California Institute of Technology Pasadena, California 91125

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CaltechNews

Volume 39, Number 1



Tsunami Saga

Wretched Writing Rewarded

Criminal Calculation on Campus



and

\$1 Billion and Beyond

California Institute of Technology Volume 39, Number 2005

Caltech News







ON THE COVER

The Institute shows off its *film noir* side in this glimpse of the campus at sunrise, with California Boulevard in the foreground and the San Gabriel mountains to the northeast. A story on Caltech's role in inspiring and scripting a new crimeadventure TV series, set in Los Angeles and partially filmed on campus, begins on page 12. Paper-Hack Writer

I2

Dave Zobel '84 explains how even a Caltech education couldn't stop him from becoming an award-winning Awful Author.

IO Prospecting in Pala The Associates go gem hunting with Caltech mineralogist George Rossman.

Crime and Computation A new, Caltech-inspired network television series fights crime by the *Numb3rs*.

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Up Front

AFTER THE TSUNAMI

The signs of catastrophe became evident slowly. On a boat heading up the Indian Ocean toward Banda Aceh along the northwest coast of Sumatra, Caltech senior research assistant John Galetzka first noticed a hospital ship anchored in the ocean. Next he saw a few enormous U.S. Navy ships off shore and many helicopters shuttling back and forth to the mainland. Looking toward land, he began to see an unnatural brown band snaking along the entire coastline. The sienna-colored strip seemed to rise as high as a small building, and as the boat got closer to shore, he could make out masses of broken trees and branches, chunks of concrete, pieces of lumber, twisted metal, plastic detritus, clothing, and other debris clogging the beach. Maps were useless. The December 26 tsunami that struck western Sumatra following the 9.0 megathrust earthquake in the region had dramatically altered the island's shoreline. To navigate, the captain of the boat ferrying

Galetzka and three colleagues from the Indonesian Institute of Sciences followed a local fishing vessel up a river to the center of the city. It was February 6, six weeks after the disaster that had killed an estimated 300,000 people in several countries bordering the Indian Ocean, but by the look of the battered landscape, the calamity could have hap-



pened the day before.

The devastation continued for a mile or two up the river, Galetzka says. "Everything was completely flattened except for a few very strong structures. You could see dump trucks and bulldozers clearing rubble of all sorts. Smoke was rising from burning piles of rubble. People were salvaging metal. There were others in haz-mat suits. It was a surreal scene." Like the scientists, the ship's crew was mesmerized by the destruction, and when the ship ran aground on a sand bar, Galerzka noticed that the captain was still steering, too transfixed by what he was seeing to notice that his ship was stuck.

Galetzka had been sent to Aceh Province by his colleague Kerry Sieh, Caltech's Sharp Professor of Geology,



Caltech senior research assistant John Galetzka traveled to Banda Aceh six weeks after the earthquake and tsunami leveled the city. At a government operations center he noticed a sign that said that 950 bodies had been discovered that day. "It was a shell of a city," he says.

who for more than 10 years has been traveling to Indonesia to study the Sumatran plate boundary, with its prominent and highly active megathrust where three plates—the Australian, Eurasian, and Indian Ocean plates overlap and whose rupture had produced the quake and monstrous wave. Just last summer, Sieh had been farther south in Sumatra, installing Global Positioning System (GPS) instruments to measure local ground movements, and educating villagers about how to prepare for a major earthquake and tsunami, which he had warned could come in their lifetimes. To the locals, the geologist's warnings now seemed prophetic.

On January 1, Sieh returned to Indonesia for six weeks to get a firsthand look at the geologic effects of the earth-

Continued on page 9 . . .

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Campaign Crosses \$1 Billion Mark



Left: As Caltech researchers see campaign contributions rise, "We are encouraged to dream," says Anneila Sargent, Rosen Professor of Astronomy and director of Caltech's Owens Valley Radio Observatory.

On January 25, the campus community gathered in Caltech's Beckman Auditorium for an important announcement: With three years to go, the Institute's benefactors have already provided \$1 billion in new gifts and pledges toward the \$1.4 billion "There's only one. Caltech" campaign goal.

Opening the afternoon event's program, campaign chairman Wally Weisman remarked, "The last time I addressed the Institute community was at the public launch of the campaign in Ocrober 2002. We have been working hard and wanted to give you an update on the campaign's progress."

Progress indeed. For example, \$45 million has been raised for professorial chairs, including the Richard and Barbara Rosenberg Professorship of History and Social Science, now occupied by Philip Hoffman; \$20 million for graduate fellowships, such as the Oringer Fellowship in Information Science and Technology (see article, page 8); and \$72 million for research initiatives, including the Engineering Immunity project funded by the Skirball Foundation. Likewise, the campaign's first capital project—the restoration of Dabney Hall—is already complete; renovation of the South Houses is scheduled to begin in summer 2005; and Caltech is moving forward with plans for a number of new facilities, among them the Cahill Center for Astronomy and Astrophysics; the Walter and Leonore Annenberg Center for Information Science and Technology; and the Campus Center, which received its lead gift from Benjamin Rosen '54, who stepped down earlier this year as chair of the Caltech Board of Trustees. Moreover, \$158 million of the \$300 million committed by the Gordon and Betty Moore



student houses, to launch the Global Environmental Science initiative, to support the Information Science and Technology research centers, and to build much-needed endowment.

Anneila Sargent, PhD '77, the Rosen Professor of Astronomy and director of Caltech's Owens Valley Radio Observatory, told the audience how the campaign is supporting faculty research initiatives. "We are encouraged to dream," she remarked. And benefactors are helping her in realizing her own dream, the Combined Array for Research in Millimeter-wave Astronomy (CARMA). Once complete, CARMA will provide instrumentation an order of magnitude more powerful than present radio-telescope arrays, making it possible to conduct studies that will directly address some of the most important questions in astrophysics today.

Providing a student's perspective, Caltech sophomore Ben Golub commented on the impact that philanthropy has already had on his academic career. As the 2004 beneficiary of the Associates SURF (Summer Undergraduate Research Fellowships) award, Ben had the opportunity to pursue a summer research project in pure mathematics. "At the deepest level, you are funding a feeling of freedom, and a knowledge of the nature of science at its best," he said.

Finally, Caltech benefactor Carl Larson '52 explained that for him and his wife, Shirley, supporting the Institute is an investment. In return, he said, "we are allowed to feel we're part of this great institution." Like a good investment, "you give us back more than we put in."

Before closing the afternoon event,

there's only one.caltech

THE CAMPAIGN

Caltech president David Baltimore announced the generous gift responsible for propelling the campaign over the \$1 billion threshold. "Just as Gordon and Betty Moore's commitment launched us into this campaign effort, another Caltech couple is responsible for pushing us over the \$1 billion mark," Baltimore remarked. "I am pleased to announce that Warren and Katharine Schlinger have graciously increased their campaign pledge to \$20 million. Their additional commitment provides the lead gift toward a new facility for Chemistry and Chemical Engineering." The new building will be named the Warren and Katharine Schlinger Laboratory for Chemistry and Chemical Engineering, in recognition of their generosity. Schlinger is a threetime Institute graduate (BS '44, MS '46, PhD '49).

"You may be wondering just how you raise \$1 billion," Baltimore said. "One donor, one dollar at a time." From building Caltech's endowment to funding vital capital projects, support raised through the campaign will enable faculty, research staff, and students to carry out the Institute's ambitious research and academic objectives.

"Reaching \$1 billion is a significant achievement," Baltimore said. "But there is much more to do. Funds raised through the campaign will fuel the next generation of Caltech luminaries who are working to answer the most intriguing questions of our time. Every gift and pledge to our campaign helps us reach our goal."

VANNESSA DODSON

For more information on ways to support the Institute's strategic priorities, please call 1-877-CALTECH or visit http://one.caltech.edu.



Foundation has been designated to campaign objectives that include the Thirty Meter Telescope (TMT), new nanoscience initiatives, and the Tectonics Observatory. In all, grant funding for eight projects has already been approved through the Moore Foundation's campaign commitment.

"But we're not finished," Weisman said. To reach Caltech's financial goal, nearly \$400 million more must be raised during the next three years. Funding is still needed to fulfill projects like the improvement of the



From bottom left: Campaign chair Wally Weisman joins Warren and Katharine Schlinger, whose \$20 million pledge pushed Caltech's campaign over the \$1 billion threshold. Sophomore Ben Golub tells the audience that his 2004 SURF award provided him time to explore pure mathematics. Above: When complete, the campaign-supported Thirty Meter Telescope will provide powerful new tools for the study of astrophysics. Campus Update

NEW U.S. STAMP HONORS RICHARD FEYNMAN

ALUMNA SANDRA TSING LOH TO SPEAK AT CALTECH COMMENCEMENT

Writet/petformet/musician/humorist and Caltech graduate Sandta Tsing Loh '83 will present the address at Caltech's 111th commencement ceremony on June 10 on Beckman Mall on the Pasadena campus.

Loh, who graduated from Caltech with a BS in physics, was awarded the Institute's highest honor, the Distinguished Alumni Award, in 2001. She is the first alumna to be commencement speaker.

"Caltech is a wonderfully unique academic institution whose legacy, aside from outstanding achievement in science, is a rich cultural history with more than its share of quirks and surprises, and I intend my comments to fully reflect that," said Loh.



During her varied career, Loh has done national and local radio commentary, written and performed one-woman shows, composed and performed music for film, created some traffic-stopping performance art, and written for the *New York Times*, *Elle*, *Harper's Bazaar*, and *Vogue*. She recently was named a contributing editor to the *Atlantic Monthly*.

She has a national monthly radio commentary on the public radio business program *Marketplace*, and has been a regular commentator on NPR's *Morning Edition*. She also does a weekly commentary, *The Loh Life*, that has aired in Southern California on KPCC 89.3 FM since 2004. She joined the station last year after the accidental airing of a profanity that she expected would be cut by her recording engineer in a commentary on KCRW radio in Santa Monica. She was fired by KCRW management, and the resulting flurry of media coverage kept the story in the public eye for several months. Although the station offered to rehire her, she chose to work at KPCC instead.

Apropos of that experience, Loh acted in a recent stage performance, *Fired*, a series of comic monologues about losing a job, at the Skirball Cultural Center in Los Angeles. It is being produced by LA Theater Works and will air on NPR at a later date.

Loh has also been a solo performer and writer. Her latest one-woman show was Sugar Plum Fairy, performed in Los Angeles, San Jose, and Seattle in 2004. She is the author of the books A Year in Van Nuys, Depth Takes a Holiday: Essays

from Lesser Los Angeles, Aliens in America, and If You Lived Here, You'd Be Home By Now. The last is based on Loh's solo off-Broadway show that ran at Second Stage

Theatre in New York in summer 1996. She returned to Second Stage for *Bad Sex* with Bud Kemp, another solo show, in 1998. Loh has also been featured at the U.S. Comedy Arts Festival im Aspen, the HBO New Writers Project, and on NPR's *This American Life*. She also has appeared on tour performing *Aliens in America*, her darkly comic semi-autobiographical tale of growing up middle-class Chinese-German in Southern California.

Loh began her career in the mid-1980s as a performance artist, whose piano concert "spectacles" were covered by *People*, the *Wall Street Journal*, and CNN, among other media outlets. "Spontaneous Demographics" (September 1987) featured Loh playing a piano aboard a flatbed truck in a concert for rush hour commuters on the Harbor Freeway in Los Angeles. Nearly 1,000 people attended "Night of the Grunion" (Match 1989), in which Loh and the Topanga Symphony played a concerto for spawning fish on a Malibu beach at midnight. Among the people who will appear on new postage stamps in 2005 will be the late Caltech professor Richatd Feynman. The Nobel Ptize–winning physicist is scheduled to appear in a May rollout of the "American Scientists" stamp series shown at right. The series also includes the likenesses of geneticist Barbara

McClintock (top left), mathematician John von Neumann (bottom left), and thermodynamicist Josiah Willard Gibbs (above Feynman). McClintock spent 1931–1933 at Caltech as a postdoc in the biology division.

The citation that accompanies the Feynman stamp reads "Richard P. Feynman (1918–1988) developed a new formulation of quantum theory



based, in part, on diagrams he invented to help him visualize the dynamics of atomic particles. In 1965, this noted theoretical physicist, enthusiastic educator and amateur artist was awarded the Nobel Prize in Physics."

Each year, the U.S. Postal Service receives thousands of stamp suggestions, from which a few dozen stamps

Continued on page 9 . . .

FLUID DYNAMICS EXPERT WINS FEYNMAN PRIZE

Caltech professor Chris Brennen has many pleasant memories of the Freshman Camp trips he used to make to Catalina Island with another Frosh Camp regular, physicist Richard Feynman. "I remember him sitting on the low stone wall at Camp

Fox surrounded by maybe a hundred frosh," says Brennen, "all enthralled by his stories of particle physics, or lock-picking, or Mayan hieroglyphics, or whatever."

Now, two decades later and 16 years after the death of his friend, the Caltech professor of mechanical engineering has been named winner of the annual Feynman Prize, Caltech's most prestigious teaching honor, which is awarded each year to a faculty member for "exceptional ability, creativity, and innovation in both laboratory and classroom instruction."

Brennen is known to the student body as an especially lucid and helpful teacher of fluid mechanics, a field that was important to the Wright brothers as they built their first airplane, and that is just as important today to the designers of Mars landers. Brennen himself has done research on one of the components of the space

shuttle's engine, and his interests generally center on the still-imperfectly understood issues of complex multiphase and multicomponent flows.

"These are a ubiquitous part of almost all existing and projected energy systems,

Her recent musical forays have included composing and performing on the score for Jessica Yu's 1997 Oscar-winning documentary *Breathing Lessons: The Life and Work* of Mark O'Brien, and scoring Yu's documentary *The Living Museum* on HBO.

Loh's family has been associated with Caltech for many years. Her father, Eugene Loh, received his PhD from the Institute in 1954, and her brother, Eugene, earned his Caltech BS in 1980.

"We are pleased that Sandra is the first alumna to give the Caltech commencement address," said Caltech president David Baltimore. "She will no doubt bring a refreshing sense of humor and unique perspective to the ceremony. As a graduate of the Institute she can relate to the great accomplishments of our students when they reach this milestone. The talent and perseverance that helped her graduate from Caltech has obviously held her in good stead in her diverse and successful career."

For a Caltech News feature on Sandra Tsing Loh, published in spring, 2000, check out http://pr.caltech.edu/periodicals/CaltechNews/articles/v34/loh.html.

JILL PERRY

yet our understanding of these flows is inadequate for many engineering purposes," he writes on his Web site.

Brennen's research also involves acoustics, and one of the students who nominated him for the Feynman Prize recalls the professor's leading a student field trip to the Mojave Desert, where the group hiked up several miles to the top of a sand dune, then slid back down to induce the dunes to "boom."

"Professor Brennen's enthusiasm, even in hundred-degree-plus temperatures, was an inspiration," the student said. "His scientific intuition taught me a lot."

Another student applauded Brennen's "perpetual enthusiasm that kept me interested through unavoidably dry material." Yet another temarked that he'll never forget Brennen, "dressed up in a suit, riding a bike into the swimming pool at the year-end swimming party—that is, the year-end real-life experimental laboratory in fluid mechanics, where the undergrads compete in underwater bicycle racing."

The bicycle stunt is a Brennen original, but is very much in keeping with the spirit and enthusiasm of the Nobel laureate for whom the Feynman Prize is named. Brennen says he is thrilled to be associated with Feynman through the award.

"I regard myself as being truly blessed to have lived out my career at this unique institution, to have interacted with such inspiring colleagues, and to have had the privilege of teaching the best students in the world," he says.

ROBERT TINDOL

KENT KRESA NAMED TO CHAIR CALTECH BOARD OF TRUSTEES



Kent Kresa, chairman emeritus of Northrop Grumman Corporation, has been named the new chairman of the Caltech Board of Trustees, succeeding Ben Rosen '54, chairman emeritus of Compaq Computer Corporation, who has served as Trustee Chair since 2001. Kresa, whose term as chairman commenced in February, has been a member of the Caltech Board of Trustees since 1994.

Kresa was chairman of the board and CEO of Northrop Grumman from 1990 to 2003. He served as the company's president from 1987 to 2001. Before joining Northrop, he served

Continued on page 22 . . .

DEAN CURRIE NAMED VICE PRESIDENT FOR BUSINESS AND FINANCE



FOR BILL IWAN, LEADING TSUNAMI INVESTIGATION IS "PERSONAL"

When Bill Iwan '57, PhD '61, professor of applied mechanics, emeritus, was asked last January to lead an international investigation into the causes and effects of the December 26 earthquake and tsunami that devastated the Indian Ocean region, he didn't have to think long before taking on the assignment. Although he's been involved in several earthquake investigations before, this one was personal.

Shortly after the catastrophe occurred, he heard that the son and daughter-in-law of a colleague and longtime friend in Japan had been vacationing at a beach resort in Thailand when the tsunami struck, and were missing. They were never found, and it was eventually presumed that they died in the tsunami.

"The father is an earthquake specialist, and they were Japanese residents," says Iwan. "What flashed through my mind is that the Japanese know about tsunamis. Japan has a warning system." If they were on or near rhe beach, they should have known that the tsunami was coming when the ocean started receding dramatically. Iwan says that he can't understand why they didn't head inland to safety, assuming that they saw the water level drop.

"That's why I accepted the challenge of leading the investigation," he says. "I'm concerned with the overall human tragedy. But it was my friend and colleague's only son and daughter-inlaw who died. So it was very personal to me, and I felt very much involved."

Iwan is heading the investigation for the Earthquake Engineering Research Institute (EERI), a rechnical society that seeks to improve understanding of the impact of earthquakes on the physical, social, economic, political, and cultural environment and that advocates for measures to reduce the harmful impacts of earthquakes. According to the EERI, "Iwan will be working with leading seismologists, tsunami experts, civil and structural engineers, lifeline engineers, and social and policy scientists to compile a comprehensive picture



of the events and to extract lessons for research and practice in the U.S. and other countries at risk."

Iwan, who directs Caltech's Earthquake Engineering Research Laboratory, has chaired or been a member of numerous commissions that have studied seismic safety and other issues related to earthquakes. As part of his research he has gone to several areas that have suffered catastrophic earthquakes, including Kobe, Japan, in which more than 5,300 people were killed and more than 100,000 buildings were destroyed in the city's 1995 temblor, and Tangshan, China, in which an 8.2 magnitude earthquake in 1976 caused massive damage to the industrial city. "We think that there were more than 500,000 deaths in Tangshan," Iwan says. "The city looked like pictures I had seen of Hiroshima."

