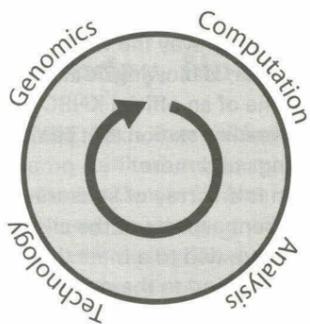


Caltech 336

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

The campus community biweekly

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Systems biology may aid prevention

The dream of monitoring a patient's physical condition through blood testing has long been realized. But how about detecting diseases in their very early stages, or evaluating how illnesses are responding to treatment, with no more to work with than a drop of blood?

That dream is closer to realization than many of us think, according to several leading experts advocating a new approach known as systems biology. Writing in a recent issue of the journal *Science*, Institute for Systems Biology immunologist and technologist Leroy Hood and Caltech chemist Jim Heath and their colleagues explain how a new approach to the way that biological information is gathered and processed could soon lead to breakthroughs in the prevention and early treatment of a number of diseases.

The lead author of the *Science* article is Leroy Hood, a former Caltech professor and now the founding director of the Institute for Systems Biology in Seattle. According to Hood, the focus of medicine in the next few years will shift from treating disease—often after it has already seriously compromised the patient's health—to preventing it before it even sets in.

Hood explains that systems biology essentially analyzes a living organism as if it were an electronic circuit. This approach requires a gigantic amount of information to be collected and processed, including the sequence of the organism's genome, and the messenger RNAs and proteins that it generates. The object is to understand how all of these molecular components of the system are interrelated, and then predict how the mRNAs or proteins, for example, are affected by disturbances such as genetic mutations, infectious agents, or chemical carcinogens. Therefore, systems biology should be useful for diseases resulting from genetics as well as from the environment.

Heath and his colleagues write in the *Science* article that, with a sufficient number of measurements of a patient's blood, "one can presumably identify distinct patterns for each of the distinct types of a particular cancer, the various stages in the progression of each disease

see *Systems biology*, page 6

Faster, simpler carbs All in the family

Even as many Americans have avoided carbs like the plague, Caltech grad student Alan Northrup and professor of chemistry David MacMillan have been pumping them out more quickly and efficiently.

The pair have streamlined the manufacturing of carbohydrate molecules to just two steps—a huge improvement over current methods requiring up to a dozen steps. The new strategy should benefit chemists and biologists, as well as scientists in the pharmaceutical industry.

MacMillan and Northrup describe their success in "Two-Step Synthesis of Carbohydrates by Selective Aldol Reactions," published in the September 17 issue of the journal *Science*.

"The issue with carbohydrate utilization is that, for the last 100 years, scientists have needed many chemical reactions to differentiate five of the six oxygen atoms present in the carbohydrate structure," explains MacMillan,

see *Carbs*, page 6

Books for Ethiopia

Twenty years after the famine, the name Ethiopia may still conjure images of a far-away country mired in strife, its residents gripped by hunger, its farmlands as dry as dust. But times and conditions have changed in this east African nation, and its name should now summon images of people eager for the tools to lead their nation to modernity.

It is these students whom the Caltech Y seeks to reach, not with thousands of dollars, but with thousands of books. Working with Azusa Pacific University, the Y has appealed to the Caltech community for help to reach a donation goal of 10,000 texts.

These textbooks will fill a new library that will be built in the capital of Addis Ababa, says Jerry Houser, director of Caltech's career development center. Houser, an adjunct professor at Azusa Pacific University, spent the past summer teaching a career-development class there.

"When I heard they were building a library, I thought, this is what the Y does," Houser recalls, referring to the Caltech Y's Alternative Spring Break. For many years, students have collected donations and taken them to the people of Tecolote, Mexico, and of the Navajo Nation.

The library is the brainchild of Badeg Bekele, an Ethiopian who is studying toward a doctorate in the United States. Back home, he has applied his Western-style leadership skills to found children's schools, medical facilities, and now the library. Bekele has done this through the International Leadership Institute, which has

see *Ethiopia*, page 6



Sydney Garstang

Witches waged battle with a crazed clown, an apple-cheeked princess, and a leggy bag of groceries recently at the Caltech Bookstore's Halloween costume contest. The winner for most creative costume took home tickets to Disneyland. Hint: she shops at Vons.

TACIT presents *The Misanthrope*

Lessons and laughter will be handed out in equal measure this month within the cozy ambience of Dabney Lounge, in the Theater Arts at Caltech (TACIT) production of Molière's *The Misanthrope*.

