CHEMICAL SCIENCE AND ENGINEERING

Newsletter of the College of Chemistry, University of California, Berkeley
Volume 6, Number 5, December 1998

College Shares in Surprise $42 Million FEMA Grant

The Federal Emergency Management Agency (FEMA) awarded UC Berkeley a $42 million grant to design and build seismic retrofitting for four campus buildings that would be vulnerable in a major earthquake: the College of Chemistry's Hildebrand Hall and Latimer Hall, and the Samuel Silver Space Sciences Laboratory and Barrows Hall.

Berkeley had applied earlier this year to FEMA's Hazard Mitigation grant program, in hopes that an award from FEMA would jump-start the retrofit process begun under the campus's Seismic Action plan for Facilities Enhancement and Renewal (SAFER) program in October 1997. The FEMA grant was announced in October 1998.

UC Berkeley was also chosen to take part in a new Disaster Resistant Universities Initiative, which will develop risk assessments for universities and locate funds for campus improvements to better withstand such tragedies.

photo by Greg Butera

Vice Chancellor Edward Denton (right) and Dean Alexis Bell talked with College faculty and staff about the upcoming renovations.

The FEMA program was developed in response to the 1994 Northridge, California earthquake. Berkeley's SAFER report was part of the advanced planning that enabled FEMA to award the $42 million grant. According to that report, the estimated repair work needed to eliminate life safety hazards on campus in the event of a major quake would cost at least $700 million, expanding to $1.2 billion over the 30-year span of construction required.

"This is an exceptional opportunity for us to accelerate the critically needed seismic safety work on campus," said UC Berkeley Chancellor Robert M. Berdahl. "It's great to see FEMA investing funding in preventive work that can help our university avoid much more costly repairs after the fact."

Hildebrand Hall, built in 1966, will receive $16.7 million of the funding for seismic safety corrections. It houses research and undergraduate laboratories and the Chemistry library, and was rated "very poor" in the recent SAFER report. Latimer Hall, built in 1963, was rated "poor" in the SAFER report and will receive $9.8 million. It houses laboratories, teaching facilities, and administrative offices of the College and the Chemistry Department. Remaining funds will be used on the other two buildings.

"The College of Chemistry is now facing a great

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Berkeley, University of Hawai'i Launch Marine Bioproducts Center

Faculty members in the Department of Chemical Engineering at UC Berkeley, in a core partnership with the University of Hawai'i, were awarded a National Science Foundation (NSF) grant for a Marine Bioproducts Engineering Center (MarBEC).

An aerial photo of the MarBEC Bioprocess Engineering Laboratory site on the island of Oahu, Hawai'i. Microalgae are grown in the rows of ponds seen at the upper left.

Announced on November 2, the Center will receive $12.4 million over the next five years and will be headquartered at the University of Hawai'i, Manoa. Multidisciplinary research at the center will be dedicated to developing marine bioproducts for the chemical, pharmaceutical, nutraceutical and life sciences industries. The Berkeley-

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FEMA

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challenge, since the university must design the retrofitting and start the construction process within the next two years," said Dean Alexis T. Bell. "In addition," said Bell, "it is critical that we modernize the laboratories within these buildings at the same time that we improve the seismic safety of the structures."

The award requires that matching funds be acquired to complete the projects. FEMA monies cover more than half of the estimated costs, leaving Berkeley with the responsibility to come up with the remainder.

Latimer Hall will require external bracing, including the shoring up of the east and west walls, bracing on the north and south side balconies, and an upgrade of the ventilation system, according to Bell.

"We are in year three of five on our fire safety and sprinkler system upgrade," added Bell, "putting us on track for other seismic improvements."

A $1 million NIH grant for biomedical laboratory renovations, which will be used to further renovate Latimer facilities, was also recently awarded. (See related story on Page 3.)

Hildebrand Hall will require external bracing, added shear wall in building corners, the bracing of glass panels, widening of interior walls and corridors, an improved fire safety system, and the addition of donut baffles at the tops of columns to stop floors from collapsing, said Bell.