Iwan has also traveled extensively throughout southeast Asia as part of his research and as a board member of the World Seismic Safety Initiative, a project formed by the International Association for Earthquake Engineering. From an earthquake perspective, he says, "There are a number of unique things in that part of the world: there is a capability of very large earchquakes, there are many islands in the region, so there's a unique esumami hazard; and because the area includes many developing countries that depend on courism

"I want to make sure we go in a direction that covers the event adequately," he says. "The press is calling it the December 26 tsunami." But while the tsunami caused nearly all of the deaths and much of the devastation, Iwan says, "the event itself was an extraordinary earthquake. I don't want that to get lost."

Shortly after the disaster, dozens of scientists and engineers rushed to the region to get a firsthand look at the devastation, and Iwan hopes to debrief them to find out what they saw and learned. He also plans to involve Hiroo Kanamori, the Smits Professor of Geophysics, and Kerry Sieh, the Sharp Professor of Geology, in his investigation, and to visit the region himself later this year. (For more on Sieh's research in Sumatra, see page 2).

Besides providing a detailed analysis of the earthquake and rsunami, Iwan's investigation will make recommendations on how to lessen the impact of future disasters, "In the United States, we have building codes and a good system for monitoring construction," Iwan says. But in many other countries, shoddy construction materials and methods are common. "Hawaii has a highly functional tsunami warning system and so does Japan. But developing countries don't have the resources to do that on their own. They have the hazard and vulnerability but often jack the ability or will to take the needed major actions to reduce their risk.

"But there are also small things that you can do to reduce risk, such as educating people about what constitutes good construction. Often, you can build a safer structure for the same cost as a more vulnerable structure." And in Hawaii, the hotel guest rooms have information about the islands' tsunami warning system. "Are these measures successful?" Iwan says. "You don't know until a big event comes along and tests the system. There's a certain hazard in an earthquake. What we do and how we live in regions prone to earthquakes establishes the risk. We can't control the hazard, but we can control our risk."

Dean Currie arrived on campus in early February to take up his new position as Caltech's vice president for business and finance. Currie comes to the Institute from Rice University in Houston, where he had served for 16 years as vice president for finance and administration.

A 1969 graduate of Harvard, where he majored in government, Cutrie also earned his MBA from that institution in 1973. At Rice his accomplishments have included converting the university to new software for finance, payroll, human resources, and student data; implementing a cogeneration system that provides 80 percent of campus electri-

Continued on page 12 . . .

and fishing, an earthquake and rsunami can have a huge economic impact."

Iwan says that no one yer knows just how much destruction was caused by the earthquake off Sumatra and how much by the resulting tsunami, and that's something that he hopes to find out. An earthquake of that size would cause massive destruction if it happened in a city with call buildings. But the press, he says, has mostly covered the event as a tsunami story. To mitigate future catastrophes, he says that the effects of the earthquake need to be investigated in detail.

MIKE ROGERS

This would be Ramon's shrimp cocktail -- tonight she would not him. she would be to stight as she ... cut it out just as she was now ferociously digging was sand veins out of the shring. the sand veins out of the shring. for his dinner.

a

OR. HOW I OFFICIALLY BECAME THE WORST WRITER IN THE WORLD

BY DAVE ZOBEL '84

It wasn't the Nobel committee calling last year, but I knew there had been a dreadful mistake just the same. The voice on the other end of the phone that July afternoon was congratulating me on my writing.

It seemed I had just been named the most atrocious writer in the world.

Inferiority is in the eye of the beholder, of course; but in my case the beholder was the 2004 Bulwer-Lytton Fiction Contest (BLFC), the annual competition named for the Victorian novelist who first penned the immortal cliché "It was a dark and stormy night." The contest rules are the soul of brevity: Each entry must be the opening sentence to the worst novel never written. Exactly one sentence long. Original. Unpublished.

And awful.

Unintentionally bad writing comes naturally to us all, I daresay. Surely even an infinite number of monkeys banging away at their laptops could never match the trash-production capacity of Homo sapiens pseudoauctor (or Desktop-publishing man). The trick, however, is doing it on demand, and thus it was with a sensation of prompt, gentle relief that I had managed to squeeze out my contest entry just in time for the April 15 due date: "She resolved to end the love affair with Ramon tonight summarily, like Martha Stewart ripping the sand vein out of a shrimp's tail though the term 'love affair' now struck her as a ridiculous euphemism not unlike 'sand vein,' which is after all an intestine, not a vein and that tarry substance inside certainly isn't sand. . . . and that brought her back to Ramon." Sand vein? Ramon? I have no idea where any of that came from. I think Voltaire once said something similar about the Holy Roman Empire (though presumably in a different context), and I vaguely recall one rather

lively evening of fish cleaning, but beyond that the precise circumstances of my moment of inspiration are a blur.

I do know that I, like Voltaire, harbored no illusions of winning any prize for bad writing and that I was only following the example of Nabokov, who wrote mainly to amuse himself, and of Tolstoy, who wrote mainly to annoy his wife.

"BADLY WRITTEN, BUT CLOSE ENOUGH." - GRADER'S NOTE, MIDTERM EXAM, 1981

Those five stretches of ellipses in my winning sentence are part of the original entry; no text has been left out. The reason they're there is that I was finally responding to a suggestion made more than two decades ago by my Caltech history professor, Peter Ward Fay.

From day one of my freshman year, Fay had recognized in my rampant prose and unbridled punctuation the muddy footprints of a truly heavyhanded metaphor mixer. At the bottom of my very first humanities quiz, he

WY UNTVERS

had gently reproved, "I think you overcomma a bit." Later, he filled the last page of one of my term papers with a long and thoughtful commentary that acknowledged up front that "a person's style is his own" before making a recommendation that plunged directly to the core of my affliction.

The essence of his advice: "Write more simply.'

He cited a few examples from my own work and then directed my attention to Elementary Principle 17 from Strunk and White's classic Elements of Style: "Omit Needless Words."

Granted, it took nearly a quartercentury for the lesson to sink in. Still, there I sat last April, wrestling with one truly abominable sentence that was a jumble of licentiousness and sand veins and commas and vowing to rip out everything but the sand veins. But what to insert in place of all those commas? Ellipses won the coin toss.

As for Omit Needless Words, I mulled over that one too, well aware that by rights that rule ought to have reduced my entire sentence to one big fat ellipsis. I made one or two uninspired excisions, tacked on a lackluster cover letter, and clicked Send.

Night" competition shares its April 15 deadline with another Outrageous Fiction contest, although in honor of the BLFC's origins in academia, late entries are both expected and accepted. In that same vein, the winners are announced on no particular date—just whenever the judges finally come up for air.

The reward for my uncommon punctuality (and punctuation) arrived promptly, in the form of a simple form letter straight from bulwer-lytton.com. Its affable equivocation—"Your entry has arrived and will receive the attention it deserves"-was all the editorial validation I could ever have wished for.

"IN THE FUTURE, SOMEONE WILL MISQUOTE ME EVERY FIFTEEN MINUTES." - ANDY WARHOL (DOUBTFUL)

"You are a finalist in the Bulwer-Lytton Fiction Contest. What can you tell us about yourself?"

That terse e-mail limped into my inbox one late-summer morning. "Hey!" I whooped. "Someone thinks I write lousy fiction!" Half hoping that the message might be either misdirected or spam, I replied with what I took to be a terribly clever press release, which the contest's PR department promptly rejected as completely inadequate. "Hey!" I whooped. "Someone thinks I write lousy press releases, too!" Lest others cry beginner's luck, I must say that I had been submitting Bulwer-Lytton entries for several years with the hope of finding out how abysmal a writer I truly was, but never with an expectation of capturing anything more than a Dishonorable Mention. You don't need to have taken AMa 95c at Caltech twice (as I of all people should know) to figure that with over 5,000 entries



"Every frustrated writer," says Zobel, seen at right wallowing in memorabilia from his Caltech days, "should have his own milieupreferably a reasonably portable one." Above, the deathless phrase that inspired the Bulwer-Lytton contest is, in the hands of a new talent, given a slightly different twist.

Fittingly, the "Dark and Stormy





Dave Zobel ((left), winner of the 2004 Bulwer-Lytton Fiction Contest for bad writing, is congratulated by Scott Rice, the San Jose State University English professor who created the contest in 1982. Zobel's deliberately execrable prose was plucked from more than 5,000 entries in the annual competition. The wastebasket at top, left, showcases some of the discarded drafts that preceded his triumphant final version.

"I've made this [letter] such a long one only because I hadn't the time to make it shorter." — Blaise Pascal

As the alert reader may by now have realized, prolixity is my affliction. But perhaps I'm not alone. There must be a reason no Bulwer-Lytton entry can be longer than one sentence. Call it a "mercy rule," instituted to preserve the sanity of English professor Scott Rice of San Jose State University, who came up with the idea of the contest in 1982 as a refuge for all the dreck that would otherwise clutter more traditional competitions.

Despite this simplest of regulations, Rice tells me that every year he and his fellow judges fill several dumpsters with misdirected novelettes that would be much better suited to no-wordlimit competitions like the Imitation Hemingway or the Faux Faulkner. And for those entrants who endeavor to stretch the single-sentence restriction by writing the way most people talk, the BLFC web page contains the dire warning, "You go beyond 50 or 60 words at your peril."

Unfortunately, brevity has its costs. The shortest sentence I ever wrote on a Caltech exam was the flawlessly jejune "Price is price," which drew from the grader the sneering annotation: "This is really good! Do you have any more Cosmic Insights to share with us?"

Alas, no, for it seems I am cursed with an unusually high words-to-insights ratio. Thus, having run out of ideas midway through a "compare and contrast" evaluation of Impressionist masterpieces, I fumbled my way into "Any further analysis would only repeat the individual aspects of each painting as given above in the separate discussions," and ground to a halt. The professor discreetly remarked that I was "somewhat flailing around for what to discuss."

Most honest of all, though, was the long-suffering TA who, having waded through one of my more convoluted ramblings on an economics midterm, observed in block capitals in the margin, "I THINK YOU'RE B*** S****ING HERE!" (asterisks mine) His "I think" pleased me enormously. Could it be that he was giving me the benefit of the doubt? As the alert reader may by now have realized, prolixity is my affliction. But perbaps I'm not alone. There must be a reason no Bulwer-Lytton entry can be longer than one sentence.

riveting opener ought to be—must be—followed by an enthralling, enrapturing, utterly engrossing 500-page novel. And who better to write it? Indeed, various relatives of mine (mainly the ones who funded my college education) have confessed that the very thought gives them the shivers.

But how to select a texture and tone for this tortid tome? Or even a topical title? Who's Tarry Now? Her Offal Romance? The Deveinci Cookbook? An Affair to Dismember?

Any and all suggestions are welcome and will of course be dealt with appropriately.

But please . . . keep them to one sentence.

Manhattan Beach, California, software developer Dave Zobel has finally stopped pinning all his early-retirement hopes on the film rights to Dave Zobel's Bent Book of Boatspeak. His NPR commentary on his fleeting figment of Bulwer-Lytton fame can be heard at http://www.npr.org/rundowns/ segment.php?wfld=4163265.



a year, the probability of winning is exceedingly small.

Yet within a weekend, and with no further effort whatsoever on my part, I somehow morphed from finalist to Grand Prize winner. And the commotion began.

The AP sent a photographer over—a Pulitzer winner, in case a miracle was needed. BBC Radio interviewed me during what can only be called their "American Freaks Hour." Even local cable access featured me. I felt like the schnook in Chekhov's short story "Joy," delighted at having been run over by a horse while drunk because "the newspapers only write about famous people, and now there's something in them about me!"

Evidently I had solved the conundrum once posed by the witty and alluring Sandra Tsing Loh '83: "How does one make the evening news without the benefit of having anything important to say?"

Everyone wanted to know how I would spend the official Grand Prize. (As a matter of fact, I returned all \$250 of it to the judges, on the assumption that they needed it more than I did.) And everyone wanted to know why I had mentioned Martha Stewart.

At the time I scribbled the piece, the embattled cuisinartiste was the pet of the Net, and her recent trial for obstruction of justice was providing plenty of blogger fodder. But let me say it yet again: I never intended to mock another's misfortune. That both Ms. Stewart and I spent weeks brooding over our appalling sentences is nothing more than coincidence.

The simple truth is that I brought her in rather late in the process, and only because I sensed that my brief narrative needed a strong female archetype in a cookery setting. In short, the explanation is much more Freudian than schadenfreudian. TAs, the many underappreciated souls who suffered for years through my postadolescent prose. Here and there on the yellowed term papers, reports, and exams now moldering in my garage lurk such red-penciled observations as: "Clever but irrelevant"; "An out-ofcontrol essay"; "This is much more text than necessary."

On one of my efforts, a professor noted sadly, "My impression is that this bobs around a lot." On another she confessed herself "irritated that you didn't seem to say clearly where you were headed with this."

Ah, but one must be careful what one wishes for, inasmuch as certain professors discovered only too clearly where my thoughts were headed—over and over again.

For instance, given two pages to address the question "What is Asia?" I ebulliently vowed to analyze 10 distinct aspects of the continent, including "the geographical, political, religious, societal, . . . anthropic, . . . self-impressionistic. . . ." (Even today, I'm still not sure what some of those categories mean.) "Let us deal with each of these in turn," I effervesced, prompting the professor to gasp (in the margin), "Golly, Dave! In a couple of pages?"

And only a bloody-minded veneration of the old saw "Tell them what you're going to tell them; tell it to them; then rell them what you told them" can account for this finale to my very first freshman lab report: "In conclusion, let us summarize the basic features of this experiment—what was performed as well as what was learned...."

Yes, let us! But I then went on to wax pedantic on precisely neither of those topics: "In fin, the experiment was quite successful—materially and educationally. . . . [T]he experiment was enjoyable, the data surprisingly accurate, and the lab experience invaluable." The lab handout I deemed "adequately enlightening—and the TA a hundred times moreso [sic]."

"I'LL AWARD YOU A BONUS POINT FOR THIS, BUT IT DOESN'T HAVE ANYTHING (MUCH) TO DO WITH THE QUESTION." — MARGIN NOTA-TION, PROBLEM SET, 1981

The late and great-hearted Peter Fay, who charitably deemed my writing style "just a touch heavy and portentous for my taste" but was willing to nurture it as far as he could bear to, would not (I'm sure) be in the least surprised at my taking first place in a bad-writing contest.

In this he would doubtless be joined by a host of other Caltech faculty and Tactfully ignoring the glittering sycophancy, the grader's patient response went straight to the heart of my neurosis: "Just tell me the specifics.... Don't feel you have to justify everything that happens."

I failed to learn the lesson, however, and spent most of my senior year, now a TA myself, mercilessly filling the margins of innocent students' problem sets with entire paragraphs of blustery irrelevant commentary. "A very competent fellow whom, however, I rarely saw . . . though I do not complain."—First-term freshman-year progress report, 1980

Having been saddled with the title "World's Wretchedest Writer," where do I go from here? Is there more to the story? Is romance really the sand vein of life? And . . . what about Ramon? Surely (some have suggested) my

The once and future wretched writer displays his wild and crazy side in his Caltech senior yearbook photo, from 1984.

ALUMNUS HOWARD ORINGER ESTABLISHES GRADUATE STUDENT FELLOWSHIP FUND

"It's habit-forming," says Howard Oringer, MS '63, of his long relationship with faculty and students at Caltech. The Institute graduate recently established the Oringer Fellowship Fund in Information Science and Technology, a \$600,000 endowment to generate support for Caltech graduate students.

His motivation, Oringer says, is the people he meets in his visits to campus. "My visits to meet with graduate students and faculty have deepened my commitment to Caltech, and to the research model the Institute has uniquely developed," he says. "I marvel at the quality of the students, their ability to communicate their ideas, and the diversity of backgrounds and interests."

Oringer Fellows will be working in Information Science and Technology (IST) an area recently launched by Caltech—with a preference for students in mathematics of information. IST is the first integrated research and teaching activity in the country that investigates information from all angles: from the fundamental theoretical underpinnings of information, to the science and engineering of novel information substrates, biological circuits, and complex social systems. This will be IST's first graduate fellowship program.

Oringer has more than 30 years of operating and management experience in the telecommunications industry, with an emphasis on the planning and implementation of major communications networks. It was a mutual interest in communications and networking that led him to the Caltech lab of Michelle Effros, professor of electrical engineering, director of the Institute's data compression laboratory, and an IST member.

Oringer says that after meeting with Effros, "I realized the personal impact she could make in an area that I had spent my career involved in. So I decided to make permanent the funding that I had supported her lab with each year since 1996."



In her research, Effros investigates ways to increase the speed of data transmission across the Internet by compressing it. She and her colleagues use computer algorithms that look for redundancies within disparate data and eliminate them, thus reducing the number of information bits being sent. Once the data reaches the receiving end, it is "reasHoward Oringer (second from right) gets together with Professor Michelle Effros and some of her students during a spring '04 visit to campus. Pictured from left: Development's Bruce Genung, Effros, and graduate students Michael Fleming, Sidarth Jaggi, and (far right) Wei-Hsin Gu.

sembled" by other algorithms. The traditional way of doing this, says Effros, is to

ASSOCIATES ACTIVITIES

All events will be held at the Athenaeum unless otherwise noted. Individual invitations for each event will be sent monthly. For more information about the Associates, please call 626/395-3919, or e-mail us at associates@caltech.edu. Visit our website at http://giving.caltech. edu/CA.

May 14, Northern California Associates Dinner and Program—"Dark and Darker: The Search for Dark Matter and Dark Energy," with Sunil Golwala, assistant professor of physics. The Garden Court Hotel, Palo Alto.

May 26, Associates Board of Directors Meeting, Millikan Library Board Room.

May 26, Dedication of the Garden of Associates, with Tours, Dinner, and Program at Dahney Hall—Remarks by Jean Ensminger, chair, Division of the Humanities and Social Sciences; and a talk by Warren Brown, associate professor of history.

June 15, Associates Special Event—Dinner, Program, and Opera Performance of Falstaff at the Los Angeles Music Center, with Tom Neenan, lecturer in music.



More than 120 Associates turned out for a talk this winter on "Nanosystems Biology and Cancer," presented at the Caltech Athenaeum by James Heath, the Institute's Gilloon Professor and professor of chemistry. Above, Heath shares a moment with guest Dan Kim and Associates Board member Kathleen Wiltsey; below, attentive audience members listen as Heath discusses his research into the application of manoelectronics technologies to cancer and infectious diseases.



