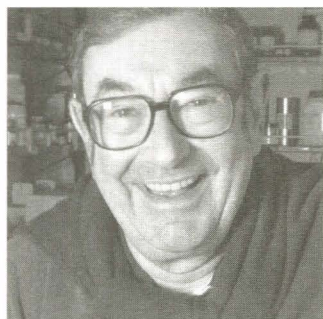


# Caltech 336

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

The campus community biweekly  
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## Harry Gray wins Wolf Prize

Harry Gray still recalls the day in 1982 when, after eight years of research, he and his colleagues finally proved that electrons can literally jump from one molecule to another. "I was ecstatic," recalls the Caltech chemist. "My whole research group was ecstatic." Gray is referring to electron transfer (ET), the process of moving an electron from one place to another, which is critical for life.

For his insight into ET, Gray, Caltech's Beckman Professor of Chemistry and founding director of the Beckman Institute, has been awarded the 2004 Wolf Prize in Chemistry. Specifically, the Wolf Foundation is honoring Gray for his "pioneering work in bio-inorganic chemistry, unraveling novel principles of structure and long-range electron transfer in proteins." The prize includes an honorarium of \$100,000.

"It is really special to be recognized for experimental work that's been done with students and other good friends," says Gray. "It has been so much fun."

Electron-transfer reactions are ubiquitous in the chemistry of biological systems. They are fundamental processes that, among other functions, are responsible for the generation of energy in a cell.

Gray studies the tiny bits of inorganic material in living molecules, such as iron or copper, which, within proteins, have long been known to transfer electrons. But conventional wisdom held that in order for such exchanges to take place, the molecules had to be physically close enough to interact. The puzzle was how the few metal atoms in proteins, surrounded by thousands of other atoms, could maneuver close enough for the exchange. Further, in biological systems the timing always has to be perfect in order to allow for such things as breaking down food and generating energy, conducting photosynthesis, or fixing nitrogen.

The answer, Gray and his colleagues discovered, is that in biological systems, electrons really do jump, and jump big—his work shows that electrons can leap across at least 30 atoms in a large protein molecule in less than one-millionth of a second.

see Gray, page 6

## Leakey lectures examine evolution

The Leakey Speaker Series on Human Origins continues at Caltech with three lectures based on the latest in anthropological and archeological research. Presented by leaders in their respective fields, the lectures provide insights into the ways that our earliest ancestors lived, and delve into the mysteries of the evolution of the human race.

The dig site Olorgesailie in Kenya has provided Richard Potts, the director of the Smithsonian Institution's Human Origins Program, with a detailed snapshot of early human life. Since Louis and Mary Leakey began work there in 1942, the Paleolithic-era site, which was inhabited by early humans some 500,000 years ago, has given up a rich collection of fossils, most notably Acheulian hand axes.

These primitive yet effective tools have provided paleoanthropologist Potts and his team with the data to conduct a comparative study of Olorgesailie with an early settlement in China. In the lecture "The Adaptable Hand-Axe and Human Origins," Potts will show how recent discoveries support a novel theory that hand axes were adaptable to the users' needs and in widely varying ecologies. This lecture will take place on Wednesday, February 25.

The point at which hominids made the transition as a species from *Australopithecus* to *Homo* has been identified at about 2.5 to 2 million years ago. In 1962, the Leakeys dated early hominid fossils associated with stone tools at 1.8 million years ago. These hominids were subsequently named *Homo habilis*.

In the lecture "The Transition from *Australopithecus* to *Homo*," Berhane Asfaw, director of the Middle Awash Research Project, will speak about the oldest discovered bones and stone tools in Ethiopia. These relics have been associated with a subset of *Australopithecus*, a finding indicating that the use of stone tools

see Leakey, page 6

## Daffodil Days are here again

Daffodil Days, a fund-raiser for the American Cancer Society, has returned to Caltech. Order flowers through February 20; they'll be delivered on campus in mid-March to you or a recipient of your choice, or to a cancer patient. Proceeds will fund research, educational programs, advocacy, and services for cancer patients and their families. Call Susie Clark at ext. 1745 or Catherine May at ext. 6502 to order or to locate a campus representative near you.

## Macbeth doth come



The Weird Sisters (from left, Cecilia Yu '07; former Seismo Lab staffer Karen Kähler; and Erica Rolufs, wife of postdoc Calum Chisholm) offer answers to the curious Macbeth (alum Allen Corcorran, BS '91) with a bit of home brew in TACIT's upcoming production. See article on page 6.

## Caltech's Mail Services delivers

Be they campus mail, U.S. mail, or privately shipped parcels, millions of pieces of correspondence pass through Caltech every year, and the dozen staff members at Mail Services make it all look effortless.

Based in Keith Spalding Building, the department runs a FedEx shipping desk and they also receive and distribute inbound FedEx, DHL, and Airborne packages under 50 pounds, says Darrel Goudeau, manager of Mail Services.

But the main focus of Mail Services, which is part of Campus Planning, is the delivery and pick up of campus and U.S. mail, which is done via a fleet of electric carts that travel throughout the campus to 120 mail stops, twice a day.

Mail Services and Graphic Resources run Tech Express on the Olive Walk, a three-year-old offshoot of the Spalding offices that provides many of the same mail and graphics services, but that is closer to the heart of campus.

Caltech even runs its own contract United States Post Office, which provides all the functions available at a regular post office, says Christopher Henderson, director of Mail Services and Graphic

see Mail, page 6



## Douglas named University Librarian

Kim Douglas has been named University Librarian. She has been serving as acting director of libraries since the death of the former University Librarian, Anne Buck, last April.