In Hildebrand, the upper four floors will have to be completely decanted during construction, including the entire chemistry library. The B and D levels may also be affected by vibration while construction takes place.

The impact on teaching and research will be significant, but the College will do whatever it can to mitigate the disruption while this very important renovation takes place. "A project committee will be set up for each building, with faculty, staff and student representatives to determine what actions will be needed for the least amount of disruption," said Bell. "Weekly updates will be available on a new website to be developed by building manager Susan Slavick."

There is a potential for reduced enrollment, but Bell said research groups will move to temporary facilities so they can continue. Vice Provost Nicholas Jewell, who has been directing the SAFER program, said, "It's a huge challenge for the entire university. It is enormous and unpleasant. But the alternative is unacceptable."

Chancellor Berdahl has hired a Vice Chancellor for Capital Projects, Edward Denton, to coordinate all aspects of the campus's massive seismic retrofitting program. Denton, former vice president of national facilities services at Kaiser Permanente, will be working closely with Jewell on the SAFER program.

Denton said that he is considering bringing project managers from Kaiser to supplement existing Planning, Design and Construction staff. "We have a lot to look at in the two years we have to begin construction," said Denton. "One thing we are looking at is the Chemistry library issue. Libraries in Physics and Statistics will also be affected over the next several years, so maybe a different solution will be chosen altogether, instead of putting them in temporary housing and replacing them."

The College will have the opportunity, if additional funding becomes available, to modernize facilities while the seismic upgrades are performed. However, once the seismic construction planning is completed, any changes will have to demonstrate great need, said Denton.

Though Hildebrand needs a great deal of work, he also noted that that FEMA monies may be too restricted to be used for demolition and rebuilding, so that is not really an option. In any case, it would cost far more to replace a building rather than upgrading it.

Will Berkeley's part of the money be raised on time? "It shows a weakness in the state government that we get federal funds faster," said Jewell, but he is "confident that we will get the money without delay. At least, both projects are greatly accelerated from one year ago."

The four structures receiving FEMA money were chosen from a long list of campus buildings requiring seismic retrofitting to upgrade them to an acceptable safety level. They were chosen specifically because of their high occupancy and the large amount of federally funded research contained within.

With the passage of Proposition 1A in the last election, these four buildings will join Wurster Hall, Barker Hall, LeConte Hall and the Archaeological Research Facility as the next buildings receiving seismic improvements.

NIH Grant Awarded for Lab Renovations

by Jane Scheiber

The College of Chemistry has received a $1 million grant from the National Institutes of Health/National Center for Research Resources to renovate laboratories in Latimer Hall that are used for biomedical research. The federal funds will be matched by $1.5 million in university funds and College funds raised from the private sector for a total budget of $2.5 million.

The funds were awarded under NIH's Extramural Research Facilities Construction initiative to enhance biomedical and behavioral research by supporting the costs of expanding or renovating facilities for such research.

Entitled "Innovation through Renovation: Organic Synthesis in Biomedical Research," the award-winning project calls attention to the central role of organic synthesis and combinatorial chemistry as the foundation for medicinal chemistry and the discovery of new pharmaceuticals.

"From the inception of the pharmaceutical industry, organic chemistry has played the lead role in generating novel drug candidates—either by total synthesis or through modification of naturally occurring compounds—and in providing economical routes to the final products," said chemistry chairman Paul Bartlett. "The central role of organic synthesis in pharmaceutical discovery has become even more apparent with the maturation of the biotech industry, since increased understanding of biological function at the molecular level has greatly enlarged the number of targets for drug discovery."

The grant will permit the modernization of approximately 5,000 square feet of laboratory space for chemistry professors Bartlett, Carolyn Bertozzi, Jonathan A. Ellman, and Clayton H. Heathcock. Together, they bring a variety of approaches to the discovery of new medicinal agents, including syntheses of very complex molecules, the design of drugs based on biochemical principles, engineering of cell surfaces to make them receptive to specific therapeutic agents, and combinatorial chemistry, which represents one of the most fundamental advances in the way that new compounds are synthesized and screened for biological activity.

