

Change service requested

Volume 34, Number 3
2009

Caltech News

In This Issue

Modern Provost

Futuristic Pundit

and

Legendary Peaks



Caltech News



ON THE COVER: Students try out a new site for Freshman Camp (in Idyllwild) and an enhanced program of activities. In this challenge, they attempt to switch places along a log without speaking or touching the ground, explains John Roberts (far right), Institute Professor of Chemistry, Emeritus.

3 21st Century Provost

A Q and A with Caltech Provost Steve Koonin '72.

5 Ray Bradbury Chronicles the Lessons of Life

The science fiction writer urges Techers to find out what "you want to do and *do* it."

10 Hua Shan Rises

Two alums explore folklore and footpaths atop a legendary Chinese mountain.

Also in this issue:

The Broad Center breaks ground; two late alumni are commemorated with a fellowship and prizes; alums cast a wide net—in letters, class notes, and aboard fishing boats; and a postdoc simulates a sight for sore eyes on the back-page poster.

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Issued four times a year and published by the California Institute of Technology and the Alumni Association, 1200 East California Blvd., Pasadena, California 91125. All rights reserved. Third class postage paid at Pasadena, California. Postmaster: Send address changes to: *Caltech News*, Caltech 1-71, Pasadena, CA 91125.

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U p F r o n t

HIXON GIFT FUNDS WRITING CENTER

Caltech has received a \$1.1 million gift from Pasadena philanthropists Alexander and Adelaide Hixon for the creation of a new writing center and an annual undergraduate writing prize.

The gift will be used to establish the Alexander P. and Adelaide F. Hixon Writing Center, which will be available for use by the Caltech student body. The center will be directed by a professional with credentials in composition and rhetoric, and will provide a range of instruction and services in basic composition.

The center's offerings will supplement the curriculum of the Division of the Humanities and Social Sciences, which has through various courses traditionally provided the bulk of writing instruction to the student body. In particular, Caltech freshmen have received their primary writing instruction in their sequence of two freshman humanities courses that cover rhetoric and composition and also serve as an

introduction to college-level work in the humanities disciplines, as well as to more specialized upper-level humanities classes. All humanities courses, with the exception of those in foreign languages, have a writing requirement of at least 4,000 words.

The creation of the writing center is especially welcome in the light of recent reforms to the humanities curriculum. These reforms reflect the faculty's commitment to giving Caltech's undergraduates a serious introduction to the humanities (in particular history, literature, philosophy, art history, music, and languages), while emphasizing their writing skills.

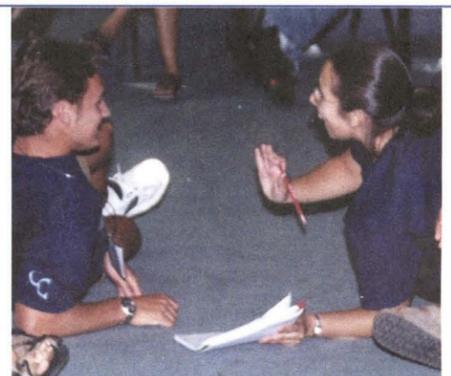
All freshmen will take a writing examination at the beginning of the academic year, and basic composition courses will be required of those students who need help with their writing skills. Beyond that, students will also have to pass a writing proficiency requirement in each of their freshman humanities courses.

Those students who do not meet the required standard will be directed to

take a composition course to improve their ability to write flowing, coherent prose and to structure an argument. The writing center will provide these courses. It will, moreover, be a permanent resource for all students—undergraduates and graduates—who seek assistance in the composition of their papers, reports, and applications.

The Hixon gift also provides funding for the Hixon Prize for Writing, which will be awarded annually to a student for the best composition in a freshman humanities course. The prize will be administered by the writing center, and the winner will be chosen by a special committee, with preference given to the paper best illustrating the relationship between the humanities and science and/or engineering. The winner will receive a cash award of at least \$1,000.

"The Hixon Writing Center will add a significant component to our undergraduate education program, greatly enhancing our ability to foster students' communication skills," said Caltech president David Baltimore.



Entering frosh demonstrate that they've got the write stuff at Freshman Camp.

"Furthermore, rewarding those students who show excellence in writing is a great way to reinforce the importance of those skills."

The Hixons are both members of the Caltech Associates, whose donations assist in the development of the research and educational programs at the Institute. Their previous gifts to the Institute have included the Frank P. Hixon Professorship of Neurobiology, currently held by John Allman. Adelaide Hixon also serves on the Associates board.

21st Century Provost

"It's pretty gratifying for someone who grew up reading Scientific American from cover to cover," says Steve Koonin of his job as Caltech's provost. It might also be said of Koonin that he virtually grew up—in terms of his professional life, most certainly—at Caltech, where he earned his BS degree in 1972 and carried off the Institute's top undergraduate physics prize. Koonin went to MIT for his PhD, but three years later the New York native was back on campus as assistant professor of theoretical physics. Appointed a full professor in 1981, Koonin has focused his research on the structure and interaction of atomic nuclei; he has also developed an innovative course in computational physics, and with his Caltech colleagues Nate Lewis and Charles Barnes played a major role in debunking the "science of cold fusion" in 1989. More recently, he has been a pioneer in the field of "earthshine"—making detailed observations of the lunar surface to gain unique new insights into changing climate conditions back here on Earth. Koonin chaired the Caltech faculty from 1989 to 1991 and was named provost in 1995; he recently signed on for another five years. In this interview with Caltech News editor Heidi Aspaturian, he reflects on the challenges of helping to bring Caltech into a new century, from both the provost's perspective and the equally unique vantage point of one who has observed the Institute's evolution over the course of three decades.

Let's start by trying to get an overview of your job. You're generally described as the Institute's chief academic officer. What does that mean at Caltech these days?

It means that I have specific responsibility for overseeing Caltech's research and educational programs. Fortunately or unfortunately, it's often a lot more than academics that I have to concern myself with. Making the campus run academically really means that I work closely with Student Affairs, Business and Finance, Institute Relations, and the General Counsel. The provost also acts for the president in his absence, and so I'm really in some ways the inside operating officer.

In terms of specific responsibilities, I often say that there are three currencies in this office—professorial appointments, money, and space. Anybody who comes in here usually wants to talk about one or all of those things—they are what make the Institute run. I pass on all faculty appointments and promotions, with a lot of input from other people. You can't do this kind of job if you think you know it all—even if you're right! I am also heavily involved in establishing research directions and allocating research funding to those areas where Caltech money is used to seed projects and start up new academic activities. In the end, it is the provost's responsibility to make sure those things go the way they should. Space on this campus is another big issue. Interestingly, it's also the most difficult, because there never seems to be enough of it, and it costs money every time you change what it's used for. And it's not like money, where you can pick up a bit here and a bit there and put it all together somewhere else.

So that's what the job is about, applying the grease that makes the Institute's wheels turn. It's also about exercising academic leadership, which means coaxing, persuading, and in some cases cajoling people. Sometimes it means just whispering the right things in the right person's ear at the right time. "Hey, you know, there's Professor X across the campus who's doing something that may be relevant to what you're doing. Why don't you get together and talk?"

So you're a facilitator . . .

That's right. Facilitator, coordinator, conductor, referee, sometimes traffic cop—all of those things.

The press release in the wake of your appointment stated that you oversee all day-to-day affairs and provide guidance for the future of the Institute. Now, how does that work? These are two very different things.

Indeed. My daily life ranges from the ridiculous—almost trivial in some ways—to the grand strategic directions of the Institute. But it's essential to focus on the day-to-



day operations as well, because the types of problems that filter up here are the ones that couldn't be handled at other organizational levels. I don't know if the buck stops here, but it sure pauses for a long time before it goes across the hall to the president. The major strategic issues focus, as you might expect, on such questions as, Where are we headed in the next 20 years? What is the right size for the faculty and student body? Where are we going to get the money to pay for our dreams? And so on. So the provost's outlook really encompasses a great range of things.

And even in the academic arena, you have to shift gears a lot because, as I discovered when I took this on, there is a lot of diversity among technical cultures. As a physicist, I was used to a certain style. I was very surprised—and I think it still takes some getting used to—to understand that other sciences have other ways of arranging things and of thinking about themselves. It's not that any one way is better than another, but they're all very different. And someone sitting in this office has to have an appreciation for that diversity.

Are there other aspects of the job that turned out to be unexpected and surprising to you?

I found myself doing more alumni relations work and other outside representation of the Institute than I thought I would. And that's quite enjoyable. It's easy to talk about Caltech, and I like doing that a lot. Another enjoyable part of the job, which I guess I didn't really think about when I took it, is interacting with the faculty. One of my roles is to try to create a sense of community among the faculty—through dinners at the provost's residence, through organizing lunchtime gatherings, and so forth. I can tell you, I now know practically all 280 of my faculty colleagues on a very close, first-name basis. I pretty well know what everyone is doing and how it all fits together. That's a lot of fun, and pretty gratifying for someone who grew up reading *Scientific American* cover to cover. As for other surprises, in some ways it turns out to be harder to move the Institute in new directions than I thought it would be.

How so?

The Biological Sciences Initiative is a good example. I don't think we've ever done anything on an Institute-wide basis quite like it before. It's one of the things I got started on soon after I became provost. It involved lots of consultation and laying of groundwork to be able to say that this is a major new direction for the Institute. You listen to everybody's analyses and points of view, and you try to get as many people on board as possible. It was a lot of effort.

Except for your graduate work at MIT, you have been at Caltech as a student and professor

Continued on page 8 . . .

CALTECH HOLDS GROUNDBREAKING FOR BROAD CENTER

Caltech trustees and faculty, two mayors, and other dignitaries braved near-record-breaking heat on September 12 to break ground for the future Broad Center for the Biological Sciences. But even the high temperatures, which soared to 106 degrees, couldn't wilt the enthusiasm of the guests at the event, many of whom said they had been waiting for nearly a decade for the new building to take shape.

"This is a memorable day in the life of Caltech," said Caltech president David Baltimore. "Many people think this new century will be dominated by discoveries and therapies that come from the biological sciences, so it's fitting that the first building that we begin in the 21st century is in this very exciting area of inquiry."

The Broad Center is named for Caltech trustee and Los Angeles civic and business leader Eli Broad and his wife, Edye, who provided the lead gift of more than \$20 million for the building. It is the main component of Caltech's \$100 million Biological Sciences Initiative, and Baltimore announced at the groundbreaking that the campaign had reached its goal, well ahead of schedule. "However, we need further support for the building and some of the other initiatives, so we're hoping to raise significantly more than that," he added.

Located at the southeast corner of Wilson Avenue and Lura Street on the northwest side of campus, the Broad Center is expected to be completed in the year 2002. Designed by James Freed, the internationally known architect and senior partner with Pei Cobb Freed & Partners, the Broad Center will house approximately 12 key research groups in several disciplines, including structural biology, behavioral biology, and computational biology. It will also house several major new research facilities, including centers devoted to electron microscopy and magnetic resonance imaging.

Measuring 120,000 square feet, with three floors above ground and two below, the building will include laboratories and offices, as well as conference rooms, compact libraries, a lecture hall, and a seminar room. The latest modular design elements will be used to allow the greatest flexibility for rearranging labs and offices to accommodate future needs at minimum cost.

"Without the gift from Eli and Edye Broad, the Broad Center might still be on our wish list, and Caltech would be in danger of missing the great opportunities that are inherent in the sequencing of the human genome," Baltimore



said. "With the Broad Center, we will be able to take a new leadership position in the exploitation of this kind of new information for the welfare of humankind."

Gordon Moore, PhD '54, chair of Caltech's board of trustees, credited Broad with showing an early interest in the building and using his knowledge of the construction business and interest in art and architecture to help shepherd the project along. "In many respects, this building is Eli's baby," said Moore. "His extensive knowledge of architecture and art is represented in what we will see, and it will certainly be nice to have an architecturally significant addition to the buildings on the campus. The Broad Center will be a jewel on the Caltech campus."

Pasadena Mayor Bill Bogaard and Los Angeles Mayor Richard Riordan attended the groundbreaking, and, while remarking on Caltech's rapid rise into a world center for research and technology development, Bogaard said that the Broad Center "is a new beginning in the history of Caltech." Riordan, a longtime friend of Broad, praised Broad for his commitment to education. "Through the Broad Education Foundation, Eli has become the true visionary of what's needed to turn public education around in this country," Riordan said. "Eli's fingerprints are everywhere you look if you're looking for something of quality. And the Broad Center for Biological Sciences is a great, great example of Eli's vision."

Broad, chairman and chief executive officer of financial services giant SunAmerica Inc., said he believes that Caltech is uniquely positioned to make important breakthroughs in the biological sciences in the coming years. Caltech's "Biological Sciences Initiative places it squarely in the middle of the greatest growth area of this new millennium. It will foster scientific breakthroughs and high-tech spin-off companies and will create new industries in our region. I believe in Caltech and I believe in David Baltimore."



Let the building begin. Wielding the shovels at the Broad Center ground-breaking are, from left, John Rudolph of Rudolph and Sletten, which is constructing the facility; Mayor of Los Angeles Richard Riordan; biology professor and former biology division chair Mel Simon; Eli Broad; Mayor of Pasadena Bill Bogaard; Edye Broad; Broad Center architect James Freed; biology professor, former biology division chair, and chair of the Broad Center Building Committee John Abelson; Caltech president David Baltimore; and board of trustees chair Gordon Moore. Inset, above, an artist's rendering depicts the completed Broad Center, next to the Beckman Institute on Wilson Avenue.

BIOLOGIST WINS LASKER AWARD

Alexander Varshavsky, Smits Professor of Cell Biology, has been named a recipient of the 2000 Albert Lasker Award in Basic Medical Research for his groundbreaking work on the ubiquitin system that targets proteins for destruction.

Among the most prestigious honors in biomedicine, the Lasker Awards are given each year by the Albert and Mary Lasker Foundation for basic and clinical medical research. Varshavsky shares the honor with Avram Hershko and Aaron Ciechanover of the Technion-Israel Institute of Technology in Haifa.

Varshavsky was cited "for the discovery and the recognition of the broad significance of the ubiquitin system of regulated protein degradation, a fundamental process that influences vital cellular events, including the cell cycle, malignant transformation, and responses to inflammation and immunity."

"Alex's record of scientific originality is extraordinary," wrote Caltech Biology Division Chair Elliot Meyerowitz earlier this year. "His earlier work included the invention and first use of several of the most important and most widely used methods of modern molecular genetics. His work from the late 1970s to the present has centered on understanding the cellular

Continued on page 13 . . .

INSTITUTE NAMES NEW HEADS OF CALTECH Y, CAREER DEVELOPMENT CENTER



Athena Castro

Two Caltech offices that have loomed large in the lives of many Techers—the Y and the Career Development Center—have recently named new directors.

Athena Castro has been named the executive director of the Caltech Y, succeeding Sue Borrego, who is now associate dean and director of minority student affairs.

Castro has almost 10 years' experience administering student programs. She earned her BA from Scripps College and her MA at Azusa Pacific University (APU), where she also served as student life graduate assistant and student center coordinator. After coming to Caltech in 1994, she developed and implemented the Young Engineering and Science Scholars (YESS) program and coordinated other programs such as the Multicultural Task Force. In 1996 she became assistant program director for minority student affairs. She joined the Y as director of student activities in 1997, serving as

advisor to the student executive committee, coordinating many student-driven programs, and developing the Y's community service and volunteer program.



Jerry Houser

Jerry Houser is the new director of Caltech's Career Development Center, taking over from past director Sally Asmundson.

Houser brings to his position many years of experience in career program administration and in the university environment. From 1981 to 1998, he worked with USC's Career Planning and Placement Center, the last 10 years of which he served as director.

For the past two years, Houser has been an associate professor of applied management and leadership studies with Azusa Pacific University's Center for Accelerated Degree Programs, traveling to Africa, Europe, and Asia to teach undergraduate and graduate courses.

Houser holds a BA and MA from APU and a PhD from USC.

Ray Bradbury Chronicles the Lessons of Life

As a child, Ray Bradbury developed a fervent devotion to the futuristic and fantastical Buck Rogers comic strip, an affection that led him to begin collecting the daily installments of this classic science-fiction adventure.

But when his fifth-grade classmates learned of his fascination with the time-traveling space hero, Bradbury was singled out for such severe ridicule that one day he went home in tears and ripped his entire collection to shreds.

With that, a child's imagination might have been stifled and the world would have never heard of *The Martian Chronicles* or *Fahrenheit 451*, innovative, thought-provoking novels that were examining humanity's unique place in the universe even as scientists began launching exploratory forays into space.

At Caltech's 106th commencement, on June 9, Bradbury reminded the graduates, their families, and the faculty and staff assembled on Beckman

"I wrote a whole series of stories about Mars without knowing what the hell I was doing," Bradbury said to laughter and applause. "The important thing in life is to follow your passion, no matter what it is, for whatever mysterious reasons."

As his writing skills matured he was rewarded with fame, literary renown, and—Bradbury noted—a steady income. Eventually he bought an entire collection of Buck Rogers comics, including copies of the strips he had impulsively destroyed. It all came about, he said, because he did what he loved.

At a moment when the eyes of all of Caltech's newest graduates were trained on the future and its myriad possibilities, the 84-year-old Bradbury urged them to follow their dreams.

"Whatever it is, do it! Sure there are going to be mistakes. Everything is not going to be perfect," he said. "I've written

ten thousands of words that no one will ever see. I had to write them in order to get rid of them. But then I've written a lot of other stuff too, so the

good stuff stays and the old stuff goes." With imagination, hard work, and moxie, he told his listeners, much can be accomplished.

