Caltech336

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The campus community biweekly

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NASA/JPL-Caltech/S. Wilner (Harvard-Smithsonian CfA)

A short-wavelength infrared view of the spiral galaxy Messier 81, one of the first images released by the Spitzer Space Telescope.

Space telescope captures dazzling images

A new window to the universe opened with the December 18 release of the first dazzling images from NASA's newly named Spitzer Space Telescope, formerly known as the Space Infrared Telescope Facility.

The first observations—a glowing stellar nursery; a swirling, dusty galaxy; a disk of planet-forming debris; and organic material in the distant universe—demonstrate the power of the telescope's infrared detectors to capture cosmic features never before seen.

The Spitzer Space Telescope is named after the late Lyman Spitzer Jr. He was one of the 20th century's most influential scientists, and in the mid-1940s he first proposed placing telescopes in space.

"NASA's newest Great Observatory is open for business, and it is beginning to take its place at the forefront of science," says NASA's associate administrator for space science, Ed Weiler. "Like Hubble, Compton, and Chandra, the new Spitzer Space Telescope will soon be making major discoveries, and, as these first images show, should excite the public with views of the cosmos like we've never had before."

Launched August 25 from Cape Canaveral, Florida, the Spitzer Space Telescope is the fourth of NASA's Great Observatories, a program designed to paint a more comprehensive picture of the cosmos, using different wavelengths of light.

While the other Great Observatories have probed the universe with visible light (Hubble Space Telescope), gamma rays (Compton Gamma Ray Observatory), and X rays (Chandra X-ray Observatory), the Spitzer Space Telescope observes the cosmos in the infrared.

Spitzer's unprecedented sensitivity allows it to sense infrared radiation, or heat, from the most distant, cold, and dust-obscured celestial objects. The initial images reveal the versatility of the telescope and its three science instruments:

see Spitzer, page 6

Event commemorates Northridge quake

Early one morning ten years ago, thousands of Southern Californians sleeping in bed awoke to feel the earth move, buck, and roll. The phenomenon that rocked their world—a powerful earthquake—also shoved structures off their foundations and knocked down sections of freeway overpasses. The temblor was named after the nearby San Fernando Valley community of Northridge, the city closest to the epicenter.

At 4:31 a.m. on January 17, the magnitude 6.7 quake struck about a mile from Northridge and some 18 kilometers beneath the city.

"This was the largest earthquake in an urban area in North America, after the 1933 Long Beach earthquake," says Margaret Vinci, manager of the earthquake programs office at Caltech. She added that widespread shaking and damage to buildings were reported from Santa Clarita south to Santa Monica. The number of dead totaled 57 people, some struck down by fright-induced heart attacks.

To commemorate the 10-year anniversary of the quake as well as to show off the advances in seismology that were made in the decade that followed, the public is invited to an event titled 'Learning from the Past, Planning for the Future.' It will take place on January 17, beginning at 9 a.m., in Beckman Auditorium.

"The focus of the event is what we know today compared with what we knew 10 years ago," Vinci says. The United States Geological Survey, Caltech, and the Earthquake Country Alliance are sponsoring the day of lectures, movies, displays, and children's activities, to provide an earthquake primer for those who plan on living in a state prone to quakes.

The list of speakers includes engineers and seismologists from Caltech and the USGS, who will expound on a variety of topics. These include advances in earth-

see Anniversary, page 6

Viola Carter

KCAL-TV queries Caltech professor of engineering seismology Thomas Heaton at a media conference following last month's Paso Robles earthquake.

NASA/JPL

A mosaic image taken by *Spirit*'s navigation camera, reprocessed for clarity, gives an overhead view of the rover on the surface of Mars. Inset: At a live video feed in Ramo Auditorium, Pam Hoffman, Mars Exploration Rover integration manager, explains to children how *Spirit* will land and deploy itself.

Postcards from Mars

A traveling robotic geologist has flown 302.6 million miles, landed on Mars, and returned stunning images of the area around its landing site in Gusev Crater.

NASA's Mars Exploration Rover *Spirit* successfully sent a radio signal after the spacecraft had bounced and rolled for several minutes following its initial impact at 8:35 p.m. Pacific Standard Time on January 3.

"This is a big night for NASA," said NASA Administrator Sean O'Keefe. "We're back. I am very, very proud of this team, and we're on Mars."

Members of the mission's flight team at JPL cheered when they learned that NASA's Deep Space Network had received a postlanding signal from *Spirit*. The cheering resumed about three hours later when the rover transmitted its first images to Earth.

"We've got many steps to go before this mission is over, but we've retired a lot of risk with this landing," said Pete Theisinger, JPL project manager for the Mars Exploration Rover Project.

JPL's Richard Cook, deputy project manager for the rovers, said, "We're certainly looking forward to *Opportunity* landing three weeks from now." *Opportunity* is *Spirit*'s twin rover, launched July 7 and due to land on the opposite side of Mars on January 25.

Charles Elachi, JPL director, said, "To achieve this mission, we have assembled the best team of young women and men this country can put together. Essential work was done by other NASA centers and by our industrial and academic partners."

