ChemiCAL Science and Engineering

College of Chemistry, University of California, Berkeley
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Chemistry's Bill Miller wins the Welch Award

Selection of theoretical chemist is a first

In this issue:

Chemistry professor William H. Miller is having a good year. In October, he will receive one of chemistry's most prestigious prizes, the Welch Award in Chemistry. Just a few months ago, he became the first winner of the Dudley R. Herschbach Award in chemical dynamics.

Both awards recognize Miller for his seminal research in the field of chemical dynamics. The Welch Award is presented by the Welch Foundation, based in Houston, TX. Founded in 1954, it is one of the oldest and largest private funding sources for basic chemical research.

Peg Skorpinski photo

Chancellor Robert Birgeneau (l.) and Welch Foundation chairman J. Evans Attwell (r.) congratulate professor William Miller (c.) during the UC Berkeley reception.

The Dudley R. Herschbach Award is presented at the bi-annual conference on the Dynamics of Molecular Collisions.

Born in Kosciusko, MS, Miller grew up in Jackson, the state's largest city. He enjoyed math and chemistry in high school, and a post-Sputnik General Motors scholarship landed him at Georgia Tech in Atlanta. He graduated at the head of his class with a B.S. in chemistry in 1963, and he began graduate school in chemistry at Harvard the same year.

Miller earned his Ph.D. in chemical physics with advisor E. Bright Wilson Jr. "Wilson was a wonderful advisor," says Miller, "and he was willing to let me pursue molecular collision theory before it was widely accepted. Wilson had also been Herschbach's advisor, and Herschbach returned to Harvard after teaching at Berkeley, the same year I arrived."

Following a postdoc year at Freiburg University in Germany and a year as Junior Fellow at Harvard, Miller joined the chemistry department at Berkeley in 1969. He served as Department Chair 1989-93 and was named the Kenneth S. Pitzer Distinguished Professor in 1999.

One of Miller's major contributions to theoretical chemistry has been the development of *semiclassical* methods, techniques that approximate quantum mechanical effects in models that otherwise are based on purely classical or Newtonian mechanics.

When modeling molecular systems containing a small number of atoms, it is possible to carry out fully rigorous quantum mechanical calculations using standard methods (which Miller helped develop). But for larger systems with many atoms, it is only feasible to carry out classical mechanics calculations, which omit all quantum effects. "Semiclassical theory is a way to use classical mechanics within a quantum mechanical framework," says Miller, "thereby providing an approximate way to add quantum effects to classical molecular dynamics simulations of large molecular systems. The approach includes all quantum effects at least qualitatively, and in most cases quite quantitatively."

As the Chemical Physics Program Leader at the Lawrence Berkeley National Laboratory, Miller studies the complexities of combustion with a group that is seeking to improve energy efficiency.

"I am continually amazed to see the growth of theoretical chemistry as an significant player in chemical research over the almost four decades that I have been at Berkeley. The combination of theory and experiment is much more powerful than either alone. And there is no doubt that the role played by theory will only grow in importance."

College mourns death of distinguished alumnus Daniel Koshland

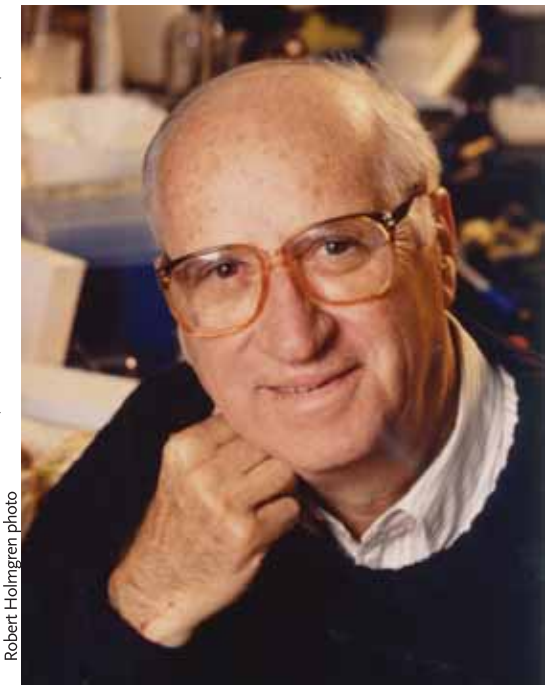
Professor Daniel E. Koshland Jr., an esteemed alumnus of the College of Chemistry, has died. Koshland, who received his B.S. in chemistry in 1941, served on the college advisory board for many years. A long-time professor of molecular and cell biology at Berkeley, Koshland, 87, died July 23 following a massive stroke.

