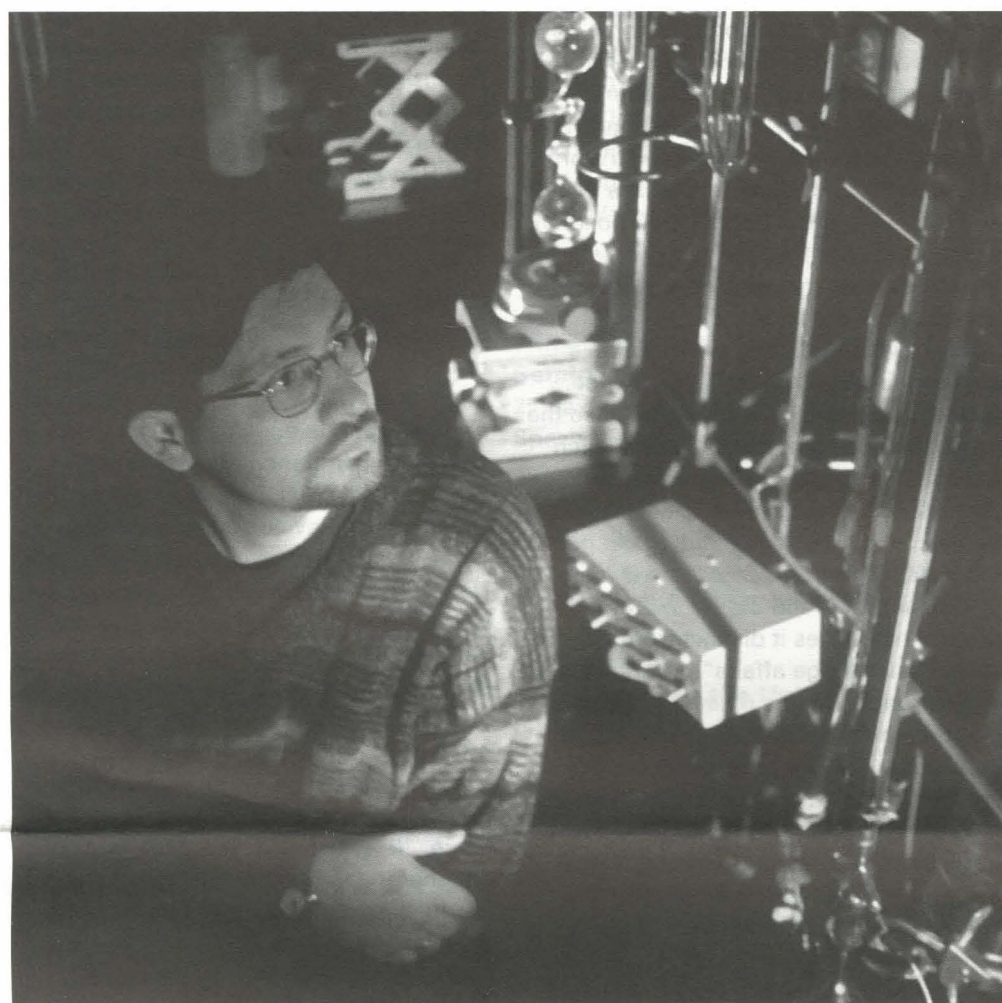


Caltech 336

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

The campus community biweekly

February 22, 2001, vol. 1, no. 4



In John Bercaw's lab, grad student Seva Rostovtsev conducts a reaction with oxygen and one of the platinum complexes under investigation.

Hunting the elusive catalyst

Barbara DiPalma

The importance of John Bercaw's research isn't hard to grasp—just think about what it's cost you lately to fill your car with gasoline. Caltech's Centennial Professor of Chemistry has a long-standing interest in developing catalysts that will selectively change natural gases—which are probably as abundant on Earth as petroleum—into the chemicals needed to make plastics, solvents, and especially the alternative fuel methanol. The key word is *selectively*: Bercaw is looking for a catalyst that will let him precisely control the timing of methane-to-methanol conversion.

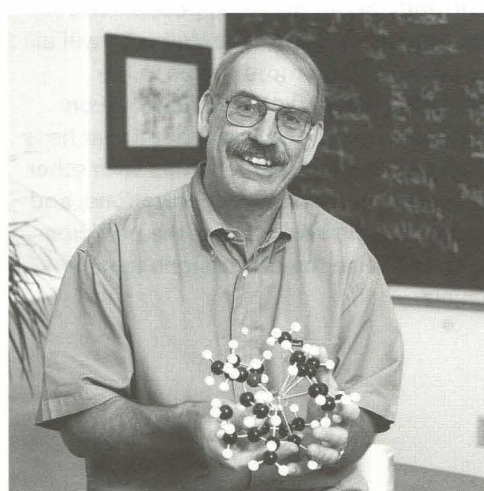
The giant petrochemical corporation BP thinks Bercaw's work is important, too—so much so that it recently awarded him, his colleague Jay Labinger, and their research team a 10-year, \$10 million grant to figure out how to turn methane gas into more user-friendly chemicals. Ideally, the investigators would like to find a catalyst that would let them combine oxygen with methane to produce methanol, or (even better) ethylene or propylene, chemicals that are used to make a host of everyday products.

Bercaw and his collaborators have their work cut out for them. It's not difficult to make methane react with oxygen; what's tricky is stopping the reaction part way, before it ends up as carbon dioxide and water. Unfortunately, the usual way of controlling this

reaction—by a two-step process that uses steam to turn methane into carbon monoxide and hydrogen, then makes methanol from those two gases—requires considerable energy, and is thus expensive. It leaves the chemists once again hunting for the elusive catalyst that can do the job in one energy-efficient step.

A compound containing a reactive platinum center may turn out to be that catalyst. Russian researchers have reported using that metal to produce methanol from methane with a high degree of selectivity, and the Bercaw lab has been testing their findings for several years. But difficulties persist: the platinum compound quits working

see Bercaw, page 2



John Bercaw, Centennial Professor of Chemistry

Caltech receives \$10 million Fairchild grant

Deborah Williams-Hedges

The California Institute of Technology has received a \$10 million grant from the Sherman Fairchild Foundation to establish an endowment for the existing Sherman Fairchild Postdoctoral Scholars Program in theoretical physics, theoretical astrophysics, and mathematics.