NASA chose the landing site based on evidence from Mars orbiters that the Connecticut-sized Gusev Crater may have held a lake long ago. A long, deep valley, apparently carved by ancient flows of water, leads into Gusev. *Spirit* will spend the next three months exploring for clues in rocks and soil as to whether the area's past environment was ever watery and able to sustain life.

see **Spirit**, *page 6*

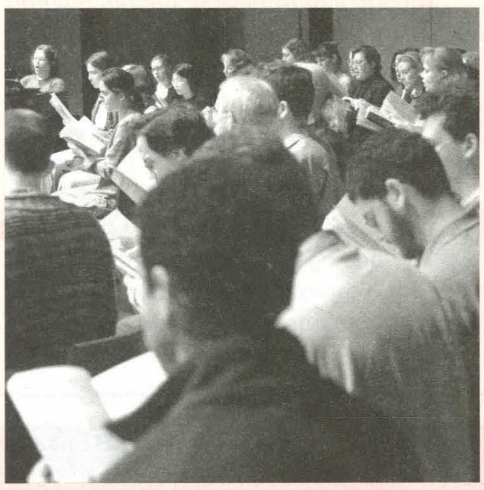
Moore grant aids TMT project

The Gordon and Betty Moore Foundation has awarded $17.5 million to the University of California for collaboration with Caltech to build the Thirty-Meter Telescope (TMT), the most powerful in the world. Coupled with the foundation's award to Caltech for the same amount, a total of $35 million is now available for the visionary project's next step, which will be to formulate detailed design plans.

A 30-meter-diameter optical and infrared telescope would result in images

see TMT, page 6

NewsBriefs



The Caltech Glee Clubs' annual *Messiah* sing-along on December 12 drew the usual crowd of enthusiastic vocalists from the campus and local communities.

Personals

Welcome to Caltech

November

Postdoctoral scholars **Benjamin Deverman**, in biology, and **Prosenjit Ghosh**, in geochemistry; **Keiko Gibson**, administrative assistant, Athenaeum; **John Gutierrez**, security officer, Campus Security and Parking; **Michael Herrera**, assistant director of admissions, Undergraduate Admissions; **Jonathan Meagher**, postdoctoral scholar in JPL's radar science and engineering section; **Calvin Ridgle**, security officer, Campus Security and Parking; postdoctoral scholars **Alok Saldanha**, in biology, and **Benjamin Villac**, in computer science.

December

Albert Chavez, catering assistant manager, Dining Services; **Mohamed Chlieh**, postdoctoral scholar in geology; **Ramon Collazo**, banquet supervisor, Athenaeum; **Dario Fadda**, staff scientist, Infrared Processing and Analysis Center; **Amir Hakami**, postdoctoral scholar in environmental science and engineering; **Linda Hodges**, audit/compliance associate, Audit Services; **Gary Kleiger**, postdoctoral scholar in biology; **Jennifer Martinez**, worker's compensation claims coordinator, Human Resources; **Shojiro Miyazaki**, postdoctoral scholar in chemistry; **Daniel Santos-Costa**, postdoctoral scholar in JPL's astrophysics and space sciences section; **Robert Shumway**, security officer, Campus Security and Parking; **Anna Wenzel**, postdoctoral scholar in chemistry.

Brian Murphy has returned to Caltech as senior development officer in the Principal and Major Gifts program—he served as a major gift officer for the Institute a few years ago. Most recently he was director of major gifts and director of alumni development at USC's Keck School of Medicine, and prior to that was associate director in Occidental College's Planned and Major Gifts program. He received his BA and MS in physical education, from Occidental and from USC, respectively.

January

R. Preston McAfee has joined Caltech's faculty as J. Stanley Johnson Professor of Business Economics and Management, effective January 1. Known for his theoretical, empirical, and practical work on auctions, his discoveries have been cited widely and have provided insights into a broad range of topics including corporate strategy, contract theory, auctions and bidding, mechanism design, cartel behavior, price discrimination, and merger policy, among others. He received his BA from the University of Florida in 1976 and his MS and PhD from Purdue University in 1978 and 1980, respectively.

Iyoni Rice has been appointed Caltech's director of annual and special gifts, effective January 2. With seven years' experience in nonprofit management and fund-raising, with special emphasis on program development, she most recently served as director of development, special gifts and alumni relations at USC's Keck School of Medicine, and earlier served as associate director, annual giving, at the same institution, and as a program consultant at UC Irvine. She received her BA in psychology and sociology from UC Davis.

New positions

Jonathan Katz, associate professor of political science, has been appointed professor of political science, effective November 1. He received his SB from MIT in 1990 and his MA and PhD from UC San Diego in 1992 and 1995, respectively. He was an assistant professor at Caltech from 1995 to 1998, and returned in 2000 as associate professor.

Raul Turcios, currently supervisor of Caltech's transportation services, has been appointed supervisor of transportation, motor pool, shipping and receiving, effective January 5. He has been with the Institute for more than 19 years.

Retirements

Ernie Delgadillo, supervisor of transportation, motor pool, shipping and receiving in Facilities Management, has retired effective January 2, after 44 years at Caltech. According to Director of Facilities Management Bill Irwin, the new retiree "is looking forward to refining his golf game and spending some quality time with his children and grandchildren. Please join me in thanking Ernie for all he has done for Caltech, and in wishing him a long and happy retirement to go along with a low handicap."

Deaths

Edward Hutchings, of Sonoma, California, died on December 8; he was 91. A short-story writer and an editor with *Literary Digest*, *Business Week*, *Look*, *Liberty*, and *Science Illustrated*, he joined Caltech in 1948, becoming director of publications and editor of *Engineering and Science* magazine, which he developed into an award-winning science periodical. He also taught journalism and edited two best-selling books by Nobel Prize–winning physicist Richard Feynman. He retired in 1987, moved to Creekside Village in Sonoma, and pursued a lifelong interest in theater and musical comedy. Predeceased by his wife, Elizabeth, in 2000, he is survived by his daughter, Alison McAlpine; his son, David; and his sister, Marjorie Sanborn. A celebration of his life will be held from 2 to 4 p.m. on Sunday, January 18, at the Creekside Village Clubhouse, 159 Avenida Barbera, Sonoma, and donations in his memory may be made to the Sonoma Valley Regional Library, 755 West Napa Street, Sonoma CA 95476.

