

# UC Berkeley

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# Catalyst

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COLLEGE OF CHEMISTRY • UNIVERSITY OF CALIFORNIA, BERKELEY

121B

## Illuminating undergraduate learning

- The Que Family Undergraduate Advising Center
- The Teacher-Scholars Program
- Undergraduate research

# Catalyst

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UNIVERSITY OF CALIFORNIA, BERKELEY

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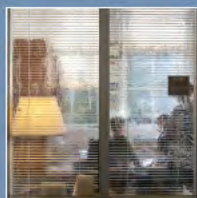
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## ON THE COVER

Late afternoon sunlight filters through an adviser's office in the Que Family Undergraduate Advising Center. The patterned glass was installed so that light could pass through the offices yet still provide privacy for conversations with students.

ALL TEXT AND PHOTOS BY MICHAEL BARNES  
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# FALL 2014/Winter 2015

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▶ Please note:  
Class Notes will return next issue.





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FLAMMABLE  
KEEP FIRE AWAY

## Moving forward with your generous support



**DOUGLAS S. CLARK**  
Dean, College of Chemistry  
Gilbert N. Lewis Professor

A new chapter unfolds as I move into my second year as dean. The College welcomes new faculty members: in Chemical & Biomolecular Engineering, Bryan McCloskey and Ali Mesbah are our most recent assistant professors; in Chemistry, Ke Xu and Evan Miller joined us in 2013, and Eran Rabani arrived this fall. Other changes this summer include a new department chair to Chemistry, Dave Wemmer, and a new executive associate dean to the College, chemistry professor Matt Francis. I want to thank Dan Neumark for his four years of exceptional service as department chair in Chemistry, and for his invaluable assistance in helping a new dean learn the ropes.

Sadly, chemistry professor Heino Nitsche passed away in July; Heino's passing was unexpected and a great loss to all of us. His wife, Martha Boccacini, held a wonderful memorial service for Heino in August that gave us a glimpse into how influential he was in so many lives.

The College continues to move forward on facilities upgrades. This fall we celebrated the opening of the Que Family Undergraduate Advising Center, which is located on the first floor of Gilman Hall. This state-of-the-art student center was made possible by a generous donation from the Que family who joined us for the ribbon cutting.

Now that the renovations of the undergraduate teaching laboratories and student center are complete, we continue to forge ahead with an aggressive plan to construct a new building for the College. With that in mind, we invited the new Chancellor, Nicholas Dirks, and the newly appointed

Executive Vice Chancellor and Provost, Claude Steele, to tour the College buildings to see our current facilities (the good, the bad, and the ugly), and we presented a vision of a future facility. Of course, renovations for faculty research laboratories continue throughout the year.

We hope that the latest *U.S. News & World Report's* summary of graduate school rankings will help us move forward with our plans: Chemistry is the #1 graduate program in the country; Chemical and Biomolecular Engineering is ranked #3, tying with our neighbor across the bay, Stanford, and the University of Minnesota. The College also continues to attract stellar undergraduates, with 233 undergraduate degrees awarded in 2013-14. Changes to our undergraduate curriculum have made a vast difference to the College. For example, the Teacher-Scholars Program provides a wonderful opportunity for undergraduates to work with graduate students to teach introductory chemistry and organic chemistry to their peers majoring in science, technology, engineering and math.

People helping people, just as it should be, and just as it is with our alumni and friends, who are supporting us at unprecedented levels. It is your generous support that is enabling us to maintain excellence and expand the horizons of all our students.

# Time Marches On

Stepping into the position of department chair in July was something I never envisioned when I came to Berkeley as an eager young physical chemistry graduate student some 40 years ago. I have always felt extraordinarily lucky that I was able to return to Berkeley as a faculty member, which happened after a few years in Germany, at Stanford and the University of Washington.

During those years after grad school, my research focus had shifted toward structural biology using NMR, a rapidly developing approach that was attractive for the biophysical chemists. Some of the great Berkeley graduate students who joined the lab in the first few years got the research program up and running quickly, and many others have sustained it.

Now having aged into the role of one of the 'senior' members of the department, when Dean Doug Clark asked if I would be willing to serve as chair I could not say no. I realize many of the faces have changed, and those remaining have aged, but through a

process of constant renewal the department has remained vigorous and strong.

We will be hiring actively in the next few years (so please let any stellar faculty candidates know), and we will have to dig to find resources to support these efforts. We greatly appreciate all of the help received from alumni and friends.

We are excited to welcome two new faculty members in theoretical chemistry. Eran Rabani comes to us from Tel Aviv University, where he built a broad research program to develop the theoretical underpinnings of nanoscience. He previously visited Berkeley as a Visiting Miller Professor, and we are excited to have him join the department.

The second addition, Eric Neuscammann, will officially join us July 2015, after finishing a Lawrence Fellowship at Lawrence Livermore National Lab. Eric graduated from UCLA in 2006 and completed his Ph.D. at Cornell in 2011. He came to Berkeley as a Miller Research Fellow for 2011 and stayed through spring 2014. His work is in developing new methods in electronic structure theory.

Offsetting our gains, Carolyn Bertozzi succumbed to the lure of the competition in Palo Alto and will move there next spring, a significant loss to the chemical biology program here. We wish her the best, though the cry remains "Beat Stanford."

We also note with sadness the untimely passing of Heino Nitsche on July 15, 2014, just two weeks shy of his 65th birthday. Heino was very active both in the identification of new elements as part of Nuclear Sciences at LBNL, and also as part of the Nuclear Science and Security Consortium on campus. Just a week before his death Heino had learned that he would receive the Glenn T. Seaborg Award from the American Chemical Society. Another colleague, Robert Connick, passed away on



DAVID E. WEMMER  
Chair, Department of Chemistry  
Joel Hildebrand Distinguished Professor

Aug. 21, at the age of 97. Bob contributed to the college and university in many ways during his long career here.

On a happy note, the chemistry faculty has continued to receive accolades for their scientific work. In July, Judith Klinman was the recipient of the Mildred Cohn Award in Biological Sciences from the American Society for Biochemistry and Molecular Biology. In October she was awarded the National Medal of Science, the highest domestic honor in science. The award was presented by President Obama in November.

Other faculty awards include the Nichols Award of the New York ACS to Gabor Somorjai, the Janssen Pharmaceutica Prize to John Hartwig, the Mitsui Chemicals Catalysis Science Award to Dean Toste and the election of Don Tilley as an ACS Fellow. Congratulations to all and keep up the good work!

BY DAVID E. WEMMER

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Emerita chemistry professor Judith Klinman received the **National Medal of Science** from President Obama on November 20.

# What makes a good undergraduate mentor?

I was fortunate enough this past semester to be asked to participate in a roundtable at MIT/Harvard on undergraduate mentoring. I began that roundtable with a parable. I would like to share it with you and leave you with a question.

A high school student from one of Oakland's poorer neighborhoods is working late one evening at a café. A famous professor, winner of a MacArthur genius award, a member of the NAE and on everyone's short list for the Draper Prize, strolls into the café and notices, over his shoulder, the high school student's homework problem on alkali metals. While waiting for his chai latte, the professor has an epiphany about his next lecture on quantum mechanics.

Rather than use the usual tired example from Alfred Kastler's 1950's Nobel prize-winning work on selection rules in alkali atoms, he will introduce his own work on artificial atom defects in diamond; this work demonstrates well the principle he wishes to cover and is also the subject of his recent paper in *Science*. The next day, at the end of his lecture, the students in his lecture class marvel at the connection between mid-20th century physics and modern work in diamond spintronics and are excited to be students in the class of this great scholar.

Soon after the professor leaves the café, a Berkeley teaching assistant strolls in and notices the same student and, watching him over her shoulder while in line, muses on his struggle to properly account for the electronic structure of alkali metal atoms. While collecting her cappuccino she too experiences an epiphany, and the next day in the discussion section for her first-year undergraduate course she suggests the students create a graphical representation of the electronic structure of the periodic



table. They work on it cooperatively and leave the section invigorated and thrilled to be taught by such an extraordinary emerging scholar.

Finally, a Berkeley City College student strolls into the café; he is on track for a med tech associate degree after two terms of duty in Afghanistan. He also notices the high school student, remembers well his own struggles with chemistry last year and strolls over to the high school student and introduces himself, briefly exchanging pleasantries in a way so as to remember each other. He then talks to the teenager about electrons in s-orbitals, leading the high schooler to the conclusion that rubidium has a single electron in the 5s orbital.



**JEFFREY A. REIMER**

Chair, Department of Chemical and Biomolecular Engineering, Warren and Katharine Schlinger Distinguished Professor

Satisfied that the young man can put the rest of the pieces together to finish his homework, our BCC vet/student gets in line for his coffee. He looks at the reflection of the high schooler in the window and notices that his clothes are ill fitting and not well matched...and the teenager's Internet tablet device has a cracked face and is from one of those companies that is soon to be out of business. The vet too has an epiphany and gets an extra latte and cream cheese bagel, delivering it to the high schooler on his way out the door, figuring that some food and a warm drink will help the student finish his homework.

So...my question to you is this: who is the better mentor: the professor, the TA, or the Berkeley City College student? reimer@berkeley.edu

BY JEFFREY A. REIMER



# Training good scientists, good citizens

Richmond Sarpong still remembers the book. He found it in his father's library in their house in Bolgatanga, northern Ghana, when he was eight years old. It was big and thick, with a blue cover, and the words "Merck Index" embossed in gold on the cover. Inside were thousands of chemical compounds, drawings of their structures and descriptions of their medicinal uses. "I remember being amazed that all those compounds listed there could have almost magical power to treat diseases," Sarpong recalls.

At the time, Sarpong's mother was a teacher, and his father was an M.D. who worked as the regional medical officer for the government of Ghana. Sarpong watched as his father became involved in one of the great medical and public health success stories of the time, the distribution of a drug, Mectizan (ivermectin), that essentially eliminated new cases of one of Africa's major scourges, river blindness.

Ivermectin proved to be a huge success. The drug kills the larval stage of the parasite that causes river blindness, preventing new infections, and halts the growth of the disease in people previously infected. From that near-miracle, Sarpong learned early in his life the value of those medicinal compounds he first saw in the Merck Index.

Soon after, Sarpong's family life in Ghana was disrupted by a series of coups that sent him, along with his parents, his older brother and two younger sisters, fleeing to southern Zambia. They lived there for three years in the town of Livingstone, the portal to Victoria Falls. Says Sarpong, "I remember traveling to the hotel near the gorge and watching the waterfall as we ate lunch." In Zambia his father began working with the World Health Organization (WHO) and began to take part in the long battle against a new scourge sweeping the continent, AIDS.

The family moved next to Lobatse, in southeastern Botswana, near the border with South Africa, where his father began working more with WHO. By then Sarpong had become familiar with a variety of people from many different cultures. "One thing my parents always told me," he recalls, "is to always treat other people with respect."

Adds Sarpong, "It's easy for Americans to lump all of Africa together into one big continent. But the reality is that Botswana is a very different place culturally and geographically than Zambia or Ghana. In fact, eastern and western Botswana are totally different from each other. The east is green, but in the west is the Kalahari Desert. In Setswana dialect, the word for rain is 'pula.' That's also the name of the national currency, because rain is so precious."

Sarpong was ten when he started in a local school in Lobatse. He skipped two years of middle school and, at age 15, he left his family behind and moved to the country's capital city, Gaborone. There he attended an international school, Maru-a-Pula. According to the school's website, the name Maru-a-Pula means "clouds of rain" or "promises of blessings" in Setswana. Says Sarpong, "We were the educated young Africans who would rain down knowledge and progress on Botswana."

Sarpong studied there for two school years, 1989–91. He concentrated on chemistry, physics and math and got hooked on organic chemistry during the classes he took from his teacher, Dr. Ramakrishna. Sarpong completed his A levels (roughly equivalent to the SATs in the United States) and left Africa at age 17 to attend Macalester College in St. Paul, MN.