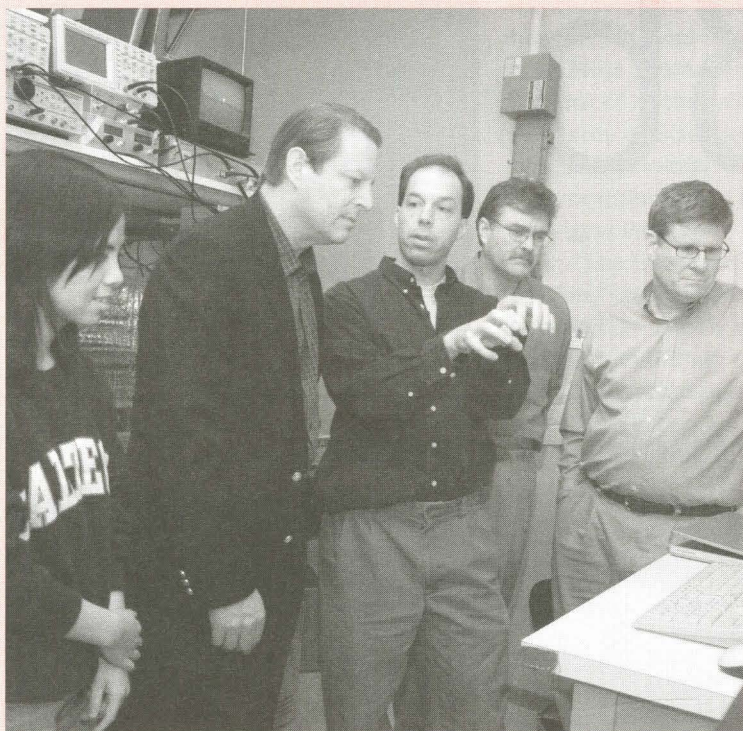
Dan Meiron, associate provost for information and information technology, wrote in an e-mail memo to the campus community: "It gives me great pleasure to announce the appointment of Ms. Kim Douglas as University Librarian. . . . Kim brings to this appointment a deep appreciation of the traditional role of libraries coupled with an equally deep understanding of the enormous potential of the integration of new digital tools of scholarship."

He added, "I am certain that Kim will continue to support the enormously high standards set by her predecessor, Anne Buck, whose planning and work in

see Douglas, page 2



# NewsBriefs



Former vice president Al Gore, second from left, recently visited the lab of Caltech professor of applied physics and physics Steve Quake, center. The two discuss data from the FANSOM (fluorescence apertureless near-field scanning microscope) with lab members Ziyang Ma (left) and Larry Wade (right), and sponsor Bruce Burrows. Designed in Quake's lab, the instrument is the world's highest-resolution optical microscope. Not pictured is lab member Jordan Gerton, who also works on the project.

## Personals

### Welcome to Caltech

#### January

**Daniel Barbosa**, postdoctoral scholar in physics; **Kristen Beverly**, visitor in chemistry; **Pratip Bhattacharya**, James Boswell Postdoctoral Scholar in Chemistry; **Steve Bustos**, plumber, Facilities Management; **Jennifer Caron**, office assistant for science writing, Office of the Provost; **Michelle Chen**, administrative secretary, electrical engineering / computation and neural systems; **Michael Doran**, visitor in physics; **Francesco Feri**, visitor in economics; **Jeffrey Goldstone**, visitor in physics; **Joseph Hagan**, painter, Facilities Management; **Hank Kang**, system administrator, Information Technology Services; **Stacey King**, administrative aide, Office of the General Counsel; **Sarita Kuhn**, admissions assistant, Undergraduate Admissions Office; **Julia McCallin**, director of employee relations, Human Resources; **Aaron McKinnon**, system administrator, Information Technology Services; **Robert Mesch**, security officer, Campus Security and Parking Services; **Carrie Miller**, assistant director, gift and estate planning, Development and Alumni Relations; **Richard Olson**, postdoctoral scholar in biology and associate, Howard Hughes Medical Institute; **Ji Young Park**, research assistant I, biology; postdoctoral scholars **Sungmin Park-Lee** and **Nivalda Rodrigues-Pinguet**, both in biology; **Laurent Ruet**, visitor in physics; **Christine Sahakians**, guest relations coordinator, Athenaeum; **Jagan Srinivasan**, postdoctoral scholar in biology; **Judith Stanton**, division administrator, engineering and applied science; **Angelle Tanner**, postdoctoral scholar in JPL's interferometry center of excellence; **Bartek Wydrowski**, research engineer, computer science; **Tony Zacarias**, cabinet maker, Facilities Management.

#### Retirements

**Nancy Brown** has retired effective February 3 after 33 years at Caltech. She was a government documents coordinator for the Caltech library system.

**Larry Frazier**, an instrument specialist in aeronautics, will retire on February 9. He has been with Caltech for 20 years.

**Ann Frey**, who provided staff support for the humanities and social sciences division administration, will retire on February 6 after 13 years at Caltech.

**Inocencia Portela** will retire on February 27. A custodian, she has been with Caltech for 17 years.

#### Deaths

**Peter Fay**, professor of history, emeritus, died on January 18; he was 79. An authority on China and India, Fay wrote *The Opium War, 1840–1842*, which won several prizes following its publication in 1975, and *The Forgotten Army: India's Armed Struggle for Independence, 1942–1945*, as well as numerous papers and book chapters. He served as an artillery officer during World War II, and then attended Harvard, from which he graduated summa cum laude in 1947. He earned a second bachelor's degree as a Rhodes Scholar at Oxford, then returned to Harvard for his PhD. He joined Caltech's faculty in 1955. As a visiting professor at the Indian Institute of Technology in Kanpur (1964–66), Fay helped develop that school's humanities program. He also served as a member of the *Pacific Historical Review's* board of directors (1975–77), and he twice won the Associated Students of the California Institute of Technology (ASCIT) Teaching Award, in 1979 and 1990. He is survived by his wife, Mariette; three sons, Todor, Jonathan, and Benjamin; two daughters, Jennifer Fay and Lisa Matthiessen; and seven grandchildren. Memorial donations may be made to either the American Friends Service Committee or the Spastic Center in Kanpur, India, the address for which can be obtained from Susan Davis, division administrator for the humanities and social sciences, at mail code 228-77.

**John O'Keefe**, who had retired as a senior scientist after 30 years with TRW, and who was a visiting associate at Caltech from 1977 to 2000, first in planetary science and then in geophysics, died on January 18; he was 66. He graduated with a BS from Cal State Long Beach in 1962; earned two MSs, one from USC in 1965, the other from UCLA in 1971; and received his PhD from UCLA in 1977. At TRW he was in charge of its laser laboratory. He is survived by his wife, Anne; two children, Ian and Cameron; two stepchildren, Jaclyn and Rebecca; a grandson; a brother, James; and a sister, Colleen. Donations may be made to the American Cancer Society, (800) ACS 2345.

## Honors and awards

**James Heath**, Gilloon Professor and professor of chemistry at Caltech and one of the scientific founders of Nanosys Inc., has been recognized "for devising a method for producing ultrahigh-density arrays of aligned nanowires and nanowire circuits," which constitute "a key architecture and technique in several of Nanosys's electronic systems." The recognition came as part of the *Chemical and Engineering News* Nanotech & Molecular Electronics Highlights for 2003. Heath, who joined Caltech's faculty last year, received his BSc from Baylor University in 1984 and his PhD from Rice University in 1988.