Honors and awards

Seymour Benzer, Boswell Professor of Neuroscience, Emeritus, and Crafoord laureate, and **Harry Gray**, Beckman Professor of Chemistry and founding director of the Beckman Institute, have been selected by the Franklin Institute to receive 2004 Benjamin Franklin Medals. Benzer is being honored for his work in neurogenetics, and Gray for his work in metalloproteins. Past recipients include Albert Einstein, Thomas Edison, Pierre and Marie Curie, Alexander Graham Bell, Stephen Hawking, David Packard, Gordon Moore, and Jane Goodall. The awards ceremony will take place on April 29 in Philadelphia.

Michael Hoffmann, Irvine Professor of Environmental Science and dean of graduate studies, was honored last October by the University of Toronto's department of chemistry as the 2003–04 A. R. Gordon Distinguished Lecturer in Chemistry. During his weeklong stay at the university, he gave three lectures covering his current research topics, which include sonochemistry, semiconductor photochemistry, and ice-phase photochemistry.

Jeroen Tromp, McMillan Professor of Geophysics and director of the Seismo Lab, **Dimitri Komatitsch**, senior research fellow in geophysics, and **Chen Ji**, associate scientist, together with Seiji Tsuboi of the Institute for Frontier Research on Earth Evolution (IFREE), have been awarded the 2003 Gordon Bell Prize. Made in the category for Peak Performance, the honor recognizes "A 14.6 Billion Degrees of Freedom, 5 Teraflop/s, 2.5 Terabyte Earthquake Simulation on the Earth Simulator," the result of a collaboration between Caltech's Seismo Lab and Dr. Tsuboi of IFREE, which is part of the Japan Marine Science and Technology Center. The Earth Simulator was used to model seismic-wave propagation resulting from large earthquakes.

James to speak on diversity

Wilmot James, Caltech's Moore Visiting Professor of History and Sociology, will be the next speaker in the Presidential Lecture Series on Achieving Diversity in Science, Math, and Engineering. His talk, "Africa, Genomic Science, and Some Notes on the Evolution of Human Diversity," will take place Thursday, January 15, at 4 p.m. in Ramo Auditorium.

In his lecture, according to James, he will cover the implications of genomic science for African research and development; Africa's contributions to global science, in particular the tracing of human ancestry through the use of mitochondrial DNA; and the evolution of human diversity, with a focus on skin color. These topics will then lead into a discussion of "globally excellent institutions like Caltech and global diversity"—in other words, the implications of "global science in the era of globalization," he says.

James is an executive director of the Human Sciences Research Council in Cape Town, South Africa, where he oversees social cohesion and integration research, and is a cofounder of the Africa Human Genome Initiative. During his stay at Caltech, James is conducting research on the human genome sequencing effort, as well as teaching. His fall-term course focused on post-apartheid South Africa, and a course in the spring will be titled "Racial Variation and the Evolution of Skin Color."

A former dean of humanities and professor of sociology at the University of Cape Town and a past executive director of the Institute for Democracy of South Africa, James has authored or edited more than a dozen books. He holds a PhD in sociology and African history from the University of Wisconsin–Madison.

The Caltech Presidential Lecture Series on Achieving Diversity in Science, Math, and Engineering is a free public program. Campus parking is available with a permit from the parking structure kiosk at 370 South Holliston Avenue. Sponsored by the Office of the President, the Office of Minority Student Education, the Officers of the Faculty, and the Division of the Humanities and Social Sciences.

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Concerts cheer up the winter

Fight postholiday blues with beautiful sounds from Caltech student groups. Beginning Friday, January 23, at 8 p.m., the chamber music program will celebrate its 25th year with its annual concert series. With their usual venue, Dabney Lounge, under construction, the students will perform this year in Ramo Auditorium.

More than 20 small ensembles will present selections including trios by J. S. Bach, Beethoven, Mendelssohn, and Dvorák; a piano duet by Hindemith; Mozart, Brahms, and Shostakovich quartets; and a Schumann quintet. Students are coached by Delores Bing, chamber music director; Allen Gross, piano ensemble instructor; and several Donald E. Hudson Visiting Artists.

The series will continue the next weekend with a festival of chamber-music concerts on Friday the 30th and Saturday the 31st, both at 8 p.m., and the annual Super Bowl Alternative Concert on Sunday, February 1, at 3:30 p.m. Says Bing, "This final event of the series takes place during the big game, and is dedicated to those who prefer chamber music to football."

For those who prefer something a little jazzier, the Caltech Jazz Bands, directed by William Bing, will perform on Saturday, January 24, at 8 p.m. in Beckman Auditorium. This concert will feature the music of Charles Mingus, of whom the *New Yorker* observed, "For sheer melodic and rhythmic and structural originality, his compositions may equal anything written in western music in the twentieth century."

Bing notes that Mingus's "wonderful" works are enhanced by their titles, such as "Fables of Fabus," "Goodbye Pork Pie Hat," Moanin'," "Oh Lord, Don't Let Them Drop That Atomic Bomb on Me," and "Haitian Fight Song." The performance will also feature pieces by musicians who had influenced the composer, including Thelonious Monk and Charlie Parker, as well as solos by graduate students Jay Bartroff and Kjerstin Easton.