In February (below), members and prospective members of the Caltech Associates gathered at the home of Junior Associates Frank and Mia Tota to learn more about the Institute support group and to hear Caltech faculty discuss their wide-ranging research. From left are Goldberger Professor of Physics Andrew Lange, hosts Frank and Mia Tota, guest Todd Molz, Rosen Professor of Biology Scott Fraser, guest Shelly Kamei, Dickinson Professor of Chemical Engineering and Biochemistry Frances Arnold, and Summerfield Professor of Annlier Physics and professor of

use coding developed for one user transmitting to one receiver. Her work, though, involves developing source coding for multiple user networks. She and her graduate students are developing theory and algorithms for compressing data from one source or multiple sources, whether it's being sent to one receiver or multiple receivers.

"Howard's support over the years," says Effros, "has been enormously valuable to both me and my students. It really makes an incredible difference." Oringer visits twice a year to hear about current research going on in the lab. "Over time, Howard has become an integral part of the group. We all really look forward to his visits. He brings to the table a wealth of knowledge and experience and shares that openly with the students. It's a wonderful opportunity for them and for me."

Oringer also holds a bachelor's degree in engineering from the Stevens Institute of Technology, and an MBA from Santa Clara University. His career has included executive positions with AT&T and Rockwell International, and he served as chief executive officer for TeleSciences. He is currently chairman of the board of directors of the Verilink Corporation and treasurer of the board of the San Francisco Art Institute and of the Omnia Foundation.

Of his ongoing relationship with Caltech, Oringer says: "I would recommend that other alumni take the time to connect with an area of their choice, and develop a rapport with the faculty and students. It may indeed become habit forming!"

MARK WHEELER

electrical engineering Amnon Yariv.



Tsunami . . . from page 2

quake, to distribute relief supplies, and to check on the welfare of the many friends he has made over the years. He was also there to download data from the GPS instruments, to make necessary repairs to them, and to talk again to local people about preparations for future earthquakes and tsunamis. (To see some of the images that Galetzka and Sieh took, check out the back-page poster in this issue.)

Sieh and Galetzka spent the first half of their time south of the equator, where they had set up 14 GPS instruments in the two years prior to the earthquake. The instruments show that western Sumatra is converging on eastern Sumatra at a rate of about five centimeters a year, because of the movement of the Indian Ocean plate. Decades of strain built up by that action were relieved suddenly during the massive December 26 earthquake. Because the area that Sieh studies is 200 to 500 miles from the epicenter, few people living there felt the earthquake, and while the tsunami was frightening and caused minor damage, no one was killed

The villagers warmly welcomed Sieh and his team back, and some said that they believed the GPS instruments had protected them from the devastation and death suffered by their countrymen to the north. Sieh tried to convince them that there was no connection between the instruments and their safety, while also warning them that the next massive earthquake in the region will likely be at their doorstep, where the convergence of plates continues to build up pressure.

Sieh took up studying the seismic history of Sumatra to better understand seismic activity in California. Up until a decade ago, he had focused much of his attention on the San Andreas Fault, discovering that its major earthquakes occur at irregular intervals of about 50 to 300 years, even though strains are building up regularly. He then set out to understand why. But paleoseismology-a field Sieh pioneered-along the San Andreas had become frustratingly ime-consuming and was too impred to yield a satisfactory answer. In the late 1980s, the work of Gerald Wasserburg, Caltech's MacArthur Professor of Geology and Geophysics, Emeritus, and his student, Larry Edwards, PhD '88, inspired Sieh to look elsewherein the tropics, in fact. Sieh says that Wasserburg and Edwards had just begun to figure out how to determine very precisely the age of coral samples. Sieh figured that paleoseismic studies of coral reefs above the active Sumatran megathrust "would yield results faster and with more precise dates for ancient earthquakes.' So, for the past decade, Sieh, Galetzka, and their colleagues have been collecting and analyzing corals to see if the big earthquakes occur on a regular basis over long timescales. "We're also

looking to see if there are unusual signals in both the coral and the GPS recordings that might presage the occurrence of a large earthquake," Sieh says. "The paleoseismic work

shows that sometimes giant earthquakes occur in couplets and sometimes singly, and that these singlets or couplets occur about every two centuries."

Along that patt of the Sumatran megathrust south of the equator, giant earthquakes that caused massive tsunamis last struck in 1797 and 1833. Mohamed Chlieh, a postdoc in Caltech's Tectonics Observatory, has used Sieh's data to calculate that the islands lurched more than 30 feet away from mainland Sumatra during the magnitude 8.7 earthquake of 1833. Sieh says that he is concerned that the December 26 quake may presage a similarly massive quake along the southern half of the Sumatran plate boundary, since the pressure there has been building since the couplet of 1797 and 1833 and may have been increased further by the latest shift. "We are telling residents of the region that it likely will happen in the lifetimes of their children," says Sieh. "If they don't prepare for this, they're taking a big gamble."

Sieh returned to Caltech in mid-February and did not have time to accompany Galetzka to Aceh Province. While in Banda Aceh, the provincial capital, Galetzka met with local officials and was directed to a small town called Lamno, about 25 miles to the south, where relief agencies had set up operations.

As with Banda Aceh, the approach to Lamno involved traveling up a river to get to the center of town. "The river was about 150 yards wide," Galetzka says. "We passed a bridge that had been destroyed by the tsunami. All that remained were the concrete abutments. I could see that the tsunami had come up eight meters in some places and 18 meters in others. It flattened everything for two kilometers except one or two of the stronger structures." Local officials gave Galetzka and his colleagues permission to install a GPS station on a hill up from the damaged bridge. While they were installing it, a teenage boy came by to watch them work. "He was off at school in Banda Aceh at the time of the tsunami," Galetzka says. "He had returned to Lamno and found that his home, family, and village were gone. This part of Lamno had been inhabited by at least 1,200 people. Only about 10 percent survived. I was amazed at the boy's steady demeanor. He had probably cried so much that he couldn't grieve anymore."

On his recent trip to Sumatra, Caltech geologist Kerry Sieh traveled by helicopter to areas that he has been studying—regions that he predicts could face another massive earthquake and tsunami within the next 50 years.

Later that night, Galetzka and his colleagues presented a talk to several hundred people in Lamno. "They had a lot of questions about plate tectonics, and we cleared up misinformation and rumors. They didn't need to know about how to survive a quake and tsunami, since they had already been through that."

Galetzka and Sieh say that educating the public in Sumatra about earthquake and tsunami dangers is an important part of their work. "The educational component is really Kerry's idea," Galetzka says. "He believes that the science should serve mankind."

Sieh and Galetzka plan to return to Sumatra in June to continue installing GPS stations and offering more educational seminars. Originally they had planned to install a total of 34 GPS stations in the region; now they are considering putting in significantly more. They and their colleagues are also working on a system that will allow data to be retrieved through satellite telemetry. "It's possible that such a network of GPS stations could be the sensors for a tsunami early-warning system," says Sieh.

Locals did seem better prepared, with many fleeing to higher ground immediately, after a magnitude 8.7 earthquake struck Indonesia March 28. Its epicenter was located just 110 miles southeast of the December 26 temblor, causing significant but localized destruction off the coast of north Sumatra on the islands of Nias and Simeulue. Sieh says scientists will probe the relationship between the two quakes in the weeks ahead. "This certainly brings to the forefront the scientific question of one fault rupture triggering another." Before December 26, says Sieh, Sumatran officials could reasonably say that they didn't have the funds to prepare for a massive earthquake and tsunami. "Now they have the interest and perhaps they will have the money," Sieh says. "Three hundred thousand people lost their lives. Let's hope they didn't lose their lives for nothing."

Feynman Stamp . . . from page 4

are issued each year. Says David Failor, executive director of stamp services, commemorative stamps portray individuals and subjects "that are instrumental to the American experience."

Feynman's appearance may be due in part to a 1995 petition and letter-writing campaign by his friend and collaborator Ralph Leighton that was supported by Feynman Professor of Theoretical Physics Kip Thorne '62 and other faculty members. Leighton also attended a Citizens' Stamp Advisory Committee meeting in 1997 and stayed in contact with committee members. He says, "I'm not sure what exactly triggered approval for the scientist stamps-persistence, probably, and perhaps the fact that scientists have not been recognized on stamps for decades, while cartoon characters and movie actors have had plenty of commemoratives."

The first-day issue of the "American Scientists" stamp is scheduled for May 4 at Yale. Caltech will hold its own commemorative event on May 20, timed to coincide with the Alumni Association's annual Seminar Day/Reunion Weekend. For that day, the Caltech post office will be officially designated the "Feynman Station at Caltech," and it will issue a special envelope bearing the Feynman stamp and a Caltech-designed cancellation postmark. The commemorative postmark will be available through June 20, and can be ordered by contacting Mail Service's Darrel Goudeau at 626/395-6359 or via e-mail at darrell. goudeau@caltech.edu.

That same day, a special presentation, open to the public, will be held at 5 p.m. on campus in Ramo Auditorium, featuring three Caltech speakers-Thorne, Professor of Theoretical Physics Steve Frautschi, and Tolman Professor of Theoretical Physics and 2004 Nobel laureate David Politzeras well as Pasadena Postmaster Bob Mysel, representing the United States Postal Service. Further updates may be found at http://alumni.caltech.edu news/announcements. Other people and topics receiving pottrayals this year include opera singer Marian Anderson, who is part of the Black Heritage series; former president Ronald Reagan; the Muppets and their creator, Jim Henson; Mickey Mouse and other Disney pals; and the Civil Rights movement, in a set titled "To Form a More Perfect Union." For more information, visit www.usps. com/communications/news/stamps/2004/ sr04_076.htm.



MIKE ROGERS





Prospecting in Pala A visit to California's Historic GEM COUNTRY

The green-brown hills of Pala, California, in north San Diego County, enfold a colorful history, etched in the glimmering hues of garnet, tourmaline, aquamarine, topaz, and other gemstones that were first discovered in the region's pegmatites near the start of the 20th century. Pegmatites, which are found around the world, are igneous (that is, originally molten) veins of rock characterized by unusually large crystals that on occasion contain appreciable amounts of rare trace elements. Over long periods of time, under optimum conditions, these elements impart gorgeous color to the crystals, to which humans, once they come on the scene, tend to attach special significance. In Pala, the boom years lasted about two decades before the mines' riches began to diminish and the locals lost their best customer-the dowager empress of China, who had developed an in-



ordinate fondness for the region's rare pink tourmaline. In recent decades, new finds and technologies have led to a partial mining revival in Pala, and the area continues to attract many amateur and professional rock hounds with an interest in gems and gem science.

One of these individuals is Caltech professor of mineralogy Geotge Rossman, PhD '71, whose research focuses on the geological, chemical, and atomic processes that underlie the formation of minerals. Gems and precious stones first caught his eye as a boy-"I wondered how they got all those pretty colors"-and he had no sooner started graduate work in Pasadena than he set about checking out the Pala area. He actually earned his Caltech PhD in chemistry, but early on "I had become known to the geology department by borrowing minerals," which he sometimes examined using various chemical apparatus.

"So they called my bluff, and right after I graduated and was hired on as an instructor said, 'Would you like to teach a short course about minerals?' and today, here I am—a professor in The mountains of north San Diego county (left) were once a mother lode of gem-quality stones such as tourmaline and topaz, many associated with quartz deposits like the one shown left, below.

Rossman not only agreed, he offered to bring another expert into the mix: gem miner, dealer, collector, and connoisseur Bill Larson. Educated as a geological engineer, Larson cofounded the San Diego-based company Pala International in 1969 and built it into one of the best-known gem mining, trading, and sales operations in Notth America. He and Rossman have known each other since Rossman's Caltech student days: on his first foray to Pala's Tourmaline Queen Mine in the early 1970s, Rossman was told that he was trespassing on Larson's property and "politely invited" to leave. Later the two gem enthusiasts hooked up, and when the scientist flew into the Pala community of Fallbrook one day piloting his own plane, the gem entrepreneur was sufficiently impressed to chauffeur him all over the region in his VW Beetle and to start bringing him interesting gem and precious-mineral samples for further explanation and investigation.

Larson was more than happy to help out with the Associates trip, so this past spring, the two gemologists met up in Fallbrook, with Larson genially booming "Any friend of George is a friend of mine!" as he herded two dozen participants, Rossman, and both Silvers into his retail gem establishment, The Collector. Already that day, the group had heard Rossman lecture on the gems and geology of Pala and had made a special tour of the outstanding gem and precious-mineral collection at





The treasures of California's gem country range from elaborate precious-mineral and artifact displays like this one at the Fallbrook gem store, The Collector (above), to trophies plucked straight from the earth at the Ocean View mine, where Alice Tyson's hand (left) holds the kunzite, the black tourmaline, and an unidentified green stone she found there. At far left, Stephen Rogers learns the fine points of rock and mineral screening, while,

the geology department who has never taken a course in geology or mineralogy. That's Caltech."

Rossman is a gifted teacher, who was awarded the Institute's Feynman Prize for Excellence in Teaching last year. Shortly afterward, he got a call from Arlana Silver, who directs the Institute support group, the Caltech Associates, and whose husband, Keck Foundation Professor for Resource Geology, Emeritus, Lee Silver, PhD '55, is Rossman's friend and colleague. She wanted to know if Rossman would lead members of the Associates' President's Circlemany of them Caltech alumni and theit spouses-on one of the group's educational tours-a two-day trip to explore rhe science, history, and natural beauty of California's gem country.

the Gemological Institute of America in nearby Carlsbad. More of the same awaited them inside Latson's gem emporium, where they toured an Aladdin's Cave–like medley of public and private showrooms, watched on-site artisans at work, and took a behind-the-scenes look at rare gem consignments bound for an international trade show.

Dinner that evening, hosted by the Larsons at their Fallbrook home, brought a chance to relax, ask questions, and admire the museum-quality collection of rare gems, minerals, and artifacts that Larson and his wife, Jeanne, have acquired on their travels to virtually every corner of the globe. "T've been to a lot of places," commented one awed guest, "and I have never seen anything like this." below, Dian Anderson and Betty McRuer try their hands at the technique.





The second day began with a look at a gem mecca on the other side of the world. Over breakfast at the Pala Mesa Resort, Rossman presented "The Road to Mandalay," an illustrated talk about a trip he and Larson had recently made to Myanmar, or Burma. Larson was there to scout out business and collecting opportunities, and Rossman wanted to have a firsthand look at the geologic conditions that have made the southeast Asian nation a treasure trove of naturally occurring precious stones.



Their exotic trek took them from the gemstone markets of Yangon, to

him such worthless stuff at the highest price possible. Rossman, who wanted the concentrates because they contain invaluable information about the rubies' source chemistry, eventually snagged a sizeable sample for about \$10, "happy to get the bag for science."

He wound up the Indiana Jones–like journey in the jade center of Hpakant, located within a 55-milelong mining region that is the source of nearly all the precious green jade on earth. "There we found ourselves in front of the largest boulder of jade that had ever been discovered in the history of the world."

After a lively question-and-answer session that, predictably with a Caltech crowd, ran overtime, the group boarded vans for their final excursion to the Ocean View Mine, one of a handful, out of an original hundred or so, that still operate in Pala. The facility, whose pegmatites have yielded gem-quality stones since the early 1900s, now gives visitors the chance to take mine tours and troll through its mine dumps—rhe piled-up dirt, rocks, and other residue of regular mining operations—for buried treasure.

After a quick orientation in the use of screening pans, the Caltech group was shown to the dumps, basins, and shovels, and turned loose to sift and dig for souvenirs. An hour or two of this amateur prospecting turned up a rainbow array of tourmaline, quartz, mica, garnet, morganite (a pink variation on emeralds), and other glimmering chips and small stones—all identified on the spot by Rossman and Lee Silver, who between them seemed to possess an encyclopedic knowledge of every specimen turned up in a pan or shaken loose from a spadeful of dirt.

Most of the Associates also opted to take the guided mine tour, donning hard hats and knee-high boots for a hike into the heart of the pegmatite mountain, a damp trek in cool dark-



Left: Caltech mineralogist George Rossman, PhD '71, (right) looks over some notes with Associates president Ted Jenkins '65, MS '66, before presenting "The Road to Mandalay," (above) on his recent gem-hunting and factfinding trip to Burma.

ness, occasionally illuminated by the gleam of flashlights on rocky walls harboring deep veins of quartz.

Afterward, before heading their separate ways, the travelers reflected on the many facets of their gem-immersion adventure in Pala. "It's been such an eclectic combination of activities," said one Associate. "The Gemological Association, George's lectures, the gorgeous gems in the Larson collections, and then seeing how it all began-in the mine itself." Others said that highlights of the two-day trip included "seeing the artisans at work at The Collector," "being with such a wellinformed group of people," and, as several Associates enthusiastically concurred, "meeting George Rossman."

"Finding the beautiful rocks," said Alice Tyson, wife of Tom Tyson '54, PhD '67, who had unearthed a gleaming chunk of black tourmaline and a clear, apparently flawless crystal of the precious mineral kunzite during the Ocean View dig. Duane McRuer '45, MS '48, who with his wife, Betty, is a veteran of several Caltech geology trips, summed up this one as "an expanding cornucopia of treasures, aesthetic and intellectual."

In short, a gem of an experience.

HEIDI ASPATURIAN

RECOGNITION

Richard Andersen, Boswell Professor of Neuroscience, has been selected by the McKnight Endowment Fund for Neuroscience to receive a 2005 Neuroscience of Brain Disorders Award. According to the fund, "Andersen's laboratory has made progress in developing a 'brain-machine interface' to help people with severe paralysis." The award of \$300,000 over three years, beginning in February 2005, will help Andersen test this device-a "cognitive cortical prosthetic' that would 'read' the intentions of people with severe paralysis, enabling them to direct their movements"with human patients.

Paul Asimow, PhD '97, assistant professor of geology and geochemistry, has been selected by the American Geophysical Union to receive a 2005 James B. Macelwane Medal. Given to as many as three recipients annually, the medal "recognizes significant contributions to the geophysical sciences by an outstanding young scientist."

David Baltimore, president of Caltech and Nobel laureate, has been named by California state treasurer Phil Angelides to the Independent Citizens Oversight Committee, which will oversee the spending of \$3 billion in state bond money approved by Proposition 71 for stem-cell research. The committee is made up of representatives of the five University of California campuses with medical schools, and of members appointed by the governor, lieutenant governor, treasurer, controller, senate president pro tempore, and speaker of the assembly.

