

Caltech 336

T E S S M T W T F S S M T W

The campus community biweekly
October 17, 2002, vol. 2, no. 15

Family Night a feast of fun



Spidey senses tingling! Maybe it's the static electricity. Crimefighter Spider-Man flexed his muscles to squeeze balloons into loopy shapes for kids at the Caltech/United Way Family Night last Friday.

Serra sculpture debate continues

Discussion of *Vectors*, a proposed work by sculptor Richard Serra, continued at a September 30 meeting in which President David Baltimore dialogued with a cross section of Caltech community representatives. Although a tense exchange or two arose, the conversation was largely cordial, even humorous at moments, as attendees presented various viewpoints.

Opening with the acknowledgment that "many of Serra's works are controversial," Baltimore sought to address numerous objections that have been raised, particularly by students. He outlined the sequence of events to date, beginning with the Pasadena city ordinance requiring certain new buildings to have one percent of their cost dedicated to public art. Using the city's formula, the sum for the Broad Center for the Biological Sciences, with which *Vectors* is associated, amounts to about \$90,000.

A list of five artists, including Serra, was given to the Institute Art Committee, a small group of faculty and staff who handle all matters art-related. Baltimore conceded, "I was most attracted by Serra's work. So I simply said I think Serra is the right answer." Caltech then contracted with the artist to create a proposal for the lawn west of the Beckman Institute.

A major impetus, Baltimore said, was the desire for "world-class" art on campus, the lack of which "diminishes Caltech somewhat" in his mind. Such art seemed a distinct possibility, particularly since Eli Broad, the Broad Center's major benefactor, is an art aficionado—and he in fact became the key donor for *Vectors*, which will cost about \$2,000,000, including installation.

The site was chosen as the best place for the work, with the proviso that it wouldn't block the view of the Beckman Institute. Because Serra's first idea was to do several small, self-contained pieces, Baltimore said, "I was as surprised as anybody" by the final proposal: a set of four steel plates, ranging from ground level to about eight feet in height, that would zigzag across the lawn from northeast to southwest, following its slope.

"I was taken aback," said Baltimore. But after thinking it over, he realized Serra was taking advantage of the site's contours, creating a work specifically tailored to it. "It's certainly more dramatic, more interesting than a self-contained sculpture would be."

Though the administration had anticipated some controversy over the choice, it wasn't prepared for the firestorm that arose. Two town-hall meetings in the

see *Sculpture*, page 6

Campaign set to kick off

With a goal of \$1.4 billion, Caltech's much-anticipated capital fund-raising campaign will officially launch on Friday, October 25.

The five-year program has been described by President David Baltimore as "the most audacious fund-raising campaign in our history and one of the most ambitious any small campus has ever attempted." Remarkably, the goal appears to be more than halfway met already—\$820 million has already been promised, including the recent gift of \$600 million from trustee Gordon Moore and his wife, Betty, together with pledges from other trustees and donors.

The campaign will be steered by a committee headed by Walter Weisman, vice chairman of the board of trustees, with Moore serving as honorary committee chairman. Others on the committee include Caltech president emeritus Thomas Everhart; Ben Rosen, chairman of the board of trustees; Gary Dicovitsky, vice

see *Campaign*, page 6

Students, community benefit through United Way

Absolute concentration, endless energy reserves, and the patience of a saint may sound like ideal traits for research work at Caltech. But for a substantial number of scholars at Caltech, these qualities are decidedly de rigueur for their tasks as parents.

For a lucky few, balancing the demands of the academy with the demands of a child is made easier through the contributions that the Caltech community makes to the annual United Way campaign, which begins on the 28th. Some of the charitable donations raised during the campaign will be distributed to the Children's Center at Caltech, JPL's Child Educational Center, and the Caltech Y.

The Children's Center at Caltech uses the United Way donations to fund a need-based tuition assistance program that offsets a family's child care costs. Quality

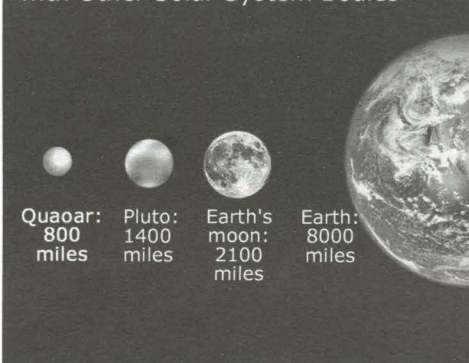
see *United Way*, page 6

Rose to emcee panel

Talk-show host Charlie Rose will moderate "A Celebration of Caltech Science," a public presentation set for Saturday, October 26, at 9 a.m. in Beckman Auditorium. See page 3 for details.

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Quaoar Compared by Diameter with Other Solar System Bodies



Largest object in solar system since Pluto discovered

Caltech planetary scientists have discovered a sizable spherical body in the outskirts of the solar system. The object, which circles the sun every 288 years, is half the size of Pluto and larger than all of the objects in the asteroid belt combined.

Named Quaoar (KWAH-o-ar) after the creation force of the Tongva tribe, the original inhabitants of the Los Angeles basin, the object is located about 4 billion miles from Earth in a region called the Kuiper belt. This region beyond Pluto's orbit is where comets originate and where planetary scientists have long expected to eventually find larger planet-shaped objects. Quaoar is by far the largest object found so far in that search.

Currently detectable a few degrees northwest of the constellation Scorpio, Quaoar demonstrates beyond a doubt that large bodies can be found in the farthest reaches of the solar system. Further, the finding provides hope that additional bodies, perhaps even larger than Pluto, will be discovered in the Kuiper belt. Quaoar and other similar bodies should provide new insights into the primordial materials that formed the solar system some 5 billion years ago.

The discovery further supports the growing opinion that Pluto itself is a Kuiper-belt object. According to recent interpretations, Pluto was the first Kuiper-belt object to be discovered, long before the age of enhanced digital techniques and light-detecting charge-coupled devices (CCDs), because it had been kicked into a Neptune-crossing elliptical orbit eons ago.

"Quaoar definitely hurts the case for Pluto being a planet," says Caltech associate professor of planetary astronomy Mike Brown. "If Pluto were discovered today, no one would even consider calling it a planet because it's clearly a Kuiper-belt object."

