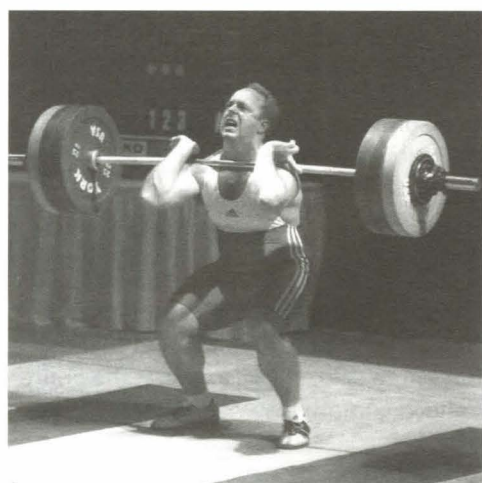


# Caltech336

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

The campus community biweekly  
February 7, 2002, vol. 2, no. 3



David "Chip" Kent performing the "clean and jerk" at the 2001 American Open in December. He's lifting 162.5 kilograms (that's 357.5 lbs.).

## Grad student weighs in on hobby

He removes calluses on his hands with a power drill. He can lift one and a half times his body weight above his head in seconds. He competes in weightlifting meets while conducting research at Caltech.

He is David "Chip" Kent, a third-year graduate student studying theoretical and computational chemistry, who originally hails from Texas, outside of Houston.

Though he's 24 years old, he's retired twice. Once he started attending Caltech, he decided to come out of retirement.

"In Southern California there's an unusually-large percent of good lifters," he said. Not so with good coaches, who are hard to find.

see Kent, page 2

## New ITS charges for dial-up access, site licenses

In an effort to stay within budget, Caltech's Information Technology Services group will begin to charge users for services considered not essential to overall operations, including certain software site licenses and dial-up network access for ITS account holders.

Dan Meiron, associate provost for information and information technology, wrote in a January 24 memo to the Caltech community, "The Institute is committed to providing those information services necessary to support our research and educational efforts. To that end, we have provided substantial new funds this year to upgrade the campus high-speed network, which will allow ITS to improve network reliability and increase the bandwidth available in selected areas.

"However, even with this additional

## Biodefense: scenarios, science, and security

Steven E. Koonin

In November, Caltech sponsored a forum on biodefense with a panel that included Alan Zelicoff, a chief scientist at Sandia National Laboratories, Jonathan Fielding, Los Angeles County's director of public health, and Steven Koonin, Caltech professor of theoretical physics and provost. Koonin has advised the government for more than a decade on the technical aspects of national security, and in 1998-99 led a study on civilian biodefense for the Department of Defense. His remarks at the forum are adapted here.

My involvement in biodefense started about two and a half years ago, when I led a study of some 20 academics looking at the defense of the civilian population against biological terrorism. We submitted our report in the fall of 1999. Over the past few weeks, it has been eerie for me to go back and read that report in the context of recent events.

We came up with four scenarios. The first involves anthrax. What we hypothesized two and a half years ago was the spreading of anthrax spores from New York City subway platforms. The trains in tunnels are very effective at spreading the spores around. In our scenario, this is done with no prior notice that it's going to happen. But on the following Saturday comes a tip that a terrorist group has attempted to carry out such an attack.

What would happen if this were to take place today? First, we don't have validated dispersal models; it would be very difficult for us to say, a priori, where

see Biodefense, page 6

## Giving the gift of life



Judith Apoliona of the Red Cross takes a blood sample from Nelson Ishida, a staff member in transportation services, during last week's blood drive held in Winnett lounge. Sponsored by Human Resources, the drive brought out almost 70 donors from the Caltech community.

## Nunnally to step down

Vice President for Development and Alumni Relations Jerry Nunnally will be stepping down from his position this month.

In a January 29 memo to the Caltech community, President David Baltimore said, "I am writing with an intense sense of personal regret to notify you that after almost ten years at Caltech, Jerry Nunnally will be stepping down as Vice President for Development and Alumni Relations, effective February 15, 2002. Having set in place the structure for the Institute's forthcoming capital campaign, Jerry has decided that he would prefer not to take on operational responsibility for this enterprise. With the campaign kick-off planned for this fall, we both agreed that it would be best to make a change now, rather than in the midst of the public phase of this major fund-raising activity."

Baltimore said that Nunnally will maintain a consulting relationship with the Institute, and that the two will continue to work together "closely" on some major fund-raising projects.

"Over the past decade, Jerry has been an integral part of the Caltech community—unvaryingly sharing his quiet counsel, kind touch, and love of Caltech with

see Nunnally, page 2

## Messina to depart from CACR

Paul Messina, Caltech faculty associate in scientific computing, will be leaving his positions as director of the Center for Advanced Computing Research (CACR) and assistant vice president for scientific computing as of March 1.

"Paul has been at Caltech for almost 15 years, and has been the director of CACR since its founding more than six years ago," Provost Steve Koonin said in his announcement. "His efforts have kept Caltech at the forefront of high performance computing."

In addition to establishing CACR, Koonin noted, Messina's accomplishments have included the redesign and renovation of Powell-Booth Laboratory for Computational Science, now a premier campus facility for collaborative research in computational science; and serving as chief architect in the National Partnership for Advanced Computational Infrastructure, a collaboration with UC San Diego and other universities.

He has also been involved with development and installation of the Intel Touchstone Delta, which at its inception in 1990 was the most powerful supercomputer in the world, and design of the CASA gigabit network, a high-

see Messina, page 6



# NewsBriefs



On his first official visit to Caltech recently, Los Angeles mayor James Hahn lunched with President Baltimore at the Athenaeum and later toured the Seismo Lab.

## Honors and awards

**David Baltimore**, Caltech's president, has been named an honorary member of Art Center College of Design's Board of Trustees. The honor reflects the importance of research collaborations between the two institutions, exploring the nature of creativity.