"Dan Koshland was both a beloved alumnus and an invaluable member of the college advisory board," said Dean Charles Harris. "Personally, I will be forever indebted to Dan for his guidance and support all these years. Like so many of his friends and colleagues, I will simply miss him and all the good things he stood for. He was unique."

An insightful scientist known for his work on proteins and enzymes, Koshland achieved the status of scientific statesman during his 10 years, from 1985–95, as editor of the nation's top scientific journal, *Science*.

In what Koshland described as "one of the high points of my life," he spearheaded the large-scale reorganization of biology at Berkeley in the 1980s, pruning or merging eleven small departments into three.

The reorganization, accompanied by a fundraising campaign that built two new buildings and renovated a third, placed UC Berkeley "in a leadership role in the biological sciences," as he subsequently wrote, and spurred many other universities to reorganize biology.



Robert Holmgren photo

Beloved Berkeley biochemist Dan Koshland has died at age 87.

In recent years, Koshland provided leadership for the campus's $400 million Health Sciences Initiative and championed the need for renewed campus infrastructure to provide faculty and students with the physical environment and tools they need to explore the frontiers of modern science. Because of his vision, Stanley Hall, a new laboratory facility for bioscience teaching and research, opened this fall.

Although actively involved with the biological sciences on campus, Koshland never forgot his roots in the College of Chemistry. In addition to his work with the advisory board, he recently established an endowment in the chemistry department. He was also a consistent and entertaining attendee at Alumni of the G. N. Lewis Era luncheons and other events.

Among the many awards Koshland received from UC Berkeley were the Berkeley Medal, the Berkeley Citation and the Clark Kerr Award. He also was given the Alumnus of the Year award from the California Alumni Association in 1991.

He was a recipient of the National Medal of Science in 1990, a Lasker Award for Special Achievement in Medical Science in 1998 and the Welch Award in Chemistry in 2006.

As a young man, Koshland followed in the footsteps of his father and grandfather and enrolled at UC Berkeley. He immediately joined the Manhattan Project group headed by Glenn Seaborg to isolate plutonium for an atomic bomb, following Seaborg to the University of Chicago and eventually to Oak Ridge, TN.

At the University of Chicago, Koshland met Marian Elliott, whom he married in 1945. In 1946, he returned from Tennessee to Chicago and stayed to complete his Ph.D. in organic chemistry in 1949, the same year his wife received her Ph.D. in immunology.

Following two postdoctoral years at Harvard University, the Koshlands moved to Long Island to work at Brookhaven National Laboratory, where they remained until 1965, when they were recruited to the UC Berkeley faculty.

Koshland was a member of the National Academy of Sciences and the American Academy of Arts and Sciences, and he served on the councils of both societies. He also served as president of the American Society of Biological Chemists.

Following Marian's death after 52 years of marriage in 1997, Koshland reconnected with Yvonne Cyr San Jule, whom he had first met in 1940 when they were UC Berkeley undergraduates enrolled in a bacteriology class. They married in August 2000.

Koshland is survived by his second wife, Yvonne Koshland, of Lafayette; sons James Koshland of Atherton, CA, and Douglas Koshland of Baltimore, MD; daughters Ellen Koshland of Melbourne, Australia, Phyllis (Phlyp) Koshland of Paris, France, and Gail Koshland of Tucson, AZ; and sisters Frances K. Geballe of Woodside, CA, and Phyllis K. Friedman of Hillsborough, CA. He also is survived by three step-children, nine grandchildren, 12 step-grandchildren, one great-granddaughter and 17 step-great-grandchildren.