"There's something to offend almost everyone," TACIT director Shirley Marneus says of the social satire. Like many TACIT productions, this one includes unique adaptations that suit it to an international cast, such as a setting updated from high-society Paris of the 1600s to what manager Gavin Claypool describes as a 1930s, Monte Carlo-like world of socialites—the "yacht set." But the themes of wealth, privilege, and decadence remain the same.

The production will use a "witty and incisive" English verse translation by Richard Wilbur that is faithful to the rhyme scheme of Molière's original—an integral part of its appeal, says Marneus, "such that if you delete [the rhyme], you've taken the barb off the fishhook. It's what sharpens or 'sets' the humor."

And that humor "is not particularly sentimental," Marneus says. "It doesn't matter if you're a nice person. If you're silly, you're silly. The humor is based

see *TACIT*, page 6

Biologists pursue a new tactic

In response to the arduously slow progress in finding cures for AIDS and cancer, Caltech researchers are now investigating a promising new approach in the treatment of these diseases.

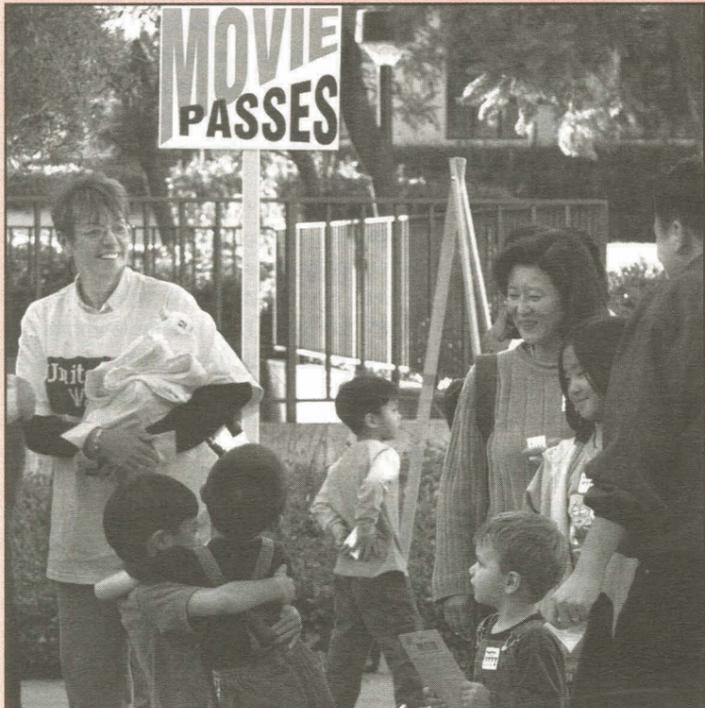
With a \$1.5 million matching grant from the Skirball Foundation in New York, Caltech biologists have established the Engineering Immunity project, designed to create a novel immunological approach to treating—and even some day preventing—HIV infection and some cancers like melanoma.

The immune system provides humans with a powerful defense against infectious diseases—but sometimes, it fails. Utilizing an innovative, integrated approach, the Engineering Immunity project will combine gene therapy, stem-cell biology, and immunotherapy to arm the immune system. This integrative methodology offers groundbreaking potential for treatment of these diseases and others for which the immune system currently fails to provide defense.

"The Engineering Immunity project advocates a new approach to therapy for AIDS and cancer with revolutionary implications for the treatment of these and many other diseases," says Caltech president David

see *Cancer*, page 6

NewsBriefs



Children of all ages and sizes came out in force for dinner and a screening of *Shrek 2* at the recent United Way Family Night. The annual event, which takes place in and around Beckman Auditorium, kicks off the agency's fundraising campaign at the Institute.

Personals

Welcome to Caltech

September

Postdoctoral scholars **Sean Crockett**, in the Social and Information Sciences Laboratory, **Sebastian Els**, in astronomy, **Shyam Krishnan**, in chemistry, and **Cedric Langbort**, in the Center for the Mathematics of Information; **Evgueniy Lubenov**, visitor in biology; **Daniel Marco**, postdoctoral scholar in the Center for the Mathematics of Information; **Alberto Tarancon Rubio**, visitor in materials science; **Sofia Vrontou**, postdoctoral scholar in biology.