**Dennis Dougherty** has been named the George Grant Hoag Professor of Chemistry; this title replaces that of professor of chemistry. Dougherty has been a member of Caltech's faculty since 1979, when he joined the Institute as an assistant professor of chemistry. He served as executive officer for chemistry from 1994 to 1999.

**Richard Ellis**, professor of astronomy and director of the Palomar Observatory, has been awarded an honorary doctor of science degree by the University of Durham, England. The honor will be conferred at a special ceremony there in the fall. Ellis was a postdoc and lecturer in Durham's physics department, and professor of astronomy from 1983 to 1993. He is credited by Durham with being "a key contributor to the development of the department, which is now recognized as one of the top physics departments in the world."

**Nate Lewis** has been named the George L. Argyros Professor. He has been a member of Caltech's faculty since 1988, when he arrived as an associate professor of chemistry. He will also retain his current title of professor of chemistry, which he has held since 1991.

**Dana Roth**, Caltech's chemistry librarian, has been appointed for a period of three years to the Royal Society of Chemistry's Journals Committee as its North American Librarian Representative. "He is looking forward to working with the RSC on behalf of the library community at large."

**Michael Roukes**, professor of physics, has been selected to give one of the 2002 Lillian M. Gilbreth Lectures from Frontiers in Engineering, at the National Academy of Engineering's national meeting. To be held on February 8 at the Beckman Center of the National Academies, in Irvine, California, the symposium will feature several speakers from the academy's Frontiers in Engineering program. The title of Roukes's talk is "Nanomechanical Systems: Progress, Challenges, Applications, and Ultimate Limits."

**Re'em Sari**, Sherman Fairchild Senior Research Fellow in Astrophysics and lecturer in planetary science, has been awarded Case Western Reserve University's 2002 Michelson Postdoctoral Prize Lectureship, which includes an honorarium. He will travel to the university this spring to give three lectures and a colloquium on the subject of gamma-ray bursts.

**Barry Simon**, IBM Professor of Mathematics and Theoretical Physics and executive officer for mathematics, has been invited to be a Distinguished

Visitor at UC Irvine. He will give a series of three lectures this spring—one for graduate students in mathematics, and the other two for a more general mathematical audience.

**Ahmed Zewail**, Pauling Professor of Chemical Physics and professor of physics, has been selected to join the Welch Foundation's scientific advisory board. The Welch Foundation is one of the oldest and largest sources of private funding for basic research in chemistry, and its scientific advisory board counsels the foundation's board of directors on scientific issues, evaluates research proposals for grants, and reviews and considers all nominations for the Welch Award in Chemistry and the Norman Hackerman Award in Chemical Research. Zewail's many honors include the 1999 Nobel Prize in chemistry and the 1997 Welch Award, and he is director of the National Science Foundation Laboratory for Molecular Sciences.

## Personals

### Welcome to Caltech

#### December

Postdoctoral scholar **Jong Hong**, in applied physics.

#### January

Postdoctoral scholars **Jordana Bandaru**, in JPL's in situ technology and experiments systems group; **Julia Bryce**, in geochemistry; **Jun-yong Choe** and **Philip Noel Collier**, in chemistry; **Christophe Geuzaine**, in applied and computational mathematics; **Alexandre Guillaume**, in JPL's space microsensors technology section; **Kirk Kaminsky**, in physics; **Zhiwen Liu**, in electrical engineering; **Cora MacBeth**, in chemistry; **Tanya Moreno** and **Bijan Pesaran**, in biology; **Hendrik Postma**, in physics; **Dorte Renneberg**, in chemistry; **Barbara Terhal**, in theoretical physics; **Charlotte Vastel**, in physics; **Xiaochun Wang**, in JPL's astrophysics research element.

### New positions

**Sunney Chan** became George Grant Hoag Professor of Biophysical Chemistry, Emeritus, on January 1. He joined Caltech's faculty in 1963 as an assistant professor, after receiving his bachelor's and doctoral degrees from UC Berkeley. He became full professor in 1968 and Hoag Professor in 1992, and he served as executive officer for chemistry 1977–80 and 1989–94 and as master of student houses 1980–83.

**Paul Jennings** became professor of civil engineering and applied mechanics, emeritus, on January 15. He received his bachelor's degree from Colorado State University and his PhD from Caltech, joining Caltech's faculty in 1965 as a

research fellow. He became an assistant professor in 1966 and was named full professor in 1972. He also served as chair of the Division of Engineering and Applied Science 1985–89, as vice president and provost 1989–1995, and as acting vice president for business and finance in 1995 and 1998–99.

### Deaths

**Alphaeus Mangum**, who worked at Caltech for 44 years, died on March 12, 2001. A senior engineering assistant in Physical Plant, he had retired in 1980. He is survived by Rebecca, his wife of 62 years; a daughter, Nancy; a son, Robert; a granddaughter, Eva Rupp; a sister, Fern Buttram; and a brother, Phil.

## Media minute

### Rare fossilized jellyfish found in quarry

Caltech geology postdoctoral scholar **James "Whitey" Hagadorn** was featured in an Associated Press article covered by international media, including the *New York Times*, *Los Angeles Times*, and BBC. Hagadorn coauthored an article in the February issue of *Geology*, describing one of the largest finds ever of fossilized impressions of jellyfish. "Preservation of a soft-bodied organism is incredibly rare, but a whole deposit of them is like finding your own vein of gold," he said. The fossils were found in neatly stacked layers of sandstone in a Wisconsin quarry—perfect for use as flagstone. "These could have ended up as someone's bathroom floor or in their side garden," Hagadorn remarked.

### Monkey moves cursor using brain power

A recent Reuters article highlighted the research of the team of **Richard Andersen**, Caltech's Boswell Professor of Neuroscience. Presenting the team's work at a Society for Neuroscience meeting, graduate student **Daniella Meeker** said the group implanted electrodes in the posterior parietal cortex of a rhesus monkey, which was trained to play a simple video game. As the monkey touched dots on a computer screen, his brain was analyzed with MRI, and the team was able to discern differing patterns of electrical activity when he planned to reach in different directions. The team then trained the monkey to simply think about a movement, without reaching out. His brain cell activity was tracked by a computer program hooked up to the implanted electrodes, and a cursor on the computer's screen then moved wherever the electrical pattern indicated the monkey was planning to reach. "In fact, we found that he became quite reluctant to move his arm to the reach command once the cursor was introduced into the game," Meeker said. "Apparently it was easier just to think about reaching."