The endowment will provide the best young scholars in these areas with three- to six-year postdoctoral appointments, along with infrastructure support. The goal of the endowment is to furnish scholars with a supportive, unencumbered research environment, and to allow for collaboration with an international network of premier scientists.

The endowment will facilitate advanced research in areas such as particle, nuclear, and string theory; theoretical astrophysics and relativity; condensed-matter physics; atomic physics and quantum computation; and mathematical physics.

The Fairchild Foundation has been a significant benefactor to Caltech for many years, establishing the Distinguished Scholars Program and providing seed funding for the Center for Computational Research in Biology and for the Sherman Fairchild Library of Engineering and Applied Science.

see Fairchild, page 6

Stevenson receives Feynman prize

"One hopes that students are being taught to think and not just grind through lots of homework," says Caltech's David Stevenson about the importance of teaching. In recognition of his passion for undergraduate education, Stevenson has been awarded this year's Richard P. Feynman Prize for Excellence in Teaching.

The Van Osdol Professor of Planetary Sciences, Stevenson was honored by a selection committee composed of faculty and students, for modifying the existing Geology 1 class into a new elective course within the core curriculum. "I was challenged," says Stevenson, "by the difficulty of constructing a course that would be attractive to a wide range of students, yet not be too conventional—not just a set of lectures. In practice, it's hard to avoid routine approaches; you want students to learn to think, which means that the problems in the exams, homework, and projects should not be merely routine applications of standard book work." The selection committee cited Stevenson's

see Stevenson, page 6



Robert Kuhn, left, the host of *Closer to Truth*, chats with Bruce Murray during a taping of the show.

Shedding light on sociocosmic riddles

What would it be like to sit in on conversations between some of the greatest minds in the English-speaking world? And contribute to those discussions and receive the impressions of other participants? The producers of the television series *Closer to Truth* wanted to know, so they created a multifaceted vehicle that allows viewers to do this, and more.

Closer to Truth is, as the title suggests, an attempt to approach a clearer understanding of perplexing questions about society, the universe, and the relationship between the two. Some of these questions have mystified thinkers and artists for centuries, while others have risen only recently alongside scientific and technological advances.

During each show, a handful of experts are assembled to discuss these universal themes, and the resulting interplay of ideas is captured. In that roster of noted authors, researchers, and thinkers, Caltech is primarily represented by Bruce Murray, professor of planetary science and geology. The president of the Planetary Society and a pioneer in exploring the solar system, Murray has appeared in five shows with titles such as "Will the Internet Change Humanity?", "Can We Imagine the Far Future—Year 3000?", and "Will Intelligence Fill the Universe?"

Besides Murray, Caltech is represented by Vice President and Provost Steve Koonin, who participated in the shows "Why Is Quantum Science So Beautiful?" and "What Are the Great Questions Of Science?" In addition, Vice Provost David Goodstein moderates an online discussion based on the latter show.

According to Murray, "*Closer to Truth* is an attempt to take on the dumbing down of America in the television world because there is so little of substance there. These programs are substantive."

The project is the brainchild of Robert Kuhn, a Pasadena writer, investment banker, and business strategist. Kuhn

see Murray, page 2

NewsBriefs



The Afro-Caribbean Band jams during a noon concert, one of the Black History Month events sponsored in February by the Caltech Y and the Minority Student Affairs Office.

Honors and awards

Janet Hering, associate professor of environmental engineering science, has received a grant of \$100,000 from the Alice C. Tyler Perpetual Trust. The grant will fund Hering's project, "Environmental Quality Near Large Urban Areas," which will examine the effects of a growing population and the impact of human interaction on land and aquatic ecosystems in the San Gabriel Valley and San Gabriel River watershed.

Steven Quartz, assistant professor of philosophy, has been selected by the National Science Foundation for a Faculty Early Career Development (CAREER) award, the NSF's most prestigious award for outstanding faculty early in their independent professional careers. Quartz will be funded for five years for his research into the mechanisms of cognitive development, enabling him to construct a computational/robotics framework for exploring how the mind emerges from a developing brain's interaction with environmental complexity.

Four Fulbrights on campus

Sponsored by the U.S. State Department, the Fulbright Scholar Program provides grants for approximately 800 U.S. faculty and professionals to lecture or conduct research abroad, and for a similar number of foreign scholars to come to the United States. During the past year, Caltech has had four visitors performing research on Fulbright grants.

Specializing in the investigation of spectral properties of operators associated with equations of mathematical physics, **Shavkat Alimov** is vice rector at the University of World Economy and Diplomacy, Tashkent, Uzbekistan. He is a visitor in mathematics.

A research associate in the University of Rome's geology department, **Nicola D'Agostino** utilizes the Global Positioning System to estimate tectonic strain in central Italy. D'Agostino is working with JPL's satellite geodesy and geodynamics group.

Federico Garcia Navarro is an assistant professor in the department of microbiology and virology, School of Pharmacy, Complutense University of Madrid, Spain. A visitor in the Division of Biology while at Caltech, he attempts in his research to understand the physiological function of protein degradation in the organism *Saccharomyces cerevisiae*.

A visitor in condensed-matter physics while at the Institute, **Vincenzo Piazza** works in the area of quantum mechanics, specifically studying novel phases in the quantum Hall regime. He is a researcher in the G. Polvani Laboratory, Scuola Normale Superiore, Pisa, Italy.

Denning to play in Bach fest

Darryl Denning, the director of performing and creative arts at Caltech, has been invited to play classical guitar on March 10 at the distinguished Los Angeles Bach Festival. The musical celebration, now in its 68th year, takes place at the First Congregational Church near downtown Los Angeles. It will run from March 9 to 18.