Kausbik Bbattacharya, professor of mechanics and materials science, has received the 2004 Young Investigator Medal from the Society of Engineering Science "in recognition of his contributions to engineering science in the areas of thin films, active materials and continuum mechanics." In a separate honor, he was awarded the 2004 Special Achievement Award for Young Investigators in Applied Mechanics by the Applied Mechanics Division of the American Society of Mechanical En-

the fabrication shops in Mandalay, to the jade and raby mines in the remote north, all under the vigilant eye of the ruling Burmese military junta, which controls the gem trade with an iron hand. In the mining city of Nam Ya, site of a freshly discovered deposit of priceless rubies, Rossman bargained for the "dregs" left over from the gem separations with street traders who were clearly convinced the visiting American was crazy, but were delighted to sell

Above: Out in the field, Caltech geologist Lee Silver, PhD '55, gets set to ID another rock; at right (from left) Associates Tom Tyson '54, PhD '67, Alice Tyson, Duane McRuer, '45, MS '48, Janet Holladay, Linda Loehr, Dian Anderson, and Hunt Holladay '56 prepare to take a guided mine tour.



gineers "in recognition of his seminal contributions in identifying the critical crystallographic features that govern shape memory behavior in solids and thin films."

Andrew Blain, assistant professor of astronomy, has been awarded the Newton Lacy Pierce Prize in Astronomy by the American Astronomical Society. The annual prize is awarded to a young astronomer "for outstanding achievement, over the past five years, in observational astronomical research based on measurements of radiation from an astronomical object." The citation acknowledges Blain's outstanding contributions to submillimeter and far-infrared astronomy and reads in part: "His work has shown that a dominant fraction of the star formation in the universe oc-Continued on page 21 . . .

Crime Compu

"The idea of a mathematician as a character on a TV show intrigues us because of the way they think, the way they use logic," says the show's cocreator, Cheryl Heuton. "It's a new kind of detective."

BY RHONDA HILLBERY

Leave it to television to work out a way to make a national symbol of nerdiness—mathematics—into something sexy.

Aided by an intense, young, touslehaired math professor named Charlie Eppes, the creators of Numb3rs, airing Fridays at 10 p.m. (Pacific Time) on CBS, manage to do just that. Yes, the algorithm ace looks dashing as he plummets down a hill in a glorified go-cart he calls an extreme-gravity vehicle. But it's not just math-flavored machismo. Caltech-caliber calculations course through the episodes, facilitated by professor Gary Lorden '62, who serves as Numb3rs's mathematics advisor, and buttressed by scenes shot at the Institute. Numb3rs, which premiered January 23, covers familiar TV crime-busting territory-foiling bioterrorism, outwitting bank robbers, and stopping a serial rapist. But there's a twist: FBI Special Agent Don Eppes (Rob Morrow, of Northern Exposure fame) enlists the help of his brilliant younger brother, Charlie (David Krumholtz), a math professor, to solve some of the bureau's most vexing cases. Real algorithms help the Eppes brothers uncover a serial rapist's point of origin when Charlie works out an equation derived from crime scene locations pinpointed on a map. He uses probability, statistics, graph theory, and vector analysis to identify

the culprit in a Spanish flu outbreak that strikes Los Angeles. Week after week, viewers see how Charlie uses actual mathematical methods to help crack tough cases.

Meanwhile, an array of numbers, calculations, and equations scribbled on blackboards or overlaid through special effects offers a glimpse into the mind of the math whiz who teaches at "Cal Sci"—the California *School* of Science and Technology.

Caltech's imprint on Numb3rs is no accident. The show's creators-Pasadena residents Cheryl Heuton and Nicolas Falacci-approached the Institute last summer about shooting some scenes on campus, and for help in mak ing the math as realistic as possible. That led the husband-and-wife team to Lorden, Caltech's executive officer for mathematics, who was soon hired as a consultant. "I was thrilled to see the show approach Caltech," says Lorden, who in more than 40 years as an occasional mathematics and statistics consultant had never before been called by Hollywood. One of his first thoughts was of movies such as A Beautiful Mind and Good Will Hunting, whose math segments struck him as unrealistic. But he was more than game to sign on. And he finds it remarkable that in the finished product, Numb3rs depicts "math as not only interesting, but actually cool and sexy. It also does a good job of showing





Top: In the pilot from the TV show *Numb3rs*, "Cal Sci" mathematician Charlie Eppes (David Krumholtz) gets chewed out by his friend, physics professor Larry Fleinhardt (Peter MacNicol), for missing a meeting, in a scene filmed under the sunlit arches of Caltech's Kerckhoff Laboratories. Above: Krumholtz and Rob Morrow (who plays Charlie's FBI-agent brother, Don) laugh as they field a question from the Beckman Auditorium audience at the Institute's special screening of the series pilot. and tation



the reality of being stuck on problems, and working and suffering along the way to finding a solution."

Lorden's job is to help the scripts credibly utilize bona fide mathematical techniques such as cryptography, combinatorics, number theory, and epidemiology statistics in solving crimes. Besides reviewing scripts for mathematical authenticity, he has also been asked to come up with math or physics concepts and equations that provide the "mathematical background to what some of the characters are doing, saying, or thinking. This could include pictures or things to write on notepads that the camera might see, or stuff that Charlie writes on a blackboard or whiteboard."

Back on campus in the Sloan Laboratory of Mathematics, in an office adorned with little besides stacks and stacks of papers and math books, Lorden talked about working on the show. "It's been fun and stimulating, hanging around with the actors and writers on the set, and somewhat glamorous, but it's a *long* day."

Initially, he assisted on story lines involving the epidemiology of human virus transmission, the responses of skyscrapers to earthquakes and strong winds, the aerodynamics of falling human bodies, and predictive models regarding criminal behavior. Also pitching in as needed are fellow Caltech math professors Dinakar Ramakrishnan and Rick Wilson, as well as associate professor Nathan Dunfield.

For their part, *Numb3rs* producers Heuton and Falacci have repeatedly made the case that the mathematical story lines are more than just a new gimmick for TV. "The idea of a mathematician as a character on a TV show intrigues us because of the way they think, the way they use logic," Heuton says on the show's website. "It's a new kind of detective."

Adds Falacci, "It's not just about the crime and solving the mystery. Charlie has a very unique perspective on the world and you want to get to know him."

In recognition of Caltech's help on and off the set, the Institute community was invited to a special advance screening of the series pilot at the campus's Beckman Auditorium on January 10. The nearly full house cheered as Charlie and his trusted colleague, physicist Larry Fleinhardt (Peter Mac-Nicol), reason together in a scene filmed under what appear to be the sunlit arches of the Kerckhoff Laboratories. In the episode, the sweeping pattern of water drops from the sprinkler in Charlie's father's backyard inspires one of the show's trademark mathematical moments, leading Charlie to an algorithmic epiphany that helps nail the perp-a serial rapist who has started murdering his victims.

The Caltech audience ate it up. And some undoubtedly recognized that the scenes in Charlie's sun-dappled office were acrually filmed in the campus office of Moseley Professor of Astronomy Nick Scoville. Conformity to the Caltech culture only stretched so far, however. No sooner had Charlie bolted from his office to keep an appointment than his gorgeous graduate student Amita (Navi Rawat) reverently and tenderly touched the equations that her advisor had scrawled across the blackboard. The Beckman crowd, composed largely of Institute students, erupted in howls of laughter.

In the panel discussion that followed the screening, coproducers Heuton and Falacci explained that they had Caltech firmly in mind for *Numb3rs*'s university setting. "We had been reading books for years about science and math, and we were interested in the idea of doing a show about a mathematician, which is very difficult to do in commercial television," Heuton said.

Along with the show's producers and Lorden, the panel included actor Krumholtz, who cheerfully admitted that he failed high-school algebra twice. "I was a terrible math student. I got zeros on tests—it was bad—I barely passed my third time. I was the kid in class constantly complaining, 'We should make it an optional class like gym or art class.'" Also on the panel were Rob Morrow and veteran



actor Judd Hirsch, who plays the Eppes brothers' widowed father, Alan, and who bemusedly informed the audience that he holds an authentic BS in physics from City College of New York.

Krumholtz's star turn as a math genius belies his dismal record as an algebra student. He explained that in preparation for his role he hung around Caltech last fall, "wandering the hallways and campus for two to three weeks," to soak up the academic ambiance. To plumb character motivation he talked to a real-life youthful math guy, Caltech's 30-year-old professor Dunfield.

In a phone interview shortly after the show's television debut Dunfield recalled spending about an hour with Krumholtz, who plays 29-year-old Charlie. "He wanted to know what it's like to do mathematics and work in academia, what types of things his character would likely be concerned about, like tenure or other issues."

The professor, who was so un-starstruck that he hadn't even made a point of watching the ptemiere, added, "He wanted to know, why would somebody choose to become a mathematics professor. Would they have to love math?" What was his response? The professor said he does not recall. A touch of the TV spotlight has also fallen on one of Professor Wilson's graduate students, David Grynkiewicz. "The producets thought Krumholtz would have trouble writing some of the complicated numerical expressions, and my hand looks similar to his," said Grynkiewicz, who is studying combinatorics. During a shooting period when Lorden was unavailable, he spent more than 30 hours standing in as both hand-double and math advisor. Some of that time was spent work-



From top: Graduate student **David Grynkiewicz** worked as a hand double in early Numb3rs episodes. **David Krumholtz** as Charlie grapples with an equation in a scene filmed in **Caltech** astronomy professor Nick Scoville's office. As series mathematics advisor, Professor Gary Lorden (left) provides the "mathematical background" to stories and scripts.

Continued on page 18 . . .

Alumni

Jpdate

CULTIVATING THE CALTECH CONNECTION

Let me tell you a success story. For 30 years or more, Caltech alumni living in the Silicon Valley area have met on the third Thursday of every month for lunch at a Chinese restaurant. I've often joined the group since I moved to the Bay Area back in the '70s. Prior to a couple of years ago, we usually filled one table. Each month there would be a few regulars and a new person or two. We'd enjoy good food and great conversation.

There have been a few memorable moments at these lunches. There was the time the Lazy Susan in the middle of the table wasn't working and a few enterprising alumni disassembled and fixed it, to the consternation of the waiter. There was also the time, shortly after pocket calculators were introduced, when the bill came to \$60 for the eight of us and half the table pulled out their calculators to figure the perperson cost. (The lesson here, I hope, is that there are lots of Early Adopters among our alumni, not that Caltech graduates can't do simple arithmetic).

But back to my story. Two or three years ago, after the dot-com bust, luncheon attendance quadrupled almost overnight. Lots of unemployed alumni began attending to network with other alumni, and soon we were filling three or four large tables every month. Peter Tong, PhD '85, who had taken on e-mailing out luncheon announcements every month and making the reservations, saw an opportunity. He started including short messages about jobs in his monthly e-mails. Anyone offering a job or looking for one could submit a brief "classified ad" to Peter for inclusion in the e-mail.

Peter also started devoting a few minutes during each lunch to announcements. The new job-postings page on the Alumni Association website (alumni.caltech.edu) was mentioned on several occasions. Even through the worst of the downturn, most months one or more alumni had announcements about job openings at their own companies. Peter eventually expanded the announcements to give one person each month an opportunity to talk at slightly greater length about his or her career or interesting work they had done. We've had some tough times here in Silicon Valley, but a few months ago Don Fossgreen '84 came up to me at the monthly luncheon and told me about his new job. It seems that Bobby Johnson had attended one of the lunches and heard about the new job postings on the Association website. When Bobby found himself needing to hire someone, he posted the opening there. Don, attending a subsequent luncheon, also heard about the new

job-postings page and checked it out. Bobby's position sounded interesting. Don sent his résumé directly to Bobby and was quickly interviewed and hired. He's been there for eight months now and is very happy with the job he landed.

Creating opportunities for alumni to talk about jobs at a monthly lunch may seem like a small thing, but for Don and several others, who found great jobs despite the awful economy, it turned out to be a very big thing.

That's a success story.

Other alumni I know have used their Caltech connection in less obvious ways. Rick Rairden '76, who has been going to the monthly Silicon Valley lunches for as long as I have, is a square dancer. He explained to me once that square dancing is just applied group theory, so what better place to recruit new dancers than among fellow alumni? Ken Dinwiddie '60 sings rather than dances. He searched the online directory for Bay Area alumni, looking for former Glee Club members who might be interested in joining his singing group. (By the way, they could still use additional singers, so if you live in this area and are interested, get in touch with Ken).

Bob Kieckhefer '74 is an alumnus whose job takes him all over the world. This past February, he visited Australia; and before he left, he searched the online alumni directory and found that there are six Caltech alumni and a former Dabney Resident Associate living in Western Australia. He e-mailed

G'DAY, TECHIE. Heading to Western Australia on business, Bob Kieckhefer '74 e-mailed Caltech alumni there—none of whom he had ever met—inviting them to join him for dinner at a local pub. All the invitees turned out for an evening of getting acquainted and swapping Tech tales at the Little Creatures pub in Fremantle, near Perth. In the front row, left to right, are Lloyd Townley, MS '78, John Bongiovanni '82, John Webb, PhD '72, and Cheryl Robertson '83; and in the back, from left, Kieckhefer, C. J. Goh, PhD '83, and Martin Storey, MS '87. them all, inviting them to join him for dinner at a local pub while he was there. The day after the get-together, he sent me an e-mail saying that there had been a 100-percent turnout. What could have been a boring evening alone turned into a great social event. Bob might not have known his dinner companions beforehand, but they had a lot in common and spent a delightful dinner together swapping stories.

In late February, I even found my Caltech connection useful in whiling away idle time on jury duty. After checking in on my first day, I was told to sit in the waiting toom until the 60 of us, called as potential jurors, were escorted down to the courtroom. The woman sitting across from me struck up a conversation and within moments she said that her daughter had graduated 10 years ago from Caltech with a degree in chemistry. As we chatted about Tech, the woman sitting next to her joined the conversation. It turned out that she was reading a book written by a Caltech alumnus, a classmate of mine. Soon, a man who had been seated in the next row stepped over to us and said that he had graduated from Caltech with a chemistry degree just a year after the daughter of the first woman! There are a lot of Caltech alumni in the Bay Area, but I never expected to run into three people with a Caltech connection, all seated in the corner of a waiting room at the courthouse. It was quite a coincidence, but it led to a conversation that made the time fly.

So the next time you are looking for a contact—for cateer or social purposes—remember the Caltech connection. Whether you come back to campus for Seminar Day, attend a regional event, search the online directory (alumni.caltech.edu), or strike up a chance conversation, you may find just the person you want to meet.

Stephanie Charles

SEMINAR DAY GENERAL SESSION TO FEATURE "A CONVERSATION WITH IRVING WEISSMAN"

The passage of California's Stem Cell Research Initiative will be among the topics highlighted this year at the Alumni Association's Seminat Day General Session keynote event "A Conversation with Dr. Irving Weissman." In a bteak from the traditional lecture format, Caltech president David Baltimore, himself a professor of biology



and a 1975 Nobel laureate, will engage biologist and biotech entrepreneur Irving Weissman in a wide-ranging discussion of current issues in biomedical research and biotechnology.

Weissman is director of the Institute for Cancer and Stem Cell Biology and Medicine and the Beehuis Professor of Cancer Biology at Stanford. A preeminent investigator in the biology and evolution of stem cells and progenitor cells—mainly blood- and brain-forming cells—he is also engaged in isolating and characterizing the rare cancer and leukemia stem cells as the only dangerous cells in these malignancies, especially with human cancers.

Weissman cofounded SyStemix in 1988, StemCells in 1996, and Celtrans (the successor to SyStemix, and now called Cellerant) in 2001, and is a director and chair of their scientific advisory boards. He was also on the founding scientific advisory boards of Amgen, DNAX, and T-Cell Sciences. The Stanford professor is a member of the National Academy of Sciences (NAS), the Institute of Medicine at the National Academy, and the American Association of Arts and Sciences. In the past four years alone, he has been named California Scientist of the Year, and has won prestigious awards from the Leukemia Society of America, the American Cancer Institute, the American Diabetes Association, the Society of Neurological Surgeons, the New York Academy of Medicine, and the NAS Council. Visit the Alumni Association website (alumni.caltech.edu) for more information about Seminar Day and other alumni activities.



Alumni Activities

May 19—Reunions for the Classes of '35, '40, '45, '50, and '55.

May 20—Half-Century Club Luncheon.

May 20—Reunions for the classes of '60, '65, '70, '75, '80, '85, '90, '95, '00, and '04.

May 20—Feynman Stamp Event, the Caltech campus (see article on page 4).

May 21—Alumni Association's 68th Annual Seminar Day.

June 10—Honorary Alumni Dinner.

June 24 and 25—Alumni College (see story below).

For more details about these and other Association activities, please visit the CAA website at http://alumni.caltech.edu/.

2005 ALUMNI COLLEGE TO INJECT DOSE OF BIOMEDICINE

The Caltech Alumni Association invites you back to campus for Alumni College 2005, "Caltech: Expanding the Boundaries of Medicine." Join fellow alumni and friends for an inside look at the many ways in which Caltech research is providing medical professionals with cutting-edge technologies and opening new frontiers in medicine.

This year's interdisciplinary program, which will be held Friday and Saturday, June 24–25, features speakers from the divisions of engineering and applied science, biology, and chemistry ALUMNI ASSOCIATION CALIFORNIA INSTITUTE of TECHNOLOGY STATEMENT of FINANCIAL POSITION SEPTEMBER 30, 2004

ASSETS

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Regional programs		17,085
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Undergraduate admissions support		60,350
Student/faculty/alumni relations		44,537
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Association ANNOUNCES BOARD NOMINATIONS FOR 2005-06

In February, the Alumni Association board of directors accepted the proposals of the nominating committee for new board officers and board members. The term of office for directors and officers will begin at the close of the annual meeting in June 2005. The election will take place at the annual meeting of the Association on Friday, June 10 at 8:30 p.m. at the Caltech Athenaeum, 551 S. Hill Ave., Pasadena, California.

Nominations for officers are as follows: President—Ponzy Lu '64 (Bala-Cynwyd, PA); Vice President—Angie Bealko '96 (Austin, TX); Treasuret—Bob Kieckhefer '74 (Lafayette, CA); and Secretary—Kelly Beatty '73 (Chelmsford, MA).

Nominations to serve on the board are as follows: Jasmine Bryant '95 (Seattle, WA); Charles Halloran '94 (Altadena, CA); Gray Jennings '67 (Houston, TX); Luis Reyna, PhD '83 (Greenwich, CT); and Peter Tong, PhD '85 (Mountain View, CA). Additionally, Bonnie Siu '81 (Libertyville, IL) has been nominated as a regional representative to serve a term of one year.