### A new musical vocabulary

Caltech's **James Boyk** was featured in *New Scientist* magazine's Technofile section on February 2. An artist in residence and lecturer in music and electrical engineering, Boyk is attempting to create an objective vocabulary with which to describe recorded music. Since language is often too arbitrary to give useful feedback to hi-fi designers, he "is making digital recordings of instruments through top-quality amplifiers, then electronically subtracting one recording from the other for each instrument. This leaves a sound signal that exposes the difference between the recordings. Expert listeners rate the original and subtracted sounds to agree on comparative descriptive words, like 'anaemic,' 'boomy,' or 'mellow.'"

### Marijuana and cloudy memory

**Rachel Wilson**, a Caltech postdoctoral scholar in biology, was featured in a January 29 *New York Times* article about the effects of marijuana on the brain. While at UC San Francisco, Wilson found that endocannabinoids—naturally occurring molecules that are very similar to cannabinoids, marijuana's active ingredient—have a vital role in the hippocampus, the area of the brain involved in learning and memory. Wilson believes endocannabinoids strengthen connections between nerve cells, thus paving the way for new memories. However, marijuana use inundates the brain with cannabinoids, she said, and forgetfulness results—"probably a case of too much of a good thing." An abundance of cannabinoids helps to strongly link experiences to memories, she believes, but when the system is overwhelmed, nothing is remembered.

**ITS**, from page 1  
their licenses will be able to continue using the current version but will not receive updates or support.  
Users of dial-up modem access to the Internet and the Caltech network, which has been free for ITS account holders, will pay a nominal quarterly fee, charged to a PTA or credit card number. The rate, as yet undetermined, will be less than that of many major Internet service providers. (This new policy does not affect network access through Charter Communications cable modems in the Pasadena area.) For Caltech community members traveling in the continental United States, ITS will be implementing a toll-free number for dial-up modem access, and users will be billed monthly.  
Details of these changes will be available in the near future on the ITS Web site, [www.its.caltech.edu](http://www.its.caltech.edu). Meiron also invites any questions or concerns to be directed to him at ext. 8157 or [dim@its.caltech.edu](mailto:dim@its.caltech.edu).  
●

**Nunnally**, from page 1  
Trustees, faculty, staff, and students, as well as neighbors, donors, and friends," Baltimore said. "I am sure that the entire Caltech community wishes Jerry all the best."  
Until Nunnally's successor is found, Vice President for Public Relations Bob O'Rourke will also serve as acting vice president for development and alumni relations. He will temporarily move his office to 103 Dabney, ext. 6214, in order to be more centrally located for coordinating both the public relations and development departments.  
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**Kent**, from page 1  
But after a lengthy search, he hooked up with Mike Burgener in Bonsall, near San Diego. Burgener's son, Casey, 20, is on the United States Olympic weightlifting team. Kent drives down there twice a week to train.  
"If you decide you're going to do something you'll be able to," he said. "A lot of people here get obsessed with work. It's very difficult to get people to do outside activities outside of work."  
Although he appears triumphant in his photograph from a recent meet in Syracuse, New York, Kent didn't do as well overall as he'd like, placing 12th in his weight class of 105 kilos, or 237 lbs.  
"I did pretty terrible," he said.

Each weight lifter gets three attempts for two lifts, called the snatch and the clean and jerk. Physically strong, Kent nonetheless made mistakes. One time he accidentally stepped off the platform. Another time the bar was too close and he jerked it into his chin. Trying to avoid that on the next attempt, he overcompensated and couldn't lift the weight over his head.  
Since then, Kent's been training five or six days a week in Pasadena, each session lasting an hour and a half. His most recent meet was the National Collegiate Weightlifting Championship in Shreveport, Louisiana, where he competed on Team Southern California this past weekend, and placed third in his weight class. Kent's two recent meets were sponsored by the Graduate Office, which helped pay for the expenses.  
"I think it's great that he's doing this, and when I heard he was competing I wanted to help," said Dean of Graduate Studies Rod Kiewiet.  
●



# February 11–17, 2002

M T W T F S S

## Monday, February 11

**Bristol-Myers Squibb Lecture in Organic Synthesis**  
153 Noyes, Sturdivant Lecture Hall, 11 a.m.—“Highly Efficient Semisynthesis of Biologically Active Epothilone Derivatives,” Gregory D. Vite, director, Discovery Chemistry, Bristol-Myers Squibb Pharmaceutical Research Institute.

**Aeronautics Seminar**  
101 Guggenheim Lab, Lees-Kubota Lecture Hall, 1 p.m.—“X-35C Joint Strike Fighter,” Joe Sweeney, Lockheed Martin. Information: [www.galcit.caltech.edu/seminars.shtml](http://www.galcit.caltech.edu/seminars.shtml).

**Bristol-Myers Squibb Lecture in Organic Synthesis**  
153 Noyes, Sturdivant Lecture Hall, 2 to 3:30 p.m.—“Target-Oriented Synthesis via Asymmetric Catalysis,” Professor Eric N. Jacobsen, department of chemistry and chemical biology, Harvard University.

**Computation and Neural Systems Seminar**  
24 Beckman Labs, 4 p.m.—“Making Working Memory Work: Computational Models of Learning in the Frontal Cortex and Basal Ganglia,” Randall C. O’Reilly, assistant professor, department of psychology, University of Colorado, Boulder.

**General Biology Seminar**  
119 Kerckhoff, 4 p.m.—“Big Developmental Decisions Regulated by Small RNAs,” Amy Pasquinelli, departments of genetics and molecular biology, Harvard Medical School and Massachusetts General Hospital.