October

Allison Artiaga, server, Dining Services; postdoctoral scholars **L. Ryan Baugh**, **Shlomo Ben-Tabou de-Leon**, and **Smadar Ben-Tabou de-Leon**, all in biology, and **Cecile Marie Cabanes**, in JPL's ocean sciences element; **Georges Chan**, senior business systems, Administrative Technology Center; **Jihyun Choi**, visitor in physics; **Razvan Cristescu**, postdoctoral scholar in the Center for the Mathematics of Information; **Juan De La Torre**, assistant materiel handler, Student Affairs; **Roxana Diaconescu**, postdoctoral scholar in the Center for Advanced Computing Research; **Odysseas Dionatos**, visitor in physics; **Peter Doucette**, postdoctoral scholar in biochemistry; **Carmen Flores**, custodian, Facilities Management; **David Gultekin**, MRI technologist, biology; postdoctoral scholars **Scott Habershon** and **Andrew Harned**, both in chemistry, **Patrice Hauret**, in aeronautics, and **Hongyi Hou**, in chemistry; **Kevin Isacson**, chef de cuisine, Athenaeum; **Yindi Jing**, postdoctoral scholar in electrical engineering; **Andrea Klein**, server, Dining Services; **Israel Klich**, Sherman Fairchild Postdoctoral Scholar in Theoretical Astrophysics; postdoctoral scholars **Aharon Lavi**, in the Social and Information Sciences Laboratory, **Gene Lee**, in chemistry, **Thomas Leung** and **Jonathan Moore**, both in biology, **Ylva Pihlstrom**, in astronomy, **Heather Pinkett**, in biochemistry, **Stefano Pironio**, in physics, **Ashwin Ramasubramanian**, in aeronautics, and **Manish Rawat** and **Tobias Ritter**, both in chemistry; **Fabian Santos**, housing custodian, Facilities Management; **Taro Sasa**, postdoctoral scholar in chemistry; custodians **Apolinar Serrano** and **Blanca Rosa Sibrian**, in Facilities Management; **Oddvar Spjeld**, research engineer, physics, mathematics and astronomy; **Mark Stalzer**, executive director, Center for Advanced Computing Research; **Gary Stowell**, maintenance services associate, biology; **Hiroki Sugiura**, visitor in bioengineering; **William Terry**, project research analyst, Office of the President; **Marck Turner**, software engineer, geological and planetary sciences; **Isidoro Urbina Jr.**, server, and **Robert Vance**, JPL floating cook, both in Dining Services; postdoctoral scholars **Frank Verstraete**, in the Center for the Physics of Information, **Reto Wyss**, in biology, and **Qingsong Zhang**, in chemistry.

Honors and awards

Clive Dickinson, who joined Caltech in June as a postdoctoral scholar in astronomy, has won the Royal Astronomical Society's 2004 Michael Penston Astronomy Prize, awarded for the best United Kingdom doctoral thesis in astronomy or astrophysics. Dickinson received the honor for his thesis "Diffuse Galactic Radiation and Its Application to CMB Observations." He obtained his PhD in 2002 from the University of Manchester, Jodrell Bank Observatory.

Charles Elachi, Caltech vice president, director of the Jet Propulsion Laboratory, and professor of electrical engineering and planetary science, has received the NASA Outstanding Leadership Medal for "outstanding leadership of the Jet Propulsion Laboratory, whose legacy of excellence in planetary exploration continues with the awe-inspiring Spirit and Opportunity missions to Mars." A member of the National Academy of Engineering and a fellow of the IEEE and the American Institute of Aeronautics and Astronautics, Elachi has worked at Caltech/JPL since 1971, the year he received his Caltech PhD in electrical engineering.

Yuk Yung, professor of planetary science, received one of three NASA Exceptional Scientific Achievement Medals given out on October 12. The citation read: "For your original thinking that has contributed to our knowledge about the Earth and the solar system through basic scientific research and developing new approaches for scientific study." Yung received his BS from UC Berkeley in 1969 and his PhD from Harvard in 1974. After coming to Caltech in 1976 as a visiting associate, he was appointed assistant professor in 1977. He became full professor in 1986.

Lynn Bryant, administrator and senior budget manager in Development and Alumni Relations, has been installed as president of the L.A. chapter of Executive Women International. Founded in California in 1938, EWI has as members over 3,500 companies and 4,000 representatives, in 85 chapters in the United States, Canada, and Europe. "EWI is the premier organization for networking and leadership development for today's professional businesswomen and their firms."

New: Citrus Bistro

The maître d' leads diners to their tables, waiters dash to and fro with plates of hot food, and water glasses are graciously filled throughout one's meal, all under a large spray of fresh-cut flowers. It's the kind of lunch one can expect at Citrus Bistro.

At the latest Caltech Dining Services venture, it's California-Mediterranean fusion at cafeteria prices. Located in Avery Center, the new eatery offers a choice of dishes like seared salmon, braised short ribs, and buffalo-milk mozzarella lasagna. It's a younger, lighter version of the Athenaeum faculty club.