At Macalester Sarpong majored in chemistry and conducted a research project with organic chemist Rebecca Hoye. He graduated with a chemistry B.A. in 1995 and began his Ph.D. studies at Princeton with Martin Semmelhack that fall.

Sarpong was introduced to enediynes in the Semmelhack lab. These are a class of organic compounds with powerful anti-tumor and antibiotic properties. Sarpong conducted his Ph.D. research on several analogs of enediynes and earned his doctorate in 2000.

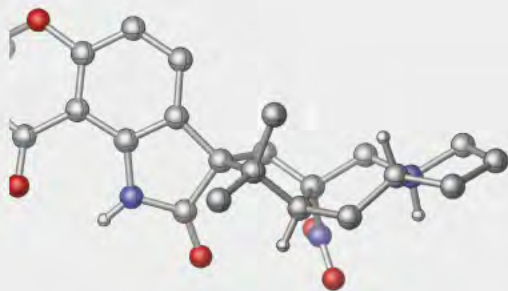
He next moved to Caltech in Pasadena, CA, for a postdoc in the research group of Brian Stoltz. At Caltech, Sarpong began to study a relatively new and unexplored area with tremendous potential—natural products from marine organisms.

Among the natural products derived from marine organisms are some of the most potent antitumor and cytotoxic agents yet discovered. At Caltech, Sarpong focused on druggmacidins, a class of bioactive marine natural products obtained from deep-water sponges.

The first druggmacidins to be described had modest antifungal, antiviral and cytotoxic properties. More complex druggmacidins have been isolated that possess a wide range of interesting biological properties, including disrupting protein phosphorylation, which regulates many processes inside cells. Sarpong was a co-author on the paper describing the first total synthesis of druggmacidin D, a potent inhibitor of serine/threonine protein phosphatases.

Sarpong joined the Berkeley faculty in 2004, where he combines his interest in natural products synthesis with his unique international background to produce collaborative research projects that can include researchers from several different countries.

Sarpong recently came across interesting research on compounds derived from *Penicillium* fungi that live in the oceans, first discovered by a research group in Sao Paulo, Brazil. Sarpong's group questioned some of the details of the structure of the compound, citrinalin B. In a multifaceted effort, Sarpong engaged a synthetic chemistry



group at Yale, a computational chemistry group at UC Davis and natural product chemistry groups in Brazil and Canada. The outcome was a May 15, 2014, *Nature* paper that correctly identified citrinalin B and provided insight into how nature might build these molecules from precursors.

Given how complicated it is to make some of these compounds in the lab, how do simple fungi do it, and why? Says Sarpong, “Most organisms produce these compounds for defense against predators and competing species. Viruses and bacteria that cause disease are akin to competitors of marine organisms, which have evolved elaborate chemical mechanisms to eliminate these competitors.”

About his work Sarpong adds, “I am pulled and tugged between solving problems that may lead to new drugs and cures for diseases, and the pure intellectual and architectural challenge of creating these molecular shapes. There is not one right way to do things.

“In some ways I am guided by my father’s work in Africa, yet in other ways I have a lot in common with my wife, who is an artist and an art teacher. We are able to talk about these things and understand each other’s work. There are lots of connections between art and synthetic organic chemistry, including the need for creativity and inspiration.”

Sarpong keeps in touch with his far-flung family, although he returns to Africa only occasionally. After full-time stints with WHO in Ethiopia and Pakistan, his parents retired to a suburb of Accra, the capital of Ghana, where his father runs a clinic and

his mother is a chief administrator of a K-10 school.

Sarpong was followed to Macalester by one of his younger sisters, who is now an organic chemist who works for GlaxoSmithKline in Philadelphia, PA. His older brother is an electrical engineer who works for Texas Instruments (TI) in Dallas. His other sister works for TI in Germany.

“When I return to Ghana,” Sarpong says, “I’m always amazed at how hot it is, and how much I appreciate the balmy weather

and the intellectual environment of Berkeley. But in Africa I met many great people and had many mentors who helped me along the way.

“The greatest joy that I have found in my professional life is the students that I work with, and seeing them develop as people, and watching them grow to the point they are educating me about their projects. I’d like to be known for training really good scientists who are also good citizens.” □



Chemistry professor Richmond Sarpong holds a model of a *tro tro*, a minibus taxi common in Ghana, where he was born.

# Illuminating

TS

Teacher-Scholar

CI

Curriculum Innovator

M

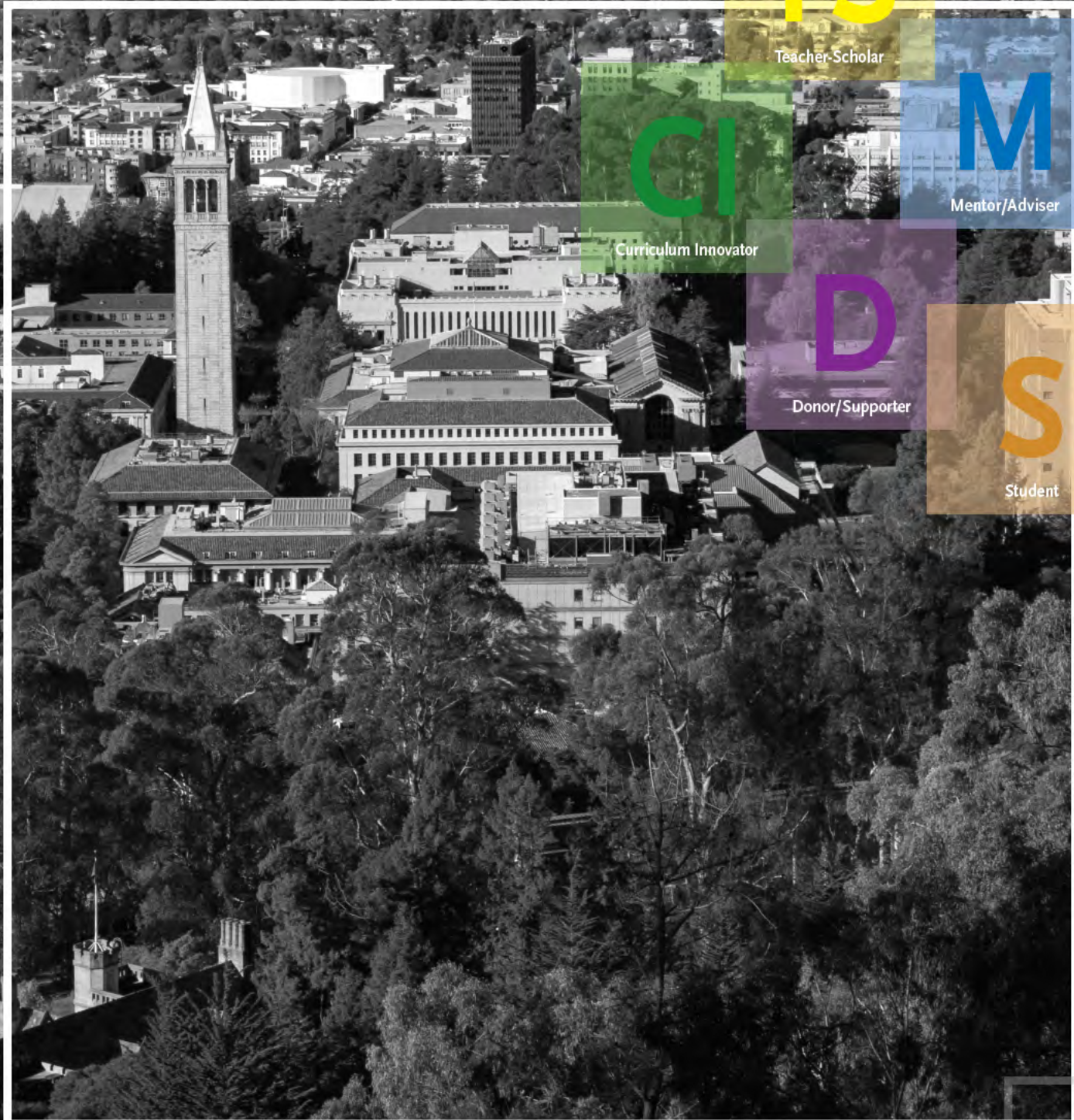
Mentor/Adviser

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Donor/Supporter

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Student



# undergraduate learning

BY MICHAEL BARNES

The UC Berkeley campus is a city within a city, one that can be intimidating for first-year undergraduate students. It's easy to get lost. In comparison, the College of Chemistry is a small town of several hundred people, where the students get to know each other and help each other during their four years here.

Even though the college is a home away from home, it is one where the town's residents have high expectations of themselves. These expectations can be tough, especially on first-year CoC students. Now, thanks in part to generous donors, the college has updated its undergraduate facilities, making our students' tasks more pleasant and productive.

However, college leaders know that bringing our facilities into the 21st century is just a first step. There must also be complementary changes in the curriculum and the roles that undergrads play in their own education.

In this issue of *Catalyst*, we explore three programs that allow our undergrads to be mentors, advisers and researchers here at the college:

In the new Que Family Advising Center, staff and student advisers work together to create an informal atmosphere where students feel welcome to relax, chat with friends, read the latest copies of *Rolling Stone* and other magazines, and ask questions about their courses.

In introductory chemistry and organic chemistry labs, undergrads who have successfully taken these classes can earn credit as teacher-scholars. Working with graduate student instructors, the teacher-scholars provide an extra pair of hands and a friendly ear to guide students who may be struggling.

During their years in the college, if undergrads become captivated by a particular question, they can seek out research groups with expertise in that area and become undergraduate researchers. Thanks to donor contributions, the college can offer financial support to allow undergraduate researchers to continue their work during the summer months.

Through these programs, the college is learning to tap an underutilized asset of great potential—our own very special students, a group of talented young people who come from all over the world to learn, and to help each other to learn, here in the College of Chemistry.



THE QUE FAMILY  
UNDERGRADUATE  
ADVISING CENTER

## Undergrads settle into their new advising center

The new Que Family Undergraduate Advising Center is a modern, graceful, airy space where undergrads can come to meet staff and peer advisers, get together with classmates for study sessions, or just hang around, relax, and read magazines.

In 2008, when chemistry professor Marcin Majda became undergraduate dean, the advising staff met with students in a row of crowded cubicles on the fourth floor of Latimer Hall. Neither Majda nor then College of Chemistry dean, Richard Mathies, was happy with the arrangement. Majda and Mathies worked to temporarily move the advising staff down the hall to more private offices and began planning a new and permanent home for them in Gilman Hall.

Constructed in 1917, Gilman Hall is the oldest building in the CoC complex. Nobel Laureate Glenn Seaborg discovered plutonium in room 307 of Gilman Hall in 1941, and the building has been identified as a National Historic Chemical Landmark by the American Chemical Society. Due to its historic status, Gilman's aging labs cannot be upgraded to meet current standards, so the building is home to faculty and administrative offices, theoretical chemists with their powerful computers, and now, a new undergrad student center.

Although Majda and Mathies readily identified a location for the center at the north end of the ground floor of Gilman, they needed to find a funding source. A recent alum, Mike Que, who earned his chemistry M.S. in 2012, mentioned the problem to his father, Wenbin Que, an entrepreneur in Chengdu, China. The family decided to donate the funds to build the center.

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In this feature, you will meet several students, faculty, staff and donors who work together to improve undergraduate education. Color-coded frames around their photos will help you keep track of their roles.

The official dedication and opening in October gave the college a chance to say thank you to the Que family. “As everyone here knows,” said Dean Doug Clark at the event, “UC Berkeley is widely recognized as having the number one chemistry program in the world. Why shouldn’t we have the number one undergraduate advising center in the world? Today, we do.”