"We hope this grant will be the lead for a much broader initiative in synthetic chemistry into new and exciting areas of biomedical and materials research," said Bartlett, the principal author of the grant proposal.

Despite its top ranking, the chemistry department has been limited in the scope of the research it has been able to perform and the number of students and postdocs it can train in biomedical research because of obsolete research facilities. By providing adequate fume hoods in well-configured space, renovated laboratories will facilitate student training and increase efficiency, productivity, and safety. The strong presence of the biotech industry in California and the Bay Area has contributed to the enormous demand for students trained in organic synthesis.

"The timing of the grant is most fortuitous," said College Dean Alexis T. Bell. "It will enable us to coordinate the seismic upgrades to Latimer Hall under the grant from the Federal Emergency Management Agency with the improvement of interior research space."

"In addition," Bell continued, "the project ties into Berkeley's new interdisciplinary Health Sciences Initiative, which, at the Chancellor's direction, seeks to generate new technology and advance research for the study and treatment of disease."

These renovations on the sixth, seventh, and eighth floors will constitute Phase III of modifications to Latimer Hall, being funded with a combination of private and public monies, to upgrade facilities for research in chemistry and chemical engineering with medical applications. Phase I, the addition of a ninth floor, was completed in 1989. Phase II, completed last year with the help of an NSF grant, upgraded laboratories for chemistry professors Heathcock, Jean Fréchet, and Ken Raymond and chemical engineering professor Jay Keasling. Additional renovations must await further funding.

The *NEWSLETTER OF THE COLLEGE OF CHEMISTRY* at Berkeley is published several times each year to support the College's mission of providing excellent teaching, research, and public service in the fields of Chemistry and Chemical Engineering.

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MarBEC

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Hawai'i team was selected from 160 initial proposals.

In 1985 the NSF initiated funding for multidisciplinary centers focusing on newer areas of engineering. MarBEC is the second to deal with biotechnology, and the first emphasizing marine biotechnology and developing high-value-added material from microorganisms.

The center will draw on Hawai'i's years of experience collecting and analyzing marine products and organisms, and Berkeley's expertise in developing technology for bioprocesses.

"We are in the international Year of the Ocean, and the time has come for a national effort that will bring benefits to Hawai'i, California, and the rest of the nation," said Oskar R. Zaborsky, center director and the HECO Williamson-Matsunaga Fellow in Renewable Energy Engineering Research at UH Manoa.

Center Associate Director Harvey Blanch, chair of the Department of Chemical Engineering at UC Berkeley, said this is truly a new direction for chemical engineering. "Marine organisms are not much used by industry for chemical and pharmaceutical manufacturing," said Blanch. He noted that many unique properties in the marine environment, which are not found in terrestrial organisms, represent an untapped biological resource.

Initial targets will be carotenoid pigments used as coloring agents in a variety of products, polyunsaturated fatty acids, enzymes, and nucleosides (bioactive agents useful as pharmaceuticals), and new products from organisms found in extreme environments, such as deep sea vents.

Berkeley's role in the center is focused on developing production technology, and using genetic and metabolic engineering and combinatorial biocatalysis, said Blanch. "It will be a real challenge to grow marine organisms on a large scale. Many are microalgae, which require sunlight for growth. This presents a new challenge in an engineering laboratory that hasn't really been dealt with before," said Blanch.

Berkeley researchers will separate, purify and formulate marine bioproducts. Blanch continues: "Our aim is to modify these new compounds with enzymes in the lab, to develop engineering and technology to exploit these microorganisms and the products they make."

Chemical Engineering Professor Douglas Clark and Professor Norman Pace from Molecular and Cell Biology are already working on areas relevant to the center. Extremophiles—unique, uncharacterized bacteria found growing at high temperature and pressure around the new underwater volcano Lo'Ihi—have been collected in special titanium canisters by a submersible craft at 2,000 meters below sea level. They are relevant for Clark's research on growth of extremophiles in high pressure sapphire reactors and Pace's research on phylogenetic characterization of microorganisms using 16-s ribosomal RNA.