Bradbury's personal anecdotes were an engaging blend of the quotidian and the sublime that revealed a tenacious do-it-yourself sensibility. In the early 1950s, finding himself without an office or a secretary, Bradbury rented time on a typewriter in the UCLA library at the rate of 10 cents every half hour. Nine dollars and 80 cents later, he had completed the manuscript for *Fahrenheit 451*, his second novel.

With evident pride, Bradbury related how *Fahrenheit 451* came to be published as a serial in the first three issues of *Playboy*. "You young men should appreciate the fact that I helped start that magazine," he quipped. His other literary achievements include *Dandelion Wine*, *The Illustrated Man*, and *Something Wicked This Way Comes*.

Bradbury also expressed his undying desire to visit the planet that orbits closest to his heart—the Red Planet. "Now there are several people sitting here today who will be living on Mars 20 or 30 years from now. I

wish I could be alive the day that we land on Mars. I'd like to believe that on some night, 50, 60 years from now, that when some of you are on Mars, that you'll carry with you a copy of *The Martian Chronicles*.

Bradbury, who has been called the Philosopher of Science Fiction, then turned to the Big Questions, such as the meaning of life. He imparted a Big Answer:

"I'll tell you why you're here. You've been put here because the universe exists," he said. "There's no use in the universe existing if there isn't someone there to see it. Your job is to see it, your job is to witness, to understand, to comprehend, and to celebrate with your lives."

Even so, Bradbury cautioned that we run the danger of missing the point of it all unless we take the time to assess the importance of our own lives in the universe as well as to appreciate the love and support that family and true friends can provide.

"At the end of your life, if you look back and realize that you did not celebrate, then you've wasted it," he said. "Your function is God-given, to act on your genetics, to be what you were born to be. Find out what it is, and *do it*."

For an online transcript of Bradbury's address and video clips of commencement, please visit www.caltech.edu/commencement and <http://www.caltech.edu/commencement/cc2kbroadcast.html>.

JAVIER MARQUEZ



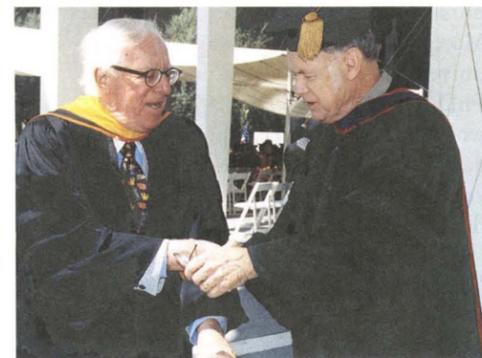
Clockwise from top: Standing in front of Beckman Auditorium, Ray Bradbury speaks to the graduates and their families, friends, and professors at Caltech's 106th commencement. The creator of the *The Martian Chronicles* (left) is greeted by a pioneer of Martian science, Professor of Planetary Science and Geology Bruce Murray. The Caltech a cappella group Echphonemia serenades Bradbury with its rendition of Elton John's "Rocket Man." Members of the class of 2000 prepare to embark on their journey.



Mall that every individual possesses the capacity to achieve greatness. He said that the challenge facing each of the graduates—of whom 202 would be receiving bachelor's; 113, master's; one, an engineer's; and 127, doctoral degrees—is to understand this and to ignore the critics who will try to prevent them from reaching their fullest potential.

He cried on that awful day when he tore up his comic strips, Bradbury said, because he felt he had symbolically destroyed the future that they represented, along with a part of himself. He had destroyed something he loved out of concern about what other people might think of him. However, as we all know, the story did not end there.

Instead, at the age of 12, the precocious Bradbury experienced an epiphany of sorts and realized that he had to follow his dreams, whatever the consequences. Inspired by the comic strip, he began to write his own tales about rocket trips to the moon, Mars, and beyond. In this way, the schoolyard incident became a touchstone for Bradbury, who went on to make a career of going against the tide and challenging conventional wisdom.



IT'S NOT SCI-FI: LIGO ACHIEVES "FIRST LOCK"

On October 20, 2000, scientists from the Laser Interferometer Gravitational-wave Observatory (LIGO) established "first lock" at the detector near Hanford, Washington. This "brings us an important step closer to our real goal—LIGO's first gravitational-wave observations," said Barry Barish, Caltech's Linde Professor of Physics and LIGO director.

LIGO, a joint project of Caltech and MIT, is a national research facility for detecting gravitational waves in the universe. Funded by NSF, LIGO comprises two detectors at Hanford and one near Livingston, Louisiana. They will work in concert to detect gravitational waves, which are distortions of space-time caused by accelerating masses, such as exploding stars or vibrating black holes.

This is the first time that the LIGO detector near Hanford has simultaneously sent laser light back and forth along its two quarter-mile-long arms, thereby



Continued on page 13 . . .

NEW FELLOWSHIP IN MATHEMATICS HONORS SCOTT JOHNSON '83

During a life cut short by a fatal hiking accident, Scott Johnson '83 impressed many of his teachers as a remarkable mathematician. As a



A postdoctoral fellowship has been established in memory of gifted mathematician Scott Johnson '83.

tribute to him, Johnson's brother and sister-in-law, Steve and Rosemarie Johnson, have established at Caltech a postdoctoral fellowship in mathematics, and awards for excellence for Institute graduate and undergraduate mathematics students. The gift totals \$2 million, of which \$1.5 million will be used to establish the endowed fellowship and \$500,000 will go toward the awards.

Johnson, a mathematics major at Caltech, died in 1988 in a hiking accident in Australia. At the time, he was pursuing his PhD in category theory at Macquarie University in Sydney. The university granted him a posthumous PhD in mathematics in 1995 for the work he had completed prior to his death. Steve Johnson said that his younger brother, quiet by nature, had flourished at Caltech.

"Scott referred to his four years at Caltech as his golden years," said John-

son, in charge of AOL's software and technology development for several years until he left in 1999 to start Sage Hill Partners, a Boston-based venture capital firm specializing in investing and consulting with early-stage technology start-ups. "While he was at Caltech, he blossomed socially and found himself intellectually." Steve was a senior at USC while Scott was a freshman at Caltech, and they often studied together at the Institute. "I spent a lot of time with Scott at Caltech. We both learned computer programming there."

Gary Lorden '62, Caltech professor of mathematics, recalls that Johnson was one of his best students. "Scott took a probability course from me as a freshman and was so creative and smart that he convinced me to let him do a summer research fellowship," said Lorden, who, until then, had never picked an undergraduate for a summer research project. "He was quiet, really smart, and knew what he wanted. He didn't think in a conventional way. He'd consider a problem for a couple of days and then come back with something amazing. He was one of the most brilliant students I've seen at Caltech. For his age and experience, Scott had the most highly developed research muscles of anyone I had ever met. His death was tragic, particularly because it came so early. At any time, it's a tragedy—but when you think about what he would have been able to contribute, it's especially so. My hope is that this

fellowship and award will encourage other students to do creative research."

According to Barry Simon, the International Business Machines Professor of Mathematics and Theoretical Physics and executive officer for mathematics at Caltech, the Scott Russell Johnson Senior Research Fellowship is Caltech's first senior research fellowship in mathematics. The first Johnson Fellowship will be awarded in September 2001 and will support an outstanding postdoctoral fellow in mathematics for three years, with the possibility of a three-year extension. The details of the awards for excellence for Caltech undergraduate math majors and graduate mathematics students are still being worked out, but Simon said that the first awards should be given out in June 2001.

"I think the gifts are wonderful," said Simon. "They solve very real needs that we have. The two gifts help mathematicians just starting out, and graduate and undergraduate students. They're a good mix. We are grateful for the generosity of Steve and Rosemarie Johnson."

Added Johnson, "Scott and I were extremely close, and doing something to memorialize him was important to me. The reason for the two different gifts is that we thought it important to support young faculty members as well as young students so that they can carry on in mathematics, which is not a very well-supported field."

PRIZE COMMEMORATES FRANK TERUGGI

Frank Teruggi Jr. came to Caltech as a freshman in the fall of 1967, direct from the suburbs of Chicago. The grandson of coal miners, Frank grew up in a working-class family with his brother and sister. Through his grand-



Frank Teruggi (left) with a friend in Chile, shortly before he was abducted and murdered in 1973. Friends of the former Caltech student have established a prize in his memory.

fathers, who were immigrants, Frank gained a respect for outsiders who rose from humble beginnings.

His training by the Jesuit priests at Notre Dame High School in Niles, Illinois, further impressed upon him a keen interest in social justice as well as the resolve to do something about it. These were the principles by which he lived and the ideals that he died for in a country at war with itself, thousands of miles from home.

To honor that young man, the Frank Teruggi Memorial Award has been established by Frank's Dabney housemate, Jack Falk '75, and friend Susan Barger. Once it is fully endowed, the fund will dispense prizes in perpetuity in a yearly competition open to undergraduate students.

"Frank was far more thoughtful and energetic than just about anyone else—vividly upbeat," remembers Falk. "He had a jokester's heart. Politics never overwhelmed his passion for people."

Frank left Caltech after a year to pursue other interests and, in 1972, he landed in Santiago, the capital of Chile. He enrolled at the University of Santiago and enjoyed working with his fellow émigrés, who shared his zeal for activism. An idealist, Frank participated in demonstrations supporting Salvador Allende, the troubled country's democratically elected president. He also joined Fuente de Información Norteamericano, a news service that attracted young Americans who worked to empower the poor.

A long-brewing and complex series of events finally led to General Augusto

NSF FUNDS CAMPUS INSTITUTE FOR QUANTUM INFORMATION

The National Science Foundation has awarded Caltech a five-year, \$5 million grant to create an institute devoted to quantum information science—a new field that could ultimately lead to devices such as quantum computers.

Caltech's new Institute for Quantum Information will draw on several fields, including quantum physics, theoretical computer science, mathematics, and control and dynamical systems engineering, says founding director John Preskill, a professor of theoretical physics at Caltech.

"The goal of the institute will be to understand ways in which the principles of quantum physics can be exploited to enhance the performance of tasks involving the transmission, processing, and acquisition of information," says Preskill, who has worked on quantum computation algorithms for the last five years.

"The most potentially exciting aspect of the field is the promise of a quantum computer," he says. "If you

could process quantum states instead of classical information, there are problems you could solve that could never be solved with classical technology."

Quantum computers would be more efficient than conventional computers because they would greatly reduce the number of steps the computer would have to jump through to solve many problems. For example, the encryption used to protect credit cards relies on the fact that it would take huge amounts of time for a conventional computer to break down a large number into its factors (the numbers one multiplies together that will equal this number). It now takes the best computers several months to find the factors of a 130-digit number, and it would take 10 billion years to factor a 400-digit number—nearly the entire age of the universe. But a quantum computer with the same clock speed could factor the 400-digit number in about a minute, according to the figures Preskill has worked out.

At the same time, quantum infor-

mation would provide a new means to thoroughly protect information from any intruder, Preskill says. "By using quantum information, it's possible to make unbreakable codes, and this security is founded on fundamental physical laws," he says.

Also, the work of the new institute will advance research in the further miniaturization of classical electronic components. Quantum effects are becoming increasingly important for microelectronics as devices continue to shrink toward atomic dimensions.

In addition to Preskill, the Institute for Quantum Information will be led by two co-principal investigators who, in consultation with other Caltech researchers, will guide and supervise scientific activities. The initial co-principal investigators will be Jeff Kimble, an experimental physicist who has done groundbreaking work in the transmission of quantum information, and John Doyle, a professor of electrical

Continued on page 13 . . .

Pinochet's violent military coup, which toppled Allende's government in September 1973. In the aftermath, soldiers rounded up individuals who had been denounced as subversives. Frank and his roommate were among the thousands who were plucked from the streets or their homes and carted to the city's National Stadium, where they were beaten. Some were murdered. Although his roommate was interrogated and released, Frank, 24, was brutally tortured and executed. His body was identified in the city morgue two weeks after his abduction.

According to an article that appeared earlier this year in the *Chicago Tribune*, a dark cloud still surrounds Teruggi's death. He was one of about 100 young Americans in the capital city during the coup, yet he was singled out for exceptional abuse.

But his friends and family are determined to see that he did not live or die in vain. In Frank's memory, the Teruggi Award will be presented annually to a Caltech undergraduate who studies or participates in "the areas of Latin American Studies, radical politics, creative radio programming, and other activities aimed at improving the living conditions of the less fortunate."

To guarantee that the award will serve as many students as possible, the fund must obtain an endowment of at least \$10,000. Although the fund is currently far from that target sum, in the two years of its existence, the prize has been presented to two Caltech students, David Zaragoza and Kevin Michael Franklin.

The prize's founders ask that Caltech alumni who knew Frank—including his friends at Dabney House and his former classmates—honor his memory with contributions of any amount. The ultimate purpose of the award is to identify and encourage students in whose work the spirit of Frank Teruggi lives on.

Donations may be sent to the Frank Teruggi Memorial Award, Mail Code 105-40, Pasadena, CA 91125.

DANCE OF EARTH AND MICROBES TO BE STUDIED

For scientists who study the history of our world, one of the deep questions has been how microscopic organisms—the most basic forms of life—have interacted with Earth's near-surface environments over billions of years. Now the David and Lucile Packard Foundation Science Program has awarded Caltech a \$1 million grant for a project to investigate that very question.

The project, led by Dianne Newman, the Clare Boothe Luce Assistant Professor of Geobiology and Environmental Engineering Science at Caltech, will bring together investigators from a wide range of disciplines that traditionally do not overlap. They will work on a well-defined problem in the new discipline of geobiology.

Entitled "The Geobiology of Anaerobic Fe(II) Oxidation: Biological, Geochemical, and Field Studies," the project will integrate molecular microbiology with geochemistry and field geology. Participating scientists will try to identify chemical signatures of early life in the geologic record.

"We believe that the potential for discoveries that could come from any of the individual components alone is extraordinary, and we think that this is just the kind of challenge that the Packard Foundation had in mind when it conceived the interdisciplinary project program," said Caltech president David Baltimore.

The David and Lucile Packard Foundation was created in 1964 to support and encourage nonprofit organizations dependent on private funding and volunteer leadership. It awards grants in six main program areas: conservation; population; science; children, families, and communities; arts; and organizational effectiveness and philanthropy.



THE ASSOCIATES GO DOWN UNDER . . .

It was winter in June for a number of Caltech Associates, as they dipped below the equator on an 18-day President's Circle air tour of Australia. With faculty leader Lee Silver, PhD '55, Keck Professor of Resource Geology, Emeritus, at their helm, the group explored the unique natural history, geology, flora, and fauna of "Oz." Trip highlights included a visit to JPL's Deep Space Communications Complex in Canberra; hiking and off-roading in Lamington National Park, a subtropical rainforest, and in Kakadu National Park, in the renowned Outback; cruising the Great Barrier Reef in a glass-bottom boat; and savoring the infamous "shrimps on the barbie" (barbecue).



Discovering some of Australia's treasures are Dick Hahn (left), with some new friends at Lamington National Park, home to more than 200 species of birds; and Ora Lee Marble, right, holding aloft a carrying bowl near Ayers Rock, a huge formation sacred to the Aboriginal people who dwelled there.

. . . AND TO A GARDEN PARTY

On a balmy June evening, more than 200 attendees, including faculty and students, gathered to honor members of the Associates President's Circle at the home of President David Baltimore and his wife, Alice Huang. The guests were treated to a reception, with music by a student jazz quartet, dinner, an address by President Baltimore, and a performance by "Out of Context," a student a cappella group. At right, Associates Delano Brouillette '55, MS '56, Richard Parker '34, and Joan Brouillette enjoy the festivities.

For more information about the Caltech Associates, please call the Associates office at 626/395-3919.



Gifts by Will

The Institute has recently benefited from gifts provided through the generosity of the following alumni:

Thomas Alan Cole, Jr., PhD '63, provided for Caltech through an unrestricted \$5,000 distribution from his retirement fund.

Bryant Essick, Ex '22, named Caltech as a remainder beneficiary of his estate. The unrestricted distribution of \$172,500 will be added to the Institute's general endowment fund.

Caltech has received approximately \$370,000 from the estate of Dr. Henry Hoyt Hilton, PhD '60. This gift is designated to establish the Diane A. and Henry H. Hilton Endowed Scholarship Fund.

CDR Byron Beanfield, USN (Ret.), MS '39, left \$10,000 to the Institute to support the Division of

Engineering and Applied Science.

William L. Penn '37 provided in his will for a specific bequest to Caltech of \$5,000, to be added to the Institute's general endowment fund.

Sherwin P. Avann, PhD '42, named Caltech as one of the residuary beneficiaries of his estate, resulting in an unrestricted gift of \$46,951 to the Institute.

Stephen C. Clark, Ex '39, provided for Caltech in his will with an unrestricted gift of \$1,000.

These are just some of the recent bequests that the Institute has received as a result of the foresight and generosity of its alumni. For more information regarding bequests, please contact the Office of Gift and Estate Planning, 105-40, Pasadena, CA 91125; 626/395-2927; planned gifts @caltech.edu. The Web site can be accessed at www.gep.caltech.edu.

Koonin . . . from page 3

for more than 30 years. Do you ever perceive that your perspective on things might be getting a little too insular?

Not really. I try to stay plugged in to the outside world in ways that go beyond just reading the journals. I am involved in a lot of government work—with agencies like the Department of Defense, Department of Energy, and National Science Foundation—and that helps me see what's going on elsewhere. I'm always busy on committees, and I talk to people. Really, with modern communications and transportation, it's hard to remain insulated. You have to work at staying alone.