Brown and Chad Trujillo, a postdoctoral researcher, first detected Quaoar on a digital sky image taken on June 4 with Palomar Observatory's 48-inch Oschin Telescope. The researchers looked through archived images taken by a variety of instruments and soon found images taken during the years 1983,

see *Quaoar*, page 6

NewsBriefs



Caltech welcomed five leaders from Afghanistan's new government to the Athenaeum October 8 for a lunchtime discussion of their roles in rebuilding the war-ravaged nation. The event grew out of a recent undergraduate course taught by Professor Robert Rosenstone and his wife, Nahid Massoud. From left are Breshna Sadat, senior Martha-Helene Stapleton, Jina Haidari, Wilda Rustaie, Provost Steve Koonin, Masooda Barekzaie, and Marzia Bazul.

Personals

Welcome to Caltech

September

Douglas Altshuler, postdoctoral scholar in bioengineering; **Francois Bondu**, visitor in physics; postdoctoral scholars **Elizabeth Boon**, chemistry, and **Colin Borys**, physics; **Clare Brown**, senior administrative secretary, Humanities and Social Sciences; **Marina Brozovic**, postdoctoral scholar in biology; **Martin Buehler**, visitor in geobiology; postdoctoral scholars **Lili Chen** and **Mee Hyang Choi**, biology, and **Kim Cobb**, geochemistry; **Csilla Csori**, grant manager, biology; **William Dickson**, postdoctoral scholar in bioengineering; **Michael Graesser**, senior postdoctoral scholar in physics; **So-Yeop Han**, visitor in chemistry; **Javier Hermosillo**, custodian, Physical Plant; postdoctoral scholars **Yanyi Huang**, applied physics, **Tamer Inanc**, control and dynamical systems, **Inese Ivans**, astronomy, **Andreas Kappler**, geobiology, **Akio Kayano**, chemistry, **Andriy Kurylov**, physics, and **Qing-Bin Lu**, chemistry; **Kirk McKenzie**, visitor in physics; **Milos Milosavljevic**, Sherman Fairchild Postdoctoral Scholar in Physics; visitors **Masayasu Miyata**, chemistry, **Yoshihiro Mizuno**, electrical engineering, and **Sophie Moinas**, economics; **Jed Mosenfelder**, scientist, Geological and Planetary Sciences; **Edward Myers**, postdoctoral scholar in physics; **Ernest Ngalula**, property services specialist, Property Services; postdoctoral scholars **Aleksey Nogin**, computer science, and **Peter Oelschlaeger**, biology; **Yasser Revez Omar**, visitor in physics; **Chris Parkinson**, Caltech postdoctoral scholar in JPL's earth and planetary atmospheres element; **Katherine Prather-Snodgrass**, senior staff, audit/compliance, Audit Services and Institute Compliance; **Frans Pretorius**, Tolman Postdoctoral Scholar in Physics; postdoctoral scholars **Benjamin Rubin**, biology, and **Michael Schulz**, theoretical physics; **Carol Schumacher**, visitor in mathematics; **Timur Shutenko**, postdoctoral scholar in biology; **Melissa Slemin**, senior administrative secretary, Engineering and Applied Science; **Harry Teplitz**, staff scientist, Space Infrared Telescope Facility (SIRTF) Science Center; **William Tivol**, electron microscope scientist, biology; **Michele Vallisneri**, Caltech postdoctoral scholar in JPL's astrophysics element; and postdoctoral scholars **Yuhong Wang** and **Shoujun Xu**, chemistry, and **Zhenming Xu**, biology.



Art Elbert started as associate vice president for campus planning on September 9. In the new position, he will oversee five areas: operations and maintenance of the physical plant; campus planning and construction; security; safety; and mail services and graphic arts. From 1995 to 1999, Elbert was vice president for administration and finance at Cal State Northridge; his main task was to rebuild the campus following the 1994 earthquake. Prior to that, he served as vice president for administrative affairs at the University of Oklahoma for 13 years and in several positions at Chicago State University for 12 years. He earned a bachelor's degree from the University of Dayton, a master's degree from Bowling Green State University, and a PhD in educational administration from Northwestern University. Al Horvath, vice president for business and finance, said Elbert's experience will "make a big difference over the coming months and years . . . He is really going to help us to strategize about our campus and the impact that the campaign will have on Caltech, facilities-wise." Having left a short-lived retirement to take the job, Elbert said he views it as a "once-in-a-lifetime opportunity" to work at a world-class research university. "It's a great honor to be part of the future of Caltech."

October

Michael Bumanglag, line cook, Athenaeum; **Peggy Burke**, travel specialist, Payment Services; **Gentian Buzi**, assistant scientist, biology; **Paulo Campos**, visitor in computation and neural systems; postdoctoral scholars **Yong Huang**, chemistry, **Eiichiro Kazumori**, economics, **Hiroto Kimura**, geochemistry, and **Martha Kirouac**, biology; **Wang-Sang Koon**, senior engineer, control and dynamical systems; **Hong Liao**, assistant scientist, environmental science and engineering; **Yanshun Liu**, postdoctoral scholar in biochemistry; **Ronnie Moreno**, dishwasher, Athenaeum; **Viviane Moraes de Oliveira**, visitor in computation and neural systems; **Jenny Patience**, postdoctoral scholar in astronomy; **Katherine Quinn**, Caltech postdoctoral scholar in JPL's tracking systems and applications section; **Graham Peter Smith**, postdoctoral scholar in astronomy; **Tomomi Tanaka**, visitor in economics; **Adri van Duin**, senior materials scientist, Chemistry and Chemical Engineering; and postdoctoral scholars **Christopher Walker**, atmosphere/climate dynamics, and **Setthivoine You**, applied physics.

New positions

September

Elin Boyle has been appointed assistant director of the Alumni Fund. She joined Caltech last year as a senior administrative secretary in Development and Alumni Relations.

Retirements

Maria Frayra, a custodian for Custodial Services, retired on October 1 after 14 years at Caltech.

Lynn Holt, an electronics specialist with the Submillimeter Observatory, retired on September 1 after 14 years with the Institute.

Newman receives Packard Fellowship

Dianne Newman, Luce Assistant Professor of Geobiology and Environmental Engineering Science, is one of 20 young researchers selected nationwide as recipients of 2002 Packard Fellowships in Science and Engineering.

Since 1987, according to the David and Lucile Packard Foundation, the Fellowship Program has made unrestricted grants of \$625,000 over five years to support new faculty members' scientific research, with the goal of developing scientific leaders, encouraging networking, and helping to attract talented graduate students into university research. One hundred nominations are made by the nominees' university presidents. After being reviewed by the Fellowship Advisory Panel, a group of nationally recognized scientists, up to 20 Fellows are recommended for approval by the Packard Foundation Board of Trustees.