Denning's performance will consist of solos by Bach, Sanz, and Corbetta, and he will also play the French and Mexican guitars. Joined by Rick Wilson on the baroque flute, and Susanne Shapiro playing the harpsichord, Denning will play chamber works by Vivaldi, Telemann, Couperin, and others.

For ticket information, call (213) 385-1345 or write to kfreeman@fccla.org.

Caltech seeks a new beaver

The Department of Athletics has launched a contest to update its beaver mascot, which has represented Caltech for nearly a century. The contest, open to undergraduates, "is an opportunity for today's Caltech students to select an image that they feel is representative of the Caltech athletic program and will promote spirit and unity within the community."

Contest entries will be judged by staff members from the athletics department, the Caltech Bookstore, the Alumni Association, and the Student-Athlete Advisory Committee. The winner, whose design will be selected for "image, concept, design, creativity, and functionality," will receive a \$250 cash prize. Contest entries are due by March 22.

Sturtevant memorial

A memorial gathering for Caltech professor Brad Sturtevant will take place on Saturday, February 24, from 1 to 3 p.m. in Dabney Lounge. Sturtevant, the Liepmann Professor of Aeronautics, succumbed to pancreatic cancer in October at the age of 67. The memorial will celebrate his life and his nearly 45 years at Caltech as a student and professor. For more information, contact Ann Harvey at 395-4426 or aharvey@caltech.edu.

Murray, from page 1

serves as the host and mediator of the half-hour programs. Always dapper in his dark suit, he poses provocative questions and deftly directs the flow of answers to keep the debates lively and engaging.

Closer to Truth's first season has produced a comprehensive overview of grand questions that fall into broad themes. These are Technology and Society, Creativity and Thinking, Health and Sex, Brain and Mind, and Universe and Meaning. Every show takes a focused look at individual topics that fall under these umbrella themes.

Those seeking answers, however, will have to look elsewhere for definitive truths. "I think that part of the agenda here is to expose the issue, not to resolve it," Murray said. "The philosophy has been that you're not going to get convergence in these discussions."

A side benefit to the debates, Murray noted, is that they provide exposure for the collected guests. The show's question-and-answer format, in a setting far from the lab and the classroom, presses the speakers to express defend their positions as eloquently as they can. Each must also tailor his or her message so that it is accessible to the layperson.

Murray stressed that the program's audience includes not only the invited guests' peers and colleagues, but also the average citizen who has pondered such questions. Because these questions address concepts that affect scientists and non-academics alike, he added, the potential audience for *Closer to Truth* is huge.

One aspect of the *Closer to Truth* project that makes it distinct from so-called "knowledge affairs" programs is its three-pronged media presence. Complementing the broadcast is an interactive Web site (www.closertotruth.com) that contains much information as well as streaming video and transcripts of previously aired shows. Furthermore, Kuhn explores the issues in finer detail in the eponymously titled book that was published last year.

Murray and Valerie Elachi, the Caltech-based associate producer of CTT, maintain the project's Web site, which also offers visitors opportunities for online expression of their views. The Web staff of local PBS station KCET created the site.

"I think there is a long-term benefit in taking high content quality in things like this and creating a really good Web site," he said. "There's nothing in that set of 28 shows that's obsolete this coming year. Those topics remain."

Murray's work on the site has given him the chance to create and utilize a feature that provides a forum for viewer feedback and response.

"I've had a parallel interest and secondary career in trying to find ways to use new communication technology for serious discourse," Murray said. One of those ways is a kind of online discussion called HyperForum. This feature invites visitors to make their contributions to four online discussions, the idea being that the conversations initiated by the televised debates continue long after the credits roll.

While taping of this season's shows is currently being planned, possibilities for the future are open. The Web site will also grow to include more topics in the HyperForum, including a new one on parapsychology. Murray added that he is actively forming relationships with other universities, research organizations, and individual viewers to increase participation and raise the discussions to new levels.

High schools join Caltech to study cosmic rays

Jill Perry

Los Angeles-area high school students will team up with Caltech researchers to study ultrahigh-energy cosmic rays on their own campuses, thanks to a recent grant from the Weingart Foundation.

The Los Angeles-based foundation has donated \$100,000 to Caltech to establish the California High School Cosmic-Ray Observatory (CHICOS) on four campuses in the Northridge area initially, expanding to 50 and possibly hundreds more sites in the future.

Of the four initial schools, three have a high number of students who are under-represented in the sciences, which means the program may assist in increasing the number of future scientists in the United States. The schools are Sylmar, Van Nuys, and Harvard Westlake high schools and Sherman Oaks Continuing Education School.

The research will be coordinated by Caltech professor of physics Robert McKeown of the Kellogg Radiation Laboratory in the Division of Physics, Mathematics and Astronomy. The program will also incorporate a high school teacher education component, coordinated by Ryoichi Seki at Cal State Northridge. Teachers will develop curriculum materials to help their students participate in the research. Caltech will host a summer workshop where teachers and students can take part in constructing new detector stations for deployment at additional sites.

"This grant will give many high school students a unique opportunity to participate in research science at the university level," said Caltech president David Baltimore. "It will serve as a model for future collaborations in other subjects between world-class research universities and high schools."

The project will involve the development and construction of detector hardware, associated electronics, and computer equipment to form a networked system among the high schools. A large array of this type will enable the study of ultrahigh-energy cosmic rays through the detection of "showers," several kilometers in radius, of secondary particles the rays create in Earth's atmosphere. These are the highest-energy particles ever observed in nature and thus of great current interest in the astrophysics and particle-physics community. Thus, while establishing a state-of-the-art experimental facility, this project will provide an exceptional educational experience for local high school students. When a majority of the 50 sites are operating, it is expected that the project will yield significant scientific results that will be reported in the scientific literature.

Bercaw, from page 1

after one reaction cycle, and it's not easily recycled using oxygen. Bercaw has continued to experiment with the platinum-methane reaction, however, and he now believes he understands the molecular basis for its selectivity. Although there are no guarantees, he thinks there's a reasonable chance that this work will lead to a more efficient way of making methanol. But a big practical payoff isn't Bercaw's primary goal. "My interest in this problem is really in the fundamental chemistry that underlies everything," he says. "I really enjoy understanding how things work."