According to André Mallié, director of the Institute's dining services, the bistro is what Caltech's lunch bunch asked for. The results of a survey conducted last summer showed that people yearned for something with a little more café ambience to replace the Avery Center restaurant.

"We got our survey results in mid-summer and from that we were able to implement the process of getting the restaurant open," Mallié says. Citrus Bistro opened on September 27 to little fanfare, he adds, in order to coordinate everyone's roles, from the kitchen to the waiters. Once everything runs smoothly, he says, the restaurant will be publicized to the campus.

From a visit to the restaurant, one can infer that Caltech diners asked for fine food and a variety of it, a troupe of uniformed waitstaff, a selection of pastries, and even details like napkins and tablecloths made of real fabric.

Meals are chosen from menus, and diners are seated in the expanse of the main room, outside in the airy patio, or high above in the loft area. Gone are the lines for drinks and food that one is likely to find at Chandler Dining Hall. Meals are delivered to one's table and dishes are whisked away, adding up to one of the more pleasant dining experiences in the entire zip code.

"I wrote the menu and work with the production staff," says Mallié. "The menu will change every month at the minimum because we want to follow the seasons of the year and the products that are available."

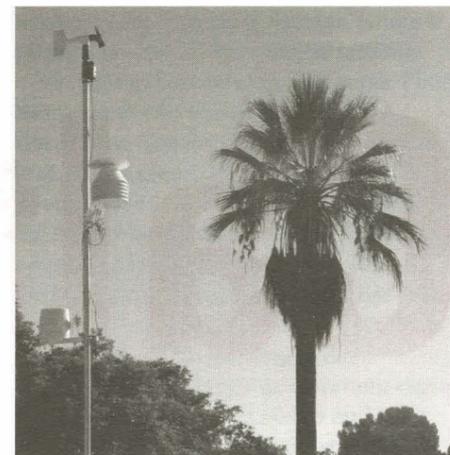
This attention paid to seasonal foods, in particular to the bounty of the Pasadena farmer's market, explains the heirloom tomato salad, the side of fall vegetables that accompanies the short ribs, and the asparagus tucked into the sandwiches.

The day-to-day operations are made possible through the efforts of the capable staff, Mallié adds. "There is a crew of eight waiters and a dining-room manager and five chefs in the back," he says. "It's quite a large support staff."

Despite all the improvements, the prices are kept reasonable. A recent lunch of pan-roasted New York strip steak was paired with a salad of Belgium endive and red oak leaf topped by warm slices of goat cheese. The meal, enjoyed on the sun-splashed patio, added up to \$13.75, not counting tip. The meal came with pommes frites and béarnaise sauce, and excluded a translator, but the waiters are knowledgeable.

Mallié explains that the low prices are made possible by Caltech's purchasing power, a fact that makes one thankful for economies of scale. "We want to deliver a good product at a decent price, and we hope to keep it that way," he says.

Citrus Bistro serves lunch from 11:30 a.m. to 1:30 p.m., weekdays only. The food is available to go, and nothing harder than espresso is served. It is located in Avery Center, near the corner of Holliston Avenue and Del Mar Boulevard. The restaurant accepts major credit cards. Reservations are recommended for large groups.



Whither the weather

Wondering if you'll need sunscreen, an umbrella, or a down jacket this weekend? Want to know which way the wind, and possibly your hair, is blowing? Caltech is now the home of an official KNBC-TV WeatherNet weather station that can tell you these things and more.

The station is an array of sensors that measure different aspects of the climate. These devices are tied to a mast that was recently attached to the roof of the carpentry shop. Their observations are fed to an onsite computer, and then the station's weather forecasters crunch the data. Caltech's WeatherNet station is identical to the ones scattered throughout Southern California that provide forecasters with a weather picture of the region.

The station provides temperature readings—current, high, and low—as well as wind direction and velocity, and humidity levels. These are the readings you'll get by watching, for example, Fritz Coleman during the weather segments. When he turns to conditions in Pasadena, he checks the readings at Caltech and a handful of area schools.

The online site also provides summaries of rainfall totals for the past 72 hours as well as the week, month, and year, plus the dew point. A WeatherNet public display hangs on a wall in the lobby of Campus Planning alongside plaques and awards. Visit www.instaweather.com/KNBC/default.asp?cid=90&id=PDNCL to get current conditions and extended forecasts for Pasadena, or log on to Caltech Today. The weather box is located just below the Featured Events section.

Loh tops thousands in contest

Taking second place among 7,500 top computer programmers from around the world, Caltech mathematics student Po-Ru Loh '07 brought home \$7,000 in Google Inc.'s second annual Code Jam competition. Loh was bested only by Sergio Sancho, a computer science student at the University of Buenos Aires, who took the \$10,000 first prize.