Having been exposed to this institutional culture for so long, I'm sure you've reached conclusions about what its particular strengths are. What are some of its weaknesses?

Well, you know, some of Caltech's weaknesses are also its strengths. Our small size is a good example. In terms of teaching, the downside may be that we can't cover everything and so sometimes the education we give the students may not be as complete as at comparable institutions. On the upside, though, it's deeper, rather than broader, and in math and science we try to concentrate that depth in teaching the fundamentals. But our size can be a negative factor when it comes to acquiring new equipment. It's easier to justify major instrumentation expenditures to funding agencies when you have a lot of potential users for a particular piece of extremely expensive equipment than when you only have two or three, as we often do.

Our size also leaves less flexibility around the margins. Let's suppose that five percent of our resources are flexible at any given time. That same five percent at Stanford, Harvard, or Berkeley is a much larger figure. So I think there's an ability at those places to have a bigger impact faster, or at least to generate a more palpable sense of motion. Of course, we think we're smarter and that we choose better when we elect to do something. But the ability to move quickly that exists elsewhere is at times hard to match here.

But aren't you also saying that this forces people to concentrate on choosing the right problems so that the resources are properly committed?

That's the upside. The discipline that you learn to practice through choosing what field to emphasize, what people to hire, and where to apply money is a very bracing one. It's an aspect of life here that I think ought to be discussed more. Another advantage of our size is that it encourages a lot of synergy both within and across disciplines that you won't necessarily find at larger places. It's much easier to reach across disparate fields to make a connection. To use David Baltimore's phrase, this is "the last academic village." Many people find that concept very attractive.

Is it true?

It is true. This is an interdisciplinary sort of place where we try to give the faculty and the students the support, the resources, and the environment to do great things. The way I like to think about it is that any given faculty member has a certain intellectual radius of the kind of people that he or she can interact with. And if the campus gets too much bigger than that intellectual radius, you start having disconnected parts. So that's a strong argument in favor of keeping the Institute small.

What do you see as the most significant changes that have occurred here since you were an undergraduate?

It might be more appropriate to ask how things have evolved since I've been a faculty member, because a student's perspective can be so different. First off, of course, the campus is growing. The total number of faculty and undergraduates hasn't increased all that much, but we do have a lot more postdocs and graduate students, and they bring with them an energy and vitality that is one of the things that makes doing science and engineering so much fun. Another change is that the scale of the research we do has become a lot different. You don't see as many single investigators sitting in their laboratories with small groups. It's a much more collective and cooperative enterprise.

Do you think that's to the good?

Again, there are gains and losses. You lose a kind of focus, a certain pace of doing things, a certain freedom of action when you have to coordinate with many other investigators. But what you gain, in some fields, is the ability to do science that you couldn't do otherwise. Whether the balance is more to the good or the bad is an open question. You have to assume that the faculty here will optimize whatever it takes to get the science done.



Clips from a many-faceted career. Clockwise from left, Koonin with a SURF student in the early 1980s; in a pensive moment as a young professor; in the provost's office with two of his favorite "earthshine" images of the lunar surface; and on the national news in 1989 at the height of the cold fusion controversy.

Another thing I've noticed in the past five years is the increasingly frenetic pace of life. Whether it's caused by the Web, cell phones, e-mail, and the ability to fly across the country in four and a half hours, I don't know. I have perhaps a romantic notion that the '50s and '60s here were a period when people had more time to really think and get deeply into the science. Faculty today run a lot harder than they used to. Everyone's so busy all the time. You've got to be out there at conferences, you've got to go give colloquia, and you want to find out what your colleagues everywhere are doing to stay at the forefront. The work at the cutting edge is so much more global now. You've got a much broader territory to cover.

Are there things you think should have changed, but didn't? And conversely, things that did change, but should not have?

What shouldn't have changed? Today, roughly 50 percent of the money that supports the Institute comes from the federal government. A few decades ago, it was much less. Again, this has its good and bad aspects. The upside is that the money is there for research. The downside is that we are beholden to the government, at least in some sense, for our research programs. It's a delicate balance between what the government wants to fund and what we want to pursue, and we try to strike that balance properly. The amount of federal regulation has also changed. We see a lot more of the government telling us how to do research and how to report on it in ways that cost a lot of effort, time, and money and are not obviously beneficial. Accountability has gone up. That's not to say that we shouldn't be accountable, but having to prove it to the satisfaction of people whose business it is to do nothing but monitor accountability gets a little silly. And the funding mechanisms have narrowed, in the sense that in the past we often would get federal money with very few strings attached. Basically we were told, "Go do something interesting with this and then come back and tell us what you did." Now, in some fields at least, you practically have to have done the research before you can get funded to do it in the first place.

The funding cycle is also shorter. Grants now run for one or two years where they used to run for four or five—a time frame that assured you of enough basic support to tackle some really tough questions. The current federal funding climate makes it harder to dream a little.

As to changes we need to make—and this one is a subject of ongoing discussion—we need to do something to improve the quality of student life. We've been talking about this for 30 years. We nibble away at the edges, but we haven't really tackled the major issues. I'd like to bring the faculty more into students' lives again. Because of the pace and pressures of faculty life, we don't have the same kind of involvement there that I remember as a student, when I had the opportunity to sit down with Dick Feynman for dinner in the student houses. It was great. That still goes on, but not

nearly as much as it once did.

Another area we keep looking at centers on the proper role for the humanities at Caltech. What should we be teaching the undergraduates? Is it great books? Is it the way humanists look at the world? Is it just the ability to enjoy a good novel or look at a film? Should we teach them how to write? These concerns constitute an ongoing dialogue among the faculty. We're starting to realize that this is an area that needs more attention than we've given in the past. We now have a mechanism—the core curriculum committee—which I hope will be taking up questions of that sort and making some recommendations.

What is your own view?

I, of course, went through the usual humanities here. I think what I took away from it most was just the ability to enjoy literature or art or music, and the sense that there are things in life beyond doing science and that they can provide a different way of looking at the world. And that *is* useful. Again, just from my own perspective, in high school and as an undergrad here, I abhorred history. I just hated it. And you know, in the last 20 years of my life I find myself increasingly drawn to reading history, understanding how people reacted in different circumstances, and learning about the forces that have shaped society.

What should the Institute's priorities be over the next couple of decades? What should Caltech be doing?

We should do what we have always done. I see no reason to deviate from the Institute's broad goals, which are to do high-impact first-class fundamental science, applied science, and engineering, and to educate the very best students to continue doing that. The tactics will change with the circumstances, but those are the goals.

What are the research priorities?

You can ask, more broadly, what are the big questions in science. There are fundamental issues we concern ourselves with, and I think that we probably will still be dealing with them 20 years hence. How does life work? What are the essential parts? What *is* life? How did the universe start? These are timeless questions. You can find them in the Bible. How does the earth work? How does the mind work? You would have thought that if there were other equally big questions, someone somewhere would have asked them already. Whether life exists elsewhere is another big question—maybe a more recent one.

Are there potential pitfalls to this concerted focus on the fundamentals, particularly given what some of Caltech's peer universities are doing?

Well, when you always aim for the most fundamental answer, you can guess wrong sometimes. We try to get home runs and, of course, we only get a finite number of times at bat. We have tried to do some things that didn't work quite right.

There's also the question of how to maintain the balance between doing what I call applied science and doing technology. Applied science is basically looking at the fundamentals of how you take physical phenomena and do useful things. Creating electronic devices, illuminating the fundamentals of turbulence to control it, and so forth. But, of course, if you look at the world around us, you also see all these great advances in technology. The Internet is a prime example. We have tended not to focus on these kinds of applications by and large. What we concentrate on is the fundamental research that makes many of them possible. And so, to the extent that there is intellectual ferment centered on developing real applications, we're not participating so much in that here. My own sense is that we probably shouldn't, but it is a strategy that is not without risk.

It's perhaps only now, when you see such huge financial returns on some of these applications, that you begin to wonder . . .

Should we be doing more? But the fact is that most of the students whom we train will go out and do that latter activity. Relatively few of them wind up in academia doing basic research, and even fewer of them in basic engineering. And so there is perhaps a growing disconnect between the kind of research we do and the way in which we train our students and what they will actually be doing in life. That is something to think about, but if I had to come down on one side or the other, it would be for retaining our emphasis on the fundamentals. Applications tend to be transient. Suppose we make a big push in the Internet area right now. In 20 years the technology will be very different—it could be an entirely different medium. And in that case we will not have invested our time and resources well. The fundamentals tend to change more slowly. Sometimes they don't change very much at all.

Lately, we have seen a lot more faculty involvement in companies that are being spun off from faculty research. Professors are devoting more time to these activities, and there's a growing climate of encouraging entrepreneurial initiative across campus. Many faculty now have a sizable stake in the success of various start-ups. How does all this affect the Caltech culture? What kind of thinking is going on about it?

This is a trend that Caltech was somewhat slow in coming to. We really started to get into this about five years ago, with the establishment of the Technology Transfer Office. That's not to say we weren't doing tech transfer before that—the DNA sequencer is probably the most famous . . .

It certainly is now.

Indeed. I think a number of factors have led us to want to foster more of this. One has been society's general expectation that universities will be generators of technology. Another is that this is what many of the young faculty in certain fields want to do. You can't attract some of the best young professors unless you give them the opportunity to go out and have more commercial impact. And then I think there's been a growing awareness among Caltech administrators that this is part of what a university is *supposed* to do.

There are the obvious upsides. One is that we do stimulate commercial activity. A lot of the information technology and biotechnology that's out there today came out of the universities. Another upside is that it gets the students integrated into the whole technology-transfer enterprise. There is certainly a great need for heightened entrepreneurial awareness among the students. Another upside is that when faculty or alums do go off and make a lot of money, they might remember the Institute. We're starting to see that happen, and it's a very nice thing. I think that Caltech probably benefits in this regard from the kind of close environment and community atmosphere that it provides. Alumni do think about us and about the kind of impact the Institute has had on their lives.

The downsides are many. We think that we have identified them all, and that we have safeguards in place to keep a careful watch out for them and to deal with them. They include the intellectual property issues and the conflict-of-commitment issues in the use of graduate students and postdocs. You can find both of these areas discussed in lots of articles. We're certainly watching out for these problems, and we're always sensitive that they don't arise and pollute what we like to think of as the open, unfettered exchange of information and freedom of inquiry on this campus. So, it's a balancing act.

Given the academic village aspect of this place that you alluded to earlier, does this shift in emphasis have the potential to cause tensions and fragmentation in the academic realm? The fact is, some people are going to get extremely wealthy.

Look—it may be that some people go into academia trying to get rich, but that's a silly thing to do, a priori. Most people doing research and education are here because they love it—it's a higher calling. If some people incidentally happen to get rich, well, I think many faculty will say, that's fine for them. But basically, if you wanted to make lots of money, you wouldn't be in academia.

We haven't seen this aspect as a source of tension yet, but we might. The issue I worry about more is conflict of commitment. You're not allowed to run a company as a faculty member, but you can become heavily involved in one. And suppose it's suddenly taking off and doing lots of exciting things technically, as well as making lots of money—I can see how that would be a great draw for someone. I think in that case the thing to do is to ask such faculty members whether their commitment to the university is really full time? "What do you think about when you take a shower in the morning? Is it the company, or is it the university?" That, I think, is where the real dividing line comes.

What about the current science funding climate? Is Caltech in pretty good shape?

I think we're in pretty good shape. Things were dicier up until about five years ago, when we began to see a federal refocus in the direction of basic research. I think anyone who thinks about it for more than a minute or two realizes that all the technology that is now changing our lives did not spring from nothing, and that decades of preparatory, fundamental work went into creating it. And in fact the Institute's federal funding has gone rather well. The last two years we've seen it go up significantly faster than inflation. At the same time the donor-driven money and the private-industry support tend to be more in the applied areas. And so, as usual, we try to strike a balance.

Do you find there are arguments for funding basic science that appear particularly persuasive to policy makers?

The people argument is important. The fact that we at Caltech train people who go out and have a broad impact in many different ways makes the point. Another approach that works well is to give specific examples of how the research chain works—how you can start at some basic discovery like quantum mechanics and wind all the way up to the newest type of laser in your supermarket scanner.

Continued on page 13

Hua Shan Rises

BY PAUL LEE '67, PHD '72; PHOTOS BY LEE AND YORK LIAO '67

Thirty-three years after rooming together at Caltech, Paul Lee and York Liao took on another challenge, climbing the legendary peaks of China's mountain Hua Shan. Reaching such heights has been a goal for many alumni and was the subject of an Alumni Association president's column in a recent issue of Caltech News. In that issue (number 1 of 2000), we called for letters to the editor on the subject. The following account grew out of that request.

China's loftiest mountains are in the far west. However, the nation's central plain holds five famous mountains known for their grandeur and history. Hua Shan, the westernmost of these, is renowned for its precipitous cliffs, splendid legends, and Taoist temples. The mountain, which is itself composed of five separate peaks, rises almost vertically some 7,000 feet and offers the most difficult, but still accessible, mountain-climbing experience to people who are only mildly athletic. This past spring, my Caltech roommate, York Liao '67, myself, and our friend Vincent Chu decided to make the pilgrimage to this Taoist center. By way of training, last October, the three of us and my wife, Amy Lee, PhD '75, climbed San Jacinto Peak near Palm Springs. Then, in March of this year, Vincent and I flew to Hong Kong to meet York, a Hong Kong resident, and the three of us flew on to Xi'an on March 27.

PREPARATION

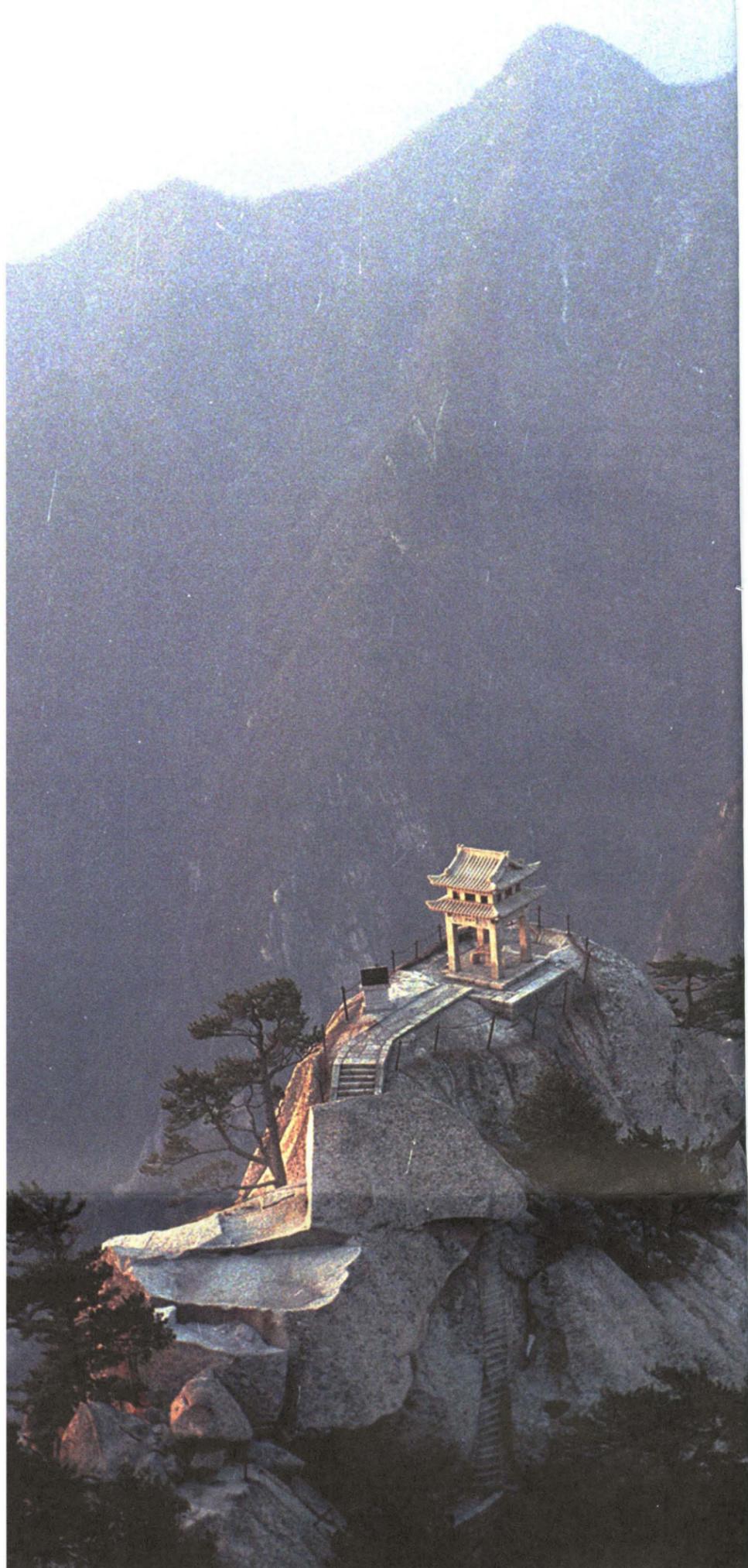
Books that offer practical information for visiting Hua Shan are hard to find. The mountain is located about 500 miles southwest of Beijing in China's Shaanxi province, a little south of where the River Wei flows into the Yellow River. The nearest city, some 100 miles to the west, is Xi'an, famous for the terra-cotta warriors from the second century B.C., Qin Dynasty. Of the usual tourist books on China, I have found only one—in *The Lonely Planet* series—that mentions Hua Shan. There are some Chinese-language books that are long on the poetry of the mountain but short on the nitty-gritty. One of them raves about the austere beauty of Hua Shan, mentions that many people have died in its precipices, and philosophically concludes that the risk is well worth taking because the scenery is so enchanting. As far as the practical details of an actual climb were concerned, we could not even find a map that was drawn to scale.