**Geology and Planetary Sciences Seminar**  
155 Arms, Robert Sharp Lecture Hall, 4 p.m.—“New Insights into Glaciological Processes with Satellite Radar Interferometry,” Dr. Eric Rignot, JPL. Information: [www.gps.caltech.edu](http://www.gps.caltech.edu).

**Applied and Computational Mathematics Colloquium**  
101 Guggenheim Lab, Lees-Kubota Lecture Hall, 4:15 p.m.—“A Model for the Nucleation and Evolution of the Martensitic Phase Transformation,” Mitchell Luskin, professor of mathematics, University of Minnesota, Twin Cities. Refreshments, 3:45 p.m.

**Women in Engineering, Science, and Technology Open Forum**  
Beckman Institute auditorium, 7 p.m.—“A Day in the Life of a Caltech Professor.” Professors Dennis Dougherty, Jean Ensminger, Jared Leadbetter, and Erin Schuman will share a “typical day” in the life of a Caltech professor. Questions and an open forum after the panel discussion. Information: 395-2508 or [westclub@caltech.edu](mailto:westclub@caltech.edu).

## Tuesday, February 12

**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.

**CACR/ASCI Seminar**  
100 Powell-Booth, Seminar Room, 3 p.m.—“Virtual Room Video-conferencing System (VRVS),” Philippe Galvez, high energy physics, Caltech. Information: [www.cacr.caltech.edu/calendar/seminars](http://www.cacr.caltech.edu/calendar/seminars).

**Institute for Quantum Information**  
74 Jorgensen, 3 to 4:30 p.m.—Topic to be announced. Dorit Aharonov, School of Computer Science and Engineering, Hebrew University of Jerusalem.

**Carnegie Observatories Colloquium Series**  
William T. Golden Auditorium, 813 Santa Barbara Street, 4 p.m.—“Supernova Cosmology: A Theoretical View,” Philip Pinto, assistant professor of physics and astronomy, University of Arizona. Refreshments, 3:30 p.m.

**Chemical Physics Seminar**  
147 Noyes, Sturdivant Lecture Hall, 4 p.m.—Topic to be announced. Hanna Reisler, professor of chemistry, USC.

**General Biology Seminar**  
119 Kerckhoff, 4 p.m.—“Regulation of EGF Receptor Signaling in *Drosophila* Oogenesis,” Trudi Schupach, department of molecular biology, Princeton University.

## Wednesday, February 13

**Mathematical Physics Seminar**  
351 Sloan, noon—“Lower Bounds for Quantum Transport: Theory and Applications,” Serguei Tcheremchantsev, University of Orleans, France. Information: [www.math.caltech.edu/events/mathphys.html](http://www.math.caltech.edu/events/mathphys.html).

**Astronomy Colloquium**  
155 Arms, Robert Sharp Lecture Hall, 4 p.m.—“The Quest for Population III,” Wallace Sargent, Bowen Professor of Astronomy, Caltech. Information: <http://astro.caltech.edu/~jlc/colloquia.html>.

**Environmental Science and Engineering Seminar**  
142 Keck, 4 p.m.—“Warmer Earth, Greener North?”, Compton Tucker, senior earth scientist, biospheric sciences branch, NASA Goddard Space Flight Center. Refreshments, Keck lobby, 3:40 p.m. Information: [www.es.caltech.edu/seminars.html](http://www.es.caltech.edu/seminars.html).

**Organic Chemistry Seminar**  
147 Noyes, Sturdivant Lecture Hall, 4 p.m.—“Exploration of the Molecular Target for Anti-inflammatory Drugs: Discovery of Selective Inhibitors and Substrates of Cyclooxygenase-2,” Lawrence J. Marnett, Stahlman Professor of Cancer Research and professor of biochemistry and of chemistry, Vanderbilt University.

## Thursday, February 14

**Ulric B. and Evelyn L. Bray Seminar**  
25 Baxter, 4 p.m.—“Why Keep a Good House? The Price of Exchange Rate Risk between Gold Standard Regimes,” Benjamin Chabot, assistant professor, department of economics, University of Michigan, Ann Arbor. Refreshments.

**Chemical Engineering Seminar**  
106 Spalding Lab, Hartley Memorial Seminar Room, 4 p.m.—“Flexible Molecular Sieve Materials,” Sankar Nair, department of chemical engineering, University of Massachusetts, Amherst. Refreshments, 113 Spalding Lab, 3:30 p.m. Information: [www.cheme.caltech.edu/seminars/seminars.html](http://www.cheme.caltech.edu/seminars/seminars.html).

**Civil Engineering Seminar**  
206 Thomas, 4 p.m.—“Simple Methods for Proportioning Earthquake-Resistant Concrete Structures,” JoAnn Browning, professor, department of civil and environmental engineering, University of Kansas. Refreshments, 210 Thomas, 3:45 p.m.

**Geoclub Seminar**  
151 Arms, Buwalda Room, 4 p.m.—Topic to be announced. Axel Schmitt, UCLA. Refreshments, 3:45 p.m.

**Physics Research Conference**  
201 E. Bridge, 4 p.m.—“Cosmology with the Cosmic Background Imager,” Anthony C. S. Readhead, Rawn Professor of Astronomy, Caltech. Refreshments, 108 East Bridge, 3:45 p.m. Information: [www.pma.caltech.edu/~physcoll/PhysColl.html](http://www.pma.caltech.edu/~physcoll/PhysColl.html).

## Friday, February 15

**Caltech/JPL Association for Gravitational-Wave Research Seminar Series**  
155 Arms, Robert Sharp Lecture Hall, 4 p.m.—“Shannon’s Theorem, Olbers’ Paradox, and the Confusion Limit in Gravitational-Wave Astronomy,” E. Sterl Phinney, professor of theoretical astrophysics, Caltech.

**Inorganic-Organometallics Seminar**  
151 Crellin, 4 p.m.—“The Photophysics of Metalloporphyrins,” Jeremy Weaver, graduate student in chemistry, Caltech.