**Richard Marsh**, senior research associate in chemistry, emeritus, at Caltech, has been selected by the American Crystallographic Association (ACA) to receive its first Kenneth N. Trueblood Award, which "recognizes exceptional achievement in computational or chemical crystallography." A Caltech alum (class of 1943), Marsh earned his PhD at UCLA in 1950 and returned to Caltech that same year as a research fellow. As part of the award, Marsh will give the keynote lecture in the Trueblood Symposium, to be held in his honor during the 2004 ACA annual meeting.

**Janis Schonauer**, Caltech ombudsperson, has been given the Service Excellence Award by the California Caucus of College and University Ombuds in recognition of her work on behalf of both the caucus and the ombuds community at large. This includes her convening both the 1991 and the 2001 caucus annual meetings, writing articles for the journal published by the caucus, and serving as a mentor to new members. Her service in 2002 as president of the University and College Ombuds Association was also noted.

## Campus authors

### Internet voting's future examined

**Michael Alvarez**, a professor of political science at Caltech, and Thad Hall, a program officer with the Century Foundation, have published a new book—*Point, Click, and Vote: The Future of Internet Voting* (Washington D.C.: Brookings Institution Press, 2004)—that addresses the question of whether Internet voting is practical and likely to be of benefit to 21st-century democracy, or whether it is more likely to lead to debacles like the one that marred the 2000 presidential election. They conclude that Internet voting can indeed move forward, but must be approached step by step, with a particular emphasis on well-planned, controlled experiments. Two opportunities will occur this year—on February 7, the Michigan Democratic Party will allow voters to cast ballots over the Internet during the party's caucus, and, on November 2, many voters covered by the Uniformed and Overseas Civilian Absentee Voting Act will be able to vote over the Internet during the presidential election. Other issues to be addressed will include security; legal and regulatory changes; and narrowing the digital divide so that all voters will have a more equal opportunity to participate.

Codirector of the Caltech/MIT Voting Technology Project, Alvarez was a lead author of *Voting: What Is, What Could Be*, which was published by the project after the 2000 elections. He is also coauthor (with John Brehm) of *Hard Choices, Easy Answers: Values, Information, and American Public Opinion*, and the author of *Information and Elections*, as well as numerous papers on voting behavior, and he has testified before Congress about election reform and appeared as an expert witness in regard to election-related litigation. He received his BA from Carleton College in 1986 and his PhD from Duke University in 1992, joining Caltech's faculty that same year.

### A sobering future predicted

**David Goodstein**, Caltech's vice provost, professor of physics and applied physics, and Gilloon Distinguished Teaching and Service Professor, sees difficult choices facing human society worldwide as global oil production peaks in the near future. In his new book, *Out of Gas: The End of the Age of Oil* (New York: W. W. Norton & Company, 2004), Goodstein argues that this peak—known as Hubbert's peak, after Texas geophysicist M. King Hubbert, who was nearly laughed out of the oil industry in the 1950s for suggesting that even a U.S. production peak was possible—will occur sooner than people think, perhaps—in a view held by a number of geologists—within this decade. The likely result will be widespread and possibly catastrophic social and economic consequences. Goodstein's hope is that, as prices begin to steadily rise and oil becomes increasingly difficult to obtain, a sobering global wake-up call will take place, and that the changes necessary for civilization's survival will be made. "The crisis will occur, and it will be painful," he writes. "Civilization as we know it will come to an end sometime in this century unless we can find a way to live without fossil fuels." He dedicates the book "to our children and grandchildren, who will not inherit the riches that we inherited."

Having received his BS from Brooklyn College in 1960 and his PhD from the University of Washington in 1965, Goodstein joined Caltech's faculty in 1966. His past forays into the realm of science communication include his award-winning PBS series *The Mechanical Universe*, and the best-selling book *Feynman's Lost Lecture*.

## Not just another Valentine's Day

For the first time, Caltech is taking part in the V-Day College Campaign, part of a global movement to stop violence against women and girls by promoting awareness and raising funds for antiviolence organizations. Through benefit performances of Eve Ensler's Obie Award-winning play, *The Vagina Monologues*, the V-Day movement ([www.vday.org](http://www.vday.org)) calls attention to the fight to stop violence—including rape, battery, incest, female genital mutilation, and sexual slavery—that is inflicted on women and girls worldwide.

On Friday, February 13, a diverse group of Caltech students, staff, postdoctoral scholars, faculty, and alumnae will bring to life the poignant, funny, and moving sketches that compose *The Vagina Monologues*. Based on Ensler's interviews with more than 200 women, the piece celebrates the sexuality and strength of women around the globe, and exposes the violations they endure. It has been translated into more than 25 languages and performed worldwide, including sold-out runs off Broadway and in London.

Says event organizer Rachel Niemer, a graduate student in chemistry, "This is an opportunity for the Caltech community—women and men—to come together and take a stand against violence in all forms." Security staff member Loren Kajitani, who is part of the cast, describes the participation in V-Day as an "exciting, groundbreaking, and inspiring venture." Proceeds will benefit the L.A. Commission on Assaults Against Women.

The performance will begin at 8 p.m. in Baxter Lecture Hall. Tickets are \$5 for students with ID, \$15 for others, and are on sale at the Caltech Y, located at the Center for Student Services (414 South Holliston Avenue), Room 158. For more information, contact Niemer at (626) 395-6379 or [rniemer@caltech.edu](mailto:rniemer@caltech.edu), or visit [http://events.vday.org/2004/College/California\\_Institute\\_of\\_Technology](http://events.vday.org/2004/College/California_Institute_of_Technology).

### Douglas, from page 1

support of the libraries have made it possible for our library system to have an impact far out of proportion to its size."

Douglas came to Caltech in 1988 as head of reader services and has all along been involved in designing and implementing automated services. She introduced desktop publishing to the libraries, initiating their online presence with Gopher in the early 1990s and then directing the transition to the World Wide Web.

The head of technical information services and director of the Fairchild Library of Engineering and Applied Science—in whose planning and execution she played a significant role—Douglas has also taken a leadership role in implementing digital collections at Caltech, beginning in 1999 with the campus discussion regarding Copyright in Scholarly Communication.

After receiving her MS in library science from the Long Island University in 1978, Douglas held positions in scientific research libraries at the Bigelow Laboratory of Ocean Sciences in Boothbay Harbor, Maine, and at USC, where she headed the Hancock Library of Biology and Oceanography from 1982 to 1985 and the Science and Engineering Libraries from 1985 to 1988.



# February 9–15, 2004

M T W T F S S

## Monday, February 9

### Geological and Planetary Sciences Seminar

155 Arms, Robert Sharp Lecture Hall, 4 p.m.—“Processes of Continental Break-up and Initial Seafloor Spreading as Observed in the Woodlark Basin, PNG,” Brian Taylor, professor of geology and geophysics, University of Hawaii at Manoa.