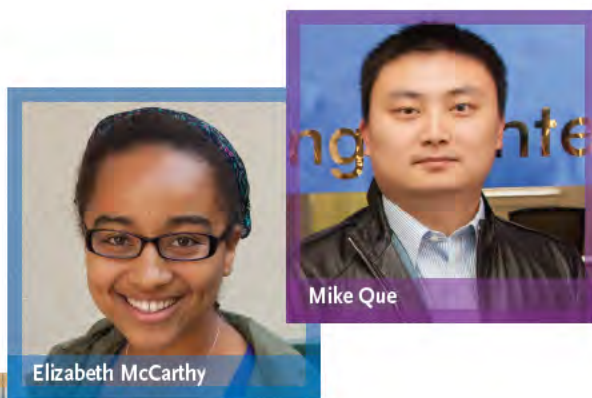
The college’s undergraduate advisers—Maura Daly, Monica Jackson, Shamaya “Maya” Pellum and Joey Wong—are a big part of what makes the center special. Daly advises entering first-year students, Wong handles the third-year community-college transfer students, and Jackson and Pellum advise continuing students, including L&S students earning a chemistry B.A. and students transferring out of the college.

Says Daly, “I talk with both prospective high school students in the spring, and incoming college majors in the fall. The college attracts competent, pragmatic students who come to the chemical sciences with specific ideas to help make the world a better place. Many are drawn to chemical engineering because job prospects are good with just the B.S. degree. A small but growing number of our first-years are pre-med.

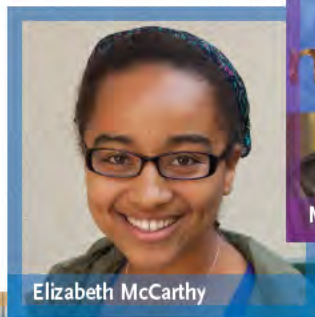
“Our students have faculty advisers, too. Some of the students’ questions should be addressed by professional chemists and chemical engineers, so we encourage them to check in with their faculty advisers. The freshman orientation session is very important, and unfortunately, the students who need it the most—out-of-state and foreign students—tend to be the ones who miss it. These students have a harder time finding their way around and have more culture shock.”

Students get informal help from peer advisers. Elizabeth McCarthy, a fourth-year ChemBio major, is the lead peer adviser. She has done undergraduate research in Jamie Cate’s lab and is currently working in the lab of Kevan Shokat at UCSF’s Mission Bay campus. She plans to go on to grad school for her M.D./Ph.D.

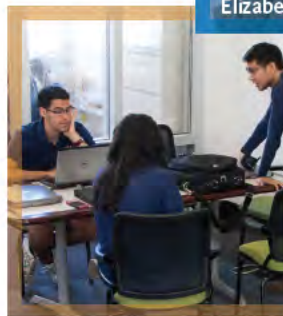
Says McCarthy, “Adviser Monica Jackson contacted me during my second year about being part of a new peer-advising program. I’ve been a peer adviser ever since. We actually answer a lot of questions



Mike Que



Elizabeth McCarthy



Monica Jackson, Joey Wong, Maya Pellum, Maura Daly

via email, in addition to having drop-in hours at the advising center. You can learn more about what we do by going to the college home page and searching for ‘peer advising.’ Since peer advisers have taken many of the courses that students ask about, we can give up-to-date informal advice about their classes and schedules.”

Undergraduate Dean Majda purposefully designed the center to be more than just a place to go for advice. It’s a gathering place. Many of the students are there for study sessions, or just to meet friends. A student studying physical chemistry might bump into a fellow student in the ChemBio or ChemE majors, someone that they might not meet in their classes. Says Majda, “I wanted the center to create a broader sense of community among our undergrads. So far, it seems to be working.”





## THE TEACHER-SCHOLARS PROGRAM

# Breaking down barriers to learning

What really makes UC Berkeley unique is the quality of its students. When you bring together thousands of the brightest young people from all over the planet, the sparks start flying.

It was Nobel Laureate and Berkeley chemistry professor Y.T. Lee who famously said, “I came to Berkeley in 1962 to pursue my graduate studies because Berkeley had the best professors in the world. I returned in 1974 as a professor because we have the best students.”

The traditional higher education model, where a professor lectures to a class of students, isn’t designed to capture the energy generated by a student body like Berkeley’s. What if Berkeley tapped into the underutilized energy of its students to create a new kind of learning community?

In the College of Chemistry, lecturers Pete Marsden and MaryAnn Robak, friends since their days together as Berkeley chemistry grad students, are building that learning community. They are working with Anne Baranger, the college’s Director of Undergraduate Chemistry, and Sara Tischhauser, a chemical education Ph.D. student.

Robak worked as a graduate student instructor while earning her Ph.D. in the Ellman group. She began teaching in the college as a lecturer soon after she graduated in 2010. Marsden earned his Ph.D. with Ellman and Berkeley chemistry professor Bob Bergman. Marsden taught as a GSI while working on his doctorate, briefly taught at the University of San Francisco, and returned to Berkeley when a permanent lecturer position opened up in 2012.

Baranger arrived from the University of Illinois in 2011, where she was a chemistry professor with a background in undergraduate science, technology, engineering and math (STEM) initiatives. At Illinois, she had worked with Tischhauser, then an undergraduate pursuing both a chemistry and psychology degree. Both Baranger and Tischhauser participated in a successful undergraduate peer teaching program there.

With the arrival of Tischhauser at Berkeley as a graduate student in 2012, the four main creators of the Teacher-Scholars Program were in place. The program launched in the spring of 2013.

Says Marsden, “When MaryAnn and I were chemistry GSIs, we were involved in an earlier program that allowed advanced undergraduate students to ‘shadow’ a GSI in the lab and provide extra help for the students. I thought the idea was worth developing. The Teacher-Scholars Program expands the number of undergrad students assisting GSIs in the teaching labs and provides them with formal pedagogical training.”

Says Baranger, “I came to UC Berkeley excited to introduce evidence-based methods of teaching. The Teacher-Scholars Program was a good place to start. We know from the education literature that peer teaching is effective for both the student and the peer teacher.”

The program is structured as a two-unit class. The teacher-scholars assist GSIs in lab sections a few hours every week. On Tuesday evenings, the teacher-scholars attend their own class. One recent Tuesday evening, Marsden began by handing out a brief survey about what went right and what went wrong during the labs in the previous week. The students then busily discussed among themselves for 20 minutes.

Marsden next led them in an informal give-and-take about the week and encouraged the teacher-scholars to share their thoughts on how the students were doing. The class finished with a brief assignment—to read a paper that discusses common conceptual errors among students learning chemistry for the first time.

Notes Baranger, “Although teacher-scholars are required to have completed general or organic chemistry, about half are not chemistry majors. The level of enthusiasm of these non-majors surprised all



of us.” Adds Marsden, “We don’t pay teacher-scholars. The students do get two units of credit, but most of them don’t need the credits. In some cases, if they are seniors and nearing the maximum number of credits, they actually ask if they can be teacher-scholars and not get any credits.”

So why do undergrad students choose to become teacher-scholars if they don’t need the credits, don’t get paid, are often non-majors and have to sacrifice part of a Tuesday evening? To find out, we asked two of them.

Stephanie Cai went to high school in Pasadena, northeast of Los Angeles. Her parents were both academics. She started at Berkeley in chemistry in the fall of 2011, but soon switched to chemical engineering because she “liked the problem-solving aspects.” She has been involved with mentoring programs for underprivileged children through the Berkeley Engineers and Mentors (BEAM) program in the College of Engineering.

Says Cai, "I like being a teacher-scholar because I can help the students. I get to do all the fun stuff, I help out in lab, and I don't have to have office hours or do any grading. It's fun to hang out with chem majors. It's very interactive.

"For example," says Cai, "I had a student in a lab for organic chemistry for non-majors. He was insecure and wanted to finish quickly. I worked with him and tried to make him relax. He stopped worrying about the time crunch and became more confident about his lab skills."

Matt Nersesian is another stalwart teacher-scholar. He was raised in Santa Rosa, CA, where his father first worked for Agilent and later became the CEO of Keysite Technologies, an Agilent spinoff. Nersesian finds time to be a teacher-scholar even though he also volunteers two days a week at a clinic at the Ft. Miley veteran's hospital, where he helps with a study involving the use of the hormone oxytocin for PTSD and schizophrenia.

"I enjoy the experience of working with my peers," he says. "It improves my ability to explain chemistry concepts. It's fun to make lab work more collaborative. I definitely help the GSI because I can be hands-on. Students are comfortable asking me questions."

Says Robak, "When it comes time to recruit new teacher-scholars, GSIs and current teacher-scholars suggest new students for the program. In some cases, we identify students who we think have potential, and we send them an email application asking them to come work with us—for free. And they do it.

"I think the Teacher-Scholars Program works because it creates a role for students with just the right amount of responsibility. They can really help the class, but they are not in charge of the room. We know the students appreciate the help. In surveys, 95 percent of them say they think the program should continue.

"It was tough to get the program up and running," she adds, "but we received a curriculum grant from the Presidential Chair Fellows program in the campus's Center for Teaching and Learning." When the program needed bridge funding to develop the assessment of the program this fall, Sunil Patel (*B.S. '93, Chem*), generously stepped in to help.

Outside the classroom, Tischhauser has been developing and implementing a rigorous assessment protocol. She is leading a small research team of undergraduates who observe and interview participants, tabulate survey data and evaluate written work. Already Robak and Marsden have modified the program in response to the results.

Notes Marsden, "I have some students who are teacher-scholars for intro-level chem classes. Meanwhile, they are taking upper division classes where they get help from their teacher-scholars. The result is something subversive in the best Berkeley sense of the word. The dichotomy between teaching and learning gets broken down, and you just have groups of students helping each other learn."

Adds Baranger, "We owe a lot to the bright, enthusiastic students who are drawn to Berkeley and who helped us get the program going. Now that it is up and running, we are talking with the physics and biology departments on campus about developing similar programs. We think the other UC campuses and large universities can learn from our success and develop programs that will work for them."



Stephanie Cai



Anne Baranger



Matt Nersesian



Sunil Patel



Mary Ann Robak



Bob Bergman



UNDERGRADUATE  
RESEARCH

## How Lauren Grant found her calling

Lauren Grant came to UC Berkeley in the fall of 2011 as a student in the College of Letters and Sciences. Raised in Orange Country in Southern California, she had focused on humanities classes in high school and had very little exposure to chemistry.

She started at Berkeley with anthropology classes, which led to an interest in physical anthropology with its emphasis on ancient humans, which in turn led her to bones. "I thought learning about isotopes and bone composition was interesting," says Grant, "so I decided to take general chemistry."

That is how she found herself walking into Pimentel Hall in the fall of 2012 for Chem 1A, introductory chemistry for non-majors. What came next was a surprise. "At first, the class was very difficult for me," says Grant. "I'd never seen the material before, while many of my classmates had."



Lauren Grant

But she worked with her GSI Katie Klymko and met one-on-one with Professor John Arnold during office hours. “Professor Arnold helped make chemistry come alive for me. I began to see that chemistry is everywhere. It fascinated me,” she says.

Grant thrived in her organic chemistry class, and by the end of the semester she wanted to become a chemistry major. She approached undergraduate dean Marcin Majda, who made her a tough offer: if, during the summer of 2013, she took Chem 3B (second-semester organic chemistry) and Math 1A, and did well, he would admit her to the major. At the end of the summer, she handed her transcript to Majda, and as promised, she became a student in the College of Chemistry.

Just a few weeks later, at the start of her third year in the fall of 2013, Grant began working as an undergraduate researcher. Her interest in research has become the driving force of her final two years at Berkeley and the focus of her undergraduate experience.

Says Majda, “Although Lauren’s path to undergraduate research was unusual, about 60 to 70 percent of College of Chemistry undergrads do at least one or two semesters of undergraduate research, and about half continue on and do three to four semesters.

“We don’t really have exact numbers, because undergraduate research is not something we attempt to plan in a top-down way. Students need to discover what interests them, talk to professors, and then make it happen.”

Had Grant been a chemistry major as a freshman, she would have taken Chem 96, *Introduction to Research and Study in the College of Chemistry*, in which first-year students learn about the research process and get to dip their toes in the water by working briefly on research topics.