Then serendipity struck. In February of this year, York met Professor Z. B. Xu from the Xi'an Jiaotong University in Hong Kong, and he had some valuable advice. All the books say in effect that "from time immemorial, there has been only one path up Hua Shan." However, an aerial tramway that started operating in 1996 now carries passengers from the base of Hua Shan to the North Peak, the lowest of the mountain's five peaks. Professor Xu suggested that a less strenuous way to undertake the ascent would be to take the tram to just below the North Peak, climb the five peaks from there, and negotiate the tortuous trail all the way down to the base. This would involve an overnight stay on East Peak, traditionally the best place to watch the sunrise.

ASCENT

On March 28 we arrived at Xi'an and visited some of the historical sites in that ancient capital before starting our journey the next morning. Professor Xu had kindly arranged for a car, and after two hours over an excellent toll road, our driver deposited us at the tram depot. We arranged to meet him at 4:30 the following afternoon at the Jade Spring Temple, the traditional entry point for the mountain. Late March is still considered cold in this part of China, so there were not too many tourists. The temperature at the base was a pleasant 60 degrees. The tram traversed the 5,000-foot distance (a 2,500-foot elevation) in 10 minutes. We got out and found ourselves within a hundred feet of Hua Shan's East Peak. In the old days it would have been quite a strenuous hike to get this far. With the aerial tramway, it was considerably easier—and with no concomitant sense of achievement. We explored the area a little and got a couple of guidebooks from one of the shops in the vicinity of the tram terminal.

Around noon, we were ready to start our walk. The path from the North Peak to the East Peak consisted of stone steps set into the mountain ridge. There were chains on both sides, which was reassuring since most of the trail overlooked cliffs with several thousand feet of sheer drop on either side. Soon we came to a very steep and treacherous stretch, which required a lot of effort to ascend the several hundred steps. At one point a short perpendicular "sky-ladder" took us from a ledge to a higher rock. We came to the spot where many pilgrims, having made it this far entirely on foot, gave up and turned back. One of them was the famous Tang Dynasty writer and poet Han Yü. The story goes that when he reached this point and looked back, he could not see how he would make it down alive. He cried and wrote out his last will and threw it down the mountain, relying on the most primitive of postal systems. When I read this account before the trip, I could not quite believe that this great writer would actually have done such a thing. When I saw the actual spot, I was not so sure. (Han Yü, incidentally, made



According to legends of Hua Shan, wise men, rulers, and gods played chess on the spot where "a magnificent chess pavilion" now rests (above). Continuing clockwise, York Liao, Vincent Chu, and Paul Lee catch their breaths atop North Peak. The slope at right convinces the alums that, if you can't climb it, then photograph Vincent climbing it. Their friend appears as the speck perched halfway up the "Hanging Footpath." At "Turn-Back Rock," the first of two porters carries a flute to interject a lighter note along the way.

it back down safely, dying in his bed in A. D. 824 as "president of the ministry of rites.")

Feeling that our hard work should have a reward, we went into the first restaurant we found on our way up to the East Peak and ordered lunch. This hotel-restaurant was one of several state-owned establishments that we subsequently encountered at various spots up and down the mountain. At this height, water was a scarcity. That being the case, hygiene suffered. We were careful to order only hot food and to have our tea in plastic cups. The food was quite good under the circumstances. The owner showed us his rooms and suggested that we spend the night and go up the East Peak in the early morning to watch the sunrise. The accommodations looked rather spartan, and we decided to stick to our original plan of staying at the East Peak.

Another long walk brought us within sight of East Peak, as North Peak receded into a little speck in the distance. We walked into some little shed with a sign that



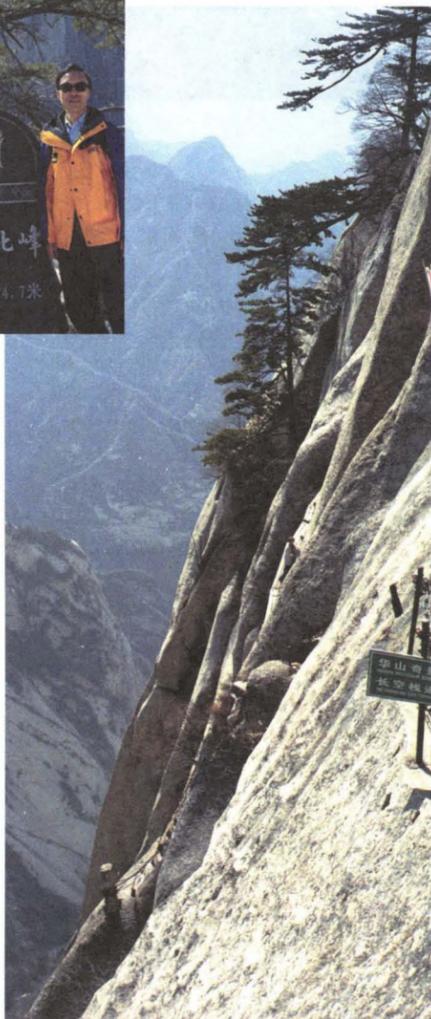
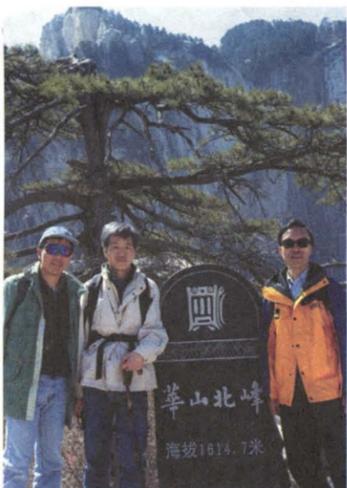
said “restaurant,” noting that the buildings definitely lacked charm. We were shocked to discover that this was the East Peak Hotel in which we would be staying.

The manager, a pleasant young man, greeted us and showed us the deluxe room for four. It measured about 9 by 14 feet with four single beds and two chairs. He quoted a price of 120 yuan (approximately \$14) per person and pointed out the further luxury of a color TV. When we said we were not going to watch TV, he lowered the price to 100 yuan.

Leaving our backpacks on the beds, we went out to explore our surroundings. In stark contrast to the gloom of the hotel room, the scenery was glorious. The second highest of the five peaks, East Peak stands 7,000 feet high and commands a marvelous view of the mountain ranges beyond Hua Shan. About 500 feet away, we spotted a magnificent but scarcely accessible chess pavilion, built in 1987 on the spot where the ancient sage Chin Shou Huang is said to have played chess with the gods. A number of other legends are associated with the site. The most famous recounts that before Chao K’uang-yin, the founder of the Sung dynasty, became king in A.D. 960, he played chess here with a local Taoist monk and lost three matches. When he persevered, his opponent, Chen Chun, pointed out that Chao had nothing more to wager. The future king vowed that he would give the monk Hua Shan if he lost again, which he did. So when he became king, he exempted the Hua Shan district from government taxes. This may well be the first reported incident of a successful political candidate giving a tax break to an early benefactor.

We headed up toward the South Peak. At 7,200 feet, it is the highest of Hua Shan’s five peaks, although at the mountain’s base it is hidden from view by the more impressive

West Peak. To reach it, we initially had to hike down a rather steep set of stairs, which brought us within view



of the mountain’s famous “Hanging Footpath.” To get there, one had to climb down about 30 feet of sheer vertical drop before reaching a line of wooden planks, eight to ten inches wide, built into the side of the vertical cliff. Someone in authority had thoughtfully placed chains on the cliff for brave souls to cling to. At the end of the walkway, one would be treated to the sight of a cave dug out by a Taoist monk who was particularly averse to crowds. We went as far as the place where the vertical drop began, and while York and I decided that prudence was the better part of valor, Vincent chose to tempt fate and venture down. He completed the path but was too focused to notice the misanthropic monk’s cave. He told us later that the trick was never to look down and to concentrate on what was immediately in front of you. Vincent, unlike the two of us, is single.

After the Hanging Footpath detour, we continued an easy climb to the East Peak. It turned out that York and I had been so diligent in recording on film Vincent’s high drama that we were out of film. We decided to return the next day. By this time it was past 5 p.m., so we retraced our steps to the hotel.

The bleak prospect of eating awaited us. The dining room was right next to a filthy kitchen and boasted four big tables but no customers. After a careful study of our options, we decided on a bowl of instant noodles that carried its own utensil. We got boiling water and washed the noodles down with beer that was at ambient temperature—i.e., ice-cold. We finished our repast with some crackers that were surprisingly fresh and a chocolate bar. By this time the outside temperature had dropped, but the temperature in our unheated room seemed colder still. We piled up and shaped the blankets into cocoons and braced ourselves for a freezing night. We did not sleep well but suffered no permanent damage from the cold.

DESCENT

Our wake-up call came in the form of a knock at the door around 5:15 a.m. We put on all our clothes, including three old army overcoats that we rented from the establishment, and went up to the East Peak in the dark. The horizon was hazy, which did not bode well for watching the sunrise, and by 6:30 it had become obvious that our effort was not going to be rewarded. We packed up and were on our way, having breakfasted on crackers and chocolate bars. We returned once again to the South Peak, having brought along fresh film to record our “summitry” for posterity. From this highest point we went past the inconspicuous Central Peak and came upon the famous ridge that leads up to the West Peak. This is the impressive ridge that appears in postcards of Hua Shan. The actual path turned out to be far less dangerous than it appeared. At the peak there is a Taoist temple in excellent repair and several spots associated with famous legends. We explored these sites a bit and took a good look at the panoramic view of the valley and the river in the distance.

From the West Peak, there are two alternative routes back down to the North Peak. We consulted with a tour guide who happened to be there and were told that one route was much steeper than the other. We opted for the easier route, which was difficult enough. Soon we were back at the “Golden Lock Pass”—the entrance point to the three highest peaks—where we were now meeting people laboring up these steep steps, just as we had the day before. We got down to the North Peak, had lunch, and then continued our descent. En route, we discovered that one disadvantage of our itinerary was that we would meet the progressively climactic points in reverse order! The first and most difficult obstacle we encountered was a series of steps carved out of a cliff. Massive rocks towered on either side, with the sky appearing as a thin line high above. We looked at the rocks dangling precariously at the top and hoped they would not choose this time to complete their downward fall.

After this “Hundred-Foot Gorge,” we arrived at the “Thousand-Foot Slope,” which had 366 very steep steps carved out of a huge rock slab. The descent here was less demanding on the heart, but more demanding on everything else in the body. Looking straight down the steps made us quite dizzy, and we were glad there were chains on either side that we could hold to help control our descent. The only way down these precarious steps was through a small, steep opening, described in one of our guide books as the “Sky Well.” Off to one side of the well was a small metal plate. Throughout Chinese history, the book said, a single person guarding this plate had the ability to hold off a 10,000-man army trying to cross Hua Shan. The book also related how in the late 1940s the Nationalist Chinese apparently tried to use this method to block the Chinese Communist advance through the region, but were thwarted when Communist commandos discovered and crossed a treacherous path around the North Peak and attacked the Nationalist forces from behind. This saga has become a modern legend in its own right and has been made into a movie.

At the foot of the “Thousand-Foot Slope” was the “Turn-Back Rock.” This is the traditional point where the tired mountaineer would look up at the sheer cliff ahead and retreat. Throughout our climb up and down the mountain, we had found messages carved into rocks. Here at the “Turn-Back Rock” were two that sent mixed signals: “Onward you brave people” and “Before you continue, think of your parents.”

Here we also saw many porters carrying supplies up the mountain for the various establishments. This was backbreaking work, with miserable pay. Then we heard some lovely music coming from below. It was a porter. He was walking deliberately with his load but kept playing his flute. We listened and marveled at his serenity. Later, he caught up with us again after he had deposited his burden. His steps were lighter and his tune more playful. His music brought joy and life to that quiet valley.

At this point we were about six miles from our rendezvous at the foot of the mountain, with all the scary spots behind us. We could now look up at the magnificent West Peak and see the amazing meandering path that led to the summit. This was what the pioneers of old had seen, and their ingenious efforts and determination had carved out a path where none seemed possible. At this lower altitude the valley is quite lovely, with beautiful trees and flowers in bloom. There are many meadows and Taoist shrines. We stopped for drinks at a roadside store.

The last stretch was unexpectedly difficult, probably because we were quite tired by this time. The road was now paved with rock and though not treacherous, it was fairly steep. This was quite hard on the body. We made it back to the Jade Spring Temple by 4:40 with very little bodily reserve remaining. Our taxi driver met us as he had promised and drove us to Xi’an. Our journey back to Xi’an was filled with images of the rugged mountain of the five peaks and a not uneager anticipation of the comforts of a five-star hotel.

Paul Lee is professor of physics and astronomy at Cal State Northridge; York Liao, a Caltech trustee, lives in Hong Kong and is executive director of Varitronix Limited.

LETTER FROM THE ASSOCIATION PRESIDENT

Hello from Orange County, California. I'm Blair Folsom, president of the Caltech Alumni Association (CAA) for 2000-01. Since this is my first column in *Caltech News*, I thought I would respond to a common question: What



Blair Folsom

is the CAA and how does it work? Then, I'll discuss one of our focus programs for this year—a strategic communications plan.

The CAA is a not-for-profit corporation; its

members are Caltech alumni and postdoctoral scholars. The CAA has three primary functions: to maintain links between alumni and Caltech, to provide benefits and services to alumni, and to provide a vehicle for alumni to provide service back to the Institute. Fund-raising for Caltech isn't on the list because that function is handled by Caltech's Office of Development, which includes the Alumni Fund and the Caltech Associates.

The resources to conduct CAA programs come from alumni members and from Caltech. Members pay annual or lifetime dues and fees for specific programs (such as educational travel), which are typically conducted on a zero profit/loss basis. Caltech provides Alumni House and the CAA staff and cofunds several CAA activities.

The CAA has a volunteer board of directors and officers who are elected annually in June. The work of the CAA is conducted through several committees populated by board members and other interested alumni. At present the committees include (1) communications (publications and electronic communications); (2) programs (regional events and travel); (3) students, faculty, and alumni relations (programs bringing these groups together); (4) undergraduate admissions support (projects that help high school students learn about Caltech); and (5) Seminar Day.

All Caltech alumni are welcome and encouraged to participate in the CAA committees, which typically meet quarterly on Saturdays at Alumni House on campus. Below I will discuss the focus of the communications committee this year.

First, the broken record: "The Internet will change everything we do."

Now the reality: "The Internet *will* change everything we do, including how CAA communicates with alumni." Historically, most CAA communications with alumni have been via hard-copy publications, letters, and announcements. This has required a lot of staff effort and expense for the production, materials, and postage. The use of the Internet can significantly reduce the effort and expense, freeing these resources to provide additional benefits to alumni. This year we will accelerate the transition to Web-based communications by developing a strategic communications plan. Some of the elements are in place now, and others will be enhanced.

- Alumni server (in place now). Alumni can have Unix accounts.
- Caltech e-mail address (in place now). Alumni can maintain a permanent personal e-mail address at Caltech, such as myname@alumni.caltech.edu.

- *Alumni Directory* (work in progress). Historically, CAA published a hard-copy e-mail directory about every five years, which was distributed free to all CAA members. Now we are transitioning to an online directory, which will be accessible from the CAA Web site. Caltech staff are even now putting finishing touches on this directory. Look for an update and the latest details in the next issue of *Caltech News*.

- CAA Web pages (work in progress). The CAA Web pages are integrated with the Caltech Web pages and can be accessed at <http://www.its.caltech.edu/~alumni>. There is potential to significantly expand the content. For example, we could include articles from *Caltech News*, class notes, and a bulletin board. What would you like to see? We need your input. Maintaining a first-class Web site takes a lot of work, and we are pleased that Mr. Tracy Davis has recently joined the alumni staff as Web content developer.

- Contacting alumni via e-mail (just starting). Most alumni have e-mail, and many prefer it to hard-copy communications. We need to be careful here to provide true benefits, not spam. How much is helpful and how much is spam? Would you like to receive a periodic update from CAA? What would you like to hear about? Campus news? Announcements of coming events? How often? Monthly? Quarterly?

We welcome alumni comments and participation in all these areas. Please e-mail me with your thoughts at bafolsom@alumni.caltech.edu.

Blair A. Folsom



Photo Top: The Alumni Association has named three new honorary members. From left, they are Director of Minority Student Affairs Sue Borrego, Associate Dean of Students Barbara Green, and Professor of Geology and Dean of Graduate Studies Arden Albee, who recently stepped down, after 15 years on the job, to resume full-time teaching and research. Below: Frank Rock '48 and Associate Professor of History Diana Barkan enjoy the grounds of the Chateau de Marçay, in Chinon, during the Association's July trip to France. Two dozen alumni and two undergraduates participated, touring Provence and traveling by boat on the Rhone and Saone rivers to the Loire River Valley.