### Inorganic-Electrochemistry Seminar

147 Noyes, Sturdivant Lecture Hall, 4 p.m.—“Understanding the Role of Cysteinate Sulfur Ligands in Promoting Function in Non-Heme Iron Enzymes,” Julia Kovacs, professor of chemistry, University of Washington.

### Kroc Seminar

24 Beckman Labs, 4 p.m.—“Recognition and Signaling in the Immune Response of *Drosophila*,” Professor Jules Hoffmann, Institut de Biologie Moleculaire et Cellulaire, Centre National de la Recherche Scientifique, France.

### Applied and Computational Mathematics Colloquium

101 Guggenheim Lab, Lees-Kubota Lecture Hall, 4:15 p.m.—“Some Aspects of the Boltzmann Equation,” Tai-Ping Liu, department of mathematics, Stanford University. Refreshments, 3:45 p.m. Information: [www.acm.caltech.edu/colloq.shtml](http://www.acm.caltech.edu/colloq.shtml).

## Tuesday, February 10

### Inorganic Crystal Structure Database Workshop

Sherman Fairchild Library, multimedia conference room, noon—Intended as a follow-up to the “Introduction” class, this workshop will be a hands-on session intended for specific search and structure questions. Laptop computers will be provided. Information and registration: <http://library.caltech.edu/learning/default.htm>.

### Institute for Quantum Information Seminar

74 Jorgensen, 3 p.m.—Topic to be announced. Hans Briegel, professor of physics, University of Innsbruck.

### Mechanical Engineering Seminar

206 Thomas, 3 p.m.—“Large Eddy Simulation of Two-Phase Flows with Evaporation,” Josette Bellan, visiting associate in aeronautics, Caltech. Refreshments, 210 Thomas, 2:45 p.m.

### Carnegie Observatories Colloquium Series

William T. Golden Auditorium, 813 Santa Barbara Street, 3:30 to 5 p.m.—“Comparing Chemical Histories of Halo Field Stars and Globular Clusters: The Struggle Continues,” Professor Christopher Sneden, department of astronomy, University of Texas at Austin. Refreshments, 3:30 p.m.

### General Biology Seminar

119 Kerckhoff, 4 p.m.—Topic to be announced. Professor David Kingsley, department of developmental biology, Stanford University, and Howard Hughes Medical Institute assistant investigator.

### W. N. Lacey Lectureship in Chemical Engineering

106 Spalding Lab, Hartley Memorial Seminar Room, 4 p.m.—“Creating Functional Peptide Architectures at Interfaces,” Matthew Tirrell, Auhl Professor and dean of engineering, College of Engineering, UC Santa Barbara. Refreshments, 113 Spalding Lab, 3:30 p.m.

### Special High Energy Theory Seminar

469 Lauritsen, 4 p.m.—“A Matrix Model for AdS<sub>2</sub>,” Andrew Strominger, professor of physics, Harvard. Information: [www.theory.caltech.edu/people/seminar/schedule.html](http://www.theory.caltech.edu/people/seminar/schedule.html).

## Wednesday, February 11

### Astronomy Colloquium

155 Arms, Robert Sharp Lecture Hall, 4 p.m.—“Evidence from Type Ia Supernovae for a Decelerating, Then Accelerating Universe, and Dark Energy,” Alex Filippenko, professor of astronomy, UC Berkeley. Information: [www.astro.caltech.edu/~gma/colloquia.html](http://www.astro.caltech.edu/~gma/colloquia.html).

### Environmental Science and Engineering Seminar

142 Keck, 4 p.m.—“Bacterial-Fungal Interactions: Molecular Mechanisms and Biological Consequences,” Professor Deborah Hogan, department of microbiology and molecular genetics, Harvard Medical School. Refreshments, Keck Labs lobby, 3:40 p.m.

### General Biology Seminar

119 Kerckhoff, 4 p.m.—“Functional and Molecular Adaptations of Disrupted Development of Forebrain Interneurons,” Professor Pat Levitt, JFK Center for Research on Human Development, Vanderbilt University.

### Materials Research Lecture

106 Spalding Lab, Hartley Memorial Seminar Room, 4 p.m.—“Gene Sensors: Detection of Specific Targeted Sequences on DNA,” Alan J. Heeger, UC Santa Barbara. Refreshments, 113 Spalding Lab, 3:45 p.m. Information: [www.matsci.caltech.edu/seminars.html](http://www.matsci.caltech.edu/seminars.html).

### Earnest C. Watson Lecture Series

Beckman Auditorium, 8 p.m.—“String Theory: Past, Present, and Future,” John Schwarz, Brown Professor of Theoretical Physics, Caltech. Admission is free. Information: 395-4652, 1 (888) 2CALTECH, or [events@caltech.edu](mailto:events@caltech.edu). Individuals with a disability: 395-4688 (voice) or 395-3700 (TDD). Visit Public Events at [www.events.caltech.edu](http://www.events.caltech.edu).

## Thursday, February 12

### Caltech Library System Presents: Introduction to Beilstein/Gmelin Crossfire

Sherman Fairchild Library, multimedia conference room, 2 to 3:30 p.m.—A review of database content, and a quick comparison with SciFinder Scholar and the Combined Chemical Dictionary. Examples of structure searching and displaying results in Beilstein Commander will be shown. Information: <http://library.caltech.edu/learning/default.htm>.

### W. N. Lacey Lectureship in Chemical Engineering

106 Spalding Lab, Hartley Memorial Seminar Room, 4 p.m.—“Forces Between Layers of Surface-Tethered Polyelectrolytes in Various Ionic Environments,” Matthew Tirrell, Auhl Professor and dean of engineering, College of Engineering, UC Santa Barbara. Refreshments, 113 Spalding Lab, 3:30 p.m.

### Physics Research Colloquium

201 E. Bridge, 4 p.m.—Topic to be announced. Sunil Golwala, assistant professor of physics, Caltech. Refreshments, 114 E. Bridge, 3:45 p.m.

## Friday, February 13

### High Energy Theory Seminar

469 Lauritsen, 11 a.m.—Topic to be announced. Clifford Johnson, professor of physics and astronomy, USC. Information: [www.theory.caltech.edu/people/seminar/schedule.html](http://www.theory.caltech.edu/people/seminar/schedule.html).

### Fluid Mechanics Seminar

101 Guggenheim Lab, Lees-Kubota Lecture Hall, 3 p.m.—“Uncertainty Quantification in Reacting Flow Modeling,” Habib Najm, principal member of technical staff, Combustion Research Facility, Sandia National Laboratories. Information: [www.galcit.caltech.edu/Seminars/Fluids/CurrentFluids/index.html](http://www.galcit.caltech.edu/Seminars/Fluids/CurrentFluids/index.html).