The Berkeley component is $1 to $1.5 million per year, which will fund 10-12 graduate students and postdocs. Blanch's research will focus on reactor design and analysis, and separations. Other faculty members involved include chemical engineering professors Clayton Radke, who will be working on formulation of compounds, specifically colloidal and interfacial phenomena, and Jay Keasling, who will be working to take gene sequences out of the marine organisms and incorporate them in terrestrial bacteria.

The education component of the center will involve graduate students from chemical engineering, ocean engineering and marine microbiology working on collaborative projects. According to Blanch, "The program will train engineering students in marine biotechnology, and develop programs in engineering with a marine systems emphasis. An outreach component is also planned, working with Hawai'i museums, community colleges, and Bay Area high schools." Opportunities exist for undergraduate research as well, said Blanch.

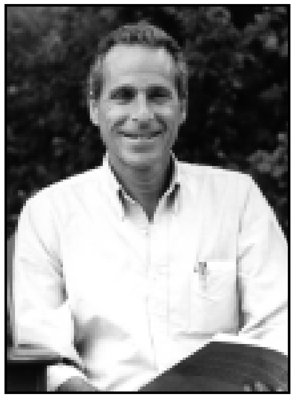
This represents a major collaboration among government, university and industrial sectors. Other partners in addition to UH and Berkeley include three national laboratories (Argonne National Laboratory, Edgewood Research Development and Engineering Center, and Eastern Regional Research Center), the Bishop Museum, State of Hawai'i Department of Business, Economic Development and Tourism, and industrial firms.

Participating companies include Aquasearch Inc., Aquatic Farms, Cyanotech Corporation, Eastman Chemical Company, Genencor International, Hawai'ian Electric Company, Honolulu Venture Capital, Inc., Monsanto Company and Precision Systems Science Company.

Chandler Delivers Hirschfelder Address

High Honor for Theoretical Chemists

Professor David Chandler was the winner of the 1998 Joseph O. Hirschfelder Prize in Theoretical Chemistry. The award, named after one of the leading figures in the field, has been given annually since 1991 by the Theoretical Chemistry Institute at the University of Wisconsin, Madison. Chandler delivered the named lecture series this October.



Professor David Chandler

Two of the previous winners, Rudolph Marcus and John Pople, have gone on to win the Nobel Prize in Chemistry. Professor William Miller, who won the award in 1996, said that “this award has taken on the status as the major national award for theoretical chemists,” making it more prestigious than the ACS award in theoretical chemistry.

Chandler has been a leader in the field of theoretical chemistry. His research has dealt with statistical mechanics—the physical theory used to describe chaotic and complex systems. Much of his research has focused on studying the structure and dynamics of liquids. Virtually anyone working on problems in liquid state has been affected by Chandler’s work.

In the 1970s, the Weeks-Chandler-Andersen (WCA) theory, a quantitative description of liquid structure and thermodynamics, became the accepted equilibrium theory of the liquid state. To expand that theory to accommodate polyatomic and polymeric fluids, Chandler also developed the statistical mechanical theory of packing of irregular shaped objects in the fluid state, known as the reference interaction site model (RISM).

Chandler is also well known for the theory of hydrophobicity that he developed with his student, Lawrence Pratt. He has returned to this topic in some of his most recent research. The terminology "hydrophobic" refers to the fact that oil and water do not mix, as if oil "fears" water. “In actuality, water and oil separate because too much oil in water would disrupt favorable attractions between water molecules,” said Chandler. These attractions, called hydrogen bonds, are responsible for the stability of liquid water (and ice, at low enough temperatures). The macroscopically observed separation of oil and water occurs to avoid this energetically unfavorable disruption.

Biological structures, like the folds of proteins or the structures of membranes, are commonly made up of clustering oily amino acids—lipid chains that remove them from contact with aqueous solution. Thus, hydrophobicity is generally believed to be a significant stabilizing feature of biological structure. The Pratt-Chandler theory successfully interprets these properties.

Interestingly, however, the theory also shows that for small oily species, there is no hint of the oil-water demixing that lies at the heart of what structural biologists call the "hydrophobic interaction."