ALUMNI FUND SAYS "THANK YOU!"
TO VOLUNTEERS

The Alumni Fund wishes to thank each of the alumni who volunteered as Key Volunteers, Class Year Chairs, Option Chairs, and Callers for the 1999/00 Fund year. Through all of your efforts, the Fund remains a strong means of financial support for the Institute. Your phone calls to classmates provide another avenue by which alumni can stay abreast of what's happening at Caltech. Space constraints do not permit our thanking every one of you by name in this issue of Caltech News—so, we'll do it next time! Look for the list in the next issue. We salute you for all of your hard work.

JOIN ASSOCIATION FOR
2001 ROSE PARADE

The Caltech Alumni Association invites alumni to join their fellow Caltech grads in viewing "Fabric of America," the 112th Tournament of Roses Parade, on Monday, January 1, 2001. The event will commence with parade-ticket distribution at the Athenaeum, from 7 to 8:15 a.m. on January 1, followed by a viewing of the parade at approximately 9 a.m. from the prime location of the stands at the southwest corner of Colorado Blvd. and Hill Avenue. Buffet lunch at the Athenaeum will follow at 11:45 a.m.

The cost of \$70 per person includes reserved seating for the parade, the buffet lunch, and parking in the campus Holliston parking structure. An optional pre-parade continental breakfast is available at the Athenaeum for an additional \$9, from 7 to 8:15 a.m. Confirmation of reservations will be sent. Tickets will be held for pickup at the Athenaeum on January 1.

The reservation deadline is December 11, 2000, with refunds dependent upon the resale of tickets. To make a reservation or for more information, call Christina Pink at 626/395-6592 or email pink@alumni.caltech.edu.

Alumni
Activities

December 7, *Alumni Association Chapter Event with President Baltimore in San Diego.*

January 1, 2001, *Tournament of Roses Parade.* See article, this page.

January 13, *Alumni Association Board of Directors and Committee Meetings.*

January 14–29, *Antarctica Travel Study Program*, led by Professor of Geology and Geophysics Joann Stock.

February 3, *The Magic Castle.* See coupon, facing page.

February 8, *UAS Leadership Conference.*

March 21, *Metropolitan Water District Tour of Diamond Valley Lake.*

March 31, *Board of Directors and Committee Meetings.*

Koonin . . . from page 9

What about the opposite end of the spectrum—school board decisions that sanction the teaching of creationism in schools, a backlash—in some quarters anyway—against things like childhood immunizations. Are we seeing an emerging climate in which science is somehow perceived as alien and perhaps even dangerous?

Let me say a few words about this phenomenon. The flow from basic scientific and engineering research to applications is accelerating. People are more interested in how one turns a new development or discovery into something useful. And because new technologies are developing more rapidly, giving us better communications and transportation all around the world, we are seeing many more large-scale dislocations in society. This does raise the danger that society will start to see scientists as agents for a type of change that is not always desirable. We're seeing bits and pieces of this reaction already, for example, with respect to genetically modified food. Society needs to learn how to balance risk and reward. Already in biology, we have to deal with the ability to manipulate life. We have not had that capability before, and the potential implications are staggering. Soon we're going to have the power to examine the genetic basis of behavior and personality, whether it's intelligence, sexual orientation, substance abuse, violence—you name it. There's no doubt all of this will

turn out to have *some* genetic basis, and we will be discovering what it is in the next 10 or 20 years. How do we deal with all this knowledge? It strikes at the very heart of what we think about ourselves as beings.

It's a big ontological issue, not just a scientific one.

That's right. And of course people will start to have second thoughts about what all this means. And that's a legitimate concern. It's not that we shouldn't do it, but we should think a lot more about the implications. These issues are important ones for society and for scientists. Where are we going with science?

Do you see yourself someday moving more in the direction of advisory science policy?

I might. I can imagine that as a possible future. It's always important for good scientists to remain engaged with the government, although public service is a big proposition. But I strongly feel that these issues are important ones for society, and that scientists need to recognize that they must play a role in providing responsible and reasonable advice.

What about the ferment over the female scientist issue we've been seeing at MIT?

Well, of course, that has sparked some interest. I have looked at the data for Caltech, and I think they will show,

although I may be proven wrong, that we have generally treated the women faculty without prejudice and that there is equity at Caltech. We have established a committee headed by [Professor of Astronomy] Anneila Sargent to look into this question. I think it will be a healthy exercise. A lot of the questions surrounding this issue have to do with perceptions and maybe with just the way men and women think about themselves and interact with one another. I'm looking forward to working with the committee.

I've been told you play the piano well. Do you ever think that you would have preferred to do something like that as a career?

Occasionally. I have a brother who's a professional musician, so I have some idea of what it's like to live that life. And sure, there are days when I can imagine myself being happy sitting in a bar at the piano with a brandy snifter filled with dollar bills and just having a good time playing and making people feel good about listening to the music. I also think I have some talent for talking about and explaining science, and so there are certainly times when I can imagine science communication as a career.

When you finish as provost, do you have a sense of what you would like to see as your personal legacy?

I think having helped to hire good faculty and energizing and facilitating life for faculty and others on campus would certainly be one of the prime things. Another is having moved the Institute in some new research direction. Not that it wouldn't have pursued the Biological Sciences Initiative and several other initiatives anyway, but I would like to think that I provided constructive and positive encouragement for these new directions.

Do you feel that being provost has made you in some sense a different person?

Oh, yes. Coming to an administrative job like this as a scientist has been a real eye-opener, because the two roles can require completely different sets of skills. As a scientist, you have the opportunity—it's really a luxury—to go down the byways of ideas and think about things deeply. As an administrator, you often end up making decisions about things you're not that familiar with, and sometimes you make them almost by the seat of your pants. That's one of the key things I think I've learned as provost—that decisions are not always optimized. This job has also taught me a lot about human nature, and about how heavily it figures into science and engineering. And that has humbled me in some ways. In this kind of environment, it becomes so clear that while there are right answers, there are also good answers, and that the two are not always the same. It sure is interesting. Hope I've done some good.

Varshavsky . . . from page 4

regulation of protein stability. In this crucial area he and his laboratory are the world leaders."

Born in Moscow, Varshavsky has been a member of the Caltech biology faculty since 1992. After finishing his doctorate at the Institute of Molecular Biology in the former Soviet Union in 1973, he headed the institute's research group for four years before joining MIT, where he worked from 1977 to 1992.

Varshavsky is a member of the National Academy of Sciences and the American Academy of Arts and Sciences. His honors include the 1999 Gairdner International Award, the 2000 Shubitz Prize in Cancer Research, the 2000 Sloan Prize, and the 2000 Hoppe-Seyler Award from the German Biochemical Society.

Recipients of the Lasker Awards are often honored with the Nobel Prize for Physiology or Medicine or for Chemistry. Caltech recipients of past Lasker Basic Medical Research Awards include biology professor and 1995 Nobel Laureate Ed Lewis and neuroscientist and 1993 Crafoord Laureate Seymour Benzer. Former Caltech faculty who are Lasker Prize awardees include Leroy Hood in 1987, Renato Dulbecco in 1964 (a 1975 Nobel laureate), and George Beadle in 1950 (a 1958 Nobel laureate).

LIGO . . . from page 5

achieving the delicate optical interference that will make the detection of gravitational waves possible. This feat, dubbed "first lock" or "locking the interferometer," is similar to the "first light" of a newly commissioned telescope.

Commissioning of the LIGO detectors will continue through the remainder of 2000 and 2001. Short periods of operation to test different aspects of their operation ("engineering runs") will be alternated with installation and commissioning. Full operation to detect gravitational waves will commence at the beginning of 2002.

Quantum . . . from page 6

engineering who is interested in control issues of quantum systems.

Other investigators will include faculty members Michelle Effros, Hideo Mabuchi, Michael Roukes, Axel Scherer, and Leonard Schulman. The institute will develop a substantial visitors' program and hire postdoctoral researchers and graduate students who wish to enter the field of quantum information systems.

The NSF announced the Caltech award and others as part of a \$90 million information technology research initiative aimed at seeding fundamental research in innovative applications of information technology.

THE MAGIC CASTLE - A DAY OF SORCERY
SATURDAY, FEBRUARY 3, 2001
11:00 A.M. - 4:00 P.M.

Experience the Magic Castle for an exciting day of feasting and sorcery. A clubhouse of the Academy of Magical Arts, this 1908 Victorian mansion is a Hollywood landmark and home to some of the foremost entertainers in magic. Entry usually requires an invitation by a Castle magician, but this is an exclusive Caltech event.

Magic will be performed in intimate surroundings by various magicians as the audience moves from one haunted room to another. Included in the program is a three-course lunch in the historical Victorian dining room. Typically, the Castle does not allow guests under 21 and requires formal dress; but because we have reserved the entire facility, the dress code has been lifted, and the age requirement lowered to 12 years of age.

The Magic Castle is located at 7001 Franklin Avenue, Los Angeles. Valet parking is included. Tickets will be mailed out two weeks prior to the event.

Refunds are dependent upon resale of tickets. For more information please contact Christina Pink at 626-395-6594 or pink@alumni.caltech.edu.

For reservations, please mail your check and the reservation form below to:
Caltech Alumni Association
Mail Code 1-97
Pasadena, CA 91125

Please make ___ reservations for the Day of Sorcery and lunch at the Magic Castle. Enclosed is my check in the amount of \$_____ (\$45.00 per person.)

Name _____ Class Year _____
Address _____

Names of Guests _____

Daytime phone _____ Email address _____

Letters

ALUMNI TELL OF TEACHERS AND TACKLING TEACHERS

Two items in your recent issue (vol. 34, no. 2) struck me deeply: Bruce Reznick's contribution, "What makes a good teacher? Where does research fit in?" and the announcement of Dr. Frederic Bohnenblust's death.

My doctoral study in physics at Caltech spanned the period from September 1951 to June 1955. For a while, my assistantship consisted in the construction, repair, and testing of demonstration and laboratory equipment with Dr. Neher. For the remainder of my first two years, other graduate students and I were permitted to teach (yes, teach—not just tutor) a section of the two-year general physics class. I understood that later there was discontent with this system, resulting in the taking over of this important class by Dr. Feynman.

It was understood that physics graduate students' assistantship responsibilities would be met in some research group after the first two years. However, since my goal was to teach at a small liberal-arts college, I ventured over to Dr. Bohnenblust's office to ask about teaching in the mathematics department and was entrusted with a section of students in the two-year calculus sequence.

As a result of this nearly four-year experience in teaching the basic physics and mathematics courses, I experienced none of the difficulties and anxieties that plague most college teachers when they first enter their classrooms. Furthermore, I was superbly prepared to teach the advanced subjects while yet avoiding the error of teaching over the heads of the beginning students. The time required for most novice teachers to learn how to teach I was able to devote to starting a small research effort. I will be forever grateful for this preparation.

As I look back on these circumstances, I cannot but be grateful for the faith of Dr. Bacher (chair of the PMA division), Dr. Watson (in charge of the two-year general physics sequence, if I recall correctly), Dr. King (my major professor), and Dr. Bohnenblust (in charge of the two-year calculus sequence) that I would teach effectively and still

accomplish my thesis work.

Somewhere along the line I did acquire the reputation of being a good teacher. I'm not sure how well the general physics went at Caltech, but a couple of my students say that our section was a very effective learning experience. Dr. Bohnenblust had surely done some homework before entrusting me with freshman and sophomore mathematics majors. Since then, there have been some nice acknowledgments, e.g., the Pegram Award of the Southeastern Section of the American Physical Society.

The research during my years as a professor at Southern Adventist University could not be and has never been as rapid as that at research universities. However, it has been published in more than 60 articles and a book.

At first it was (as often is the case) a continuation of my thesis topic, determination of metal-atom oscillator strengths. Then it evolved into reentry and thermonuclear plasma diagnostics using classical spectroscopy, and involved a lot of consulting. By the end of the 1970s, it turned to the construction and testing of periodic systems for small molecules. Now it is an investigation of the texture of chemical space (the space in which periodic systems of atoms, molecules, and quarks exist).

This letter is partly a belated tribute to Dr. Bohnenblust and partly a response to Bruce Reznick's question "Anybody out there getting some ideas?" The response is that the Caltech faculty of 1951–1955 were as interested in good teaching as in good research. My advanced graduate courses were taught by senior faculty such as Dr. Anderson (discoverer of the positron), Dr. Greenstein (astrophysics), Dr. Smythe (sheep and goat divider), Dr. Plesset (hydrodynamics), and Dr. Sands (electrical engineering). They planned their presentations thoroughly and deeply influenced my teaching style. Dr. Goodstein's teaching, as seen in *The Mechanical Universe*, is a more recent example. Here are three things that I'd like to see at the universities about which Dr. Reznick writes: senior faculty continuing to appear in the classroom; graduate students having opportunities to teach some class sections; and some new faculty being hired and respected for their skill in teaching.

—Ray Hefferlin, PhD '55

Alumnus Bob Staley wrote in reference to a June 11 New York Times obituary about a former Caltech instructor. The article is excerpted below:

Kermit Roosevelt, who was a member of the famous American political family but who made his contributions to the nation in the shadowy world of spy craft, died in Cockeysville, Md. He was 84. Mr. Roosevelt's best-known exploit was as director of the 1953 coup that overthrew the leader of Iran, Prime Minister Mohammed Mossadegh, a nationalist who concerned Washington because he was supported by

the Iranian Communists at the height of the cold war. Earlier this year, the CIA's secret history of the coup surfaced, providing a detailed account of the overthrow, which brought Shah Mohammed Reza Pahlevi to power. . . . After graduating from Harvard, Mrs. Roosevelt said, her husband "tried to teach history to the techy boys at Cal Tech," and then entered the military during World War II.

In his letter, Staley writes:

I am one of those "techy boys" that [Roosevelt] tried to teach history. We always referred to him as Kermit the Hermit because of his withdrawn nature. He had the misfortune to replace J. Wallace Sterling, who unfortunately was on sabbatical during my senior year. I am afraid any young instructor would have suffered by comparison.

As for his leadership of the coup in Iran, that seems incredible given his manner in class. In my opinion, the principal beneficiary of the coup was not the U.S. but British Petroleum. Given how the Shah screwed up with American help, Mossadegh might not have been so bad, and we could have avoided the Ayatollahs.

Kudos to Prof. Cohen for his exceptionally well-deserved award (the Feynman Prize for Excellence in Teaching, *Caltech News*, Volume 34, No. 1). I took advanced complex analysis from him in 1982 and remember the class (and his teaching) very clearly. He made complex variables come alive with his explanations of how different parts of a radio wave (and, accordingly, different approximate solutions to the same complex equations) hit a space probe "way out there in the boondocks." To this day, when I think of the best teacher I have ever had, Prof. Cohen's name comes immediately to mind.

—Pierre Grosdidier, PhD '86

Caltech sailors have been competitive even before Gary Bodie (*Caltech News*, Volume 34, No. 2), though perhaps not to his Olympic level.

In the '50s and early '60s Caltech owned a fleet of six racing sailboats, of a unique class known as the "Tech dinghy." Those 12-foot Fiberglas boats were powered only by a mainsail, and were berthed and launched thanks to the generosity of the Los Angeles Yacht Club. When I arrived at Caltech, the Sailing Club members used them only for sailing instruction and pleasure.

Then along came competitive John Letcher '63, PhD '66. He decided we Caltech pleasure sailors must get involved in intercollegiate racing, so we traveled to compete against the likes of UC Santa Barbara and UC Berkeley, among other schools. Most of those races were in Lehman 10s, which were even smaller than Tech dinghies. It was a pleasure to sail at UC Berkeley, which offered its fleet of larger Lido 14 sloops (which have a jib as well as a mainsail) to the racers.

I'm not sure if we won any races, but we had a good time representing Caltech while trying. John kept the sailing team going during his stay at Caltech, taking some time off to single-handedly sail his own wooden 25-foot cutter to Hawaii. He later formed his own marine architecture firm and participated in the design of America's Cup racers. As for me, my sailing experiences at Caltech inspired me to choose a water-oriented community (Huntington Beach) as my permanent home, where boating is a part of our everyday life.

Whatever happened to the Caltech dinghy fleet? Well, unlike modern Fiberglas boats, they lacked permanently attached flotation. One by one, unlucky sailors capsized them and sent them to the bottom of the Los Angeles Harbor, so far as I know.

—Alan Dauger '62



The castaways in the shed behind Brown Gym hint at Caltech's flirtations with competitive sailing. Kobold, which sits at the bottom of the heap, was the somewhat victorious boat mentioned in the recent *Caltech News* feature on Gary Bodie '78. Bodie, now the head coach of the U.S. Olympic Sailing Team, helped the team garner one gold, two silver, and one bronze medal in the 2000 Olympics.

Please include me as a Caltech sailor. I grew up sailing in Narragansett Bay, Rhode Island. I cruised and raced with my brother Pete, who was editor of *Rudder, Motorboat and Sailing, Motorboat, and Florida Waterways*. I taught for both New York Sailing School and Offshore Sailing School. I qualified as an Auxop in the Coast Guard Auxiliary and [got] a full ticket from the United States Power Squadron. As Branch Chief, I wrote "Seven Lesson Sail Course" with Tony Gibbs (then editor of *Yachting*) for the auxiliary. I lived aboard Tony's 37-foot ketch (designed by my brother) for several months. [I contributed] articles and photographs to *Motorboat and Sailing* and *Yachting*. No current involvement with sailing. Now it's ballroom dancing.

—Bill Smythe '48

Thanks for your letters! Please keep the conversations going by writing or e-mailing Caltech News (billary@caltech.edu).

CALLING ALL K-12 EDUCATORS

Caltech News is gathering a list of contacts for an upcoming article about alumni involved in K-12 education. Please send e-mail to billary@caltech.edu, listing the names and contact information of alumni who teach, administer, or volunteer in the elementary- or secondary-school systems.

