and others), Quantum Dot, a company that markets an imaging tool he developed to show that quantum dots—glowing particles only nanometers wide—can be used to tag proteins in cells. The tool can assist biologists and drug developers who are seeking more detailed knowledge of molecular events. Bruchez notes that it is “one of the first commercial applications of nanotechnology.” He was named a “Top Young Innovator” by M.I.T.’s Technology Review.

Ph.D. Seth M. Cohen (Chem) married Sandra Rodriguez-Cruz (1999 Ph.D., Chem) in July 2001. They relocated to San Diego, where Seth is an assistant professor at UC San Diego and Sandra is a forensic chemist with the federal Drug Enforcement Administration. They live in La Jolla.

Postdoc. Robert P. Meagley (Chem) has been with Intel since 1998, focusing primarily on P854-1272 lithography. He has received numerous Intel awards for excellence. Since August 2004, he has been back in Berkeley, having been named Intel’s Lawrence Berkeley National Laboratory Researcher-in-Residence, the program manager of MAP (Molecules for Advanced Patterning), and Senior Staff Scientist. He writes, “It is great to be working with Cal and LBNL folks again!”

1999

Ph.D. Kristala Jones Prather (ChemE) left Merck and, since September 2004, has been an assistant professor at M.I.T., where she received a Camille and Henry Dreyfus Foundation New Faculty Award. Her research interests include metabolic engineering, biochemical engineering, bioprocess engineering, and synthetic biology. She and her husband, Darcy Prather, have a daughter, Katheryn Ann, born June 1, 2004.

2000

B.S. Lt. Ameh Babakhani (Chem) is a division lieutenant in the U.S. Navy’s Mobile Environmental Team in San Diego.

2001

Ph.D. Stefan Hecht (Chem), who was an assistant professor of chemistry at Free
University, Berlin, Germany, wrote to share two pieces of good news: He has accepted a position as an associate professor at the Max-Planck-Institute for Coal Research in Muelheim/Ruhr, Germany, and he was named to the 2004 list of the world’s 100 Top Young Innovators (TR100), by M.I.T.’s Technology Review. Hecht was recognized for devising a new class of polymer nanotubes and other molecular building blocks with potential applications in the fabrication of nanosized electronic devices. He points out that Berkeley’s Department of Chemistry was well-represented in these awards, including Marcel Bruchez (see 1998 Ph.D. Chem) and Yi Cui, currently a postdoc in the department.

Postdoc. In 2004, Sharad Verma (Chem) was promoted to senior research scientist in Bayer Pharmaceuticals’ department of chemistry in West Haven, CT, and was married that year to Ranee Mehra, M.D., who is a medical oncology fellow at Yale University.

2003

Ph.D. Sundiep Tehara (ChemE) has been with Bain & Co. in Palo Alto as a management consultant since September 2003. With fellow Berkeleyans Read Simmons (1999 Ph.D. ChemE) and Jonathon Eide (expected Ph.D. 2003), “the chemical engineering PhD contingent at Bain is reaching critical mass!” writes Tehara. She also writes, “I really enjoyed my time at Berkeley and I find myself missing it all the time!”

Postdoc. Catherine Klapperich (Chem) has been an assistant professor of manufacturing engineering and biomedical engineering at Boston University since fall 2003. A news release on BU’s website last fall announced that she is leading a team of researchers in developing a multiple-disease testing device that addresses the difficulties currently faced by public health officials in their efforts to provide early detection and treatment of sexually transmitted diseases (STDs). Klapperich’s work prototypes a microfluidic device that will make it possible to quickly test for multiple diseases using a single vacuum tube of blood and get results in under an hour. Made of molded polymers, the device will be inexpensive, disposable, easy to use, and will fit into standard blood centrifuges.

2004

B.S. Edwin Ka Wai Chan (ChemE) started work in July 2004 as an associate engineer in Genenentech’s late stage formulation department in South San Francisco.