After receiving her BA in 1993 from Stanford and her PhD in 1997 from MIT, Newman served as a postdoctoral fellow at Harvard Medical School. She joined Caltech in 2000 as Luce Assistant Professor. With research interests that include a variety of fields, she takes an interdisciplinary approach to studying problems in environmental science. "Specifically," she writes, "I am interested in applying the tools of bacterial genetics, physiology, and biochemistry to understanding how microorganisms have shaped, and continue to shape, the chemistry of their environment."

Her Web page can be found at <http://www.gps.caltech.edu/~dkn/>.



Robotic bugs swarm Pasadena

Around 200 large robotic insects were released in Pasadena this week. But the swarm of colorful, lifelike bugs was a harmless event—not surprisingly, planned by Caltech students.

B.I.O.-Bugs, short for biomechanical integrated organisms, are formidable, autonomous creatures, about 11.4 inches long by 9.8 inches wide and weighing 1.08 pounds. The October 13 demonstration—part of the 11th annual U.S. symposium of students who are sponsored by the Studienstiftung des deutschen Volkes (German National Merit Foundation)—featured the robotic bugs performing a variety of tasks, from fighting with one another to scampering from light, other bugs, and humans. Held at Pasadena's Ritz Carlton Hotel, the event was organized by students together with **Christof Koch**, Caltech's Troendle Professor of Cognitive and Behavioral Biology and a Studienstiftung alumnus.

Based on similar robots developed at Caltech's Center for Neuromorphic Systems Engineering, the transistor-controlled bugs can actually alter their behavior as they interact with the environment. While their scientific applications could include planetary exploration, military defense, or nuclear-accident cleanup, the bugs have become so popular that they're being marketed by U.S. toy manufacturer Hasbro. Creator Mark Tilden, director of research at Hasbro's WowWee Toys division, is excited about their appeal, noting that they could help stimulate children's interest in the physical sciences. The bugs are available in a variety of colors for about \$20 each.

Symposium cosponsor WowWee Toys donated the B.I.O.-Bugs for the event. Photos are available at www.wowwee.com/biobugs/biointerface.html.

Caltech alum wins Nobel Prize

Vernon Smith, who graduated from Caltech in 1949 and is currently professor of economics and law at George Mason University, has won the Nobel Prize in economics. He will share the \$1.6 million prize with Princeton University psychologist Daniel Kahneman.

According to the Royal Swedish Academy of Sciences, which selects the winners, Smith is being honored "for having established laboratory experiments as a tool in empirical economic analysis, especially in the study of alternative market mechanisms."

Smith is a pioneer in the area of experimental economics, which empirically tests predictions from economic theory. He is also noted for his use of "wind-tunnel tests," which try out new market designs in the lab before they are implemented in practice.

A Sherman Fairchild Distinguished Scholar at Caltech in 1973–74 and a visiting professor in 1974–75, Smith, working with Charles Plott, now the Harkness Professor of Economics and Political Science, established Caltech as the wellspring of research in experimental social science. Smith received the Institute's Distinguished Alumni Award in 1996.

Having received his bachelor's degree in electrical engineering from Caltech, Smith earned a master's degree from the University of Kansas in 1952 and a doctorate from Harvard in 1955. He served on the faculties of several universities, including Purdue, the University of Massachusetts, and the University of Arizona, and worked with the RAND Corporation and a variety of foundations and research centers. In addition to his holding a professorship at George Mason University, he is currently a research scholar in the Interdisciplinary Center for Economic Science, and a Fellow of the Mercatus Center, all in Arlington, Virginia.

The author or coauthor of more than 200 articles and books, Smith was elected to the National Academy of Sciences in 1995, and is a Fellow of the Econometric Society, the American Association for the Advancement of Science, and the American Academy of Arts and Sciences.

Trimble named Caltech trustee

Caltech alum Charles Trimble, the former president of Trimble Navigation, Ltd., has been named to Caltech's board of trustees. He brings with him more than 30 years of business and engineering expertise.

Trimble retired as president in 1998 from the company he helped found, which is a leading developer of commercial equipment utilizing the global positioning system. Prior to his association with that company, he worked as manager of integrated circuit research and development at Hewlett Packard.

He earned his bachelor's degree in engineering and applied science in 1963 and his master's in electrical engineering in 1964, both from Caltech.

Trimble has received numerous honors, including membership in the National Academy of Engineering, the Council on Foreign Relations, the NASA Advisory Council, the National Electronics Manufacturing Initiative, and the Silicon Valley Defense/Space Consortium. He is also chair of the United States Global Positioning System Industry Council.

October 21–27, 2002

W T W T F S S

Monday, October 21

General Biology Seminar

119 Kerckhoff, 4 p.m.—“A Vaccinia Virulence Factor Is a Z-DNA Binding Protein: A Possible Route to Smallpox Therapy,” Alex Rich, Sedgwick Professor of Biophysics, MIT.

Geology and Planetary Sciences Seminar

155 Arms, Robert Sharp Lecture Hall, 4 p.m.—“Time-Variable Gravity from GRACE: What Might It Tell Us About the Earth and Its Environment?”, Professor John Wahr, department of physics, University of Colorado at Boulder. Information: www.gps.caltech.edu.

Tuesday, October 22

Caltech Library System Presents: Web of Science for Science and Engineering

Sherman Fairchild Library, multimedia conference room, noon to 1:30 p.m.—Learn tips and tricks for searching Web of Science databases more effectively. Registration: <http://library.caltech.edu/learning/form.htm>. Open to Caltech community members only.

IR/submm/mm Sack Lunch

469 Lauritsen, 12:15 p.m.—“Is Deuterium Depleted in the ISM?”, Tom Phillips, professor of physics and director of the Submillimeter Observatory, Caltech. Information: www.submm.caltech.edu/~cdd/sacklunch.html.

Institute for Quantum Information Seminar

74 Jorgensen, 3 p.m.—“Entanglement Transfer and Entanglement Concentration Using Particle Statistics,” Yasser Omar, Centre for Quantum Computation, University of Oxford.

Ulric B. and Evelyn L. Bray Seminar

25 Baxter, 5 p.m.—“Salience: Agenda Choices by Competing Candidates,” Marcus Berliant, visiting associate in economics, Caltech. Refreshments.

Physics Graduate Student Seminar

107 Downs Lab, 5 p.m.—“(One of the Little Reasons Why) LIGO is Really Hard,” Shanti Rao, LIGO. Information: www.its.caltech.edu/~corcoted/pgs2002.html.