Classes Notes

1951
Edwin Matzner
eamc@compuserve.com

After graduating with a BS in physics, **Dave Elliott** (david.g.elliott@jpl.nasa.gov) received a Caltech MS in mechanical engineering. He worked at JPL until 1953, then was at Purdue University from 1953 to 1959, receiving a PhD in mechanical engineering. Since 1959, he has worked at JPL on electric propulsion, magneto-hydrodynamics, rail transportation (with **Brad Houser**), cryogenic microgravity experiments (with **Peter Mason**), and space infrared telescopes. Dave and his wife, Leona, live in La Cañada and have two children, two grandchildren, and a Cherokee 180 airplane.

One of the first class of ex-GIs, **Bob Boyer** (RBoyer@aol.com) was 22 years old his freshman year, and will be 76 at the 50th anniversary. After graduation, he worked in the air-conditioning industry for a local contractor and for his major employer, Honeywell. During 30-plus years with Honeywell, he worked in engineering and management, and retired as supervisor of quality engineering at the Gardena plant. Bob and his wife, Ruby, have two sons in California and a daughter in Wisconsin, who have given them five grandchildren. Bob and Ruby now live in Nipomo, California, near a golf course (where he plays regularly), and consider the central California coast the best of all locations.

Since **Rod Smythe** (Rod.Smythe@colorado.edu) retired in 1995 after 38 years in the physics department of the University of Colorado at Boulder, running and flying have claimed a lot of his time. He became involved in a thermal wave research project at the National Center for Atmospheric Research. In addition to building some of the equipment, Rod had interesting flights into Wyoming and Nebraska. He hopes to do more cross-country flying in his glider and new Cessna 172. He and his wife, Judy, who ran in the New York marathon last fall, are getting ready for another season of competition. They have six children and nine grandchildren. A few years ago, Rod flew down to Los Alamos and had lunch with **Don Hanson** (donmarg@att.net), who was in the '51 freshman class but finished at USC. Don is now retired after a career at Los Alamos National Laboratory.

Marshall Klarfeld (mklarfeld@pacunion.com) is an active agent with Pacific Union, San Francisco, and president of Global Golf Connection (www.globalgolfconnection.com), a company engaged in the sale of golf courses and real estate, and Tour 18 expansion. Marshall and his wife, Mary, live on the golf course at Adobe Creek, Petaluma, California. Bud is very involved with a project on the "Bible Code," which has led him to some strong conclusions regarding the source of the first five books of the Old Testament.

After retiring from AlliedSignal at the end of 1995, **Ron Caldwell** (RC12234@aol.com) continued consulting for two years but is now fully retired. Ron's principal residence is Phoenix, Arizona. He keeps active with various hobbies, including reading, ham radio, surfing the Internet, and bicycling. After a second marriage, Ron enjoys a more extended family with several grandchildren.

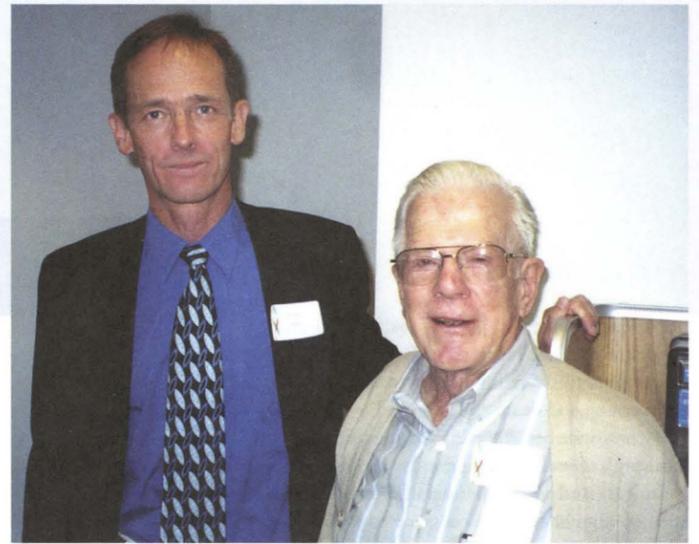
Paul Armstrong (Hikerdad@aol.com) retired as an attorney in 1993, and it is hard for him to remember his past, as he and his wife of 47 years keep busy on new pursuits, none of which rise to the level of being "unusually promising."

Walt Biggers '55 (wbdbrw@soar.com) lived off campus from 1949 on and so feels much closer to his friends in the class of 1951. After receiving his BS in ME, he worked in gas-furnace design and production engineering and manufacturing for a number of years. In 1971 he joined Subaru of America as director of its emissions lab in Huntington Beach, and from 1979 to 1990 served as VP of engineering. Walt then consulted for five years before starting a home-building company in Spokane, Washington. He retired in 1999, and now maintains an orchard and berry patch, which produced over 200 pounds of fruit last year. Walt was married in 1949 to Helen Hammond. They have five children, 14 grandchildren, and one great-grandchild, and are healthy and active in the Episcopal church.

Regarding the Good Old Days, **Dave Manning** (dtmanning@mindspring.com) asks, "Do you remember Professor Lucas and the draft board? Making white lightning in Zechmeister's lab? Big Mary? The Skip Inn? The waitresses at Van De Kamps? The Caltech 'Tux Rental' shack?" But before dissolving in a pool of nostalgia, here are biographical highlights: Dave retired in '99 from Rhône-Poulenc Ag Co. after 44 years in the chemical industry, which included co-patenting a cotton harvest-aid growth regulator product. From chemistry he turned to poetry, with more than 50 poems and one book in print to date (thanks to Hallett Smith's evening English Lit seminar, which put him on the right track). Dave says he also does some choral singing (tenor) and gardening, annoys people with e-mail, and plays an unbelievably bad game of golf.

Al Thiele (AlThiele@aol.com) enjoys reading about our classmates and feels it certainly beats reading the obituaries. Retired since 1993, Al enjoyed his professional career

Caltech Professor of Geology Kerry Sieh (left) was among those on hand September 8, when Robert Wallace, PhD '46 (right), was honored by the U.S. Geological Survey. The USGS has named its new earthquake center in Menlo Park, California, after the renowned geologist, who served for 14 years as chief scientist of the USGS Office of Earthquakes, Volcanoes, and Engineering.



with General Electric and Rockwell International, with endeavors including nuclear energy, instrumentation, robotics, and advanced manufacturing. He and his wife have two sons, one a teacher and one in the automotive industry. The couple now enjoy the beach climate in Oxnard, California. Al's interest in photography has covered his walls with prints, and he has now expanded to digital processing. He and his wife enjoy boating, traveling, and RV camping. They have explored all over California, the United States, and England. Al's campus interests have included working on the Seminar Day committee, an avenue for maintaining his technological interests.

Larry Dyer (lddyer@flash.net) worked two years at Oak Ridge National Laboratory and, after getting a PhD at the University of Virginia, worked at GM Research, then went to Texas Instruments in 1966. The holder of 23 patents, he retired in 1991, then consulted for eight years, mainly in silicon and glass fracture. Larry's main hobby is genealogical research. He hopes to go to the 2001 reunion and to bring his son **Brian '78** (who, with son #2, Glenn, helps him with computer problems). A grandchild was added last summer: son Kent (named after **Kent Stratton**) and daughter-in-law Tiffanie adopted a baby boy. Larry reflects that he didn't end up rich, famous, or powerful, but "rich enough," with three sons supporting themselves, and he and Roberta, his wife of 48 years, still enjoying good health.

Bert Clark (brt.clark@juno.com) attended Caltech in the Navy's Officer Training Program, went to sea and to Pasadena City College, then

returned to Caltech to graduate. He then started as an electrical engineer with the California Division of Highways (now Caltrans). Bert worked in traffic engineering for 35 years, retiring in 1986. His wife, Leanna, is retired from teaching. They have three children: two sons in San Diego and a married daughter in San Jose. Both native Californians, Bert and his wife have enjoyed 37 years in the home they built in Pasadena.

Dallas Peck (dpeck@usgs.gov) received an MS in geology at Caltech and went on to Harvard for a PhD. He spent his career with the U. S. Geological Survey, including field work in Oregon, California, and Hawaii, and management (including as director) in the Washington, D.C., area. He received the Caltech Distinguished Alumni Award in 1985. Dallas married Sue as a Caltech senior, and they had three children: Ann and Stephen, in Southern California, and Gerry, a U.S. Army major stationed in Japan. All are married and have produced four grandchildren. Sue died in 1993, and Dallas married Shirley in 1995. They live in Reston, Virginia, in the house he has occupied for 25 years. He retired in 1995, but continues going to the office most days, unless good gardening weather abounds or he and Shirley are off to Europe again.

After obtaining an MS and PhD at Caltech, **Michael Basin** married JoAnn Wener in 1954, started System Development Planning (undersea surveillance systems) in 1970, and retired in 1991 after serving as CEO and board chair. After living 46 years in Studio City, California, Mike moved to Palm Desert in 1991, becoming a desert rat but frequently traveling all over the globe. Mike and JoAnn have a son, David, a Cornell PhD, professor of computer science, and chair of software engineering at Freiburg University (Germany); and a daughter, Karen, an MD (UCSD) practicing rheumatology in Medford, Oregon. One granddaughter, Emma, was born in 1999.

Bob Connelly (rconnell@psi-japan.com) came to Caltech following stints in the Army Air Corps as an aviation cadet and IBM tabulating machine operator. After graduating, he was an instructor in high-tech manufacturing techniques at USC and Stanford, and then spent 29 years in Japan with Barclay & Co. He formed an import company in 1978, and was also president of PSI-Japan, a company that works with the Japanese government in trade and procurement. Bob's early interest in electronics has come full circle, as he maintains several Web sites and writes code for PSI-Japan and PSI-USA (managed by sons Duane and William, respectively). Bob holds a number of patents in the United States and abroad, and has been vice president of the American Chamber of Commerce in Japan for five years and on its board of governors for 12 years.

Steve Pardee (spardee@home.com) earned a Caltech MS in EE, and then joined Bell Labs. In 1955 the draft caught up with him, and he was assigned to the Army Security Agency's Special Project Unit in Virginia. In 1957, **Al Jackson** offered him a job at the National Aviation Facilities Experimental Center, where they worked together using digital computers to control air traffic. They created the FAA's first large-scale digital simulation facility, a significant breakthrough, and in 1963 Steve

CLASS NOTES CUTOUT COUPON

If you're a Caltech undergrad with a class agent, please take a moment to update us on what you've been doing, and we'll be sure to send that info on to your class agent.

Return this coupon and any additional materials to Caltech Alumni Association, 1-97, Pasadena, CA 91125. If you would prefer to e-mail your news directly to your agent, you can find your agent's name and e-mail address on the Web at http://www.its.caltech.edu/~alumni/class_notes.htm. And if your class doesn't yet have an agent, please fill out and mail the Personals Coupon on page 21.

Name _____

Option and Degree Year _____ New address? _____

Address _____

Day Phone _____ E-mail _____

NEWS _____

became its manager of process analysis and programming. He returned to Bell in 1967, focusing on software for computer-aided engineering and design, and retired in 1990. Steve has since become addicted to attending local high school sporting events. He also does consulting and plays a little golf. Four children and seven grandchildren continue to make life interesting. This October he and Mary Jo, whom he married during his senior year, celebrate their 50th anniversary.

Fred Eisen (am478@lafn.org) retired in 1988 after 33 years at the Rockwell International Science Center. He and his wife, Carol, then went to Freiburg, Germany, for 16 months, where he worked at the Fraunhofer Institute for Applied Solid State Physics as a Humboldt Foundation U.S. Senior Scientist. Back home, Fred became a visiting associate in applied physics at Caltech, where he is still pursuing an experiment. Fred and Carol have traveled throughout the United States and Canada in their motor home, and have enjoyed many Alumni Association travel/study programs, particularly those with Bob Sharp and Lee Silver. Fred is the webmaster for the Cellarmasters Home Winemaking Club, has served on the Alumni Seminar Day Committee, and is on the Alumni Association Board of Directors.

Bill Eilau was originally in the class of '49, but health problems delayed his graduation until 1951. He married Pauline (Polly) in 1947, and they celebrated their 53rd anniversary in July. They started growing orchids as a hobby in the '50s, and have been to many orchid shows worldwide. Professionally, Bill spent 20 years in aerospace on projects including wind tunnel design, an optical satellite facility, and transport and erecting equipment. He then was involved in designing and upgrading processing plants. He retired from U.S. Borax in 1987, but has continued designing plants with a small engineering company. Bill and Polly have lived in Arcadia, California, for 45 years.

After receiving chemistry and biology degrees from Caltech, your class agent, **Ed Matzner**, obtained a PhD in organic chemistry from Yale, synthesizing fulvalene (an isomer of naphthalene) for the first time in history, working with William Doering. Ed joined the Monsanto Company in St. Louis, Missouri, in 1958, retiring in 1991 with many publications and patents to his credit. He is now a scientific consultant, publishes a newsletter on organic chemical technology, and is active in communicating scientific thought to lay audiences. Ed has developed a strong interest in literature; other hobbies include camping, combinatorials, dog training, and photography. He travels a lot, is active in French and German organizations in St. Louis, is an enthusiastic canoer and ardent Cartesian, and has one daughter. He is pleased to serve as 1951 class agent. If you read this and haven't yet sent him your latest news, please do so. Ed has already received many more updates from classmates. *Space did not permit printing all of them here; they will appear in the next issue of Caltech News.*

1955

John Andelin
jandelin@cais.com

That was then. Forty-five years ago, at our class's graduation, **Ed Seidman** wheeled twin strollers down the aisle with sons Daniel and David, six weeks old (they'd been the hit of the party a week earlier, too, when Pasadena ladies held an afternoon tea for the graduates). This is now—son Daniel and daughter-in-law, Wendy, had twin girls in February, giving now-grandpa

THE YOUNG WOMAN AND THE SEA

Of all this year's college graduates with freshly minted rocket-science credentials, it's a safe bet that none has spent more time in a fishing boat than Carrie Garner '00.

The 21-year-old Garner, who received her aeronautics degree in June, has spent nearly every summer since she was 15 on her family's commercial boat, scouring Alaskan waters for red, or sockeye, salmon. After packing away her diploma, she headed once again for Seattle to join the four-member crew that includes her mother, her uncle, and an old family friend. From there, the four flew to Naknek, Alaska, and boarded the family's 32-foot salmon gillnetter, the *Nexus*, for three weeks of fishing.

Garner is a deckhand on the boat, a job that entails such demanding physical duties as handling the 900-foot fishing net. Her mother is co-owner of the boat and also a deckhand, and her uncle is skipper. Her father, meanwhile, works year-round in Seattle, running the salmon-processing company that receives the *Nexus's* annual haul.

Because the Alaskan fishing industry is tightly regulated, commercial crews find it economically necessary to work literally 24 hours a day during the short open seasons—with no trips to shore, no real recreation to speak of, very little sleep, and not many showers. For Garner, this can mean 18-hour shifts of setting out nets, hauling them back in, plucking the 5- to 10-pound salmon and tossing them into bins, and then repeating the process. (Slim and not particularly brawny-looking, Garner says that in previous years, she'd head to the gym a few months before launching out, to build up her endurance and her arms.) When the fish bins fill up, the crew gets a break in the routine and unloads the catch onto a "tender," a boat that hauls the salmon to a processing plant or cannery.

Says Garner of the industrial-strength fishing jaunts, "It's a lot of hard work and long hours. But we work well together, and we all get along, which can make a huge

Ed his revenge, and bringing the grandchild count up to 10. Not necessarily coincidentally, the girls were initially named "A" and "B," just as Daniel and David had been 45 years earlier.

And this is both then and now. **Don Roberts** went to our 45th class reunion in May and wrote a personal reflection on it. The text from Don follows:

"I confess that I was somewhat paranoid about returning to Caltech after 45 years, afraid to face the changes in the campus and in my classmates. I knew I would feel like an outsider on a different campus, and I was certain that my personal achievements wouldn't measure up to those of my classmates.

"Indeed, the campus has changed a lot. Our campus—walkways, ice plants, dust, and two rows of nondescript buildings—has been replaced by a landscape of innovative, dramatic buildings in an Eden of lawns, flowers, pools, fountains, and trees (jacarandas were in bloom everywhere). Here and there I located familiar buildings—almost hidden, like old artifacts. The student houses in particular are dramatically older, shabbier, in crumbling disrepair, and look like some poorly preserved, recently



It's a wonderful (fishing) life: Carrie Garner '00 hauls in a catch aboard the *Nexus*, her family's salmon boat, on which she has served as a deckhand for the past several years.

the four took it easy, enjoyed the beautiful weather, and went beachcombing.

The most unusual moment on the otherwise low-key outing came as the crew headed back to shore, Garner recalls. "We rescued a guy on a tiny wooden skiff at one in the morning." The ex-Navy SEAL, a scuba diver who untangles fishing nets that become caught in boat propellers,

had hit a sandbar while returning to land and was stranded when the tide receded. When the sea rose again several hours later, he continued on his way, but was soon taking on water faster than he could bail. Spotting some boat lights, he made a beeline toward them—and came upon the *Nexus*. "We were just cruising along when he appeared next to our friend's boat directly in front of us, half under water. It was pretty bizarre for all of us," Garner says, and heartening to feel that "we did our good deed."

Though she's enjoyed being part of the family business, Garner is getting set to spend more time in the sky than at sea. In mid-May she finished the requirements for a private pilot's license, and is planning to return to California to finish her flight-training instruction certificate and to work as an instructor. She's not sure what the future holds, or whether she'll continue to join the yearly salmon expeditions—at least as part of her livelihood.

