

California Institute of Technology
Pasadena, California 91125

Change service requested

Volume 34, Number 4
2000

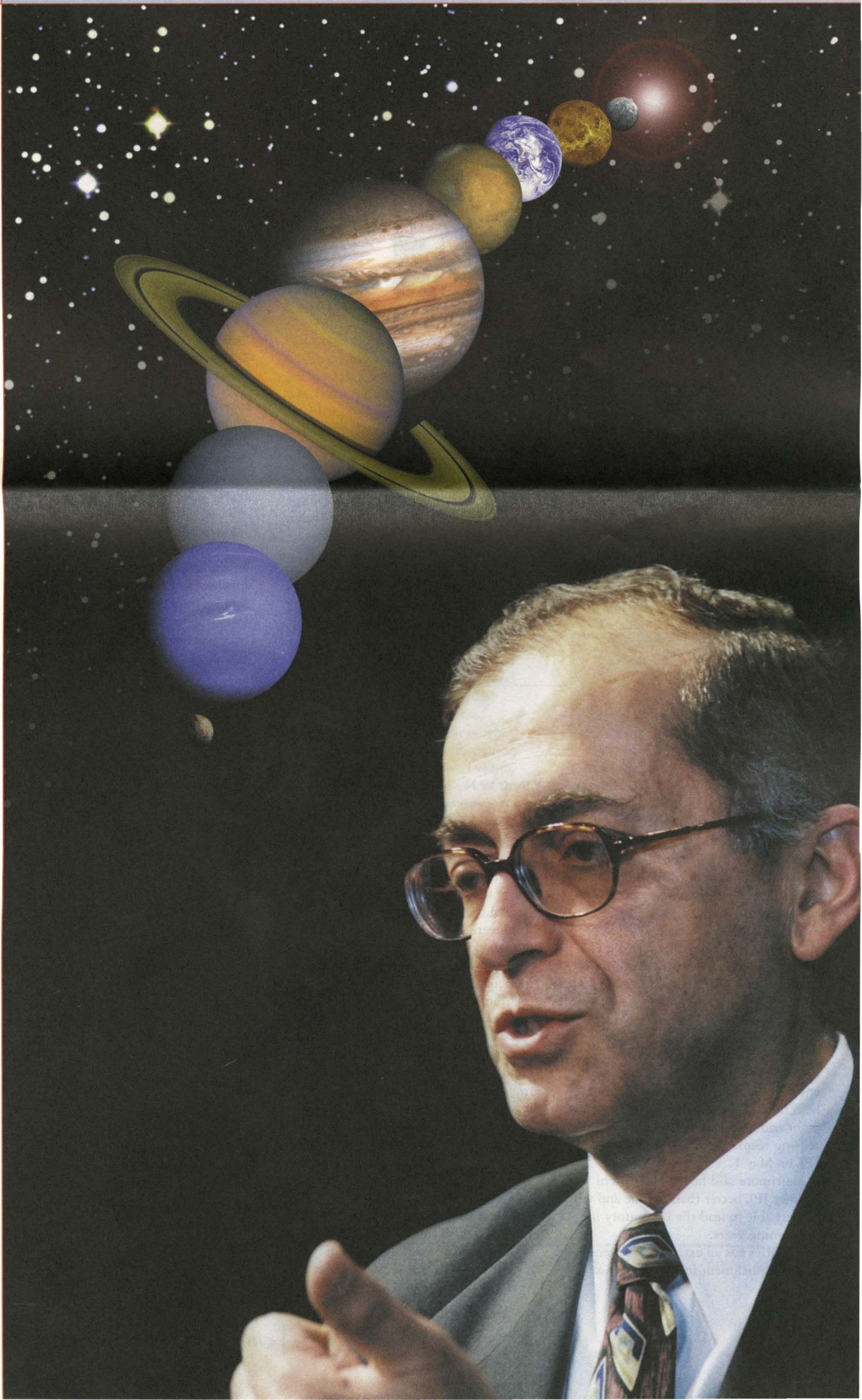
C a l t e c h **N e w s**

In This Issue

A New Guide to
the Galaxy

A Better Way to Vote

A Top Prize for Science



Caltech News



ON THE COVER
To Boldly Go . . .
After shepherding
dozens of planetary
missions through JPL
in his three decades'
tenure there, Charles
Elachi, PhD '71, takes
on a new mission—
leadership of the lab.



3 Out of the Box
Caltech and MIT come together to build a better way to vote.

8 Baldeschwieler and Fung Go to Washington
A faculty member and an alum took very different routes to the National Medal of Science.

Also in this issue

Trustees elect new board members; alumni make new connections; a recent grad turns to government relations; Alumni Fund thanks volunteers; Association president shares monolithic memories; alumni write in; and *Caltech News* ices over (on the back-page poster).

Picture Credits: Cover-Doug Cummings, Robert Paz, NASA; 4,7,9,10,15-Robert Paz; 3-Cathy Hill; 5,11-Heidi Aspaturian; 8-UC San Diego and White House; 13-David Ramos, 13,14-Arlana Silver, Back Cover-Ken Libbrecht

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.

Blair A. Folsom
President of the Alumni Association
J. Ernest Nunnally
Vice President for Institute Relations
Robert L. O'Rourke
Associate Vice President for Institute Relations
Jane S. Dietrich
Director of Periodicals

Executive Editor – Heidi Aspaturian
Associate Editor – Hillary Bhaskaran
Contributors – Daryn Kobata, Jill Perry, Robert Tindol
Copy Editors – Emily Adelsohn, Michael Farquhar, Elena Rudnev
Circulation Manager – Susan Lee
Photographer – Robert Paz

Up Front

THE LAB NAMES ONE OF ITS OWN

Caltech alumnus Charles Elachi, PhD '71, has been named the new director of the Jet Propulsion Laboratory. Caltech president David Baltimore made the announcement at a press conference on January 31.

At the press conference, Baltimore and Elachi were joined by retiring JPL director Ed Stone and NASA administrator Dan Goldin. Caltech manages JPL for NASA.

Elachi has served in a variety of research and management positions at JPL since 1971. Most recently, he has been head of the Space and Earth Science Programs. Other positions he has held include manager for radar development and leader of the radar remote-sensing team. He takes over as head of JPL on May 1.

Baltimore said he believes Elachi “knows JPL better than anyone and will be best able to lead the Laboratory in the coming years.

“Charles has an extraordinary record of accomplishment in his 30 years at

JPL,” said Baltimore. “He is an alumnus of Caltech and so knows the school well. He is an expert in remote sensing, and in recognition of his work, he was one of the youngest members ever elected to the National Academy of Engineering. He has long been a leader of planetary exploration at JPL and is widely respected at the Laboratory. I look forward to having a close working relationship with him.”

“Charles Elachi brings formidable talents to his new job, as both a scientist and a leader,” said NASA's Dan Goldin. “In addition to already being responsible for many of JPL's missions in solar system exploration, Earth sciences, and astrophysics, he has led efforts to create road maps of our exploration strategies decades into the future. He is both an effective administrator and a visionary.”

Elachi said he was honored to be entrusted with the leadership of JPL. “For the last 40 years JPL has enjoyed a tradition of excellence as a NASA



Rocket men: Charles Elachi and Ed Stone beam as Elachi's appointment to succeed Stone as JPL director is announced.

center and division of Caltech, and I intend to continue that tradition. My commitment is to continue the tradition of excellence and boldness in exploring our solar system, understanding the origin of galaxies, and applying that knowledge to better understand the changes on our own planet.”

The new post brings Elachi full circle, as he recalled being inspired as an 11-year-old in Lebanon by JPL's

launching of Explorer 1—43 years ago to the day, he noted. “Maybe that's a good omen for me,” he joked.

Elachi went on to receive a bachelor's degree in physics from the University of Grenoble, France, and the Dipl.Ing. in engineering from the Polytechnic Institute, Grenoble, both in 1968, and then earned his PhD in electrical engineering from Caltech.. He also earned an MBA from USC in 1978 and a master's in geology from UCLA in 1983.

He is perhaps best known for his role in the development of a series of imaging radar systems for the Space Shuttle that have allowed scientists to see through the clouds that blanket Earth. This technology penetrates the top layer of soil in arid regions, revealing hints of what lies below the surface.

Elachi has served as principal investigator on numerous NASA research and development studies and flight projects. He is currently the team leader of the Cassini Titan radar experiment and a coinvestigator on the Rosetta Comet Nucleus Sounder Experiment. He is the author of more than 200 publications on space and planetary exploration, Earth observation

Continued on page 6 . . .

O u t o f t h e b o x

C a l t e c h a n d M I T e l e c t t o r e f o r m v o t i n g s y s t e m

As catcalls, confusion, and chads multiplied in Florida in the wake of the 2000 presidential election, Caltech president David Baltimore and his MIT counterpart Charles Vest got together to say there has to be a better way for Americans to vote. In December, in a joint videoconference, the two university presidents announced that Caltech and MIT would collaborate to develop a simple, secure, and reliable method of casting ballots that could be implemented nationwide.

What might that method be? Neither Vest nor Baltimore, nor the scientists who have stepped forward at Caltech and MIT to pursue this project know for sure—first they have to canvass the crazy quilt of existing voting methods across the country and see what they can learn from them. But they recognize a technical problem when they see it. If science can detect radiation emanating from the era of the Big Bang, it should be able to help Americans detect who actually won an election.

"Academic institutions have a responsibility to help repair the voting process so that we don't see anything like this again," said Baltimore, speaking from the videoconference room in the Sherman Fairchild Library on the Caltech campus, as listeners at MIT nodded agreement on the big screen behind him. "It's preposterous that a lack of technology would bring this democracy to its knees."

For his part, MIT's Vest observed that "a country that has put a man on the moon and put an ATM on every corner has no excuse why it cannot put in a reliable voting system. America needs a uniform balloting procedure."

The initial idea for the Caltech-MIT collaboration came from Baltimore. He phoned Vest, who was immediately receptive, and the two schools have now fielded a team of social scientists, computer scientists, and engineers to study the problem.

The Caltech/MIT Voting Technology Project harnesses the combined ingenuity of Caltech's Thomas Palfrey, professor of economics and political science; Jehoshua Bruck, professor of computation and neural systems and electrical engineering; Michael Alvarez, associate professor of political science;

and Erik Antonsson, professor of mechanical engineering. MIT researchers include Stephen Ansolabehere, professor of political science; Nicholas Negroponte, chairman of MIT's media lab; Ronald Rivest, the Andrew and Erna Viterbi Professor of Electrical Engineering and Computer Science; Charles Stewart, professor of political science; and Stephen Graves, the Abraham J. Siegel Professor of Management and Engineering Systems.

Although they have been friendly competitors for decades, collaboration between Caltech and MIT is nothing new. MIT graduate and Caltech founder George Ellery Hale brought his MIT professor Arthur Amos Noyes out to Pasadena to establish Caltech's chemistry division. Baltimore himself came to Caltech from MIT, where he had headed the Whitehead Institute. Currently, the two institutions are jointly building the Laser Interferometer Gravitational-Wave Observatory (LIGO), which consists of two gravity-wave detectors, one in Washington and one in Louisiana. The Washington detector achieved "first lock"—the equivalent of first light—last fall.

Legislators interested in voting reform appeared to welcome Caltech and MIT's latest collaborative venture. "It's exactly what we're looking for," opined Senator Charles Schumer of New York, hailing the move through a spokesperson. Speaking to a *Los Angeles Times* reporter, California secretary of state Bill Jones noted, "The more ideas

you have on the table, the better. They are probably more intelligent than any of us, so I'm looking forward to their input."

THE GOOD, THE BAD, THE
HANGING CHAD

In the initial phase of the project, which is now under way, the researchers are investigating the varied ways in which Americans currently vote, and establishing a set of criteria that will help them develop a standardized, effective voting system. Its recent notoriety notwithstanding, the punch-card ballot is only one of a number of voting methods that are being scrutinized to find out what works, and what doesn't.

Researchers from both universities have begun to study five voting technologies—paper ballots with hand-marked votes, lever machines, punch cards, optical scanning devices, and direct-recording electronic devices, known as DREs.

"Phase one is getting the data and getting the facts: what's good and what's bad about these systems," Caltech's Palfrey said. "A lot of what we're doing right now is information collection of two sorts. One is voting data—we're mainly trying to identify voter error by looking at overcounts and undercounts. We're also looking at recounts and reversals"—ballot recounts that identify votes tabulated

Caltech News welcomes the perspective of readers on this project and the related voting issues. We would also like to hear from alumni who have been involved in elections and electoral politics. Write to hja@caltech.edu.

the first time around for the wrong candidate.

"The other information we're collecting is county-by-county-level data for the entire country regarding what voting system they use," Palfrey said. "Those data are readily available."

This first phase, which is expected to be completed in June, will encompass presidential elections dating back to 1980. The work is supported by a \$250,000 grant from the Carnegie Corporation of New York, whose president, Vartan Gregorian, enthusiastically endorsed the plan.

"We should know within six months whether we have to invent technology," Baltimore said at the press conference, "and we have the people for that." He and Vest commented that the ubiquitous ATM machine might serve as a useful model.

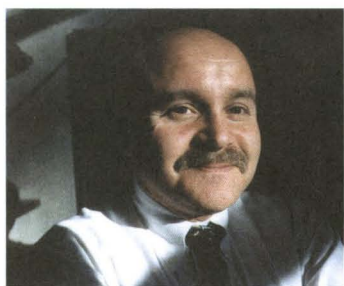
Whatever form a revamped voting technology takes, Vest and Baltimore emphasized that it "should minimize the possibility of confusion about how to vote and offer clear verification of what vote is received. It should

Continued on page 6 . . .



NOW THAT THEY'VE ESTABLISHED FIRST LOCK ON LIGO, CALTECH AND MIT MOVE ON...

INFORMATION AGE YIELDS ASSOCIATE PROVOST



Professor Dan Meiron has become the Institute's first associate provost for information and information technology.

According to Provost Steve Koonin '72, this half-time administrative appointment responds to an expressed need "for a more focused and knowledgeable attention to the role of information on the campus, and the technology to manage it."

Meiron will advise the administration on the deployment and use of information and information technology (IT) resources campuswide, says Koonin. "In consultation with appropriate campus constituencies, he will also lead the promotion of, and strategic planning for, the delivery of new information services to the campus."

The associate provost is already on the job fielding plenty of calls and e-mails. His experience as professor of applied and computational mathematics and as director of a large research project that requires technology integration has helped prepare him for this new assignment. Information and IT

issues "are becoming a very large part of everyone's life," says Meiron. There are "lots of opportunities to solve problems," and there's plenty of exciting problem-solving going on. "All that's needed is a central point of contact to support efforts in the most optimal way."

Overseeing Caltech's Information Technology Services, Meiron will focus on infrastructure critical to the efficient functioning of the campus. This includes the wired and future wireless campus network, e-mail delivery, security, software site licensing, and future IT services. He'll collaborate with the vice president for business and finance and with other administrators to develop IT strategies to improve the quality, efficiency, and responsiveness of Caltech's business systems.

Meiron will also work with the university librarian and the Caltech libraries staff to support access to Caltech's current and future online library resources, and he'll promote the integration of the diverse electronic information resources around the campus.

"Dan brings to the task a deep knowledge of computing and computing technology," says Koonin, "as well as experience as both executive officer for applied math (from 1994 to 1998) and director of Caltech's ASCI effort" (detailed online at broccoli.caltech.edu/~media/).

Meiron received his degrees at MIT and joined Caltech in 1981, first as a research fellow and then as a professor.

ROSEN TAKES THE CHAIR; RIDE AND LEE COME ABOARD

Astronaut Sally Ride and Global Crossing cofounder David Lee, PhD '74, have been named Caltech's newest trustees. Vice-chairman Ben Rosen '54 has been named the new chairman of the board.

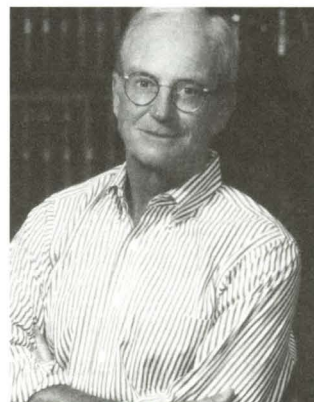
A longtime trustee who has served as board vice chair since 1989, Rosen, received his Caltech degree in electrical engineering and is chairman emeritus of Compaq Computer Corporation. Legendary for his business acumen, he is almost as well known for his affable personality and his ability to balance chairs and golf clubs on his chin.

A New York City resident, Rosen succeeds Gordon Moore, chairman emeritus of Intel Corporation, who has stepped down after six years as chairman. Moore has been a Caltech trustee since 1983, and will continue serving in that capacity.

New trustee Ride is best known as the first American woman in space. She flew aboard the space shuttle *Challenger* in 1983 and served on two additional shuttle crews as a NASA astronaut. Currently the Hibben Professor of Physics at UC San Diego, Ride also conducts research at UCSD's California Space Institute. She holds a PhD in physics from Stanford University.

A strong supporter of science and math education for young women, Ride has written three children's books about space. Her many awards include the Jefferson Award for Public Service and the National Spaceflight Medal.

David Lee cofounded the transcontinental telecommunications firm Global Crossing in March 1997. Recently, he left that firm to cofound and become managing general partner of Clarity



From the top: Ben Rosen has been elected the new chairman of Caltech's board of trustees; Sally Ride and David Lee have joined the board; retiring chair Gordon Moore and Caltech president David Baltimore share a moment at Moore's retirement party.

Partners, a venture capital firm.

Lee has established centers for advanced networking at Caltech and at the National Chiao Tung University in Taiwan. He continues to serve on the board of Global Crossing, as well as on that of New Focus, Inc., and the board of overseers at USC's Keck School of Medicine. A graduate of McGill University in Canada, Lee holds a PhD in physics, with a minor in economics, from Caltech. He is also a CPA.

HONORS AND AWARDS

Don Anderson, PhD '62, Crafoord laureate and the Eleanor and John R. McMillan Professor of Geophysics, has received an honorary doctor of science degree from his alma mater, Rensselaer Polytechnic Institute.

Frances Arnold, the Dick and Barbara Dickinson Professor of Chemical Engineering and Biochemistry, has been chosen by the American Institute of Chemical Engineers to receive its 2000 Professional Progress Award for Outstanding Progress in Chemical Engineering, sponsored by Air Products and Chemicals, Inc.