Wednesday, October 23

Astronomy Colloquium

155 Arms, Robert Sharp Lecture Hall, 4 p.m.—“Chandra Observations of Clusters of Galaxies,” Professor Andrew Fabian, Institute of Astronomy, Cambridge. Information: www.astro.caltech.edu/~gma/colloquia.html.

Environmental Science and Engineering Seminar

142 Keck, 4 p.m.—“Elements of the High Seas: The Inorganic and Bio-Inorganic Chemistry in the Marine Environment,” Professor Alison Butler, department of chemistry and biochemistry, UC Santa Barbara. Refreshments, Keck Labs lobby, 3:40 p.m.

Earnest C. Watson Lecture

Beckman Auditorium, 8 p.m.—“The Response to Nicotine,” Henry Lester, Bren Professor of Biology, Caltech. Admission is free. Information: 395-4652, 1 (888) 2CALTECH, or events@caltech.edu. Individuals with a disability: 395-4688 (voice) or 395-3700 (TDD). Visit Public Events at www.events.caltech.edu.

Thursday, October 24

Caltech Library System Presents: Life Sciences Information Resources

Sherman Fairchild Library, multimedia conference room, 2 to 3:30 p.m.—Learn how to make the most of biology and chemistry information tools and services provided by the Caltech Library System. Registration: <http://library.caltech.edu/learning/form.htm>.

Thesis Seminar

147 Noyes, Sturdivant Lecture Hall, 2 p.m.—“Tailoring Polymer Synthesis with Designer Ruthenium Catalysts,” Christopher Bielawski, graduate student in chemistry, Caltech.

Biophysics Seminar

153 Noyes, Sturdivant Lecture Hall, 4 p.m.—“Atomistic Simulations or Protein Folding on the Tens of Microsecond Timescale: Using Worldwide Distributed Computing to Bridge the Gap Between Simulation and Experiment,” Professor Vijay S. Pande, department of chemistry, structural biology, and Stanford Synchrotron Radiation Laboratory, Stanford University. Refreshments, 3:45 p.m.

Geoclub Seminar

151 Arms, Buwalda Room, 4 p.m.—“Invasion of the Water-Rich Aliens from the Planet CMI!”, John Eiler, assistant professor of geochemistry, Caltech.

Physics Research Conference

201 E. Bridge, 4 p.m.—“Adventures in Theory Space,” Nima Arkani-Hamed, professor of physics, Harvard University. Refreshments, 108 E. Bridge, 3:45 p.m. Information: www.pma.caltech.edu/~physcoll/PhysColl.html.

Friday, October 25

Fluid Mechanics Seminar

101 Guggenheim Lab, Lees-Kubota Lecture Hall, 3 p.m.—“The Dynamics of Diffusion-Flame Holes in Counterflow,” Carlos Pantano, postdoctoral scholar in aeronautics, Caltech. Information: www.galcit.caltech.edu/Seminars/Fluids/CurrentFluids/index.html.

Inorganic-Organometallics Seminar

151 Crellin, 4 p.m.—“Platinum Bis(pyrazolyl)borate Complexes vs. Platinum Bis(phosphino)borates and Bis(amino)borates: A Comparative Study,” Christine Thomas, graduate student in chemistry, Caltech.

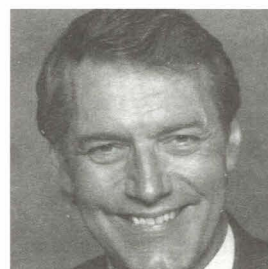
NSF fellowships available

The National Science Foundation (NSF) is accepting applications for its annual Graduate Research Fellowship Program, which awards fellowships for graduate study leading to research-based master's or doctoral degrees in mathematics, science, and engineering.

Approximately 900 new three-year fellowships, consisting of stipends of \$21,500 and cost-of-education allowances of \$10,500 for 12-month tenures, will be awarded in March 2003. Last year, 14 Caltech students received fellowships, two of whom will continue their studies here, and 18 students from other schools also won fellowships to begin studying at the Institute.

Applicants must be U.S. citizens or permanent resident aliens applying to accredited nonprofit U.S. graduate institutions or equivalent international institutions. Fellowships are geared toward individuals in the early stages of graduate study, and most individuals can apply during their senior year of college, their first year of graduate school, and the beginning of their second year of graduate school. Women, minorities, and persons with disabilities are especially encouraged to submit applications, which are due November 7.

The NSF Graduate Research Fellowship Program is administered by Oak Ridge Associated Universities. For more information, contact the program at (866) 353-0905 (toll free) or nsfgrfp@orau.gov, or visit online at www.orau.org/nsf/nsffel.htm.



Caltech, Charlie Rose to celebrate science

Television talk-show host Charlie Rose will lend his verbal facilitation skills to the Institute for an upcoming public lecture and panel discussion, “A Celebration of Caltech Science.”

Focusing on the topics “The Brain” and “The Earth and the Universe,” the program will be presented in two segments, each comprising a faculty lecture followed by a panel discussion and a question-and-answer session. The event will take place on Saturday, October 26, from 9 a.m. to noon in Beckman Auditorium.

As of press time, faculty members confirmed to discuss “The Brain” were Christof Koch, Troendle Professor of Cognitive and Behavioral Biology and professor of computation and neural systems, who will present the keynote lecture; and David Anderson, professor of biology; Jean Enslinger, professor of anthropology and chair of the Division of the Humanities and Social Sciences; and Steve Quartz, associate professor of philosophy, who will serve as panelists.

Taking part in the “The Earth and the Universe” will be Andrew Lange, Goldberger Professor of Physics, lecturing, and panelists Kip Thorne, Feynman Professor of Theoretical Physics; Annelia Sargent, professor of astronomy and director of the Owens Valley Radio Observatory and the Interferometry Science Center; and Kerry Sieh, professor of geology.

Moderator Rose has become renowned for *The Charlie Rose Show*, which airs weeknights on more than 200 PBS affiliate stations. On the program, he and his guests sit at a round wooden table, about which Phil Patton wrote in *Esquire* magazine, “Afloat in a black background, Charlie’s table has become an island where savvy channel surfers put ashore each weeknight.”

the academic week at Caltech

is a printed version of selected events from the online @Caltech calendar, <http://atcaltech.caltech.edu/calendar/>. To publish events online, register as an event planner on the @Caltech calendar. If unable to submit electronically, please call (626) 395-3630. For further information or a schedule of deadlines, call (626) 395-3630, fax (626) 449-2159, write 336 Calendar, 1-71, California Institute of Technology, Pasadena, CA 91125, or e-mail debbieb@caltech.edu.