Promoted as "a celebration of the art of computer science," the Code Jam attracted participants from more than 100 countries. All entrants participated in an initial qualification round, with 500 going on to a two-round competition field. Google flew 50 finalists from round two to its Mountain View, California, headquarters last week to compete in the championship.

November 8–14, 2004

M T W T F S S

Monday, November 8

CNSE 10th Annual Industry Day
Ramo Auditorium, 8 a.m. to 6 p.m.—Caltech's Center for Neuromorphic Systems Engineering will hold its 10th Annual Industry Day on the theme of machine awareness and learning. "Towards Intelligent Machines" will feature presentations by Caltech faculty members on the latest results in various groundbreaking areas. Continues Tuesday, November 9, from 8:30 a.m. to 6 p.m. Information and registration: www.cnse.caltech.edu/Industry/Conferences/2004/AIC/index.html.

Biophysics Lecture Series
153 Noyes, Sturdivant Lecture Hall, 4 p.m.—"The Mysterious Meanderings of Myxobacteria," George Oster, professor of cell and developmental biology and of environmental science, policy and management, UC Berkeley.

High Energy Physics Seminar
469 Lauritsen, 4 p.m.—"Heavy Quark Symmetry in Isosinglet Nonleptonic B-decays," Sonny Mantry, MIT. Information: www.theory.caltech.edu/people/carol/seminar.html.

Applied Mathematics Colloquium
101 Guggenheim Lab, Lees-Kubota Lecture Hall, 4:30 p.m.—"Algebraic Geometry for the Multivariate Spline," Professor Ren-Hong Wang, Institute of Mathematical Sciences, Dalian University of Technology.

Tuesday, November 9

Institute for Quantum Information Seminar
74 Jorgensen, 3 p.m.—Topic to be announced. David Poulin, Institute for Quantum Computing, University of Waterloo.

Carnegie Observatories Colloquium Series
William T. Golden Auditorium, 813 Santa Barbara Street, 3:30 to 5 p.m.—"Plugging Away at Dwarf Galaxy Kinematics," Professor Mario Mateo, University of Michigan. Refreshments, 3:30 p.m.

General Biology Seminar
119 Kerckhoff, 4 p.m.—Topic to be announced. Janet Shaw, department of biology, University of Utah.

High Energy Physics Seminar
248 Lauritsen, 4 p.m.—"QCD Physics at the Tevatron," Associate Professor Andrey Korytov, physics department, University of Florida.

Wednesday, November 10

Environmental Science and Engineering Seminar
142 Keck, 3:40 to 5 p.m.—"Mechanistic and Structural Studies of Biogenic Manganese Oxides," Samuel Webb, beamline scientist, Stanford Linear Accelerator Center, Stanford Synchrotron Radiation Laboratory. Information: www.ese.caltech.edu/seminars/index.html.

Astronomy Colloquium
155 Arms, Robert Sharp Lecture Hall, 4 p.m.—Topic to be announced. Professor Reinhard Genzel, Max Planck Institute for Extraterrestrial Physics. Information: www.astro.caltech.edu/~gma/colloquia.html.

Information Science and Technology Seminar
080 Moore, 4 p.m.—Topic to be announced. Professor Eric Klavins, electrical engineering department, University of Washington.

Organic Chemistry Seminar
153 Noyes, Sturdivant Lecture Hall, 4 p.m.—"The Bioactive Conformation of Somatostatin; Design of Glucosidic Mimetics; and Radial Symmetry and Aromatic Electrostatic Potentials in Bioorganic Chemistry," Professor Ralph Hirschmann, department of chemistry, University of Pennsylvania.

Earnest C. Watson Lecture Series
Beckman Auditorium, 8 p.m.—"The Quest for Consciousness: A Neurobiological Approach," Christof Koch, Troendle Professor of Cognitive and Behavioral Biology and professor of and executive officer for computation and neural systems, 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, November 11

Caltech Library System Presents: Web of Knowledge
Sherman Fairchild Library, multimedia conference room, 2 to 3:30 p.m.—Learn to use the Caltech Library System's powerful new tool, the Web of Knowledge. Information: <http://library.caltech.edu/learning/default.htm>.

Biochemistry Seminar
147 Noyes, Sturdivant Lecture Hall, 4 p.m.—"Argonaute: The Secret Life of Slicer," Leemor Joshua-Tor, associate professor, Keck Structural Biology, Cold Spring Harbor Laboratory.