Association President Stephanie Charles '73 (Mountain View, CA) will become official past president for 2005–2006 when the new terms begin.



Dear Editor:

I saw the obituary of Richard Jaffe '53 in the last Callech News. What wasn't mentioned is that he was the founder of the post-WWII Caltech Glee Club. The glee club had been a very active and prestigious group before the war but [after the war] languished until Dick came along. Although he couldn't sing due to a throat problem, he loved vocal music, and in the winter of '52-'53, he gathered a group of eight or so singers and we sang along to his piano. I vaguely remember that we performed a couple of times in the student houses. Dick did some research and discovered that there had been money in the Caltech budget for years for a glee club. So he got us a faculty adviser, and we interviewed directors. Finding Olaf Frodsham for the job was a stroke of luck, and the test, as they say, is history. There is a lot more ro the story, and I'm sure that a lot of it is recorded in the Caltech Archives. Ron Cuchran '53

and chemical engineering. Space is limited, so mark your calendars, and check out http://alumni.caltech.edu and your mail for additional details this spring.

Deferred income	(0.5.3022)	
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INDEPENDENT AUDITOR'S REPORT

Board of Detectors, Altorna's Association California Institute of Technology, Pasadema, California

We have and/red the accompanying statement of financial posizion of the Alamni Association California Institute of Technologya non-profit organization as of September 30, 2004, and the related statements of activities and down for the year then ended These financial statements are the responsibility of management. Our responsibility is to express an opinion on these financial statements based on our audit.

We conducted our audit in accordance with audit to obtain reasonable associates above whether the financial scattering. Those standards generally accepted in the United States of Attering. Those standards require that we plan and perform the audit to obtain reasonable associates above whether the financial scatterings are fire of material misstatement. An audit includes examining, on a test basis, evidence supporting the announce and disclosures as die fluxed as a test basis, evidence supporting the announce and disclosures as die fluxed as a test basis, evidence supporting the announce and disclosures as die fluxed as a test basis, evidence supporting the announce and disclosures as die fluxed as a test basis, evidence supporting the announces and disclosures as die fluxed as a test basis, evidence supporting the announces and disclosures as die fluxed as a set of the obtain feator our optime supporting the announces and disclosures as die fluxed as a set of the obtain the out and the overall financial statements presentation. We believe the our audit provides a teasonable basis for our optimize its out optimes the financial statements before to an optime the financial statements before to a over present finally, in all material respects, the financial positions of the Atemi Association California Institute of Tachnology as of September 39, 2004, and the charges in its net as easily flows for the year them ended in conforming with accounting principles generally accepted in the United States of America.

Hanlon, Kurdinar & Gronwees, LLP Comined Public Accountances, Pasadena , California, January 20, 2005

Alumni

Notes

1937

Shao W. Yuan, MS, PhD '42, has been included in the American Biographical Institute's book *Great Minds of the 21st Century*, which features biographies of men and women who "break the normal barriers and further enhance their subjects with the substance of their thoughts." Yuan, who is 90 years old, is living with his wife, Hui Yuan, in the Sequoias Life Care Retirement Residence in San Francisco.

1941

Hugh Bradner, PhD, and his wife, Marge, celebrated their 61st anniversary last fall, at the ages of 89 and 86, respectively. According to a "How They Met" column in the December 5, 2004, San Diego Union-Tribune, the couple met at Los Alamos National Laboratory in 1943, when he was a physicist on the Manhattan Project, and she had just started working there as a secretary. When they married, J. Robert Oppenheimer offered to give the bride away, since the couple's families, lacking security clearance, were not allowed at the ceremony. Their daughter was born at Los Alamos in 1945, and the couple now has three grandchildren. Bradner spent much of his career after World War II as a physics professor at UC Berkeley, and in 1951 he invented the neoprene wet suit used by Navy frogmen. Meanwhile, his wife worked in the office of the dean of women at Berkeley and, later, in San Diego, as a real-estate broker and income-tax preparer. "Looking back on more than six decades together, the Bradners agree, 'tolerance on both parts' has kept them together. That and mutual interests, including skiing, tennis, and horseback riding.'

1944

P. Herbert Leiderman, CAVU, MS '49, professor of psychiatry, emeritus, at Stanford

University and currently a consultant with the California Youth Authority at Stockton as well as with Stanford's Center for Advanced Study in Behavioral Science, recounts that despite a "checkered path from meteorology to social sciences, and medicine, I fondly recall my evenings spent reading history of science in the library while sneaking away from meteorology studies. My spirits were raised!" One of a group of students during World War II who received certification after completing an accelerated training program in meteorology, and who referred to themselves as Ceiling and Visibility Unlimited, Leiderman went on to receive his MS in meteorology from Caltech in 1949, an MA from the University of Chicago, also in 1949, and his MD from Harvard in 1953.

started to go up, the stock responded, and I was able to retire seven years later and become in mid-life what I still am, a full-time free-lance student of sculpture. Arley, who designs jewelry and cooks inventively, and I, who gardens and makes sculptures, live in Hawaii near a perfect beach. We are blessed, finding that old age includes lots of pain, but is worthwhile anyway!" He adds that "Grandpa Speaks"—"a srory where Grandpa tries to explain Relarivity and why it matters to his grandchildren"—is posted at www.thehowardcollection.com/Grandpa/Prologue.html. "The www.thehowardcollection. com website," he continues, "also tells how Arley and 1 met, and holds images of some of her jewelry, my sculptures, carved ivory and jade, and other cool collectibles looking for a new home."

1950

Philip J. Closmann, MS, was one of three persons to receive the 2004 IOR (Improved Oil Recovery) Pioneer Award by the Society of Petroleum Engineers. Awarded in Tulsa, Oklahoma, in April 2004, the honor "recognizes the development, application, and/or management of enhanced oil recovery," he writes. Employed by the Shell Development Company for 33 years, Closmann was active in laboratory studies of performance analysis of projects involving heavy oils and oil shale. Since retiring, he has consulted and has taught courses at the University of Houston on the thermal recovery of petroleum, and courses for the petroleum industry on basic steam flooding. Closmann is the author or coauthor of 27 publications and 32 U.S. patents. He and his wife, Madeline, live in Houston, Texas, and have six children and six grandchildren.

1955

John W. McKee, PhD, of Santa Barbara, California, writes that he is the author of a new book, *New Horizons in Science*, which "describes events during the next hundred years based on fundamental science. The book offers conjectures and new approaches to understanding spin from a combination of relativity and zitterbewegung. The importance of decoherence for the origin of classical physics is described."

1956

Alan Poisner, of Overland Park, Kansas, last year won racewalking gold in his age division in the Missouri Senior Olympics in Columbia, the Kansas Senior Olympics in Topeka, the Oregon State Games in Portland, and, on October 12, at the Huntsman World Senior Games in St. George, Utah. He set records in Missouri and Kansas. In addition, the Kansas Senior Olympics voted him the Kansas Senior Athlete of the Year at the organization's September 24 awards ceremony. Previously, in 2002, he had won the Missouri and Kansas Senior Olympics and the Sunflower Games gold medals in racewalking for his age division. truths" in various disciplines, and his discussion includes "an original and plausible hypothesis on the composition of dark matter that does not require either a cosmological constant or a repulsive gravitational force to explain the observed anomalies in the expansion tate of the universe."

1963

Wayne C. Huber, professor of water resources engineering at Oregon State University, has been named chair of the National Research Council Committee on Independent Scientific Review of Everglades Restoration Progress, which will prepare a report to rhe U.S. Congress during the next two years on progress of the Comprehensive Everglades Restoration Plan, an \$8 billion, 30-year project whose goal is to return the Everglades-home to an enormous variety of subtropical wildlife-to as natural a condition as possible. The whole south Florida tegion, and especially the "River of Grass" inland from Miami, has been drained and encroached upon for over 120 years, with attendant floods, droughts, and pollution. A key aspect of the restoration will be to ensure that the natural system receives its allocated share of water, a precious and limited resource also in demand by urban areas and agriculture. The congressionally mandated review will assess progress in achieving restoration goals as well as evaluate specific scientific and engineering issues that might impact progress. An expert in urban hydrology and stormwater management, nonpoint source pollution, and transport processes related to water quality, Huber served as a professor of environmental engineering sciences at the University of Florida, prior to joining Oregon State's faculty in 1991.

1964

Robert C. Liebermann, Distinguished Service Professor in Stony Brook University's department of geosciences, writes that he and his wife, Barbara, spent the 2002-03 academic year in Toulouse, France, where he worked in a CNRS laboratory at the Université Paul Sabatier. "We enjoyed exploring southern France, visiting sites of the Cathar rebellion and pursuing my side project in Romanesque architecture. We returned to Long Island in August 2003 to take up our regular teaching positions. However, my plans were changed when I was appointed the president of the new NSF Consortium for Materials Properties Research in Earth Sciences (COMPRES), which coordinates opportunities for geoscience students and staff to conduct research at national synchrotron facilities and nurture technological projects in support of such research." Liebermann received his PhD from

JAMES GUNN SHARES CRAFOORD PRIZE

James Gunn, PhD '66, currently Eugene Higgins Professor of Astronomy at Princeton University; P. James E. Peebles of Princeton; and Martin J. Rees of the University of Cambridge have been awarded the 2005 Crafoord Prize "for contributions towards understanding the large-scale structure of the Universe." Awarded by the Royal Swedish Academy of Sciences, the prize of \$500,000 will be shared equally by the laureates.

According to the academy's press release, Gunn is being recognized for his contributions in the areas of galaxy formation, the gaseous medium between galaxies, and the presence of dark matter in galaxies. He has played a central role in several observational projects, such as the Sloan Digital Sky Survey—which has undertaken the charting of one million galaxies—and the Hubble Space Telescope.

In addition, Gunn has been named recipient of the 2005 Henry Norris Russell Lectureship, awarded for a lifetime of eminence in astronomical research and considered the highest honor of the American Astronomical Society (AAS).

Other honors include a MacArthur Fellowship, the Royal Astronomical Society's Gold Medal, the Canadian Astronomical Society's Petrie Prize, and the AAS's Heinemann Prize and Weber Award. He is a member of the National Academy of Sciences, the American Academy of Arts and Sciences, the AAS, the Astronomical Society of the Pacific, and the American Philosophical Society.

After receiving his PhD in astronomy and physics from Caltech, Gunn worked as a senior space scientist at JPL while serving a two-year term of military service with the U.S. Army Corps of Engineers. He spent a year as an assistant professor at Princeton, then joined Caltech as an assistant professor in 1970, becoming full professor in 1972. He returned to Princeton as Higgins Professor in 1980.

ing Seagate, he was the founding director of the Data Storage Systems Center at Carnegie Mellon University.

Chiu-sen Wang, PhD, professor emeritus at National Taiwan University, has just published a book titled *Inhaled Particles* (Elsevier Academic Press, 2005). He has been president of the International Aerosol Research Assembly since 2002 and received in 2003 the Distinguished Achievement Award from the Chinese Association for Aerosol Research in Taiwan.

1948

Paul Howard writes: "When I graduated, Procter and Gamble hired me as a Project Engineer. Twenty-four years later, by then the Manufacturing Manager of their newly acquired Folger's Coffee Company, I quit P & G for Hunt-Wesson Foods in Fullerton, partly to get back to California from the Midwest, which was far too far from beaches, and partly because of an irresistible challenge. Hunt-Wesson was in bad trouble, and I became part of a new team under Harold Williams, a wonderful lawyer transformed into a CEO by Norton Simon, who owned the sick conglomerate. Harold and his new crew did turn the company around. Stock options were a big part of what lured all of us into this swamp of a company, and they paid off. When we began running it right the earnings

1962

Daniel Romm, of Seattle, Washington, reports that his new book, A Grain of Salt—Why You Must Make Your Own Decisions, is available from Xlibris.com, Amazon.com, and Barnesandnoble. com. "This book is about wisdom," he writes, "the ability to make good decisions . . . You must never merely accept arguments, even from purported experts, at face value. You need to take them with a grain of salt and do your own independent analysis in order to make good decisions, which always require accurate facts and reliable theories." He challenges "obvious Columbia University in 1969. He and his wife live in East Setauker, New York.

1966

Mark Kryder, MS, PhD '70, chief technical officer and senior vice president of research at Seagate Technology, has been selected by VARBusiness magazine as a top Technology Innovator for 2004. He was recognized "for his contribution to the storage industry and helping establish Seagate as a leading technology company fueling the invention of new storage products that push the IT envelope." Seagate's release continues: "Dr. Kryder identified the 2004 demonstration of world-record magnetic recording areal densities near 200 Gigabit per square inch as Seagate's top technology innovation." The author of over 350 publications and holder of 21 patents, he joined Seagate as senior vice president of research in 1998. Prior to join-

1969

Sébastien Candel, MS, PhD '72, has been a professor at Ecole Centrale Paris since 1978 and has also held a chair at Institut Universitaire de France since 2001. He was selected last year to receive the Pendray Award of the American Institute of Aeronautics and Astronautics (AIAA), with the citation "For extensive and pioneering technical contributions to aerospace literature, especially for seminal papers on the dynamics of perturbed flames, computational aeroacoustics, advanced rocket combustion processes, and hypersonic flows." Presentation of the award took place on January 11 of this year at the AIAA Aerospace Sciences Meeting in Reno, Nevada. He also received the Aeroacoustics Award of the



Confederation of European Aerospace Societies and was elected a fellow of both the Institute of Physics and the Association Aéronautique et Astronautique de France, all in 2004.

1971

François Wildenberg, MS, reports that his company, the French firm CMW, in collaboration with the research center INRIA, has developed a hexapod for the high-speed milling of very large parts, and that the first two Hexapode CMW 380s have been sold. Airbus is interested in using the technology for machining, riveting, polishing, and replacing chemical machining, and CMW with the help of customers and prospects is continuing to discover efficient new utilizations. He adds that his three children-Laura (14), Julia (11), and Thomas (10)-are doing extremely well at school, "better than their father," he says. "So I am dreaming they could, one day, attend Caltech. For the last two yeats," he continues, "I have started enjoying climbing in Contrexeville. It is a lot of fun. I am still pursuing diving. So I decided to go, for New Year's Eve, to the Maldives islands. Luckily, at the last minute, I had to cancel my trip for personal reasons. So I survived the rsunami."

1973

Harold McGee has published a completely revised and updated edition of his book On Food and Cooking: The Science and Lore of the Kitchen, originally published in 1984 and widely considered a classic. Expanded by two-thirds to nearly 900 pages, the book explores subjects ranging from what hunger is and how digestion works to the basics of cooking, along the way investigating a variety of topics, including individual foods, the effects of alcohol, how food spoils, and why rurkey brining is a bad idea. He is also the author of The Curious Cook: More Kitchen Science and Lore, and his website can be found at www. curiouscook.com. He is married to Sharon Long '73, who is the Vernon R. and Lysbeth Warren Anderson Dean of Humanities and Sciences, and the William C. Steere Jr.-Pfizer Inc. Professor in Biological Sciences, at Stanford University.

Six past presidents of the Caltech Alumni Association, all of them "Ricketts Rowdies" in their carousing Caltech days, got together recently for this commemorative photo on the steps of the Athenaeum faculty club. From left (with presidential years in parentheses) are Dick Van Kirk '58 ('77–'78), Craig Elliott '58 ('69–'70), Rube Moulton '57 ('71–'72), Jim Workman '57 ('80–'81), Phil Reynolds '58 ('81–'82), and Tom Tisch '61 ('03–'04).

May 19 of last year and again at the university's commencement ceremony on May 20.

1977

Jacqueline Gish, PhD, director of directed energy technology and products for Northrop Grumman's Space Technology sector, has been elected a fellow of the Directed Energy Professional Society (DEPS), which was founded in 1999 "to foster research and development of directed energy technology for national defense and civil applications through professional communication and education." The holder of three patents and the author of 38 publications and presentations, Gish has been widely recognized for significant contributions to the development of high-energy lasers. According to Northrop Grumman, "Gish has led company research efforts in chemical physics, chemical oxygen iodine lasers (COIL), and solid-state lasers." In addition to her Caltech doctorate, she has a master's of business administration from USC. She is a member of DEPS's Board of Science and Engineering Advisors, and next June in Los Angeles she will be the program chair of the DEPS-sponsored Solid State and Diode Laser Technology Review.

1980

Frank L. Bernstein has been elected a partner of the law firm Kenyon & Kenyon, which specializes in intellectual property and has offices in Silicon Valley, New York, and Washington, D.C. According to the firm, "Mr. Bernstein joins Kenyon & Kenyon with 20 years of legal experience. He is well known for his litigation

Catherine D. Strader, PhD, executive vice president for discovery research at Schering-Plough Research Institute, has been named a 2004 Woman of Influence by NJBIZ, a statewide publication specializing in New Jersey business news. She is one of 25 New Jersey women featured in NJBIZ's December 13 special issue, in honor of their leadership and professional accomplishments. With more than 150 publications to her credit, Strader is a recognized expert in the field of receptor biology and leads a team of more than 850 scientists at Schering-Plough, where she is responsible for drug discovery operations. In particular she leads the group that identified the molecular target of Zetia (ezetimibe), a medication that has helped thousands of people worldwide lower their cholesterol. She also chairs the research leadership committee at Schering-Plough Corporation and is a member of the operations management team. Prior to joining the Schering-Plough Research Institute in 1995 as vice president of CNS (central nervous system), cardiovascular and genomics research, she served as executive director of the department of molecular pharmacology and chemistry at Merck Research Laboratories.

1984

Eric Pan, president of Meridian Deployment Corporation (MDC), reports that he has published a new book, *Perpetual Business Machines: Principles of Success for Technical Professionals.* He

writes, "The content of the book should be of general interest to Caltech students, faculty members, and alumni who would like to learn more about what the technology business is all about." According to the book's summary, "This comprehensive manual makes clear the essential business knowledge required by technical professionals in the new economy: a global economic environment characterized by knowledge, convergence of technologies, and free markets." MDC, located in Fremont, California, is a consulting, publishing, and training firm providing career and business publications for engineering and science students and professionals. Pan's book can be ordered online at http://www.mdc-learning.com.