### Inorganic-Organometallics Seminar

151 Crellin, 4 p.m.—“Picosecond Electron Transfer into the Active Site of Nitric Oxide Synthase,” Wendy Belliston, graduate student in chemistry, Caltech.

### William Bennett Munro Memorial Seminar

25 Baxter, 4 p.m.—“Information and Knowledge on the Internet: The Case of the William Blake Archive,” Robert Essick, professor of English, UC Riverside. Refreshments.

## Physicists string it all together

In physics, string theory connects the microscopic quantum world of elementary particles to the macroscopic world of gravity and geometry. John Schwarz, Brown Professor of Theoretical Physics, will discuss the possibilities in an Earnest C. Watson Lecture, “String Theory: Past, Present, and Future,” on Wednesday, February 11. The free public talk will begin at 8 p.m. in Beckman Auditorium.

Physicists believe string theory may have the potential to achieve two very ambitious goals: to give a complete mathematical description of the microscopic laws that determine the properties of elementary particles and the forces acting on them, and to explain the origin and evolution of the universe. Much has been achieved, but the theory is still a work in progress. Schwarz will give a historical overview of the subject and discuss some of the challenges that remain.

No tickets or reservations are required; first-come, first-served seating will be available at 7:30 p.m. For more information, contact Public Events at 1 (888) 2CALTECH, (626) 395-4652, or [events@caltech.edu](mailto:events@caltech.edu), or visit [www.events.caltech.edu](http://www.events.caltech.edu). Individuals with a disability can call 395-4688 (voice) or 395-3700 (TDD). All Watson Lectures will be available online at Caltech’s Streaming Theater, <http://today.caltech.edu/theater>.



# February 16–22, 2004

M T W T F S S

## Monday, February 16

### Presidents' Day Holiday

#### 23rd Annual Western States Mathematical Physics Meeting

151 Sloan, 9 a.m. to 5:30 p.m.—For information on speakers and topics, see [www.math.caltech.edu/events/wsmp04.html](http://www.math.caltech.edu/events/wsmp04.html). Fee: \$10; graduate students free. Through February 17.

## Tuesday, February 17

#### Institute for Quantum Information Seminar

74 Jorgensen, 3 p.m.—"Coherent Communication of Classical Messages," Aram Harrow, MIT. Information: [www.iqi.caltech.edu/seminar\\_abstracts.html#harrow04](http://www.iqi.caltech.edu/seminar_abstracts.html#harrow04).

#### Mechanical Engineering Seminar

206 Thomas, 3 p.m.—"Theory and Simulation of Deformation Twinning in FCC Metals," Professor Ellad Tadmor, Technion—Israel Institute of Technology. Refreshments, 210 Thomas, 2:45 p.m.

#### Carnegie Observatories Colloquium Series

William T. Golden Auditorium, 813 Santa Barbara Street, 3:30 to 5 p.m.—"Cluster Lensing," Jean-Paul Kneib, visiting associate in astronomy, Caltech. Refreshments, 3:30 p.m.

#### General Biology Seminar

119 Kerckhoff, 4 p.m.—"Epigenetic Regulation in Development: The Thymus and Beyond," Dan Littman, department of pathology and microbiology, NYU Medical Center, and Howard Hughes Medical Institute.

#### Inorganic-Electrochemistry Seminar

147 Noyes, Sturdivant Lecture Hall, 4 p.m.—"Corroles: Synthesis, Coordination Chemistry, Catalysis, and Conjugation to Proteins for Biomimetic Processes," Professor Zeev Gross, department of chemistry, Technion—Israel Institute of Technology.

#### Caltech/MIT Enterprise Forum

Baxter Lecture Hall, 5:30 to 9:30 p.m.—"Entrepreneurial Opportunities in Software." The program begins with dinner in Chandler Dining Hall. Registration: 395-3916 or [entfor@caltech.edu](mailto:entfor@caltech.edu). Information: [www.entforum.caltech.edu](http://www.entforum.caltech.edu).

## Wednesday, February 18

#### Astronomy Colloquium

155 Arms, Robert Sharp Lecture Hall, 4 p.m.—"The Spitzer Space Telescope: New Views of the Cosmos" (6th Annual Greenstein Lecture), Mike Werner, Spitzer project manager, JPL. Information: [www.astro.caltech.edu/~gma/colloquia.html](http://www.astro.caltech.edu/~gma/colloquia.html).

#### Everhart Lecture Series

101 Guggenheim Lab, Lees-Kubota Lecture Hall, 4 p.m.—"Cancerous Stem Cells: Insights into the Origins of Human Brain Tumors," Houman Hemmati, graduate student in biology. Refreshments, 3:45 p.m. Information: [www.its.caltech.edu/~els](http://www.its.caltech.edu/~els).

#### General Biology Seminar

119 Kerckhoff, 4 p.m.—"Identifying Neural Circuits Governing Motor Behavior in *Drosophila*," Julie Simpson, genetics department, University of Wisconsin—Madison.

#### Materials Research Lecture

106 Spalding Lab, Hartley Memorial Seminar Room, 4 p.m.—Topic to be announced. Vicki Colvin, Rice University. Refreshments, 113 Spalding Lab, 3:45 p.m. Information: [www.matsci.caltech.edu/seminars.html](http://www.matsci.caltech.edu/seminars.html).

## Thursday, February 19

#### Beilstein/Gmelin Workshop

Sherman Fairchild Library, multimedia conference room, 2 to 3:30 p.m.—Intended as a follow-up to the introductory class, this workshop will be a hands-on session for specific compound searching. Laptop computers will be provided for attendees with priority given to those who sign up first. Information: <http://library.caltech.edu/learning/default.htm>.

#### Biophysics Lecture

153 Noyes, Sturdivant Lecture Hall, 4 p.m.—Topic to be announced. Professor William Gelbart, chemistry and biochemistry department, UCLA.

#### Physics Research Colloquium

201 E. Bridge, 4 p.m.—"Novel 'Deconfined' Criticality in Quantum Magnets," Leon Balents, professor of physics, UC Santa Barbara. Refreshments, 114 E. Bridge, 3:45 p.m.

#### Social and Information Sciences Laboratory Seminar Series

25 Baxter, 4 p.m.—"Sharing Spectrum on the Unlicensed Bands: Power Allocation Rules for Multiple Access Channels," Eric Friedman, associate professor, School of Operations Research and Industrial Engineering, Cornell University. Refreshments.