All performances are free and open to the public. For more information, contact Public Events at 1 (888) 2CALTECH, (626) 395-4652, or events@caltech.edu, or visit www.events.caltech.edu. Individuals with a disability can call 395-4688 (voice) or 395-3700 (TDD).

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Healing people at the atomic level

In the future, diagnosing disease will be possible with a tiny sample of cells, making invasive surgery unnecessary. That breakthrough will only come, however, when scientists successfully combine the field of nanotechnology—the scaling down of existing technologies to molecular dimensions—with microfluidics and systems biology, leading to better understanding of biological organisms. James Heath, Gilloon Professor and professor of chemistry, will study the issues in the next Watson lecture, "NanoSystems Biology," on Wednesday, January 14.

The merging of recent advances in nanoscience and technology has exciting potential for systems biology, but the experimental hurdles are daunting. In response to the challenge, Caltech, UCLA, and the Institute for Systems Biology in Seattle have formed the NanoSystems Biology Alliance. Heath will present the project's background and its early successes, as well as examine problems remaining to be solved in the future.

The free public lecture will begin at 8 p.m. in Beckman Auditorium, with first-come, first-served seating available after 7:30. For more information, contact Public Events at 1 (888) 2CALTECH, (626) 395-4652, or events@caltech.edu, or visit www.events.caltech.edu. Individuals with a disability can call 395-4688 (voice) or 395-3700 (TDD).

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Caltech tops the Kiplinger 100

Kiplinger's Personal Finance has named the Institute the best value among U.S. private colleges in its January 2004 issue. The magazine cites Caltech's quality, including academic excellence and its 3:1 student-faculty ratio, and its average cost with financial aid—for students receiving need-based aid, the yearly tab of $32,700 falls to $11,000. Read more at www.kiplinger.com.

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January 12–18, 2004

M T W T F S S

Monday, January 12

Biochemistry Seminar
153 Noyes, Sturdivant Lecture Hall, 2 p.m.—"Dissecting the Broad Substrate Specificity of a Human DNA Repair Glycosylase," Dr. Patrick O'Brien, Harvard Medical School. Refreshments.

Ulric B. and Evelyn L. Bray Seminar
25 Baxter, 4 p.m.—Topic to be announced. Massimo Morelli, assistant professor of economics and political science, Ohio State University. Refreshments.

Geological and Planetary Sciences Seminar
155 Arms, Robert Sharp Lecture Hall, 4 p.m.—"High Productivity During Mid-Cretaceous Ocean Anoxic Events," Adina Paytan, assistant professor, geological and environmental sciences, Stanford University.

High Energy Physics Seminar
469 Lauritsen, 4 p.m.—Topic to be announced. Iain Stewart, assistant professor of physics, MIT. Information: www.theory.caltech.edu/people/helen/seminar1.html.

Applied and Computational Mathematics Colloquium
101 Guggenheim Lab, Lees-Kubota Lecture Hall, 4:15 p.m.—"Conformal-Map Dynamics for a Class of Non-Laplacian Growth Phenomena," Martin Bazant, associate professor of applied mathematics, MIT. Refreshments, 3:45 p.m. Information: www.acm.caltech.edu/colloq.shtml.

Tuesday, January 13

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. Information: library.caltech.edu/learning/default.htm.

Institute for Quantum Information Seminar
74 Jorgensen, 3 p.m.—Topic to be announced. Anatoli Polkovnikov, department of physics, Harvard University.

Mechanical Engineering Seminar
206 Thomas, 3 p.m.—"A Model of Co-operative Diffusion in Dense Granular Flows," Martin Bazant, associate professor of applied mathematics, MIT. 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.—"The Cosmically Averaged Universe Out to Z-3," Professor Gregory Rudnick, Max Planck Institute for Astrophysics, Germany. Refreshments, 3:30 p.m.

Caltech/JPL Association for Gravitational-Wave Research Seminar Series
114 E. Bridge, 4 p.m.—Topic to be announced. Patrick Brady, assistant professor of physics, University of Wisconsin, Milwaukee. Information: http://cajagwr.caltech.edu/scripts/seminars.html.

Chemical Physics Seminar
147 Noyes, Sturdivant Lecture Hall, 4 p.m.—"Bonding Patterns in Open Shells: Structural, Spectroscopic, and Chemical Points of View," Anna Krylov, assistant professor of chemistry, department of chemistry, USC.

General Biology Seminar
119 Kerckhoff, 4 p.m.—"RNAi: Mechanism and Application," Professor Greg Hannon, Cold Spring Harbor Laboratory.

Wednesday, January 14

Information Science and Technology Seminar
080 Moore, 4 p.m.—"Complete Sets of Logic Primitives," Professor Amar Mukherjee, School of Computer Science, University of Central Florida. Information: http://netlab.caltech.edu/seminar.

Materials Research Lecture
106 Spalding Lab, Hartley Memorial Seminar Room, 4 p.m.—"Materials Chemistry and Physics for Thermoelectric Power Generation and Cooling," Jeff Snyder, JPL. Refreshments, 113 Spalding, 3:45 p.m. Information: www.matsci.caltech.edu/seminars.html.

Organic Chemistry Seminar
147 Noyes, Sturdivant Lecture Hall, 4 p.m.—"Supramolecular Chemistry as Applied to the Assembly of Nanostructured Materials and Their Subsequent Manipulation," Professor Karen L. Wooley, Division of Biology and Biomedical Sciences, Washington University in St. Louis.

Wiersma Lecture
100 Broad Center, 4 p.m.—"Nicotine, Addiction, and Learning: Studies Using Constitutive and Conditional Knockout of the High Affinity Nicotinic Acetylcholine Receptors," Marina Picciotto, assistant professor of psychiatry, Yale University School of Medicine.