"I'm not sure if it'll be profitable," she muses, and adds, "but I love fishing. I would go just for the experience."

—ROBERT TINDOL AND
DARYN KOBATA

excavated ruins (as do we). The once-thriving ghetto in which we lived survives as a relic of a bygone era. Perhaps it is time for some innovative buildings there.

"Change has been good for the Caltech campus. This campus (not *our* campus) is as beautiful as any I have seen. In marked contrast, we of the class of 1955 have not changed very much. Our grueling experience at Caltech was a time of never-to-be-equalled effort and intellectual strain. We were a couple of hundred intensely competitive, hive-dwelling adolescent young men, the intellectual elite of the nation, struggling to validate ourselves. After graduation, we would go on to achieve greatness, since successful survival at Caltech was incompatible with anything less in the real world of mere mortals. Forty-five years later, I returned as a mere mortal, finally humbled by and comfortable with my ordinary humanity. I was without greatness, ready to accept my inferiority in the presence of my now-great classmates.

"My initial impression at our class gathering was that I was with a group of strangers. I ordinarily recognize people by their faces, and there were no familiar faces in the crowd. While

talking with men whose name tags identified them as classmates, I realized how unimportant appearance is. Here, behind the facades of age, were men I still knew well and still loved. It was profoundly reassuring to me when I realized that these men—successful professionals, solid citizens, and admirable individuals, who have contributed to the benefit of humanity, and whom I am honored to have as friends—had all returned to this reunion sans greatness of their own.

"Forty-five years after graduating from Caltech, I have finally realized the importance of some truths that have been known as long as we have been a species. Time brings changes, and the moving finger continues to write whether we are involved or not. Friendships, however, can provide stability in the midst of the chaos of change. Fortunately, friendships once formed are self-sustaining, and can last a lifetime without any effort being made to maintain them. Any communication from classmates is welcome. However, may you all know that your friendship means a lot to me, even if we never communicate physically again. I love every one of you."

I'll toast to that.

1973

Stephanie Charles
sjcharles@juno.com

Marvin Mandelbaum reports that after more than 20 years with Logica (formerly Data Architects), he recently took a position as a systems architect with Edgewater Technology, a company specializing in e-strategy and e-commerce infrastructure (<http://www.edgewater.com>).

Lee Kondor writes that he and his wife, Teresa, have relocated from Elmira, New York, to Charlottesville, Virginia. Lee is enjoying his job with GE Fanuc Automation as manager of machine tool projects and finds the Virginia weather delightful.

Bob Plaag reports that he is still enjoying early retirement, and he definitely recommends it. He spent the spring quarter teaching a physics class at Seattle University (a Jesuit university) as an adjunct professor. He enjoyed it because it was more a hobby than a job. Bob and his wife, Linda, recently drove from Seattle to upstate New York with their 17-year-old cat in an inherited Vanagon to attend his nephew's high school graduation.

John Fraser says that he was recently promoted to corporate scientist at ATL Ultrasound, a position at the VP level on the technical side of the dual career ladder. He had previously reported that ATL had been bought by Philips, and now he writes that the assimilation is going well. He has been to the Netherlands, Germany, and France, and has been very pleased with the openness and technical competence of the Philips people. He is currently spending a three-month sabbatical at Stanford studying novel ultrasonic transduction techniques. His wife, Lindy, and their children have joined him there. They've bought an old 18-foot daysailer, and John is alternating between fixing it up and enjoying the strong winds of the Bay Area.

Robert McNamara reports that he is consulting in the telecommunications area. He and a couple of other associates have just started a company, e-Vangel, that specializes in doing due diligence for investors and in evaluating technology, people, and development processes in start-up companies. In addition, they work with companies that have troubled investments, helping them do turnarounds. He holds the position of CTO and COO at e-Vangel. At this time, he is also CTO of one such company in the secure fiber optic transmission area. He and his wife, Evelyn, have eight children: Molly (age 23); Robert (21); Kate (18); Maggie (who died seven years ago when she was 4); Mimi and Caroline (both age 5), whom they adopted from China; and Ryan and Jack (both age 1), whom they adopted from Vietnam. They are having a great time with their new additions.

Joe Rayhawk, who lists himself in the "Class of '72+," is still up in sunny dry Oregon and still married to the former **Shelley Johnson** '76. He says he sent his news just to make the rest of us feel old. His daughter Kirsten, whom he believes to be the first pure-bred Flem and maybe the oldest child of two Caltech graduates, is married and should deliver a baby sometime in the fall. "Yes," he says, "that will make me a grandf. . . . Oops, just cannot quite type it. But, a lot of the rest of you cannot be too far behind me in undergoing this shocking transition." Joe suggests that one of the reasons people pretend to be 29 is that they lose track of birthdays after that. Joe originally entered with the class of '72, and used to write that he was class of '72' (72-prime), because the prime signifies "successor function" (i.e. 72+1).

However, he says, the 72++ is a far more well-known geeky notation, and he hopes that the desire to abuse himself in a public display of geekiness will motivate a few extra friends to contact him. "Assuming any of the really old people from the class of '72 are still alive," he adds.

In the last two years, **Mark Bleck** has visited campus several times to attend classes at the Industrial Relations Center. He has touched base with his former Page roommate, **Stan Whitcomb**, who is on the research staff at Caltech, and once had the opportunity to play in the annual varsity/alumni basketball game. He was the oldest alumnus by far, but he had fun playing and then having dinner with the current team and coach. Mark says the new gym is a vast improvement over the old one. What wasn't fun was getting out of bed the next morning! He was sore for two weeks! Mark has roamed the campus and brings us this travelogue. "So much there is familiar and brings back memories, and yet so much has changed as well. There is an awful lot more campus north of what used to be San Pasqual (which is now a big garden) than there was when we left in 1973. A very beautiful garden also sits where Throop Hall used to be, and the fountain in Millikan Pond has been replaced with a new model. Still, the ambiance of the olive walk is the same, though the student body seems more diverse. A much nicer, much larger bookstore occupies most of the first floor of Winnett Center."

Jean-Francois Saint-Marcoux, MS '73, reports that he met his wife, Kazuyo, while at Caltech. She teaches Japanese to business people in Paris. They have a daughter, Cécile (age 22), who has completed her second year (out of three) in aeronautical engineering in Toulouse, France. Currently she is on an internship at NASDA, Tsukuba, Japan. Their son, Antoine (age 18), has finished his first year of preparatory courses for engineering studies.

For the last eight years Jean-Francois has been in charge of the engineering department of ETPM, an offshore general contractor based in Paris. ETPM and Stolt Comex Seaway (SCS) have been working together on a very challenging and innovative project to produce oil in very deep (1,000 m to 1,500 m) water using highly thermally insulated towers. Those towers are very slim (about 1.5 m in diameter), to scale looking very much like a hair. ETPM and SCS have recently formed a new company, Stolt Offshore, where Jean-Francois is in charge of conceptual design and is contemplating projects in yet deeper (1,500 m to 3,000 m) water.

Jean-Francois says that mention of **Jacques Beser** in an earlier class notes column reminded him of a day in February 1973 when it rained so heavily that Professor Norman Brooks of environmental engineering showed the class a record of the rainfall that almost prevented them from attending his class. Jean-Francois says that only three people on campus had a decent raincoat: Jacques (from Belgium), and **Xavier Lagarde**, MS '73, and himself (both from France). He says that was the only occasion they had to wear this rather odd piece of clothing in sun-bathed California.

Jean-Francois thanks Caltech for its education and spirit, and expresses his gratitude to several Caltech alumni who have been very helpful to him, notably **Sebastien Candel**, PhD '72, and **Robert Blevins**, PhD '74.

Dan Reichel says he is still trying to publish a paper in which he conjectures that the planet Nibiru, known to the ancient Sumerians and supposedly the cause of the Biblical Deluge (if one can believe the writings of Zecharia Sitchin, based on ancient Sumerian cuneiform texts), is now our moon. He knows the "planetary capture" hypothesis for the moon's origin is rather out of favor at the moment, but finds it far preferable to

the current popular leader, that the moon is the result of an ancient collision of Earth with a large asteroid. He enjoys the intellectual play of having physics as a hobby, while he earns his keep as a senior systems analyst for a small software firm. (He asks, "When Caltech encouraged an open mind and independent thinking, is this what they had in mind?")

On a personal note, after two hectic years of consulting for a series of start-ups, your class agent, **Stephanie Charles**, is taking a break between contracts this summer to have a life. I planned on traveling, gardening, reading, playing the guitar. I didn't anticipate a house invasion by a berserk (probably rabid) raccoon family, a mountain lion encounter, a drug bust while in Pasadena for Seminar Day (not me, the man next door at the motel), a near encounter with a spectacular car fire, etc. It has served to liven up the summer (although I've been threatened with election as "Class Jonah"). In a classic "small world" experience, Winslow Briggs (a fellow volunteer at Henry Coe State Park) and I were chatting, and I discovered that he is a professor at Stanford, where years ago he invited **Sharon Long** to give a seminar. That invitation quickly resulted in her move to Stanford University, where she has been for some time. With a glimmer in his eye he suggested I read the section on beating egg whites in copper bowls in **Harold McGee's** book *On Food and Cooking*, and sure enough, Winslow and Sharon are credited with running copper-beaten egg whites through a spectrophotometer to detect the copper-conalbumin complex.

1984

Laura Ravine
LRVINE@graycary.com

Dave Zobel has finally put his Caltech education to good use—specifically, by writing (with John Dusenberry) an introduction to sailing. In the author's own words, "Dave Zobel's *Bent Book of Boatspeak* (McGraw-Hill) is a goofy, tongue-in-cheek look at the confusing and arbitrary world of nautical nomenclature . . . and quite possibly the only marine dictionary ever to define 'abaf' as "something you take in abaftub." The book is subtitled, *How to Sound Like a Sailor and Know Just Enough to Be Dangerous*. Read more about it at Amazon.com.

Joel Disini writes, "I just wanted to say hi to all my friends at Tech, whom I have not seen for 16 years now. I'm based in Manila, Philippines, very happily married with three kids. I never thought I'd ever post anything in Caltech class notes—but here I am! I also run a small start-up—the PH domain (which we now call dotPhone). You can reach me at jed@email.com or check out our website at www.dot.ph. Surprise me, guys, and send me some mail!"

As for your class agent, **Laura (Wilson) Ravine**, I'm now an attorney practicing intellectual property law in San Diego. I specialize in counseling emerging technology companies in protecting and exploiting their intellectual property. **Mike Ravine** '82 and I will be celebrating our 12th anniversary this fall.

1990

Ed Lee
Edlee_hotmail.com

In June, I spent five weeks in London on a study-abroad theater program through Santa Barbara City College. London was amazing. Speaking of theater, I've been very busy this year. I was in *The Complete History of America (Abridged)*, and that was great fun. Then I made my directorial debut with the play *Bel Canto*.

Jennifer Low (jennalow@alumni.caltech.edu)

wrote in June, "Just thought we'd let you know that Jennifer has finished her residency in internal medicine at UC Davis Medical Center and is now starting a fellowship in medical oncology at the National Cancer Institute (NIH) in Bethesda, Maryland, where she will be for at least the next four years. **Dean Brettle** '92 (husband of seven years) will continue to work as a senior developer for Disappearing, Inc., an Internet start-up founded by, and continuing to employ, many Techers. We'll be settling on a house in Rockville, Maryland, by the end of July."

I went to the 10th reunion of our class on May 19, and it was sad—only about 25 people showed up, and that included spouses and significant others. About a third of them were my friends from the Del. I was very disappointed with the turnout. Where was everyone else? What is everyone doing?

1997

Emily Chen
emilyc@alumni.caltech.edu

Kanna Shimizu (kannas@stanford.edu) is currently a PhD student in electrical engineering at Stanford, but spent the summer of 2000 in Tokyo working for an investment bank. On a more personal note, she is now engaged to **Geoff Beach**, who is doing a PhD in physics at UC San Diego.

The following alums are "lost" and need to be located! If you are one of these missing persons or know of the whereabouts of any of them, please contact the Alumni Association Office or forward the information to jnichols@alumni.caltech.edu. Thank you!

Cyrus Behroozi, Seth Blumberg, Eugene Ha, Robert Lin, Matthew Richardson, Marco Santos, Sanjiv Shrestha.

MELLON FOUNDATION OFFERS FELLOWSHIPS

Caltech students and alumni planning to begin PhD studies in the humanities in fall 2001 are invited to apply for Andrew W. Mellon Foundation Fellowships in Humanistic Studies. Designed to help exceptionally promising individuals prepare for teaching and scholarship in humanistic disciplines, the fellowships are competitive merit awards that cover graduate tuition and required fees for the first academic year and include a stipend of \$15,000. For the year 2001, 85 fellowships will be awarded. Fellows may take their award to any accredited graduate program in the United States or Canada.

Applications for the fall 2001 program are due in December. For a description of the program and its eligibility guidelines, and to request an application, visit the foundation's Web site at www.woodrow.org/mellon. The foundation can also be reached at 1-800-899-9963, ext. 149.

Personals

1948
BILL SMYTH writes, "Much to my amazement I have been invited to membership in the Future Flight Data Collection Committee, a committee of Requirements, Technology and Concepts for Aviation. RTCA is a forum governed by the Federal Advisory Committee Act."

1953
ALLAN R. SANDAGE, PhD, staff astronomer emeritus of the Observatories of the Carnegie Institution of Washington, has been selected by the Peter Gruber Foundation to be one of the first recipients of the foundation's Cosmology Prize, "the first ever award dedicated to cosmology." The prize carries a cash award of \$150,000. Sandage, according to the foundation, "has for half a century been a leader in our observational quest to understand the stars, galaxies and the universe. This prize recognizes his relentless pursuit of the true values of the Hubble constant, the deceleration parameter, and the age of the universe."

1959
DONALD D. CLAYTON, MS, PhD '62, has been elected a fellow of the American Academy of Arts and Sciences, in its division of earth sciences and astronomy. The academy "honors leading intellectuals from both this country and abroad in every field and profession," and Clayton's election, "the result of an extensive selection process undertaken" by the academy's current members, recognizes his distinguished contributions to his profession. His work was featured in a May 15 *San Francisco Examiner* front-page story, and his paper on gamma-ray

lines from supernovas was selected for inclusion in the Centennial Volume of the American Astronomical Society.

1966
HERB SCHILLER, MS, writes that, since retiring from industry three years ago, he has become "the proud grandpa" of his oldest daughter's son, named Matthew. He is director of SUNY Stony Brook's industrial management program, which makes up part of that school's master's degree in technological systems management.

1973
DONALD KELSEY, PhD, staff research chemist at Shell Chemical Company's Westhollow Technology Center in Houston, Texas, and four colleagues have received the 2000 ACS Award for Team Innovation from the American Chemical Society (ACS) for their research and development leading to the commercialization of Corterra polyester, which "combines the stain resistance of regular polyester with the resiliency of nylon." Sponsored by the ACS Corporation Associates, the award recognizes multidisciplinary teams for successfully transforming innovative ideas into commercial products of special value to society, and consists of a gold medal, a certificate, and an honorarium. The award was given in March at the 219th ACS National Meeting, in San Francisco. Kelsey began his career at Union Carbide, Danbury, Connecticut, researching aromatic engineering polymers, and he has worked for Shell for 11 years. He is an inventor on 47 U.S. patents.

1980
MARK GURNEY, PhD, led the Pharmacia Corporation scientific team that reported last fall the cloning of a key enzyme in Alzheimer's disease pathogenesis, the beta secretase that catalyzes the first step in the production of the amyloid beta-peptide. He now is moving to Reykjavik, Iceland, where he will assume the position of vice president of target discovery at deCODE Genetics (mark.gurney@decode.is). The mission of the company is to uncover the susceptibility genes underlying common human disorders, using the unique aspects of Icelandic genealogy.

1992
NIEL BRANDT, assistant professor of astronomy and astrophysics at Penn State, has received a Faculty Early Career Development Award (CAREER) from the National Science Foundation. Described by the foundation as its highest honor for new faculty, the award will provide Brandt with five years of funding for his research using the Chandra X-ray Observatory and the Hobby-Eberly Telescope to investigate X-ray sources. He also plans, as part of the award, to support astronomy outreach activities at the Pennsylvania Junior Academy of Science. He received his PhD in X-ray astrophysics from Cambridge University in 1996, was a Smithsonian Postdoctoral Fellow at the Harvard-Smithsonian Center for Astrophysics, and joined the Penn State faculty in 1997.

COMPUTER SCIENCE TO HOLD SPRING REUNION

The computer science option at Caltech invites all the program's alumni—graduate students and postdocs—to a gala 25th anniversary celebration to commemorate a quarter century of cutting-edge Caltech research in computer science—work that continues to break new ground in such areas as DNA computing, quantum computing, and reconfigurable architectures.

The reunion celebration will take place on the Caltech campus in March, on a date that is still to be determined. Check out the next issue of *Caltech News* for the latest update. It will include presentations by both industry and research leaders in the fields Caltech pioneered and continues to pioneer: VLSI, massively parallel computing, computer graphics, networks, and substrates beyond silicon. Social activities, which are still in the planning stages, will be capped by a banquet with a keynote speaker at the Athenaeum, and will include invited guests from industry, academia, and the Institute's Board of Trustees.

For more information, please contact cbrady@cs.caltech.edu.