Caltech president and Nobel laureate David Baltimore will present the science-book award at the *Los Angeles Times* Book Festival in April 2001.

Assistant Professor of Planetary Astronomy Michael Brown has been selected to receive the Presidential Early Career Award for Scientists and Engineers—

"the highest honor bestowed by the U.S. government on outstanding scientists and engineers beginning their independent careers."

Peter Dervan, the Bren Professor of Chemistry, has been named the recipient of the Tetrahedron Prize, for his "creativity in developing a new field of bioorganic chemistry."

Michael Hoffmann, the James Irvine Professor of Environmental Science and executive officer for environmental engineering science, has been selected to receive the American Chemical Society Award for Creative Advances in Environmental Science and Technology, sponsored by Air Products and Chemicals, Inc.

The book *Growth in a Traditional Society: The French Countryside 1450–1815*, by Professor of History and Social Science Philip Hoffman, was the subject last year of a Social Science History Association symposium, whose proceedings have now been published in an

issue of *Historical Methods: A Journal of Quantitative and Interdisciplinary History*.

Professor of Aeronautics and Applied Mechanics Wolfgang Knauss '58, PhD '63, has been presented with the 2000 Lazan Award of the Society for Experimental Mechanics, for his "outstanding original technical contributions to experimental mechanics."

Professor of History and Social Science Morgan Kousser has been named the cowinner of the American Political Science Association's 2000 Ralph J. Bunche Award for his book *Colorblind Injustice: Minority Voting Rights and the Undoing of the Second Reconstruction*. The award is given annually for the best political-science work exploring ethnic and cultural pluralism. The book was also the subject of a Southern Sociological Society symposium, whose proceedings were published in the summer edition of *Social Science History*.

Associate Professor of Biology and Computation and Neural Systems Gilles

Laurent has received a 2000 McKnight Investigator Award from the McKnight Endowment Fund for Neuroscience, for his work on "Memory in Olfactory Network Dynamics."

Professor of History James Lee has been named by the Social Science History Association as a cowinner of the 2000 Allan Sharlin Memorial Award for the book *One Quarter of Humanity: Malthusian Mythology and Chinese Realities, 1700–2000*. In recognition of this book, Lee has also been selected to receive the Otis Dudley Duncan Award. Presented annually by the American Sociological Association "for distinguished scholarship in social demography," the award "is considered the highest honor available for publications in demography."

Professor of Biology, Emeritus, Ray Owen is the Transplantation Society's Medawar Laureate for the year 2000, "the highest dedicated award for the most outstanding contributions in the

ALUMNA OPTS FOR "RESEARCH IN A DIFFERENT SPHERE"

A chance encounter in Caltech's weight room has led Elizabeth Stratford Krider, PhD '01, to a job where she'll be dealing with some weighty issues—how best to represent Caltech, its achievements, and interests to policy makers. She's just been named the Institute's first assistant director of government and community relations.

Is this an odd career choice for a young woman fresh out of Caltech with her doctorate in chemistry? Krider thinks not. "It's an opportunity," she says, "to use my research interests in a different sphere. I spent several years at Caltech learning how the research process works at a first-class university. Now I get to promote the fruits of that process."

Call it chemistry by other means, with Krider in the role of catalyst. The San Marino native will act as a liaison between Caltech and local, state, and federal officials, and play an active part in cultivating town-gown relations between the Institute and Pasadena. She will also keep an eye on educational, government, and science-policy developments and issues that affect Caltech and its faculty, so that she can serve as a campuswide source of information about them.

Krider will be working with Assistant Vice President and Director of Government and Community Relations Hall Daily, who calls her "a tremendous asset to Caltech."

"Elizabeth brings a depth of understanding about Caltech, the local scene and, of course, the educational and research environment that is at the

heart of the campus culture," he says.

It's these educational and research aspects of the job that especially appeal to Krider, who did graduate work in bioinorganic chemistry under the supervision of Beckman Professor of Chemistry Harry Gray and faculty researcher Tom Meade. With her scientific background, she notes that "one of my primary activities will be to keep up with what faculty all over campus are doing," and to find ways of communicating this information in terms that policy makers at all levels can relate to. "I expect," she says, "to spend a lot of time developing meaningful analogies."

Growing up in San Marino, Krider, 29, was aware of Caltech from a very early age. She majored in biochemistry at Brigham Young University in Utah, but spent the summer of her junior year as a SURF student in the lab of Caltech's Bren Professor of Chemistry Peter Dervan. She also met David Krider, who had just received his Caltech BS in economics and computer science. They were married in 1994, following Krider's college graduation, and settled in Pasadena. She spent a year as a research technician in Beckman Institute before applying to Caltech for graduate study.

Krider did her thesis research on the interaction between DNA and transition metals, developing automated ways of incorporating the metals into the DNA molecules and then studying the properties of both metals and DNA. She published several papers and thought about a career in science, but wondered whether it was really for her.

"Research was exciting, but it was isolating," she recalls. "I liked doing science, though, so it was a tough choice."

When she wasn't working on her thesis, Krider spent some of her time working out in Caltech's weight room, where one day last summer she met Caltech's VP for Institute Relations, Jerry Nunnally. She asked him if he knew Hall Daily, about whom she had heard quite a lot when she attended the local San Marino High School. Daily had graduated from the place more than two decades before Krider, but his aptitude for Latin was still a bright memory for his teacher, who was fond of reminding subsequent classes of Latin students about it. Krider inquired if Nunnally, in his capacity as an Institute veep, knew this individual.

"Do I know him?!" responded Nunnally, whose office oversees Daily's. He arranged for the two to meet.

"Government relations—hmmnn," wondered Krider, when Daily told her how his life had evolved since Latin class. Beyond a "vague idea" that it involved government funding, Krider didn't know much about the office, but as an active community volunteer, she was particularly interested in what Daily had to say about Caltech's civic involvement at the local and state level. Daily, then in the midst of a search for an assistant director, had been looking for someone with public policy experience, but this meeting with Krider altered his thinking.

"Finding someone with such a broad range of interests, a great academic



As Caltech's first assistant director for government relations and community affairs, Elizabeth Krider, PhD '01, will be talking up the Institute to policy makers.

background, a thorough understanding of Caltech, and an ability to communicate what goes on here, went way beyond my expectations," he says of his decision to recruit her. In late October, two weeks after she defended her dissertation, Krider started the job she describes as a "perfect combination of my interests."

In recent weeks, meetings with local officials, as well as with California state assemblywoman Carol Liu and newly elected congressman Adam Schiff, have helped acquaint Krider with Caltech's role in the community and its place on the state and national landscape. She has also traveled to Sacramento for the first time to meet with California legislators.

On campus, Krider has begun to do "research on the researchers"—talking with faculty members and research teams about their work and asking how she can help support it. The Caltech graduate who "never wanted to stop learning," is having a great time.

"It's fun," she says, "to go into a faculty member's office and hear about what they love to do, what they dream about, and to play a role in trying to make that happen."

— HEIDI ASPATURIAN

field of transplantation."

Rahul Pandharipande, associate professor of mathematics, is one of 24 scientists nationwide to be awarded a

\$625,000, five-year Packard Fellowship for his work in advanced mathematics and the study of the geometry of algebraic curves. The program was estab-

lished in 1988 by the David and Lucile Packard Foundation to improve scientific research by "encouraging exceptional scientists and engineers to remain within academia to conduct basic research and to teach the next generation of science leaders."

Professor of Biology Paul Patterson has received a grant from the Charles A. Dana Foundation. The grant of \$100,000 over the next two years was awarded by the Dana Clinical Hypotheses Program in Brain-Body Interaction and will support clinical

Ahmed Zewail (left), 1999 Nobel laureate in chemistry, and Pope John Paul II met at the Vatican on November 13, as Zewail was inducted into the Pontifical Academy of Sciences. The Linus Pauling Professor of Chemical Physics and professor of physics joins Caltech president David Baltimore as one of two Caltech faculty in the 80-member, 398-year old academy, which "promotes the progress of the mathematical, physical, and natural sciences, and the study of related epistemological problems."



research into the relationship of physiological changes in brain function to cancer, stroke, and heart disease.

Assistant Professor of Chemistry Jonas Peters is one of 59 young researchers recently named a recipient of the Presidential Early Career Award for Scientists and Engineers (PECASE). Now in its fifth year, the program was established by the government to recognize and assist outstanding young professionals at the outset of their independent research careers. The award provides up to five years of grant support to meritorious young scientists and engineers.

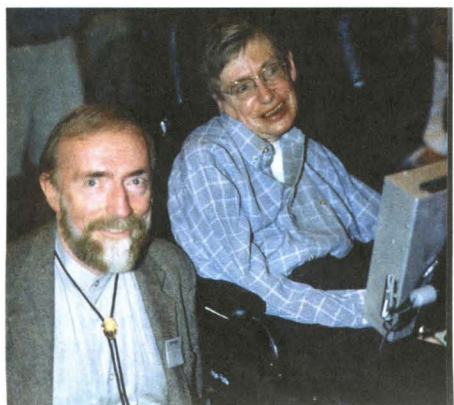
Assistant Professor of Applied and Computational Mathematics Niles Pierce received a first prize at the Ninth Leslie Fox Prize meeting, held last June at the University of Dundee, in Scotland. The competition is in the field of numerical analysis, and the title of Pierce's talk was "Adjoint Recovery of Superconvergent

Continued on page 6 . . .

THORNE WILL OFFER "GLIMPSE OF FUTURE" AT SEMINAR DAY

Caltech alumnus Kip Thorne will present the general session address at the Institute's 64th annual Seminar Day on May 19. In his talk, "Space-Time Warps and the Quantum: A Glimpse of the Future," Thorne will discuss two of the great discoveries of the 20th century—the warpage of space and time and the random, unpredictable quantum-mechanical behavior of atoms and molecules—and will speculate about 21st-century discoveries in these fields.

Thorne's association with Caltech



Kip Thorne (pictured here with longtime colleague and frequent collaborator Stephen Hawking) will be this year's Seminar Day speaker.

dates back more than 40 years, commencing with his arrival on campus as a member of the class of '62. After receiving his PhD in 1965 from Princeton, Thorne returned to the Institute in 1966 as a research fellow and was named an associate professor the following year. He was named professor of theoretical physics in 1970 and the William R. Kenan Jr. Professor in 1981, holding those titles until 1991, when he was named the Feynman Professor of Theoretical Physics.

His research interests have included gravitational physics and astrophysics, with emphasis on relativistic stars, black holes, and gravitational waves. He is a cofounder of the LIGO (Laser Interferometer Gravitational-Wave Observatory) project, and chaired the LIGO steering committee from 1984 to 1987. He and his research group continue to provide theoretical support for LIGO by identifying gravitational-wave sources that the observatory should target and by laying foundations for data analysis techniques.

Thorne is a member of the National Academy of Sciences and the American Academy of Arts and Sciences, and has received numerous awards, including the Lilienfeld Prize of the American Physical Society (1996) and the Karl Schwarzschild Medal of the German Astronomical Society (1996). His many publications include *Gravitation*, the textbook from which most of the present generation of scientists learned about general relativity, and the popular *Black Holes and Time Warps: Einstein's Outrageous Legacy*.

Elachi . . . from page 2

from space, active microwave remote sensing, wave propagation and scattering, electromagnetic theory, lasers, and integrated optics, and he holds several patents in those fields. He has written three textbooks on remote sensing and has taught Introduction to the Physics of Remote Sensing at Caltech since 1982.

In 1988, the *Los Angeles Times* selected him as one of "Southern California's rising stars who will make a difference in L.A." In 1989, Asteroid 1982 SU was renamed 4116 Elachi in recognition of his contributions to planetary exploration.

Elachi has participated in a number of archaeological expeditions in the Egyptian desert, the Arabian peninsula, and the Western Chinese desert, using satellite data to search for old trading routes and buried cities using satellite data. Some of these expeditions have been featured in *National Geographic Magazine* and in *Caltech News* ("The Road to Ubar," 1992).

He is married to Valerie Gifford Elachi and has two daughters—Joanna, 25, and Lauren, 15.

Elachi is the second Caltech alumnus to be named director of JPL. The first, William Pickering '32, PhD '36, headed the lab from 1954 to 1976.

Elachi succeeds Edward Stone, who will return to full-time teaching and research at Caltech, where he has taught since 1967. The David Morrisroe Professor of Physics, Stone has been widely regarded as an energetic and thoughtful leader at JPL.

Stone was project scientist for the Voyager mission, which launched twin

spacecraft in 1977 and sent them on a 12-year tour of the outer solar system, flying past Jupiter, Saturn, Uranus, and Neptune.

Named JPL director in January 1991, Stone has led the laboratory during a decade in which it took on the management of dozens of missions exploring the solar system, and in Earth sciences and astrophysics. Highlights of his time at JPL include Galileo's five-year orbital mission to Jupiter, and the launch of Cassini to Saturn, as well as a new generation of Earth-sciences satellites such as TOPEX/Poseidon and SeaWinds, and the spectacularly successful Mars Pathfinder landing in 1997.

Baltimore praised Stone for leading JPL with great distinction during the past 10 years. "Many seminal discoveries about the solar system have been made during his tenure, and a much deeper appreciation of Earth's dynamic cycles has emerged from missions flown by JPL under his leadership. Ed is a person of high integrity, unflagging energy, and deep commitment to the laboratory and its goals. It has been a great pleasure for me to work with him as JPL director, and I look forward to having him back on campus full time."

Goldin also had high praise for Stone. "Over the past decade, Ed Stone has led JPL from managing a handful of large projects to overseeing dozens of new, smaller exploration missions. A great deal of what we know about the solar system has been a result, directly or indirectly, of Ed's work. It has been my honor to work with him in revolutionizing the way JPL does business, because JPL is the most important organization in the field of astrophysics and planetary science."

Voting . . . from page 3

decrease to near zero the probability of miscounting votes. The voting technology should be tamper-resistant and should minimize the prospect of manipulation and fraud."

Subsidizing this vision on the large scale will be expensive. Estimates suggest that any comprehensive overhaul of the nation's voting machines will run into billions of dollars. But the scientists point out that many antiquated voting systems around the country will need to be replaced soon anyway, at some considerable cost. Why not couple their inevitable departure with the introduction of something expressly designed to do the job well?

As for the projected multibillion-dollar price tag, Palfrey suggested a comparison with the nation's \$300 billion annual defense budget. "It's a small price to pay," he said, "for modernizing democracy."

To follow the progress of the Caltech/MIT Voting Technology Project, including updates, visit www.vote.caltech.edu.

Honors . . . from page 5

Functionals from PDE Approximations."

David Tirrell, the Ross McCollum-William H. Corcoran Professor and professor and chair of the Institute's chemistry and chemical engineering division, has been selected to receive an honorary doctorate from the Technische Universiteit Eindhoven.

Alexander Varshavsky, the Howard and Gwen Laurie Smits Professor of Cell Biology, has been chosen a Kirsch Investigator by the Steven and Michele Kirsch Foundation, as part of a program to support medical research. He will receive \$450,000 over the next three years to fund his research activities, and Caltech will receive \$90,000 over the same period.

F r i e n d s

Associates Calendar

March 20, Joint Event in Seattle with the Alumni Association, with President David Baltimore.

March 26, President's Circle Dinner and Program—"How the Nervous System Gets Wired," with Kai Zinn, professor of biology.

April 5, Associates Dinner and Program—"The Einstein Papers Project," with Diana Barkan, associate professor of history, and director and general editor of the Einstein Papers Project.

April 21, Associates Saturday Luncheon, Program, and Play at the Mark Taper Forum at the Music Center—QED, a play featuring Alan Alda as Richard Feynman; luncheon speaker Gordon Davidson, artistic director and producer of the Center Theatre Group, director of QED.

April 24–28, All-Associates Trip to Hawaii—with Jason Saleeby, professor of geology, and Michael Brown, assistant professor of planetary astronomy.

May 9, Associates 75th-Anniversary Celebration—conversations with President David Baltimore and past presidents Thomas Everhart, Marvin Goldberger, and Harold Brown; facilitated by Harry Gray, Beckman Professor of Chemistry and the director of Beckman Institute.

May 19, Seminar Day.

May 31, Associates Dinner and Program—"Mars, Water, and the Future," with Bruce Murray, professor of planetary science and geology.

June 5, Associates Board of Directors Meeting, with Steve Koonin '72, vice president and provost and professor of theoretical physics.

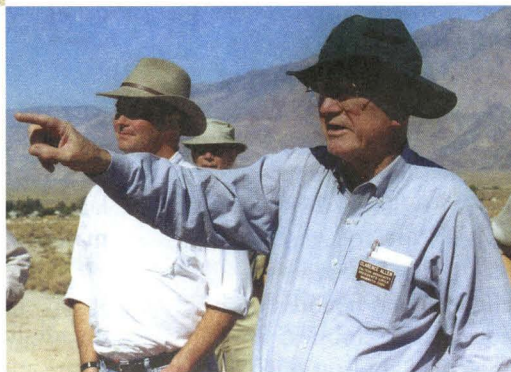
June 9, Northern California Dinner and Program—"The Origin of the Earth and the Moon," with David Stevenson, Van Osdol Professor of Planetary Science, at the Claremont Hotel in Berkeley.

June 16, President's Circle Garden Party, at the home of President David Baltimore and Alice Huang.

All events will be held at the Athenaeum unless otherwise noted. Invitations for each event will be sent monthly. For further information, call the Associates at 626/395-3919.



Caltech Associates tour the Owens Valley Radio Observatory (above) and get a geologist's perspective on the region from Clarence Allen (pointing, right). Allen, PhD '54, professor of geology and geophysics, emeritus, was joined on the President's Circle trip by William Deverell, associate professor of history, who along the way shed light on the history of the Los Angeles Aqueduct and the Manzanar internment camp, where Japanese Americans were confined during the second World War. At OVRO, the group was treated to a private tour by professors Anneila Sargent, PhD '77, and Geoff Blake, PhD '86, the observatory's director and deputy director, respectively.