Earnest C. Watson Lecture Series
Beckman Auditorium, 8 p.m.—"Nanosystems Biology," James Heath, Gilloon Professor and professor of chemistry, Caltech. Admission is free. Information: 395-4652, 1 (888) 2CALTECH, or events@caltech.edu. Individuals with a disability: 395-4688 (voice) or 395-3700 (TDD). Visit Public Events at www.events.caltech.edu.

Thursday, January 15

Biochemistry Seminar
147 Noyes, Sturdivant Lecture Hall, 2 p.m.—"A Tale of Two GTPases in Cotranslational Protein Targeting," Dr. Shu-ou Shan, UC San Francisco. Refreshments.

Introduction to SciFinder Scholar
Sherman Fairchild Library, multimedia conference room, 2 to 3:30 p.m.—The presentation includes a review of database content and a quick comparison with Beilstein/Gmelin and the Combined Chemical Dictionary. Examples of search/display techniques will be shown. A handout will be provided, along with practice questions and structures. Information: http://library.caltech.edu/learning/default.htm.

Caltech Presidential Lecture Series on Achieving Diversity in Science, Math, and Engineering
Ramo Auditorium, 4 p.m.—"Africa, Genomic Science, and Some Notes on the Evolution of Human Diversity," Wilmot James, Moore Visiting Professor of History and Sociology, Caltech, and executive director, Human Sciences Research Council, Cape Town, South Africa. This lecture series brings to campus speakers who have successfully promoted women and under-represented minorities in science and technology.

Chemical Engineering Series
106 Spalding Lab, Hartley Memorial Seminar Room, 4 p.m.—"From Genome to Organism: A Virus-World View," John Yin, associate professor and Cargill Faculty Fellow, chemical and biological engineering, University of Wisconsin, Madison. Refreshments, 113 Spalding Lab, 3:30 p.m.

Physics Research Conference
201 E. Bridge, 4 p.m.—"Muon g-2," Ernst Sichtermann, Lawrence Berkeley National Laboratory. Refreshments, 114 E. Bridge, 3:45 p.m. Information: www.pma.caltech.edu/~physcoll/PhysColl.html.

Friday, January 16

High Energy Theory Seminar
469 Lauritsen, 11 a.m.—Topic to be announced. Amer Iqbal, department of physics, Harvard. Information: www.theory.caltech.edu/people/seminar/2004-spring.html.

Condensed Matter Physics Seminar
107 Downs Lab, noon—Topic to be announced. David Nelson, Mallinckrodt Professor of Physics, Harvard.

Fluid Mechanics Seminar
101 Guggenheim Lab, Lees-Kubota Lecture Hall, 3 p.m.—"A Reformulation of the Large Eddy Simulation of Turbulence," Professor Robert Moser, department of theoretical and applied mechanics, University of Illinois at Urbana-Champaign. Information: www.galcit.caltech.edu/Seminars/Fluids/CurrentFluids/index.html.

Inorganic-Organometallics Seminar
151 Crellin, 4 p.m.—"Homogeneous Electron Transfer Rates in DNA Monolayer Films," Greg Drummond, 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.—"The Northridge Earthquake: Ten Years After." Several speakers will make brief presentations preceding the premiere of the new video *Written in Stone: Earthquake Country—Los Angeles*. Admission is free. Information: www.jpl.nasa.gov/lecture.

Saturday, January 17

Northridge Earthquake 10th Anniversary
Beckman Auditorium, 9 a.m. to 3:30 p.m.—"Learning from the Past, Planning for the Future" will commemorate the Northridge Earthquake and allow the public a first-hand look at earthquake research and technology. There will be a variety of speakers in Beckman Auditorium, earthquake movies, exhibits from Caltech and the USGS highlighting ongoing earthquake research and technology, and displays from other participating organizations. Free and open to the public. Information: http://pasadena.wr.usgs.gov/info/lectures, 583-6801, or 395-6318.

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January 19–25, 2004

M T W T F S S

Monday, January 19

Martin Luther King Day Holiday

Tuesday, January 20

Thesis Seminar
151 Crellin, 9 a.m.—"Electron Transfer Processes at Semiconductor/Liquid Interfaces and Metal/Nanogap Junctions," Florian Gstrein, graduate student in chemistry, Caltech.

Electronic Theses and Dissertations
Sherman Fairchild Library, multimedia conference room, noon to 1:30 p.m.—Caltech requires that theses be submitted in both paper and electronic versions. This presentation will offer a brief overview of techniques useful in the production and publication of electronic theses. The session will include tips on formatting, intellectual-property considerations, turning paper to pixels, creating PDFs, how to submit a thesis, and availability (who can see it and when) issues. Information: http://library.caltech.edu/learning/default.htm.

Institute for Quantum Information Seminar
74 Jorgensen, 3 p.m.—Topic to be announced. Chetan Nayak, assistant professor, department of physics and astronomy, UCLA.

Carnegie Observatories Colloquium Series
William T. Golden Auditorium, 813 Santa Barbara Street, 3:30 to 5 p.m.—"Probing the Epoch of Reionization at Radio Wavelengths," Chris Carilli, National Radio Astronomy Observatory, New Mexico. Refreshments at 3:30 p.m.

Chemical Physics Seminar
147 Noyes, Sturdivant Lecture Hall, 4 p.m.—"The Transition of Molecular Surface Chemistry to Molecular Surface Biology," Gabor Somorjai, professor of chemistry, UC Berkeley.