One of his daughters-in-law, Catherine Koshland, is UC Berkeley's vice provost for academic planning and facilities.

A campus memorial service is planned for September 16 at 4:00 p.m. in Zellerbach Hall. Donations in Koshland's memory can be made to the Marian Koshland Science Museum, 500 Fifth Street, NW, Washington DC, 20001, or to the UC Berkeley Foundation to support bioscience and energy teaching and research. Write to the UC Berkeley Foundation, Attention: Vice Chancellor—University Relations, 2080 Addison Street, #4200, Berkeley, CA 94720-4200.

based in part on press release by Robert Sanders, Media Relations

News & Notes

DOE awards LBNL, UC Berkeley $125 million for biofuels research

Berkeley and the Bay Area cemented their position as the nation's center of alternative energy research with the recent announcement by the Department of Energy of a $125 million, five-year grant to UC Berkeley, Lawrence Berkeley National Laboratory (LBNL) and four other partners to develop better biofuels.

The California center, to be known as the Joint BioEnergy Institute (JBEI), has as its other partners Sandia National Laboratories, the Lawrence Livermore National Laboratory, UC Davis and Stanford University.

"The selection of JBEI is a major vote of confidence in the Bay Area's growing leadership in the national effort to develop new and cleaner sources of renewable energy," said **Jay Keasling**, the Hubbard Howe Jr. Distinguished Professor in Biochemical Engineering and JBEI's chief executive officer. Keasling also is director of LBNL's Physical Biosciences Division.

UC Berkeley, LBNL and the University of Illinois at Urbana-Champaign were selected earlier this year by oil company BP to receive $500 million over 10 years for an Energy Biosciences Institute.

"This clearly will make the Bay Area the locus for development of a green tech industry to rival the high tech and biotech industries which started here," said **Graham Fleming**, Melvin Calvin Distinguished Professor of Chemistry at UC Berkeley and deputy director at LBNL.

Research will center on improvements to current technology for producing ethanol, in particular cellulosic technology for producing ethanol from biomass, and new technologies for producing other biofuels, according to **Harvey Blanch**, UC Berkeley professor of chemical engineering and JBEI chief science and technology officer.

based on press release by Robert Sanders, Media Relations

Schaffer wins $2.1 million stem cell research grant

Chemical engineering professor David Schaffer has won a $2.1 million grant from the California Institute of Regenerative Medicine (CIRM) for research at the Berkeley Stem Cell Center.

In July, Schaffer was appointed the associate director of the center. Created in November 2004, the center includes faculty, students and staff from UC Berkeley, Lawrence Berkeley National Laboratory, and Children's Hospital Oakland Research Institute. Schaffer also holds a faculty appointment at Berkeley's Helen Wills Neuroscience Institute.

Somorjai is named 2008 Priestley Medalist

Gabor Somorjai

The American Chemical Society will bestow its highest honor, the Priestley Medal, on Gabor A. Somorjai, University Professor and professor of chemistry at the University of California, Berkeley, for his "extraordinarily creative and original contributions to surface science and catalysis." The annual award will be presented at the spring 2008 ACS national meeting in New Orleans.

"I am delighted to receive this prestigious award following in the footsteps of several distinguished faculty members from our chemistry department," says Somorjai. "It honors pioneering research in surface chemistry and heterogeneous catalysis and our forty years of research with more than 300 outstanding Berkeley graduate students and postdoctoral fellows."

"Professor Somorjai could be considered the father of modern surface chemistry and to have almost single-handedly set the molecular foundations of heterogeneous catalysis," says Francisco Zaera, a chemistry professor at UC Riverside. Zaera, who conducted his doctoral research with Somorjai in the early 1980s, notes that Somorjai's contributions are far-reaching but have made an especially strong impact in hydrogenation, hydrocarbon conversion, polymerization, ammonia synthesis, and syngas processes.

Somorjai was born in Budapest, Hungary, on May 4, 1935. He was a fourth-year student of chemical engineering at the Technical University in Budapest in 1956 at the outbreak of the Hungarian Revolution. He left Hungary and emigrated to the United States, where he received his Ph.D. in chemistry from UC Berkeley in 1960. He joined the College of Chemistry faculty in 1964.