How big must an oily assembly be to cause biologically significant hydrophobic effects? Recently, working with his student Ka Lum and with John Weeks, now Distinguished Research Professor at the University of Maryland, Chandler has developed the equations that predict when oily surfaces are large enough to induce drying. Solving these equations, they have found that drying sets in on a nanometer-length scale, precisely the regime of relevance to biology. “When these transitions occur,” Chandler says, “water moves away from the surfaces, and oily particles are attracted to it with powerful forces of adhesion.” Chandler says that “the discovery of this phenomenon, and the theory for it, should play an important role in understanding the stability of biomolecules.”

He continued, “On a very different topic, we are now trying to understand the pathways to chemistry in liquid. How does a weak acid dissociate and what does water do?” To use a computer to discover how water reorganizes to make an acid dissociate is like “sitting blindfolded in a valley of a rugged mountain range, and trying to throw a rope from one valley to another.” In this analogy, the mountain range and valleys refer to the topography of the potential energy surface of a complex system. The first valley represents the acid not being dissociated, the new valley the dissociated state, and the mountain passes the transition states.

“Understanding the mountain pass is the key,” said

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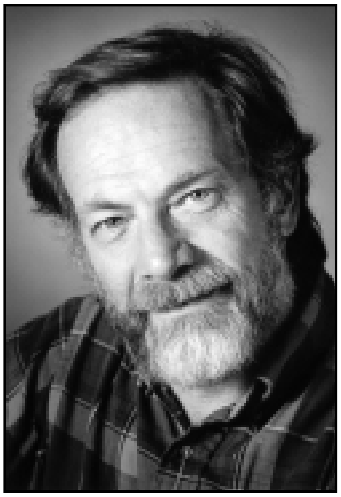
Denn Wins Lewis Award for Contributions to Education



Professor Morton Denn

Professor Morton Denn received the 1998 Warren K. Lewis Award for Contributions to Chemical Engineering Education given by the American Institute of Chemical Engineers (AIChE). The award, sponsored by Exxon Research and Engineering Company and Exxon Chemical Company, was presented at a luncheon on November 16th at the AIChE 1998 Annual Meeting in Miami, Florida.

While the award honors contributions to education, it is not simply a teaching award. "The Lewis Award historically honors research contributions and their educational impact as well," said Professor Harvey Blanch, department chair. "Mort is responsible for helping to educate a generation of chemical engineers. His research has defined new areas in fluid mechanics, rheology and polymers, and, to a large extent, shaped these fields."

Professor Arup Chakraborty, who nominated Denn for the award, said Denn is one of three senior faculty in the college who had an enormous impact on his own development as a young faculty member. "Denn sets a high standard," he said. "His personal interest in the subject and dedication to research have set the example that younger people in the department try to achieve."

Chakraborty called Denn "a 'triple threat,' since he does superb research while devoting enormous energy and time to writing textbooks, articles on other educational issues, and serving the profession." He continued, "Mort views his research activities as a means to educate the next generation of researchers who will staff industrial, academic, and government laboratories." With his strong focus on educating, it is not surprising that 13 of his former students and postdocs are now educators themselves.

Professor Denn, currently on sabbatical in Jerusalem, has been unavailable to comment on his award. Blanch said that Denn's speech at the award ceremony "highlighted how much he valued interactions and mentorship with young faculty at Berkeley."

Blanch emphasized Denn's contributions to the field as a textbook author. "He is the most prolific author in the chemical engineering department," said Blanch. "He has written five books, including two titles which have had great impact on the field. *Process Fluid Mechanics* set the stage for the way people analyze fluid mechanics problems in polymer processing." The book, used by undergraduates, graduate students, and as a reference by practicing engineers, said Blanch, "has had a profound impact, shaping the way undergraduate and graduate students address problems in complex fluid mechanics."

The book addresses two distinct needs that process engineers have for fluid mechanics. "They must be prepared to deal with macroscopic problems such as pressure drop and power calculations. They must also have a reasonable appreciation of detailed flow structure (including turbulence and boundary layers), partly because this forms the basis for a proper understanding of heat and mass transfer," added Chakraborty.