#### Von Karman Lecture Series

JPL, von Karman Auditorium, 7 p.m.—"Artificial Life: Life *Not* As We Know It," Dr. Chris Adami, lecturer and faculty associate in computation and neural systems, Caltech, and principal scientist, quantum computing technologies group, JPL. Admission is free. Information: [www.jpl.nasa.gov/lecture](http://www.jpl.nasa.gov/lecture).

## Friday, February 20

#### High Energy Theory Seminar

469 Lauritsen, 11 a.m.—Topic to be announced. Rob Myers, Perimeter Institute for Theoretical Physics, and department of physics, University of Waterloo. Information: [www.theory.caltech.edu/people/seminar/schedule.html](http://www.theory.caltech.edu/people/seminar/schedule.html).

#### Condensed Matter Physics Seminar

107 Downs Lab, noon—Topic to be announced. Professor Chris Palmstrøm, chemical engineering and materials science department, University of Minnesota, Twin Cities.

#### Fluid Mechanics Seminar

101 Guggenheim Lab, Lees-Kubota Lecture Hall, 3 p.m.—"Langmuir Circulation: An Upper Ocean Wave/Boundary-Layer Instability," Professor William Phillips, department of theoretical and applied mechanics, University of Illinois at Urbana-Champaign. Information: [www.galcit.caltech.edu/Seminars/Fluids/CurrentFluids/index.html](http://www.galcit.caltech.edu/Seminars/Fluids/CurrentFluids/index.html).

#### History and Philosophy of Science Seminar

25 Baxter, 4 p.m.—"Revisiting the Academie Royale des Sciences: Wilhelm Homberg and His Chemistry," Larry Principe, professor of history of science and technology, Johns Hopkins University. Refreshments.

#### Inorganic-Organometallics Seminar

151 Crellin, 4 p.m.—"Rhodium Complexes for the Detection of Single Nucleotide Polymorphisms," Jonathan Hart, graduate student in chemistry, Caltech.

#### Von Karman Lecture Series

Pasadena City College, 1570 E. Colorado, the Vosloh Forum (south of Colorado on Bonnie), 7 p.m.—"Artificial Life: Life *Not* As We Know It," Dr. Chris Adami, lecturer and faculty associate in computation and neural systems, Caltech, and principal scientist, quantum computing technologies group, JPL. Admission is free. Information: [www.jpl.nasa.gov/lecture](http://www.jpl.nasa.gov/lecture).



# CampusEvents

## Tuesday, February 10

**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: 793-4099 or camila\_bruns@hotmail.com.

**TheatreworksUSA: Jim West’s Aesop’s Fables II**  
Beckman Auditorium, 10 a.m.—Master Puppeteer Jim West returns with a new, large-scale production. TheatreworksUSA is America’s largest and most prolific professional not-for-profit theater for young and family audiences. There will be two performances; the first at 10 a.m. and the second at noon. Tickets: TheatreworksUSA, (800) 497-5007.

**Women’s Tennis**  
vs. Biola University, 3 p.m.

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

**Amnesty International Letter Writing**  
Athenaeum Rathskeller, 7:30 p.m.—Caltech/Pasadena AI Group 22 will host an informal meeting to write letters on human-rights abuses around the world. All are welcome. Refreshments. Information: (818) 354-4461 or lkamp@lively.jpl.nasa.gov. Visit our website at www.its.caltech.edu/~aigp22.

**Women’s Basketball**  
vs. Pomona-Pitzer, 7:30 p.m.

## Wednesday, February 11

**Baby Furniture and Household Equipment Pool**  
234 S. Catalina, 10 a.m. to 12:30 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—Every Wednesday there’s conversation and coffee for parents and caregivers, and playtime and snacks for children. Information: 403-7163 or ktclark@caltech.edu.

**Emergency Preparedness Training**  
118 Keith Spalding Building, 3 p.m.—This course will describe the campus emergency operations plan, including information about the emergency operations center, evacuation, fire prevention and protection techniques, behavioral principles during an emergency, and personal preparedness. Reservations: 395-6727 or safety.training@caltech.edu.

**Salsa Dance Class**  
Winnett lounge, 7 p.m.—Learn the fundamentals of Cuban-style salsa and rueda from a professional instructor. The beginners’ session begins at 7 p.m. The intermediate/advanced lesson starts at 8:30. The first class took place January 28. Fee: \$28 for 5 classes; \$7 per class.

**Men’s Basketball**  
at Whittier College, 7:30 p.m.

## Thursday, February 12

**Reel Women Film Series**  
Caltech Women’s Center, noon—*Wild Women Don’t Have the Blues* shows women’s unique contributions to the blues, which was born out of the economic and social transformation of African American life early in the last century. Featuring the music of Ma Rainey, Bessie Smith, Ida Cox, Alberta Hunter, and the other legendary women who made the blues a vital part of American culture.

## Friday, February 13

**Caltech Tai Chi Club**  
See Tuesday, February 10, for details.

**Women’s Basketball**  
vs. Claremont-Mudd-Scripps, 7:30 p.m.

**Caltech Chess Club**  
Page House dining room, 8 p.m.—Be you master or novice, you will enjoy the chess club’s weekly meetings. Information: www.its.caltech.edu/~citchess.

**Caltech Chinese Chess Club**  
Page House dining room, 9 p.m.—The Chinese Chess Club meets on Friday nights for casual play. Information: www.its.caltech.edu/~xiangqi.

## Saturday, February 14

**Men’s Tennis**  
vs. Whittier College, 9:30 a.m.

**Women’s Tennis**  
at Whittier College, 9:30 a.m.

**Track and Field**  
Road Runner Invitational, at Cal State Bakersfield, 10 a.m.

**Baseball**  
vs. Cal State Monterey Bay, at Pasadena High School, doubleheader, noon.

**Hawaiian Club Hula Lessons**  
Winnett lounge, 1 p.m.—Learn hula dancing from the Hawaiian Club. The weekly lessons, which began January 10, will be held on Saturdays through March 13. Fee: \$5 per class; graduate students and ASCIT members, \$3 per class. Pareos are the recommended attire; purchase one at the class for \$5. Registration: maruchan@its.caltech.edu. Information: www.ugcs.caltech.edu/~lilinoe/hula.html.

**Men’s Basketball**  
vs. Cal Lutheran University, 7:30 p.m.

## Sunday, February 15

**Cha-Cha Dance Class**  
Winnett lounge, 4:30 p.m.—Learn competitive-style cha-cha from one of the top amateur dance couples in the country. Sponsored by the Ballroom Dance Club, this series of classes, which began January 11, will be held on Sunday evenings through March 7. All experience levels are welcome. No partner is necessary. Refreshments.