(Note: This article appeared in the Caltech 1999-2000 annual report. For a copy of the report, contact Barbara DiPalma at dipalma@caltech.edu.)

February 26–March 4, 2001

M T W T F S S

Events in roman type are open to the public
Events in *italic type* are open to the Caltech community only

Monday, February 26

Aeronautics Seminar

Guggenheim Laboratory, 1 p.m.—“Active Control, Parameter-Updating, and Node-Prediction Algorithms for Thermal Network Models of Spacecraft,” Miltiadis Papalexandris, JPL.

Ulric B. and Evelyn L. Bray Seminar

25 Baxter, 4 p.m.—“A Non-Welfarist Solution for Two-Person Bargaining Situations,” Antonio Nicolo, assistant professor of economics, University of Padua, Italy.

Geological and Planetary Sciences Seminar

155 Arms, Robert Sharp Lecture Hall, 4 p.m.—“Outgassing of the Shergotty Meteorite and Implications for Mars: Come Hell or High Water?,” Harry McSween, visiting professor of geology, Caltech. Refreshments, 151 Arms, 3:45 p.m.

Inorganic-Electrochemistry Seminar

147 Noyes, Sturdivant Lecture Hall, 4 p.m.—“Self-Processing Redox Enzymes: A New Venue for Metal Ions in Biology,” Professor David M. Dooley, department of chemistry, Montana State University, Bozeman.

Applied and Computational Mathematics Colloquium

306 Firestone, 4:15 p.m.—“Differential Operators on Graphs as Models of Mesoscopic Systems,” Peter Kuchment, professor of math and statistics, Wichita State University. Refreshments, 204 Firestone, 3:45 p.m.

Astronomy Tea Talk

106 Robinson, 4:15 p.m.—“The Stellar Content of the Hamburg/ESO Objective-Prism Survey,” Norbert Christlieb, assistant professor, Hamburg Observatory.

Tuesday, February 27

Caltech Library System Presents

Sherman Fairchild Library, multimedia conference room, noon to 1:30 p.m.—“Business Resources.” Learn research strategies and methods for finding information on companies and industries. Registration: <http://library.caltech.edu/learning/form.htm>.

Mechanical Engineering Seminar

206 Thomas, 3 p.m.—“Granular and Gas-Solid Flow Research at Cornell,” Professor Michel Louge, Sibley School of Mechanical and Aerospace Engineering, Cornell University. Refreshments, 210 Thomas, 2:45 p.m.

Carnegie Observatories Colloquium

William T. Golden Auditorium, 813 Santa Barbara Street, 4 p.m.—“LISA (Laser Interferometer Space Antenna): An Astronomer’s Love Affair with Gravitational Waves,” Sterl Phinney, professor of theoretical astrophysics, Caltech. Information: 577-1122.

William Bennett Munro Memorial Seminar

25 Baxter, 4 p.m.—“The Ultimate Trip: Special Effects and Science Fiction Cinema,” Scott Bukatman, assistant professor, department of art and art history, Stanford University. Presented in conjunction with “The Future of the Universe” Science Fiction Film Festival. Refreshments.

“The Future of the Universe” Science Fiction Film Festival

Beckman Auditorium, 7:30 p.m.—The movie *Blade Runner*, followed by a panel discussion. 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.

Wednesday, February 28

Geological and Planetary Sciences Seminar

155 Arms, Robert Sharp Lecture Hall, 11 a.m.—“Chemical Composition of the Earth: Core and Mantle,” Claude J. Allègre, Moore Distinguished Scholar, Caltech.

Biolunch Seminar

24 Beckman Labs, noon—“Rust in Anoxic Environments: Fe²⁺ Oxidation by Anaerobic Phototrophic Bacteria on the Early Earth,” Laura Croal, graduate student in biology, Caltech; and “ATR Disruption Leads to Chromosomal Fragmentation and Early Embryonic Lethality,” Eric Brown, postdoctoral scholar in biology, Caltech.

Mathematical Physics Seminar

351 Sloan, noon—“Phase-Averaged Transport for Quasi-Periodic Hamiltonians,” Dr. Hermann Schulz-Baldes, UC Irvine. Information: www.math.caltech.edu/events/mathphys.html.

Astronomy Colloquium

155 Arms, Robert Sharp Lecture Hall, 4 p.m.—“From Stars to Superplanets: The Low-Mass IMF in the Young Cluster IC348,” Joan Najita, National Optical Astronomy Observatories, Tucson.

Geology Club Seminar

151 Arms, Buwalda Room, 4 p.m.—“Volatile Discharges from Active Volcanoes: Fluxes, Sources, and Variations,” Tobias Fischer, assistant professor, department of earth and planetary sciences, University of New Mexico. Information: www.gps.caltech.edu/seminars/geoclub/geoclub.html.

Thursday, March 1

Solid Mechanics Seminar

101 Guggenheim Laboratory, 3 p.m.—“Thermally Induced Martensitic Transformations in Atomic Lattices,” Professor Nicolas Triantafyllidis, department of aerospace engineering, University of Michigan, Ann Arbor. Refreshments.

Everhart Lecture Series

155 Arms, Robert Sharp Lecture Hall, 4 p.m.—“Recovery of Life Following the Cretaceous/Tertiary Mass-Extinction Event,” Sujoy Mukhopadhyay, graduate student in geochemistry, Caltech. Refreshments, 3:45 p.m. Information: www.its.caltech.edu/~els.

Nanotechnology Seminar

070 Moore, 4 p.m.—“Nanotechnology R&D in the Asia Pacific Region,” Dr. Lerwen Liu, technology consultant, Asian Technology Information Program, Tokyo. Refreshments.

Physics Research Conference

201 E. Bridge, 4 p.m.—Topic to be announced. Margaret Kivelson, professor of space physics, department of earth and space sciences and the Institute of Geophysics and Planetary Physics, UCLA. Refreshments, 110 East Bridge, 3:45 p.m.