Caltech hosted a panel discussion on Biomedicine of the Future, welcoming members of the Blue Ribbon of the Performing Arts Center of Los Angeles County to the Athenaeum. The Blue Ribbon is an organization of 625 women who help support the center's resident companies and other programs. Its president, Joan Hotchkis (second from left), is joined at the fall event by husband John Hotchkis (left) and Caltech's Alice Huang (a Blue Ribbon member) and David Baltimore. The panel included President Baltimore discussing the search for an AIDS vaccine; Professor of Biology Barbara Wold, PhD '78, speaking about stem cell research; Michael Hunkapiller, PhD '74, senior vice president of PE Corporation and president of Applied Biosystems, discussing the human genome's impact on biomedicine; and Bren Professor of Chemistry Peter Dervan moderating.

CALTECH RECEIVES IRVINE FOUNDATION GRANT TO ENHANCE INSTITUTE'S DIVERSITY PROGRAMS

The James Irvine Foundation has awarded Caltech \$2.2 million to support and expand the campus's diversity programs over the next three years. The funding is earmarked for several goals and objectives, including increasing the number of underrepresented students at Caltech; supporting minority students in the sciences, math, and engineering; enhancing precollege and college-level science initiatives; and increasing the awareness of diversity issues within the Caltech community.

Caltech president David Baltimore said the funding would allow the Institute to make more rapid progress in the important areas of campus diversity and minority access.

"This generous grant will help us do much more to assure that Caltech attracts and retains underrepresented minority students," Baltimore said.

"With the longtime support of the James Irvine Foundation, we have launched and maintained an array of initiatives for broadening our diversity, and this new award will allow us to continue. Caltech is committed to providing its unique brand of education to an increasing number of underrepresented minority students."

The \$2.2-million award will be apportioned to 11 budgeted areas. These are \$725,000 for nine graduate fellowships; \$235,000 for the Irvine Postdoctoral Fellows Program; \$45,000 for outreach; \$305,000 for the High Achievement for Undergraduates Pro-

gram; \$190,000 for the Minority Undergraduate Research Fellows Program; \$180,000 for the Minority Pipeline programs; \$210,000 for the Precollege Science, Math, and Engineering programs; \$75,000 for multicultural activities on campus, including lectures and community outreach; \$50,000 for curriculum development; \$120,000 for the President's Initiative Fund; and \$60,000 for assessment and evaluation of existing programs.

The James Irvine Foundation is a private grant-making foundation dedicated to enhancing the social, economic, and physical quality of life throughout California, and to enriching the state's intellectual and cultural environment. The foundation was established in 1937 by James Irvine, the California pioneer whose 110,000-acre ranch in Southern California was among the largest privately owned land holdings in the state.

With assets of \$1.6 billion, the foundation makes grants of approximately \$75 million annually for the people of California. The foundation's higher-education program seeks to encourage the full participation of California's ethnic minority and low-income populations in all levels of higher education.

Gifts by Will

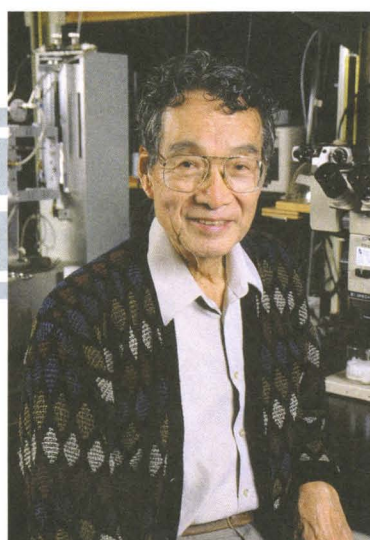
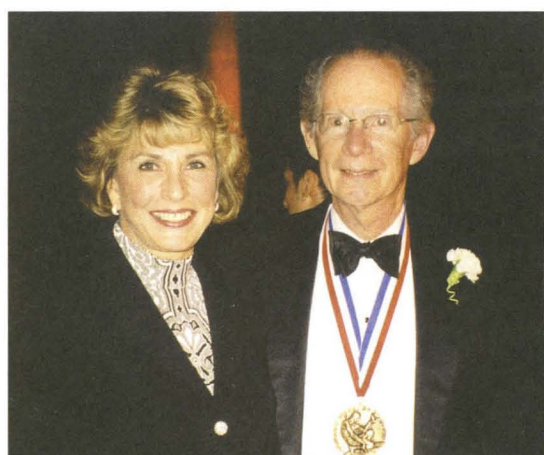
The Institute has received a bequest of \$16.8 million from the estate of William (Bill) Hacker, Jr. '31, who died on February 19, 2000. Final distribution of the residuary estate is expected to increase the total amount of the bequest to around \$17.4 million. Bill designated his bequest to support several areas at Caltech. A significant portion goes to economics, including a newly endowed chair named the William D. Hacker Professorship in Economics and Management. Another significant portion is designated for the biological sciences, some of which will be applied toward construction of the *Broad Center for the Biological Sciences*. The gift also establishes a \$1 million student-loan fund.

Bill was born in Indiana in 1908. Shortly thereafter, his family moved to California, settling in the San Gabriel Valley. Bill entered Caltech in the midst of the Depression, and lived at home in order to afford the tuition fees—\$80 at the time! At the urging of Caltech Professor Hoarce Gilbert, he decided to attend Harvard Business School for graduate work. It seems that Bill was the first Caltech student to be admitted to the business school, and, as a result, he felt some pressure to prove himself on behalf of the entire Institute. After graduating, he married Barbara Lang; his wife predeceased him in 1993.

Bill began his career as vice president of sales for the American Pencil Company, one of the first companies to sell ballpoint pens in the United States following World War II. Later he became president of the American distributorship for Elna sewing machines. After this company was sold, Bill was able to "retire" at age 41, to concentrate full-time on investing. He reported that many of his most successful investments were based on Caltech connections, including Beckman Instruments and TRW.

In 1999 Bill gave more than \$200,000 to Caltech to fund the Social Science Experimental Laboratory, named in his honor. This gift reflected his lifelong interest in business economics and the social sciences, as well as his strong attachment to his alma mater. (See *Caltech News*, vol. 33, no. 4, for related article.) Professor John Ledyard, chair of the Division of the Humanities and Social Sciences, had become well acquainted with Bill in recent years. Recounting a visit with Bill to thank him for his gift, Ledyard recalls that Hacker responded by saying, "I am so glad you gave me this opportunity!" "That was typical of Bill," according to Ledyard. "He was a very smart guy and a shrewd investor who achieved a great deal in his lifetime with little fanfare, and yet it thrilled him to be able to help Caltech in this way."

For more information regarding bequests, please contact the Office of Gift & Estate Planning, Mail Code 105-40, Pasadena, CA 91125; 626/395-2927; e-mail: planned_gifts@caltech.edu; www.gep.caltech.edu.



Baldeschwieler and Fung go to

On December 1, while the presidential race still hung in the balance, Caltech had its eye on the White House. A professor and an alumnus were heading straight for the Oval Office, where they were in line to receive a big prize: the National Medal of Science.

On that day, the nation's highest scientific honor went to 12 individuals, including John Baldeschwieler and Yuan-Cheng Fung, PhD '48. Baldeschwieler is Caltech's J. Stanley Johnson Professor and Professor of Chemistry, Emeritus. Since joining the faculty in 1973, he has turned scientific ideas into products and helped others to do the same.

Fung, professor emeritus at UC San Diego, received his Caltech doctorate in aeronautics and mathematics and made a name for himself as a Caltech aeronautics professor. Then in 1966 he laid the framework for a new field, bioengineering, at UCSD.

At the White House, all the honorees received hearty congratulations from President Clinton for setting new directions in social policy, neuroscience, biology, chemistry, bioengineering, mathematics, physics, and earth and environmental sciences. Fung and his wife left the Oval Office with a personal autograph for their grandson, who had wanted to meet the president.

Baldeschwieler, who has advised and helped direct science policy for various administrations, met Bill Clinton for the first time. He found the president to be very relaxed, in contrast to other government workers whose jobs were still in question.

"When the president changes jobs, so do about 3,000 other people," says Baldeschwieler. His inside-the-beltway friends "all had various levels of uncertainty" about what would happen next. Imagine if all the top levels of management suddenly turned over at Caltech, or at a big corporation like IBM, he says, and the Institute or company was expected to continue functioning. "Part of why the process works," he adds, is because government think tanks, like the Brookings Institute, keep experts in

a sort of holding pattern. Thus, people from the "exiled administration" can be tapped for advice and future positions.

OVATIONS FOR INNOVATIONS

Baldeschwieler was honored for his work in molecular assemblies, which has led to practical applications that include the "targeted delivery of pharmaceuticals for cancer diagnosis and therapy." The National Science Foundation, which administers the award for the White House, also noted his development of ion cyclotron resonance spectroscopy, "an important tool for chemical and biochemical analysis that led to a new scientific field providing unique ways to study molecular structure and reactivity." Among its many uses, ICR "allows us to understand chemical reactions under extreme conditions, such as in plasma," says Baldeschwieler.

For these and other advances, he credits the students and postdocs who have worked with him throughout his career. "What we do rides on their creativity and skills." And their caliber helps Caltech attract high-quality faculty, he says.

His first grad student at Caltech, John Boland, PhD '85, remarks on Baldeschwieler's knack for "perceiving things in different ways." Boland, now a chemistry professor at UNC Chapel Hill, says that Baldeschwieler "sees applications for almost anything. Where others doubt, he will say, 'What if you could?'"

Recalling group lunches at the Athenaeum, Mike Youngquist, PhD '93, says "there was always a lot of talk about how to convert research ideas into products that do some good in the world." Youngquist is now director of engineering at CIPHERGEN Biosystems Inc.

"Our most relevant work is in the area of drug delivery," says Baldeschwieler. In the '70s, his Caltech lab designed and built liposomes that could be used to deliver chemotherapeutic drugs directly to cancerous tumors. He and Ronald Gamble, a postdoc at the

time, turned this into a new venture—a company called Vestar and later Nexstar Pharmaceuticals—and launched a product that reached U.S. markets in the early '90s.

"It's more intimidating in retrospect," Baldeschwieler says of the two-decade-long process. He went on to create and direct several more companies. Most recently, during a breakfast meeting, he and fellow Caltech Associates John Glanville and Malcolm Cloyd conceived of the Athenaeum Fund, a source of seed money for high-tech start-ups—"primarily for ideas coming out of Caltech."

Baldeschwieler has witnessed and nurtured an increasingly entrepreneurial environment inside and outside the Institute. "The driving force has come from the marketplace," he says. In the '70s, he saw a majority of Caltech students heading to grad school and ultimately into university jobs or top-notch industrial research. But a decrease in such openings has changed that pattern dramatically. Baldeschwieler notes that the dearth of these opportunities has been "more than made up for by start-up ventures, many started by the students themselves."

To many of these students, the professor became an unofficial mentor. He formalized that role in 1997, when he created and began teaching Engineering 102, a primer on marketing, intellectual property issues, company formation, venture capital financing, basic accounting, and corporate governance. As an instructor and advisor, Baldeschwieler has helped students launch approximately 10 companies.

This is one of "a series of constructive changes" that have occurred at Caltech, he says. In 1984 the Industrial Relations Center started the Caltech/MIT Enterprise Forum, making entrepreneurial education an integral part of the center's outreach effort. Then in 1995 the Institute hired Larry Gilbert to head up a new Office of Technology Transfer. Baldeschwieler served on the selection committee. A year later, Avery House was opened as a residential complex that, among other things,

provides a meeting ground for the students' Entrepreneur Club—"a major force on campus," says the professor.

In addition, Baldeschwieler has helped create Pasadena Entretec, an independent not-for-profit corporation "whose mission is local economic development." Executive Director Stephanie Yanchinski will work with the city and other Entretec partners to offer the infrastructure and incentives necessary to convince Caltech-bred start-ups to stay in Pasadena, says Baldeschwieler.

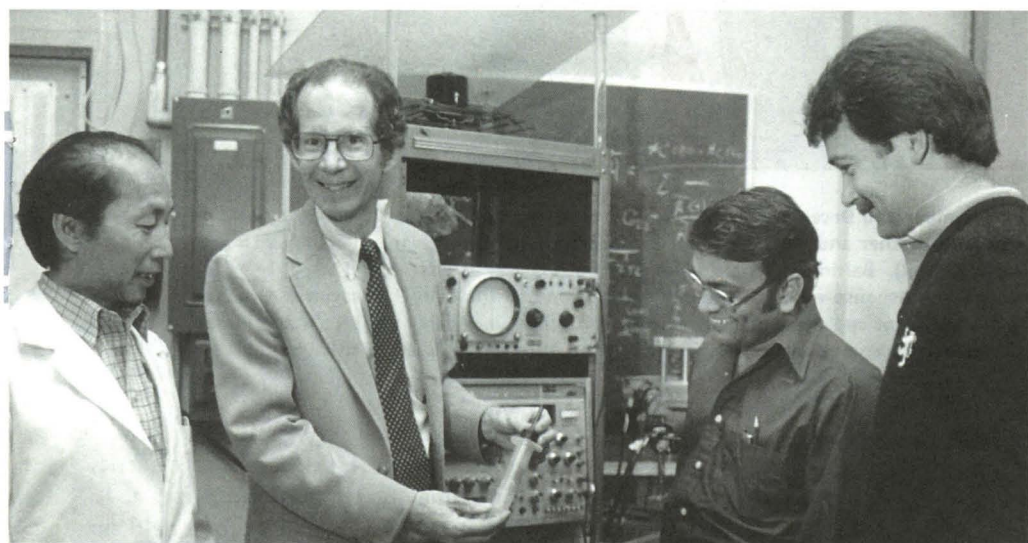
In D.C., where he and the other honorees were asked to recount their trek to the top, Baldeschwieler spoke of early days playing with erector sets and other building toys. He pursued these engineering interests at Cornell, where he learned from physical chemist Paul Flory that "the structure of molecules is much more interesting than the structure of other things." So he did graduate work in physical chemistry at UC Berkeley, receiving his PhD in 1959.

After several years on the faculty at Harvard and Stanford, he served on the President's Science Advisory Committee (1969–72) and was deputy director of the Office of Science and Technology (1971–73). He recently served on the National Academy of Sciences committee on international security and arms control and on the president's committee on Gulf War veterans' illnesses. He is a member of the NAS and a fellow of the American Academy of Arts and Sciences and the American Philosophical Society.

FATHER OF BIOENGINEERING THANKS "MOTHER DUCK"

Yuan-Cheng Fung says that luck brought him from China to Caltech in 1946 and sped him through his doctoral program in aeronautics. There were a few people involved too. He enjoys retelling the story he told in D.C.

During World War II, a team of American professors visited Chungking, China, and, while dining with the minister of education, asked the minister why they hadn't seen Chinese graduate



Washington

students in their U.S. schools lately. He told them that all of China's resources had been focused on the war effort. The professors then wanted to know, "If the U.S. provided scholarships, would students be permitted to go out of China?" The answer was yes. A year later, the minister received promises for graduate scholarships and held nationwide exams to choose the recipients.

Fung was thrilled to earn the Caltech award and come to the United States. But when he showed up at the office of Professor Ernie Sechler, in January 1946, Sechler said, "you're two years too late." The scholarship had been given to someone else, but this news hadn't reached Fung in China. Luckily, he says, Sechler was "so kind, so nice, he took me in as a lab aide."

Fung's first impressions of the United States were formed at Caltech, he says, reminding him of Konrad Lorenz's book on animal behavior. "When ducklings hatch, the first grown-up they see is regarded as mother. Caltech, to me, is like a mother." Fung would eventually leave this home and migrate south.

At Caltech, Fung developed his theory of aeroelasticity, "forming the defining ideas of how aerostuctures interact with aerodynamic flows," according to the NSF citation. (Some of his earliest work involved making sense of Theodore von Kármán's analysis of the 1942 Tacoma bridge failure.) Then he took a sabbatical—a "dangerous" tradition for a school that likes its professors to stick around, jokes Fung. He went to the Max Plank Institute of Aerodynamics on a Guggenheim fellowship, but he soon found himself delving into journals at the physiology institute across the street.

He first looked up articles about glaucoma, which his mother was suffering from back in China. He translated the articles and sent them to her doctor, who was grateful for the access to external publications. But as Fung read on, he was surprised to find that the medical literature did not address mechanics, forces, or motion—the lenses through which he had learned to view

After missing each other at Caltech, an Institute professor and an alumnus cross paths in Washington. John Baldeschwieler attends the National Medal of Science ceremony with his wife, Marlene Konnar (far left). Yuan-Cheng Fung is joined by his wife, Luna, and President Clinton in the Oval Office that morning. The long road to the White House led Fung from China to Caltech to UC San Diego, where he appears in his lab in the second photo from left. Baldeschwieler's path landed him at the Institute, where he is seen in 1983 (above, surrounded by researchers Ming Li, Kanaiyalal Patel, and John Bolland, PhD '85) refining research that led to the targeted delivery of cancer drugs.

the world as an engineer. Reading farther afield, he became convinced that "the function of our bodies could be better understood if the roles played by forces and motion and stress and strain were analyzed as thoroughly as they are for airplanes."

Back at Caltech, Fung began to explore the "rich field of biology," examining the relationship between structure and function in blood cells, vessels, and microcirculation. He was able to solve the mystery of why our smallest blood vessels are so rigid—due to support from the surrounding tissues—and then to predict that the smallest vessels in the lungs would be the softest, due to the absence of neighboring tissue.

He could have continued in that vein of research at the Institute, but, with a UCSD offer pending, he chose to make a clean break. "If I had stayed at Caltech, there wouldn't have been any other faculty to teach my aeronautics courses. My desire to give 100 percent to my new field was so strong, I had to shake off my old responsibilities."

Joining the UCSD faculty in 1966, Fung was able to build the new university's bioengineering program from the ground up. He even got to take part in the hiring of medical-school faculty. His partners in this endeavor were Caltech alumnus Marcos Intaglietta, PhD '63, and Ben Zweifach, an NYU physiology professor who had completed his sabbatical at Caltech just

Dear Editor:

The January 7 *Parade* magazine carried a cover story by sportswriter Dick Schaap on the greatest stars he had encountered in his 50 years on the beat. One of them was Caltech alumnus Meredith Gourdine, PhD '60, winner of a silver medal in the long jump in the 1952 Olympics in Helsinki.

Meredith was a graduate student when I attended Caltech as an undergrad, and he could often be found working out for the long jump with the Caltech track team, although his eligibility was gone. In 1956, he and five others founded the Southern California Striders to provide an outlet for track and field competition for African-American athletes, who were being snubbed by the local AAU clubs. The Striders soon became the best team in the country, reigning as national champions for several years in a row. Meredith and his cofounders had created opportunities for dozens of athletes, many of whom went on to become Olympic champions.