# February 18–24, 2002

M T W T F S S

## Monday, February 18

### Presidents' Day holiday

### 21st Annual Western States Mathematical Physics Meeting

151 Sloan, 9 a.m. to 5 p.m.—Through February 19. For the complete schedule, including speakers and topics, see [www.math.caltech.edu/events/wsmmp02.html](http://www.math.caltech.edu/events/wsmmp02.html). Fee: \$10; graduate students free. Information: 395-3744 or [cgalvez@its.caltech.edu](mailto:cgalvez@its.caltech.edu).

## Tuesday, February 19

### Chemical Physics Seminar

153 Noyes, Sturdivant Lecture Hall, 2 p.m.—Topic to be announced. Professor Rex T. Skodje, University of Colorado, Boulder/JILA.

### Institute for Quantum Information

74 Jorgensen, 3 to 4:30 p.m.—"Quantum Information and Relativity Theory," Daniel Terno, department of physics, Technion—Israel Institute of Technology.

### Carnegie Observatories Colloquium Series

William T. Golden Auditorium, 813 Santa Barbara Street, 4 p.m.—"Brown Dwarfs and Giant Planets: What's Hot About What's Cool," Adam Burrows, professor, department of astronomy, University of Arizona. Refreshments, 3:30 p.m.

### Wiersma Lecture

119 Kerckhoff, 4 p.m.—"Research as a Conservation Tool: A Case Study in Madagascar," Professor Patricia Wright, director of the Institute for Conservation of Tropical Environments, department of anthropology, SUNY Stony Brook.

### Caltech/MIT Enterprise Forum

Registration and dinner, 5:30 p.m., Chandler Dining Hall; lecture, 7 to 9 p.m., Baxter Lecture Hall—"Homeland Security Technology for the 21st Century: How Southern California Entrepreneurs Can Be Both Good Patriots and Run Successful Businesses." Moderator: Russell Frandsen, Radcliff, Frandsen & Dongell. Fee: \$35 general admission, \$10 non-Caltech students; Caltech faculty and staff free. Information: [www.entforum.caltech.edu](http://www.entforum.caltech.edu). Registration: 395-3916 or [ircshare@caltech.edu](mailto:ircshare@caltech.edu).

## Wednesday, February 20

### Astronomy Colloquium

155 Arms, Robert Sharp Lecture Hall, 4 p.m.—"FUSE Studies of the Interstellar and Intergalactic Medium," Mike Shull, professor of astrophysics, University of Colorado. Information: <http://astro.caltech.edu/~jlc/colloquia.html>.

### Environmental Science and Engineering Seminar

142 Keck, 4 p.m.—"Chemical Interactions between the Atmosphere and Forested Ecosystems," Professor Allen Goldstein, Division of Ecosystem Sciences, department of environmental science, policy and management, UC Berkeley. Refreshments, Keck lobby, 3:40 p.m. Information: [www.esse.caltech.edu/seminars.html](http://www.esse.caltech.edu/seminars.html).

### Organic Chemistry Seminar

147 Noyes, Sturdivant Lecture Hall, 4 to 5:30 p.m.—"An Integrated Systems-Oriented Approach to Molecular Electronics," J. Fraser Stoddart, Winstein Professor of Organic Chemistry, UCLA.

### Wiersma Lecture

24 Beckman Labs, 4 p.m.—"Tooth Transformations: Integrating Evolutionary and Developmental Change," Jukka Jernvall, Institute for Biotechnology, University of Helsinki.

### Earnest C. Watson Lecture Series

Beckman Auditorium, 8 p.m.—"Formation of the Nervous System," Marianne Bronner-Fraser, Ruddock Professor of Biology, Caltech. Tickets and 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). (See article at right for more information.)

## Thursday, February 21

### Ulric B. and Evelyn L. Bray Seminar

25 Baxter, 4 p.m.—"On the Probability of the Competitive Equilibrium Being Globally Stable: The CES Case," Masayoshi Hirota, visiting associate in economics, Caltech. Refreshments.

### Chemical Engineering Seminar

106 Spalding Lab, Hartley Memorial Seminar Room, 4 p.m.—"Towards an Understanding of Nucleation Phenomena in Complex Systems: Applications in Environmental Science, Biology, and Nanotechnology," Ravi Radhakrishnan, department of chemical engineering, MIT. Refreshments, 113 Spalding Lab, 3:30 p.m. Information: [www.cheme.caltech.edu/seminars/seminars.html](http://www.cheme.caltech.edu/seminars/seminars.html).

### Geoclub Seminar

151 Arms, Buwalda Room, 4 p.m.—"Global Warming and Methane Hydrate Dissociation at the Paleocene-Eocene Boundary," James Zachos, associate professor, earth sciences department, UC Santa Cruz. Refreshments, 3:45 p.m. Information: [www.gps.caltech.edu/seminars/geoclub/](http://www.gps.caltech.edu/seminars/geoclub/).

### Physics Research Conference

201 E. Bridge, 4 p.m.—"Discovering New Physics at Future Colliders," JoAnne Hewett, assistant professor, Stanford Linear Accelerator Center. Refreshments, 108 East Bridge, 3:45 p.m. Information: [www.pma.caltech.edu/~physcoll/PhysColl.html](http://www.pma.caltech.edu/~physcoll/PhysColl.html).

## Friday, February 22

### Fluid Mechanics Seminar

101 Guggenheim Lab, Lees-Kubota Lecture Hall, 3 p.m.—Topic to be announced. Professor Stephen B. Pope, mechanical and aerospace engineering department, Cornell University. Information: [www.galcit.caltech.edu/Seminars/Fluids/CurrentFluids/index.html](http://www.galcit.caltech.edu/Seminars/Fluids/CurrentFluids/index.html).