Friday, March 2

Fluid Mechanics Film Series

306 Firestone, 1 p.m.—“Characteristics of Laminar and Turbulent Flow,” prepared by Professor Hunter Rouse, University of Iowa.

Fluid Mechanics Seminar

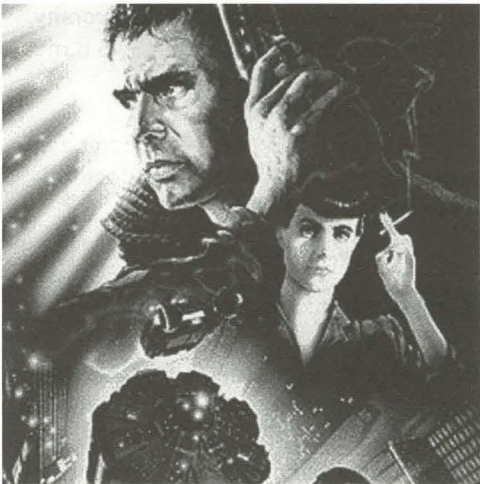
101 Guggenheim Laboratory, 3 p.m.—“The PDF of the Velocity Difference between Two Points in Isotropic Turbulent Flow,” Tom Lundgren, professor emeritus, aerospace engineering and mechanics, University of Minnesota, Twin Cities. Information: www.galcit.caltech.edu/Seminars/Fluids/CurrentFluids/index.html.

Biomedical Engineering 0.1 Seminar Series

Baxter Lecture Hall, 4 p.m.—“Molecular Springs, Powerful Engines That Drive Cellular Movements,” Paul Matsudaira, professor of biology and bioengineering and environmental health, and member, Whitehead Institute for Biomedical Research, MIT. Information: www.cco.caltech.edu/~koonin/0_1seminars.html.

Caltech/JPL Association for Gravitational-Wave Research Seminar

155 Arms, Robert Sharp Lecture Hall, 4 p.m.—“Gravitational-Wave Searches Via Pulsar Timing,” Professor Donald C. Backer, department of astronomy, UC Berkeley.



Harrison Ford stars in *Blade Runner*, which will be screened Tuesday, February 27 as part of “The Future of the Universe” Science Fiction Film Festival.

Courtesy of Warner Brothers

March 5–March 11, 2001

M T W T F S S

Events in roman type are open to the public
Events in italic type are open to the Caltech community only

Monday, March 5

Control and Dynamical Systems Seminar
102 Steele, 11 a.m.—Topic to be announced. Professor Miroslav Krstic, department of mechanical and aerospace engineering, UC San Diego.

Aeronautics Seminar
101 Guggenheim Laboratory, 1 p.m.—“Aerodynamics of Low Power,” Paul MacCready, AeroVironment, Inc.

Geological and Planetary Sciences Seminar
155 Arms, Robert Sharp Lecture Hall, 4 p.m.—“What Do Nd and Sr Isotopes in Marine Sediments Tell Us About Late Pleistocene to Holocene Changes in the ‘Great Ocean Conveyor’?”, Steven L. Goldstein, associate professor of geochemistry, Lamont-Doherty Earth Observatory. Refreshments, 151 Arms, 3:45 p.m.

Inorganic-Electrochemistry Seminar
147 Noyes, Sturdivant Lecture Hall, 4 p.m.—“The Utilization of Metal Nitrosyl Complexes,” Professor Peter Legzdins, department of chemistry, University of British Columbia.

Applied and Computational Mathematics Colloquium
306 Firestone, 4:15 p.m.—“The Immersed Boundary Method for Biological Fluid Mechanics,” Charles Peskin, professor of mathematics, Courant Institute of Mathematical Sciences, New York University. Refreshments, 204 Firestone, 3:45 p.m.

Astronomy Tea Talk
106 Robinson, 4:15 p.m.—Topic to be announced. Adwin Boogert, postdoctoral scholar in physics, Caltech.

Tuesday, March 6

Carnegie Observatories Colloquium
William T. Golden Auditorium, 813 Santa Barbara Street, 4 p.m.—“The Nature of the Submillimeter-Luminous Galaxy Population,” Dr. Scott Chapman, Carnegie Observatories. Information: 577-1122.

Chemical Physics Seminar
147 Noyes, Sturdivant Lecture Hall, 4 p.m.—Topic to be announced. Dr. Daniel Rugar of IBM’s Almaden Research Center.

Wednesday, March 7

Biolunch Seminar
24 Beckman Labs, noon—“Fly Caspases: What, Where, and Why?”, Jun Ryul Huh, graduate student in biology, Caltech.

Mathematical Physics Seminar
351 Sloan, noon—“Critical Percolation in the Plane, II,” by Stanislav Smirnov, instructor in mathematics, Caltech. Information: www.math.caltech.edu/events/mathphys.html.

Chemical Physics Seminar
147 Noyes, Sturdivant Lecture Hall, 2:15 p.m.—“Multidimensional Femto-second Coherent Spectroscopies of Polypeptides, Dendrimers, and Biological Complexes,” Shaul Mukamel, professor of chemistry, University of Rochester.

Astronomy Colloquium
155 Arms, Robert Sharp Lecture Hall, 4 p.m.—Topic to be announced. Steven Beckwith, director, Space Telescope Science Institute, and professor of physics and astronomy, Johns Hopkins University.

Environmental Engineering Science and Global Environmental Science Seminar
142 Keck, 4 p.m.—“The Impacts of Land Use/Land Cover Change on Regional and Global Hydroclimatology,” Roni Avissar, director, Center for Environmental Prediction, Rutgers University. Refreshments, 3:45 p.m.

Geology Club Seminar
151 Arms, Buwalda Room, 4 p.m.—“Constraints on Volcanic Plumbing Systems from Time-Dependent Deformation Measurements,” Paul Segall, professor of geophysics, Stanford University. Information: www.gps.caltech.edu/seminars/geoclub/geoclub.html.

Organic Chemistry Seminar
147 Noyes, Sturdivant Lecture Hall, 4 p.m.—“Emulating Nature’s Efficiency in the Synthesis of Bioactive Natural Products,” Professor Erik J. Sorensen, Scripps Research Institute.