**Competitive-Style Waltz Class**  
Winnett lounge, 5:30 p.m.—Learn international waltz from one of the top amateur dance couples in the country. Sponsored by the Ballroom Dance Club, this series of classes, which began January 11, will be held on Sunday evenings through March 7. All experience levels are welcome. No partner is necessary.

**Amnesty International Book Discussion Group**  
Vroman’s Bookstore, 695 E. Colorado Boulevard, second floor, 6:30 p.m.—This month’s book was not determined at the time of printing. All are welcome. Sponsored by Caltech/Pasadena AI Group 22. Visit Group 22 at www.its.caltech.edu/~aigp22.

## Monday, February 16

**Presidents’ Day Holiday**

**Credit Union Closure**  
All branches of the Caltech Employees Federal Credit Union will be closed in observance of the Presidents’ Day holiday.

## Tuesday, February 17

**Preschool Playgroup**  
See Tuesday, February 10, for details.

**Credit Union Annual Meeting**  
Beckman Auditorium, 5 to 6:30 p.m.—Members are invited to attend the 54th annual meeting of the Caltech Employees Federal Credit Union. The session will include a business meeting, the treasurer’s report, and the election of officers. Refreshments, 5 p.m. Free gifts.

**Caltech Tai Chi Club**  
See Tuesday, February 10, for details.

**Women’s Basketball**  
at Whittier College, 7:30 p.m.

## Wednesday, February 18

**Baby Furniture and Household Equipment Pool**  
See Wednesday, February 11, for details.

**Wednesdays in the Park**  
See Wednesday, February 11, for details.

**Watch Your Back! Back Safety Training**  
118 Keith Spalding Building, 3 p.m.—This course includes information on back anatomy and proper methods and realistic approaches to handling and moving materials. Space is limited. Registration: 395-6727 or safety.training@caltech.edu.

**Salsa Dance Class**  
See Wednesday, February 11, for details.

**Men’s Basketball**  
vs. Claremont-Mudd-Scripps, 7:30 p.m.

## Thursday, February 19

**Caltech Opera Club: Die Frau Ohne Schatten**  
Brennan Conference Room, third floor, Center for Student Services, noon—A speaker will present a talk on *Die Frau Ohne Schatten* by Richard Strauss. Please bring your lunch and friends. Information: www.its.caltech.edu/~opera.

**Women’s Wellness Series**  
Caltech Women’s Center, noon—In her talk “Top 10 Mistakes Women Make When It Comes to Their Health,” Cindy Moskovic, director of the UCLA Women’s Health Education and Resource Center, will address the crucial mistakes women make regarding their health, the impact of those mistakes, and the cultural and social factors that contribute to the problems. Registration: 395-3221 or wcenter@studaff.caltech.edu.

## Friday, February 20

**Men’s Tennis**  
at Pomona-Pitzer College, 2 p.m.

**Women’s Tennis**  
vs. Pomona-Pitzer College, 2 p.m.

**Baseball**  
vs. University of Redlands, at Pasadena High School, 2:30 p.m.

**Women’s Basketball**  
at Occidental College, 7:30 p.m.

**Macbeth**  
Ramo Auditorium, 8 p.m.—Theater Arts at Caltech presents Shakespeare’s tragedy, through March 6. 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.

**Caltech Tai Chi Club**  
See Tuesday, February 10, for details.

**Caltech Chess Club**  
See Friday, February 13, for details.

**Caltech Chinese Chess Club**  
See Friday, February 13, for details.

## Saturday, February 21

**Men’s Tennis**  
at University of La Verne, 9:30 a.m.

**Women’s Tennis**  
vs. University of La Verne, 9:30 a.m.

**Track and Field**  
Pomona-Pitzer All Comers, at Pomona-Pitzer, 10 a.m.

**Baseball**  
at University of Redlands, doubleheader, 11 a.m.

**Beginning Belly-Dancing**  
Braun Gym, multipurpose room, 12:45 p.m.—Learn basic belly-dance technique with Leela, a popular performer and instructor. No special clothing or shoes are required. Open to all with valid gym membership. Reservations: 395-6763 or Kathy.Kelly@caltech.edu.

**Hawaiian Club Hula Lessons**  
See Saturday, February 14, for details.

**Men’s Basketball**  
at University of La Verne, 7:30 p.m.

**Gypsy Spirit: Journey of the Roma**  
Beckman Auditorium, 8 p.m.—Through music and dance, trace the route of Gypsy traditions from India and Turkey and across the European continent. 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.

**Macbeth**  
See Friday, February 20, for details.

## Sunday, February 22

**Macbeth**  
Ramo Auditorium, 2 p.m.— See Friday, February 20, for details.

**Skeptics Society Lecture**  
Baxter Lecture Hall, 2 p.m.—“NASA and the Future of Human Space Exploration: A Skeptical View,” Dr. Robert Zubrin, president, Mars Society. Donation is \$8 for nonmembers, \$5 for members and non-Caltech students. Free to the Caltech/JPL community. Tickets and information: 794-3119 or skepticmag@aol.com. Visit the Skeptics Society at www.skeptic.com. Book signing to follow the lecture.

**Cha-Cha Dance Class**  
See Sunday, February 15, for details.

**Competitive-Style Waltz Class**  
See Sunday, February 15, for details.





Mail Services staff member Chau Dinh sorts on-campus mail.

### Mail, from page 1

Resources. He estimates that half of the people who use it are local residents and South Lake Avenue businesses.

"Ours is a full-service office," Henderson says. "The community sees it as a true convenience." They like the shorter lines and cheerful service, he says, attributes that have won the Caltech staff several U.S. Postal Service honors.

Henderson adds that the contract post office distributes tax forms and holds extended hours during the December holidays and at the tax-filing deadline.

The Mail Services statistics are impressive for a virtual city like Caltech, which has its own campus ZIP code (91125), and another for undergraduate housing (91126).

Department statistics showed that the 2003 mail volume handled by Mail Services reached 6,318,855 units. This included 4,870,200 pieces of incoming U.S. mail; 65,000 FedEx, DHL, and Airborne parcels; and 833,300 pieces of intercampus mail.

Graphic Resources handled its share of the volume as well, performing nearly 11 million copies and prints.

Henderson says that proposed plans include a packaging center at the Keith Spalding mail center that will box, pack, and ship artwork and other fragile items for customers.

### Leakey, from page 1

may have preceded the arrival of the earliest members of genus *Homo*. Asfaw will deliver his talk on Wednesday, April 7.

Few things survive in the fossil record, and human skin is not one of them. Yet the study of the evolution of human skin has not received serious study—until now. Nina Jablonski, the Irvine Chair and Curator of Anthropology at the California Academy of Sciences, has used epidemiology, physiology, and remotely sensed environmental data to study the origin of skin-tone variation.