B.S. Tanguy My Chau (ChemE) was chosen as a finalist for the 2005 University Medal, awarded to the most outstanding graduating senior on the Berkeley Campus. After leaving Berkeley, he moved to Shanghai, where he works with Accelergy, an American startup company, and is currently in charge of a project involving the development of new technologies for high throughput experimentation.

B.S. Andrew E. Howery (Chem) has already started his graduate studies in chemistry at Stanford University. He is planning to travel in Peru this summer.

B.S. Avi S. Moussa (Chem) took a position last July as an assistant research scientist for Exelixis, a genomics-based drug discovery company focused on the discovery and development of potential new drug therapies, specifically for cancer and other proliferative diseases, also in South San Francisco.

B.S. Marie Therese Ung (ChemE) is planning a trip to France to visit her family this summer, after which she begins her chemical engineering Ph.D. studies at the University of Pennsylvania in Philadelphia.

Ph.D. Bristol-Myers Squibb’s Pharmaceutical Research Institute in New Jersey is where Jessica L. Defreese (ChemE) started work last December, as a research engineer.

Ph.D. Jingtong Hou began his postdoctoral research this March in the physical biosciences division of the Lawrence Berkeley National Lab.

Ph.D. Wei Liu (ChemE) has taken a position at Amgen in Thousand Oaks, CA, working in drug product process development.

Ph.D. Charles W. Monroe (ChemE) has been a research associate in the Department of Chemistry at Imperial College, London since October 2004.

Ph.D. Matthew R. Pratt (Chem) is doing postdoctoral work at the Muir Lab of Rockefeller University in New York City.
Ph.D. Michael D. Rhodes (ChemE) took a new research position last October as a senior scientist with Rohm and Haas Company in Spring House, PA.

Postdoc. Antonio Chica (ChemE) is a research scientist at the Instituto de Tecnologia Quimica, a national laboratory, in Valencia, Spain. His work relates to the petrochemical and refining industry.

Postdoc. Zhebo Ding (Chem) is working in research and development at General Electric’s Global Research Center in Niskayuna, NY, focusing on polymer and special chemical technologies.

Postdoc. Last July, Ekatrina N. Kadnikova (Chem) accepted a tenure-track appointment as an assistant professor in the department of chemistry at the University of Missouri, Kansas City.

Professor Leo Brewer

Leo Brewer, a member of the University of California, Berkeley chemistry faculty for nearly 60 years, died of natural causes on February 22 in Lafayette, California. He was 85.

Born in 1919 in St. Louis, Missouri, Brewer received his undergraduate degree from the California Institute of Technology in 1941. On the recommendation of Linus Pauling, he entered the graduate program at UC Berkeley, and only 28 months later he completed his thesis work on the effect of electrolytes on the rates of aqueous reactions.

He was immediately asked to join the top-secret, wartime Manhattan Project. He headed a group that was charged with predicting the possible high-temperature properties of the newly discovered plutonium (then available only in trace amounts) and with providing materials for a crucible that would contain molten plutonium without contaminating it. To complete his task, he studied the behavior of all the elements at high temperature, and, unsatisfied with any existing materials for a crucible, he experimented with new sulfides of thorium and cerium, which indeed proved successful. Brewer’s new crucibles were ready when the plutonium became available.

The combination of theory with experimentation that he exhibited during his wartime work would mark his research throughout his distinguished career. Although his research covered an unusually wide range of subjects and employed many different techniques from theory to spectroscopy, his primary focus was on high-temperature thermodynamics, materials science, studies of metallic phases, and development of metallic bonding theory. He was also involved at different points in his career with astrophysics and ceramics.

In 1946, following his service with the Manhattan Project, Brewer was appointed an assistant professor of chemistry. He rose through the ranks, becoming a professor in 1955.