October 28–November 3, 2002

M T W T F S S

Tuesday, October 29

IR/submm/mm Sack Lunch
469 Lauritsen, 12:15 p.m.—"SHARC II: A New Facility 350 Micron Camera for the CSO," Darren Dowell, senior postdoctoral scholar in physics, Caltech.

Caltech Library System Presents: Research Techniques for Core Science Writing Course
Sherman Fairchild Library, multimedia conference room, 3 to 4:30 p.m.—This session, intended primarily for undergraduates working on their Core 1ab (Science Writing) requirement, provides an introduction to the library's resources and services. We will focus on research strategies for searching major science and engineering databases to identify key articles, conference papers, and books. All undergraduates are invited to attend. Registration: <http://library.caltech.edu/learning/form.htm>.

Institute for Quantum Information Seminar
74 Jorgensen, 3 p.m.—"Exponential Algorithmic Speedup by Quantum Walk," Andrew Childs, department of physics, MIT.

Mechanical Engineering Seminar
206 Thomas, 3 p.m.—"The Atomic Detail of a Wetting/De-Wetting Flow," Jonathan Freund, assistant professor of theoretical and applied mechanics, University of Illinois at Urbana-Champaign. Information: <http://me.caltech.edu/seminars>.

Ulric B. and Evelyn L. Bray Seminar
25 Baxter, 4 p.m.—"Saving the Whales: Lessons from the First Great Whale Extinction," Ian Keay, assistant professor of economics, Queens University, Ontario. Refreshments.

Carnegie Observatories Colloquium Series
William T. Golden Auditorium, 813 Santa Barbara Street, 4 p.m.—"The Formation of Galactic Disks at Low and High Redshift," Rachel Somerville, assistant professor, department of astronomy, University of Michigan, Ann Arbor. Refreshments, 3:30 p.m.

Wednesday, October 30

Astronomy Colloquium
155 Arms, Robert Sharp Lecture Hall, 4 p.m.—"A Fossil Record of Galaxy Formation and Evolution," Puragra Guhathakurta, professor of astronomy and astrophysics, UC Santa Cruz, and astronomer, Lick Observatory. Information: www.astro.caltech.edu/~gma/colloquia.html.

Environmental Science and Engineering Seminar
142 Keck, 4 p.m.—"Phase Transitions of Aqueous Atmospheric Particles," Scot Martin, associate professor of environmental chemistry, Harvard University.

Organic Chemistry Seminar
147 Noyes, Sturdivant Lecture Hall, 4 to 5:30 p.m.—"The Continuing Evolution of Process Research and Development," Dr. John W. Scott, executive director, Process Research and Development, Bristol-Myers Squibb Company.

Aero Association of Caltech General Membership Meeting
201 E. Bridge, 7:30 p.m.—Featuring guest speaker Robert Gilliland, retired Lockheed Skunk Works test pilot. Robert has logged more experimental supersonic flight test time above Mach 2 and Mach 3 than any other pilot, and was the project test pilot for the SR-71. Non-members are welcome to attend. Information: <http://aacit.caltech.edu>.

Thursday, October 31

Theoretical Astrophysics Including Relativity (TAPIR) Seminar
114 E. Bridge, 11 a.m.—"Galaxy Formation in Lambda CDM Cosmologies," Fabio Governato, University of Washington.

Caltech Library System Presents: Research Techniques for Core Science Writing Course
Sherman Fairchild Library, multimedia conference room, 4 to 5:30 p.m.—This session, intended primarily for undergraduates working on their Core 1ab (Science Writing) requirement, provides an introduction to the library's resources and services. We will focus on research strategies for searching major science and engineering databases to identify key articles, conference papers, and books. All undergraduates are invited to attend. Registration: <http://library.caltech.edu/learning/form.htm>.

Chemical Engineering Seminar
106 Spalding Lab, Hartley Memorial Seminar Room, 4 p.m.—"Engineering Gels to Control Cell Function and Tissue Development," Kristi S. Anseth, Patten Associate Professor, department of chemical engineering, University of Colorado at Boulder, and investigator, Howard Hughes Medical Institute. Refreshments, 113 Spalding Lab, 3:30 p.m. Information: www.che.caltech.edu/calendar/seminars.html.

Geoclub Seminar
151 Arms, Buwalda Room, 4 p.m.—"New Insights into the Relationship Between Mountain Uplift and the Carbon Cycle," Andrew Jacobson, postdoctoral scholar in geochemistry, Caltech.

Physics Research Conference
201 E. Bridge, 4 p.m.—"Fine-Tuning Electronic States in Carbon Nanotubes," Ali Yazdani, assistant professor of physics, University of Illinois at Urbana-Champaign. Refreshments, 108 E. Bridge, 3:45 p.m. Information: www.pma.caltech.edu/~physcoll/PhysColl.html.

Friday, November 1

Organic Chemistry Seminar
153 Noyes, Sturdivant Lecture Hall, 2 to 3:30 p.m.—"Discovery of New Catalytic Asymmetric Reactions for Organic Synthesis," Huw M. L. Davies, Larkin Professor of Organic Chemistry, State University of New York, Buffalo.

Fluid Mechanics Seminar
101 Guggenheim Lab, Lees-Kubota Lecture Hall, 3 p.m.—"The Structural and Statistical Character of Acceleration in Wall Turbulence," Kenneth Christensen, assistant professor, mechanical engineering department, University of New Mexico. Information: www.galcit.caltech.edu/Seminars/Fluids/CurrentFluids/index.html.

Inorganic-Organometallics Seminar
151 Crellin, 4 p.m.—Topic to be announced. Jeffery Byers, graduate student in chemistry, Caltech.

CampusEvents

Monday, October 21

Credit Union’s Grand Opening Celebration
515 S. Wilson Avenue, 9 a.m. to 4 p.m., through October 25—Visit the Caltech Employees Federal Credit Union’s new campus location during our grand opening celebration week. There will be gifts for new and existing members. Information: 395-6300.

Baby Furniture and Household Equipment Pool
234 S. Catalina, 10 a.m. to 1 p.m.—Loans of kitchen and household necessities and baby furniture are made to members of the Caltech community. Information: 584-9773.