“In Chem 96,” says Majda, “I discuss how to think about research. Students want to work in somebody’s lab, so I ask them, ‘What research do you want to do? Do you want to make things or measure things?’ Even after you know, it’s difficult to join a research group. Students have to have guts, drive and imagination. Research requires intellectual maturity.

“The reality is that faculty don’t necessarily need another student in their research group,” says Majda, “But undergraduate research is not about being a helper. Typically, undergrads start working with a grad student mentor. Each week they show their results to their grad student mentor and ask, ‘What do you want me to do next?’ Then one day they might say, ‘Look, I got this interesting result. I think that now we should do this next experiment.’ And the grad student can see what a great suggestion this really is and says, ‘That’s exactly what I wanted to suggest myself.’ At that point the undergrad has become a researcher.”

When Grant began to consider undergraduate research, she started by reading the current chemistry literature. She found herself drawn to articles on organometallic chemistry and its application to catalysis. Then she began to look for research groups in the college that were working in that area. That task brought her full circle by leading to the research group of John Arnold, the professor who had helped her succeed in Chem 1A.

Says Grant, “Professor Arnold paired me to work with Ben Kriegel, a grad student whose research in niobium complexes interested me. Since many organometallics are air sensitive, we work with Schlenk lines and in nitrogen-filled glove boxes. Working this



way requires lots of good technique and practice. It's like learning to play the piano—you never get good at it if you only practice a few hours a week.

“So I spent many hours each week in the Arnold lab and got comfortable with the equipment and standards. After that I began working on making new compounds. I'm always in lab, I love it. It's like magic to me, creating molecules that have never been made before.”

Grant has been assisted in her research by the Haas Scholars Program, founded in 1997 by Robert and Colleen Haas. Each year, twenty highly qualified Berkeley seniors are selected to become Haas Scholars. Applicants are evaluated primarily on the merit and originality

of their proposals for an independent research or creative project that will serve as the basis for a senior thesis.

Once selected, Haas Scholars receive mentoring from Berkeley faculty members, attend workshops to assist them with their research and writing, present their work at a conference and are provided with up to \$12,600 in financial support.

Says Grant, “For my Haas Scholars project, I'm looking at a new class of transition metal complexes based on niobium. In addition to being more sustainable than many alternate catalysts, niobium costs much less than other potential transition metals.”

Along with other College of Chemistry undergrad researchers, Grant has participated in the Saegebarth Undergraduate Research Fair, held every spring in the Hildebrand Student Learning Center and Library.

The research fair was the brainchild of Dean Majda and was organized with the assistance of the college's undergraduate advisers. Says Majda, “In previous years we had held small Honors Teas for our outstanding students in chemistry and in chemical and biomolecular engineering. But a research fair provides a greater opportunity to highlight the work of a broader group of undergraduate researchers, as well as to promote research as an important element in our undergraduate curriculum.”

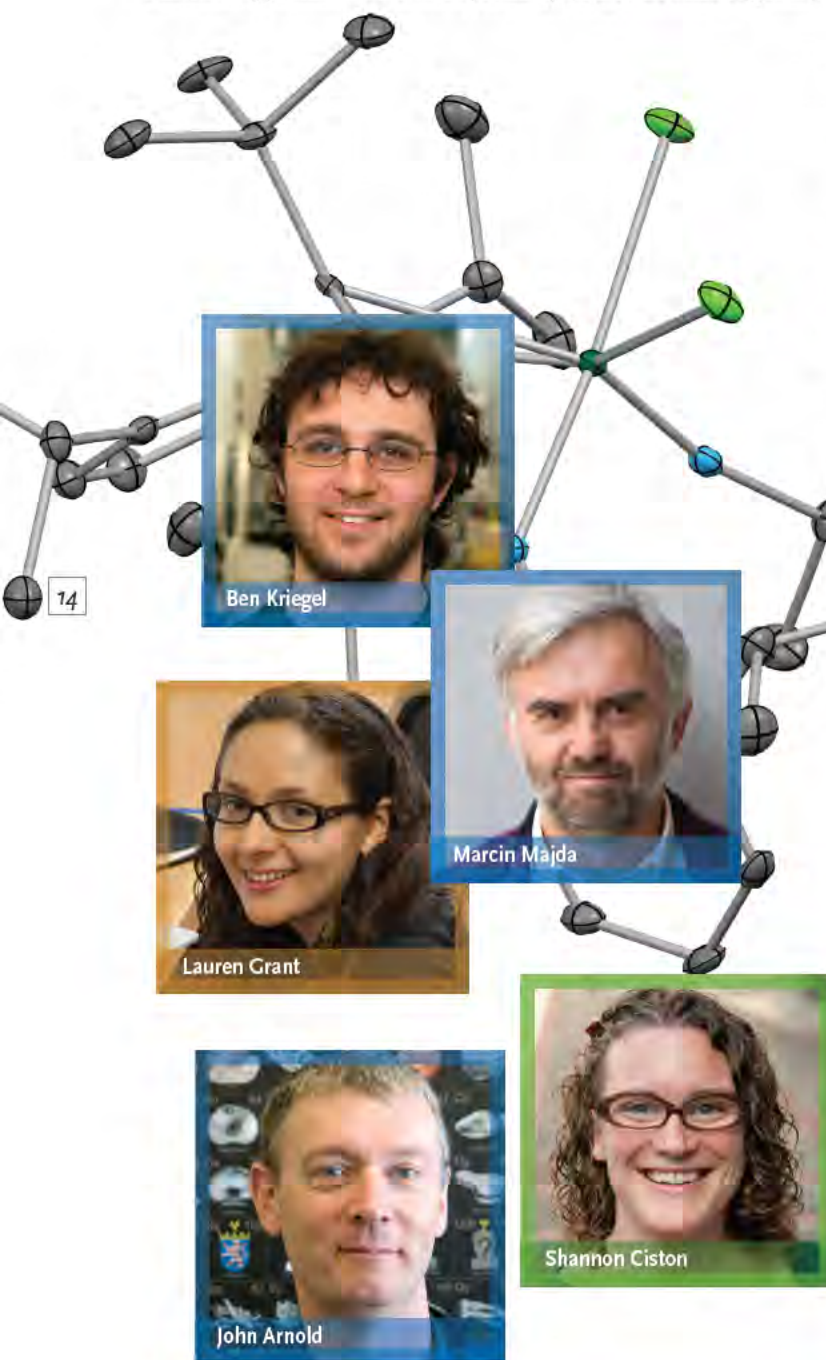
For the event, more than 40 undergraduate students create posters featuring their research, which are viewed by about 200 students and faculty members. Funding for the fair is provided through an endowment established by the late Klaus Saegebarth (*B.S. '53, Chem*) and his wife, Mary Ann.

At the research fair, Dean Majda presents college undergrads, nominated by their faculty mentors, with summer research stipends. The awards, funded through the generosity of numerous donors, including the John Stauffer Charitable Trust, allow undergraduates to conduct research at the college during summer months. Most of the stipend winners also present research posters.

Says Majda, “To further encourage undergrads to do research, and to reward their effort and success, the college has just established an honors program which offers our students an opportunity to earn honors with their bachelor's degree by performing research in a particular group for at least three semesters and writing a senior thesis.”

In the Department of Chemical and Biomolecular Engineering (CBE), Shannon Ciston, lecturer and acting director of undergraduate education, is moving forward with plans to create an innovation incubator. Says Ciston, “Our faculty felt it was time to create a lab for hands-on, student-directed work. In CBE, almost all the faculty have undergrad assistants, and many of them are ready to pursue their own projects.”

Summing up the benefits of her undergrad research, Grant concludes, “There's no place I'd rather be than in lab. Research has deepened my understanding of chemistry, which also applies to understanding my coursework. The most exciting part is making things that have never been made before, and using NMR and other tools to figure out what you have made. It's like solving a puzzle, there's really nothing else I can see myself doing in life other than chemistry. Now I am starting to apply to grad schools. My goal is to one day become a chemistry professor.”



# Curriculum innovations

The Chemical and Biomolecular Engineering Innovation Incubator—a space for student teams to work on student-director projects in research and design—will be launched by CBE in January 2015.

The Department of Chemical and Biomolecular Engineering has implemented a new course, *Introduction to Chemical Engineering Design*, which gives freshmen a broad view of chemical engineering at the start of their studies.

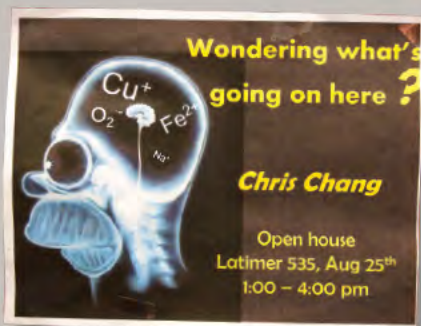
In a “flipped” classroom, students watch videos of lectures at home and save classroom time for discussion and problem solving. The CBE department is experimenting with flipping a classroom in its *Carbon Capture and Sequestration* course.



## Recruiting first-year grad students

Every fall College of Chemistry research groups post humorous flyers around the college in an informal competition to entice first-year grad students to visit the group's open house. Anecdotal evidence reveals that offers of free food dramatically increase the participation rate.

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# NEW & NOTABLE

RESEARCH • VIEWS  
DISCOVERIES • AWARDS



## NMR experiment uses Earth's magnetic field

Researchers in the lab of chemistry professor Alexander Pines and colleagues have conducted a proof-of-concept NMR experiment in which a mixture of hydrocarbons and water was analyzed using a high-sensitivity magnetometer and a magnetic field comparable to that of the Earth.

The research demonstrated the use of high-sensitivity optical magnetometers as detectors for ultra-low-field NMR relaxation and diffusion measurements. This technique might one day be used to characterize the chemical composition of fluid mixtures in their native environments.

The work was conducted in collaboration with Berkeley physicist Dmitry Budker and colleagues at the National Institute of Standards and Technology.

CHEMISTRY/LBNL

## Semisynthetic artemisinin anti-malarials reach Africa

In August, 1.7 million treatments of semisynthetic artemisinin were shipped to Africa, where they will treat malaria sufferers in six countries. The shipment is the culmination of a 13-year project in the lab of CBE professor Jay Keasling.

The shipment signals a new era of lifesaving drugs made with safe, high-quality and affordable artemisinin that is non-seasonal. By complementing botanically derived supplies, the new option can widen access to treatment for millions sickened by malaria every year—most of them young children.

This success is the result of a partnership between Keasling, Amyris Biosciences, Sanofi and PATH, which is funded by the Bill and Melinda Gates Foundation.



GABRIELLE BRIGGAM

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CBE

## Citizen-science collaboration to monitor CO<sub>2</sub> emissions

A new collaboration between a Berkeley air-monitoring project and iSeeChange, a crowdsourced online climate journal, aims to build a



citizen-science story corps to help monitor carbon emissions in the Bay Area.

Berkeley's project, the BErkeley Atmospheric CO<sub>2</sub> Observation Network (BEACON), led by chemistry professor Ron Cohen, has mounted 20 sensors on top of buildings, mostly schools and museums, across a swath of the East Bay.

Together with iSeeChange, BEACON will develop a pilot citizen-science corps to create an information network to match data with local impacts over time.

The collaboration is a way to help connect people in the community with climate data being gathered by the BEACON monitors, said Cohen.

CHEMISTRY

## BCGC wins two major grants

The National Science Foundation has awarded Marty Mulvihill, executive director of the Berkeley Center for Green Chemistry, a three-year, \$500,000 fellowship. The fellowship will allow BCGC to integrate computational toxicology and green chemistry to design inherently safer replacements for harmful industrial chemicals.

In addition, the U.S. Environmental Protection Agency has awarded more than \$335,000 to BCGC and the California Department of Toxic Substances Control for projects to help businesses and manufacturers reduce hazardous chemicals in consumer products.