His work—published in nearly 200 articles and in his revision of the well-known book by G. N. Lewis and Merle Randall on Thermodynamics—was recognized with many awards, including election to the National Academy of Sciences, the E. O. Lawrence Award of the Atomic Energy Commission, the Palladium Medal of the Electrochemical Society, the Baekeland and Coover Awards of the American Chemical Society, the Hume Rothery Award of the American Metallurgical Society, and fellowship in the American Academy of Arts and Sciences and the American Society for Metals. Upon his official retirement in 1989, he was presented with the Berkeley Citation and a symposium was held in his honor.

In addition to his academic appointment, Brewer was an investigator at the Lawrence Berkeley National Laboratory (formerly the Lawrence Radiation Laboratory), where he headed the Inorganic Materials Research Division from its inception in 1961 until 1975. He was also active in many professional societies and on the editorial boards of several journals.

Beyond the physical sciences, Brewer was passionately interested in native California plants and even had a manzanita named after him.

Brewer is survived by his three children, Roger Brewer of Portland, Oregon, Gail Brewer of La Cañada, California, and Beth Gaydos of Cupertino, California, and six grandchildren. His wife, Rose, predeceased him in 1989.

The family requests that in lieu of flowers, memorial contributions may be made to the Department of Chemistry at the University of California, Berkeley (420 Latimer Hall, Berkeley, CA 94720-1460) or to the California Native Plant Society (2707 K Street, Suite 1, Sacramento, CA 95816-5113).
Professor Donald Noyce

Donald S. Noyce, a professor emeritus of chemistry at the University of California, Berkeley, and former associate dean of undergraduate affairs in the College of Chemistry, died on November 3, 2004, at the age of 81. He was a highly regarded teacher and an organic chemist who loved to discern the mechanisms of chemical reactions.

Noyce was born in Burlington, Iowa, in 1923 and received his B.A. from Grinnell College in 1944. He pursued his graduate studies at Columbia University and received his Ph.D. in 1947. Noyce joined the faculty at UC Berkeley in 1948 as a chemistry instructor and worked his way up the academic ladder, becoming a full professor in 1960. In 1957, he was the recipient of a Guggenheim Fellowship and spent six months studying in London and Zurich. He retired from UC Berkeley in 1986 and was awarded the Berkeley Citation for his service to the campus.

He was known for his special concern for undergraduate students and, as assistant and then associate dean of undergraduate affairs, positions he held for 22 years, he was responsible for implementing the college’s highly regarded system of student advising. In addition, he was responsible for organizing the college’s commencement ceremony for 12 years, from 1974-1986, interacting enthusiastically with students.

Noyce enjoyed a reputation as one of the college’s best teachers, and for many years was principally responsible for the “Organic Chemistry for Biological Students” course, a large, demanding course taken by thousands of pre-medical students. His love of teaching was recognized by the Donald Sterling Noyce Prize, an award established in his name by his brother, Intel co-founder Robert N. Noyce, to reward excellence in undergraduate teaching; Donald Noyce was the first recipient. Noted a former student: “Besides being an excellent teacher and administrator, Professor Noyce is a kind and amiable person who always takes the time to be courteous and to treat his students as fellow human beings.”

He published over 100 articles and directed the work of nearly 40 graduate students. Noyce was particularly known for his work on acid-catalyzed reactions, proton addition reactions and the reactivity patterns of heterocyclic systems. Working in the basement of the old Chem building, Noyce made significant contributions to carboxation chemistry. Among his many notable research accomplishments: determining the mechanism of the acid-catalyzed and base-catalyzed aldol condensation; elucidating the mechanism of the acid-catalyzed isomerization of cis-trans bonds in olefins; and pioneering the study of conformational equilibrium by low-temperature proton magnetic resonance measurements.

He is survived by his wife of 58 years, Bettie, of Oakland; son, Robert, of Eau Claire, Wisconsin; son, Donald, of Grand Marais, Minnesota; daughter, Nancy, of Ashland, Oregon; and seven grandchildren. The family has requested that any contributions in his memory be sent to Grinnell College, Grinnell, IA 50112 for student scholarships.