Thursday, March 8

Chemical Engineering Seminar
106 Spalding, Hartley Memorial Seminar Room, 4 p.m.—Topic to be announced. Professor Yanis Yortsos, department of chemical engineering, USC. Refreshments, 113 Spalding, 3:30 p.m. Information: www.cheme.caltech.edu/seminars/seminars.html.

Geology Club Seminar
151 Arms, Buwalda Room, 4 p.m.—“Significance of Cocos Plate Structure on the Middle America Subduction Factory,” Professor Eli Silver, department of earth sciences, UC Santa Cruz. Information: www.gps.caltech.edu/seminars/geoclub/geoclub.html.

Physics Research Conference
201 E. Bridge, 4 p.m.—“The Origin of the Hubble Sequence,” Richard Ellis, professor of astronomy and director of Palomar Observatory, Caltech. Refreshments, 110 East Bridge, 3:45 p.m.

Science, Ethics, and Public Policy Seminar
25 Baxter, 4 p.m.—“Einstein and the Canon of Mathematical Simplicity,” Professor John D. Norton, chair, department of history and philosophy of science, University of Pittsburgh. Refreshments.

Friday, March 9

Geological and Planetary Sciences Seminar
155 Arms, Robert Sharp Lecture Hall, 11 a.m.—“Potamochemistry and Erosion,” Claude J. Allègre, Moore Distinguished Scholar, Caltech.

Fluid Mechanics Film Series
306 Firestone, 1 p.m.—“Turbulence,” prepared by Professor Robert W. Steward, University of British Columbia.

Fluid Mechanics Seminar
101 Guggenheim Laboratory, 3 p.m.—“Subcritical Transition to Turbulence in Channel Flows,” S. J. Chapman, professor of mathematics and its applications, Oxford Centre for Industrial and Applied Mathematics, Oxford University. Information: www.galcit.caltech.edu/Seminars/Fluids/CurrentFluids/index.html.

Biomedical Engineering 0.1 Seminar Series
Baxter Lecture Hall, 4 p.m.—“Developing a Neural Prosthesis for Reaching,” Richard A. Andersen, James G. Boswell Professor of Neuroscience, Caltech; and Joel W. Burdick, professor of mechanical engineering, Caltech. Information: www.cco.caltech.edu/~koonin/0_1seminars.html.

Inorganic-Organometallics Seminar
151 Crellin, 4 p.m.—“Chromium Corroles as Oxygen Atom Transfer Reagents,” Alexandre Meier-Callahan, graduate student in chemistry, Caltech.

CampusEvents

Monday, February 26

Badminton
Brown Gymnasium, 9:30 a.m. to noon—Bring your own racket. Information: 355-6158.

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

Auditions for TACIT Spring Play
Ramo Auditorium, 7 to 9:30 p.m.—Auditions for TACIT's spring-term production of Luigi Pirandello's *Six Characters in Search of an Author* are open to all members of the Caltech community. Information: 395-6259.

Ballroom Dance Club
Winnett lounge, 7:30 to 9:30 p.m.—Hustle for beginners. Third of four weekly classes. No partner or experience required. Refreshments. Information: 791-3103 or www.its.caltech.edu/~ballroom/index.html.

Ballroom Mini Dance Party
Winnett lounge, 9 to 11 p.m.—Open dancing; make requests or bring your own music. Refreshments. No admission charge and no partner needed. Information: 791-3103 or www.its.caltech.edu/~ballroom/index.html.

Tuesday, February 27

Caltech Y Friends Dinner
Athenaeum, 6:30 to 9 p.m.—Friends' contributions have provided a financial core for the Y to enable students to learn how they can make a difference in the world. Reservations: 395-6163.

Auditions for TACIT Spring Play
Ramo Auditorium, 7 to 9:30 p.m.—Auditions for TACIT's spring-term production of Luigi Pirandello's *Six Characters in Search of an Author* are open to all members of the Caltech Community. Information: 395-6259.

Wednesday, February 28

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

Ballroom Dance Club
Winnett lounge, 7:30 to 9:30 p.m.—Waltz for beginners. Third of four weekly classes. No partner or experience required. Refreshments. Information: 791-3103 or www.its.caltech.edu/~ballroom/index.html.

Jazz Dance Class
Braun Athletic Center, aerobics room, 9 p.m.—A free jazz dance class for beginners, sponsored by the Caltech Dance Troupe. No special clothing or shoes are required. Open to all adult members of the Caltech community. Information: 395-2508 or troupe@caltech.edu.

Friday, March 2

Badminton
Brown Gymnasium, 9:30 a.m. to noon—Bring your own racket. Information: 355-6158.

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

Caltech Environmental Task Force
Chandler Dining Hall, noon—Members of the Caltech community and interested public are welcome to discuss campus, community, and global environmental concerns. Look for the CETF sign on an outside table between Chandler and the Red Door.

Caltech Y Noon Concert
Winnett quad, noon—Eleni Kelakos, a Los Angeles-based singer and songwriter, will perform. Information: www.y.caltech.edu/.

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

Othello
Ramo Auditorium, 7:30 to 10:30 p.m.—Theater Arts at Caltech presents the play by William Shakespeare. 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, March 3

Baseball
vs. University of La Verne, doubleheader, 11 a.m.

Men's and Women's Track and Field
at Pomona-Pitzer, SCIAC four-way meet, 11 a.m.

Ballet Dance Class
Braun Athletic Center, aerobics room, 1 to 4 p.m.—A free ballet class, sponsored by the Caltech Dance Troupe. Beginners: 1 to 2 p.m. Intermediate: 2 to 3 p.m. Advanced: 3 to 4 p.m. No special clothing or shoes are required for the beginners' class. Open to all adult members of the Caltech community. Information: 395-2508 or troupe@caltech.edu.

Auditions for TACIT Spring Play
Ramo Auditorium, 2 to 4:30 p.m.—Auditions for TACIT's spring-term production of Luigi Pirandello's *Six Characters in Search of an Author* are open to all members of the Caltech Community. Information: 395-6259.