COLLEGE OF CHEMISTRY

CBE

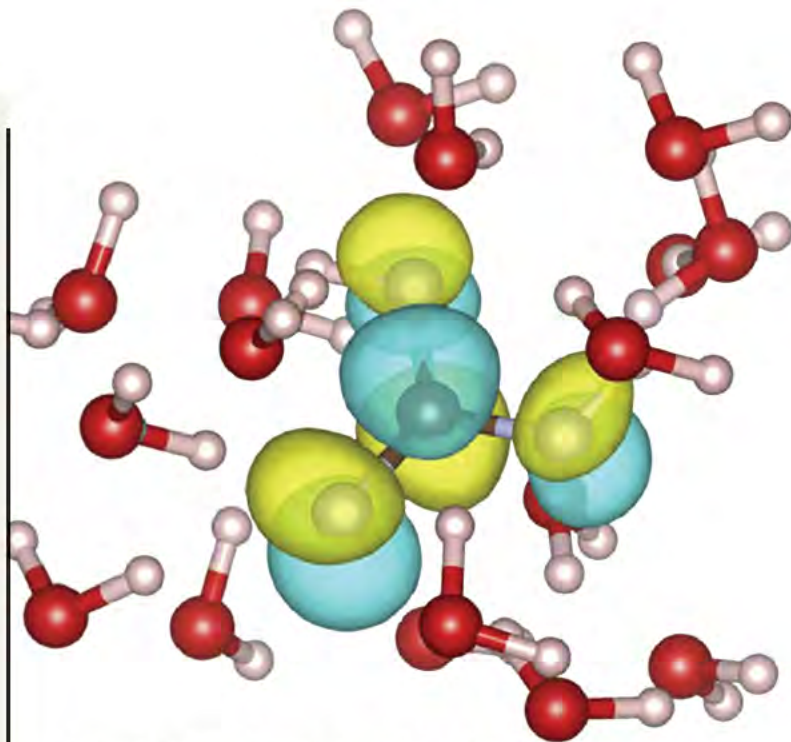


## PDP enrolls largest class to date

This fall, 30 students started CBE's Product Development Program (PDP), the largest class in the eight-year history of the program. Of the 30 students, 13 are women.

"The number of applications to PDP has grown each year since its inception in 2006," says Keith Alexander, executive director of the program. "Our new class has students from the United States, Asia and Europe."

The PDP master's degree focuses on innovation around products and industries that rely on a robust level of knowledge of the chemical sciences—a largely underserved niche in the graduate-level education market for chemical engineers and related disciplines.



## insights on carbonic acid

A study by LBNL researchers has yielded valuable new information about carbonic acid with important implications for both geological and biological concerns.

Chemistry professor Richard Saykally led a study that produced the first X-ray absorption spectroscopy measurements for aqueous carbonic acid. The results provide new insights into the hydration properties of aqueous carbonic acid that should improve our understanding of how carbonic acid regulates the pH of blood.

CHEMISTRY/LBNL

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JBEI



## Bionic Liquids from Lignin

Researchers at the DOE Joint BioEnergy Institute have developed "bionic liquids" from lignin and hemicellulose, two by-products of biofuel production from biorefineries. These bionic liquids show great promise for liberating fermentable sugars from lignocellulose.

LBNL

## GARY AND IRENE MASADA

# Remembering the opportunities, staying in touch

Gary and Irene Masada, both retired, live on a quiet street in Larkspur, in a house filled with photos and artwork of their children and grandchildren. Their backyard slopes down to a small dock on the canal where the racing sculls from the Marin rowing club glide by.

If you could get in a time machine and venture back to the time and place of each of their births, their life together would seem improbable. But the post-WWII emphasis in America on meritocratic principles and well-funded public education brought them together at UC Berkeley and gave them opportunities that they have not forgotten.

Irene was born in May 1944 in Hilo, on the rainy windward side of the big island of Hawaii. She is Sansei, or third-generation, an expression that means her grandparents were born in Japan but immigrated to America. Like many Japanese immigrants to Hawaii, her grandparents came to work in the sugarcane fields.

Unlike on the mainland, Japanese-Americans in Hawaii were not interned during WWII, although many community leaders were jailed for the duration of the war. Irene's family owned a small plot of land in Papaikou, north of Hilo, where they grew sugarcane and worked for the big sugar companies.

Gary is also Sansei. He was born in January 1945 in Granada War Relocation Center, a Japanese-American internment camp in Colorado. At the end of the war, his family drove back to Petaluma, CA, where his maternal uncle had a chicken farm that was maintained by neighbors in their absence. His mother recalls how the motels along the route back to California suddenly had no vacancies when they appeared, and how they slept in dilapidated basement rooms.



Irene and Gary Masada

Gary graduated from Petaluma High School in 1962 and started that fall at Berkeley as a physics major, but switched to chemistry at the start of his junior year. "My adviser was James Cason, who was a southern gentleman from Louisiana," recalls Gary. "He was the first professor who made a difference in my career. He encouraged me to always stay ahead of the professor, so that by the date of the lectures they were a review. I've carried that lesson with me throughout my life."

It was in a friend's dorm room that Gary saw a pencil drawing of Irene. She was taking classes at the junior college back in Hilo and was writing letters to a friend of Gary's who had been educated in Japan and wanted to practice his English writing skills.

"Just for fun," says Gary, "I took over the letter writing and added a second level of meaning in the letters. I wanted to see if anyone would notice, and Irene's older

sister did. After that, on a whim, we sent Irene a UC Berkeley application."

Says Irene, "The application came in the mail. I had never thought about applying to Berkeley, but I filled out the application and was accepted. I spent my last two years of college studying chemistry at Berkeley, 1964 to 1966, and graduated at the same time as Gary.

"We both had been accepted for chemistry grad school at the University of Washington, but we spent our summer working in the chemistry department at Berkeley. I worked for Andy Streitwieser, and Gary for Henry Rapoport. I hitched a ride up to Seattle with Gary in his car. At that time we were still just friends. But the romance blossomed at UW, and we got married in 1969."

At UW, Gary chose to join the research group of Hyp Dauben, an organic chemist

and the older brother of Berkeley's William Dauben, also an organic chemist. Both brothers had earned their Ph.D. degrees at Harvard, Hyp in 1941 and Bill in 1944.

"Hyp loved Berkeley students because we were well prepared," says Gary. "We still worked hard, but life at UW was easier for us than many other students. At least until my second year, when Hyp died from a stroke while attending a conference at UCLA.

"I had just won an NIH award for my research proposal, but at first I couldn't find any faculty members who felt they had the background to work with me. I finally found Arthur "Andy" Anderson, a professor who had been on a sabbatical to Australia in my first year. Henry Rapoport back at Berkeley told me Anderson was a good guy, and so I finished my Ph.D. in Andy's group."

Meanwhile Irene joined the research group of mechanistic organic chemist Yeshayau Pocker. Both Gary and Irene graduated from UW in 1972. Gary's Ph.D. degree involved a few stops and starts, but he spent his career at one company, Chevron. It was Irene's career that took the twists and turns.

"I taught at Sonoma State University for seven years, from 1972 until 1979," she says. "Then I spent five years with Chevron. In 1985 I moved to Milligen Biosearch, a company that manufactured devices for synthesizing DNA. When the parent company, Millipore, moved Milligen to Boston, the facilities were rented by a company called Glyko.

"I stayed to help clean up and transfer the buildings, but was hired by Glyko. In 1991, John Klock, the founder of Glyko, started another company, Biomarin, which bought Glyko. Biomarin pursued orphan drugs. I was one of the first four employees hired in 1991, and I stayed until I retired in 2004."

Orphan drugs are medications that treat rare diseases and have such a small market

that big pharmaceuticals typically aren't interested. Biomarin has been very successful in developing drugs to fight phenylketonuria (PKU) and various types of rare, debilitating lysosomal storage diseases.

Gary, on the other hand, spent his whole career at one company, working his way up to the position of Chief Information Officer for Chevron before his retirement in 2008. Says Gary with a smile, "I always got jobs I didn't want at first, but they turned out to be a lot more interesting and fun than I thought."

From the beginning, Gary's career at Chevron was auspicious. In 1972 Gary was the only chemist hired by Chevron Research Company in Richmond, according to Bruce Stangeland (*Ph.D. '67, ChE*), who would become one of his early supervisors.

Says Gary, "From 1972 to 1978 I was a senior research chemist working on lubricants. Then the management sent me to the headquarters in San Francisco for 'broadening,' where I wrote a \$500 million proposal to develop the Richmond lube project based on Chevron's proprietary hydroprocessing technology."

Hydroprocessing is a major innovation in petrochemical processing that uses hydrogen in conjunction with special catalysts to remove oxygen, nitrogen and sulfur impurities, and to crack long chains into shorter ones.

After a variety of assignments of increasing responsibility, he was promoted in 1981 to group leader of distillate processing for Chevron Research Corporation and, in 1982, was named manager of hydroprocessing.

In 1989, the company's research arm was reorganized as the Chevron Research and Technology Corporation (CRTC), and Gary was named group manager of the lubricants and specialties unit. In 1994, he became the manager of both Workforce Planning and Leadership Development and corporate human resources. In 1998

Masada became president of CRTC, which by then had expanded to include engineering, laboratories, catalysts, and environmental health and safety.

Then, in 2003, Masada was asked to become Chevron's Chief Information Officer. "The problem was," says Gary, "I didn't know anything about computers. So I got some CIO magazines and attended CIO conferences, and I realized that major IT projects often didn't turn out right for big corporations, and the CIO usually got the blame.

"Once again, I wasn't sure I wanted the job, but it turned out to be a lot of fun trying to fix the problems. We had good people, but they had to be freed to solve the problems. It was more a matter of creating a new business model and a vision of how we could help the company."

Although they have come a long way since the second-class citizenship they faced in their childhood, Gary and Irene remain unpretentious. They still live in the same house they bought 30 years ago, and when it's time for golf, a favorite pastime, they tend to avoid the elite country clubs.

Instead they drive back across the San Rafael Bridge to the Richmond Country Club. Says Gary, "We used to refer to the club as a 'working man's club.' It has a diverse membership—the only thing that is the same about the members is that they all love to play golf. It is the antithesis of a traditional country club."

The Masadas have maintained their connections to UC Berkeley. Gary serves on the College of Chemistry Advisory Board and on the Advisory Council of the Lawrence Hall of Science, and together they have attended many alumni events.

Says Gary, "Although we enjoyed our grad school years at UW in Seattle, Berkeley will always be our alma mater, and given that we live close by, we like to stay in touch."

# In Memoriam

## Faculty

### ROBERT E. "BOB" CONNICK



DENNIS GALLOWAY

Robert E. Connick, professor emeritus of chemistry and college alumnus, died at his home in Kensington, CA, on August 21, 2014, at the age of 97.

Connick earned both a B.S. ('39) and a Ph.D. ('42) in the College of Chemistry, with

William Bray as his research director.

Hired as a Berkeley instructor in 1943, he became a full professor in 1952, the year he married the late Frances Spieth Connick (*Ph.D. '47, Chem with Axel Olson*). His areas of research included NMR, reaction kinetics, ligand exchange reactions, hydrolytic oligomerization, ruthenium chemistry, sulfur chemistry and computer modeling of exchange reactions.

Connick served not only as chair of the Department of Chemistry (1958–60) and dean of the college (1960–65), but also as a Berkeley vice chancellor (1965–71) and chair of the Academic Senate of both Berkeley (1972) and the UC system (1982–83). In recognition of his exemplary achievement and service, he was awarded the Berkeley Citation in 1971 and the Berkeley Medal—the university's top honor—in 1988, upon his retirement.

Connick touched many lives over the course of his career. One of his students, James Y.P. Tong (*B.S. '50, M.S. '51, Chem*), recently established an undergraduate scholarship fund in Connick's name (see *Catalyst*, Vol. 9, No. 1) in tribute to Connick's mentorship.