Former College of Chemistry Staff

William Svoboda passed away on July 27, 2004, in Kelso, Scotland, at the age of 93. Born in Prague, Czechoslovakia, he spent family holidays in France and attended university in Vienna, where he majored in chemical engineering and minored in geology. As a young adult during WWII, Svoboda worked in an iron foundry in Czechoslovakia, where he and his fellow workers avoided bombings by retreating to the Tatra Mountains. Escaping the ravages of war in Europe, he worked as a chemist in a sugar factory in China and later spent some years in Mexico, taking a mule-back laboratory through the wilds of Oaxaca, doing geological surveys for Mexico’s equivalent of the USGS. Svoboda later told friends here that, on one of these expeditions, attackers took his mules and ate them. Co-workers and friends on campus, who remember him for his colorful accounts of his many adventures, first met Svoboda at Berkeley during the mid sixties. While employed here as the chemist for the Chem 1 storeroom and after his retirement in 1980, he enjoyed traveling extensively, making good use of his fluency in many languages, including French, German, Chinese, Japanese, Spanish, and Czech, among others. Following his retirement, he joined his wife, Edina, who survives him, in Eyemouth, Scotland, where they lived in a house on the coast with a view of the North Sea.

1935

Kenneth E. Beaver (B.S. Chem) passed away in November 2004. He had been living in Vallejo, CA.
George A. Stenmark (B.S. Chem) passed away in Concord, CA, on January 16, 2005, at the age of 90. He was a native of San Francisco who spent his youth on a farm in Manteca, CA. While a student at Berkeley, he met his first wife, Valerie Johnson. After completing his UC degree, George did a stint in the Navy and began his career with Shell Development Company in Emeryville, CA, where he worked until his retirement in 1972. He and Valerie had two sons, John and David, the latter of whom was born with profound brain damage, leading to the Stenmarks’ involvement in the Contra Costa Association for the Retarded, and support of the Las Trampas Residential Home. Following his divorce from Valerie, George married Virginia Rebscher in 1964. When Virginia developed Alzheimer’s, George cared for her until her death in 2000. He was an active member of the Walnut Creek Methodist Church and a much-appreciated supporter of the College of Chemistry, who regularly attended the annual G. N. Lewis luncheons and Benjamin Ide Wheeler Society teas on campus. He is greatly missed by his friends and colleagues in the College and alumni community.

Richard J. Martinelli (B.S. Chem) passed away on February 16, 2004. He and his wife, Mary Jane, lived in Waco, TX, and he had worked as a consultant in development and manufacture of solid propellants and ammunition.

Lloyd R. Michels (B.S. Chem), an active member of the G. N. Lewis Era Alumni group and a College supporter, died on December 28, 2004. He had spent his career with General Electric in the San Jose area and, as a retiree, worked as a consultant in chemical engineering and nuclear engineering. He is survived by his wife, Freda.

Neil Murphy (B.S. Chem) died on August 7, 2004. His widow, Barbara Murphy, wrote to tell us of his passing and let us know how greatly admired and appreciated he was for his intelligence and kindness, and how very much he is missed. They were married for 63 years and most recently made their home in Hilton Head, SC.

John G. (“Gort”) Davis (B.S. Chem) of Pinole passed away on January 3rd after a long struggle with emphysema. An active member of the Alpha Chi Sigma chemistry fraternity while a student, he spent most of his career as a research chemist at the U.S. Department of Agriculture facility in Albany until his retirement in 1976. He was an avid and talented woodworker, and his artistic creations were sold throughout the Bay Area. He also applied his building talents to working on the layouts for model trains. Although he was unable to get out much in later years, he remained interested in the university and the College. He and his wife, Joyce, endowed the John Gorton Davis Scholarship to support undergraduate students in chemistry and chemical engineering. They have also generously endowed tennis and swimming scholarships at Cal. Joyce, who worked for Dr. Wendell Stanley and in the Office of the President, survives him.