Segalman, ChemE alumni selected for TR35

Chemical engineering professor Rachel Segalman has been recognized by *Technology Review* magazine as one of the world's top innovators under age 35. She was chosen for developing a novel way to generate electricity from heat.

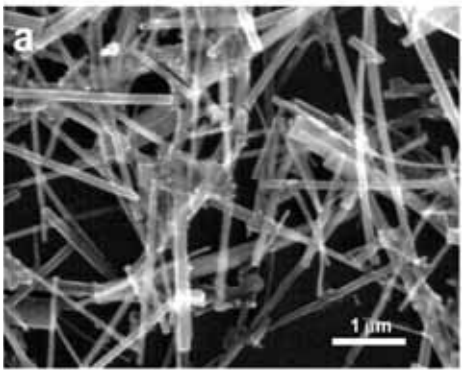
The annual "TR35" list was announced August 15 by *Technology Review*, the oldest technology magazine in the world and a publication of the Massachusetts Institute of Technology. The 35 innovators on the list were selected from more than 300 nominees as examples of "the spirit of innovation in business, technology and the arts," according to the magazine.

(continued on page 7)

Peidong Yang pioneers nanowire laser

At age 36, chemistry professor Peidong Yang is emerging as a leader in both fabricating nanowires and finding inventive uses for them. In a breakthrough that made the cover of the June 28 issue of *Nature* magazine, Yang and co-workers demonstrated an ingenious technique that may lead to optical probes small enough to operate inside living cells.

Photons (particles of light energy) are to photonics what electrons are to electronics. We already take photonics for granted every time we make a long distance phone call or surf the internet. Fiber optic cables, which can carry thousands of simultaneous phone conversations as pulses of light, form the backbone of both the internet and telephone communication.



These nanowires of potassium niobate act as miniature lasers that are small enough to be placed inside human cells, where they can act as both mechanical and optical probes.

Continued growth in computing power may require the substitution of microelectronics (electronic devices on the scale of a millionth of a meter) with nanophotonics (photonic devices on the scale of a billionth of a meter). Computer chips based on photonics would be smaller and faster, would produce less heat and would require less energy.

Yang has been in the forefront of fabricating nanophotonic devices. "Lasers, waveguides, non-linear optical converters and photodetectors are all important components for photonic technology," says Yang. "A full-fledged nanophotonic technology will require these elements to create integrated nanophotonic circuitry."

Yang's latest breakthrough is at the interface between nanophotonics and biology—a nanolaser smaller than a human cell. To grasp the scale, imagine a large beach ball filled with fluid, with a pen-sized laser pointer suspended inside. The beach ball also contains several smaller objects about the size of marbles, ping pong balls and tennis balls.

The smaller balls are tagged with fluorescent dyes that glow when zapped with laser light. The laser pen can be guided through the inside of the beach ball like a miniature submarine, probing objects and zapping them to detect how they fluoresce.

Now shrink the beach ball down to the scale of a human cell, about one-tenth the thickness of a human hair (human hair is about 100,000 nm thick while the diameter of a human cell is about 10,000 nm). Yang's miniature laser, a long, thin nanowire of potassium niobate ($KNbO_3$), is about 100 nm in diameter and 2,000 nm long—small enough to fit inside a cell.

Niobium is a rare transition metal, atomic number 41, that is used to make specialty steels. $KNbO_3$ is a transparent crystalline semiconductor that has the unique ability to alter the frequency of infrared laser light, converting it to light in the visible spectrum (400 to 700 nm).

Michelle Chang is chemistry's newest assistant professor

Michelle Chang is the Department of Chemistry's newest assistant professor. She comes to the department from the lab of chemical engineering professor Jay Keasling, where she had been a postdoc since 2004.

Chang co-authored several of the group's papers on using engineered bacteria to produce a class of compounds that includes the anti-malaria drug artemisinin and anti-cancer drug taxol.