Bob and Frances Connick were generous supporters of the college and beloved members of the G. N. Lewis (pre–1946) and the Cupola (1946–63) alumni eras.

### HEINO NITSCHKE



Professor of Chemistry Heino Nitsche died unexpectedly in his sleep on July 15, 2014, at the age of 64.

Born in Munich, Germany, Nitsche earned his chemistry Ph.D. in 1980 from the Freie Universität Berlin, where he wrote his dissertation on the transference numbers of neptunium.

He joined LBNL as a staff scientist in 1980 and by 1984 he was running his own research group, focusing on the environmental chemistry of actinides. From 1993 to 1998, he served as the head of the Dresden-Rossendorf Research Center in Germany and the director of its Institute of Radiochemistry and was a full professor of radiochemistry at the Technische Universität, Dresden.

Nitsche returned to Berkeley in 1998 to become a full professor in the chemistry department and a senior research scientist at LBNL. Along with collaborators, he confirmed the existence of element 114, first synthesized by researchers in Dubna, Russia. Earlier this year, at the GSI Helmholtz Center for Heavy Ion Research in Darmstadt, Germany, he helped confirm the existence of element 117. Several of his former students and LBNL colleagues were on the team.

Nitsche, who had an active research group at the time of his death, was a dynamic and beloved educator in the college. He was a main organizer of a symposium in 2012 honoring the 100th birthday of Glenn T. Seaborg. In 2014 he won the Hevesy Medal, the premier international award of excellence honoring outstanding achievements in radioanalytical and nuclear chemistry.

Nitsche and his wife, Martha Boccacini, who survives him, have been loyal supporters of the college and its programs.

## Friends of the college

### ANNETTE LYNN

Annette Lynn, wife of emeritus chemical and biomolecular engineering professor Scott Lynn, passed away on June 8, 2014, following a long illness. Annette was born on September 17, 1928, in The Netherlands. Her father was a professor of physics at the Delft University of Technology. She and Scott met when Scott was doing a postdoc at Delft. They married in 1954 and moved to America, where they raised four children. Annette and Scott, who retired in 1994, have been longtime supporters of the College of Chemistry and the CBE department.

### LYDIA C. MARKOWITZ

Lydia DeAntonis Canosa Markowitz, wife of emeritus chemistry professor Samuel S. Markowitz, passed away on September 22, 2014. Lydia was born in 1931 in Castleton, NY, where she grew up. She attended Sienna College in Albany, NY. Lydia and Sam met during their college years when he attended a dance at Sienna. After dancing together, they went their separate ways, each marrying and having a family. Lydia and Sam reconnected when Lydia's daughter married one of Sam's three sons. They were married about 15 years. Lydia and Sam have been faithful supporters of the college, as well as regular guests at the Dean's Dinner and alumni era luncheons.

### ANN E. PITZER



PITZER FAMILY

Ann E. Pitzer, a trustee of the Pitzer Family Foundation and a dear friend of the college, died of cancer on October 15, 2014, at the age of 77.

Ann was the daughter of the late emeritus chemistry professor Kenneth S. Pitzer (*Ph.D. '37, Chem with Wendell Latimer*) and his wife, Jean Mosher Pitzer. Professor

## Alumni

Pitzer, a renowned physical chemist, was the founder of theoretical chemistry at Berkeley, a dean of the college (1951–60), a president of Rice and Stanford universities and, together with his wife, a generous philanthropist.

Ann and her brothers, Russell M. and John S. Pitzer, grew up in Kensington, CA. Ann, the eldest, obtained a B.A. in 1958 from UC Davis in home economics, followed by a master's degree from Berkeley (*M.S. '60, HomeEc*). She spent the majority of her career as a software developer, employed at Science Applications International Corporation in San Diego for 23 years. Her husband, Fred Bromley, died in 2001.

Following their father's death in 1997, Ann and her brothers formed the Pitzer Family Foundation to continue the philanthropy initiated by their grandfather, Russell K. Pitzer, and actively maintained by their parents. Ann's brother Russ is an emeritus chemistry professor at Ohio State University, and John is a retired economist whose employers included the federal government and the International Monetary Fund.

In recent years, the family foundation had been one of Ann's priorities. Last year she noted, "Although the foundation has a very broad mandate, higher education and the Berkeley campus tend to be a focus for our work. Berkeley was really home to both of our parents."

The Pitzer Family Foundation has been an outstanding source of support for the College of Chemistry. It has endowed both the Kenneth S. Pitzer Center for Theoretical Chemistry and the Kenneth S. Pitzer Distinguished Professorship in Chemistry, a chair currently held by Martin Head-Gordon. Thanks in part to the Pitzer family's ongoing philanthropy, the college houses what is arguably the finest theoretical chemistry group in the nation.

'41 We have learned from his wife, Ella Jane, that **John R. Skinner** (*B.S. Chem*) passed away on November 11, 2013, at the age of 94. He was retired from a long career as a staff engineer in research and development at Shell Oil in Emeryville. For many years, the Skinners generously supported the college and its programs, attended Cal football games and were frequent guests at college events. Not long ago, they communicated to us their gratitude for their fortunate circumstances and their pleasure at being able to give liberally to Berkeley.

'43 **Fred J. Leitz** (*Ph.D. Chem with Joseph Kennedy*) died on July 4, 2014, at the age of 93. One of the youngest students to earn a Ph.D. in chemistry at Berkeley, he served his country as a nuclear physicist on the Manhattan Project, followed by a successful career in Richland, WA, working to produce safe nuclear power. Leitz was an active volunteer in his community throughout his adult life.

'44 **Chandler H. Barkelew** (*Ph.D. Chem with Melvin Calvin*) passed away on July 31, 2014. Barkelew graduated from Pomona College, Phi Beta Kappa, before earning a Ph.D. at Berkeley. Involved in the Manhattan Project and early nuclear chemistry research, he then worked as a research chemist at Shell Oil for 39 years in California, The Netherlands, Tennessee and Texas. He was a member of the American Chemical Society, the American Institute of Chemical Engineers, Sigma Xi and the Chemical Heritage Society, and authored numerous technical publications. He was also a talented clarinetist. Both he and his wife, Virginia, who survives him, have been generous supporters of the college.

**Edgar F. Westrum** (*Ph.D. Chem with Kenneth Pitzer*), a professor of chemistry

at the University of Michigan for 43 years, died on May 7, 2014. Westrum joined the Manhattan Project and worked under Glenn Seaborg to isolate plutonium. He was among some 155 atomic scientists who urged FDR not to use atomic weapons. Following WWII, he joined the University of Michigan faculty and devoted himself to the thermodynamics of low temperatures. He published 630 scientific papers and was a co-founder and co-editor of the *Journal of Chemical Thermodynamics*. He held many offices in professional organizations, including the international Committee on Data for Science and Technology.

'48 **Joanne L. Hurley** (*B.A. Chem*), who made her home in Rio Vista, CA, passed away on April 10, 2014. Her daughter, Ann Walker, tells us that Hurley was the first female chemist hired by the California state agriculture department.

'50 **Richard H. Busey** (*Ph.D. Chem with William Giauque*) passed away on August 3, 2014. Busey worked as a research chemist at the Oak Ridge National Laboratory for 31 years, specializing in low-temperature calorimetry. Late in his science career, Busey conceived and designed a unique micro-calorimeter and was recognized for this work by the Calorimetry Conference in 1990 with a Christensen Award. Busey had a lifelong interest in woodworking and was well known for his custom-built furniture. He and his wife, Mary, who survives him, have long been supporters of the college.

'51 **Fred P. Brauer** (*B.S. Chem*), a retired senior nuclear research scientist for Battelle Northwest in Richland, WA, passed away on April 4, 2014.

'53 **Francesco Asaro** (*B.S. '49, Ph.D. Chem*), who passed away on June 10, 2014, conducted groundbreaking research with Isadore Perlman that helped support the now-accepted unified model of the atomic nucleus. He and Perlman also



pioneered the technique of neutron activation analysis (NAA); their 1969 paper became a landmark in the field. Asaro was a senior scientist in the nuclear sciences and the environmental energy technologies divisions of LBNL. He spent much of his career developing NAA to help determine the origins of artifacts. He was a member of the team that proposed that an asteroid struck the Earth 65 million years ago, causing the Cretaceous-Tertiary mass extinction, which wiped out more than half of all species on the planet, including the dinosaurs. Asaro's daughter, Marianna F. Lee, is also a College of Chemistry alum (B.S. '80, Chem), and his son, Frank, earned a B.A. in English at Berkeley in 1972.

**Walton P. "Walt" Ellis** (B.S. Chem with *George Pimentel*) died on July 30, 2014. He obtained his Ph.D. in chemistry from the University of Chicago in 1957. He then moved to Los Alamos where he was a research chemist for 35 years, publishing numerous research studies worldwide. A supporter of the college, he loved to travel with his family, visiting all seven continents.

**Klaus A. Saegebarth** (B.S. Chem with *William Dauben*), a generous supporter of education in the College of Chemistry, passed away on April 16, 2014, at the age of 85. Saegebarth earned his Ph.D. at the University of Washington in 1957 and made his career at the E.I. duPont de Nemours Company in Wilmington, DE. At the time of his retirement in 1992, he was vice president of R&D. His entire career was devoted to research. Together with his wife, Mary Ann, who survives him, he established several endowed funds in the college to support undergraduate and graduate student research and education; the college

has named our annual undergraduate poster fair after him. Klaus's sister, Ellen, is also an alum of the college (B.S. '61, Chem).

**Raymond L. Ward** (B.A. Chem), who lived in Castro Valley, CA, passed away on July 18, 2014. Ward obtained his Ph.D. in physical chemistry from Washington University in Saint Louis. He then worked for more than 40 years at the Lawrence Livermore National Laboratory (LLNL) prior to his retirement.

'57 **Wesley D. "Wes" Ludemann** (B.S. ChE; B.A. '49 Math; M.S. '59, Ph.D. '69, MSE), who first earned a B.A. in mathematics at Berkeley in 1949, died on January 6, 2014. After serving in the Korean War, Ludemann returned to Cal to obtain a B.S. in chemical engineering, which he followed with an M.S. and Ph.D. in metallurgy. He earned his living as a metallurgist at LLNL, but his life was characterized by a very wide range of interests. Inspired while stationed in Japan by a climb up Mt. Fuji, he went on to backpack in the Sierras, complete several high-altitude treks in the Himalayas and Ecuador, and climb Mt. Kenya and Mt. Kilimanjaro. He also taught several forms of folk dance and played the fiddle and the Finnish zither. During his last 11 years, Ludemann lived half-time in Port Townsend, WA, and half-time in Livermore, CA.

'58 **William S. "Bill" Harris** (Ph.D. Chem with *Charles Tobias*) passed away on August 5, 2014. Harris obtained his undergraduate degree from the University of Oregon in Eugene. After graduate school, he worked at the Naval Weapons Center in Norco, CA, where he developed lead-acid batteries for submarines and invented various devices for which he held patents. In 1970, he moved with his family to Napa Valley and became head of the department of non-destructive testing at Mare Island Naval Shipyard. Making his home in

Yountville, CA, he was a valued, active member of the Friends of the Yountville Library.

**Glen O. Hultgren** (B.S. Chem with *Kenneth Pitzer*) died April 7, 2014, in Berkeley, CA. He obtained a Ph.D. in chemistry from Caltech in 1966, worked first as a nuclear safety engineer in Hanford, WA, for many years, then as a computer programmer, and finished his career at MacNeal Schwendler, a software company in Eagle Rock, CA. He was passionate about chemistry and math.

**Rodney J. O'Connor** (Ph.D. Chem with *Henry Rapoport*) passed away on August 7, 2014, in College Station, TX. O'Connor was the director of freshman chemistry at Texas A&M from 1973 until his retirement in 1986. After retiring from Texas A&M, he held various other teaching positions and owned and operated several successful businesses.