It was Meredith who really taught me how to long jump, after I graduated. Even though I had set school records in my junior and senior years, I was able to improve by two feet when Meredith spotted a flaw in my technique. Thanks to his help, I was able to be more competitive.

Meredith was a great success in life, athletically and in business. I also found him to be a thoughtful, caring person with a zest for life—an outstanding Caltech alumnus, who made a difference in many people's lives.

In 1996, the Southern California Striders had a 40-year reunion in Los Angeles. I couldn't go because I was attending the start of the Olympic Torch Run at the Coliseum (L.A. to Atlanta). I learned that Meredith couldn't be there because of his diabetes and the blindness that the disease had caused. I called him after that and we reacquainted ourselves after 35 years. Meredith was very ill, but he still had the old drive. He told me he wished he could have coached Carl Lewis in the long jump, because he was sure he could have helped Carl jump over 30 feet. I still remember Meredith explaining to me that your center of gravity follows a parabolic arc in the long jump, which is determined at the takeoff point. He said that the great long jumpers find a way to put their center of gravity as far to their rear as possible at the landing point. Where but at Caltech could you find a physics lesson combined with coaching track and field ?!

—Dick Van Kirk '58

Now retired as president and CEO of Special Olympics, Southern California, Van Kirk was voted MVP in track and football during his years at Caltech, where he set a long-jump record that still stands. For his story, see www.caltech.edu/CaltechNews/.

Regarding Ray Hefferlin's letter in the last *Caltech News*, I too have long been convinced that senior professors teaching undergraduates might be the single most important element of the superlative education I received at Caltech.

Professor Bohnenblust was also one of my favorites, as he consistently brought calculus to a climax a few minutes before the end of the period. I was not surprised in the least when he later graced the cover of *Time* as a premier teacher. Despite the passage of nearly four decades, I can still remember most of my professors.

Other personal favorites were Jurg Waser and Fred Anson for chemistry, Bob Sharp for geology, Maarten Schmidt for astronomy, and James Bonner for biology (one quarter each was terrific). I also recall Tom Apostol and John Todd (matrix math was a challenge) plus Richard Strong (the physics problems and demonstrations) and Gene Cowan for physics (Maxwell's equations nearly killed me!). I loved the elegance of classical mechanics as taught by Carl Anderson and still remember Harold Wayland for his research on blood flow and for his teaching of differential equations. Carver Mead taught a stellar course in introductory electrical engineering, but others were Jim Mayer, Marc Nicolet, and David Middlebrook, for solid-state physics (another course that challenged me heavily).

I recall Will Iwan and George Housner for mechanical engineering (I can still recall Housner's nearly lethal question at my course orals, an eigenvalue problem). At the time I didn't yet fully comprehend having Willy Fowler as my undergrad advisor. Another great teacher was Tommy Lauritsen for quantum mechanics, not to mention the incomparable Richard Feynman for Physics X on Tuesdays at 11 a.m. I also remember Dave and Hallett Smith and Harvey Eagleson for English (remember "beer and pretzels"), and David Elliot and Rod Paul for history. I will never forget the term paper for Alan Sweezy on Lenin's new economic policy. I will always treasure my thesis advisor, Thad Vreeland, not only for the technical side but also for the basketball, baseball, and the lunches at Acapulco or the Japanese restaurant. Other great teachers in grad school (materials science) were Dave Wood, Donald Clark, Fred Buffington, and Pol Duwez.

A corollary to Caltech's breadth of training is that I was perfectly trained for the interdisciplinary nature of the semiconductor industry, where I have spent my entire (still enjoyable) career. As painful as it was at the time, I think Caltech's insistence that the curriculum include a large proportion of humanities courses is another powerful element.

Clearly a trip down memory lane, but I thought others might enjoy sharing.

—Richard Blish '63, PhD '67

Caltech News invites alumni to respond to issues, to present new ones, to reflect on Caltech experiences, and, in general, to join in the conversation. We reserve the right to select and edit letters. Please send e-mail to billary@caltech.edu.

Continued on page 15 . . .

Alumni Update

ALUMNI WORK THE CALTECH NETWORK TO FIND OPPORTUNITY AND CONNECTIONS

FROM THE CALTECH ALUMNI ASSOCIATION

Jonathan Little '98 is president and CEO of Viaworks, a software company in Glendale, California. But before he could contemplate starting his own firm, Little relied on his Caltech education—and his Caltech connections—to help him jump-start his career. David Rutledge, one of his professors, talked to Kwang-I Yu, PhD '81, founder, and at the time, CEO and president, of Paracel, a developer of hardware and software for genomic sequencing. Rutledge encouraged Yu to consider Little for a position there. Little was hired.

"Dave and Kwang-I are two of the brilliant people I met through Caltech," says Little, who received his degree in electrical engineering. "That made deciding which job to accept easy, and Paracel turned out to be a great learning environment."

After two years at Paracel, Jonathan started his own software company, Viaworks, which has 14 employees. Eight of them are Caltech alumni. Coincidence? Hardly.

"America's best playground for math and science." That's how the Institute bills itself to prospective students. But while students may spend just a few years on the Pasadena campus, they will be Caltech alumni for the rest of their lives. And increasingly Caltech applicants, students, and graduates are coming to see the Caltech experience as more than just a great education.

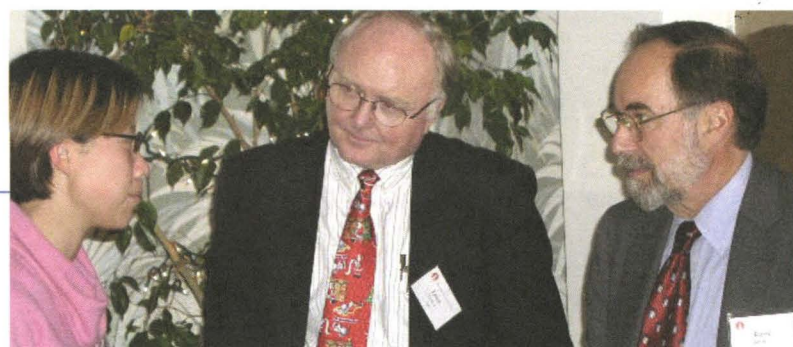
Back at Viaworks, Jonathan Little hired other Caltech alumni because he knew them personally and knew they would produce excellent work. They

recruited more Techers, and then still other alumni came to Viaworks because they liked the idea of working with fellow graduates. The company has also recruited alumni consultants such as Glen George '81, a graduate of Caltech's computer science program.

"The alumni connection made the recruiting process easy for me and saved us a lot of time. You trust the people you know to find other smart, hard-working people," says Little. His company received its initial financing from a venture capital resource founded by Caltech professor John Baldeschwieler, who had taught Little at Caltech. (For more on Baldeschwieler, see page 8.) Little also met fellow alumnus Richard Hsu '89 at Venture Law Group in Los Angeles. Hsu provided assistance and introduced Little to other members of the Caltech network in Silicon Valley.

So what is the Caltech alumni network? Alumni Association executive director Andrew Shaindlin describes it as a "lifelong network of colleagues and peers" that a Caltech grad can call on in a variety of situations.

"First and foremost, there's a shared sense of the Caltech experience," says Shaindlin. "Beyond that, there's the realization among alumni that being a Caltech graduate means you're pre-screened for difficult work and critical thinking skills. One prominent alumna—a Bay Area high-tech entrepreneur—says that she'll hire a Caltech grad every time, even in the absence of other information, and even if the person is not necessarily experienced in the



In November and December, Caltech alumni took the opportunity to connect both with one another and with President David Baltimore (above, right, chatting with San Diego alumni). Baltimore visited alumni on both coasts at Boston and San Diego receptions cosponsored by the Alumni Association and the Caltech Associates. Caltech's president spoke about new research initiatives under way at Caltech and about the challenges and opportunities facing the Institute at the dawn of the new century.

specific line of work to be done."

"Just being able to say 'I'm from Caltech' opens many doors," says Little. "Even though we started our company right as the technology market was taking a nosedive, we've been successful so far just because we were able to walk into meetings and have instant credibility due to our Caltech credentials."

At some point in their careers, Caltech alumni frequently decide to give something back by using their connections to help others. "It used to be that the alumni office's sole function was to host social events," says Shaindlin. "We love a good time as much as anyone, but times have changed. Our role now is to help bring together a network of people who need each other, for personal or professional advancement. More and more, applicants to top colleges want to know what the school community will do for them after they graduate. We're very lucky that Caltech has a tight, effective network of successful people looking for others like themselves."

"When a student gets into Caltech, she isn't just getting into college. She's gaining access to a lifelong web of resources that can send her career on a trajectory that would have been inaccessible if she had gone to school somewhere else."

To enhance the ability of students, faculty, and alumni to network with one another, the Caltech Alumni Association hosts a specialized networking, mentoring, and advising network for students on its Web site. Connect@Caltech is on the Web at <http://www.its.caltech.edu/~connect>.

Karen Carlson, an assistant director

at the Alumni Association, explains the usefulness of this program to students. "You may prefer to connect with a person in your own field, or a field that might be potentially interesting to you, for the sake of gathering career information and making other contacts. Your connections to Caltech as student, postdoc, faculty member, staff, or alumnus, give you access to a network of individuals who, by virtue of their willingness to register with the Connect@Caltech database, are welcoming some sort of interaction with you. You are in control of how you use this service."

With more than 230 members as of December 2000, and currently available only from campus IP addresses, Connect@Caltech is only a fledgling program. Carlson expects that with a significant redesign in the next few months and an increase in the number of alumni registered in the database, the service will be poised to take off. The redesign will enable alumni to access the online network from anywhere in the world via the Web.

"Although it has always been possible for motivated Techers like Jonathan to use their own personal network entirely off line, we expect that automating it will create a huge increase in the number of effective contacts among alumni throughout their careers," says Carlson.

Do you have an interesting Caltech networking experience to share with the readers of Caltech News? Please e-mail your letters to hja@caltech.edu.

ALUMNI RELATIONS TASK FORCE FINAL REPORT IS NOW ONLINE

In May 1996, a blue-ribbon Alumni Relations Task Force at Caltech provided an assessment of the relationship between Caltech and its alumni and offered several recommendations on how to strengthen that bond. The task force, formed in 1995 and composed of 16 alumni and Institute members, found a stable foundation in alumni relations upon which a much stronger relationship might be created. In addition, the task force observed that both the Institute and its alumni desired to strengthen that relationship.

In May 1998, the Alumni Relations Committee of the Caltech board of trustees distributed a status report outlining in detail the progress made since the original assessment. Since that date, Institute staff and volunteers have made substantial progress on resolving the remaining recommendations. In September 2000, the committee accepted a "Final Implementation Report," which updated the status of the task force's recommendations.

This final report is available to all alumni on the Association's Web site, at <http://www.its.caltech.edu/~alumni/arc.htm>. Alumni interested in receiving a free printed copy of the report via U.S. mail may request one by calling the Association at 626/395-6592.

ALUMNI LAWYERS LINK UP

Institute alumni in the legal professions now have an e-mail discussion group and Web page to call their own. Both are maintained by Caltech alumni for the benefit of Caltech alumni.

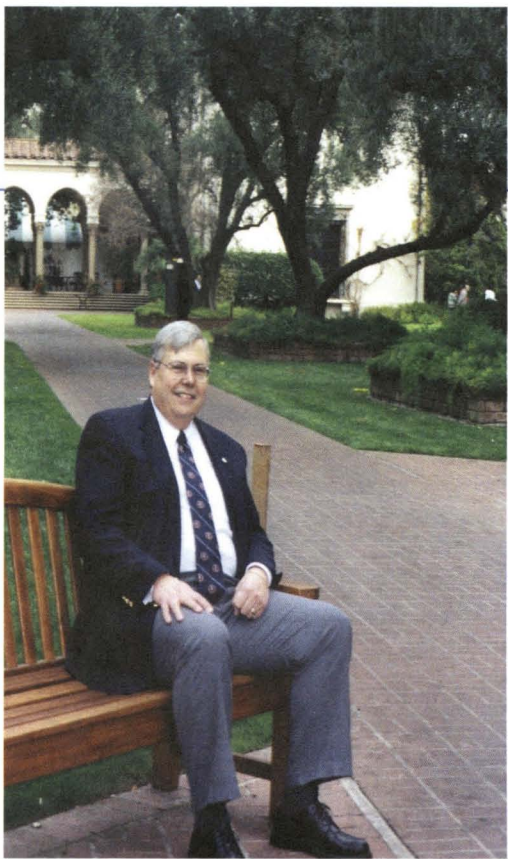
The lawyer e-group got its start this past December, when the Alumni Association e-mailed a small group of alumni with legal backgrounds to see if there was any interest in an informal network of alumni in the legal professions. The letter was proposed and written by alumni attorneys Richard Hsu '89 and Michael Krieger '63.

About half the alums who were contacted have replied, and since then

more alumni with law degrees or careers in the legal professions have learned of the group and joined.

If you're a Techer with a law degree and an interest in networking, drop a line to caltechlaw@caltech.edu. Include your current contact information, area of specialization, level of interest, and suggestions for future activities.

The Alumni Association also hosts a Web page for the group at <http://www.its.caltech.edu/~alumni/caltechlaw.htm>. Alumni can also contact Richard Hsu directly at rhu@vlg.com.



The Seat of Many Memories.
The Institute's Olive Walk provides food for thought for Alumni Association president Blair Folsom.

IS THE OLIVE WALK A TIMELESS MONOLITH? WELCOME TO 2001

made me an offer I couldn't refuse—if I would clean up *his* office, I could use it as *my* office. What a deal! Morelli's office was the giant room at the southwest corner of the third floor of Thomas Lab, overlooking, yes, the Olive Walk! It was as big as a classroom, easily four times the size of a typical professor's office. It had a big executive desk, fancy rug, artwork on the walls, and even a full-scale leather sofa. I threw away the trash, filed the papers, shelved the books, and arranged for Physical Plant to clean the drapes and rug and repaint the walls. I positioned my desk at the window overlooking the Olive Walk and ended up with the best office on campus, at least for a lowly grad student. (Morelli spent a good part of my Caltech years doing outside consulting, but when he was on campus, we shared the space.)

In 1968 I met a beautiful blond and took her to dinner at the Ath. Afterward we walked down the Olive Walk, and I kissed her for the first time by the first olive tree. When we announced our engagement at the Ath a few months later, I took her parents down the Olive Walk to tour the campus.

In 1970, Caltech and MIT joined forces to conduct the "Clean Air Car Race." I ended up as the director of Caltech's operation from my office overlooking the Olive Walk until my adviser, Duncan Rannie, PhD '51—a wonderful mentor to me—got wind that I was spending a lot more time on the race than on my thesis. That ended that. Anyway, the race culminated with the low-emission cars driving down the driveway from San Pasqual to the finish line at the Olive Walk right below my office. Afterward, the cars were displayed on the Olive Walk for a few days.

Over the years, the Olive Walk has changed a bit. It's been rebricked, and there are now phones and even a cannon. But through it all, it has remained a guiding force, just like the monolith in *A Space Odyssey*. Since those years as a grad student, I have returned to campus many times for a broad range of events, and every time I walk down the Olive Walk it brings back many fond memories and probably gives me great new ideas. Right now I'm thinking of going to Jupiter!

Caltech is a special place. Welcome to the 21st century!

Blair A. Folsom

ASSOCIATION MAKES BOARD NOMINATIONS

In January, the Alumni Association board of directors accepted the proposals of the nominating committee for new board officers and board members. Their terms of office will begin at the close of the annual meeting in June 2001.

The election will take place at the annual meeting of the Association, to be held on Friday, June 15, at the Caltech Athenaeum, 551 S. Hill Avenue, Pasadena, California.

Nominations for officers are as follows: president, Ted Jenkins '65, MS '66; vice president, Debra Dison Hall '74; treasurer, Tom Tisch '61; and secretary, Stephanie Charles '73. Association president for 2000–2001, Blair Folsom, PhD '74, will become official past president for 2001–2002 when the new terms begin this summer.

The following alumni were nominated to serve on the board: Angie Bealko '96; Peter Bloomfield '68; John Davis, PhD '00; Paul Graven '85; Joan Marie Gimbel '94 (this will be her second term); and Tom Miller '66.

Section 5.01 of the Association bylaws provides that members of the Alumni Association may make additional nominations for directors or officers by petition, signed by at least 50 members in good standing, providing the petition is received by the secretary no later than April 15. In accordance with section 5.02 of the bylaws, if no additional nominations are received by April 15, the secretary casts a unanimous vote of all regular members of the Association for the election of the candidates nominated by the board. Otherwise a letter ballot is required.

CALTECH & GNOMES OFFER REDWOODS TRIP

On March 31, Caltech Gnomes, alumni, students, faculty, and staff will visit the Caltech Centennial Grove in California's Sierra National Forest, where the Institute owns 20 acres. In the grove are five giant sequoias named after the founders of Caltech. The group will meet at the beginning of the Shadow of the Giants Loop Trail at 11 a.m. for the short hike to the Caltech redwoods. For those who wish to go up on Friday and return on Sunday, overnight accommodations are available.

The trip will be coordinated by the Caltech Y. For further information, contact Y director Athena Castro at 626/395-6163 or Le Val Lund '47 at 323/664-4432.

Alumni Activities

March 20, Seattle Chapter Event with David Baltimore. A joint event with the Caltech Associates.

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

April 8, Computer Science 28th Anniversary Reception.

April 19, QED. A play at the Mark Taper Forum with Alan Alda as Richard Feynman.

April 29, Senior BBQ.

May 3, Field Trip to Great Falls National Park, Virginia.

May 14, Geological and Planetary Sciences Division Reunion Reception.

May 15–17, Division of Geological and Planetary Sciences 75th Anniversary Symposium.

May 17, Reunions for the classes of '36, '41, '46, '51.

May 18, Half Century Club Luncheon.

May 18, Reunions for the classes of '56, '61, '66, '71, '76, '81, '86, '91, '96, '00.

May 19, Alumni Association's 64th Annual Seminar Day.

June 2, Tour of SLAC, Palo Alto, California.

June 8–12, Anza-Borrego Travel/Study Program (see story, page 14).