A second title, *Introduction to Chemical Engineering Analysis,* was used widely as the first text for chemical engineering undergraduates for many years. "Its main contribution is developing a rigorous approach for material and energy balances. Once students grasp the concepts presented in this book, they have a very solid foundation for addressing a wide variety of problems in chemical engineering," said Blanch.

Denn has also written seven papers focused on engineering education, and "is the conscience of the department regarding curriculum development and modification," said Chakraborty. As department chairman at Berkeley (1991-94), he devoted extensive effort to integrate the use of computers into the curriculum.

Denn has also led the materials program in chemical engineering and chemistry, as the leader of the Polymers and Composites program and head of the Materials Chemistry Program at the Lawrence Berkeley National Laboratory, and, says Blanch, "he has guided them in important directions in science and engineering."

Denn's research in rheology has made him a pioneer in systematic and analytical theories explaining the flow behavior of complex fluids, like polymers, said Chakraborty. "He has been a leader in the fundamental research on polymers, ever important since plastics are an integral part of what we do and how we live our lives," he continued. "He has combined adhesion theory, rheology, and surface spectroscopies in his study of how surface physics and chemistry affect flow, and has had tremendous impact on the field. His papers have become standard references."

Denn received his B.S. in Chemical Engineering from Princeton in 1961 and his Ph.D. from the University of Minnesota in 1964. He then did a postdoctoral fellowship at the University of Delaware, where he subsequently began his teaching career, leaving in 1981 to come to Berkeley.

He has won many prestigious awards, including the Professional Progress and William H. Walker Awards of the AIChE, the Bingham Medal of the Society of Rheology, the Chemical Engineering Lectureship Award of the American Society of Engineering Education, Fulbright and Guggenheim Fellowships, and election to the National Academy of Engineering.

Denn has also served his profession well: he has spent six years as the editor of the *AIChE Journal*, he is the current editor of the *Journal of Rheology*, past chairman of the Chemical Engineering Department at Berkeley, and member of many national advisory committees on education issues. He is a fellow of the American Institute of Chemical Engineers, and member of the Society of Rheology (U.S.), the British Society of Rheology, the Polymer Processing Society, Sigma Xi, and the American Society for Engineering Education.

Chandler

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Chandler. "It is perhaps the Holy Grail of chemical kinetics. In a liquid there are countless numbers of transition states, and you need a method of statistical mechanics to describe all the ways to get from one state to another."

"There should be an optimum way of throwing a rope the least number of times, to learn the most from the least amount of effort," he continued. "We've derived such optimum algorithms." Theoretical chemists spend much of their time developing the optimized equations to cut down on computing time. "Without developing statistical methods, previous scientists have just been guessing," said Chandler.

When asked about the importance of theoretical chemistry, he replied, "Who would have thought, when Schroedinger and Heisenberg were working on the foundations of quantum theory, that their work would eventually lead to the invention of transistors?" His research may be an esoteric subject, but, said Chandler, "understanding something like the hydrophobic effect is the key to understanding biological structures."

Chandler said that what excites him the most is "discovering something someone never knew before. I hear about experimental phenomena, and daydream about how they work. If there exists no idea how to compute something, a logical obstacle that has to be overcome to make calculation possible, that is what I like."

He gave an example of the theory of electron transfer developed by Nobel laureate Rudy Marcus. "It was not known whether the theory was quantitatively correct," said Chandler. "To test it using exact numerical methods, a straightforward computer calculation would have taken about 10^{12} seconds, or 32,000 years of computer time, but we figured out how to do it with just a few days of computer time."

"I was very pleased and honored to win the award," said Chandler. "There are many other outstanding theoretical chemists who you could argue should have won," he said.

Chandler received his B.S. in Chemistry from MIT in 1966 and his Ph.D. in Chemical Physics at Harvard in 1969. He did a one-year postdoc at UC San Diego and then began his teaching career at the University of Illinois, where he became a full professor in 1977. In 1983, he moved to the University of Pennsylvania, and he came to his present position at Berkeley in 1986. He is also a faculty chemist at Lawrence Berkeley National Laboratory.