Physics Research Conference
201 E. Bridge, 4 p.m.—"Complexity," John Doyle, Braun Professor of Control and Dynamical Systems, Electrical Engineering, and Bioengineering, Caltech. Refreshments, 114 E. Bridge, 3:45 p.m.

Friday, November 12

High Energy Theory Seminar
469 Lauritsen, 11 a.m.—Topic to be announced. Professor Ofer Aharony, particle physics, Weizmann Institute of Science. Information: www.theory.caltech.edu/people/seminar/schedule.html.

High Energy Theory Seminar
469 Lauritsen, 1 p.m.—"Causality and Time in String Theory and String Field Theory," Ted Erler, department of physics, UC Santa Barbara. Information: www.theory.caltech.edu/people/seminar/schedule.html.

Center for the Mathematics of Information Seminar
239 Moore, 2:30 to 4 p.m.—"Computational Complexity in Robust Control Theory," Cedric Langbort, postdoctoral scholar, Center for the Mathematics of Information, Caltech. Information: www.cmi.caltech.edu/index.shtml.

Inorganic-Organometallics Seminar
151 Crellin, 4 p.m.—"Probing Protein Denatured-State Dynamics Using Electron-Transfer Kinetics," John Magyar, postdoctoral scholar in chemistry, Caltech.

Kellogg Seminar
Lauritsen Library, 4 p.m.—"The Electron-Antineutrino Correlation in Neutron Beta Decay," Professor Fred Wietfeldt, physics department, Tulane University.

the academic week at Caltech

is a printed version of selected events from the online master calendar,

<http://today.caltech.edu/calendar/>. To publish events online, register as an event planner on the Caltech Today calendar. If unable to submit electronically,

please call (626) 395-3630. For further information or a schedule of deadlines, call (626) 395-3630, fax (626) 449-2159, write *336 Calendar*, 1-71,

California Institute of Technology, Pasadena, CA 91125, or e-mail debbieb@caltech.edu.

November 15–21, 2004

M T W T F S S

Monday, November 15

Center for Neuromorphic Systems Engineering Seminar

24 Beckman Labs, 4 p.m.—Topic to be announced. Bill Kirkwood, associate director of engineering, Monterey Bay Aquarium Research Institute.

Geological and Planetary Sciences Seminar

155 Arms, Robert Sharp Lecture Hall, 4 p.m.—“Viewing Planetary Interiors through a Diamond Window,” Wendy Mao, department of geophysical sciences, University of Chicago.

High Energy Physics Seminar

469 Lauritsen, 4 p.m.—“Phenomenology of a Little Higgs with T-Parity,” Jay Hubisz, department of physics, Cornell University. Information: www.theory.caltech.edu/people/carol/seminar.html.

Kliegel Lecture in Engineering and Applied Science

Beckman Institute auditorium, 4 p.m.—“Is a Mathematical Theory of Cryptography Possible?,” James Massey, professor of digital technology, emeritus, ETH Zurich.

William Bennett Munro Memorial Seminar

Treasure Room, Dabney Hall, 4 p.m.—“The Emotional Basis of Morals,” Jesse Prinz, associate professor, department of philosophy, University of North Carolina, Chapel Hill.

Thesis Seminar

151 Crellin, 4 p.m.—“Atomistic Simulations of Macromolecules,” Youyong Li, graduate student in chemistry, Caltech.

Applied Mathematics Colloquium

101 Guggenheim Lab, Lees-Kubota Lecture Hall, 4:15 p.m.—“Graph Partitioning, Clustering with Qualitative Information, and Grothendieck-Type Inequalities,” Assaf Naor, Theory Group, Microsoft.

Tuesday, November 16

Computer Science Faculty Research Lecture Series

74 Jorgensen, noon—“Topics in Biomolecular Computation,” Erik Winfree, assistant professor of computer science and computation and neural systems, Caltech. Refreshments.

Carnegie Observatories Colloquium Series

William T. Golden Auditorium, 813 Santa Barbara Street, 3:30 to 5 p.m.—“The Evolution of Cluster Substructure,” Tesla Jeltema, Observatories of the Carnegie Institution of Washington. 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 Sutton, senior post-doctoral scholar, LIGO, Caltech.

Chemical Physics Seminar

147 Noyes, Sturdivant Lecture Hall, 4 p.m.—“Conformations and Aggregation States of Biologically Important Systems: Oligonucleotides, G-Quadruplexes, Peptides, and Proteins,” Michael Bowers, professor of chemistry, department of chemistry, UC Santa Barbara.

General Biology Seminar

119 Kerckhoff, 4 p.m.—Topic to be announced. David Baulcombe, Sainsbury Laboratory, section for plant genetics and gene expression, John Innes Center, England.