1919
FRANK H. CLOUGH, Ex, of San Jose, California, on October 1, 1999; he was 101. He received his degree in civil engineering from Oregon State in 1923, and spent his career with the Southern California city of South Pasadena, first as city engineer from 1923 to 1939, then as city manager until his retirement in 1960. Predeceased by his wife, Mary, in 1988 and by his older son, Frank Jr., he is survived by his younger son, George, and by two daughters-in-law, four granddaughters, and seven great-grandchildren.

1924
REX L. LOOP, Ex, of Roseburg, Oregon, on July 24, 1999; he was 98. He worked in the refrigeration industry until his retirement at the age of 73, and he enjoyed traveling, reading, and "staying current with world events and the lives of his family and friends." He "retained his sharp analytical mind, and inquisitive nature, and was an inspiration to the family and friends who surrounded him." He is survived by Doris, his wife of 15 years; a son, Richard; and 11 grandchildren and 14 great-grandchildren.

1926
W. LEROY DIXON, of Hillsborough, California, on December 5, 1998; he was 93. He worked for various companies in Los Angeles and San Francisco and formed his own company, Western Chemical, in 1955. He retired from Stauffer Chemical in 1975 as senior vice president and director. He is survived by a daughter, Nancy Dondero; a son, Robert; and five grandchildren and six great-grandchildren.

1929
THOMAS H. EVANS, MS '30, of Redlands, California, on January 11. After leaving Caltech he taught at Yale (1930–1935) and the University of Virginia (1935–1942). During World War II he served in the Army Corps of Engineers (1942–1945), ultimately retiring as a colonel in the U.S. Army reserves. He returned to teaching as director of the Georgia Institute of Technology's School of Chemical Engineering (1945–1949), then served as dean of engineering at Colorado A&M (now Colorado State University). While on leave from that position (1958–1961) he organized the SEATO Graduate School of Engineering (now the Asian Institute of Technology) in Bangkok, Thailand, and served as its first dean. He left Colorado State in 1963 and became dean of engineering at Fresno State, in California, retiring in 1973. Predeceased by his wife, Eva, he is survived by his son, Tom; his daughters, Sally Moore and Kathy Brayton; and seven grandchildren and seven great-grandchildren.

1941
R. CARROLL MANINGER, of Danville, California, on September 24, 1999; he was 80. During World War II he interrupted his graduate studies to work for the Navy as a civilian, and continued to work as a civilian scientist for the military until 1962, when he retired and began a career with the Lawrence Livermore National Laboratory, heading first the electrical engineering research division and later the technical applications group. In 1982 he retired from Lawrence Livermore and started Holidayne, a small consulting company. Eventually his activities expanded to include work for Digiray, another company involved with applied technology; he was working on a project for Digiray

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until shortly before his death. The author of numerous publications and the holder of many patents, he was an active member of American Men and Women in Science, the American Association of Science, the Acoustical Society of America, the Nuclear and Plasma Science Society, and the Institute of Electrical and Electronics Engineers, which in 1978 elected him a fellow "for his contributions to the development of measurement techniques used in nuclear and environmental sciences." Involved in his community, he supported political causes and contributed to a variety of musical, charitable, and religious organizations. Predeceased three years ago by a daughter, Mary-Carroll, he is survived by his wife, Jean; two daughters, Emily Craine and Margaret Brown; and three granddaughters and two great-granddaughters.

RICHARD S. SHEVELL, MS, Eng '42, of Atherton, California, in April 2000; he was 79. He was professor of aeronautics and astronautics, emeritus, at Stanford University. After receiving his aeronautical engineer's degree from Caltech, he went to work for Douglas Aircraft as an aerodynamicist, participating in early guided-bomb and interceptor-missile projects. By the late '40s he had joined the aircraft performance group, where he worked on the DC-6, DC-7, and DC-8 commercial aircraft. In the late '50s he became head of Douglas's aerodynamics group, which developed the aerodynamic design of the DC-9, and in the late '60s headed the advanced design group, which defined the basic configuration of the DC-10. He joined Stanford in 1970, teaching a number of courses, most particularly one on aircraft design. The author of numerous papers on aircraft design and technology development, he published a textbook, *Fundamentals of Flight*, in 1983. He served on a variety of aerospace-industry boards and committees and was a fellow of the American Institute of Aeronautics and Astronautics. Known as a man who maintained a balance between work and family, he once declined an invitation to attend a weekend executive training session at a Southern California resort, "noting that weekends were his time with his family." He is survived by his wife, Lorraine; a son, Steven; two daughters, Jeanne and Diane; and two granddaughters.

1942
RICHARD LATTE, PhD '49, on December 2, 1999, in McLean, Virginia; he was 76. A physicist specializing in nuclear theory, he spent

Farther Afield

The back-page poster illuminates the work of Wolfgang Fink, a postdoc in Steve Koonin's physics lab. Fink has captured video footage via helicopter, automobile, and foot and, with help from Caltech's Digital Media Center, has translated the physics of sight into an "Eyemovie." He wants to give medical professionals and patients a frame of reference when they discuss visual impairments related to the front part of the eye, the part that affects how light reaches the retina. In other work, Fink and a USC colleague recently invented a vision test that allows medical personnel to quickly and accurately evaluate a patient's central visual field. The 3-D Computer-Based Threshold Amsler Grid Test enables the diagnosis of conditions ranging from macular degeneration to glaucoma to certain brain tumors. See broccoli.caltech.edu/%7Emedia/Press_Releases/PR12076.html for details.

much of his early career with the RAND Corporation, where he was head of its physics division and later a member of its research council. From 1952 to 1953 he was also acting head of the theoretical division of the Livermore Weapons Laboratory. "His research into the properties of high-temperature gas produced by the release of energy from the uncontrolled fission of heavy atomic nuclei led to a deep understanding of the many dangers resulting from the detonation of nuclear arms. This work included the first prediction of electromagnetic pulse (or EMP), a very destructive result of a nuclear burst." While at RAND he also coauthored a seminal astrophysics paper on the properties of atoms in very hot gases, furthering the detailed analysis of radiation from hot interstellar gases. A science advisor to the Strategic Arms Limitation Talks (SALT) and a member of the U.S. SALT delegation in 1969, Latter served on many national boards and advisory groups and received the Ernest Orlando Lawrence Memorial Award "for his lifetime of work in nuclear energy and defense policy and strategy," and the Defense Intelligence Agency's Exceptional Civilian Service Medal "for contributions to intelligence analysis and collection." He is survived by his wife, a daughter, and two sons.

LEROY A. WELLER, of Carpinteria, California, on April 11; he was 79. After serving in the merchant marine during World War II, he worked in sales at Ingersoll Rand, first in New York and then in St. Louis. Returning to California, he joined the Stanford Research Institute, then became a vice president at Pacific Finance Corporation and later at Economics Research Associates. He eventually joined Merritt Williams Company as a partner. At the time of his recent retirement he was senior vice president of Hillside Associates. A past trustee of the Santa Barbara Foundation and a member of the Santa Barbara Visiting Nurses Association board of directors, he was also a Paul Mellon Fellow of the Montecito Rotary Club. He was an avid traveler and over the past 40 years had visited 68 countries. Predeceased in 1989 by his first wife, Eloise, he is survived by his wife, Sylvia; two daughters, Constance O'Connor and Barbara Beasley; a son, Thomas; three grandchildren; a stepson, Mark Brickley; a stepdaughter, Elizabeth Adams; and two step-grandchildren.

1944
The following alumni—members of CAVU, a group of students who in 1944 received certification after completing an accelerated training program in meteorology, and who referred to themselves as Ceiling and Visibility Unlimited—were retroactively awarded master's degrees in meteorology.

RUSSELL C. COLLMER, MS, of Benson, Arizona, on March 4; he was 76. An air force veteran of World War II and Korea, he had also earned a master's degree from the University of Iowa. He spent his career of over 30 years in both the administrative and technical areas of scientific and engineering research, and he retired as director of the Institutional Research Office, Pima Community College. He was a member of Phi Delta Theta, Kappa Mu Epsilon, the IEEE, the American Meteorological Society, and the Caltech Alumni Association. He was also voluntary treasurer of La Asociación Nacional Guatemalteca de Iglesias Bautistas, Guatemala. He is survived by Ruth, his wife of 50 years; a son, Reed; and a brother, Robert.

ROBERT G. HALLWACHS, MS, of Philadelphia, on January 2; he was 85. He also had two master's degrees in English, one from the

THOMAS WOLFF 1954-2000

Thomas Wolff, professor of mathematics at Caltech, was killed on the night of July 31 in an automobile accident in Kern County, California. He was 46 years old.

A native of New York City, Wolff was a specialist in analysis, particularly harmonic analysis. He made numerous, highly original contributions to the mathematical fields of Fourier analysis, partial differential equations, and complex analysis. A recurrent theme of his work was the application of finite combinatorial ideas to infinite, continuous problems.

Wolff grew up in a mathematical environment. His uncle Clifford Gardiner was a professor at New York University's Courant Institute of Mathematics for many years, and Wolff's mother, Lucile, was a technical editor of volume 1 of the English translation of the celebrated book *Methods of Mathematical Physics* by Courant and Hilbert.

Wolff earned his bachelor's degree in 1975 from Harvard, where he often played poker with his fellow student Bill Gates. He received his PhD in mathematics at UC Berkeley, and afterward was acting assistant professor at the University of Washington and an NSF Postdoctoral Fellow at the University of Chicago.

Wolff came to the Institute in 1982 as an assistant professor and was named full professor in 1986. From 1986 to 1989 he was a professor of mathematics at New York University, was at Caltech from 1988 to 1992, and from 1992 to 1996 was at Berkeley. He returned to Caltech in 1995, where he was a professor at the time of his death.

Wolff was mild-mannered and unassuming, but broke through his shyness to be a mentor and teacher with enormous impact on his graduate students, postdocs, and coauthors. Among his major awards were the 1999 Bocher Prize and the 1985 Salem Prize, as well as a Sloan Fellowship and invited named lecture series at the University of Chicago and Stanford.

Wolff is survived by his wife, Carol Shubin, a mathematics professor at Cal State Northridge; two sons, James Herbert Wolff, age 3, and Richard Thomas Wolff, age 5; his parents, Frank and Lucile Wolff, and his sisters, Virginia and Caroline.



Thomas Wolff

University of Illinois, the other from Princeton, as well as a PhD from Princeton. After serving as an air force weather officer during World War II, he taught at Princeton (1946-1955) and then was appointed dean and chairman of the English department at Wells College, in Aurora, New York. In 1967 he moved to Philadelphia, becoming the first dean of Drexel University's College of Humanities and Social Sciences, and working to bridge the gap between those two disciplines. He also pursued his avocation of playing the cello, performing with both the Chestnut Hill Orchestra and an amateur chamber quartet. After retiring from Drexel as professor emeritus in 1979, he took up gardening and also served as a volunteer guide at the Morris Arboretum. He is survived by Marianne, his wife of 47 years; two daughters, Marianne Charny and Winnie; and two grandchildren.

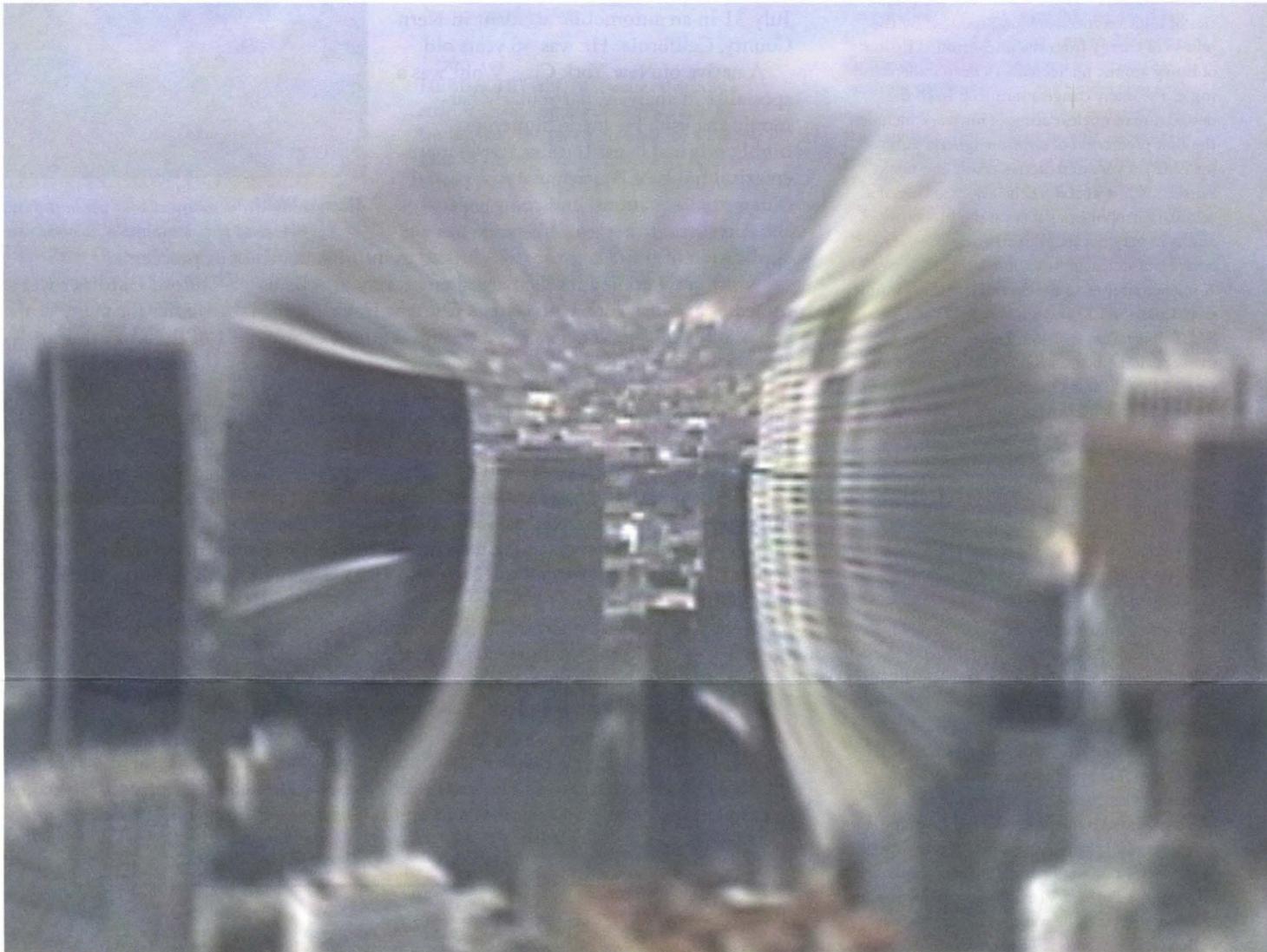
1945
WILLIAM C. MCDONELL, MS '48, of Sherman Oaks, California, on February 5; he was 74. After retiring as an executive with the Southern California Gas Company, where he had spent a career of over 40 years, he traveled extensively, especially enjoying the Caltech Alumni Association's geology field trips. His favorite hobby was reading, and he also enjoyed playing bridge, square dancing, and round dancing. He is survived by Wilma, his wife of 49 years; a son, Brian; a daughter, Bonnie; and a brother, Robert.

1948
LEIF SKOGSTAD, MS, of Hidden Hills, California, on June 3; he was 79. An engineer

with Rocketdyne-Rockwell for 39 years, he had retired in 1992. He is survived by his wife, Virginia (Ginnie); a daughter, Vesla Greenwood; and two grandchildren.

1950
JERRY O. MATTHEWS, of Laguna Beach, California, on April 26. After receiving his medical degree from the USC School of Medicine in 1955, he started his medical practice at La Palma Medical Center in Buena Park, in 1957. Retiring in 1992, he continued to enjoy such pursuits as golf, reading, attending church, world travel, and growing orchids and roses. He particularly enjoyed jazz, attending the Sacramento Jazz Festival every year. He is survived by Margaret, his wife of 45 years; three daughters, Julie Stevens, Leslie Casserly, and Nancy O'Brien; and 12 grandchildren.

1962
ROBERT B. BUMP, of Loveland, Colorado, on April 21; he was 60. After graduating from Caltech he earned an MS from Colorado State University. He worked for Hewlett-Packard/Agilent in both Loveland and Pennsylvania, retiring after 36 years, and he held several patents. Active in his community and in local politics, he served on the Larimer County board of adjustments and was an advocate for the environment and for bicycling. He rode more than 200,000 miles on his bike, riding in every state and many countries. After retiring he devoted time to Habitat for Humanity, teaching himself Latin, and gardening, as well as to his family and church. He is survived by Jean, his wife of 38 years; two sons, John and David; his mother, Leonore; and a sister, Linda.



A Closer Look

To see the world through different eyes, physics postdoc Wolfgang Fink has created a computer program that simulates vision ranging from 20/20 to severely impaired. The program follows billions of rays of light through an eye to create an image. This same program can add eyeglasses, as it did (at left) to correct hyperopia due to aphakia, a farsighted condition in which the eye lens has been permanently removed during cataract surgery; and (below) to correct extreme myopia, or nearsightedness.

To best view Fink's images of downtown Los Angeles, hold the paper ten centimeters in front of you and stare at the center of each image. The central region represents perfect vision (in the top image) and corrected vision (in the hyperopic and myopic renditions). All the images have fuzzy edges due to the computer's calculations of peripheral vision for each condition. In the lower two images, the telescopic and crystal-ball effects result from the corrective eyeglasses that have been added and that behave like telephoto and wide-angle camera lenses.