### Everhart Lecture Series

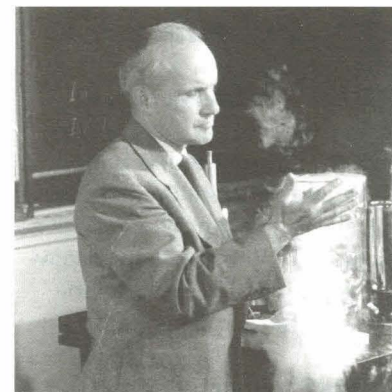
155 Arms, Robert Sharp Lecture Hall, 4 p.m.—"Ancient Magnetism, Pan-spermia, and the Evolution of Mars," Benjamin Weiss, graduate student in planetary science, Caltech. Refreshments, 3:45 p.m.

### Inorganic-Organometallics Seminar

151 Crellin, 4 p.m.—"Development of a Kinetic Study of Ziegler-Natta Polymerization of  $\alpha$ -Olefins by Alkyl Zirconocene Cations," Sara Klamo, graduate student in chemistry, Caltech.

### LIGO Science Seminar

155 Arms, Robert Sharp Lecture Hall, 4 p.m.—"Are Glassy Metal Flex Joints a Viable Alternative to Fused Silica Suspensions?," Riccardo De Salvo, member of the professional staff, LIGO Laboratory, Caltech.



Earnest Watson giving the "Liquid Air" lecture in 1953.

## Watson Lectures celebrate 80th year

Caltech's popular Watson Lecture Series, named for the late Earnest C. Watson, is celebrating its 80th year of presenting science to the Pasadena community.

Watson served the Institute for more than 40 years as a professor of physics, advisor to presidents Millikan and DuBridge, chair of the physics division, dean of the faculty. He began the series, originally known as the Friday Evening Demonstration Lectures, as a program designed to explain science to the public. In October 1964, Watson presented one of the first lectures at the newly built Beckman Auditorium, "Liquid Air"—a crowd favorite that he had given for many years in the Friday Night series.

The winter quarter Watson Lectures will kick off the 80th year of the series. As is customary, lectures will feature Caltech scientists discussing their research, and will take place on Wednesday evenings at 8 p.m. in Beckman Auditorium. The series is free and open to the public.

On February 20, Marianne Bronner-Fraser, Ruddock Professor of Biology, will speak on "Formation of the Nervous System." The answer to the question of how complex organisms develop from single cells has its roots both in embryology and evolution. Bronner-Fraser's research focuses on early formation of the nervous system in vertebrate embryos. The nervous system forms from a group of cells that would normally become skin, but due to an interaction with neighboring tissue, these cells instead form brain and spinal-cord tissue and a migratory cell type that forms the so-called neural crest cell. Bronner-Fraser will discuss her lab's work in decoding the molecular and cellular signals by which these tissues form and evolve, using a combination of embryological, molecular, and genomic approaches.

No tickets or reservations are required for the Watson Lectures. A minimum of 700 seats will be available on a first-come, first-served basis, beginning at 7:30 each lecture evening. For more information, call Caltech Public Events at (626) 395-4652, e-mail [events@caltech.edu](mailto:events@caltech.edu), or visit [www.events.caltech.edu/watson/](http://www.events.caltech.edu/watson/).



# CampusEvents

## Monday, February 11

**Men's Golf**  
vs. Occidental College, at Brookside, 12:30 p.m.

## Tuesday, February 12

**Credit Union Annual Meeting**  
Beckman Auditorium, 5:30 p.m.—Our 52nd annual shareholders' meeting. Refreshments, 4:45 p.m. Drawing and prizes. Information: (818) 952-4444, ext. 220; vbrown@cefcu.org; or www.cefcu.org.

**Caltech Folk-Dancing Club**  
Dabney Lounge, 7:30 p.m.—Meets every Tuesday until midnight. Drop-ins are welcome. Donations accepted.

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

**Lyrical Jazz Dance Class**  
Braun Gym, multipurpose room, 10 p.m.—The Caltech Dance Troupe sponsors an intermediate-level lyrical jazz dance class, open to members of the Caltech community with Athletic Center membership. Some prior dance experience is required. The cost per term is \$20 for Caltech students and \$30 for nonstudents.

## Wednesday, February 13

**Men's Basketball**  
vs. Occidental College, 7:30 p.m.

## Thursday, February 14

**Video Compression for Web, PowerPoint, CD, DVD**  
New Media Classroom, 363 S. Hill Avenue, 10 a.m. to noon—Learn how to produce videos for playback on personal computers and discs (CD/DVD). Information: http://twing.caltech.edu/workshops. Open to Caltech community members only.

## Friday, February 15

**Baseball**  
vs. Pasadena City College, 2:30 p.m.

**Women's Basketball**  
vs. Occidental College, 7:30 p.m.

**Armchair Adventure Series**  
Beckman Auditorium, 8 p.m.—*Magic of Malaysia*, narrated by Hal McClure. 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, February 16

**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.

**Women's Swimming and Diving**  
at Mills College, noon.

**Ballet Classes**  
Braun Gym, multipurpose room, 1 to 3:30 p.m.—The Caltech Dance Troupe offers free ballet classes to members of the Caltech community with Athletic Center membership. No prior dance experience or special shoes or clothing are required for the beginners' class. Intermediate dancers meet from 1 to 2:30, beginners from 2:30 to 3:30.

**Caltech Y Community Service—Union Station**  
6 to 9 p.m.—Caltech Y volunteers will help prepare and serve meals for homeless men, women, and children at the Union Station shelter in Pasadena. Information: 395-6163, gregf@caltech.edu, or www.y.caltech.org/volunteer.

**Men's Basketball**  
vs. University of Redlands, 7:30 p.m.

**Chicago City Limits**  
Beckman Auditorium, 8 p.m.—Improvisational comedy. 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.

## Monday, February 18

**Presidents' Day holiday**

**Women's Basketball**  
at Claremont-Mudd-Scripps, 5:30 p.m.

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

## Tuesday, February 19

**Caltech Folk-Dancing Club**  
Dabney Lounge, 7:30 p.m.—Meets every Tuesday until midnight. Drop-ins are welcome. Donations accepted.