Political Economy Seminar Series

25 Baxter, 4 p.m.—Topic to be announced. Bill Bianco, associate professor of political science, Pennsylvania State University.

Wednesday, November 17

Environmental Science and Engineering Seminar

142 Keck, 3:40 to 5 p.m.—“The Structure and Origin of Southern California Climate Variations,” Alex Hall, assistant professor, department of atmospheric and oceanic sciences, UCLA. Information: www.ese.caltech.edu/seminars/index.html.

Astronomy Colloquium

155 Arms, Robert Sharp Lecture Hall, 4 p.m.—“The Role of Feedback in Galaxy Formation,” Dr. Crystal Martin, department of physics, UC Santa Barbara. Information: www.astro.caltech.edu/~gma/colloquia.html.

Information Science and Technology Seminar

080 Moore, 4 p.m.—“A New Look at Deep-Space Ranging,” James Massey, professor of digital technology, emeritus, ETH Zurich.

Thursday, November 18

Caltech Library System Presents: Business Resources

Sherman Fairchild Library, multimedia conference room, 2 to 3:30 p.m.—This class will focus on business research strategies and methods for finding information on companies and industries. Information: <http://library.caltech.edu/learning/default.htm>.

Chemical Engineering Seminar

106 Spalding Lab, Hartley Memorial Seminar Room, 4 p.m.—“Localization in the Immune System: A Surmountable Challenge to Design of Vaccines for Viruses and Cancers,” Professor Michael W. Deem, department of bioengineering, Rice University. Information: www.che.caltech.edu/seminars/index.html.

Physics Research Conference

201 E. Bridge, 4 p.m.—Topic to be announced. Professor Michael Luke, interim chair, theoretical particle physics, University of Toronto. Refreshments, 114 E. Bridge, 3:45 p.m.

Von Karman Lecture Series

JPL, von Karman Auditorium, 7 p.m.—“To See or Not to See: Tools for Early Detection, Diagnosis, and Prevention of Eye Disorders,” Dr. Wolfgang Fink, senior research scientist, JPL, and assistant professor of ophthalmology, USC. Admission is free. Information: www.jpl.nasa.gov/lecture.

Friday, November 19

Inorganic-Organometallics Seminar

151 Crellin, 4 p.m.—Topic to be announced. Irvin Lau, graduate student in chemistry, Caltech.

Kellogg Seminar

Lauritsen Library, 4 p.m.—“Underground Laboratory,” Professor Wick Haxton, Institute for Nuclear Theory, University of Washington.

Von Karman Lecture Series

Pasadena City College, 1570 E. Colorado, the Vosloh Forum (south of Colorado on Bonnie), 7 p.m.—“To See or Not to See: Tools for Early Detection, Diagnosis, and Prevention of Eye Disorders,” Dr. Wolfgang Fink, senior research scientist, JPL, and assistant professor of ophthalmology, USC. Admission is free. Information: www.jpl.nasa.gov/lecture.

CampusEvents

Tuesday, November 9

Changes and Trends in Today's English Usage

Brown Gym classroom, 8:30 a.m. to 4 p.m.—This one-day class can help reduce writing stress and improve the clarity of your written communications. This practical, hands-on workshop is designed to provide you with a quick and easy review of the current rules of good writing as they relate to your job. Registration: 395-8055 or diane.williams@caltech.edu.

Focus on Child Education Series

Winnett lounge, noon—"Unlocking your Child's Potential: Keys to Self-Motivation." Noted local child psychologist Enrico Gnautati, PhD, will speak to parents on navigating the precollege years. Dr. Gnautati brings a wealth of experience in child testing, educational assessment, and family and child psychotherapy.

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.

Ballroom Team Practice

Braun Gym, multipurpose room, 9 p.m.—Ballroom team practice is held each Tuesday. Sessions feature the assistance of a professional coach so that team members can get advice and tips to improve their dancing. Team membership is required, and there is a \$5 fee to enter the gym if you do not have Caltech/JPL-issued ID.

Wednesday, November 10

Office Ergonomics Training

118 Keith Spalding Building, noon—Low-budget techniques will be taught to assist computer users in adjusting their workstations to be more user-friendly. Registration: 395-6727.

Salsa Dance Classes

Winnett lounge, 7 p.m.—Learn the fundamentals of salsa dancing starting at 8:30 p.m. If you already know the basics, come to the intermediate class at 7 p.m. and learn Cuban rueda. Everyone is welcome to stick around for the free practice session at 10 p.m. Classes started on October 6. Cost: \$7 per class.

Thursday, November 11

Reel Women's Film Series: India—Holy Cow!