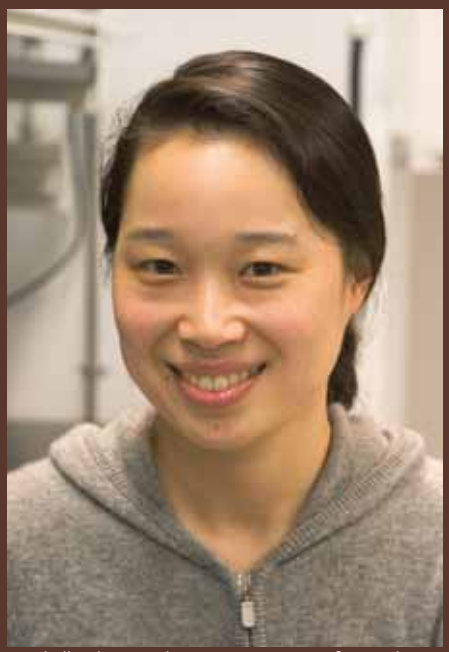
Born in San Diego, CA, Chang obtained a B.S. in biochemistry and her B.A. in French literature in 1997 at UC San Diego.

In 2004, she earned her Ph.D. with Daniel Nocera and JoAnne Stubbe *(Ph.D. '71 Chem)* at MIT, where she studied ribonucleotide reductase, an enzyme essential for DNA synthesis.

Chang's interest in pharmaceuticals embraces organofluorine chemistry, the source of many important drugs, including Prozac, Lipitor and Cipro.

"Current synthetic methods for creating carbon-fluorine bonds limit development of new drugs," says Chang. "I'm interested in working on chemoenzymatic methods for fluorine-based drug discovery."

Chang will be part of the Berkeley/LBNL Energy Bioscience Institute, where she will help develop bacteria to convert biomass to fuels. "We can draw enzymes from different organisms and combine them in a single genetically-engineered host," says Chang. "This approach allows us to create new biological tools for synthesis of sustainable, carbon-neutral fuels."


Michelle Chang is chemistry's newest professor. She formerly was a postdoc with chemical engineering professor Jay Keasling.

"Our potassium niobate nanowires have diameters that are below the wavelengths of visible light," says Yang. "They also have excellent electronic and optical properties, and low toxicity, plus they are chemically stable at room temperatures. This makes them ideal for sub-wavelength laser and imaging technology, especially for biology."

Yang and co-workers have grown potassium niobate nanowires and have manipulated them using an "optical tweezer," an instrument that uses intensely focused infrared laser beams to move nanoscale objects.

In addition to applying force to the nanowire, the beams act as a light pump that funnels energy to the nanowire, where it is converted to visible laser light and emitted from its end. Yang and co-workers have demonstrated that they can place the end of the nanowire laser against a microscopic fluorescent bead and measure the resulting glow.

The beauty of the nanowire laser is that it may be possible to place it inside a living cell and use it to both mechanically and optically explore the organelles and other features inside. The infrared and laser frequencies involved are well-tolerated, unlike the beams of electrons used in electron microscopes, which are fatal to cells and cannot be used on living samples.

Yang and colleagues have yet to demonstrate that they can place and manipulate their nanowire laser inside a living cell, but Yang has grown human and mouse cells on a bed of nanowires that penetrated the cells. The cells tolerated the presence of the nanowires and lived for several days when penetrated by 30 nm silicon nanowires, although they died more quickly with larger-diameter nanowires.

Berkeley physics professor Jan Liphardt, a biophysicist who holds a joint appointment with LBNL's Physical Biosciences Division, was another principal investigator for the nanophotonic laser research.

Additional researchers on the nanowire laser project include chemistry graduate students Peter Pauzauskie and Robert Onorato, chemistry professor **Richard Saykally**, and physics postdoctoral student Aleksandra Radenovic.

"This is truly beautiful work—a tour de force," says Charles Lieber, professor of chemistry at Harvard University, Yang's dissertation advisor and one his major competitors. Lieber believes the results are a "major advance" in the growing field of nanophotonics that will have a substantial impact on imaging in chemistry and biology, as well as in other fields.