**Lyrical Jazz Dance Class**  
Braun Gym, multipurpose room, 10 p.m.—The Caltech Dance Troupe sponsors an intermediate-level lyrical jazz dance class, open to members of the Caltech community with Athletic Center membership. Some prior dance experience is required. The cost per term is \$20 for Caltech students and \$30 for nonstudents.

## Wednesday, February 20

**Women in Engineering, Science, and Technology**  
Steele House (carriage house), noon—Female students are invited to attend an informal lunch with Caltech professors Judith Cohen and Pamela Bjorkman to learn about their individual pathways to success, current research projects, and thoughts on women in science. RSVP westclub@caltech.edu.

**Men's Golf**  
vs. Claremont-Mudd-Scripps, at Brookside, 12:30 p.m.

**Women's Basketball**  
vs. University of La Verne, 7:30 p.m.

## Thursday, February 21

**Swimming and Diving**  
SCIAC Championship at Cerritos, 10 a.m.

**Men's Basketball**  
vs. University of La Verne, 7:30 p.m.

## Friday, February 22

**Swimming and Diving**  
SCIAC Championship, at Cerritos, 10 a.m.

**Men's Tennis**  
at Occidental College, 2 p.m.

**Baseball**  
vs. University of La Verne, 2:30 p.m.

**Women's Tennis**  
vs. Occidental College, 3 p.m.

**Opening Night of *Love's Labour's Lost***  
Ramo Auditorium, 8 p.m.—Theater Arts at Caltech presents the play by William Shakespeare. Runs weekends through March 9. 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, February 23

**Men's Tennis**  
at Claremont-Mudd-Scripps, 9:30 a.m.

**Women's Tennis**  
at Claremont-Mudd-Scripps, 9:30 a.m.

**Fencing**  
UC Irvine Tournament, at UC Irvine, 10 a.m.

**Track and Field**  
Whittier Invitational, at Whittier College, 10 a.m.

**Swimming and Diving**  
SCIAC Championship, at Cerritos, 10 a.m.

**Baseball**  
at University of La Verne, doubleheader, 11 a.m.

**Ballet Classes**  
Braun Gym, multipurpose room, 1 to 3:30 p.m.—The Caltech Dance Troupe offers free ballet classes to members of the Caltech community with Athletic Center membership. No prior dance experience or special shoes or clothing are required for the beginners' class. Intermediate dancers meet from 1 to 2:30, beginners from 2:30 to 3:30.

**Folk Music Society Presents Michael Smith**  
Dabney Lounge, 8 p.m.—Smith is one of the finest singer/songwriters in the United States. Admission is \$12 for adults and \$4 for children and Caltech students. 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.

***Love's Labour's Lost***  
Ramo Auditorium, 8 p.m.—Theater Arts at Caltech presents the play by William Shakespeare. Runs weekends through March 9. 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.

**Lúnasa Traditional Irish Music**  
Beckman Auditorium, 8 p.m.—One of the most sought-after bands on the international Irish music scene, Lúnasa's melodic interweaving of wind and string instruments and bass-driven grooves are steering Irish acoustic music into surprising new territory. 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.

## Sunday, February 24

***Love's Labour's Lost***  
Ramo Auditorium, 8 p.m.—Theater Arts at Caltech presents the play by William Shakespeare. Runs weekends through March 9. 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.

## *Love's Labour's Lost*, then found, at Caltech

It is often said that art imitates life, but in some cases, it turns out to be the other way around. A case in point is Shakespeare's *Love's Labour's Lost*, which is currently being produced by Theater Arts at Caltech (TACIT).

The plot concerns a small band of men led by the King of Navarre, which was a realm that straddled the border of modern-day Spain and France. The king and his men decide one day, quite high-mindedly, that they will focus their attention on nothing but academic pursuits. They also agree to adopt rules governing their behavior, including such basic needs as sleep, food, and sex. Self-denial and virtue, they believe, will purify their bodies, exalt their minds, and lead to fame and glory.

"Think Caltech, 1969," said Gavin Claypool, the play's production manager.

No sooner do these self-styled ascetics begin attempting to live by their new rules, than a group of independent young women, including the Princess of France, alights on this motley group.

"Think Caltech, 1970," Claypool quipped, referring to the year that undergraduate women were admitted to the Institute.

As directed by Shirley Marneus, a lecturer in theater arts who is co-teaching the Shakespeare course, Lit 114, the action in this production of *Love's Labour's Lost* is set during the Roaring '20s.

"I thought it would be fun because it's in the past, but a not-too-distant past," Marneus said. "I feel that it's a period when people felt that nothing could go wrong and they were running around in white linen coats. There was a carelessness among the wealthy, and to a degree, an arrogant attitude of the privileged."

There is a corresponding degree of extravagance to the language as well. Many of the lines are erudite to the point of being ostentatious, a fact Marneus believes indicates that Shakespeare was poking fun at a fashion of his time.

"Not every word and phrase needs to be understood to know what the characters are saying," said Jenijoy La Belle, professor of the literature course. "You don't need to be a scholar to enjoy this play and become caught up in its excitement." A number of her Shakespeare students are also involved in the play's production.

The cast is composed of a true cross-section of the Caltech community, Marneus said, including undergraduate and graduate students, alumni, and staff from Caltech and JPL.

Although the play has 26 players, more are needed for the closing scene, Claypool said. Volunteers are sought to throw flowers, carry banners, and move blackboards. The production also needs people to work backstage building the set and assisting during performances.

"This is a great way to meet and interact with people of this century meeting and interacting with ideas from another century," Marneus said.

*Love's Labour's Lost* opens on Friday, February 22, and runs for three weekends. For more information, visit the TACIT website at www.its.caltech.edu/~tacit/. Volunteers can call Gavin Claypool at extension 3696, or email tacit@caltech.edu.



**Biodefense**, from page 1

the spores went and who was affected. Second, about four million people ride the New York subways every day, and even if only one percent contracted the disease, that's still 40 thousand people.