David Lipkin (Ph.D. Chem) was professor emeritus in Washington University’s Department of Chemistry when he passed away on March 31, 2004. Following his retirement, Lipkin and his wife, Sylvia, had moved to Los Altos, CA, from Saint Louis.

Leo Heller (B.S. Chem) passed away on March 5, 2004. He was retired from Chevron and living in Oakland, CA.

Robert S. Barker (B.S. Chem) passed away on January 7, 2004. He had been living in Bloomfield, NJ.

Peter E. Yankwich (B.S. 1943 and Ph.D. Chem) died on December 1, 2004 in Santa Barbara, CA, at the age of 81. Yankwich, who was born in Los Angeles, joined the Scientific Staff of the UC Radiation Laboratory in 1944, serving until 1946 on the Manhattan Project. He then joined Prof. Melvin Calvin as a founding member of the RadLab’s Bio-Organic Group, later the Laboratory of Chemical Bio-Dynamics. During the 1947-1948 academic year, he was an instructor in Berkeley’s Department of Chemistry. Yankwich was professor of chemistry at the University of Illinois at Urbana-Champaign from 1948 to 1988, serving in several senior administrative roles. He also served on many National Science Foundation and American Chemical Society committees and was a leader in promoting excellence in chemistry education in the U.S. In 1985, he joined the staff of the NSF, where he was a senior member of its education directorate until 1999. He was elected a fellow of the American Association for the Advancement of Science and of the American Physical Society, and served as chairman of the Gordon Research Conference on the Chemistry and Physics of Isotopes. Yankwich was internationally recognized for his contributions to three fields of scientific research: the chemical effects of nuclear transforma-
tions, the application of radiocarbon tracers to the elucidation of chemical reaction mechanisms, and isotope mass effects on chemical reaction rates. His principal contribution was a long series of experimental and theoretical studies of isotope rate effects. He is survived by his wife of nearly 60 years, Elizabeth, and two sons and a daughter.

1947

Paul W. Gilles (Ph.D. Chem) died on February 12, 2004. He was a professor emeritus at the University of Kansas. He is survived by his wife, Helen.

1948

Natalie Pyle Barton (B.A. Chem) passed away on December 24, 2004 at the age of 77. She spent her youth in Southern California, married George Barton in 1947, and lived in Alamo, CA, for 52 years. Barton taught math and science for 19 years at San Ramon High School in Danville and was head of the math department there when she retired in 1986. She had many hobbies and activities, including painting, sewing, scuba diving, bridge, photography, gardening, and orchid culture. Barton is survived by her three children and one grandchild.

Warren J. Heiman (B.S. Chem) was president of Reactor Experiments, Inc. in Sunnyvale, CA, and he and his wife, Shirley, lived in Portola Valley, CA. He died on July 1, 2004.

1949


Lyman Mower (B.S. Chem), who was born in Berkeley, earned his Ph.D. in Physics at M.I.T. in 1952 and worked for several years at the GTE Electronic Defense Lab in Mountain View, CA. In 1957, he joined the University of New Hampshire faculty and was an emeritus professor of physics there at the time of his death on December 20, 2004. His work in theoretical physics was recognized with his election to the American Physical Society. During his retirement, he enjoyed doing in-depth genealogical research and published five books of family histories, two of them with his wife, Karen Hotiris. They also shared travel, classical music, and gardening.

1950

In addition to his chemistry degree, Lyle A. Bean (B.A. Chem) also completed an M.A. in Education at Berkeley in 1957. He died on August 4, 2004.

Dale R. Fenstermacher (B.S. ChemE) passed away on January 3, 2005. He had been employed by Hercules Inc. in Wilmington, DE.

Hugh F. Harnsberger (Ph.D. Chem) died on April 7. Before coming to Berkeley, he served as a Navy code breaker in the Pacific during WWII, assigned to find Japan’s secret codes. After completing his degree here, Harnsberger taught for a few years in Pennsylvania, and then chose a career at Chevron Research in Richmond, CA, where he worked for 31 years until his retirement in 1983. He and his wife, Doris Harnsberger (1947 M.S. Chem), who died in 2001, lived in Marin County. He is survived by their four sons and 11 grandchildren.