Rainforest Odyssey
Beckman Auditorium, 2 p.m.—A magical journey through different levels of life in a tropical rain forest, performed by the graceful and inspirational David Taylor Dance Theatre dancers. 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.

Othello
Ramo Auditorium, 7:30 p.m.—Theater Arts at Caltech presents the play by William Shakespeare. 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, March 4

Othello
Ramo Auditorium, 2 p.m.—Theater Arts at Caltech presents its final performance of the play by William Shakespeare. 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.

Coleman Chamber Concert
Beckman Auditorium, 3:30 p.m.—The Ahn Trio, winner of the 1991 Coleman-Barstow Award for Strings, will perform Mozart, Musto, and Dvorák. 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, March 5

Badminton
Brown Gymnasium, 9:30 a.m. to noon—Bring your own racket. Information: 355-6158.

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

Ballroom Dance Club
Winnett lounge, 7:30 to 9:30 p.m.—Hustle for beginners. Last of four weekly classes. No partner or experience required. Refreshments. Information: 791-3103 or www.its.caltech.edu/~ballroom/index.html.

Ballroom Mini Dance Party
Winnett lounge, 9 to 11 p.m.—Open dancing; make requests or bring your own music. Refreshments. No admission charge and no partner needed. Information: 791-3103 or www.its.caltech.edu/~ballroom/index.html.

Wednesday, March 7

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

Ballroom Dance
Winnett lounge, 7:30 to 9:30 p.m.—Waltz for beginners. Last of four weekly classes. No partner or experience required. Refreshments. Information: 791-3103 or www.its.caltech.edu/~ballroom/index.html.

Friday, March 9

Badminton
Brown Gymnasium, 9:30 a.m. to noon—Bring your own racket. Information: 355-6158.

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

Baseball
vs. DeSales University (formerly Allentown College), doubleheader, 2:30 p.m.

End-of-Term Ballroom Dance Party
Winnett lounge, 8 to 11:45 p.m.—Dance the hustle, cha-cha, fox-trot, waltz, tango, rumba, salsa, East Coast swing, and more. The party is free, and no partner or experience is required. Refreshments. Information: 791-3103 or www.its.caltech.edu/~ballroom/index.html.

Caltech-Occidental Symphony
Ramo Auditorium, 8 p.m.—Caltech-Occidental Symphony Orchestra performs Beethoven's *Egmont* Overture, William Walton's *Viola Concerto*, and Dvorák's *Symphony No. 8*. Information: 395-4652 or www.music.caltech.edu/.

Saturday, March 10

Men's and Women's Track and Field
Ben Brown Invitational, at Cal State Fullerton, 10 a.m.

Baseball
vs. alumni, 2 p.m.

Caltech Y Decompression
Winnett quad, 7 to 11 p.m.—The Caltech Y's end-of-term, prefinals celebration. Information: 395-6493 or www.y.caltech.edu/calendar/.

Celtic Roots
Beckman Auditorium, 8 p.m.—The Renaissance group Hesperus, performing with Scottish fiddler Bonnie Rideout, will explore the roots of Scots-Irish traditional music in a rich medieval and folk style. 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.

Occidental-Caltech Symphony
Thorne Hall, Occidental College, 8 p.m.—Occidental-Caltech Symphony Orchestra performs Beethoven's *Egmont* Overture, William Walton's *Viola Concerto*, and Dvorák's *Symphony No. 8*. Information, 395-4652 or www.music.caltech.edu/.

Sunday, March 11

Skeptics Society Lecture
Baxter Lecture Hall, 2 p.m.—“Mesmerized! Science, Pseudoscience, and Powers of Mind in Victorian Britain,” Alison Winter, associate professor of history, Caltech. 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.

Paco A. Lagerstrom Chamber Music Concert
Dabney Lounge, 3:30 p.m.—Susan Greenberg, flute; Belinda Broughton, violin; Simon Oswell, viola; and Ronald Leonard, cello, will perform works by Mozart, Beethoven, and Dohnányi, as well as the world premiere of a quartet for flute and strings by Bruce Broughton. Tickets and information: 395-4652, 1(888) 2CALTECH, or events@caltech.edu. Individuals with a disability: 395-4688 (voice) or 395-3700 (TDD). Visit Public Events at www.events.caltech.edu.

Caltech Y Decompression
Winnett quad, 7 to 11 p.m.—The Caltech's end-of-term, prefinals celebration. Information: 395-6493 or www.y.caltech.edu/calendar/.



Caltech junior Michael Shulman (Roderigo), left, and grad student Adam Burgasser (Lieutenant Cassio) battle it out in TACIT's production of *Othello*, running through March 4.

Remembering Harold Wayland

A memorial service for J. Harold Wayland, professor of engineering science, emeritus, was held in Dabney Lounge on January 29. Wayland died October 10 at the age of 91.

Wayland was a member of the Caltech family for 65 years, noted George Housner, Braun Professor of Engineering, Emeritus, whose own friendship with him went back 50 years. Wayland earned his PhD from Caltech in 1937 and, after service in the Navy, returned to join the faculty in 1949. He was appointed full professor in 1957 and retired as professor emeritus in 1979.

Also speaking at the memorial service was another longtime friend, Bill Pickering, professor of electrical engineering, emeritus, and former director of JPL, who recalled first meeting Wayland when they were both graduate students in the mid '30s. They and their families remained close over the following decades.

Wayland's research focused on micro-circulation, in particular the flow of blood through capillaries. He was a "pioneer in what we now call bioengineering," said Housner. Several of his former colleagues—including Yuan-Cheng Fung, PhD '48, who went on to establish UC San Diego's department of bioengineering—spoke at the memorial on Wayland's crucial role in founding this field.

Both Pickering and Ward Whaling, professor of physics, emeritus, remarked on Wayland's interests in music and art—and food and wine. His elegant "private" dinners at the wineless, plain-food Athenaeum of the '50s paved the way for the Athenaeum's reputation for fine dining today, said Whaling. "I think Harold would count that as one of his worthy accomplishments."