If an attack is overt—that is, if we have warning ahead of time—then we can try to reduce casualties by distributing the appropriate antibiotics. But if the event is covert, then there is no “event.” There are no first responders to distribute medication. A few days later, people start checking into hospital emergency rooms with severe distress, and by that time, most of the people who exhibit symptoms will be lost. In any case, there will be a panic rush on medical facilities as soon as it becomes known that there has been a wide-scale dispersal of spores.

Scenario number two involves smallpox: a terrorist cell plants smallpox in the air ducts of a flight with 265 people aboard. The first sign of a problem is when the whole air crew reports in sick two weeks later. This disease is highly contagious. Among unvaccinated populations, the fatality rate is about 30 percent.

What would happen today if this event were to occur? Again, there's no actual “event” and no responders. Nothing happens for two weeks. Eventually we would realize what's going on and would quarantine and vaccinate. Right now we have 15 million full-strength doses on hand. Medical experts think that this can be diluted to about 75 million.

Scenario number three is not quite a biological attack, but it's an attack using a chemical agent, called ricin. You can imagine this scenario in terms of the Oklahoma City bombing attack, but with the bomb wrapped with ricin. Ricin is a very interesting protein produced from castor beans. It manages to get into cells and gum up the ribosomes, which are essential for you to keep on living. A lethal dose of ricin is as small as 10 micrograms when inhaled. The symptoms occur within a few hours: fever, cough, nausea, and death within three days at most. There is no known treatment.

What would happen today? The first responders, the people who show up to deal with the explosion, would be unlikely to consider a biological agent. Eventually it would be recognized as a hazardous-material incident, but because the effects would be very rapid, the likely casualty figures would be in the thousands rather than the hundreds you would expect from the explosion by itself.

The last scenario is an agricultural one: a wheat-rust attack in the Great Plains by an enemy state. How would that play out now? Wheat rust is an ongoing problem in the United States, even without somebody releasing it deliberately, so there would be only a modest economic impact. But there would be an

unknown psychological impact because we would see the ability of a foreign country to reach into our homeland.

There are several lessons we can draw from these four scenarios. The first is that good intelligence is the best defense. The second is that there is often no “event.” The revelation of an attack can be either delayed because of incubation times or hidden in the natural background. The third is that people are currently the “canaries” for biodefense. We wait until people show up in the emergency room before realizing an event has occurred.

Fourth, I believe the public health system is ill-prepared to deal with bioevents. Reporting is haphazard, although the public health system is much more vigilant these days for attacks involving the sorts of agents I've mentioned. Our stockpiles of vaccines and antibiotics to combat some of these agents are inadequate, and we have no surge capability in our health care system. The United States is a leader in biomedical technology; can't we harness some of that technology to do a better job on biodefense?

Let me now take you through some of the things that, two and a half years ago, we thought the government should be doing to respond to these threats. One is to strengthen public health information systems. It is extraordinarily important to detect an attack as quickly as we can to contain contaminated areas, prevent new exposures, and stem epidemics of contagious agents. One way is to collect and mine existing data. The health system produces all kinds of information about the population's health state. We have billing and insurance records, emergency room admissions, and pharmacy sales. What we ought to do is collect and analyze this data to look for the natural patterns, and then look for anomalies in the data.

We also suggested facility sampling— anonymously monitoring the population with some specificity in terms of time and place. This could be a device like a smoke detector sitting in a room, analyzing what people are breathing in and out, or analyzing people's sweat, sputum, and so on.

Another way of monitoring the health state of the population is wearable instrumentation. Noninvasive means of measuring pulse, blood pressure, respiration, temperature, blood sugar, and so on have already been developed. There are obvious privacy issues, but probably a lot of interesting science would result, in addition to the biodefense aspects.

Besides monitoring people, we can also utilize sensors for the environment. One no-brainer is a better field detector for anthrax that would yield fewer false positives and negatives. We can do area surveillance for anthrax and other bioagents by deploying sensors on municipal vehicles. These drive around the

city, they are where the people are, and they have power and communications.

We need to learn more about the bio-science of biological pathogens. If we build a worldwide database of bacterial genomes, we will be better able to tell whether a bacterium is foreign or has been introduced in a particular locale, and perhaps where it came from.

Finally, a lot of this is not about technology; it's about getting all parts of the system to play together well. The first thing we should be doing from an organizational standpoint is erecting a scientific infrastructure for biodefense. We should be getting national labs, academia, and industry working on these things and arrange efficient mechanisms for transferring the technology out to the field. We should also foster an operational infrastructure. There are lots of players involved here, and we need to clarify and adjust their roles and responsibilities.

There's a host of other issues, and the various parts of the government associated with these functions are not used to working together. The big thing that Tom Ridge, the director of homeland security, has on his plate is to try to get everybody singing from the same page. It's not so easy to do, but there is cause for optimism because there *are* steps that can be taken to bolster our defenses, and in some cases these are, in fact, being taken now.

*Video of the Biodefense Forum may be viewed by accessing Caltech's Streaming Theater, located at <http://atcaltech.caltech.edu/theater/>.*

**Messina**, from page 1

speed, wide-area network that became a prototype for later computing infrastructure. “Paul has also served ably on numerous national committees advising such government agencies as NSF, NASA, and DOE on issues of high-performance computing and networking,” Koonin said.

Messina will continue part-time, for the near term, to facilitate Caltech's role in the TeraGrid, a collaborative project to create the world's largest and most powerful computer infrastructure for scientific research. He also plans to serve part-time as a senior advisor at CERN (the European Organization for Nuclear Research) and at Argonne National Laboratory.

Koonin also announced that Daniel Meiron, associate provost for information and information technology, will serve as acting director for CACR until the position is filled.

“Caltech remains committed to the continued support and development of the Institute's capabilities in high-performance computing and computational science,” Koonin said. “To that end, it is anticipated that one of the faculty searches now under way and associated with the Computational Science and Engineering (CSE) Initiative will identify the next director of CACR.”

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**On the other side now**

Caltech alum Jonathan Chow '91 recently returned to campus, this time as a representative for Lockheed Martin. Career Day 2002, sponsored by the Career Development Center, attracted about 50 organizations and an estimated several hundred students.

# Caltech 336

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