June 15, Honorary Alumni Dinner.

June 22–23, Alumni College—"Computing the Future of Communications."

THE ALUMNI FUND
SALUTES VOLUNTEERS

The Alumni Fund wishes to thank each of the alumni listed here, who volunteered as Key Volunteers, Class Year Chairs, Option Chairs, and Callers for the 1999/00 Fund year. Through 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. Thank you for all of your hard work.

Bruce R. Abell '62
Henry I. Abrash '61
B. Thomas Adler '93
Paul E. Ainsworth '94
Philip H. Albert '83
Albert P. Albrecht '42
Charalambos D. Aliprantis '73
Frederick H. Allardt '35
Paul H. Allen, Jr. '42
Harvey J. Amster '50
John P. Andelin, Jr. '55
William J. Anderson '63
J. Milton Andres '49
Kristie L. Armentrout '98
Irving L. Ashkenas '37
Boris Auksmann '64
John R. Austen '37
John W. Bacon, Jr. '43
Richard L. Baker '74
Antony C. Bakke '78
Lawrence C. Baldwin '55
Mark L. Baldwin '86
Halcyon Ball '45
David C. Banks '45
Richard C. Barbieri '73
Brian T. Barcelo '71
Stanley M. Barnes '49
Donald R. Bartz '50
William L. Basham '49
Stuart R. Bates '46
John A. Battle '39
Niels J. Beck '48
Robert A. Bell '72
David F. Bender '33
William F. Benisek '60
Robert R. Bennett '45
Carl S. Benson '60
Clarke Berdan, II '82
Jason R. Beresford '88
John T. Billings '54
Harry S. Blackiston, Jr. '63
Ernest W. Blair '49
Graeme A. Blake '60
Richard C. Blish, II '63
Fred A. Blum, Jr. '68
Donald L. Blumenthal '65
Ronald L. Boatright '76
Ernest R. Boller '59
Edward M. Boughton '55
Ray D. Bowerman '51
Charles G. Boyd '91
Kenneth R. Bragg '39
George H. Bramhall '41
Alan M. Breakstone '72
G. David Brin '72
Elmore G. Brolin '46
Alfred B. Brown, Jr. '50
Victor G. Bruce '42
William R. Burns '45
Linden R. Burzell '45
Gary D. Cable '69
Herbert J. Cabral '44
William J. Carroll '48
Robert T. Carter '39
R. Kyle Catterlin '52
I-Lok Chang '65
Karl K. Chang '85
Robert J. Chansler, Jr. '74
Nim Cheung '76
David C. Clark '63
John E. Clauser '64
Howard J. Cohan '49
Robert C. Colgrove '81
George B. Cooke '52
Brian M. Cooper '95
France de Cordova '79
Robert E. Covey '51
James H. Crabtree '65
Harold B. Crockett '40
Timothy R. Crowder '93
Steven A. Cuccaro '91
John C. Cummings Jr. '69
H. Starr Curtis '63
Charles R. Cutler '45
James A. Cutts '71
Stephen P. Cutts '88
Dean C. Daily, II '51
Darren P. Dang '94
Alan B. Dauger '62
Donald D. Davidson '38
Robert C. Davidson '38
James A. Davies '35
Frank W. Davis '36
Kirk M. Dawson '61
Thomas E. Dawson '59
Robert D. de Pencier '65
Albert O. Dekker '35
Walter M. Denekas '69
Taletha M. Derrington '93
Ray F. Destabelle '52
Christopher Diamantoukos '72
Keith S. Ditman '44
Howard H. Dixon '51
Nicholas I. Djeu '65
Eugene H. Dryden '55
Franklin D. Dryden '54
Daniel C. Duan '83
Gerald Dudek '54
Donal B. Duncan '45
Antanas V. Dundzila '58
Vladimir Dvornychenko '63
K. Norman Easley '60
Col. Robert B. Eddington '67
Nancy D. Edwards '87
Eric R. Ehlers '73
William E. Eilau '51
Craig T. Elliott '58
David G. Elliott '51
Bryce M. Engelbrecht '96
Rolf Engleman, Jr. '59
Leonard A. Erickson, Jr. '68
Ralf A. Erickson '50
Dean W. Face '79
Steven M. Farber '64
Frederic Farina '92
William E. Farrell '62
David W. Faulconer '65
Paul H. Faust '41
Jerry M. Feinberg '70
Neil E. Fernandes '97
Norman B. Fjeldsted '45
Edgar W. Flavell '43
John E. Fleming '46
Wallis T. Fleming '45

Delos E. Flint '39
Bern D. Folkman '55
Edward B. Fomalont '67
Kenneth T. Fong '70
Pamela Y. Fong '90
Lawrence C. Ford '74
Richard W. Forester '75
Edward W. Forman, Jr. '54
A. Finley France, III '40
Jonathan A. French '70
H. Kent Frewing '60
Teryl K. Frey '78
Jerrold Fried '58
William K. Funkhouser, Jr. '92
Alfred H. Gale '54
Sidney K. Gally '41
Mark A. Gaponoff '72
William D. Gardner '53
John M. Gerty '45
Thomas L. Gilbert '44
Delwyn L. Gilmore '92
David L. Glackin '74
Gordon E. Glattenberg '58
Barry L. Goldberg '65
John R. Golden '62
Steven J. Goldner '64
Francisco G. Gomez '93
Judith Michelle Green '98
Hans W. Grellmann '64
Raymond H. Greutert '51
Jerry D. Griffith '60
E. Ted Grinthal '69
Albert O. Grote '43
William F. Gulley '45
Reinaldo V. Gutierrez '54
Joel H. Gyllenskog '71
William B. Haigler '55
Debra Dison Hall '74
Robert N. Hall '42
Thomas H. Hamilton, P.E. '48
Thomas W. Hamilton '52
Thomas C. Hanks '72
Thor P. Hanson '64
Philip D. Harriman '59
Wendell W. Harter '42
Ryusuke Hasegawa '69
Eastman N. Hatch '56
John B. Hattick '79
Robert G. Hawthorne '47
Jeffrey C. Hecht '69
Norman L. Helgeson '73
Robert T. Herzog '56
Col. William B. Higgins '50
Douglas W. Hill '64
H. Peter Hofstee '95
George S. Holditch '48
Riley H. Holly '58
Albert V. Holm '66
Neil C. Holmes '70
Vincent R. Honnold '48
Donald L. Hook '54
Joseph E. Hook '45
George M. Howe '45
Peter A. Howell '50
J. Byrne Hull '43
Joseph W. Humphrey, III '87
Carter Hunt '42
Lawrence A. Hunt '69
G. N. Huntley '54
John K. Inman '50
Ernest G. Janzen '61
Robert P. Jenkins '45
Rodman Jenkins '50
Eric B. Jensen '70
Donald K. Jephcott '42
Howard E. Jessen '46
Carl B. Johnson '37
Douglas S. Johnson '62
Gilbert A. Jones '41
W. Lawson Jones '43
Michael L. Kahn '70
Hiroshi Kamei '51
David Kauffman '62
Jack A. Kaye '82

Hugh Kendrick '62
John J. Kennedy '61
Jack R. Kettler '44
John H. Keyser, Jr. '40
James T. Kindle '65
Daniel W. King '49
Raymond D. Klopotek '64
Franklin H. Knemeyer '44
Richard H. Knipe '50
Robert V. Knox '45
Charles F. Koerting '85
James B. Kolhoff '85
Steven D. Kraus '70
David G. Kuehn '69
Lawrence D. Kugler '62
Warren Y. Lai '80
Jark C. Lau '65
Koon H. Lau '85
Larry A. Lebofsky '69
Jose A. Lebron '99
David A. Lee '52
Jason T. Lee, M.D. '94
Donald M. Leinweber '45
Dan B. LeMay '51
Robert E. Leo '45
Alexander A. Lesin '94
Menachem Levanoni '70
Lionel L. Levy, Jr. '49
Steven M. Lewis '69
William H. Libbey '46
Roger A. Lighty '72
Paul A. Linam '47
David A. Lind '48
Lee A. Lindblom '72
D. M. Lindquist '60
Rongzhi Liu '95
Malcolm H. Lock '61
R. Bruce Lockwood '37
Eric B. Loftsgaarden '94
James B. Logan '69
Ruth B. Logan '69
William H. Long, Jr. '69
Le Val Lund, Jr. '47
William P. Lundy '47
George W. Lyon '47
Douglas J. MacLean '48
Wayne MacRostie '42
Linda N. Maepa '96
Philippe L. Maitrepierre '69
Gershom R. Makepeace '42
Jeremiah Mans '98
Maury I. Marks '58
John C. Marshall '49
B. Keith Martin '58
William L. Martin, III '69
Peter V. Mason '51
Jules F. Mayer '40
Peter J. McCann '93
David B. McCarroll '66
Arthur O. McCoubrey '43
John H. McCoy '64
C. R. McEwen '46
Miles W. McLennan '61
O. J. Mead '43
George B. Melrose '47
Wendell W. Mendell '63
Stanley H. Mendes '46
Thomas M. Menzies '65
Steven S. Michael '98
Michelle M. Miller '98
Wendell B. Miller '37
Roger L. Minear '64
Donald M. Mintz '76
Gary F. Mitchell '62
Lothrop Mittenenthal '48
Cleve B. Moler '61
Donald W. Moore '50
Harry J. Moore, Jr. '44
G. Richard Morgan '49
Jeffrey F. Morris '96
David B. Morse '61
Albert H. J. Mueller '47
Carol A. Mullenax '89
Rollie J. Myers '47

Michael A. Nassir '92
Carter G. Naylor '64
Marco R. Negrete '55
Richard C. Neville '58
Arthur E. Niell '65
Julian V. Noble '62
Irving L. Odgers '50
Walter T. Ogier '47
Carl W. Olson '44
Masayuki Ono '73
Louis S. Osborne '44
David J. Osias '62
Thomas R. Palfrey, III '81
Capt. William M. Pardee '53
Noel R. Park '37
Stanley F. Parkill '55
Paul D. Patent '72
Carlton H. Paul, III '65
Dale D. Paynter '69
David B. Peisner '74
William H. Pickering '32
Russell F. Pinizzotto, Jr. '72
David P. Pope '67
Calvin E. Porcher '50
William D. Post '76
Peter Price '51
Prof. Carlton P. Pryor '77
Keats A. Pullen '39
Paul W. Purdom, Jr. '61
William K. Purves '56
Douglas M. Rabin '81
Mahendra S. Rao '91
John Rasmussen, Jr. '48
Prabhat Rastogi '70
Charles A. Ray '61
John R. Rempel '44
J. Thomas Renfrow '69
Luis G. Reyna '83
Philip L. Reynolds '58
Joseph Rhodes, Jr. '69
B. K. Richard '74
L. W. Richards '54
Raymond G. Richards '40
Ronald L. Richmond '57
Henry L. Richter '52
Ralph S. Riffenburgh '44
Denton D. Riggs '52
David B. Ritchie '80
Haywood J. Robinson '74
Martin S. Robinson '48
Jonathan D. Romney '67
Theodore W. Rose '49
Bruce S. Rosen '79
Karen E. Ross '93
John P. Rostykus '86
Bruce L. Rothschild '63
Robert M. Ruby '61
Carl F. Ruoff, Jr. '93
Charles W. Rush, Jr. '47
Frank J. Ryan '69
James M. Sagawa '63
John D. Sahr '84
G. Thomas Sallee '62
Thomas P. Santoro '77
Loveriza A. Sarmiento '82
Paul C. Schaffner '37
Harold Schiller '35
Don Schmid '51
Barbara E. Schneider '85
Edward A. Schroeder, IV '70
Kenneth D. Schureman '42
Bernard P. Schweitzer '55
Albert Schweizer '74
Eugene L. Scott '45
Oliver Seely, Jr. '61
M. Carol Seidel '77
Mitchell H. Seidman '58
Robert F. Sensibaugh '46
Sheueling Chang Shantz '85
Murali Sharma '93
Robert P. Sharp '34
Lawrence H. Shirley '69
Michael D. Shumway '98
William H. Simons '49

Virgil J. Sims, Jr. '50
Donald W. Sinclair '45
R. Vencil Skarda, Jr. '66
Col. John T. Slankas USAF(ret) '79
Michelin A. Sloneker '94
Adrian C. Smith, Jr. '70
Clay T. Smith '38
Paul L. Smith '39
Philip H. Smith '44
Robert M. Spencer '72
Stephen J. Spicklemire '90
Robert E. Spitzer '65
Norton Starr '58
Michael S. Stefanko '70
Stanford G. Stiles '47
William A. Stinger '68
Thomas H. Stix '48
Patricia J. Stoddard '82
Robert G. Stokely '48
Chester R. Stone '45
William C. Straka '62
Donald L. Strange '72
Donald R. Street '66
Jay Wm. Stuart, Jr. '46
Laurence J. Stuppy '35
Derek M. Surka '94
Eliza L. Sutton '84
Edwin P. Swatek, III '65
Donald H. Sweet '45
Joseph D. Tajnai '64
Theodore D. Tarbell '76
Charles F. Thomas '35
John R. Thomas '57
Louis Thomas '98
William F. Tivol '62
Robert C. Tookey '45
James Tuedio '44
Laura E. Verhoff '96
Charles I. Vinsonhaler '64
William B. Voss '38
Thomas Vrebalovich '48
Ernest Wade '43
Jephtha A. Wade, Jr. '47
Richard A. Wade '81
Edwin P. Wald '41
Keh-Chung Wang '79
Run-Han Wang '75
Jessica A. Warren '93
S. S. Watson '65
Samuel E. Watson, Jr. '38
Merle G. Waugh '45
Robert W. Wayman '40
Joseph W. Wechsler '48
Philip S. Wessels '44
Hugh S. West '45
Raymond C. Wheeler '45
Warren G. Whiting '50
Quentin R. Whitmore '47
James C. Whitney '64
Albert C. Whittlesey '62
Robert D. Wieting '74
Doyle E. Wilcox '44
Lawrence E. Wilferth, Jr. '45
George M. Wilhelm '45
Larry G. Williams '68
Richard R. Williams '66
Stanley G. Williamson '60
Robert W. Wilson '30
Robert L. Winchester '48
Robert C. Wise '46
Greg L. Wojcik '77
Stanley T. Wolfberg '38
Kenneth W. Wood '61
Frank A. Woodward '52
John D. Woolverton '89
David C. Wooten '67
Herbert M. Worcester '40
Harvey W. Wright, Jr. '48
Frank A. Yank '45
Paul C. Yankauskas '47
Joel W. Young '63
Ming L. Yu '74
Robert Zacharias '48
Leon W. Zelby '57



Leni and John Honsaker '55, PhD '65, of Alberta, Canada, pose on the south rim of Arizona's Canyon de Chelly during last fall's Alumni Association travel/study trip to the American southwest. Behind them is the sheer sandstone drop of the canyon, and to the left is the landmark known as Spider Rock.

SICILY—A MIRROR OF MEDITERRANEAN HISTORY
TRAVEL/STUDY PROGRAM, SEPTEMBER 5–16, 2001

Join the Caltech Alumni Association this September on an exciting journey to Sicily, an island that mirrors the history of the whole Mediterranean basin. Factions from the Greeks to Garibaldi have fought over, occupied, or colonized Sicily, and each has left its unique mark. The ravages of war have long since disappeared, but the fruits of past civilizations remain in Sicily's many spectacular archaeological sites.

Accompanied by a Caltech professor, we will tour the entire island of Sicily and its fascinating cities, including Palermo, Agrigento, Syracuse, Catania, and Taormina. We will take in the extraordinary landscape and vistas, and dine on a variety of Sicilian specialties as we discover the island's compelling history, blend of cultures, and architectural heritage. Our excursions will include trips to investigate some of Europe's finest archaeological sites, dating to the Greek and Roman periods, as well as visits to vineyards and olive groves, medieval towns and seaside villages, and of course Mount Etna, one of the world's most active volcanoes! An optional posttrip extension will be available to those who wish to extend their trip and visit Pompeii, Paestum, Ravello, Capri, and the Amalfi Coast.

Our study leader for this adventure will be Warren Brown, assistant professor of history at Caltech and a specialist in the history of medieval

Europe. In addition to his academic publications, Brown has published a series of historical books for young adults. His broad historical expertise will illuminate the cultural legacies of



Mount Etna provides the backdrop for the well-preserved ruins of this ancient Greek amphitheater, one of the many attractions of Sicily's seacoast city of Taormina.

the diverse populations that have lived in the region.

For pricing information, and to ensure that you receive a trip brochure and other information, call 626/395-6592 or e-mail travel@alumni.caltech.edu. Or complete and mail the coupon below to Caltech Alumni Travel, Mail Code 1-97, Pasadena, CA 91125. *Preference for participation in alumni travel programs is given to Association members in good standing, and their guests.*

Please send me more information about the
Alumni Association's September 2001 Travel/Study Program to Sicily.

Name _____

Class Year _____

Mailing Address _____

Daytime phone _____ E-mail address _____

Join the Caltech Alumni Association
for
QED

This new play by Peter Parnell is inspired by a book by Ralph Leighton and the writings of Richard Feynman. Alan Alda will play Feynman, the gifted Caltech physicist who became a household word when he solved the mystery of the space shuttle *Challenger* disaster. Join us for a glimpse into the workings of this unique personality!

Thursday, April 19
8 p.m.

Mark Taper Forum—Performing Arts Center of Los Angeles County
135 North Grand Avenue, Los Angeles

The Alumni Association has reserved a limited number of tickets for this performance at a group discount. Deadline to order tickets: *March 8*. Refunds are dependent on resale of tickets. Performance parking: \$7, payable upon arrival at the Music Center.

Questions? Please call 626/395-6592 or e-mail arlana@alumni.caltech.edu.

QED
Thursday, April 19, 2001

Name _____ Class Year _____

I would like _____ tickets in Section A at \$33 each.

I would like _____ tickets in Section B at \$27 each

____ If tickets are no longer available in the section I selected, I will accept tickets in the alternate section at an additional cost or refund, whichever applies.

Total enclosed for tickets _____

____ I will pick up my tickets at the Alumni Association, 345 South Hill, Pasadena. (Available from April 4, Monday through Friday, 8 a.m.—noon, and 1–5 p.m.)

or

____ For an additional \$4, please send my order by certified mail to the address indicated below. (Tickets will be mailed two weeks prior to the event.)