Beginners’ Hip-Hop Dance Class
Braun Gym, multipurpose room, 10 p.m.—Beginners’ hip-hop, professionally taught. The trial class costs \$5; cost for the full term is \$20 for Caltech students and \$30 for others. No special clothing or shoes are required. Open to all who have a valid gym membership. Sponsored by the Caltech Dance Troupe.

Tuesday, October 22

Preschool Playgroup
Tournament Park, 10 a.m. to noon—Song and storytime, crafts and free play for toddlers and preschoolers (from walking to age 4). Information: 792-7808 or julia@astro.caltech.edu.

Caltech Tai Chi Club
Winnett lounge, 7:15 p.m.—Meets Tuesdays and Fridays weekly. Sessions are free. Information: www.its.caltech.edu/~taichi/.

Volleyball
vs. Pomona-Pitzer Colleges, 7:30 p.m.

Intermediate Jazz Dance Class
Braun Gym, multipurpose room, 9:30 p.m.—Intermediate jazz dance, taught by a professional instructor. The trial class costs \$5; cost for the full term is \$20 for Caltech students and \$30 for others. No special clothing or shoes are required. Open to all who have a valid gym membership. Sponsored by the Caltech Dance Troupe.

Wednesday, October 23

Baby Furniture and Household Equipment Pool
234 S. Catalina, 10 a.m. to 1 p.m.—Loans of kitchen and household necessities and baby furniture are made to members of the Caltech community. Information: 584-9773.

Wednesdays in the Park
Tournament Park, 10 a.m. to noon—Conversation and coffee for parents and caregivers, and playtime for children. Information: 355-3874 or lcklavins@hotmail.com.

Booksigning and Reading by Robert Rosenstone
Caltech Bookstore, 12:30 to 1:30 p.m.—Robert Rosenstone, professor of history, Caltech, will sign copies and read from his new book, *The Man Who Swam Into History*. Information: 395-6161. Visit the Caltech bookstore at www.bookstore.caltech.edu.

Office Ergonomics Training
118 Keith Spalding Building, 3 p.m.—This course discusses ergonomic design of office environments, specifically computer use. Low-budget techniques are emphasized in assisting computer users to alter their workstation to a “user-friendly” environment. Space is limited. Please call 395-6727 or e-mail Andrea.Acosta@caltech.edu to reserve a place.

Men’s Soccer
at Whittier College, 7 p.m.

Men’s Water Polo
at Pomona-Pitzer Colleges, 7 p.m.

Thursday, October 24

Video Compression for Presentations, Web, and CD/DVD
New Media Classroom, 363 S. Hill Avenue, 10 a.m. to noon—Learn why and how video is compressed for playback on a computer. Hands-on exercises with Cleaner 5 software and demonstrations of other compression software, such as Premiere and Sorenson Squeeze. Information: http://morel.caltech.edu/classes/workshops.html. Open to CaltechJPL community members only.

Caltech Architectural Tours
Athenaeum, 11 a.m. to 12:30 p.m.—Meet in the entry hall of the Athenaeum. Led by members of the Caltech Architectural Tour Service. Reservations: Susan Lee, 395-6327 or suze@caltech.edu.

Women’s Wellness Series: Breast Health
Steele House (carriage house), noon—Renée Gaines, Director of Community Outreach for the Women’s Information Network Against Breast Cancer, will address the issues of breast health, self-examination, and new treatments. Brown bag lunches will be provided. Registration: 395-3221 or wcenter@cco.caltech.edu.

Amnesty International Monthly Meeting
Caltech Y lounge, 7:30 p.m.—Amnesty International Group 22 holds its monthly meeting to discuss current activities and plans. All are welcome. Refreshments. Information: (818) 354-4461 or lkamp@lively.jpl.nasa.gov.

Friday, October 25

Caltech Tai Chi Club
Winnett lounge, 7 p.m.—Meets Tuesdays and Fridays weekly. Sessions are free. Information: www.its.caltech.edu/~taichi/.

Volleyball
vs. Cal Lutheran University, 7:30 p.m.

Vienna Choir Boys
Beckman Auditorium, 8 p.m.—The Vienna Choir Boys present a broad range of sacred and secular works. Tickets and information: 395-4652, 1 (888) 2CALTECH, or events@caltech.edu. Individuals with a disability: 395-4688 (voice) or 395-3700 (TDD). Visit Public Events at www.events.caltech.edu.

Saturday, October 26

Men’s Soccer
vs. Cal Lutheran University, 11 a.m.

Beginning Ballet Class
Braun Gym, multipurpose room, 1 p.m.—Free class taught by experienced members of the Caltech Dance Troupe. All experience levels are invited. No special clothing or shoes are required.

Women’s Self-Defense Refresher
Steele House (carriage house), 1 to 5 p.m.—Participants will review techniques from the introductory and intermediate classes and have the opportunity to work with the padded attacker. Registration: 395-3221 or wcenter@cco.caltech.edu.

Intermediate Ballet Class
Braun Gym, multipurpose room, 2 p.m.—Free class taught by experienced members of the Caltech Dance Troupe. No special clothing or shoes are required.

Volleyball
at Occidental College, 7:30 p.m.

Biology/Prufrock Halloween Party
Event location: Prufrock House (373 S. Wilson), 8 p.m.—All Caltech faculty, staff, and grad students are invited. Excessively elaborate costumes are strongly recommended. Information: www.its/~prufrock/.

Sunday, October 27

Men’s Introduction to Self-Defense
Steele House (carriage house), 1 to 5 p.m.—Participants will learn a variety of hands-on self-defense techniques, rehearse verbal role-play scenarios, and practice delivering full-force, debilitating blows to a padded assailant in a variety of simulated scenarios. Registration: 395-3221 or wcenter@cco.caltech.edu.

Monday, October 28

Baby Furniture and Household Equipment Pool
234 S. Catalina, 10 a.m. to 1 p.m.—Loans of kitchen and household necessities and baby furniture are made to members of the Caltech community. Information: 584-9773.

Beginners’ Hip-Hop Dance Class
Braun Gym, multipurpose room, 10 p.m.—Beginners’ hip-hop, professionally taught. The trial class costs \$5; cost for the full term is \$20 for Caltech students and \$30 for others. No special clothing or shoes are required. Open to all who have a valid gym membership. Sponsored by the Caltech Dance Troupe.

Tuesday, October 29

Preschool Playgroup
Tournament Park, 10 a.m. to noon—Song and storytime, crafts and free play for toddlers and preschoolers (from walking to age 4). Information: 792-7808 or julia@astro.caltech.edu.