General Biology Seminar
119 Kerckhoff, 4 p.m.—Topic to be announced. Chris Goodnow, Medical Genome Center, John Curtin School of Medicine, Canberra, Australia.

Caltech/MIT Enterprise Forum
Baxter Lecture Hall, 5:30 to 9 p.m.—"Medical Devices: The Power of Small." This program will explore the emerging opportunities in the medical device field. Networking and complimentary dinner, Chandler Dining Hall, 5:30 p.m. Registration: 395-3916 or entfor@caltech.edu. Information: www.entforum.caltech.edu.

Wednesday, January 21

Astronomy Colloquium
155 Arms, Robert Sharp Lecture Hall, 4 p.m.—"Obscured Galaxy and SMBH Formation," Chris Carilli, National Radio Astronomy Observatory, New Mexico. Information: www.astro.caltech.edu/~gma/colloquia.html.

Environmental Science and Engineering Seminar
142 Keck, 4 p.m.—"Are Changes in Tropopause Height a 'Fingerprint' of Human Effects on Climate?", Dr. Benjamin Santer, physicist, Lawrence Livermore National Laboratory, Program for Climate Model Diagnosis and Intercomparison. Refreshments, Keck Labs lobby, 3:40 p.m.

Materials Research Lecture
106 Spalding Lab, Hartley Memorial Seminar Room, 4 p.m.—"Rotational Behavior of Smectic Liquid Crystals in Magnetic Fields," Wim Bras, the European Synchrotron Radiation Facility, France. Refreshments, 113 Spalding Lab, 3:45 p.m. Information: www.matsci.caltech.edu/seminars.html.

John D. Roberts Lecture
22 Gates Annex, 4 p.m.—"Gas-Phase Ionic Chemistry and Spectroscopy," Professor John I. Brauman, department of chemistry, Stanford University. Refreshments.

Thursday, January 22

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

Chemical Engineering Graduate Seminar
106 Spalding Lab, Hartley Memorial Seminar Room, 4 p.m.—"EGF-Mediated Proliferation of Non-Tumorigenic Mammary Epithelial Cells Requires Tcf/Lef Signaling," Nicholas Graham, graduate student in chemical engineering, Caltech. Information: http://cheme.caltech.edu/~gradtalks/feature.html.

Physics Research Conference
201 E. Bridge, 4 p.m.—"Molecular Mechanics and Electronics," James Heath, Gilloon Professor and professor of chemistry, Caltech. Refreshments, 114 E. Bridge, 3:45 p.m.

Friday, January 23

Condensed Matter Physics Seminar
107 Downs Lab, noon—Topic to be announced. Dr. Donna Sheng, department of physics and astronomy, Cal State Northridge.

Fluid Mechanics Seminar
101 Guggenheim Lab, Lees-Kubota Lecture Hall, 3 p.m.—"Bioinspired Optimization for Engineering Problems," Professor Petros Koumoutsakos, Institute of Computational Sciences, ETH Zurich. Information: www.galcit.caltech.edu/Seminars/Fluids/CurrentFluids/index.html.

Inorganic-Organometallics Seminar
151 Crellin, 4 p.m.—"High Resolution X-Ray Photoelectron and Infrared Spectroscopy of Alkylated Crystalline Silicon (111) Surfaces," Lauren Webb, graduate student in chemistry, Caltech.

CampusEvents

Monday, January 12

Advanced Ballet Class
Braun Gym, multipurpose room, 10 p.m.—Free class taught by experienced members of the Caltech Dance Troupe. Prior dance experience is required. Dance shoes and clothing are recommended.

Tuesday, January 13

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.

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

Wednesday, January 14

Outlook 2000
120 ATC Building, 263 S. Chester, 8:30 a.m. to noon—This introductory course will teach you how to use Outlook to manage e-mail, calendars, contacts, tasks, and to-do lists; to browse and share documents and files on the hard drive; and to handle group-scheduling and meeting-planning activities. This is the first of two sessions. Fee: $80. Registration: 395-3500 or ATC.helpdesk@caltech.edu. Information: http://atc.caltech.edu/Desktop_Training/outlook_level1.htm.

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.

Electric Cart Safety Training
118 Keith Spalding Building, 3 p.m.—This course teaches participants about safely driving electric carts on campus. Registration: 395-6727 or safety.training@caltech.edu.

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

Thursday, January 15

Reel Women's Series: *Playing Unfair—The Media Image of the Female Athlete*
Caltech Women's Center, noon—This film examines the post–Title IX media landscape in terms of the representation of female athletes.

Teaching Workshop
Beckman Institute auditorium, 5:30 p.m.—"Tips and Tricks for Teaching Bright Students," Ran Libeskind-Hadas, professor of computer science, Harvey Mudd College. Sponsored by the Caltech Project for Effective Teaching.

Friday, January 16

Fire-Extinguisher Training
Wilson Avenue North Parking Structure, roof, 11 a.m.—This class, which will meet on the roof, will teach basic fire safety and include hands-on training on how to use a fire extinguisher. Class size is limited; please call 395-6727 or e-mail safety.training@caltech.edu to reserve a place.

Swimming and Diving
vs. Whittier College/Cal Lutheran University, 3:30 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.

Women's Basketball
at Pomona-Pitzer, 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.

Folk Music Society Presents Harvey Reid
Beckman Institute auditorium, 8 p.m.—Harvey Reid plays guitar, autoharp, and banjo and always has something interesting and funny to say. Tickets and information: 395-4652, 1 (888) 2CALTECH, or events@caltech.edu. Individuals with a disability: 395-4688 (voice) or 395-3700 (TDD). Visit the Folk Music Society at http://folkmusic.caltech.edu.