'59 We have learned from alumni **Geoffrey Cooper** (B.S. '71, Pdoc '79, Chem) and **Gordon Gribble** (B.S. '63, Chem) that **Lloyd J. Dolby** (Ph.D. Chem with *Donald Noyce*) passed away on May 16, 2014. Following a postdoctoral year at the University of Wisconsin, Dolby joined the faculty at the University of Oregon, where he taught organic chemistry from 1960 until he retired in 1991. In 1980 he founded Organic Consultants, where he conducted pharmaceutical research until 2013. Dolby was known for his pioneering work in both organic synthesis and physical organic chemistry. His work included topics ranging from secondary isotope effects to alkaloid synthesis. He was also an expert fisherman.

'61 **Edward R. Fisher** (B.S. ChE), who obtained a Ph.D. in chemical engineering from Johns Hopkins University, passed away on August 2, 2014. He was a



SÄEGEBARTH FAMILY

professor of chemical engineering for 50 years, first at Wayne State University in Detroit and then for 20 years at Michigan Technological University in Houghton, MI. Since his retirement ten years ago, he dedicated himself to the Village of Lake Linden, writing grants for historical improvements, establishing a farmer's market and assisting in building skateboard ramps for the Village Park.

**Tony K. Ling** (*B.S. ChE*), a faithful and generous alum of the college, passed away on July 19, 2014, at the age of 80. Ling earned an M.S. in chemical engineering from Stanford University. He was a retired manager of



China Operations for Chevron Overseas Petroleum. In the words of Maria Ling (*B.A. '86, Econ*), his daughter-in-law, "Tony truly loved Cal and all it has done for him and his family." He and his wife, Louisa, who survives him, established two endowments in the college in support of students: The Ling Family Award for Undergraduates and the Tony and Louisa Ling Undergraduate Scholarship Fund, which was matched by the Ford Challenge Endowed Scholarships program. Tony's sons, Allen (*B.A. '83, Microbio/Immun*) and Lambert (*B.S. '81, EECS*), earned Berkeley degrees, and his granddaughter, Rachel, is an alumna of the college (*B.S. '13, ChE*).

'69 **Aaron D. Kossoy** (*Pdoc Chem with Henry Rapoport*) passed away on June 4, 2014. Kossoy earned his B.S. at City College of New York and his Ph.D. from Polytechnic Institute of New York University. He was retired from Eli Lilly and Company and lived in Tucson, AZ.

'71 **Daniel Howlett** (*M.S. Chem with Gabor Somorjai*), a member of the first incoming undergraduate class at UC

San Diego, died of heart failure in his home on May 6, 2014. Howlett, who earned his D.D.S. degree from the UCSF School of Dentistry, practiced dentistry for more than 40 years and was a partner in Howlett & Renfer in Concord, CA. Among many activities, he taught jewelry-making at Mt. Diablo Adult Education.

'74 **David W. "Dave" Benzing** (*B.S. ChE*) passed away on July 29, 2014, at the age of 61. Benzing, who earned a Ph.D. in chemical engineering from Princeton University, joined Signetics Corporation in 1978, working in plasma etch development for their Advanced Technology Center in Sunnyvale. After holding leadership positions at both Applied Materials and Anelva Corporation, Dave and his brother, Jeff (*B.S. '79, Mech Eng*), founded Benzing Technologies of San Jose in 1984, which developed the industry's first stand-alone in-situ plasma based cleaning system for hot-wall LPCVD reactors. In 2000 Dave founded Innovative Silicon Systems, providing reactor design and process development consulting services to semiconductor equipment and device manufacturers. He held nine U.S. patents for his work in the area of processes and equipment for semiconductor device manufacturing.

'76 **Peter G. Boisvert** (*M.S. ChE with Eugene Petersen*), who obtained his undergraduate degree from UMass Amherst, died of multiple myeloma on April 13, 2014. Boisvert worked as a chemical engineer at Bayer Corporation from 1976 to 1999; during this time he also graduated first in his class in computer science from the University of Hartford. In 1999, he became the production manager at Deerfield Urethane, and from 2007 to 2014 he worked as an independent contractor for Bayer. A lifelong autodidact, he taught himself German, Japanese, and

many computer languages. He was an avid conservationist and environmentalist.

'81 We have belatedly learned that **David J. Roha** (*M.S. ChE with Rolf Muller and Charles Tobias*) died on July 18, 2013. Roha obtained his Ph.D. in electrochemical engineering from Case Western Reserve University in Ohio and was employed by Alcoa as a senior scientist from 1990 until his death. His work with Alcoa resulted in more efficient aluminum production methods for which he was awarded patents. Roha was a passionate scholar of history and science.

'88 **Carolyn H. Gondran** (*Ph.D. Chem with George Pimentel*), who did her postdoc at the University of Texas at Austin, passed away peacefully at home on June 29, 2014. She graduated from Smith College with degrees in chemistry and physics. While an undergraduate, she developed a passion for rowing, which remained an important part of her life until she became ill with ALS. She worked as a materials scientist at Sematech in Austin, TX, for seventeen years, where she published dozens of technical papers. Gondran left the high tech industry in 2007 to pursue her dream of teaching, both at Austin Community College and UT Austin.

'02 **Leigh M. Warren** (*Ph.D. Chem with Paul Bartlett*) died on June 12, 2014. After graduating from Berkeley, Warren went on to obtain her J.D. from Columbia Law in 2006 and an L.L.M. in Health Law and Policy from American University in 2010. At the time of her death, she was with the Public Health & Science Division of the Office of the General Counsel of the U.S. Department of Health & Human Services in Rockville, MD.

COMPILED BY KAREN ELLIOTT

# ANNUAL REPORT of private giving 2014

It's my pleasure to report on the first fiscal year of my tenure as dean. We have had a fortunate year, thanks to the great generosity of our community and the sustained efforts of our faculty, staff and students.

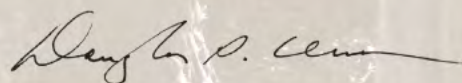
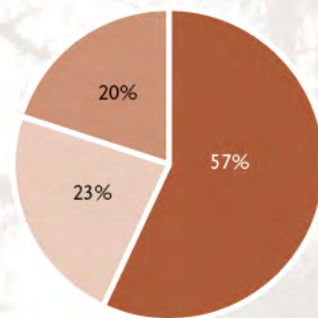
In this report you will see listed the many names of the people and organizations that make up our vibrant community—alumni, students, parents, and corporate and individual friends. Every single one of you is important to us. The success of the college depends on you! We are deeply grateful for your participation in our central enterprise: providing the very best chemical sciences research and instruction to our students and equipping them to thrive in our modern world.

Highlighted in these pages are several members of our wide community: two married alumni who made their careers in the chemical sciences; a current student and his parents; and a dear longtime friend. I hope that their stories will resonate with you as representative of the many ways the college touches our lives.

I'd also like to acknowledge, in particular, all the efforts on the part of our faculty support administrators who tirelessly assist our principal investigators in bringing in research grants to fund their experiments. We are indebted to the hard work and generosity of so many people, here within our walls and extending far beyond to all of you, around the globe!

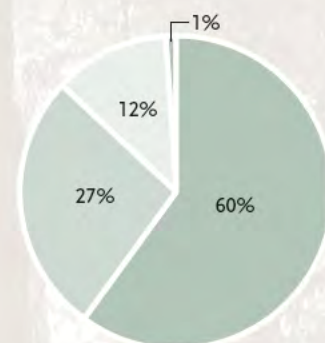
I look forward to our continued partnership.

With deep appreciation,

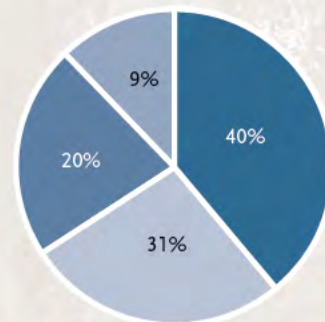
## SOURCES OF PRIVATE FUNDS

Individuals	\$5.45 M	57%
Private Foundations/ Nonprofit Organizations	\$2.20 M	23%
Corporations/ Corporate Foundations	\$1.91 M	20%
<b>Total</b>	<b>\$9.56 M</b>	<b>100%</b>



## ALLOCATION OF ENDOWED FUNDS

Student Support	\$0.50 M	60%
Endowed Chairs	\$0.23 M	27%
Unrestricted	\$0.10 M	12%
Research	\$0.01 M	1%
<b>Total</b>	<b>\$0.84 M</b>	<b>100%</b>



## ALLOCATION OF OPERATING FUNDS

Research	\$3.51 M	40%
Capital	\$2.68 M	31%
Unrestricted	\$1.72 M	20%
Student Support	\$0.81 M	9%
<b>Total</b>	<b>\$8.72 M</b>	<b>100%</b>

# donors to the college

The first three donor clubs listed—the California Benefactors, the Blue and Gold Society and the 1868 Society—are cumulative clubs. Donors’ lifetime giving to the College of Chemistry determines their club level. The remaining clubs are annual—the club level shows each donor’s giving during the 2013-14 fiscal year.

## Cumulative Clubs

*Cumulative Clubs include each donor’s total giving through June 30, 2014.*

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*Gifts received between July 1, 2013, and June 30, 2014.*

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D O N O R P R O F I L E : T H E P H I L L I P S F A M I L Y



Alums Richard (Ph.D. '82, Chem) and Helen (B.A. '79, Physiology) Phillips and son Greg (B.S. '15, ChemBio), relax on the porch of the Bancroft Hotel just a few steps from the Berkeley campus.

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## THE PHILLIPS FAMILY SUPPORTING THE NEXT GENERATION OF UNDERGRADUATE RESEARCHERS

Richard Phillips was born in Los Angeles in 1954, grew up in Anaheim and graduated from UC Irvine in December 1976 with a B.S. in chemistry. It was at Irvine that he met his wife-to-be Helen, who was three years younger.

Richard came to the College of Chemistry for graduate school in the fall of 1977. Here he studied physical and medicinal chemistry in the research group of William Dauben. To be together with her new husband, Helen, who had studied biosciences at Irvine, transferred to Berkeley and completed her B.A. in the physiology department, graduating in 1979.

While a student, Helen had conducted research associated with extra-corporeal membrane oxygenation, a mechanical pump for supporting lung function. Following graduation, she worked for pharmaceutical companies and clinical re-

search organizations for many years, dropping to part time while the family's three children were young.

In 1982, doctoral degree in hand, Richard entered the job market and eventually landed a position in the pharmaceutical industry, first as an analytical chemist and eventually as a regulatory scientist. It was a tumultuous time for pharmaceuticals. The biotech revolution was in full swing, and Genentech and Amgen were providing new drugs and approaches for unmet medical needs. In 1984 the Hatch-Waxman Act made it easier for generic drugs to enter the market, and the combination of new technology and new competitors caused multiple waves of reorganization to sweep through the industry.

During the early years of his career, Richard's work led him and his family to several locations in the U.S., to Switzerland,

*continued next page*

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Henry F. Koopmann	James W. McFarland	John M. and Susan Prausnitz	Donna R. Sterling
P. G. Kosky	Robert C. McIntosh	David Rabuka	Ivan T. Stinson
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...continued

and eventually back to California. He worked for G.D. Searle, Sandoz/Novartis, Janssen, Warner Lambert Park Davis, Chugai Pharma USA, SGX Pharma, and Amgen.

Tired of the big pharma roller coaster, Richard began working for a local biotech startup, Cougar Biotechnology, where he was a senior executive in regulatory affairs and quality assurance.

Cougar developed Zytiga™, a drug to fight prostate cancer, and Johnson & Johnson was impressed enough with the drug's potential that in 2009 it bought the company. The clinical trials of Zytiga were so successful that the FDA ended them early and approved the drug in 2011.

Not ready to rest on their laurels, Cougar's executive managers, including Phillips, then started another biotech firm, Puma Biotechnology. This company is developing another drug, neratinib, that has recently completed Phase 3 clinical trials in patients with HER2-positive breast cancer.