Postage _____

Total Enclosed _____

Address _____

Daytime Phone _____ E-mail Address _____

Please return form, with a check payable to the Caltech Alumni Association, to
Caltech Alumni Association
Mail Code 1-97
Pasadena, CA 91125

NOTICE OF HEARING

A hearing to determine the fairness of the conversion of the Caltech Alumni Association from a nonprofit mutual benefit corporation to a nonprofit public benefit corporation will be held by the California Department of Corporations as follows:

DATE: March 21, 2001
TIME: 11 a.m.
PLACE: 320 West 4th Street, Suite 750, Los Angeles, CA 90013-1105

Anyone who wishes to be heard on this matter may attend. Inquiries should be addressed to: Steve Kiang, Esq., 213/576-7577.



ALUMNI PROGRAM WILL EXPLORE MOUNTAINS, DESERT, OF SOUTHERN CALIFORNIA

The great Salton depression is the dynamic and dramatic product of the rifting of Southern California between the North American and the Pacific tectonic plates. The western wall of this rift will be explored next spring in a five-day, four-night travel/study trip led by W. M. Keck Foundation Professor for Resource Geology, Emeritus, Lee Silver, PhD '55.

From our base in the luxurious La Casa del Zorro oasis, near Borrego Springs, in the great Anza-Borrego Desert State Park, we will first examine the geology of the Coachella Valley—the leading edge of the active continental rift—from the heights of Mount San Jacinto. A remarkable aerial tramway will carry us to 8,000 feet above the valley in new, rotating trams, the largest in the world. We will then travel to Borrego Springs along the desert floor, examining features of the modern Salton Sea and ancient Lake

Cahuilla, which preceded it.

From La Casa del Zorro we will make a number of day and half-day trips, some with four-wheel drive vehicles into the desert and the adjacent Peninsular Ranges, examining the geologic consequences of the rift development. The contrasts of low desert gardens and palm oases with mountain pines and lakes reflect the great topographic effects of this singular geologic boundary.

La Casa del Zorro is a magnificent establishment with great cuisine, swimming pools, spas, and other sports facilities—and there will be time for recreation and relaxation! Total cost of the trip is \$1325 per person (double occupancy) or \$1695 (single occupancy), and covers all group activities, including all meals, accommodations, gratuities, and travel by motor coach from and to Caltech.

To take advantage of this opportunity to explore the richly varied geology, history, and landscape of this unique desert region of Southern California, please complete and return the form below with your deposit. Confirmation of reservations will be mailed out. *Priority will be given to Alumni Association members.* Final payment is due by April 6, 2001.

Refunds (less a cancellation fee of \$50 per person) will be given for cancellations made by April 1, 2001. Refunds following that date will be dependent on recoverable costs.

If you have questions about this program, please contact Arlana Silver at 626/395-8363, or e-mail travel@alumni.caltech.edu.

Desert to the Mountains
Caltech Alumni Association Travel/Study Program, June 8–12, 2001

I/we would like to participate in this program. Enclosed is a deposit of \$_____ (\$200 per person), representing ____ participants.

Name _____ Class Year _____

Spouse/Guest _____

Home Address _____

Daytime Phone _____ E-mail _____

If available I would prefer a ____Nonsmoking room ____ Smoking room

____ I am traveling alone and am interested in sharing a room with another participant. (Sharing cannot be guaranteed.)

____ Please arrange a single room for me.

Make checks payable to the Caltech Alumni Association and return to
Desert to the Mountains Travel/Study Program
Caltech Alumni Association, 1-97, Pasadena, CA 91125

ALUMNI ASSOCIATION FINANCIAL STATEMENT

ALUMNI ASSOCIATION
CALIFORNIA INSTITUTE OF TECHNOLOGY
Pasadena, California

STATEMENT OF FINANCIAL POSITION
September 30, 2000

ASSETS

Cash and Cash Equivalents:	
Cash on Hand and in Bank	\$ 49,124
Charles Schwab Money Market Fund	45,552
T. Rowe Price Prime Reserve Fund	48,491
Caltech Employees Federal Credit Union	38,963
C.I.T. Consolidated Portfolio - Special Investment Fund	146,319
Total Cash and Cash Equivalents	\$ 328,449
Investments:	
C.I.T. Consolidated Portfolio - Life Memberships	3,933,454
eProNet	5,000
Accounts Receivable	9,455
Investment Income Receivable	73,360
Inventories	6,027
Deferred Expenses	6,597
Postage Deposit	1,243
Computer and Other Equipment	17,594
Accumulated Depreciation	(17,594)
TOTAL ASSETS	\$ 4,363,585

LIABILITIES

Accounts Payable	\$ 62,945
Deferred Income:	
Investment Income from C.I.T. Consolidated Portfolio - Life Memberships	153,183
TOTAL LIABILITIES	\$ 216,128

NET ASSETS

Life Membership Reserve	\$ 3,933,454
Reserve for Directory	41,678
Surplus	172,325
TOTAL NET ASSETS	\$ 4,147,457
TOTAL LIABILITIES AND NET ASSETS	\$ 4,363,585

STATEMENT OF ACTIVITIES
Fiscal Year Ended September 30, 2000

REVENUES

Dues of Annual Members	\$ 79,280
Investment Income:	
C.I.T. Consolidated Portfolio:	
Life Memberships	151,642
Special Investment Fund	24,974
Charles Schwab Money Market Fund	2,390
T. Rowe Price Prime Reserve Fund	2,657
Caltech Employees Federal Credit Union	1,987
Checking Account	568
Net Income of Travel Study Programs	27,912
Sale of Legends and Other	1,834
TOTAL REVENUES	\$ 293,244

EXPENSES

Publications	\$ 37,721
Net Income of Continuing Education	1,837
Net Expenses of Local Programs	2,151
Net Expenses of Seminar Day	5,560
Net Expenses of Class Reunions	19,336
Net Expenses of Chapter Programs	7,959
Student/Faculty/Alumni Relations	28,803
Undergraduate Admissions Support	37,484
Administration	70,439
Membership	9,431
Directory	20,000
Communications	10,042
TOTAL EXPENSES	\$ 250,763

REVENUE (OVER) EXPENSES \$ 42,481

Surplus, September 30, 1999 \$ 129,844

Surplus, September 30, 2000 \$ 172,325

INDEPENDENT AUDITOR'S REPORT

Board of Directors
Alumni Association
California Institute of Technology

I have audited the accompanying statement of financial position of the Alumni Association California Institute of Technology as of September 30, 2000 and the related statement of activities, changes in life membership reserve, reserve for directory, investment in equipment, surplus and cash flows for the year then ended. These financial statements are the responsibility of the Association's Board of Directors. My responsibility is to express an opinion on these statements based on my audit.

I conducted my audit in accordance with generally accepted auditing standards. Those standards require that I plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by the management, as well as evaluating the overall financial statement presentation. I believe that my audit provides a reasonable basis for my opinion.

In my opinion, the financial statements referred to above present fairly in all material respects, the financial position of the Alumni Association California Institute of Technology as of September 30, 2000 and the results of its operations and its cash flow for the year then ended in conformity with generally accepted accounting principles.

Fred T. Arjani
Certified Public Accountant

January 19, 2001

Personal

1942
RICHARD HORTON COX, MS '46, of Honolulu, Hawaii, reports that he is repainting the backside of his three-story house, and that in September he went on an Elder Hostel hiking and rafting adventure in northern Georgia.

1943
ROBERT LAURANCE BENNETT, owner-operator of Bennett Vineyards in Calistoga, California, writes that he has gotten a seven-year replant for five acres of his vineyard infected with phylloxera. He is also volunteering at the Bale Grist Mill Historic Park. In a high-tech world, he says, "it is fun to work on machinery with wooden gears and fabric belts powered by a water wheel." He adds that the water wheel is the largest in the country.

1952
EDWIN KURTZ, PhD, of Flagstaff, Arizona, reports that "after 33 years on the editorial board, I continue for the National Wildlife Federation and its publication *Ranger Rick Nature Magazine*, which helps young children's awareness and knowledge of the environment."

1959
CHARLES RANUNKEL, MS, has been selected to receive the *Chevalier de la Légion d'Honneur* (Knight of the Legion of Honor), awarded to him for his "contribution to the reinforcement of the economic presence of France in Hungary." After serving as an executive in U.S. companies such as Honeywell and Schlumberger, he went on to found his own French-based consulting firm and succeeded in closing in favor of French investors an important share of acquisition negotiations in Hungary, making France the third-largest foreign investor in that country.

1962
JOHN E. FISCHER, MS, is one of the leaders of a University of Pennsylvania team whose research "indicates that carbon nanotubes, filaments of pure carbon less than one ten-thousandth the width of a human hair, may be the best heat-conducting material . . . known." Details of their research were published in the September 8 issue of *Science*.

1966
H. GERARD "GERRY" SCHWARTZ, JR., PhD, is the new president-elect of the American Society of Civil Engineers, assuming this office in October at the society's annual conference and the presidency itself in October 2001. A member of the society for more than 40 years, he has served as vice president from Zone III, as director from District 16, and on the board of directors of the Civil Engineering Research Foundation. He has also served as president of the St. Louis Section and on a number of national ASCE committees, in several cases as chair. He has spent his entire career with Sverdrup Civil, Inc., starting as a design engineer and currently serving as chairman.

1979
ELIZABETH "BETSY" HOFFMAN, PhD, has been named the 20th president of the University of Colorado. She previously had been provost and vice chancellor for academic affairs at the University of Illinois at Chicago (UIC), where she held concurrent academic appointments as professor of economics, history, politi-

The "father of earthquake engineering," George Housner, PhD '41, was honored by friends and colleagues on his 90th birthday. Housner pioneered the fields of earthquake engineering design, both as a Caltech grad student and, since 1945, as a professor.



cal science, psychology and professor in the Institute of Government and Public Affairs. The author or coauthor of three books and many articles, she had held academic or administrative positions at several universities before joining

1986
PARKER MACCREADY, MS, assistant professor of physical oceanography at the University of Washington, lives near Olympia with his wife, Molly, and children Jillian, six, and Henry, one. He received his PhD from UW in 1991, and he specializes in coastal and estuarine circulation, especially flow over complex topography.

1987
EMILY ANN CARTER, PhD, a professor in UCLA's department of chemistry and biochemistry, writes that she was elected a fellow of the American Physical Society in 1998 and of the American Association for the Advancement of Science in 2000. She was also a visiting scholar with Harvard's physics department in 1999.

1989
WILLIAM J. HEALEY, PhD, of Washington, D.C., reports that he has left private law practice to become vice president and intellectual property counsel at Lotus Biochemical Corporation, in Blacksburg, Virginia. On New Year's,

he performed a commitment ceremony with life partner Tom Seidenspinner in Key West. He adds, "Daughters Auden, 12; Adrienne, 9; Maren, 7; and Sloane, 4, are all doing great!"

1990
Paul D. Tripodi II, MS, received a law degree from UCLA and is currently a patent attorney with the Los Angeles firm Pretty & Schroeder. "Recently," he writes, "I was involved in a patent lawsuit between the Durel Corporation and Osram Sylvania. This lawsuit involved patents relating to electroluminescent phosphors and lamps, which are widely used for lighting in consumer electronics, such as watches, pagers, and cell phones, among others. In the lawsuit between Durel and Sylvania, a Phoenix jury was asked to decide who had the predominant rights to this technology and to assess damages against the loser. I am happy to report that my firm was successful in obtaining a \$49.9 million judgment on behalf of our client, the Durel Corporation. As you can imagine, this is one of the largest verdicts ever awarded in a patent case."

1994
TODD RICHMOND, PhD, has been named managing director of the Annenberg Center for Communication at USC, "where he will further

the Center's mission to attract and fund innovative research initiatives in the fields of communications theory and practice." Formerly a chemistry professor at the Claremont Colleges, he has sought from early in his career to incorporate multimedia and Web technologies into his teaching. He did his postdoctoral research in protein engineering at UC San Francisco.

1997
DAVID A. BEAM, PhD, has joined the Stamford, Connecticut, executive search firm Taylor/Rodgers & Associates as the managing director in charge of diversity practice. He previously had served as a carrier-based naval flight officer and mission commander, and as a physics instructor at the U.S. Naval Academy; as a staff member at JPL; as a consultant; and, prior to joining Taylor/Rodgers & Associates, as a senior manager with Sikorsky Aircraft Corporation.

National Medals . . . from page 9

before the team's migration. Fung then went to work "clarifying" blood circulation in the lungs. He worked with colleagues Sid Sobin and Mike Yen and students to propose, test, and establish a sheet-flow theory of the lung. The theory "recognizes the fact that the capillary blood vessels of the lung are not like a maze of tubes at all," says Fung, but more "like an underground garage" with a flexible roof and columns. When this theory is applied to all parts of the lung, he says, it explains and predicts many clinical observations, including those on pulmonary blood flow, edema, and hypertension. It explains why a car's airbag, impacting the lung as a supersonic shock, poses a threat to the lungs of young children in particular.

Again branching out, Fung studied the heart, the intestines, high blood pressure, tissue remodeling under stress, and tissue engineering, among other things. "Applying analytical methods of mechanics to the study of biological tissues, he contributed new concepts in the field of biomechanics," according to the NSF citation. "Results of his work are helping to solve important biomedical problems."

An author of classic texts in both his fields, the interdisciplinarian has the rare honor of having been elected to membership in the National Academy of Engineering, the NAS, and the NAS Institute of Medicine.

Baldeschieler and Fung bring to 47 the number of Caltech faculty members and alumni who have received the National Medal of Science. A total of 386 individuals have won the medal since it was first awarded to Theodore von Kármán in 1962.

When Fung comments on the advances of bioengineers, he could be speaking of the entire scientific enterprise. As he puts it, "I am sure that the sum total of our effort will benefit mankind."

— HILLARY BHASKARAN

KEEP US INFORMED THROUGH THE CALTECH PERSONALS!

Keep us informed so we can keep your fellow alums informed! If you're a Caltech graduate who received your MS or PhD from the Institute, or an undergrad alum who doesn't yet have a Class Notes agent, the *Personals* is the place to let us know what you've been doing. Send us news about you and your family, about a new job, promotion, awards—anything you'd like to see printed in the *Personals* section of *Caltech News*.

Return this coupon and any additional materials to
Caltech News, 1-71, Pasadena, CA 91125.

Name _____

Degree(s) and year(s) _____

Address _____

_____ New address? _____

Day phone _____ E-mail _____

NEWS _____

Classes

Notes

1942
John McClain

I checked the class response on a recent visit to the Alumni House and found nothing. Nada. Zero. Zip. This, of course, means that I shouldn't have anything for a column, since my crystal ball is not working either. But, I do have a few items to mention.

In July, Esther and I joined the alumni group that toured France. As usual the trip was outstanding. The food was delicious, the accommodations superb, and the wine plentiful and good. The two professors—Diana Barkan of Caltech, and Jed Buchwald (who is moving from MIT to Caltech)—gave interesting and educational lectures, and the two Tech students—Julia Salas and Deborah Eason (whose trip was made possible by a special fund)—were delightful.

This past October, we had the opportunity to participate in an alumni tour of JPL. What goes on there every day is mind-boggling. Our thanks to Patsy Gougeon and Arlana Silver of the Alumni Association for putting this trip together.

A final word. The class of '42 has given great support to the Alumni Fund in the past, and the campaign for 2000/2001 is under way, so please respond. Alumni support contributes to the reputation of the school.

And, if you want to hear what everybody else is doing, *start* them cards and letters coming!

1949
Hugh Carter
hcarter1@home.com

Bernard Rudin writes, "I retired from IBM in early 1998, after 48 years of work in the computing industry. My last post was in Austin, Texas, where I contributed to the project that placed the large supercomputer at Livermore Labs. My wife, Jean, also retired from her career in real estate, and we decided to move back to California to be near our two daughters and their families and, especially, to our granddaughter, now five. We settled in Roseville, near Sacramento, which puts us within two hours of the family and gives us a climate we like. I am busy with research in mathematics, which should lead to a publication or two before long. I'm also working on a book about the management of scientists and engineers, which occupied a good deal of my industrial career. I will teach math in the local universities on an as-needed basis. My e-mail address is brudin@attglobal.net. Correspondence and visitors are welcome."

Bill Simons writes, "Stan Barnes and I worked together in a summer job for General Petroleum at Lost Hills, California, and I can remember a daily 'weigh-in' ritual in which we engaged. When I was a pound heavier than he was, he declared to all within hearing that I was 'flabby, a pound overweight.' When things went the other way, I was 'scrawny by a pound.' I could never quite achieve the perfect level of fitness." Barnes clarifies that it was a mutual contest in which whoever was flabby accused the other one of being scrawny. Bill and Stan competed in the 880, and, as seniors, they ran first and second in the Conference finals. A talented frosh from Occidental (John Barnes, no relation to Stan) gave them a good run for the money and went on to win the NCAA finals as a senior. Semiretired, Stan does "occasional consulting" and has become an active collector

of early California maps pinpointing the irrigation systems that built the state. The earliest dates to 1885. Both Bill and Stan travel; Stan recently completed a rail and trail trip in Africa.

Howard Cohan sends word that he has a new e-mail address—howselma@aol.com.

Dick Morgan recalls, "As a student, I always looked forward to the lectures by Linus Pauling. In one lecture Pauling admitted that he did not know why mercury was a liquid when all of the adjacent elements in the periodic table, with only a few atoms different, were solids. Have we uncovered this mystery?" Dick continues working on his book about the Apollo moon flights. He would appreciate a call or e-mail if you have information. He can be reached at 818/346-7240.

Clayton Englar sends his e-mail address (clayccmt@aol.com) and this news: "Those of us in the San Francisco north and east bay area get together every other month for lunch." Contact Clayton if you wish to join this group or would like their roster.

1951
Edwin Matzner
eamc@compuserve.com

Robert Madden (glumlord@aol.com) came to Caltech after serving in the Navy. After graduating, he worked at IBM on global navigation, high-level and toss bombing, and determining vertical reference. In 1955, he went to Radio Corporation of America, where he was involved with fighter bomber interaction, the strategic ground environment and fire control problems, wave mechanics and radar design, and studies of the destruction of incoming ballistic missiles. His work at the Institute for Naval Studies (1960–1966) and Institute for Defense Analysis (1966–1968) included deep ocean sound surveillance, tracking of warships and submarines, convoy systems simulation, and antisubmarine warfare. Finally, he spent 26 years at the National Security Agency on signals intelligence and cryptography, covert operations, and problems within the general intelligence community. He retired in 1994.