Saturday, January 17

Swimming and Diving
vs. University of Redlands, 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. The class is open to all with valid gym membership. Fee for full term: $30 for Caltech students, $60 for other Caltech community members. Special fee for trial class. Reservations: Kathy.Kelly@caltech.edu.

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

Sunday, January 18

Amnesty International Book Discussion Group
Vroman's Bookstore, 695 E. Colorado Boulevard, second floor, 6:30 p.m.—This month's book is *Tainted Legacy: 9/11 and the Ruin of Human Rights*, by William Schulz, executive director of Amnesty International USA. All are welcome. Sponsored by Caltech/Pasadena AI Group 22.

Monday, January 19

Martin Luther King Day Holiday

Tuesday, January 20

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.

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

Women's Basketball
at Claremont-Mudd-Scripps, 7:30 p.m.

Wednesday, January 21

How to Write Letters, Memos, and Reports
Brown Gym classroom, 8:30 a.m. to 4 p.m.—This workshop is designed to give you a firm grasp of the principles of effective business writing and teach you to target your writing for a specific audience. Registration: 395-8055 or diane.williams@caltech.edu.

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.

Annual Radiation Safety Refresher
118 Keith Spalding Building, 3 p.m.—This course, part of the certification process for radiation workers, is designed to inform participants about changes in regulatory requirements and Institute policies. Issues such as inspection results, dosimetry records, radiation accidents at other organizations, lessons learned, and basic radiation safety principles will be reviewed. Registration: 395-6727 or andrea.acosta@caltech.edu.

Men's Basketball
at Cal Lutheran University, 7:30 p.m.

Thursday, January 22

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

Women's Wellness Series
Caltech Women's Center, noon—"Staying Heart Smart!", Dr. Bairey Merz, medical director of the Women's Health Program and the Preventive Cardiac Center at Cedars-Sinai Medical Center in Los Angeles, will discuss the risk factors, prevention, and treatment of heart disease.

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

Friday, January 23

Swimming and Diving
at University of La Verne, 3:30 p.m.

Women's Club Welcoming Coffee
Athenaeum Rathskeller, 5 to 6:30 p.m.—An opportunity to meet new friends, welcome newcomers, and learn more about the Caltech Women's Club. Information: Carol Andersen, (818) 790-8175 or carol@vis.caltech.edu.

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

Women's Basketball
vs. Whittier College, 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 Student Chamber Ensembles
Ramo Auditorium, 8 p.m.—Program to be announced. Admission is free. A reception for all will follow the concert. 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.

The Kingston Trio
Beckman Auditorium, 8 p.m.—Such Kingston Trio classics as "Tom Dooley" and "Where Have All the Flowers Gone?" will transport you back to the heyday of folk music. Tickets and information: 395-4652, 1 (888) 2CALTECH, or events@caltech.edu. Individuals with a disability: 395-4688 (voice) or 395-3700 (TDD). Visit the Caltech Folk Music Society at http://folkmusic.caltech.edu.

Saturday, January 24

Baseball
vs. Dodgertown West, at Pasadena High School, doubleheader, 11 a.m.

Swimming and Diving
vs. Claremont-Mudd-Scripps, 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. The class is open to all with valid gym membership. Fee for full term: $30 for Caltech students, $60 for other Caltech community members. Special fee for trial class. Reservations: Kathy.Kelly@caltech.edu.

Men's Basketball
at Claremont-Mudd-Scripps, 7:30 p.m.

Caltech Jazz Bands
Beckman Auditorium, 8 p.m.—The Caltech Jazz Bands will feature an evening of music by and about Charlie Mingus, one of the great composers and bass soloists in the world of jazz. There will be original compositions by Mingus, in addition to selections by other musicians who influenced his life and music. Admission is free. A reception for all will follow the concert. Information: 395-4652, 1 (888) 2CALTECH, or events@caltech.edu. Individuals with a disability: 395-4688 (voice) or 395-3700 (TDD).

Sunday, January 25

Skeptics Society Lecture
Baxter Lecture Hall, 2 p.m.—"LSD, Spirituality, and the Creative Process: The Role of Hallucinogens in Tribal and Modern Peoples," Dr. Marlene Dobkin de Rios, medical anthropologist, Cal State Fullerton. 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.

Coleman Chamber Concert
Beckman Auditorium, 3:30 p.m.—The Tokyo String Quartet will perform works by Smetana, Panetti, and Schumann. 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.

Spitzer, *from page 1*

—Resembling a creature on the run with flames streaming behind it, as imaged by the Spitzer, a dark globule in the emission nebula IC 1396 is in spectacular contrast to the view seen in visible light. Spitzer's infrared detectors unveil the brilliant hidden interior of this opaque cloud of gas and dust for the first time, exposing never-before-seen young stars.

—The dusty, star-studded arms of a nearby spiral galaxy, Messier 81, are illuminated. Red regions in the spiral arms represent infrared emissions from dustier parts of the galaxy where new stars are forming. The image shows the power of the Spitzer to explore regions invisible in optical light, and to study star formation on a galactic scale.

—Spitzer reveals, in its entirety, a massive disk of dusty debris encircling the nearby star Fomalhaut. Such debris disks are the leftover material from the building of a planetary system. While other telescopes have imaged the outer Fomalhaut disk, none has been able to provide a full picture of the inner region. Spitzer's ability to detect dust at various temperatures allows it to fill in this missing information, providing astronomers with insight into the evolution of planetary systems.