Richard recently retired from Puma in Los Angeles and lives with Helen in Portland, OR. Their oldest child, daughter Kyra, is in her second year of a Ph.D. program in Biopsychology at the University of Michigan in Ann Arbor. Their second child, Greg, is a fourth-year student in the College of Chemistry's chemical biology program. Their youngest son, William, is studying game programming at the University of Utah.

Greg has continued the family tradition of both undergraduate research and traveling abroad, all while maintaining a focus on a biomedical career. He spent the summer of 2013 in the lab of Berkeley chemist Jamie Cate thanks to a summer undergraduate research fellowship from the Rose Hills Foundation.

He then studied Spanish in a UC Education Abroad Program in Argentina in the fall of 2013 and spent the summer of 2014 working in a low-income health clinic in Costa Rica.

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Greg finds time to work on a clinical research project at UCSF's spine center while applying to medical school. Says Greg, "Although Chemical Biology is a rigorous program, the College of Chemistry leaves room in the curriculum for students to explore. I had time to pursue a minor in Global Poverty and Practice as well as spend a semester abroad during my undergraduate education."

The Berkeley campus and the College of Chemistry have been special places for two generations of the Phillips family. Richard and Helen recently created an undergraduate scholarship fund and are working to help support the College in other areas of need. Richard and Helen are particularly interested in undergraduate research opportunities as they both consider their undergraduate research to be key to their later professional successes.

ChemBio student Greg Phillips (B.S. '15 ChemBio) chats with a young patient at a community health clinic in Costa Rica. Phillips volunteered in the clinic during the summer of 2014.



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LAURA SMOLIAR

Jingsong Zhang (*Ph.D.*'93, *Chem*), Laura Smoliar, (*Ph.D.*'95, *Chem*) and Hongtao "Ted" Hou, (*Ph.D.*'95 *Chem*), all students of emeritus professor and Nobel Laureate Y.T. Lee, reconnect at the August 2014 ACS meeting in San Francisco.

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Daniel DeGabriele (B.S. '15, ChE) and Vianca Vianzon (B.S. '15, Chem Bio) model the popular new College of Chemistry T-shirt, designed by Josephine Ung (B.S. '15, Chem).

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## ELEANOR HOLLAND HONORING A MAN WHO BELIEVED IN EDUCATION AND CHANGED LIVES

“Education underlies everything else,” says Eleanor Holland. That’s why she decided to follow in the steps of her brother-in-law Eugene Roberts (*B.S. ’39, Chem; C. Sing ’51, M.A. ’60, Educ*) and leave a bequest to UC Berkeley in honor of Roberts and his wife, June, who was Holland’s sister.

Holland has devoted her life to education. Born in San Francisco, she moved with her family when she was 13 years old to Oregon. She attended public schools in North Bend, on the Oregon Coast, where she was the salutatorian for the North Bend High School Class of ’52.

She returned to San Francisco to study theater arts at SF State with Jules Irving, founder of San Francisco Actor’s Workshop. While still a college student, she began working in the theater and traveling with the Children’s Theater of the West. After graduating in 1957, she worked with the Armed Services Entertainment in the Pacific Command.

Holland earned a teaching credential in 1958, settled down in San Francisco and began to teach in the city’s public schools. She retired 36 years later, in 1994, from Lincoln High School in the Sunset District. Along the way, she earned her M.A. at the University of San Francisco in 1968.

In retirement, Holland has been traveling to Europe, especially Italy. A lover of classical music, she now has more time for playing her piano. In one of her favorite stories, she tells how those two interests converged.

She recalls, “I had looked all over San Francisco and even called New York, but I couldn’t find the piano music for the ‘Danse of the Skomorokhi’ from Rimsky-Korsakov’s opera *The Snow Maiden*.

“While I was traveling in Europe, I met a Russian violinist. It

*continued page 36*

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Eleanor Holland and Dean Douglas Clark point to the names of June and Gene Roberts, Holland's sister and brother-in-law, on the Builders of Berkeley wall.

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...continued

was one of those chance encounters of two people who really love classical music. She was traveling with her daughter, who was learning English and who translated for us. I told them about my attempts to find the Rimsky-Korsakov sheet music.

“A few months after I got home, a big envelope arrived in the mail. My violinist friend had found the piano transcription at the Moscow Conservatory of Music, copied it and sent it to me.”

Holland has vivid early memories of her brother-in-law, Gene, a College of Chemistry alumnus. “I first met Gene when I was nine years old,” she says. “Gene was about to be shipped overseas in WWII, and he was marrying my older sister June. I remember I ran out of room screaming, ‘You’re taking my sister away from me!’

“June was 13 years older,” Holland explains, “and she was always my ‘big sister.’ My sister Betty, who was two years younger than June, had already married and left home by then.

“Gene spent most of his career teaching chemistry at San Francisco City College,” she remembers, “but he was a well-rounded scholar. He introduced me to Shakespeare when I was ten. I still have his collection of Shakespeare’s plays, each individually leather bound and showing the wear of good use.” Holland remained close to June and Gene for the rest of their lives. June died in 2009 and Gene in 2012.

Says Holland, “My entire career was based on one question from my high school civics teacher. He asked each of us to tell the class what vocation we wanted to enter and what it contributes to society. I’ve operated on the premise that, if God gives you a reasonably good mind and allows you a reasonably good education, you are, in my opinion, obligated to ‘give back’ to the community you live in. I was able to do that through teaching, and now in retirement, through philanthropy.

“Gene and June strongly influenced me. None of us had extravagant tastes,” Holland says. “We lived modestly, taught for many years and retired comfortably. But it wasn’t until

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after his death that I realized how much Gene had changed our lives. Gene was a strong believer in education, and Berkeley was his first choice for donating a portion of his estate. I know he would approve of my making sure that another portion of his life savings be given for the benefit of the university's College of Chemistry."



Eleanor Holland with Gene Roberts (B.S. '39, Chem) at a G.N. Lewis Era alumni luncheon.



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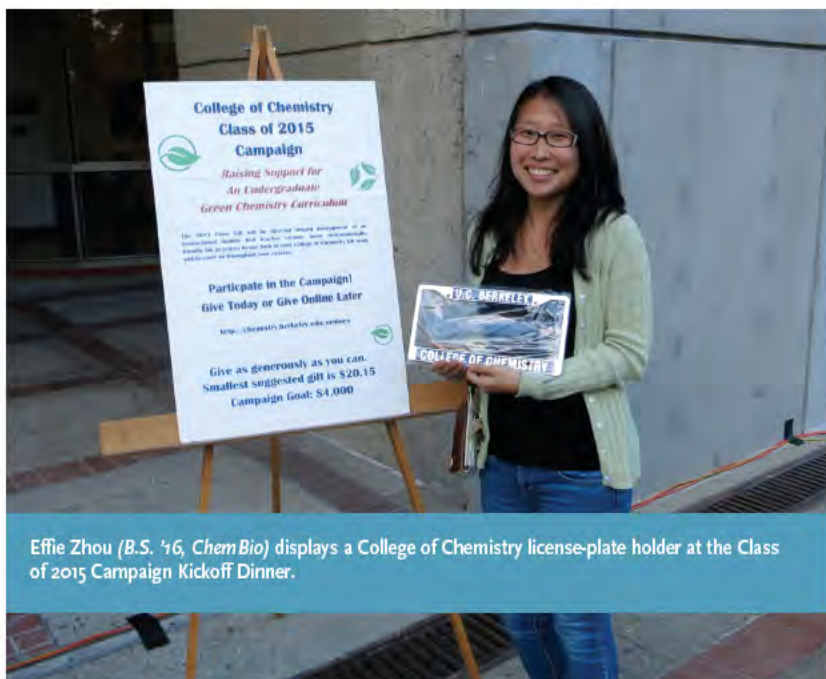
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Effie Zhou (B.S. '16, ChemBio) displays a College of Chemistry license-plate holder at the Class of 2015 Campaign Kickoff Dinner.

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Chevron's Shariq Yosufzai and Dean Douglas Clark cut the ribbon at the Chevron Computing Center's grand reopening in Tan Hall.



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2013-14

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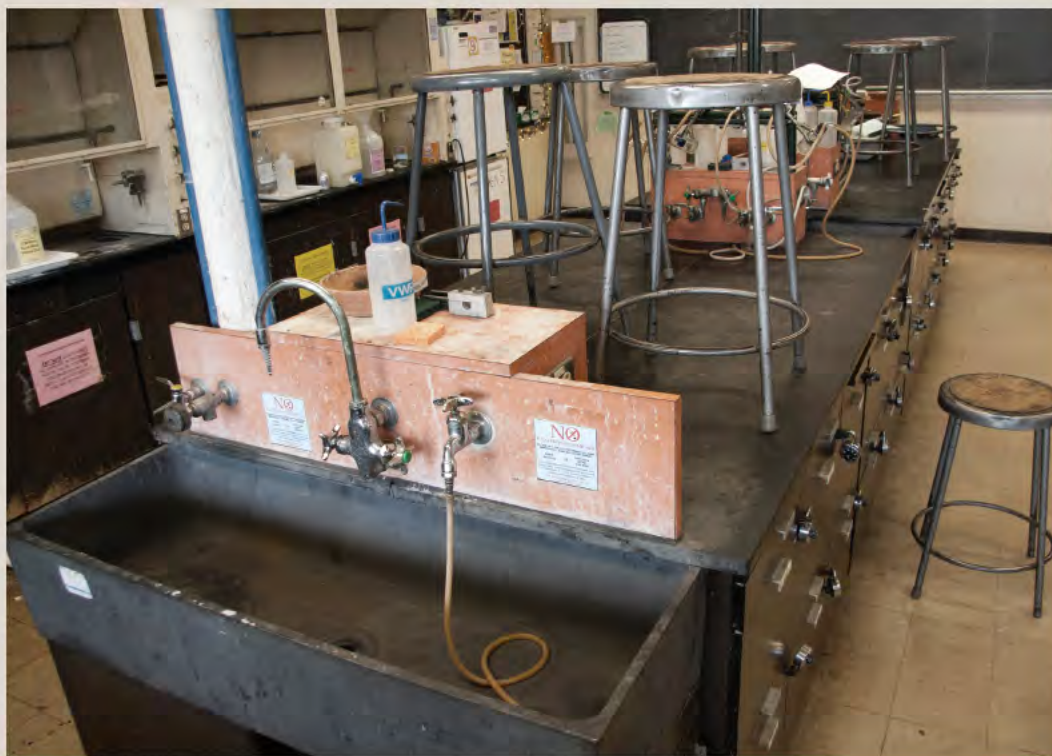
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## Latimer Hall labs

This photo of an aging teaching lab is not as old as you might suspect. The photo was taken in late 2009, five years ago. The teaching labs in Latimer Hall had never been updated since the building's construction in 1962. In the last five years, almost all of the teaching labs in Latimer have been renovated with support from the Dow Chemical Company and the college's community of donors.



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We've moved to email for most event invitations and notices.

Please take a moment to update us at [chemistry.berkeley.edu/email](http://chemistry.berkeley.edu/email)

## Upcoming Spring 2015 Events

### Free Radicals & Chemillenniums Event

**TBA** College of Chemistry alumni and friends from the attending years 1964–99 are invited to attend this event.

**Cal Day** **College of Chemistry, UC Berkeley Campus**  
**April 18** Join us for a campus-wide day of activities! Lab tours and activities for kids will be offered in the College of Chemistry. Check the website closer to the date for a complete list of events and programs: [calday.berkeley.edu](http://calday.berkeley.edu)

A description of the college's Cal Day programs will be available online in early 2015.

**Springfest** **Location to be determined**  
**April 30** Join us in celebrating the graduating class of 2015—both undergrads and grads are invited! *This is a complimentary event, and reservations are not required.*

**College of Chemistry Commencement**  
**May 16** Commencement speaker TBA

+ For updated event information visit [chemistry.berkeley.edu/alumni/events.php](http://chemistry.berkeley.edu/alumni/events.php)