Ritch Newman retired in 1986 after a career at Dow Chemical in plastic fabrication research and economic analysis. Since then, he has done some consulting and worked on a groundwater cleanup project with his youngest son. Ritch has kept his mind active through the state of Michigan's Retired Engineer Technical Assistance Program since it began five years ago. This program sends retired engineers, scientists, and managers to assist firms in reducing waste and improving efficiency. The consultants have fun and get modest pay, and the clients get a free assessment and sometimes impressive savings. Ritch and his family live in the woods on a small lake, and enjoy sea kayaking and Elderhosteling in the U.S. and abroad.

Fred Baily (baily@capital.net) earned an MS in mechanical engineering from Union College in Schenectady, and started with General Electric in 1951, with his first assignment involving the B-52 bomber. He spent the bulk of his career in the large-steam turbine business. He holds a number of patents, and has written many articles and made presentations around the world. In the mid-1950s he took a three-year Navy tour of duty and continued in the reserves, retiring as a lieutenant commander. Fred officially retired in 1994 but continues consulting with GE half-time. He and his wife of 43 years, Sheelagh, live in a 19th-century

farmhouse in Saratoga County, New York. They sometimes winter in Arizona, California, or the Virgin Islands, and recently have traveled to Europe, Egypt, and China. They have two sons: Douglas, a firefighter and emergency medical technician who lives with his wife and two children in Oregon; and Stuart, a U.S. Border Patrol agent near San Diego. Fred serves on the board of directors of a local Planned Parenthood affiliate and the Schenectady Museum.

Jim Ibers (ibers@chem.nwu.edu) received his PhD in chemistry at Caltech in 1954. He was a National Science Foundation postdoc at CSIRO, Melbourne, Australia, from 1954 to 1955. He then joined Shell Development Company in Emeryville, California, before moving to Brookhaven National Laboratory in Upton, New York, in 1961. In 1965 he became a professor of chemistry at Northwestern University. Jim and Joyce (whom he married at graduation time) still happily live in Evanston, Illinois, a great community contiguous with Chicago. Jim has no immediate plans to retire, since chemistry is so much fun. He and Joyce have two children and three grandchildren. Their daughter, Jill '81, received her BS with honors.

Peter Mason (pmason@alumni.caltech.edu) is happily married to Doreen, née Kroeger—former Caltech Health Center nursing director and member of the Caltech Y board (where they met). Peter has also been active in the Alumni Association, serving as president from 1994 to 1995. His first wife, Bernadette, died in 1991 after a satisfying 38-year marriage, including five children and five grandchildren. Most of Peter's career was at JPL, with a 10-year break while obtaining his PhD (he may be the only PhD in Caltech history whose wife and children witnessed his graduation). He then spent five years on the Caltech EE faculty; worked with Bill Whitney at JPL, researching superconductive devices and superfluids in zero gravity; and spent two years at NASA in Washington, monitoring Apollo experiments. He retired in 1997, but to avoid boredom, works several hours a week with a Caltech professor, flying telescopes to observe the cosmic microwave background. It's been fascinating so far, including stints at Caltech's submillimeter telescope in Hawaii and in Antarctica. The results were published in the media in April.

Richard Brewer (rgbrewer@worldnet.att.net) earned a PhD at UC Berkeley in 1958. He taught at Harvard and UCLA before joining IBM's San Jose research division in 1963. He was an IBM Fellow from 1973 to 1994 and has been a consulting professor of applied physics at Stanford since 1977. He is a fellow of the APS and OSA, a National Academy of Sciences member, and has received the Franklin Institute's Michelson Gold Medal, Caltech's Distinguished Alumni Award, and the Optical Society of America's Townes Silver Medal. He married Lillian Magidow in 1954, and they raised three children—Laurence, Emily, and Cathy. In his free time, he grows magnolias and improves his Italian conversation. In 1998, he endowed Caltech's Brewer Prize, given each year for the most promising freshman in Physics 11.

Hiroshi Kamei (Tk0426@aol.com) retired from Rockwell International in 1987 after almost 37 years in the autonetics division. Throughout his career, he was involved with inertial navigation, applying his expertise in heat transfer to guidance electronics and electromechanical equipment. Presently, Hiroshi passes the time of day playing golf, tending his vegetable garden, sitting on the boards of various civic and Nisei organizations, and overseeing his rollover IRA (hoping to have it

last longer than he does). He and his wife, Tami, have four offspring: Susan, an attorney; Robert, the director of pediatrics residency at UCSF; Alan '81, an executive at Solelectron; and John, a manager at Boeing. The four, collectively, have three sons and three daughters.

John "Jack" Dyer (jwdyer@flash.net) retired in 1994 from 30 exciting years in space exploration (e.g., Pioneer missions to Jupiter and Saturn and investigation of Venus) with NASA's Ames Research Center. Ill health drove him from industry to the government employment "soft life" three years after Caltech. Thanks to acceptance in a medical research protocol, and to a superbly supportive wife, Jack has outlived and outworked early predictions by multiples. Now he and his wife enjoy active travel, the outdoors, and their three children and six grandchildren, 0 through 8 years.

David Durham (Davidur@aol.com) took a job with the U.S. Geological Survey immediately after graduation and stuck with it for 32 years, working mainly in California and Nevada. David married after graduation and has also stayed with that ever since. He and his wife have two children and one grandchild. After retiring, he produced *California's Geographic Names*, a book describing some 50,000 places in the state (details on Amazon.com). David now manages to keep busy with another book of an entirely different sort.

After graduation, Ray Sjodin (Ray1mar2@aol.com) received a doctorate in biophysics and physiology from UC Berkeley in 1955, followed by NIH fellowships at University College, London, and Uppsala University, Sweden. Upon returning, Ray began a professorship in biophysics at the University of Maryland School of Medicine in Baltimore, chairing the department for six years before retiring in 1994. His research focused on muscle cell ion transport, about which he wrote a book, *Transport in Skeletal Muscle*. Ray was also a summer investigator at the Marine Biological Laboratory at Woods Hole, MA, from 1961 to 1986, working on ion transport in squid giant axons, and was active for years in the Biophysical Society. He now spends his time auditing grad courses in physics and math. He and his wife of many years, Marion, enjoy traveling, most recently revisiting Florence. Their two daughters are both married and have given them three grandchildren.

George Trilling (trilling@mh1.lbl.gov) obtained a Caltech PhD in 1955. After a Caltech research fellowship, he became an assistant professor at the University of Michigan, then returned to California in 1960 as a UC Berkeley professor and Lawrence Berkeley National Laboratory senior scientist. He chaired the physics department at Cal and headed the physics division and was associate director of Lawrence Berkeley, before becoming a professor emeritus in 1994. George has held several fellowships over the years, including a Fulbright (Ecole Polytechnique, Paris, 1956–57); NSF Senior Postdoctoral (CERN, 1966–67); and Guggenheim (CERN, 1973–74). He is an American Academy of Arts and Sciences and American Physical Society fellow, and a National Academy of Sciences member. He and his wife, married since 1955, live in Berkeley and have three children and two grandchildren.

Kent Wanlass (gordon@wirelessound.com) met and married Jeanne Hazlett in San Francisco and they have two children, Gordon and Gigi. After leaving Caltech, Kent received an MS and PhD from Stanford and Berkeley, and worked for Boeing and NASA. During the Korean War, he herded around aging experimental aircraft at Edwards Air Force Base. After

the war, the family started a systems company, now Ford Aeroneutronic, in Newport Beach. Kent presently works for his son, a Stanford EE, in the company, without possibility of advancement. He has one aside for Rod Smythe: “What is all this talk about sailplanes, FAA ratings, and Diamond C altitudes? I can still take you in the air with a canceled medical. How about a blimp race? Big Warm Licks, Buster.” (Kent’s Newport Beach household is run by a dog named Buster.)

Bob Waid and Juanita were married in Pasadena in 1951, and have four daughters and eight grandchildren. Bob did research on cavitation, cavity flows, and hydrofoils in the Hydro Lab on campus, followed by five years at JPL operating the supersonic wind tunnels. He became a professional mechanical engineer in California, and taught an evening review course for the Engineer-in-Training exam. Bob joined Lockheed in Sunnyvale in 1959, retiring in 1993. He helped develop underwater launch capability for submarine-launched ballistic missiles (Polaris, Poseidon, and Trident), and was involved in research and development of oil spill cleanup devices, deep-sea data buoys, ocean thermal energy conversion plants, and surface and underwater vehicles. Bob was active in the American Society of Mechanical Engineers and received the ASME Centennial Medal in 1980.

After graduation, Robert Adler (rmadler@inconnect.com) earned his MS at USC, served for two years in the Army Medical Corps, and worked for six with the Potash Corporation in Whittier, California. Married since 1963, Bob earned his PhD at UC Riverside and taught for several years at Bethel College, a Mennonite liberal arts college in Kansas. In 1971 he and his wife moved to Salt Lake City, where he worked for the agency that became OSHA, developing the quality-control program for the agency’s laboratory. Bob underwent a successful kidney transplant in 1984 and retired in 1995.

Dean Blanchard (thedean1@flash.net) began his post-Caltech career with Caltex Oil, moving first to Sumatra, then to the Philippines. Drafted in 1954, he served for two years in Panama with the Interamerican Coast & Geodetic Survey, and, after more than a decade working for aerospace and missile defense companies, he joined a large project in Libya for Bechtel Corporation. In 1970, he went to work for Garrett Corporation (aka Allied-Signal, which later merged with Honeywell) in the plant engineering department. In 1989, Dean retired as manager of plant engineering and maintenance for the automotive plant in Torrance and now tries to keep in shape by playing some tennis and golf. Dean’s wife, his love for 33 years, died this past year. Time to formulate new hopes and dreams.

Olly Gardner (ogardner@olypen.com) has been retired for the past 20 years after managing a few manufacturing companies. The first eight years of retirement were spent sailing his 47-foot sailboat up and down the coasts of North America and around the Caribbean. Since then, he and his wife, Vicky, have been traveling to foreign lands and living happily in Port Ludlow, Washington, where they are involved in many local activities. They enjoy their son and family in Florida and their daughter and family (including a super grandson) in New Zealand. Olly is looking forward to seeing old friends at the 50th reunion.

Jon Goerke (goerke@itsa.ucsf.edu) feels that his post-Caltech life has been mostly fun. After attending Yale Medical School, he graduated in 1955 with both an MD and a wonderful, talented wife, Betty. Jon was drafted (as a captain, fortunately) into the army for

service in Germany in 1957–1959, before spending a year of residency at the Boston VA Hospital and two years doing research at the Harvard Biophysical Lab. He and Betty then moved to the Bay Area, where Jon did two years of training in cardiology at UCSF, before joining, first, the UCSF department of medicine and then the department of physiology, eventually becoming a full professor. He has been there ever since, researching the function of lung surfactant and teaching physiology to medical and pharmacy students. He and Betty have three wonderful kids, Jon, Kate, and Robin, and three great step-grandchildren. Jon and Betty’s many activities include book groups, dancing, fly fishing, bicycling, and programming their computers. If anyone wants to join Jon in bicycling down to Pasadena from San Francisco for the reunion, please let him know.

Eager to get out into the world after graduation, Carroll Lindholm (crl@deltanet.com) joined Motorola in Chicago and received an MS in EE from the Illinois Institute of Technology before moving back to California to work for Motorola in Riverside. He landed at JPL during the Sputnik era, working on the radio inertial guidance system for the Jupiter missile. From there he went to RAND in Santa Monica, where he worked in communications systems and satellites until—badly bitten by the computer bug—he sought hardware and software design work anywhere he could find it. After 12 years at RAND, he became chief engineer and then VP at Mobilfone of Los Angeles, a paging and mobile telephone company. He lectured at UCLA in the engineering extension program for 12 years and later did the same for USC. Since 1981, Carroll and his second wife, Janet, have frequently enjoyed Caltech alumni trips with Robert Sharp ’34, MS ’35, visiting Alaska, Hawaii, Yellowstone, etc. Now retired from the company he founded, Automation Designs, Carroll (K6PRB) is a member of two amateur radio clubs, in Los Angeles and Idyllwild—where he and Janet have a mountain cabin—and still spends significant time with computers (he has six).

Howard Mower (Mower@iarc.fr) earned his PhD from Caltech and then spent seven years in Wilmington, Delaware, studying biological nitrogen fixation for DuPont. In 1962, he moved to Honolulu to accept a position at the University of Hawaii Medical School, where he has now been teaching and doing research for 38 years. He spent the last three summers in Lyons, France, working with the International Agency for Research on Cancer, which is a unit of the World Health Organization, and where all conversation is in English—otherwise he wouldn’t be there! He and Nancy have been married for 45 years, and have four children and eight grandchildren.

1955
John Andelin
jandelin@cais.com

If you’ve faithfully read these columns, you know that Carl Bowin, Woods Hole Oceanographic Institution, was the first in the world to put a scientific computer (used for real-time gravity measurements) on a ship. He also initiated the use of GPS for plate tectonic studies and published papers about structures on the earth, the moon, Venus, and Mars (the most recent in *Reviews of Geophysics*, just last year). He’s now producing 30-minute mini-documentaries for public-access TV in his series, *Science and Cape Cod*. The eighth episode, “Truth,” compares the differences in how scientists, mathematicians, lawyers, and clergy identify

truth. (Carl—what about politicians? Or ordinary folk?) He still brags about “a great wife, Jean, four terrific kids, and now four grandchildren!”

Equally busy, Ed Seidman absorbs himself in his family, chases around art shows in Wisconsin, and still works at Abbott—a validation project “to make the FDA happy” and reviewing and interpreting their rules. Think about the rewards one might get from work. Here’s Ed’s list: a couple of Y2K T-shirts, a jacket, and assorted polo shirts, with appropriate company logos. More appropriate for the record books, the Optimists awarded him a Governor’s Certificate of Merit for his many years of service.

Can’t top that. Guess I’ll quit.

1994
Bryce Elliott
bryce.elliott@halliburton.com

This is Bryce Elliott, checking in from Houston, Republic of Texas. I am taking over from Won Bang as the collector of the class notes for ’94. I am happy to report that my wife, Suzanne, and I had our first child, Andrew, in August. I am currently in the control systems department at Kellogg Brown & Root, and I am working part-time on a master’s degree in chemical engineering at the University of Houston.

Charles Halloran apparently didn’t get enough of Pasadena during school, so he is back, working for the law firm of Christie, Parker and Hale, LLP, an intellectual property boutique. He specializes in intellectual property law, particularly patent, trademark, and trade-secret litigation.

Nina Cardoza’s activities can be found in the 1993 class notes, as she and her husband are generally bundled together. Ryan Naone earned his PhD in materials science from UC Santa Barbara in the spring of this year; he is currently working for a start-up near Boulder, Colorado, called Cielo Communications. It manufactures fiber-optic components for telecommunications, and Ryan is charged with designing semiconductor lasers and fabricating them.

Joe Long is on the research faculty at Georgia Tech, doing telecommunications research and working part-time on a PhD. Keith Schneider expects to graduate from the University of Rochester in time to apply for academic jobs in the fall; he is in the brain and cognitive sciences department, using brain imaging (MRI) and psychophysics techniques to study the human visual system, visual attention, and motion perception.

Craig Smith finished his PhD at UC Berkeley in May and is now an assistant professor of mechanical engineering at Texas A&M; he is mixing golf, ultimate Frisbee, and tennis in with trying to find a sponsor for control and dynamic systems research. Hans Hornstein is in San Diego working for Xerago, a small consulting/training/web back-end company. He is involved with a local fat-acceptance organization—the Southern California Size-Acceptance Coalition—and also a sci-fi fandom group, Darkstar, and also writes for *In the Crease*, covering the San Diego Gulls hockey team. If you want your exploits included in the next class notes, e-mail me at one or more of these addresses: bryce.elliott@halliburton.com; behemoth@alumni.caltech.edu; or bryceandsuzy@netzero.net.

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 in the *Personals* section.

Name_____

Option and Degree Year_____New address?_____

Address_____

Day Phone_____E-mail_____

NEWS_____

1925

PAUL E. NOLL, of Port Hueneme, California, on April 15; he was 96. He worked for Columbia Geneva Steel and United States Steel, retiring from the latter in 1963. A photographer, he was a member of the Photographic Society of America and a recipient of many of its awards, and a past president of the society's Port Hueneme chapter. He was also an avid traveler. Predeceased in 1967 by Ruth, his wife of more than 40 years, he is survived by his daughter, Nancy Pegrum, and by three grandchildren and four great-grandchildren.

1930

L. SPRAGUE DE CAMP, of Plano, Texas, on November 6; he was 92. A prolific writer, he was the author of some 100 science-fiction, fantasy, and historical novels, as well as biographies, popular-science books, and numerous short stories and essays. His best-known work was perhaps *Lost Darkness Fall*, originally published in 1941, in which a 20th-century academic, thrown back in time to 6th-century Rome, tries to change history and prevent the arrival of the Dark Ages. De Camp's writing featured a wit that led to his work being described as "often closer to P. G. Wodehouse than J. R. R. Tolkien," and his awards included the Tolkien award for life work in fantasy, the Grand Master Nebula Award from the Science Fiction Writers of America, and the World Fantasy Award for Lifetime Achievement. After receiving a master's degree in aeronautical engineering from the Stevens Institute of Technology, he worked as a technical editor, but then had his first science-fiction story accepted by *Astounding Stories* in 1937. Finding writing "much more enjoyable than working," he only on occasion thereafter turned to his talents as a patent expert, publicity writer, and educator to supplement his income; he also served as a lieutenant commander in the U.S. Navy during World War II. His nonfiction works included a study of the Scopes evolution trial and *The Evolution of Naval Weapons*, a textbook published by the U.S. government. He also wrote scores of radio scripts for the Voice of America. Predeceased in April by his wife and frequent editor and collaborator, Catherine Cook de Camp, he is survived by two sons, a brother, three grandchildren, and two great-grandchildren.