Caltech Tai Chi Club
Winnett lounge, 7:15 p.m.—Meets Tuesdays and Fridays weekly. Sessions are free. Information: www.its.caltech.edu/~taichi/.

Volleyball
at University of Redlands, 7:30 p.m.

Intermediate Jazz Dance Class
Braun Gym, multipurpose room, 9:30 p.m.—Intermediate jazz dance, taught by a professional instructor. The trial class costs \$5; cost for the full term is \$20 for Caltech students and \$30 for others. No special clothing or shoes are required. Open to all who have a valid gym membership. Sponsored by the Caltech Dance Troupe.

Wednesday, October 30

Baby Furniture and Household Equipment Pool
234 S. Catalina, 10 a.m. to 1 p.m.—Loans of kitchen and household necessities and baby furniture are made to members of the Caltech community. Information: 584-9773.

QuickTime Pro 6
New Media Classroom, 363 S. Hill Avenue, 10 a.m.—Learn about this \$30 program that can do basic video editing, create animations from still images, and create interactive movies combining video and stills. Registration: 395-3420 or carolynp@caltech.edu. Information: http://morel.caltech.edu/classes/demos.html.

Wednesdays in the Park
Tournament Park, 10 a.m. to noon—Conversation and coffee for parents and caregivers, and playtime for children. Information: 355-3874 or lcklavins@hotmail.com.

QuickTime Pro 6
New Media Classroom, 363 S. Hill Avenue, noon—See 10 a.m. for details.

Men’s Water Polo
at Occidental College, 4 p.m.

Men’s Soccer
at University of La Verne, 7 p.m.

Thursday, October 31

Scanning and Resolution
New Media Classroom, 363 S. Hill Avenue, 10 a.m. to noon—Learn how to scan correctly the first time for great-looking images for publications and presentations. The workshop will cover resolution for different outputs, Photoshop tips, and hands-on practice with photos, journals, and line art. Reservations: carolynp@caltech.edu. Information: http://morel.caltech.edu/classes/workshops.html.

Friday, November 1

Caltech Tai Chi Club
Winnett lounge, 7 p.m.—Meets Tuesdays and Fridays weekly. Sessions are free. Information: www.its.caltech.edu/~taichi/.

Women’s Club Welcoming Coffee
Avery Library, 9 to 10:30 a.m.—An opportunity to meet new friends, welcome newcomers, and learn more about the Caltech Women’s Club. Information: Carol Andersen, (818) 790-8175 or carol@vis.caltech.edu.

Volleyball
vs. Whittier College, 7:30 p.m.

Saturday, November 2

Men’s Soccer
vs. Pomona-Pitzer Colleges, 11 a.m.

Men’s Water Polo
vs. Claremont-Mudd-Scripps, 11 a.m.

Beginning Ballet Class
Braun Gym, multipurpose room, 1 p.m.—Free class taught by experienced members of the Caltech Dance Troupe. All experience levels are invited. No special clothing or shoes are required.

Intermediate Ballet Class
Braun Gym, multipurpose room, 2 p.m.—Free class taught by experienced members of the Caltech Dance Troupe. No special clothing or shoes are required.

Sunday, November 3

Skeptics Society Lecture
Baxter Lecture Hall, 2 p.m.—“Extravagant Universe: Exploding Stars, Dark Energy, and the Accelerating Cosmos,” Robert Kirshner, Clowes Professor of Science, Harvard University, and head of the Optical and Infrared Divison, Harvard-Smithsonian Center for Astrophysics. Donation is \$8 for nonmembers, \$5 for members and non-Caltech students. Free to the Caltech/JPL community. Tickets and information: 794-3119 or skeptimag@aol.com. Book signing to follow the lecture.

Coleman Chamber Concert
Beckman Auditorium, 3:30 p.m.—The Berlin Philharmonic Woodwind Quintet performs music by Mozart, Reicha, Holst, and Nielsen. Tickets and information: 395-4652, 1 (888) 2CALTECH, or events@caltech.edu. Individuals with a disability: 395-4688 (voice) or 395-3700 (TDD). Visit Public Events at www.events.caltech.edu.

Free flu shots

With flu season just around the corner, free vaccinations will again be offered to community members with a current Caltech ID. The shots will be available Wednesday, October 30, from 9 a.m. to 5 p.m. at Winnett lounge. For more information, contact the Health Center at ext. 6393 or www.healthcenter.caltech.edu.

Sculpture, from page 1

spring, intended to communicate the situation, turned into protests as community members aired concerns ranging from aesthetics to safety to perceived secrecy in the decision-making process.

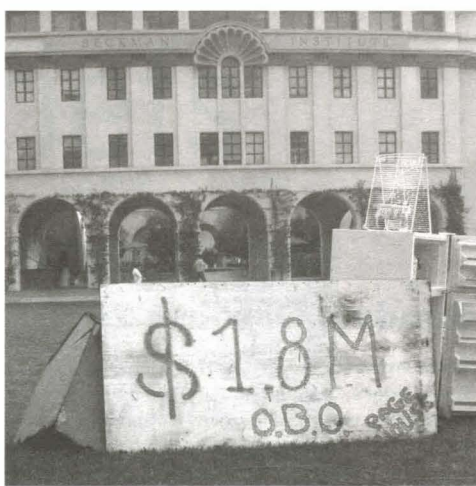
Undergrads and grad students have been among the most vocal opponents, and their biggest grievance is the sense of being disregarded by the administration. Ted Jou, president of the Associated Students of Caltech, speculated that the situation, coming on the heels of other incidents in which students felt overlooked, has turned the artwork into "a symbol, not so much of anger toward Serra, but because we found out through the back door"—through the Graduate Student Council newsletter.

Graduate student Elizabeth Mayo and Professor Jack Roberts voiced similar concerns of lack of consensus. Mayo also cited a GSC poll showing that 94 percent of grad students oppose the sculpture, and noted they learned of the decision following an \$80,000 cut in their annual health-insurance funding. Being unaware of the work's private funding, the students' misperception that a large chunk of the general budget would then be spent on art has made them "feel a little less important," she said.

Baltimore responded that secrecy was never the intent; it was more that no one had previously seemed to take an interest in the Institute Art Committee or its duties. Noting that the board of trustees and its executive committee had also approved the choice, he said, "I believe we went through historically appropriate processes." He expressed the hope that students will realize the administration is "trying hard" to listen to them, commenting that student involvement in campus issues is fairly recent. "We're still adapting to it. I think it's good, but we weren't prepared."