1951

Karl Kinaga (B.S. Chem) passed away on January 28, 2004 in San Jose, CA, at the age of 81. He and his family, along with many other Japanese Americans, were interned during WWII. Over the last decade of his life, he worked with various groups to try to reconcile the issues raised by the internment, by prisoners who resisted being drafted out of the camps into the U.S. military, and by the subsequent treatment of those resisters.

Ernest J. Soldavini (B.S. Chem), who had been retired since January 1992, passed away on March 8, 2004. He and his wife, Gail, lived in Walnut Creek.

1952


1955

William C. Alford (B.S. ChemE) was a manager of process documentation for Hunt-Wesson Inc. After his retirement, he and his wife, Beryl, lived in Garden Grove, CA. He passed away on March 5, 2004.
“A chemist’s chemist,” who was “fearless in going into all the different fields” of chemistry, according to his friend and Nobel prize-winning chemist, Barry Sharpless, Satoru “Sat” Masamune (Ph.D. Chem) was an emeritus professor of chemistry at M.I.T. when he passed away on November 9, 2003 at the age of 75 in Massachusetts. Masamune was best known for developing a method for synthesizing molecules that became an indispensable tool for organic chemists doing drug discovery and other research. He was born in Fukuoka, Japan, came to Berkeley on a Fulbright Fellowship, and married Takako Nazoe in 1956. The couple spent time in Wisconsin, where their son and daughter were born, and eventually came to the University of Alberta in Edmonton, Canada, where he was a tenured professor until 1978. He then joined the faculty of M.I.T., retiring in 2000. His son and Sharpless both describe him as tireless and buoyant, always seeking answers, and not afraid to fail. Besides chemistry, he greatly enjoyed baseball, sumo wrestling, and classical music. Masamune was recognized by the ACS in 1978 for his creative methods of attacking chemistry problems, was given the Arthur C. Cope award in 1987, and in 1991 was named the Arthur C. Cope Professor of Organic Chemistry. Other honors included being designated the Centenary Scholar of the Chemical Society of London in 1987, and receiving the Fujihara Award of Japan in 1997. Masamune leaves behind his wife, Takako, and their son and daughter.

Sargit S. Bupara (B.S. ChemE) served as the manager of advanced technology at Mechanical Technology, Inc, in Latham, NY, and as manager of research and development for International Imaging Materials, Inc, in Amherst, NY. He passed away on March 8, 2004.

After completing his degree, Richard D. Lee (Ph.D. ChemE) went to work for Standard Oil/Chevron in Saudi Arabia. We recently learned that he died on January 10, 2005.


Scott N. Walker (B.S. ChemE), who died on April 4, 2004, worked for Dow Chemical Company in Florida, and also served as vice president for Fresenius USA, a company providing peritoneal and hemodialysis machines. He most recently lived in Alamo, CA with his wife, Virginia.

Jie Wang (M.S. and C.Phil. Chem) died on March 10, 2005, at the age of 25, from severe injuries sustained approximately two weeks earlier in a car accident in Berkeley, caused by a crime suspect fleeing the police. Growing up as a child of two teachers with modest incomes, Wang dreamed of studying at Berkeley and, through much hard work and perseverance, was able to realize his dream and begin work on his Ph.D. here in 2002. At the time of his death, he was working on the synthesis and measurement of new radiation detector compounds. He was planning to return to China after graduation to do postdoctoral research. Family and friends remember Wang as a talented, hardworking student who enjoyed playing sports with fellow students, and was always willing to help his friends. Wang leaves behind his parents, who came from China to be by his bedside after the accident, and a community of students, staff, and faculty, who mourn his passing and miss him greatly. A tree has been planted in his memory in the College of Chemistry complex.