1933

ARNOLD M. KUETHE, PhD, of Ann Arbor, Michigan, on April 12; he was 94. Initially a research engineer with the Guggenheim Airship Institute and then a lecturer at New York University, he joined the faculty at the University of Michigan in 1941 as an associate professor. Two years later he became full professor, and in 1953 he was named the Pawlowski Professor of Aeronautical Engineering. In 1965 the University of Michigan faculty honored him with the Henry J. Russell Lectureship. Kuethe's principle area of investigation was aerodynamic turbulence in the flow of gases around various structures, and his book, *Foundations of Aerodynamics*, now in its fifth edition, continues to be used. He is survived by his wife, Helen, and many friends and family.

DWIGHT O. NORTH, PhD, of Princeton, New Jersey, on June 26, 1998; he was 88. A pioneer in the development of noise theory and the author of a seminal paper analyzing signal-to-noise ratio, he began working for RCA Laboratories in 1934, becoming a member of RCA's technical staff when it was established in 1942, and working on radar at MIT's Radiation Lab

during World War II. He retired from RCA in 1974. A member of the American Physical Society and the Institute of Electrical and Electronics Engineers, he was cited with a Golden Jubilee Award by the IEEE's Information Theory Society, for his invention of a matched filter, and he was also a recipient of the David Sarnoff Outstanding Achievement Award. He is survived by his wife, Evelyn; two sons, Karl and Phillip; and four grandchildren.

1935

JOHN R. GELZER, of Upper Arlington, Ohio, on July 24; he was 85. Decorated jointly in 1947 by the War and Navy Departments for his contributions to the development during World War II of the first heat-seeking missile, he was throughout his 50-year electronics career the inventor of numerous groundbreaking devices in the automotive, medical-equipment, space, and factory-automation industries, becoming the holder of more than 60 patents. He founded Gelzer Systems Company (now ATS Ohio) in 1968 and ran it until 1983, when he turned the operation over to his daughter Helen. In 1984, at the age of 70, he founded GPAX International with his daughter Kit, remaining active as a consultant for many years. He was also a member of the Columbus Investors' Council and a charter member of the Dublin Presbyterian Church. He is survived by Helen, his wife of nearly 60 years; four daughters, Jay, Barbara, Helen, and Kit; and three grandsons.

1937

BRUCE W. DUNBAR, of Fallbrook, California, on August 3; he was 84. After graduating from Caltech he went to work as a technologist at Shell Oil Company's Wilmington refinery. He also served in Shell's San Francisco office, and, in 1948, he moved to the company's head office in New York City. From 1950 to 1952, during the Korean War, he held the position of chief of the refining technology branch of the Petroleum Administration for Defense, helping procure a rapid increase in the production of aviation gasoline, for which service he was honored by the National Petroleum Council. Returning to Shell, he was named chief technologist at the company's new refinery at Anacortes, Washington. In 1960 he became manager of manufacturing operations at the New York office, and, in 1971, he became head of the company's national employee occupational, health, and safety programs in Houston. He retired after 41 years to Fallbrook, taking up avocado ranching, and traveling worldwide with his family. He is survived by a son, Robert; three daughters, Carol Tether, Lauren Keough, and Debra Dunbar; and three grandsons. Marguerite, his wife of 62 years, died in November.

1938

FREDERIC T. FUETSCH, MS, of Bloomfield, Connecticut, on October 4, 1999. "He had enjoyed a very full and interesting career as a consulting engineer in the aircraft industry." He is survived by his wife, Elizabeth.

1940

ROBERT RAYMOND BERLOT, of Los Angeles, on December 20, 1999; he was 82. He began his career in aeronautical and engineering R&D at Douglas Aircraft. Later, he received an MA in physics from UCLA. He then joined Northrop, where he headed the Planetary Physics and Chemistry Laboratory. He was a lecturer in the field of fluid mechanics in the general engineering department at USC; he held a patent related to the measurement of hypersonic flight data and was the author of many technical papers. He is survived by his wife, Elizabeth; his daughter, Catherine; and his son, John.

CLIFFORD C. BURTON, of Santa Fe, New Mexico, on July 8. After a stint with Texaco in New York, he joined C F Braun & Co in 1948. In 1954 he joined the home office of C F Braun in Southern California, rising to the presidency in 1971 before leaving in 1979 to help launch PCL-Braun-Simons Ltd. in Calgary, Alberta; he served as president and CEO until his retirement in 1981. In Santa Fe, he and his wife, Marcella, contributed to the arts and to civic affairs. Both were active as well in the Caltech community for more than half a century; longtime members of the Caltech Associates, they had gone on many Associates trips, including to Antarctica, the Galapagos Islands, Spain, and Morocco. Burton received a Distinguished Alumni Award in 1974. He is survived by Marcella and by his son, Tom '69.

1944

ROSS A. BUCHANAN, of Fullerton, California, on October 16, 1999. He is survived by his wife, Marion; his daughter, Joan; his son, David; and five grandchildren.

HAROLD V. CURCI, of Oceanside, California, on April 26; he was 77. He was a retired aerospace engineer, and he had served in the U.S. Navy. He is survived by Frances, his wife of 35 years; two daughters, Babette Allcock and Camille King; two sons, Mark and Bruce; a stepdaughter, Kathy Herrington; a stepson, O'Brien Fraser; his mother, Henrietta; two brothers, Raymond and Shurl; and 15 grandchildren and five great-grandchildren.

JOHN J. WRITT, MS, of Lawrence, Kansas, on April 15; he was 82. He served with the U.S. Navy in the South Pacific during World War II. He then spent 38 years with Goodyear Tire and Rubber Company, in Akron, Ohio, retiring in 1984 as manager of its international energy products department. An avid golfer, he was a member of the Alvamar Country Club in Lawrence, where he had moved in 1987. He is survived by Ruth, his wife of 57 years; a daughter, Patricia; a son, John Edward; two sisters, Maryann Foreman and Lavina Haelele; and five grandchildren and two great-grandchildren.

1946

JOSÉ C. CHAVEZ, of West Covina, California, on May 18. He is survived by his wife, Maria; five sons, Carlos, Mike, Tom, Gabe, and Bob; five daughters, Linda Meehan, Patti McIntyre, Barbara Devore, Torie Alvarez, and Tina Leal; four stepchildren, Laura Finger, Carolyn Caldera, Larry Caldera, and Cathy Lew; five sisters, Socorro Flores, Gloria LeNoue, Teresa Baca, Olga Paramo, and Esther Macias; and 29 grandchildren.

DONALD J. HASS, MS '48, of Las Vegas, on April 28; he was 75. He had retired from the civil service in 1992. He had also obtained master's degrees in theology and divinity from Fuller Theological Seminary and served as an Air Force chaplain for eight years. He is survived by June Louise, his wife of 52 years, four children, three grandchildren, two great-granddaughters, and a sister and two brothers.

1948

DONALD J. STERLING JR., Ex, of Portland, Oregon, on March 27; he was 72. He received his bachelor's degree in history from Princeton in 1948, and went to work for the *Denver Post* as a reporter that same year. He joined the *Oregon Journal* in 1952, becoming its editor in 1972. When the *Journal* was combined with the *Oregonian* in 1982, he moved over as assistant to the publisher, holding that position until his retirement in 1992. In 1956 he was named

a Nieman Scholar at Harvard in journalism. A leader in community and area affairs, he was a former president of the City Club of Portland, active with the Ecumenical Ministries of Oregon, and a former president of the Oregon Historical Society, among other involvements, and he received the City Club's highest award for outstanding service to the community. He is survived by his wife, Julie; two sons, John and Bill; a daughter, Sarah; and a sister, Harriet.

ROBERT ZACHARIAS, MS '49, of Avila Beach, California, on July 25.

1949

WARREN P. WATERS, Encinitas, California, on July 17; he was 77. A recipient of the Bronze Star and Purple Heart during World War II—having lost a leg in combat—he worked at Los Alamos the summers of 1947 and 1948 and the year 1949–50. He received his MS in physics from USC in 1954 and completed all coursework towards a PhD. A physicist and electrical engineer, he worked for Hughes Aircraft, Texas Instruments, Rockwell International, and Western Digital, and his pioneering work in semiconductors included the design of circuits enabling smooth lunar landings by several Surveyor spacecraft. The designer of numerous patented inventions and the author of many articles, he received the Bausch and Lomb Honorary Science Award. He was a senior life member of the IEEE and a member of the American Physical Society and the Electrochemical Society, among other organizations. He is survived by Lois, his wife of nearly 49 years; three daughters, Andrea Rosney, Carolyn Broe, and Elizabeth Jennings; and five grandchildren.

1955

NELSON N. HOFFMAN, MS, of Palm City, Florida, on May 13, 1999; he was 67. After graduating from Caltech he was employed by the Philco-Ford Corporation in its Philadelphia Research Laboratories, where he was one of the early investigators in the field of millimeter-wave radars. He was also a key participant in the design and development of millimeter-wave crystal mixers. In 1969 he joined the United Technologies Corporation, where he worked in the United Technologies Research Center in Hartford, Connecticut, and later for United Technologies Optical Systems in West Palm Beach, Florida. He did research there on a wide variety of lasers and laser-based systems for radar and airspeed sensing applications and was granted several patents. A lifelong sailor, he enjoyed competitive Lightning-class racing in both the New Jersey and Connecticut areas. He retired to Palm City in 1992. He was a member of the Optical Society of America and the IEEE, as well as Phi Kappa Phi, Tau Beta Pi, and Eta Kappa Nu. He is survived by Helen, his wife of 37 years.

JAMES F. REX, Eng, of San Francisco, on March 25, 1999; he was 75. A graduate of the U.S. Naval Academy and a naval aviator, he planned to continue working for his PhD after receiving his aeronautical engineer's degree from Caltech for his work in spray combustion. However, in a move that fulfilled his childhood dream of becoming a military pilot, the Navy assigned him to an electronic-countermeasures squadron in Japan. He continued as an aviator both abroad and in the United States, and then transferred to Treasure Island, in the Bay Area, where he rose to second in command. He retired with the rank of captain. He is survived by two daughters, Deborah and Sheila; a son, James; and three grandchildren.

1956

RICHARD H. CLARK, of Durham, California, on August 1; he was 69. His career at Caltech was interrupted by service in the U.S. Army from 1953 to 1955—during which he was assigned to the 388th Engineering Company in Korea—but he then returned to complete his BS in geology. He worked for Shell Oil and later established his own mining exploration company. In the 1960s he sold the company and began teaching at San Marino High School, and in 1969 he moved to Chico, where he taught in Pleasant Valley High School's science department. In 1970 he joined the faculty at newly established Butte College, where he taught full-time in its natural-science department for 27 years. He formally retired in 1997, but continued to teach part-time until his death. He is survived by his wife, Linda.

1971

ROGER J. JONES, of Bellevue, Washington, on November 15; he was 50. After graduating from Caltech, he went on to earn his PhD in behavioral biology from Harvard. He was an assistant research professor at the University of Washington Medical School, and he worked for many years at Boeing, where he was company service manager for CAD-CAM computing at the time of his death from internal injuries received in a mountain-biking accident. Besides being an avid drummer and mountain biker, he was active in civic affairs and the Church of Jesus Christ of Latter-day Saints. He is survived by Wendy, his wife of 25 years; two daughters, Jennifer and Julie; a son, Steven; and his sister, Marjorie Heyborne.

1977

BEN S. FREISER, PhD, of West Lafayette, Indiana, on December 30, 1997; he was 46. He joined the Purdue University staff in 1976, becoming professor of chemistry in 1985. He was head of the analytical division from 1984 to 1988. The recipient of Caltech's 1976 Herbert Newby McCoy Award for his outstanding contributions to chemistry as a graduate student, and of Purdue's 1983 Frank Martin Award for teaching excellence in chemistry, his research awards include the American Chemical Society Pure Chemistry Award, the Fresenius Award, the Backeland Award, the Purdue Sigma Xi Award, and the Purdue Herbert Newby McCoy Award. He is survived by his wife, Helene; two daughters, Monika and Melissa; his parents, Henry and Edith Freiser; a brother, Manny; and a sister, Deborah.

COLD AS ICE

The back-page poster shows a cluster of dendritic (tree-like) snow crystals grown in the lab of Caltech Professor of Physics Ken Libbrecht '80. The cluster, measuring approximately 1 cm across, formed along a string hanging in a vapor diffusion chamber. The temperature varies along the string, and the large dendrites only grow where the temperature is near minus 15 centigrade. By observing growth under changing conditions of temperature, supersaturation, and chemical composition of the gas in which the crystals form, Libbrecht's lab is working to understand the detailed physics of snow crystal growth. To view the team's Snow Crystal Gallery, complete with instructions on how to grow your own snow crystal, visit <http://www.its.caltech.edu/~atomic/snowcrystals/designer/designer.htm>.

JEFFREY SCOT BANKS 1958–2000



Jeffrey Scot Banks, with his wife, Shannon (foreground), and friends at a humanities and social sciences picnic last year.

Professor of Political Science Jeffrey Scot Banks, PhD '86, died of complications of a bone marrow transplant on December 21 at the City of Hope Hospital in Duarte, California. He was 42.

Banks taught and conducted research in the field of political theory. He made significant contributions to such areas as strategic voting, bargaining, coalition formation, and jury behavior, and was coauthor (with David Austen-Smith of Northwestern University) of the book *Positive Political Theory*.

Banks had taught at Caltech since 1997, and since 1999 had served as executive officer for the social sciences. He earned his BA at UCLA in 1982, and after receiving his Caltech PhD was professor of political science and economics at the University of Rochester from 1986 to 1997. He was also a visiting professor at the University of Arizona and the University of Michigan.

The recipient of several National Science Foundation (NSF) grants, Banks was also an NSF Presidential Young Investigator. He received the National Academy of Sciences Award for Scientific Reviewing in 1996 and was elected a fellow of the Econometric Society in 1996.

As a researcher, Banks's contributions to political science were characterized by the use of formal mathematical and deductive methods to model political behavior. As executive officer for social science, his dry wit, easygoing nature, and imperturbable demeanor, as well as his knowledge of voting theory, helped smooth many meetings. He was widely known and respected by his students as an excellent but demanding teacher who always gave freely of his time and his ideas.

Banks is survived by his wife, Shannon; sons Bryan, 15, and Daniel, 13; mother Sandra Jacobs; father James Banks; and brothers Michael and Timothy.

BRADFORD STURTEVANT 1933–2000

Bradford "Brad" Sturtevant, PhD '60, the Hans W. Liepmann Professor of Aeronautics, died on October 19, after battling pancreatic cancer for several months. He was 67 years old.

Sturtevant, who spent nearly 45 years at Caltech, as both a student and a professor, specialized in the study of nonsteady gasdynamics shock waves, which includes research into such varied phenomena as volcanic eruptions, explosions, and engine noise from motorcycles and airplanes.

Sturtevant earned his BE from Yale in 1955, before coming to Caltech, where his great-uncle, biologist Alfred Sturtevant, had carried out pioneering genetics work in collaboration with Thomas Hunt Morgan. He joined the Institute's faculty as a research fellow in 1960, and was appointed assistant professor in 1962 and full professor in 1971.

Sturtevant served as executive officer for aeronautics from 1972 to 1976, and took a leading role in consolidating the campus's engineering libraries into the Sherman Fairchild Library.

An enthusiastic swimmer, hiker, and sailor, he actively promoted athletics at Caltech and served terms as the chair and secretary-treasurer of the Southern California Intercollegiate Athletic Conference. Sturtevant himself won numerous awards for his swimming, particularly in the open ocean.

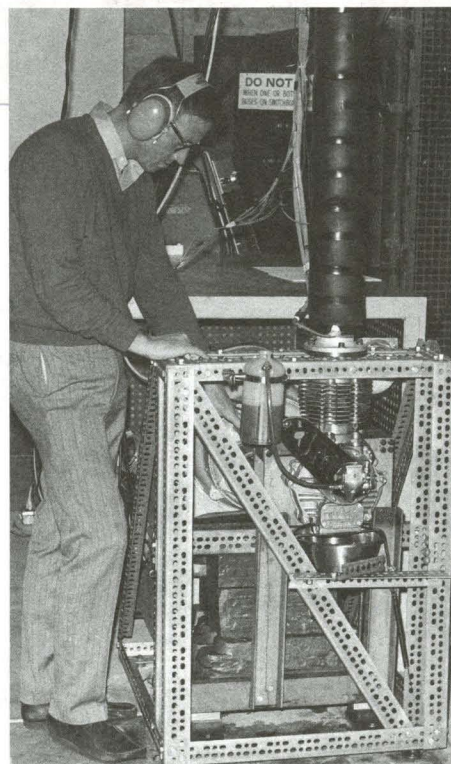
HAROLD WAYLAND 1909–2000

J. Harold Wayland, PhD '37, professor of engineering science, emeritus, died October 10 after suffering a heart attack two days earlier. He was 91.

Wayland was internationally known for his research on blood flow and for pioneering the development and use of quantitative measurements at the microscopic level to investigate fundamental life processes. He also carried out research on the impact of diabetes mellitus on blood flow and on the molecular exchanges between blood and tissues that occur at the level of the smallest vessels in the body.

A native of Idaho, Wayland earned his bachelor's degree in physics and mathematics in 1931 at the University of Idaho, before coming to Caltech for his PhD. Following his graduation in 1937, he taught at the University of Redlands until 1941, when he joined the Naval Ordnance Laboratory in Washington, D.C., as head of the magnetic model section for the degaussing of ships.

He conducted torpedo research as a War Research Fellow at Caltech in 1944 and 1945 and joined the Institute's faculty in 1949 after spend-



Brad Sturtevant in his lab in the 1970s.

Sturtevant was active in many professional organizations, including the American Physical Society, the Acoustical Society of America, the Society of Automotive Engineers, and the academic honorary group Sigma Xi. He served as a visiting instructor and lecturer at institutions around the world, including Harvard and the department of aerospace engineering, Indian Institute of Science in Bangalore.

Sturtevant is survived by his wife, Carol; his father, Julian; daughter Victoria; grandsons Jonathan and Thomas Armstrong; and his sister, Ann Sturtevant Ormsby.



Harold Wayland, at work in the 1970s.

ing four years with the U.S. Navy's Underwater Ordnance Division. He was appointed professor of applied mechanics in 1957, became professor of engineering science in 1963, and retired as professor emeritus in 1979.

A former chairman of the medical sciences section of the American Association for the Advancement of Science, Wayland was awarded the Malpighi Award in 1988 from the European Society for Microcirculation.



C a l t e c h **N e w s**