While recognizing the need for student input, Baltimore stated that in this situation he believes a committee decision isn't likely to yield world-class art. "Unless there's one person making the ultimate decision, the resulting choice will be a compromise of several people's opinions," he said. Professor Jack Roberts disagreed. "I think when you have consensus from the best undergrads and faculty in the world, you won't have mediocrity."

The discussion also addressed aesthetics and site usage. Many have called the artwork an eyesore that would usurp recreational space and block foot access, a "derivative" rehash of earlier works, or an "arrogant" piece that belies Institute values. Marianne Bronner-Fraser, chair of the faculty board, said, "I think Serra is a great artist. But I'm just not sure this is the right place for the work, and that's why I can't support it."



In a sign of continuing dissent over *Vectors*, a mock sculpture recently appeared on the artwork's proposed site west of the Beckman Institute.

Professor Mel Simon countered, "I think it's going to have tremendous benefit—it'll be beautiful. I saw [Serra's] work at the Geffen, and it's amazing the effect his work has on you." The piece, he forecast, would help launch a new campus aesthetic and draw visitors from all over. He also pointed out that other sites remain for recreation, and Baltimore predicted people would use the lawn with the wall in place.

The charge of the work's unoriginality was unfair, Baltimore said, reiterating that Serra created it specifically for the site. In fact, he said, the artist felt so strongly that he "made it very plain it was out of the question" to change the design.

Undergraduate Neda Afsarmanesh reminded the group of the penchant of Caltech students for pranks, and Baltimore indicated the administration was aware of the potential, jokingly asking about a budget for cleaning graffiti from the work. Roberts also brought up safety concerns, calling the sculpture an "obstacle course," to which Mayo shot back, "Some would call that natural selection." Most, however, saw the issue as secondary, pointing out the potential dangers all over campus and people's need to be responsible for their actions.

As to the bottom line of whether *Vectors* was a done deal, Baltimore replied no, "that's why we're having a meeting." The contract with Serra cannot be signed until the proposal is submitted to the Pasadena Arts Commission for approval. He reemphasized, however, that if Caltech rejects the work, "a voting process is not the answer," and noted that the funds raised for the piece might no longer be available.

If the project does go forward, the group agreed, a process of education and reconciliation would be essential to ease the situation. Postdoc Liz Haswell said, "I think the sculpture is [the administration's] opportunity to show concern, symboli-

cally." Suggestions included a campus Serra exhibit; guided tours, perhaps by the artist himself; and inclusion of students on the art committee.

"In one sense, I'm not unhappy this was controversial," said Baltimore. "It's an opportunity for dialogue and learning. I really do think it'll be a source of pride to have art we can point to, even if it's with ambivalence." The door is open for further art possibilities on campus, he said, such as shows in a gallery slated for the future student center.

Baltimore concluded by saying he hadn't wanted to make a final decision over the summer, when most undergrads are away, but he hopes to resolve the issue "in the next month or two" through continued discussion.

United Way, from page 1

child care can be expensive, and a working family can spend up to \$1,000 per month, per child on this service.

"The United Way lets us spend the money the center receives the way we want to," says Susan Wood, the director of the center at Caltech. "But we choose to use it as tuition assistance."

Caltech's child care center has places for more than 100 children, and of these, 15 percent have parents who are graduate students and another 15 percent who are postdocs. In a report submitted to the Faculty Board this summer, the Children's Center showed that about a quarter of postdocs and just under half of graduate students participate in the tuition assistance program.

The United Way funds also help Caltech students to act on their desire to connect with the community, whether by tutoring local students and raising money for college scholarships or helping to feed the homeless. Athena Castro, director of the Caltech Y, said the United Way funds that her office receives are put to use in student-directed activities, such as participating in the high school program Building Bridges and volunteering at Pasadena's Union Station shelter.

"The United Way contribution from staff and faculty members is a nice gesture," Castro says. "It's a sign that people enjoy and believe in what we're doing, that they support what we do."

The campaign runs through November 8; forms are due to Diana Alvarez in Human Resources, MC 153-84, by the 15th, but she will continue to accept checks after that date. Checks should be made out to the United Way, and Caltech and JPL donors can write on their checks the name of the agency that they wish to support, to ensure that their contribution funds the chosen program.

Quaoar, from page 1

1996, 2000, and 2001, which allowed them to establish Quaoar's distance and orbital inclination and also to determine that its orbit around the sun is remarkably stable and circular.

"It's probably been in this same orbit for 4 billion years," Brown says.

The discovery of Quaoar is not so much a triumph of advanced optics as of modern digital analysis and a deliberate search methodology. In fact, Quaoar apparently was first photographed in 1983 by then-Caltech astronomer Charlie Kowal in a search for the postulated "Planet X." Kowal unfortunately never found the object on the plate—much less Planet X—but left the image for posterity.

Since the discovery, Brown and Trujillo have also employed other telescopes to study Quaoar, including the Hubble Space Telescope and the Keck Observatory on Mauna Kea, Hawaii. Information from these studies will provide new insights into Quaoar's precise composition. The two are also continuing their search for other large Kuiper-belt bodies.

Amateur astronomers can get a faint image of Quaoar using precise coordinates and a 16-inch telescope fitted with a CCD, such as advertised in magazines like *Sky and Telescope*. Images on successive nights will show a faint dot of light in slightly different positions.

Additional information and images are available at www.gps.caltech.edu/~chad/quaoar.

Campaign, from page 1

president for development and alumni relations; John Baldeschwieler, Johnson Professor and Professor of Chemistry, Emeritus; Professor of Astronomy Anneila Sargent; Amnon Yariv, Summerfield Professor of Applied Physics; and a number of trustees and alumni.

A formal dinner for key and potential donors will take place on the 25th, emceed by talk-show host Charlie Rose and featuring *Infinite Possibilities*, a video presentation on the campaign, and a performance by Ecphonema, Caltech's all-male a cappella group. Also on that day, the brick walkway stretching from Wilson to Holliston Avenues will be formally dedicated as Moore Walk, in honor of Gordon and Betty Moore's "generous friendship, support, and service toward the entire Caltech community."

All Caltech community members will be invited to view the *Infinite Possibilities* video on Monday, November 18, at noon in Beckman Auditorium. Following the presentation, box lunches will be provided on the Beckman Institute patio.

"I believe that this campaign and the fruits of all our collective labors in the next years will further the mission of this campus in extraordinary and lasting ways," Baltimore said. "This will be a very exciting time in the history of the Institute."

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