In "The Evolution of Human Skin Coloration," Jablonski will demonstrate how human skin color is a product of natural selection. Although skin must protect individuals from damaging ultraviolet radiation, these rays are necessary for the synthesis of vitamin D; therefore melanin pigmentation represents a compromise between these two needs. Jablonski will present her talk on Wednesday, May 19.

All lectures will take place in Beckman Auditorium and are set to begin at 8 p.m. The cost is \$12 for the general public and \$5 for students. Series discounts are available. For further details, contact Caltech Public Events at (626) 395-4652 or visit [www.events.caltech.edu](http://www.events.caltech.edu).

### Gray, from page 1

Gray's insights could have practical applications in a number of areas. Because ET plays a role in the body's natural barriers against foreign substances, his work may influence the design of drugs to get around those barriers. It also has implications for computer miniaturization, energy storage, and the effort to develop an artificial counterpart to photosynthesis.

Gray, a Caltech professor since 1966, is the recipient of numerous distinguished honors and awards. These include the National Medal of Science in 1986 and six national awards from the American Chemical Society, including the Priestley Medal, the society's highest honor. Last year he received both the National Academy of Sciences Award in Chemical Sciences and an honorary degree from the University of Copenhagen that included an audience with Queen Margrethe II of Denmark.

The Wolf Prize was established in 1978 and is designed to promote science and art for the benefit of mankind. In presenting Gray the prize, the foundation noted that "his ingenious chemistry, meticulously executed, has given us a real understanding, for the first time, of a biological process of great significance for life."

## A drum, a drum! *Macbeth* doth come

For the seventh consecutive year, Professor of Literature Jenijoy La Belle and Lecturer in Theater Arts and Lecturer in Literature Shirley Marneus are coteaching Shakespeare (the Lit 114 class), which examines three plays—one of which TACIT (Theater Arts at Caltech) presents as its winter-term production. This term's play is *Macbeth*, the Bard's murderous and witchy tragedy.

The tag-team instructors encourage students in the class to become involved with the production, and vice versa. "As Dr. La Belle says, you don't really learn the play until you do it," Marneus notes.

"Shakespeare was interested in people, very interested in psychology, a great poet, a stunning dramatist," she says. In class, each speech is carefully examined for tone, inflection, "to see how the man uses words, meter, stichomythia [rapid back-and-forth dialogue first seen in Greek dramas]. There are a great many things we pay attention to that students can then see in the play."

While remaining true to the text, *Macbeth*, like other TACIT plays, will take on a unique Caltech flavor: a combination of culturally diverse cast members and some creative twists. For one, the cast will not don 10th-century Scottish costumes or speak with burrs.

Anachronism, Marneus notes, "is always a problem in Shakespeare"—his actors wore Elizabethan clothing regardless of the setting. In order to lift the play out of a particular time and emphasize its universality, the cast will wear plain black clothing, draped with tartans. The players will also speak in their own voices, whether the accent is East Coast, East Indian, or Eastern European.

In another touch, says TACIT manager Gavin Claypool, the stage will be "more abstract and bare" than in other shows. There will be minimal use of set; the same construct will be the witches' cauldron in some scenes, a well in others. As in Shakespeare's own productions, the set will not change. It will be up to the actors, the text, and especially the audience's imagination to transform the scene and fill in the details.

"We have some very exciting performers," Marneus enthuses, "including new students, frosh, and alums. I'm very proud and pleased that they come back to work with us." The cast also includes children of alums, and Marneus revels in the continuity and integration of the TACIT community.

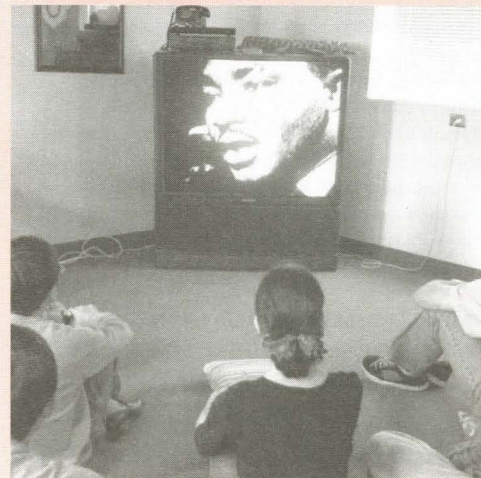
Pointing to alums like Mark Adler, JPL's Mars Exploration Rover *Spirit* mission manager, whose sons are in the play, she says, "You have a sense of people who are leaders and will be lead-

ers, also exploring the creative aspects of theater, bringing in their children.

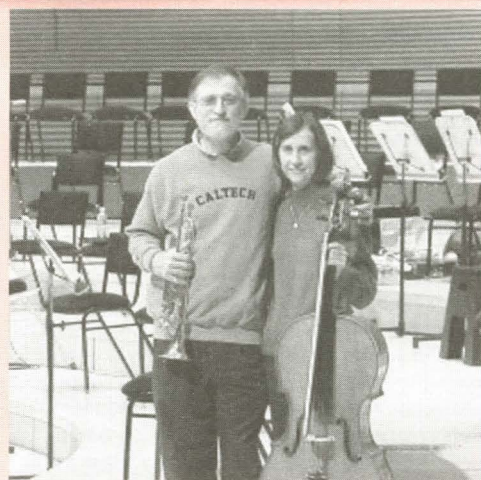
"They bring the same kind of dedication to an art form that they do to their scientific discipline, and make it part of their life. Maybe it makes them better scientists. Their science certainly makes them better actors."

Performances will be held in Ramo Auditorium on Fridays, Saturdays, and Sundays from February 20 through March 6; a special closing performance will be held 1 p.m. Sunday, March 7, at the Huntington Library. For more information, performance times, and tickets, contact Public Events at 1 (888) 2CALTECH, (626) 395-4652, or [events@caltech.edu](mailto:events@caltech.edu), or visit [www.events.caltech.edu](http://www.events.caltech.edu). Individuals with a disability can call 395-4688 (voice) or 395-3700 (TDD).

## News extras



A viewing of Martin Luther King Jr.'s "I Have a Dream" speech was one in a series of events commemorating the civil rights leader last month.



Caltech's first couple of music, Bill and Delores Bing, at the new Walt Disney Concert Hall, where they recently played with the Los Angeles Master Chorale in preparation for the group's debut concert in the venue. Both are lecturers in the music department—Bill oversees the jazz and concert bands and Delores directs the chamber-music program.

# Caltech 336

T E S S E N T I A L S

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