1985

Richard "Rick" Gilbrech, MS, PhD '91, has been named deputy director of the NASA Engineering and Safety Center (NESC). He had been a principal engineer at NESC and, prior to that, assistant director of NASA Stennis Space Center (SSC) in Mississippi. An independent organization formed in November 2003 in the wake of the *Columbia* accident, the NESC "coordinates and conducts robust engineering testing and safety assessments to support critical NASA projects and programs." Gilbrech began his career with NASA at SSC in 1991, working in propulsion test technology. He has since undertaken a variety of management tasks, including as project manager for the National Aerospace

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Name_

Degree(s) and year(s)_

Address

New address?_

1975

Suzanne Ostrand-Rosenberg, PhD, professor of biological sciences at the University of Maryland, Baltimore County, has been elected to the Johns Hopkins University Society of Scholars. According to the university's release, "Ostrand-Rosenberg's career has been a model of scholarship. She has achieved a fruitful balance between excellence in research and clarity and quality in teaching. She has made major contributions to the direction of tumor immunology, and has developed relevant animal models for translating her research into the clinical area. In addition, she has made a major commitment to reaching and mentoring students in her field. Dr. Ostrand-Rosenberg presently holds the Robert and Jane Meyerhoff Chair of Biochemistry at UMBC." She, along with 14 other scientists and clinicians, was honored during the society's 35th annual induction ceremony on

and client counseling skills in the computer, software, electronics, semiconductor, mechanical and e-commerce fields." He previously managed the Silicon Valley office of Sughrue Mion PLLC, and he received his JD and MBA from the University of Wisconsin–Madison.

Don Brotemarkle met programmer, musician, and helicopter pilot Laura McColm while in the Bay Area doing research into modern applied philosophy, and they are now engaged. Brotemarkle provides services adapting open-source software for businesses, and McColm works at D-M Information Systems Inc. in Davis, California. "They are contemplating fantastical and utterly impractical wedding plans. Current notions include an opera and blue elephant parade." They add: "At this rare, ETA is approximately 10 years."



Plane project, as chief of the Propulsion Test Engineering Directorate, and as manager of SSC's Program Integration Office. His honors include a NASA Exceptional Achievement Medal in 2002 and being named a Space Flight Awareness Launch Honoree in 1999.

1986

Joseph Yang, MS '87, PhD '91, writes: "I have joined Cryptography Research, Inc. in San Francisco as its Vice President and General Counsel. My responsibilities include managing the legal aspects of the company's patent, licensing, and litigation activities. In addition, my wife, Roxana, and I have started our own law firm, PatentEsque Law Group, LLP. We specialize in helping companies with licensing, joint ventures, and intellectual property matters. Before Cryptography Research and PatentEsque Law Group, I led the intellectual property transactions practice in the Palo Alto office of Skadden, Arps, Slate, Meagher & Flom LLP, a large mulrinational law firm. We continue to live in Los Alros Hills, California, a small town in Silicon Valley, with our kids, Jacqueline and Russell. I welcome old friends and classmates to drop me a line at joe@patentesque.com."

1987

Hamid Savoj, a senior vice president and cofounder of software maker Magma Design Automation of Santa Clara, California, writes that he "was in New York with the rest of Magma management to kick off trading at the Nasdaq stock market on May 6, 2004, in celebration of Magma's third year as a public company and its record-breaking annual revenue of more than \$113 million."

Mark Wieczorek is pleased to announce that his wife, Ann, has given birth to their first baby, "a beautiful baby girl, Brianne Georgette Anh-Phuong Wieczorek, on August 30, 2004. Brianne's Godfather is Ed Zanelli, BS '87 (Fleming), with whom she shares her birthdate." Brianne weighed in at 7.5 pounds and measured 20 inches. Wieczorek adds that "the whole family is doing well."

1989

Laurie Leshin, MS, PhD '95, Dee and John Whiteman Dean's Distinguished Professor of Geological Sciences and director of the Center for Meteorite Studies at Arizona State University, has joined the board of directors of the Planetary Society. The organization, headquartered in Pasadena, California, is the world's largest representing space interests.

Linda Rowan, MS, PhD '93, writes, "I have

memotizing trading cards as a child, the new position makes full-time the statistical studies he had previously offered to NBA reams in exchange for free tickers. Sonics president Wally Walker, who has a Stanford MBA and himself loves numbers, had as general manager overseen the development of player-rating software for the team and last year paid for outside analysis, so that bringing in Oliver represents a logical next step. Interested in what makes players and teams successful, Oliver studies efficiency on the scale of seasons and careers as well as of single games. He has even published a book on the subject, Baskethall on Paper. "Even though basketball is a form of trivial entertainment," he says, "I still like the kind of science that I'm doing."

1993

Jessica Warren, née Nichols, reports that she relocated in July 2003 to Pennsylvania, the home state of her husband, Brett. She is parricularly excited about having started a new career last November as director of admissions and financial aid at the Harrisburg Academy, which was founded in 1784 as "an independent, coeducational, college preparatory day school with a diverse student body in nursery through 12th grade," and is located on 24 acres about one mile west of the Susquehanna River, in Wormleysburg. "This step was raken in very large part as a result of the volunteering at Caltech for the Alumni Fund and Undergraduate Admission Support programs." She adds that she and Brett are enjoying life as parents to their two children, Alec (three and a half) and Rebekah (21 months). "We've been lucky enough ro have already had two Techers stop by for visits since relocating last summer. Taletha Detrington (BS Bio '93) and Rich Baltzersen (BS Chem '93) have stopped in to say hi. Taletha is still in Hawaii working with early childhood developmental psychology at UH after receiving her MS, and Rich has finally gotten his dream job-as an agent with the FBI. Now if only he could find a decent condo in NYC for him and his greyhound, Tess . . . Drop us an email sometime! jnichols@alumni.caltech.edu."

2004

Joseph Jewell will attend the University of Oxford as a Rhodes Scholar. A grad student at the University of Michigan, he will now spend two years working on a master's degree at Oxford. As a specialist in scramjer engines, which show promise in significantly speeding up subspace travel, he plans to seek his PhD in aeronautics at either Caltech or Michigan after he returns to the United States. The scholarship is "a great honor," Jewell says. "I hope to generally soak up the medieval atmosphere. I had a second major in medieval history at Caltech, so it will be pretty cool for me to study in England."

Crime and Computation. . from page 13

ing in a rented Los Angeles house, a 1909 California Craftsman, where the Eppes-at-home scenes are filmed. Grynkiewicz says that he churned out enough material to fill the 17 blackboards that Charlie frantically covers with equations during the show's second episode. Since blanketing the blackboards required more math than was expected, the grad student had to come up with some of his own material. "Thankfully, the script called for combinatorics."

On those occasions when Charlie was called upon to write his own equations, "I tried to show David Krumholtz how a mathematician would do it," said Grynkiewicz. "It has to be quick and emphatic." He didn't think his hand would be featured in many future episodes, however. The producers, he said, figured that the versatile Krumholtz would soon be able to do some of his own close-up scribbling and that production artists could do the rest.

As for the Caltech campus, it will appear in subsequent shows, but strict Institute policies permit filming only on weekends and when school is not in session. At the Caltech premiere, the news that USC and other campuses will also stand in for "Cal Sci" drew a predictable shudder from the Beckman crowd.

In fact, the Institute came extremely close to being identified as Charlie's university, according to Caltech's public events director Denise Nelson Nash. The stumbling block was that the network officials were unwilling to allow the Institute script review.

"CBS wanted to have complete creative control, which was fine with us, as long as there were no illegal or illicit relationships or activities depicted involving Caltech people." But the network decided against allowing even that level of oversight, Nelson Nash said.

Producers Heuton and Falacci say that CBS was "wildly enthusiastic"

and Alien, while Tony's list includes Spy Game, Crimson Tide, and Days of Thunder.

Meanwhile, Numb3rs has garnered lively, albeit mixed reviews. Newsweek called it "a gripping hour of TV with unexpected shades of character, crisp acting, and enough gee-wizardry to excite anyone with even a quark of scientific curiosity." Tom Shales of the Washington Post was less enthusiastic, declaring, "No matter how often we're told how unbearably fascinating it all is, it isn't. It's more likely to trigger horrifying flashbacks of algebra class."

Critical commentary aside, the CBS team behind Numb3rs clearly hopes that dazzling mathematics will do for their series what forensics has done for CBS's immensely successful CSI franchise—secure a large and loyal following among viewers with a proven appetite for crime dramas.

Whatever the show's outcome, Lorden admits that the attention should be very flattering to mathematicians everywhere. But he figures that more than flattery is at work here.

"I think we are in uncharted territory in that I don't think there's been a commercial prime-time TV series that has tried to apply mathematics in an integral way. The producers of *Numb3rs* have said on many occasions that Caltech is the model they are thinking of. I think that it's an attractive thing. I know that it's good for Caltech."

Lorden adds that he, for one, is impressed by *Numb3rs*'s success in making mathematics appear dynamic and relevant, rather than like some stodgy old relic. "Contrary to what most people think, as a field of study, mathematics is not all worked out. Many of the most interesting problems are yet to be solved. I think *Numb3rs* portrays that very well."



accepted a challenging new position as Director of Government Affairs at AGI [the American Geological Institute] and, as of 24 January, 1 am no longer a Senior Editor at *Science* magazine. I will serve as a liaison between geologists and the government. I hope that geologists and other scientists will devote some time to science policy, outreach, and education. Feel free to contact me if you'd like to help." Het e-mail is rowan@agiweb.org.

1990

Dean Oliver has joined the Seattle SuperSonics basketball team as a full-time statistics consultant, in the process taking a pay cut of 75 percent from the six-figure salary he made as an environmental engineer, according to the *Seattle Post-Intelligencer* (http://seattlepi.nwsource.com/ basketball/205859_sonx30.html). The culmination of a lifelong pursuit that goes back to his

about taking a chance on Numb3rs, whose ultimate fate will teside in, well, numbers. Cannily scheduled to debut immediately after the American Football Conference Championship game, the pilot attracted 25 million viewers, placing in the top 10 that week. The show has slipped a bit since then, but has performed well enough to convince CBS to order more episodes. Adding to the cachet and buzz surrounding the series is the involvement of brothers Ridley and Tony Scott as executive producers. Both are known for directing action movies: Ridley's filmography includes Black Hawk Down, Gladiator,

Obituaries

1928

Elbert E. "Al" Miller, of Bellevue, Washington, on May 16, 2004; he was 97. A member of the Aviation Hall of Fame, he spent two decades in the aircraft industry, working at Douglas, Fleetwings, and Boeing; he was project engineer at Douglas for the A-20 attack bomber, worked in aircraft planning and design at Fleetwings, and participated in the B-29 program at Boeing. Following World War II, he became assistant sales manager at Boeing and was instrumental in selling the Stratocruiser to Norwegian Airlines and United Aitlines. He also managed the C-97 cross-country speed flight, which on January 9, 1945, broke all previous transcontinental speed records. In 1949 he joined New York Life as an insurance agent, earning the Chartered Life Underwriter (CLU) designation and serving as president of the CLU Seattle Chapter. His many honors with the company included being named one of the Men of the Year in 1968. His interests included woodworking, investing in real estare, boating, auto racing, and civic affairs. Predeceased by Jane, his wife of more than 50 years, he is survived by his daughters, Linda Mapes and Mary Jane McLarney, and by four grandchildren and a great-grandson.

1929

Ernie Hugg, MS '30, on March 5, 1998; he was 90. He worked at Caltech for 31 years, retiring as a Physical Plant senior engineer in 1975.

Anthony J. Larrecq, of Newtown, Pennsylvania, on January 16, 2005; he was 96. After graduating from Caltech, he joined General Electric, where his work with high-temperature turbines ultimately led to the basic patent for today's gas-turbine engine. He subsequently moved to the Allison Division of General Motors, and later formed Power Generators Inc. (PGI), contracting with the Army Air Corps to convert the exhaust of reciprocating engines into steam to drive an auxiliary propeller, in order to extend the range of Tokyo-bound Boeing bombers. He conceived and superintended the design of the Navy's first 240,000-horsepower linear piston engine for launching aircraft at sea, and he was responsible for the winning design of a post-World War II seawater distillation plant for submarines. Larrecq served as the president of PGI for more than 50 years, during which time the company was a prime Navy contractor in engineering, design, and technical services for aircraft-carrier catapults and arresting gear. Cited by the Navy for his many contributions, he was in addition responsible for the administrative management of numerous other engineering projects for all service branches of

continents would be connected, and he believed such a system would promote understanding and compassion among peoples. He wrote numerous letters to Congress expressing his views. During his professional career he worked for the federal government, including as chief engineer on aid projects overseas, and he and his family lived in Oceania, Asia, and Africa. He fell in love with Kenya in 1962 while piloting his own airplane and established a second home there, and his daughter Yony settled there permanently. In 1969 he retired to Inverness, California, where he surveyed the Point Reyes National Seashore in its entirety, designed and built footbridges across First Valley Creek, and continued to consult into his 90s. He and his wife, Cecil, who died in 1997 after 65 years of marriage, were one of several couples featured in a PBS documentary titled For Better or for Worse. An examination of successful marriages, it resulted in a book, Living Happily Ever After: Couples Talk About Lasting Love. He died at Yony's home in Lamu, and in furtherance of his project to create new groves of trees rather than destroy old ones for coffin wood or fuel for cremation, was buried as he had wished, without a coffin, embalming, or cremation, under a newly planted coconut tree. He is survived by his daughters, Nancy Harlow, Yony Waite, and Carol Arnold, and by six grandsons and 15 great-grandchildren.

1930

Frank Edward Alderman, of San Luis Obispo, California, on May 12, 2004; he was 84. He held several engineering positions, including that of city engineer for South Gate, California, and then in 1949 founded Alderman, Swift and Lewis, a consulting engineering firm now known as ASL. He also served as South Pasadena's city engineer for several years, and he consulted on and designed water systems for a number of Southern California cities. Active in Rotary International, he served as president of rhe South Pasadena Club. He was a member of several engineering and water-works organizations, and he served as an expert witness in court and public-utility matters and as an arbitrator for the American Arbitrarion Association. He retired in 1974 to pursue golf, travel, and other pastimes. Predeceased by Frances, his wife of 65 years, he is survived by two sons, Robert and Thomas, and by four grandchildren and six great-grandchildren.

1931

Jack H. Amann, MS '32, of Diamond Springs, California, on April 10, 2004; be was 83. An electrical engineer for 36 years, he was manager for the western states for Square D Company. spent 44 years with the Pacific Telephone Company, retiring in 1977 as a division manager. He was a registered industrial engineer in the state of California, and he served as a Caltech Alumni Association director. He is survived by his wife, Mildred; a son, Robert; and five grandchildren.

Edward Simmons, MS '36, of Pasadena, California, on May 18, 2004; he was 93. Known for having invented the strain gauge while still a Caltech student in 1936, he had to fight for the patent after World War II and subsequently earned more than \$1 million in royalties. During the war the gauge enabled engineers to relieve aircraft of extra weight. The gauge measures stress on metal and other materials, and today it is used on everything from bridges to airplanes-previously, engineers hadn't had a means for precisely measuring the stress placed on objects. Simmons's awards for the invention included a 1987 honor from the New York Academy of Sciences. He liked to insist that his work was as influential as that of Linus Pauling, and Jack Roberts, Caltech's Institute Professor of Chemistry, Emeritus, recalls once walking into his office and finding a package from Simmons that contained a bathroom scale, his way of making the point that his invention was likely to turn up in almost anything. In later years he fought to remain in his childhood home in Pasadena, but was evicted in 1990 in the first of a series of property disputes. He was noted for his colorful clothing, particularly tights, tutus, and blouses, which Simmons claimed constituted the most practical clothing for hot climates. According to the Pasadena Star-News, retired nurse and longtime friend Adelle Crosse helped care for Simmons as he faced increasing financial constraints and after he was diagnosed with prostate cancer last year. "Crosse remembered his blunt humor and the 'twinkle in his eye whenever he talked about science with students and engineers." She particularly recalled his reaction when a student, unaware of Simmons's invention, asked what he thought about a strain gauge for guitars. "He turned around and said, 'They've already done that,' Crosse said."

Thomas P. Thayer, PhD, of St. Petersburg, Florida, on May 14, 2004; he was 96. A retired geologist for the U.S. Geological Survey, he was a fellow of the Geological Society of America and of the American Geological Union. He was a member of Unitarian Universalist Church in St. Petersburg. He is survived by his wife, Arnetta M. Brown; a daughter, Carolyn Thayer; and three grandchildren and seven grear-grandchildren.

- 10 m

1938 N. Robert Maines, Ex, on June 12, 2003.

George H. Osborn, in Rancho Mirage, California, on February 27, 2004; he was 88. After graduating from Caltech he worked for two years designing mechanical oil-well pumps, then went to work for Lockheed Aircraft, in Burbank, California, in 1941. In 1942 he married Marjory Lou Curtier, and together they built and remodeled houses, rode horses, and managed orange groves while Osborn pursued his engineering career. In 1948 he joined Aerojet General Corporation, where he participated in the design, construction, and launch of liquid-fuel rockets, and in the late '50s the family moved to Northern California when Osborn transferred to Aetojet in Sacramento. They built a home in Loomis, where they ranched, and later built another at Lake Tahoe, where he and his wife retired. After retiring they traveled and split their time between the Tahoe home and Agua Caliente Springs in Southern California. He is survived by Marjory, his wife of 61 years; three sons, David, Steve, and Glen; a daughter, Judie; and eight grandchildren.

Philip F. Shepherd, of Carlsbad, California, on July 9, 2004; he was 88. After graduating from Caltech, he went into the Navy and was assigned to the Bureau of Ships, Research and Development, in Washington, D.C., where he was involved in the design of landing craft. He was eventually assigned to the Amphibious Training Command in Coronado, California, where a shortage of officer quarters led to his being put up at the Hotel Del Coronado. Later he met Lesley Kenworthy, who was also in the Navy, and they were married in 1946. After the war, they moved to Pasadena, California; Shepherd completed an executive-training program and became sales manager for Circle Seal Valve, a small company specializing in manufacturing valves for aerospace and other applications. His establishment of a worldwide distribution network led to the company receiving an E-award, and he became the firm's president. He retired to Coronado, where he enjoyed the ocean, tennis, and flying his plane. When his health began to fail, he moved to a retirement community in Carlsbad. He is survived by Lesley, his wife of 58 years; two sons, Geoffrey and Douglas; and a brother. John.