Berend Smit joins the chemical engineering faculty

Berend Smit is the Department of Chemical Engineering's newest senior faculty member. Smit comes to Berkeley from Lyon, France, where he was Director of CECAM, the European Center of Atomic and Molecular Computations.

Born and educated in the Netherlands, Smit earned master's degrees in both chemical engineering and theoretical physics. He obtained his Ph.D. in 1990 at the University of Utrecht with professors D. Frenkel and S. W. de Leeuw.

Smit spent a year as a visiting scientist in the group of Berkeley chemistry professor David Chandler and returned to Amsterdam in 1992, where he rejoined his former employer Shell Research. He later became a professor at the University of Amsterdam before moving to CECAM.

Computational chemistry of the porous zeolite catalysts used by the petrochemical industry has been his primary research focus." Zeolites are perfect model systems," says Smit, although he adds that lately he has become fascinated with the physical chemistry of antimicrobial peptides.

After 15 years of effort, Smit delivered on a youthful promise to find a new catalytic process using only computer modeling. The patent application is unique because it contains no experimental data. "In some cases," explains Smit, "simulations can be more accurate than experiments."

Berend Smit joins the chemical engineering faculty from Lyon, France, where he was the Director of CECAM.

Although it may not seem as newsworthy as developing alternative energy sources, Smit believes that there is still more work to be done to maximize the efficiency of conventional energy production.

"Sometimes science can be too fashionable," says Smit. "Solving practical problems is also important. As a scientist, I believe I am responsible for what I promise. At the end of the day, society will ask of me, 'What have you delivered?'"

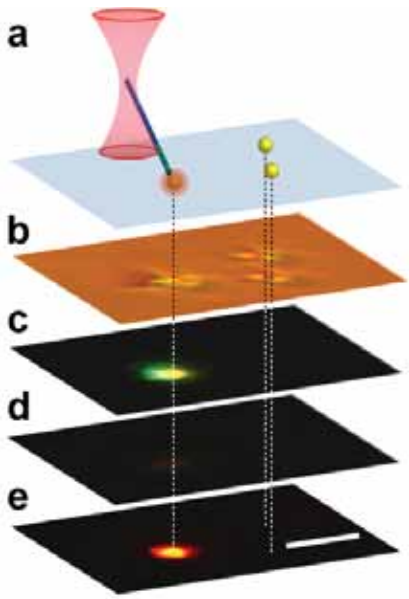


image courtesy of Peidong Yang, caption courtesy of Lynn Yarris, LBNL.

*In a demonstration of the nanowire light source's fluorescence mode, a nanowire in the grip of an infrared beam was touched to a fluorescent bead causing the bead to fluoresce orange at the contact point. **Figure a)** shows the experimental set-up with the pair of beads on the right as control; **b)** is a bright-field optical image of the beads, with the nanowire in contact with the leftmost bead; **c)** is a color CCD fluorescence image showing green light emission from the nanowire and the orange emission from the bead; **d)** is a control image of the same beads with infrared radiation but no trapped nanowire; and **e)** is digital subtraction of (d) from (c).*

Hewlett Foundation matches endowment giving

New minimum amounts for endowed funds

Endowed General Funds

$50,000 or more
Named Endowed Fund

Endowed Scholarship Funds

$50,000 or more
Endowed Fund

$250,000 or more
Berkeley Endowed Scholarship

Endowed Fellowship Funds

$500,000 or more
Berkeley Endowed Fellowship

Endowed Faculty Funds

$500,000 or more
Faculty Excellence Endowed Fund

$1,000,000 or more
Endowed Professorship

$2,000,000 or more
Endowed Chair

$3,000,000 or more
Distinguished Endowed Chair

$5,000,000 or more
Chancellor's Endowed Chair

For more information on establishing an endowed fund, please contact Assistant Dean Jane Scheiber at (510) 642–8782.

As the nation's preeminent public university, UC Berkeley serves society by providing broad accessibility to students of all backgrounds while maintaining comprehensive academic excellence. Now an extraordinary gift of $113 million from the William and Flora Hewlett Foundation—the largest such gift in the university's history—will help sustain that mission for generations to come.