His many awards include a Guggenheim Fellowship, and the Hildebrand (1989) and Theoretical Chemistry (1996) Awards of the American Chemical Society. He is a member of the National Academy of Sciences, and a fellow of the American Association for Advancement of Science, American Physical Society, and the American Academy of Arts and Sciences.

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Noteworthy News

Dean **Alexis T. Bell** was elected second vice chair of the Council for Chemical Research (CCR), an organization of more than 200 companies, universities, and government laboratories that conduct research in the chemical sciences and engineering. The CCR is dedicated to promoting collaboration between sectors and disciplines to advance the chemical enterprise as a whole.

Carolyn Bertozzi, assistant professor of chemistry, was honored with the Prytanean Faculty Award for 1998. The award, established in 1986, recognizes outstanding junior women faculty members at Berkeley, and assists them in attaining tenure. It recognizes scholarly excellence, teaching and mentoring.

Michigan Technological University awarded the Melvin Calvin Medal of Distinction to Chemical Engineering Professor **Elton Cairns** in November. The Calvin award is the highest honor bestowed by the university, which recognizes individuals in any discipline who have been associated with the university and have achieved a notable reputation in their respective field. It is named after **Melvin Calvin**, Nobel laureate, longtime UC Berkeley Chemistry professor, and a 1931 graduate of Michigan Tech.

Chemical Engineering Professor **Roya Maboudian** was honored this fall with the DOE Defense Programs Early Career Scientist and Engineer Award, for her work in self-assembled monolayer anti-stiction coatings.

Chemical Engineering Professor **John Prausnitz** was honored with a special symposium and luncheon at the AIChE annual meeting in Miami this November, in celebration of his 70^{th} birthday earlier this year. The symposium recognized Prausnitz's 40 years of research contributions in molecular thermodynamics. Invited speakers and attendees included former students and colleagues from the U.S. and Europe, and industry representatives. In August, Prausnitz's contributions were honored by a festschrift published in *Industrial and Engineering Chemistry Research,* with nearly all 50 articles written by current and former students and colleagues.

Another festschrift was published in the October 15th issue of *The Journal of Physical Chemistry B,* for Chemistry Professor **Kenneth Sauer** and LBNL Researcher Melvin Klein. Many of the papers were presented at a meeting held in their honor in January 1998.

In October, Chemistry Professor **Gabor Somorjai** was awarded an honorary doctorate in Chemistry from the Universita degli Studi de Ferrara , Italy.

Adam T. Woolley, former grad student in Rich Mathies' group, received the Hertz Thesis Prize for 1998. His thesis title was "Microfabricated Integrated DNA Analyses Systems."

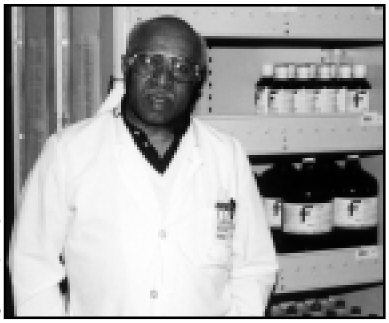
photo by Greg Butera

Lirmar Willis

Lirmar Willis celebrates a milestone this year, his 40th working at UC Berkeley. Willis started his career here in 1958 as a lab technician and animal caretaker in the bacteriology department, and moved to the College of Chemistry in 1966. He is now the Chemical Stores Supervisor, known to many a grad student and faculty member for his cheerful disposition and no-nonsense attitude.

His focus is on customer service with graduate students and industry sales reps, but he prides himself on team building, both on the sports field and in the office. "I've enjoyed every year I've been on campus. My job presented me with many challenges, and I have been befriended by many people. I have friends all over the world," he said. His handball, softball, and golf partners have included Nobel laureate Y. T. Lee, grad student John Fukudo, now a professor at UCLA, and former professors George Pimentel, Sam Markowitz, and Mike Williams.