1939

Edgar Allen Griswold, of San Marino, California, on October 22, 2003; he was 87. He participated in the development of JATO (jet-assisted takeoff) units for the then Aerojet Engineering Corporation, and roward the end World War II he went to work for the Army Corps of Engineers. In 1945 he resigned and started his own business as a general contractor, founding and becoming president of Griswold Construction Inc., which completed major public works and private projects around the state of California. These included highway bridges, parking structures, outfall sewers, and storm drains, among them one under the east end of Santa Anita race track. He pioneered the method of tilt-up construction now commonly used in large concrete commercial buildings and warehouses. His real love, however, was the ocean, and he developed an expertise as a deep-sea diver that he put to use up and down the coast, in lakes, and behind dams. He is survived by Dorothy, his wife of 64 years; two sons, Charles and James; and four grandsons and two great-granddaughters.

the U.S. government. He held 20 patents in the field of heat-transfer equipment and rorating and reciprocating machinery, and he was a registered professional engineer in Pennsylvania and New Jersey. Elected to the honor society Tau Beta Pi while at Caltech and, in his junior year, as an associate member of Sigma Xi, he was a lifetime member of the American Society of Mechanical Engineers. Predeceased by Leonia ("Alice"), his wife of 50 years, he is survived by rwo daughters, Leigh Vanden Heuvel and Linda Yarnes.

Howard W. Waite, MS '50, in Lamu, Kenya, on March 7, 2004; he was 96. A retired engineer, he had proposed a visionary United National Interterritorial Transport Entity (UNITE), a global tailway system whose stations would be staffed by members of the United Nations; his concept included a bridge or tunnel across the Bering Strait, so that all A lifelong golfer, he served as president of California Golf Club and assisted in establishing a seniors program at the Cameron Park Country Club; he also was noted for having nine holes in one. Predeceased by Joy, his wife of 64 years, he is survived by a daughter, Jacque Bartholomew.

William F. Arndt, on June 16, 2004.

1932

Ray T. Oelschlager, of Ventura, California, on March 23, 2004; he was 94. He was an aeronautical engineer.

1933

Robert S. Rose Jr., PhD, on October 6, 2001.

1934

J. Robert Schreck, of Los Altos, California, on March 3, 2004; he was 91. Elected to Tau Beta Pi, the national engineering honor society, he 1935

Robert O. La Rue, on August 2, 1996.

Alfred L. Slater, MS '41, on October 30, 2003.

1936

Howard F. Hamacher, on December 23, 2003.

John H. Waddell, of San Marino, California, on February 27, 2004; he was 91. His wife writes, "He was very active in the development of Northridge, California, where he designed and built many buildings. His engineering skill was most evident at the time of the big earthguake—none of his buildings had even a crack." The couple moved to San Marino in 1973, where Waddell spent 15 years on the plaaning commission and was also active in the Rotary Club. He is survived by Mildred, his wife of 57 years; a son, James; and a grandson. Charles E. Pertingall Jr., of Tucson, Arizona, on November 16, 2003. He is survived by his wife, Marge.

Frank Radovich, on March 1, 1993.

Frances A. Robertson, on January 12, 2004. He is survived by his wife, Margaret.

Bertram Yood, MS, of Eugene, Oregon, on March 17, 2004; he was 87. After earning his master's degree from Caltech, he went on to receive a PhD in mathematics from Yale, where he had earlier been awarded his BS. He saw active duty as an officer in the United States Naval Reserve during World War II, with tours of duty including the USS Augusta and the Naval Research Laboratory, where he conducted radar research. He served on the faculties of Cornell University, the University of Oregon, and Pennsylvania State University. After retiring in 1982, he was a visiting professor at several universities in both the United States and Canada. He returned to Oregon in 2001 and most recently was a visiting professor at rhe University of Oregon. A member of the Council of the American Mathemarical Society, Yood served on committees of that society and the National Academy of Sciences. He authored nearly 70 articles in mathematical journals, as well as two books, and he continued his mathematical research up until the time of his death, leaving two articles awaiting publication. He was also an avid bridge player, and he was past president of Temple Beth Israel in Eugene. He is survived by Shirley, his wife of 60 years; two sons, Robert and Arthur, a daughter, Janet; and seven grandchildren.

1940

William R. Cleveland Jr., MS '42, on June β , 2004; he was S5. During World War II he served in Africa and Europe with the U.S. Army Air Forces. After the war he taught geology and related subjects at the College of the Sequoias, in Visalia, California. In 1979 he retired to Whidbey Island, in Washington Srate. Predeceased by Jane, his wife of 61 years, he is survived by a son, Ralph, and by a grandson and two great-grandsons.

Charles Croxall LeGrand, of Kane'ohe, Hawaii, on April 25, 2004; he was 87. He was a retired electrical engineer. He is survived by two daughters, Suzy Parker and Janine LeGrand; two sons, Biff and Paul; and six grandchildren and six great-grandchildren.

1941

D. Francis Taylor, of Brooksville, Florida, on

surgeon for more than 40 years. He is survived by Anne, his wife of 60 years; four daughters, Christine Barish, Sharon Brown, Lynne Dusseau, and Stephanie Christiansen; two sons, Lawrence and Russell; and 11 grandchildren and one great-grandchild.

Hollis K. Hanchett, of Sun City, California, on October 1, 2002; he was 81. He served in the U.S. Army Air Forces from 1943 to 1948 and worked as an engineer at Northrop Grumman for 20 years. He is survived by his wife, Nora; a son, Kris; two daughters, Holly O'Brien and Susan Hanchett; a stepdaughter, Vici Williams; and seven grandchildren, seven great-grandchildren, and two great-great-grandchildren.

Joseph W. Mixsell, MS, on June 21, 2003. He was a retired colonel in the U.S. Air Force. He is survived by his wife, Eleanor.

John E. Wissinger, MS, of Houston, Texas, on April 12, 2004; he was 89. The first weatherman for Houston's KPRC-TV and a founder of the Harris County Senior Softball League, Wissinger joined the station in the early 1950s. He served as its weatherman on a part-time basis for 14 years, developing two evening newscasts. The use of radar was one of Wissinger's innovations in weather reporting. He would use federal weather bureau maps and information, illustrating in chalk on large maps of Texas and the United States fronts, wind speeds, and temperatures, as well as other data. In 1961, Wissinger monitored Hurricane Carla through 113 hours of continuous broadcasting as it pounded the Houston area. After retiring, Wissinger in 1981 helped organize the Senior Softball League, for players age 50 and up. He participated as a player and coach for the next 15 years. During World War II, Wissinger served in the Army Air Forces as a wearher officer in the western Pacific. He is survived by Christine, his wife of 55 years, and by two sons, John and Brad.

1944

Thomas Allen Hudson, of Cambria, California, on December 30, 2004; he was 81. He was an officer in the U.S. Navy construction battalions (Seabees) during World War IJ, serving in the Pacific theater. A civil engineer with Chevron for 39 years, he retired in 1985 to pursue interests in travel and golf, spend time with his family and friends, and serve his church and community. He is survived by Lorna, his wife of 58 years; four daughters, Ann, Mary, Laurie, and Jane; and two grandchildren.

1945

thousands of nuclear weapons were actually in circulation worldwide, how vulnerable nuclear materials were to theft, and how plausible the construction of nuclear weapons by terrorists had become. "I discovered willful deceptions at all levels of government concerning the effects of nuclear weapons on people, on buildings, on military equipment, on everything," he later wrote. "My peacekeeping rationale collapsed.

... I have worked since then to rid the world of nuclear weapons." Leaving government work, he started the consulting group International Research and Technology Corporation and, later, Nova Inc., which sought to develop alternatives ro nuclear energy. He authored or coauthored several books, including *The Restoration of the Earth and Nuclear Theft: Risks and Safeguards.* He also taught at Princeton University and was a member of the president's commission that investigated the accident at Three Mile Island. He married Caro Arnim in 1948, and they divorced in 1992. He is survived by five children, 10 grandchildren, and nine great-grandchildren.

1947

Paul G. Atkinson, MS, of Blue Bell, Pennsylvania, on October 1, 2002; he was 80. A retired colonel in the U.S. Air Force, he is survived by his wife, Fairinda; his children, Dale Murphy, Virginia Atkinson, Gay Atkinson, Sheryl Atkinson, and Hope Riley; 10 grandchildren; and a brother, Robert.

John Wray Bennett, MS, of Colorado Springs, Colorado, on April 8, 2004; he was 83. He served for 30 years in the U.S. Air Force, retiring with the rank of colonel. He flew fighter jets, including during the Korean War. Later he worked at the Pentagon in research and developmenr; commanded the 83rd Fighrer Interceptor Squadron, which was deployed to Formosa during the conflict between Chinese Nationalists and Communist China over the Formosan Straits offshore islands; and served as USAF representative to NATO in Paris. He rerired to Colorado in 1972 to enjoy hunting, fishing, and camping. He is survived by Doris, his wife of 61 years; three daughters, Joanne, Laura, and Marcha; three sisters, Helen Koesy, Sarah Bennett, and Jean Underwood; one brother, Tom; and five grandchildren and two great-grandchildren.

Arthur F. Blight, MS '47, of Peoría, Arizona, on February 6, 2004; he was 82.

Byrne Eggenberger, MS '47, of Santa Rosa, California, on June 3, 2004. A World War II veteran, he was a licensed professional engineer and a member of the California Structural active in Lake Grove Presbyterian Church and in the Kiwanis Club, participating in highway trash clean-ups, the Red Cross blood donors' program, and volunteer work fund-raising for Kiwanis scholarships. In September 2001 Pritchard's Parkinson's disease required that he move into an assisted-living facility. While there he wrote and published his memoirs for family and friends, and on his computer developed and produced a songbook for weekly singalong sessions for the residents of the facility. He is survived by his wife, Ann; two sons, Mark and Jon; a daughter, Tina Lang; four grandchildren; and three stepchildren, Wendy Scott, Beth Deveny, and David Colledge.

Patrick Michael Quinlan, MS, PhD '49, on November 8, 2001; he was 81. A former senator of the National University of Ireland (NUI) and a professor of mathematical physics, emeritus, ar University College Cork (UCC), Quinlan was noted for initiating a doctoral program at UCC as well as preparing a steady stream of students from engineering and marhematical physics to go to Caltech and elsewhere for their doctorates. Many of his former students now hold professorships and lectureships in universities worldwide, and two have served as presidents of UCC. Quinlan returned to UCC from Caltech in 1949 as a lecturer and was appointed professor in 1951, holding that position until his retirement in 1987. An early focus of his research was elasticity, and he worked with the U.S. Air Force on torsion and elastic-plate problems, which are a significant factor in the construction of aircraft. He recognized the importance of electronic computers and was influential in setting up a chair of computer science at UCC. In the early 1960s he developed as a major research theme the edge function method for solving linear boundary value problems, and he continued to develop and refine his method right up until his death. Elected in 1957 to the Irish Senate by the graduates of NUI as one of the university's three members-and serving until his retirement in 1977-Quinlan was awarded a DSc for published work by NUI in 1963 and elected to the Royal Irish Academy in 1978. He was also a longtime member of UCC's governing hody and of NUI's senate. Of his journey to and time at Caltech in the wake of World War II, his wife writes: "Paddy and I traveled to the U.S. Sept. '46 on board the first liner (the S.S. America and still a troop ship) that called to Cobh [Ireland] after the war. We crossed the continent on the old Santa Fe. We spent three delightful years in California. Paddy revisited Caltech many times. For my part I would dearly love any news of his classmates. We formed lasting friendships." Quinlan is sur-

July 16, 2003.

1942

Stewart Davis, 85, of Manlius, New York, on March 23, 2004; he was 85. Retired president and CEO of Syracuse Supply Company, he was a U.S. Navy veteran of World Wat II. He served on the boards of Community General Hospital, Marine Midland Bank, the Boy Scouts of America, and the Rescue Mission. He was also a member of the Century Club and the DeWitt Community Church. He is survived by Jane, his wife of 57 years; a daughter, Deborah Frank; a son, Srewart; a sister, Marian Davis; and three grandchildren.

1943

Harry F. Brown, Ex, of Newport Beach, California, on November 7, 2003. An Air Force veteran who served in both World War II and the Korean War, he practiced medicine in Arcadia and Pasadena as an eye physician and

Theodore B. Taylor, of Silver Spring, Maryland, on Ocrober 28, 2004; he was 79. After doing graduate work at UC Berkeley, he went on to design atomic bombs at Los Alamos National Laboratory. While others worked on the first hydrogen bomb, he developed fission weapons ranging from the 50-pound so-called Davy Crockett, nearly small enough to fir in a suitcase, to the largest ever designed, the Super Oralloy Bomb, or SOB. While at Los Alamos, he received his PhD in theoretical physics from Cornell University. He later became chief desig ner on Project Orion, which had the task of developing a giant spaceship that would have been powered by thousands of atomic bombs expluding sequentially on its tail. The Limited Test Ban Treaty of 1963, which prohibited the detonation of nuclear devices in the atmosphere and in space, ended the project. While serving a two-year term at the Defense Atomic Support Agency in the mid-1960s, his career underwent a sudden change as he discovered how many

Engineers Association. Besides engineering, he enjoyed gardening, following current events, taking walks, and horse racing. He also liked music, especially jazz and Sarah Brightman. He is survived by three sons, Peter, Paul, and James; a daughter, Janet; and three grandchildren and two great-grandchildren.

Ernest Ingersoll Pritchard, MS, Eng '48, of Lake Oswego, Oregon, on April 4, 2004; be was 82. Specializing in advanced aircraft clesign and testing, he was employed by TRW, the Aerospace Corporation, and the Aerospace Defense Support Program. During his career he worked on intercontinental ballistic missiles and satellites, ICBM reentry vehicles, and the space shuttle. He received many awards for his professional achievements. An avid downhill skier, Pritchard also enjoyed ocean surfing, tent camping, deep-sea fishing, tennis, and traveling. He loved music of every kind, especially jazz. Retiring to Lake Oswego at age 70, he became vived by his wife, Jane; a son, Michael; and four daughters, Rosarii, Gail, Josephine, and Jeanie.

Howard J. Teas Jr., PhD, of Miami, Florida, on June 20, 2004; he was 83. A professor of biology at the University of Miami, he had retired in 1985. He is survived by three children, James, Jane, and Howard III.

Joseph Ernest Veale, MS, of Fairfax, Virginia, on September 14, 2002; he was 92. An officer in the U.S. Army, Veale served on engineering staffs in London during World War II, pacticipating in plans for the Normandy invasion, and he moved across to France with the fighting. After receiving his Caltech degree in civil engineering, he served at posts worldwide, which included commanding a construction battalion at the front during the Korean War. During the Cold War he was involved with construction for nuclear-weapons storage programs and the development of logistical infrastructure in Europe. In civilian life after 1966 he worked as a professional engineer and served as director of public works for Jamestown, New York, for six years. Predeceased in 1986 by Helen, his wife of more than 46 years, he is survived by a son, William, and by four grandchildren.

1948

George Powell Steck, MS, of Albuquerque, New Mexico, on April 13, 2004; he was 79. Before attending Caltech, Steck worked with early radar during World War II as a U.S. Navy lieutenant. After receiving his master's degree in physics, he went on to earn a PhD from UC Berkeley in mathematical statistics. Moving to Albuquerque in 1955, he joined Sandia National Laboratories, where he worked until retiring in 1980. In retirement he continued his explorations of the Grand Canyon, and he enjoyed the companionship of family and friends as well as the mathematics of primes and perfect numbers. Predeceased by Helen, his wife of 53 years, he is survived by two sons, Michael and Stanley; a daughter, Ricia; a brorher, Allen; a sister, Lillian Cook; and two grandchildren and a great-granddaughter.

Charles Susskind, of Berkeley, California, on June 15, 2004; he was 82. A professor of electrical engineering, emeritus, and a cofounder of bioengineering studies at UC Berkeley, Susskind also founded the San Francisco Press with his wife in 1959, and served as editor in chief for McGraw-Hill's Encyclopedia of Electronics. Early in his academic career, Susskind's research focused on the generation and transmission of microwaves, and by the 1960s, he had become interested in the interaction of microwaves with biological tissues, including health effects. Working with Irving Fatt, at the time a Berkeley professor of mechanical engineering, Susskind organized the campus's first bioengineering graduate training program and later helped extend it into an undergraduate curriculum. This led ro the founding of a joint UC Berkeley / UC San Francisco graduate group in bioengineering in 1982, and a department of bioengineering in 1999. A native of Czechoslovakia, Susskind and his brother fled to England to escape the Nazi occupation and, after World War II broke out, he joined the U.S. Army as a radar specialist. In England he also met his wife, Teresa, who was working as a code-breaker for the Women's Royal Naval Service. After the war, the Susskinds moved to the United States and became U.S. citizens. After graduating from Caltech, Susskind earned his PhD in electrical engineering at Yale in 1951. He spent the next four years at Stanford before joining UC Berkeley as an assistant professor in electrical engineering in 1955. His interest in the historical context of technology's rise in the 20th century greatly influenced his writings, and his many books covered the lives of such influential inventors as Heinrich Rudolf Hertz, Nikola Tesla, and Guglielmo Marconi. His concern with the role of technology in society led him, in his book Understanding Technology, to propose an engineer's version of the Hippocratic Oath. Engineers would promise, among other things, not to use their professional knowledge contrary to the laws of humanity and to avoid waste and consumption of nonrenewable resources. Susskind served as assistant dean of UC Berkeley's College of Engineering from 1964 to 1968, and in 1969 he took a position in the UC Office of the President as coordinator of academic affairs for all UC campuses. In 1985, he became chairman of the U.S. Environmental Protection Agency's presidential scientific advisory committee. Among his many honors were a Fulbright Scholarship in 1961,

a National Science Foundation Senior Faculty Fellowship in 1968, and numerous awards from the Institute of Electrical and Electronics Engineers. Fluent in English, French, and German in addition to his native Czech, Susskind also loved music-he wrote newspaper reviews of the San Francisco Symphony, which he subscribed to along with the San Francisco Opera for nearly half a century. This was a love instilled in him by his family-he played cello; his mother, who had survived Auschwitz, was a pianisr; and his brother, Walter Susskind, became a worldrenowned conductor, most notably for the St. Louis Symphony. Susskind is survived by Teresa, his wife of 59 years; two daughters, Pamela Pettler and Amanda Susskind; a son, Peter; and two grandsons.

James Earl Whitney, MS, of Annapolis, Maryland, on May 1, 2004; he was 83. After graduating from Caltech he received a PhD in chemistry from the University of Maryland. His varied career included work on the reactor in the first nuclear submarine, the USS Nautilus; food research; and water-quality studies with the Environmental Protection Agency. He was a member of the American Chemical Society, the American Institute for Chemists, Sigma Xi, the American Association for the Advancement of Science, and the Instrument Society of America. After his rerirement, he enjoyed traveling through all 50 states, camping, and cooking. Predeceased by his wife, Barbara, he is survived by two sons, J. Scott and David; a daughter, Joanne Hill; two stepsons, Rowland and George Creamer; a sister, Alice; and five grandchildren and seven step-grandchildren.