—Data from the young star HH 46-IR, and from a distant galaxy 3.25 billion light-years away, show the presence of water and small organic molecules not only in the here and now, but, for the first time, far back to the time when life on Earth first emerged.

JPL manages the Spitzer Space Telescope mission for NASA's Office of Space Science, Washington. Science operations are conducted at the Spitzer Science Center at Caltech. Images are available at www.spitzer.caltech.edu and http://photojournal.jpl.nasa.gov.

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Floating their boats

James Faddy (far left, background), who recently finished his PhD in aeronautics, and his friends celebrate his new status with a relaxing excursion in Millikan Pond.

Anniversary, *from page 1*

quake response systems; scientists' ability to predict quakes; improvements in detecting and mapping quakes with new technology; and the life-saving quality of rigorous building codes. More information is available online at the event's website, http://pasadena.wr.usgs.gov/info/nr10/.

The Northridge quake hit along a previously unknown blind thrust fault, later named the Northridge Thrust. It damaged buildings throughout the area, displacing some 20,000 people due to the total or partial collapse of houses, apartment complexes, and office buildings. The estimated economic losses are estimated at between $20 billion and $40 billion.

Although it was a grim milestone in the history of the city, the calamity provided civil engineers, geophysicists, and seismologists with a rich store of facts and knowledge that may help mitigate future such disasters.

One of the technological triumphs is the California Integrated Seismic Network, which covers all of the state. Recently completed, the network of computerized sensors incorporates the TriNet system, which monitors fault activity and ground movement in Southern California.

"We use the seismic network to measure the quakes," Vinci says. "Within seconds we can determine the magnitude, the time, and the location of the earthquake." After a temblor of magnitude 3.5 or higher occurs in an urban or densely populated region, the system is capable of producing computerized Shake Maps almost instantaneously. Fire departments and rescue teams use these maps to pinpoint communities that have experienced violent shaking and concentrate their efforts there.

"Shake Maps improve emergency service response time to an earthquake," Vinci says. "Using the Shake Map, they know where to respond and they can respond faster."

More than 30 exhibitors will be on hand at the January 17 event to provide demonstrations of the new quake technology, and a kids' zone exhibit will introduce children to practical tips on how to prepare for a temblor, as well as how to survive the next one.

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Spirit, *from page 1*

The flight team expects to spend more than a week directing *Spirit* through a series of preparation steps before the rover rolls off its lander platform. Meanwhile, *Spirit*'s cameras and a mineral-identifying infrared instrument have begun examining the surrounding terrain, revealing a vast flatland well suited to the robot's unprecedented mobility and scientific tool kit.

"My hat is off to the navigation team because they did a fantastic job of getting us right where we wanted to be," said Steve Squyres of Cornell University, principal investigator for the science payload.

"We hit the sweet spot," he said. "We wanted someplace where the wind had cleared off the rocks for us. . . . What we're seeing is a section of surface that is remarkably devoid of big boulders, at least in our immediate vicinity, and that's good news because big boulders are something we would have trouble driving over."

"We see a rock population that is different from anything we've seen elsewhere on Mars, and it comes out very much in our favor," he said.

More information and images are available at http://marsrovers.jpl.nasa.gov.

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TMT, *from page 1*

more than 12 times sharper than those of the Hubble Space Telescope. With such an instrument, astrophysicists will be able to study the earliest galaxies and the details of their formation, as well as pinpoint the processes that lead to young planetary systems around nearby stars.

"We are very pleased that the Gordon and Betty Moore Foundation has recognized the strengths of the University of California and Caltech to carry out such an important project," says UC President Robert C. Dynes.

The two institutions will also work with the Association of Universities for Research in Astronomy and the Association of Canadian Universities for Research in Astronomy, which are seeking funding.

Richard Ellis, director of Caltech Optical Observatories and Steele Family Professor of Astronomy, notes that the award will provide crucial funding to address the project's major areas of risk. "This next phase is of central importance, because in the course of carrying it out, we will establish the fundamental technologies and methods necessary for the building of the telescope," he says.

Following the design study, the project's final phase, not yet funded, will be construction of the observatory at a site still to be determined. Regular astronomical observations are projected to begin by approximately 2012.

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News extras

Update on campus parking

Construction has begun on a new parking structure beneath the athletic field, and is estimated to continue through July. During this time, the parking area between the tennis courts and the athletic field will be closed. To help alleviate the situation, Security and Parking Services is allowing Caltech vehicles to use the visitor spaces at the top of the north Wilson Avenue garage. Campus community members may also sign up with Caltech Security to park at the Huntington Library. On weekdays, a shuttle will run between the library and the JPL shuttle stop on California Boulevard every half hour. Details and a schedule will be provided at signup. Contact Todd Swart at todd.swart@caltech.edu.

A call for support

Colleagues and friends of Student Affairs chief administrator Stan Borodinsky are calling on the Caltech community to help encourage his daughter, a mother of four who is preparing for a heart transplant. To help bolster her morale, so critical under the circumstances, notes or cards would be very welcome. Participants with even-numbered birthdays (e.g., the 24th) are asked to mail in January, and those with odd-numbered birthdays in February. Mail to Sheryl Borodinsky at P.O. Box 1152, Lebec, California, 93243. For questions, contact Karen Carlson, ext. 6593, or Dan Langdale, ext. 8375.

Joe DeVito and Alice Edel of the Tech Express held their first-ever student tree-ornament contest, which they hope will become an annual event. Edel, shown with the winners, says that over time, the students "get to be like your kids."

Undergrads Ben Solecki '04 (left) and Dylan Owens '04 salute their victory in "Cage Against the Machine," the 2003 ME 72 design engineering contest, in December.

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