Designed as a challenge grant to encourage new philanthropic support, the Hewlett Foundation gift will be used to create 100 new endowed faculty chairs, thereby attracting and supporting world-class faculty members and graduate students. The gift thus creates an innovative partnership to ensure excellence in the public domain.

> *"This gift is an extraordinary vote of confidence in the contributions that UC Berkeley and all public universities make to society."*
>
> UC Berkeley Chancellor Robert Birgeneau

The gift also helps the university to build a new financial model, using endowment support to narrow the funding gap between Berkeley and its private peers. Until the 1990s, Berkeley's funding from the state was about equal to the payout from robust endowments at top private universities. Although state funding has generally kept pace with the Consumer Price Index, the costs of running a major teaching and research university such as Berkeley have risen far more steeply.

At the same time, endowments at the top private schools have been yielding two to three times the CPI. For example, Harvard's endowment is nearly $30 billion and Stanford's is approximately $15 billion, compared to Berkeley's $2.4 billion. With only one-third of Berkeley's budget coming from the state, Berkeley must increase its endowment in order to build a stable financial future, according to the chancellor's office.

In an effort to build its endowment and address the critical need for faculty support and graduate fellowships, Berkeley has adopted a new set of endowed fund minima (see sidebar). Over the next seven years, the Hewlett Foundation will put $110 million toward establishing 100 chairs and encourage a wide range of donors to step forward to match its gift, dollar for dollar, thus easing the transition to the new endowment levels.

The Hewlett gift will match 80 gifts of $1 million each to create 80 new $2 million chairs. The new chairs will benefit all the campus's schools and colleges. Another 20 gifts of $1.5 million will be matched to create 20 chairs of $3 million each for multidisciplinary initiatives. At the request of the foundation, the Hewlett name will not be attached to the chairs, which may be named for the donor or for someone the donor wishes to honor or memorialize. In addition, $3 million will be used to support an enhanced infrastructure at UC Berkeley to manage endowed funds.

The new chairs will be especially helpful in retaining outstanding faculty members who receive lucrative offers from the nation's elite private universities. In the College of Chemistry, for example, there have been several retention cases in the last two years.

"Our ability to offer endowed chairs is critical to keeping our most talented faculty," says Dean Charles Harris. "The new Hewlett matched chairs will also provide valuable graduate fellowships. Overall, the new endowed chairs will help the college remain one of world's premier places for chemistry and chemical engineering research."

It is critical to the future of our democratic society that private universities not be the only option for a first-class education. The Hewlett gift recognizes the importance of endowment for a public university such as Berkeley and helps set the stage for private philanthropy to aid the mission of the country's top public universities.

(l. to r.) Edmundo Angeles, Mary Grace Brubacher, Rich Mathies, William Strong and Amanda Stockton pose with a much-appreciated acquisition to the Chem 105 lab, a Bio-Rad Experion electrophoresis system. Bio-Rad donated the system at the request of Mathies, who teaches the course. Bio-Rad's Brubacher and Strong installed the equipment and demonstrated its capabilities for Stockton, Chem 105 graduate student instructor, and Angeles, physical chemistry instructional facility supervisor.

Bio-Rad donates to undergrad lab

Bio-Rad, a Bay Area scientific instrumentation company founded by college alumnus **David Schwartz** *(B.S. '51 Chem)* and his wife Alice *(B.A. '49 Biochemistry)*, has made an important in-kind contribution that will improve the lab experience of many chemistry undergraduates.

Chem 105, Instrumental Methods in Analytical Chemistry, emphasizes hands-on laboratory analysis using modern instrumentation. But many of the instruments used in the course are aging.

At the suggestion of chemistry professor Richard Mathies, who serves on the scientific advisory board of Bio-Rad, the company has donated a state-of-the-art electrophoresis system. The Bio-Rad Experion system separates and analyses proteins and RNA automatically by performing gel-based electrophoresis, including separation, staining, destaining, band detection, imaging and data analysis.

Says Mathies, "This is a big help for our students, but Bio-Rad also benefits by developing the skills of young chemists who start their careers already familiar with the Bio-Rad equipment."