Fairchild, from page 1

According to Caltech president David Baltimore, "Caltech is fortunate to have a long relationship with the Sherman Fairchild Foundation through which many of our most outstanding scientists have benefited. The foundation's exceptional commitment and foresight have ensured that our postdoctoral scholars have sufficient resources available to them so that they can achieve their maximum potential."

The foundation was incorporated in 1955 by Sherman Fairchild, inventor of the Fairchild aerial camera, chairman of Fairchild Camera Instrument Co. and of Fairchild Hiller Corp., owner of Fairchild Recording Equipment Co., and a director of IBM.

Stevenson, from page 1

success in avoiding such routine, noting the increase in the class's enrollment, from 20 students at its start to 165 this year.

The Feynman Prize is made possible by the generosity of an endowment from lone and Robert E. Paradise. It is named in honor of the late Caltech Nobel laureate and popular science author, who was lauded for his innovative classroom lectures on physics. The prize is given each year to a Caltech professor who demonstrates exceptional ability, creativity, and innovation in both laboratory and classroom instruction.

The selection committee cited Stevenson's "lucid and enthusiastic" teaching style, along with his ability to bring together concepts from evolution, biology, and chemistry, thus making Geology 1 "unlike any other course of its kind in the world." Stevenson also incorporated the use of small group projects, each led by an individual professor, along with field trips to give students the opportunity for firsthand observation. The result, the committee noted, was to create "a lasting impression of how geology research is done, how our Earth was created, and how our environment evolves."

Stevenson notes that teaching is also helpful to him. "Teaching helps the teacher as well as the student. This is especially true of people who are more theoretically inclined in their research"—Stevenson doesn't have a lab—"because that kind of research is helped by looking at things with a fresh approach."

He admits, too, that teaching can also be fun: "You can think of different applications of the ideas, how it relates to current research, and how it can be valuable to a nonexpert."

Stevenson's own research efforts concerning the origin, evolution, and structure of planets, including Earth, are noteworthy as well. In 1998, the American Geophysical Union awarded him its Harry H. Hess Medal for outstanding achievements in the research of the constitution and evolution of Earth and its sister planets. In addition, in 1993 Stevenson was elected as a fellow of the Royal Society, the United Kingdom's national academy of science, in recognition of his scientific excellence and work of distinction.

Campus numbers to know

Campus emergencies: ext. 5000

Disaster information: (888) 427-7465

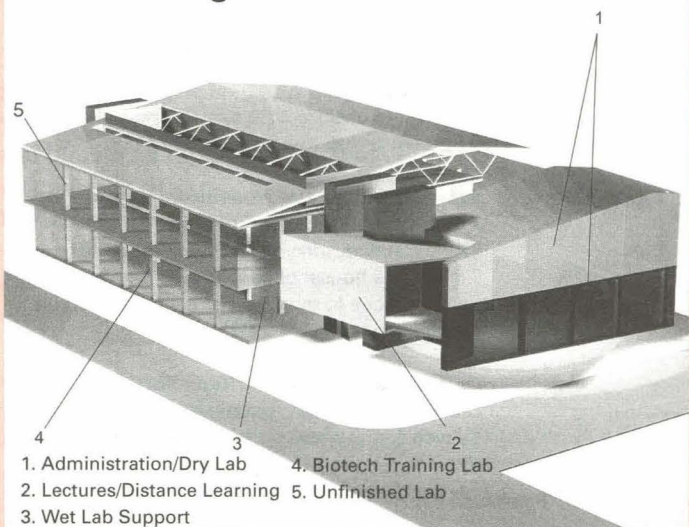
For campus updates following an earthquake or other local disaster

Ombuds Office: ext. 6990 Confidential help in resolving work-related issues

Staff and Faculty Consultation Center: ext. 8360 Confidential consultations for personal and growth-related issues

NewsExtras

Proposed Pasadena Bioscience and Training Center



1. Administration/Dry Lab
2. Lectures/Distance Learning
3. Wet Lab Support
4. Biotech Training Lab
5. Unfinished Lab

Courtesy of California State University

Pasadena proposed for biotech center

A study released at a February 12 press conference named Pasadena as an ideal site for a world-class biotechnology center. Conceived by state senator Jack Scott (D-Pasadena) and commissioned by the California State Legislature, the study was prepared by a committee of representatives from Caltech, Pasadena City College, and California State University; city and state officials; and science and business professionals.

The proposed \$20 million center would include research labs, a business incubator, and a workforce training center, all with an emphasis on bioinformatics—the blending of computer science and biotechnology. In choosing the best Los Angeles-area location for the center, the committee cited Pasadena for its high quality of life, the existing biotechnology corridor along Raymond and South Fair Oaks avenues, and the presence of Caltech and JPL. The center could help to position the city as the newest hub in the competitive, high-growth biotech industry by producing skilled workers at all levels, as well as supporting new businesses.

President David Baltimore said, "My interest in being here is because Caltech supports the dream of seeing Pasadena spoken in the same breath with Silicon Valley and San Diego . . . where technologies are born and where technologies are nurtured." He noted that the Institute has spun off some two dozen companies in the past year, and that both Caltech and JPL "will need workers to bring economic development from intellectual energy."

Other Caltech personnel involved with

the project are John Baldeschwieler, Johnson Professor and Professor of Chemistry, Emeritus; Hall Daily, assistant vice president and director of government relations; Sandra Ell, treasurer and chief investment officer; William Goddard, Ferkel Professor of Chemistry and Applied Physics; and John Richards, professor of organic chemistry and biochemistry.

According to the report, the next step in bringing the project to fruition will be to develop partnerships between local educational institutions, bioscience companies, government, and corporate and private investors. "The realization of this center will require considerable leadership, partnering, and buy-in by local industry," the study noted.

The luck o' the Irish



Bob O'Rourke, left, Caltech associate vice president for institute relations, got to meet *Angela's Ashes* author Frank McCourt during the latter's recent visit as a City of Pasadena Distinguished Lecturer.

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