John R. B. Whittlesey, MS '50, of Houston, Texas, on September 30, 2003. He is survived by his wife, Estrella.

1949

John Harrison Goldie, MS, in Palm Desert, California, on March 11, 2004; he was 77. A former executive vice president at Boeing and chief engineer on one of the nation's early space programs, Goldie was also the author of a book, R & D Sweepstakes: Winning Government Research and Development Contracts, published in 1988. Hired by Boeing in 1949, Goldie worked on missiles and for years directed the X-20 Dyna-Soar project, one of the first U.S. space programs to advance to the development stage-a fullscale mock-up of the space plane, designed to be launched into orbit by a Titan II missile, was produced before the program was canceled in 1963. In 1971, Goldie was named to help run Boeing Computer Services but had to slow down following a heart attack in the 1970s, and he retired from Boeing in 1982.

a professot ar Southern Tech for 13 years. He is survived by his wife, Bertha; a daughter, Katherine Bass; two sons, Dan Jr. and James; a sisrer, Doris White; and ten grandchildren.

1950

Worthie Lefler Doyle, PhD, on June 15, 2004; he was 82. He worked on the first guided-missile project at Hughes Aircraft in Culver City, California, and larer at MIT's Lincoln Laborarory. He also worked as a consultant to the RAND Corporation and later at ASI in Santa Monica, California. In addition, he served as a consultant to the Norwegian Defense Department. An expert skier and avid mountain climber, he ultimately moved to Washington State, where he climbed Mount Rainier rwice. He also climbed in California, British Columbia, and Norway.

Recognition . . . from page 11

curred in dust-enshrouded galaxies, not detected in optical surveys, thus transforming the prevailing view of galaxy formation."

Yanbei Chen, postdoctoral scholar in theoretical astrophysics, has been selected to receive a Sofja Kovalevskaja Award, which is funded by Germany's Federal Ministry of Education and Research. The award sum of up to 1.2 million euros gives recipients "an opportunity to concentrate on high-level, innovative research work in Germany, virtually without administrative constraints, in order to promote the internationalization of research in Germany."

Charles Elachi, PhD '71, Caltech vice president, JPL director, and professor of electrical engineering and planetary science, has been chosen to receive the Bob Hope Distinguished Citizen Award for 2005, "in recognition of outstanding dedication and service to the national security of the United States." During his 30-year career at JPL, Elachi has "played the lead role in developing the field of spaceborne imaging radar from a small research area to a major field of scientific research and application."

Tom Hon, Powell Professor of Applied and Computational Mathematics and executive officer for applied and computational mathematics, is the first recipient of the Morningside Gold Medal in Applied Mathematics "for his seminal research on applied partial differential equations, scientific computation and numerical analysis."Awarded to outstanding mathematicians of Chinese descent under the age of 45, the Morningside medals are intended to encourage the pursuit of mathematical truth. David Goodstein, Caltech's vice provost, professor of physics and applied physics, and Gilloon Distinguished Teaching and Service Professor, had his book Out of Gas: The End of the Age of Oil (New York: W. W. Norton & Company, 2004) selected by the New York Times Book Review as one of its 100 Notable Books of the Year for 2004.

tebohm of Rockefeller University have jointly received the American Philosophical Society's 2004 Karl Spencer Lashley Award for their work illuminating the physiological basis of the vocallearning abilities of certain birds. The award was established in 1957 by a gift from Dr. Lashley to recognize work on the integrative neuroscience of behavior. Konishi specifically was recognized for his experiments demonstrating that birds "depend heavily on their ability to monitor their own voice, both to produce previously memorized songs and to maintain them once developed."

Harald Pfeiffer, Sherman Fairchild Postdoctoral Scholar in Caltech's numerical relativity group, has been selected to receive the American Physical Society's 2005 Nicholas Metropolis Award for Outstanding Doctoral Thesis Work in Computational Physics. "Established to recognize doctoral thesis research of outstanding quality and achievement in computational physics and to encourage effective written and oral presentation of research results," the award consists of \$1,500 and a certificate, which will cite Pfeiffer for "his outstanding research on determining initial data for the dynamics of black holes."

John Preskill, MacArthur Professor of Theoretical Physics, has been invited to give the 2005 Rouse Ball Lecture; his topic will be "Quantum Information." An eminent mathematician is invited each May to the University of Cambridge to deliver a Rouse Ball Lecture on a topic relating to mathematics or theoretical physics.

Tapio Schneider, assistant professor of environmental science and engineering, has been honored with the first annual James R. Holton Award for Junior Atmospheric Scientists, for "outstanding research contributions by a junior atmospheric scientist within three years of his PhD."

Kip Thorne '62, Feynman Professor of Theoretical Physics, has been chosen to receive the 2005 Common Wealth Award in Science, which consists of \$50,000 and a trophy. According to the award letter, the selection committee was impressed by Thorne's mentoring of younger colleagues, as well as his reputation as an outstanding scientist. Kai Zinn, professor of biology, has received a three-year, \$300,000 Neuroscience of Brain Disorders Award from the McKnight Endowment Fund. The award will enable Zinn's research group to further evaluate Pumilio-an RNAbinding protein that represses protein translation-in yeast and fly systems. This work may have implications for studies of human brain function and dysfunction, since human brains also contain a close relative of Pumilio.

Carlton Lewis McWilliams, MS, of Fallbrook, California, on April 1, 2004; he was 84. A World War II Navy veteran, he was chief engineer for the Air Force Flight Test Center at Edwards Air Force Base from 1951 to 1954. He retired from Hughes Aircraft in 1976, and he was a board member and treasurer of Fallbrook People to People. He is survived by Abbie, his wife of 62 years; two daughters, Pamela Baca and Valentina Kendall; and four grandchildren and four great-grandchildren.

Dan M. Parker, MS, of Marietta, Georgia, on June 2, 2004; he was 84. Parker received an appointment to the U.S. Military Academy at West Point in 1939 and served in World War II with the 15th Air Force, stationed in Italy. He served in the military for 27 years, including as a professor at West Point, and retired with the rank of lieutenant colonel. After retiring, he was

Mark Konishi, Bing Professor of Behavioral Biology, and Fernando Not-

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Kresa . . . from page 5

with the Defense Advanced Research Projects Agency (DARPA) in the Depattment of Defense. From 1961 to 1968 he was associated with the MIT Lincoln Laboratory.

Kresa is a graduate of MIT, where he received a BS in 1959, an MS in 1961, and an EAA in 1966, all in aeronautics and astronautics.

A member of the National Academy of Engineering, Kresa serves on numerous corporate and institutional boards and on several non-profit organizations and university boards. He is a past chairman of the board of governors of the Aerospace Industries Association; is an honorary fellow, and past president, of the American Institute of Aeronautics and Astronautics; and a seniot advisor for the Carlyle Group.

Kresa's many awatds for scientific and technological leadership include tlie International von Kármán Wings Award; Caltech's Management Association Excellence in Management Award; the California Manufacturers and Technology Association Award for Manufacturer of the Century; California Museum of Science and Industry and the California Museum Foundation Award for the California Industrialist of the Year; and the Howard Hughes Memorial Award for contributions to the advancement of aviation and space technology. In 2001 Kresa was named one of the nation's top 25 managers by Business Week magazine.

Currie . . . fram page 3

cal, heating, and cooling needs; restructuring the management of building and renovation projects; instituting a planning process for the university's finances and facilities; and orchestrating the school's first bond offering, which attained a AAA rating.

Before joining Rice, Currie spent eight years as associate dean for administration and policy planning at Harvard University's Graduare School of Business Administration (1980–1988).

Currie serves on the boards of the

ROBERT BACHER 1905-2005

Robert Fox Bachet, a tenowned Caltech physicist who headed the experimental physics division at Los Alamos Laboratory during the World War II Manhattan Project to build the atomic bomb, died November 18, in Montecito, California. He was 99.

Bacher was affiliated with MIT's Radiation Laboratory when J. Robert Oppenheimer, whom Bacher had first



Robert Bacher in his office (above) and with the Caltech synchrotron (below), whose construction he spearheaded in the 1950s.



met at Caltech in 1930; tapped him for the bomb project. Bacher took a leave of absence to become head of the experimental physics division at Los Alamos and, once the bomb-production phase began, the bomb physics division. After the war ended, he became one of the first members of the U.S. Atomic Energy Commission and also served on the President's Science Advisory Committee during the Eisenhower Administration. A close associate of the late Caltech president Lee DuBridge while both were at MIT, Bacher joined the Caltech faculty in 1949, three years after Du-Bridge became the Institute's president. He remained at Caltech for the remainder of his career, serving as chairman of the Division of Physics, Mathematics and Astronomy from 1949 to 1962. He held the position of provost from 1962

to 1969, and served as vice president and provost from 1969 to 1970. He retited as professor emeritus in 1976.

Born in 1905, in Loudonville, Ohio, Bacher earned his bachelor's degree from the University of Michigan in 1926 and his doctorate in 1930. That same year, he first came to Caltech under a one-year appointment as a National Research Council Fellow, and afterward held postdoctoral positions at MIT and the University of Michigan before joining the faculty at Columbia in 1934. He moved to the Cornell physics department in 1935, where he became professor of physics and director of the Laboratory of Nuclear Studies. He was affiliated with MIT's Radiation Laboratory and the Manhatran Project at Los Alamos from 1940 to 1945, while on the Cornell faculty.

As chaitman of the physics, math, and astronomy division at Caltech, Bacher oversaw the program's growth in the burgeoning field of high-energy physics. One of his first hires in the field was Robert Walker, whom he had known at Los Alamos and Cornell. (Walker died January 4; see page 23.) Another early recruit was Richard Feynman, who was reportedly feeling "unsettled" at Cornell; after a year in Brazil, Feynman settled in Pasadena in 1951 for the rest of his career. Now, with Feynman and Robert Christy, who had come in 1946, Bacher felt he had the two most outstanding theorists from Los Alamos. Then in 1955 he also hired Murray Gell-Mann. (Feynman received the Nobel Prize in 1965; Gell-Mann in 1969.)

On the experimental side, Bacher presided over the construction of Caltech's electron synchrotron, one of the first high-energy particle accelerators in the country. Bacher was nominally director of the synchrotron, but Walker supervised much of the research. Bachet also initiated the Institute's program in radio astronomy with the establishment of the Owens Valley Radio Observatory, now regarded as one of the world's leading radio astronomy facilities.

Next to Caltech's founding president, Robert Millikan, Bacher was the person most important to the early growth of Caltech's reputation in physics and astronomy, says Christy, now the Institute Professor of Theoretical Physics, Emeritus. "He was responsible for building Caltech physics after the war and for making Caltech physics what it is today." Bacher remained division chair until 1962. During that time he reformed the undergraduate physics curriculum to make it less rigid, broke up large classes, expanded the teaching staff, and lowered the faculty teaching load. Bacher was president of the American Physical Society in 1964, president of the International Union of Pure and Applied Physics from 1969 to 1972,

and tecipient of the Ptesident's Medal fot Metit in 1946. He was a member of the U.S. delegation to the nuclear test ban negotiations in 1958, and a membet at various times of committees and panels for the State Department, Department of Defense, the Atomic Energy Commission, and the National Academy of Sciences.

Bacher's wife of 64 years, Jean Dow Bacher, died in 1994. He is survived by a son, Andrew Dow Bacher, PhD '67, of Bloomington, Indiana; a daughter, Martha Bacher Eaton of Santa Barbara; and two grandchildren.

The memorial service that is being planned will pay tribute to Bachet's fondness for innovation. When Caltech's current physics, math, and astronomy chair Tom Tombrello broached the idea of a service to Bacher's family, Andrew Bacher (who happens to have been Tombrello's first graduate student) said that his father wouldn't like the idea of a bunch of old guys talking about him. His father, he said, liked new things and preferred to focus on what was going to happen next. So, early next fall, the memorial will be a celebration of Bacher's 100th birthday; topics for discussion will be "new things" that have their roots in what Bacher started.

THOMAS CAUGHEY 1929-2005



National Association of College and University Business Officers; the Council on Governmental' Relations; Tuition Plan, Inc.; and the China International Trade Associates, and is a past board member of the YMCA of the Rockies, TIAA-CREF Advisory Council, Joslin Diabetes Center, and the Visiting Committee for Harvard College.

Currie succeeds VP for business and finance Al Horvath, who stepped down last fall to accept a position as executive vice president for finance with Columbia University. Thomas Kirk Caughey, PhD '54, Hayman Professor of Mechanical Engineering, Emeritus, died December 7, in Pasadena. He was 77.

A native of Rutherglen, Scotland, Caughey earned bachelor of science degrees in mechanical and electrical engineering from Glasgow University, a master's degree from Cornell University, and a doctorate in engineering science from Caltech. He joined the faculty in 1953 as an instructor, and spent his entire carcer on the faculty. He was named the Hayman Professor in 1994, and in 1996 became the Hayman Professor Emeritus.

Caughey's research involved nonlinear differential equations, stability theory, stochastic processes, vibrations and acoustics dynamics, and classical physics. He was involved in a Sloan Foundation project on campus in the early 1970s to use the campus interactive computer facilities in teaching applied mathematics and engineering systems analysis.

Caltech's provost Paul Jennings called Caughey "an international leader in the field of dynamics and vibrations, particularly in the responses of nonlinear systems and randomly excited systems. Additionally, he did important work with Caltech colleagues on fluidinduced forces in turbomachinery. In recent years he had become involved in the areas of structural monitoring and active control of large structures, such as buildings and bridges, when subjected to earthquakes or strong winds." Caughey's work, said Jennings, "was noted for its elegant style and mathematical rigor."

Caughey also worked as a research engineer in the Glasgow firm of Jas Howden & Co. from 1947 to 1951, and throughout his career worked as a consultant in both Scotland and the United States.

On campus he was a member of the Academic Policies Committee, the Curriculum Committee, and the Faculty Board. He also served on the academic standards committee and the special labs committee of the Division of Engineering and Applied Science. His several awards include the Freudenthal and Theodore von Kármán medals from the American Society of Civil Engineers and the Den Hartog Award of the American Society of Mechanical Engineers.

Caughey's community work included service on the Campfire Board of Directors for 10 years, as well as on the board of the Pasadena Day Nursery. He was also active in Community Chest, AID, and the YMCA, and was an elder at Pasadena Presbyterian Church.

The Caltech professor is survived by

ROBERT WALKER 1919-2005



Robert Walker, professor of physics, emeritus, died January 4 in New Mexico. A graduate student who worked on the Manhattan Project during World War II, he was 85 years old at the time of his death.

Born in 1919, in St. Louis, Missouri, Walker earned his bachelor's degree at the University of Chicago and was a PhD student at Cornell when he joined the effort to develop the atomic bomb. While on the Manhattan Project he worked both at Los Alamos and the University of Chicago. He finished his doctorate in physics in 1948, and after an additional year at Cornell as a postdoctoral researcher he was hired as an assistant professor at Caltech.

Walker became an associate professor in 1953 and professor in 1959. During his time on the faculty he served as executive officer for physics. He retired in 1981 and moved to the Santa Fe area.

Walker's specialty was experimental high-energy physics, and for many years he worked on the Caltech synchrotron, first as a co-developer with colleagues Robert V. Langmuir and Bruce Rule, and subsequently as a researcher for the accelerator's entire offers insights into the workings of matter, energy, and the universe at the most fundamental level. In particular, Peck said, Walker's work involved pion photoproduction (in which a proton or neutron produces a pi-meson when it is bombarded by a high-energy photon). Among other applications, this research was useful to Walker's longtime Caltech colleague Richard Feynman, who used it in his theoretical studies of the underlying mechanisms of particles and their interactions.

"Bob was also a superb teacher," Peck said. "He taught a course in the mathematical methods of physics, and also courses in quantum mechanics and particle phenomena."

Walker also co-wrote a textbook, Mathematical Methods of Physics, with Jon Mathews.

After retiring from Caltech, Walker struck out in a new direction. He built harpsichords, which have been played by musicians throughout the Southwest. Eventually, he also tackled the construction of a fortepiano—a project that he estimated took him about 650 hours to build and another 200 "to cure its deficiencies. Why would anyone want to make a fortepiano? Well, it's something different, and it's fun."

Walker's wife, Dorothy, died in 2003. The couple is survived by two children, Robert Craig Walker and Jan Walker Roenisch.

SCENES FROM SUMATRA

Following the massive earthquake and tsunami that struck a dozen countries surrounding the Indian Ocean on December 26, Caltech geologist Kerry Sieh and technician John Galetzka (see UpFront, page 2) traveled to Sumatra, where they had spent time during the past several years studying seismic activity in the region. They took numerous photos during their several weeks in the area, documenting the destruction, the uplifted coral reefs, and the people. A selection of their photos is shown on the back-page poster, whose central map, created by Caltech postdoc Mohamed Chlieh, shows a view of the island from the north of the Sumatran subduction zone, where the Indian Ocean and Australian plates are being forced under the Eurasian plate. The image directly below the map shows one of the **Global Positioning System (GPS)** stations installed by Sieh and Galetzka at Nyang Nyang Island. Clockwise from upper right, images include a view of debris on Nias Island; coral exposed by uplift during the earthquake; the interior of a home in Sirombu with the homeowner at right and Danny Natawidjaja PhD '03, a geologist with the Indonesian Institute of Sciences, measuring the high watermark from the tsunami; destruction in northeast Banda Aceh; a scene in northwest Banda Aceh; Sieh in front of one of the helicopters he used during his recent trip; children standing on Porites coral uplifted during the earthquake; a mother with children at Lhokmakfur; tsunami damage in a town along the southwest coast of Simeulue Island; and people swarming a helicopter on the beach at Perak Batu, on the central east coast of South Pagai Island.

"I've been in other places that had destruction, but nothing compares to this," says Galetzka. "I constantly think about trying to make sense of what I saw there."

his wife, Jane; four children, Penelope, William, Catherine, and Christine; four grandchildren; and six great-grandchildren. 20-year lifetime. For many years, he was also the principal investigator of Caltech's contract with the Department of Energy and its predecessors to do experimental and theoretical research in elementary particle physics.

According to Caltech professor of physics, emeritus, Charles Peck, PhD '64, who was Walker's graduate student at Caltech, Walker's collaborations at the synchrotron helped to lay the foundation for research that led to the Standard Model of elementary particle physics—a theoretical framework that ties together three of nature's four forces (electromagnetism and the strong and weak nuclear forces) and Galetzka and Sieh's diary of their Sumatran experience has been posted on the Caltech website, at http://today.caltech.edu/today/storydisplay?story_id=5903