(continued from page 3)

Segalman, the Charles Wilke Assistant Professor of Chemical Engineering, aims to create polymers that automatically assemble into a desired structure, such as a flexible plastic sheet that produces energy from sunlight. Although these so-called functional polymers have many uses in the energy field, her main goal is to characterize how these polymers work alone and together—in particular, how changing the chemical structure affects their electronic characteristics.

Two other TR35 winners are Berkeley alumni. They obtained their doctorates working with Jay Keasling, the Hubbard Howe Jr. Distinguished Professor in Biochemical Engineering, who also heads the synthetic biology department at LBNL. **Kristala Jones Prather** *(Ph.D. '99 ChemE)*, an assistant professor of chemical engineering at MIT, was named to the list for developing a promising reverse-engineering strategy for synthesizing commercial molecules biologically. **Neil Renninger**, *(Ph.D. '02 ChemE)*, cofounder and now senior vice president for development at Amyris Biotechnologies, was named for applying synthetic biology to the production of biofuels.

Pines wins R&D 100 award

Alex Pines, the Glenn T. Seaborg Professor of Chemistry, and colleagues at LBNL have been awarded one of *R&D* magazine's prestigious R&D 100 Awards for 2007. The awards recognize the 100 most significant proven technological advances of the year.

The researchers won the award for laser-detected MRI—a major breakthrough in the Magnetic Resonance Imaging (MRI) field that eliminates the need for a high-field magnet, making the technology accessible to new users and applications. All winners of the 2007 award will receive a plaque at *R&D* magazine's formal awards banquet in Chicago on October 18.

College faculty and staff members garner seven ACS awards

Seven College of Chemistry faculty members and researchers are recipients of American Chemical Society awards for 2008:

- **Jhih-Wei Chu**—Hewlett-Packard Outstanding Junior Faculty Award, funded by HP and sponsored by the ACS Division of Computers in Chemistry.
- **Graham Fleming**—Ahmed Zewail Award in Ultrafast Science and Technology, sponsored by the Ahmed Zewail Endowment Fund established by Newport Corporation (Newport).
- **Daniel Neumark**—Irving Langmuir Award in Chemical Physics, sponsored by GE Global Research.
- **Kenneth Raymond**—ACS Award in Inorganic Chemistry, sponsored by Aldrich Chemical Company, Inc.
- **Frantisek Svec**—ACS Award in Chromatography, sponsored by SUPELCO, Inc.
- **Don Tilley**—Frederick Stanley Kipping Award in Silicon Chemistry, sponsored by Dow Corning Corporation.
- **Dean Toste**—Elias J. Corey Award for Outstanding Original Contribution in Organic Synthesis by a Young Investigator, sponsored by the Pfizer Endowment Fund.

The recipients will be honored at the awards ceremony at the 235th ACS national meeting in April 2008, in New Orleans, LA.

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Upcoming Events

For the latest information check chemistry.berkeley.edu/alumni

Stanley Hall Building Dedication
Saturday, September 29
1:00 – 4:00 p.m., Stanley Hall Atrium

Keynote address will be given by Peter Kim, President of Merck Research Laboratories. There will be an Open House in the new Stanley Hall which will include faculty panel discussions, tours, etc. For more information go to chemistry.berkeley.edu.

Free Radi*cal*s and CHEMillennium Alumni Era Event and Brunch
Homecoming, Saturday, October 13

8:30 – 9:00 a.m. Continental breakfast, Stanley Hall Atrium

9:00 – 10:15 a.m. Panel discussion with professors Jay Keasling and Dan Kammen, 105 Stanley Hall

10:15 – 10:30 a.m. Stanley Hall building tours

10:30 a.m. – 12:30 p.m. Alumni brunch, Heyns Room, The Faculty Club

TBA Cal vs. Oregon State football game

AIChE Alumni and Friends Reception
Tuesday, November 6
7:00 – 8:30 p.m., location TBA
Salt Lake City, Utah

Alumni of the G. N. Lewis Era Luncheon
Thursday, November 15
Noon – 2:00 p.m., Heyns Room, The Faculty Club