Caltech Women's Center, noon—Holly Morris travels to India and encounters remarkable women, including the first woman to reach the top of Mount Everest, a woman who risks her life to help women in a lower caste, and a sharp-shooting policewoman.

Planning Ahead for Your Retirement

Winnett clubroom #1, 1 p.m.—Vince Bishop, senior individual consultant, TIAA-CREF, will discuss the importance of organizing personal financial information, setting personal financial goals, and devising tolerable investing strategies to meet them.

Intermediate International-Style Ballroom Dance Class

Winnett lounge, 8 p.m.—This is the sixth class in an eight-week series. The first hour will cover standard ballroom and the second will feature the Latin style.

Friday, November 12

The Misanthrope

Dabney Lounge, 8 p.m.—Theater Arts at Caltech presents Molière's satiric play. (See Public Events contact information on this page.)

Saturday, November 13

Men's Soccer

vs. alumni, 11 a.m.

Belly-Dancing Classes

Braun Gym, multipurpose room, 12:45 p.m.—Learn to belly dance with Leela, a popular performer and instructor. Fee for trial class: \$5 for Caltech students, \$8 for others. Fee for full 8-week series: \$20 for Caltech students, \$50 for other Caltech community members.

Women's Basketball

vs. alumni, 3:30 p.m.

Caltech-Occidental Symphony Orchestra

Ramo Auditorium, 7:30 p.m.—The program features Mendelssohn's *Scottish* Symphony and Liszt's Piano Concerto no. 1, played by Caltech junior Kevin Peng, a winner of last year's Student Concerto Competition. Also included will be Strauss's Overture to *The Gypsy Baron*. A reception will follow the performance. (See Public Events contact information on this page.)

The Misanthrope

Dabney Lounge, 8 p.m.—Theater Arts at Caltech presents Molière's satiric play. (See Public Events contact information on this page.)

Sunday, November 14

A Woman's Best Defense

Caltech Women's Center, 1 to 5 p.m.—One in every three women in Los Angeles County will be assaulted in her lifetime. This is a frightening statistic, but each woman has the power to decrease her chances of becoming a victim of violent crime. This introductory workshop features skills for avoidance, deterrence, and resistance of physical and verbal assault. Reservations: 395-3221 or emery@studaff.caltech.edu.

The Misanthrope

Dabney Lounge, 2 p.m.—Theater Arts at Caltech presents Molière's satiric play. (See Public Events contact information on this page.)

Beginning International-Style Ballroom Dance Class

Winnett lounge, 4:30 p.m.—This is the sixth class in an eight-week series. No partner or previous experience is required.

Tuesday, November 16

Want to Be a Great Team Player?

Brown Gym classroom, 8:30 a.m. to 12:30 p.m.—This class will help nonsupervisory staff members develop skills as team members. Information and registration: http://cit.hr.caltech.edu/Education/non_super_courses/team_player.htm.

IFilm Screening: Lumumba

Beckman Institute auditorium, 8 p.m.—IFilm presents *Lumumba* (2000), a captivating movie about the first prime minister of independent Congo. Information: www.its.caltech.edu/~ifilm/HTML-Lumumba.html.

Ballroom Team Practice

Braun Gym, multipurpose room, 9 p.m.—Ballroom team practice is held each Tuesday. Sessions feature the assistance of a professional coach so that team members can get advice and tips to improve their dancing. Team membership is required, and there is a \$5 fee to enter the gym if you do not have Caltech/JPL-issued ID.

Wednesday, November 17

Watch Your Back! Back Safety Training

118 Keith Spalding Building, noon—This course includes a brief discussion on back anatomy and proper methods and realistic approaches to handling and moving materials. There will be a video presentation and hands-on lifting. Space is limited. Please call 395-6727 or e-mail safety.training@caltech.edu to reserve a place.

Salsa Dance Classes

Winnett lounge, 7 p.m.—Learn the fundamentals of salsa dancing starting at 8:30 p.m. If you already know the basics, come to the intermediate class at 7 p.m. and learn Cuban rueda. Everyone is welcome to stick around for the free practice session at 10 p.m. Classes started on October 6. Cost: \$7 per class.

Thursday, November 18

Caltech Architectural Tour

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.

The Great, the Good, and the Ugly: Explore the Key to Healthy Relationships

Caltech Women's Center, noon—Lita Mercado, of the Los Angeles Commission on Assaults Against Women, will discuss the components of healthy relationships, from value clarification to communication styles. Learn how to spot unhealthy relationships and develop the skills to do something about it for yourself, a family member, or a friend.

Intermediate International-Style Ballroom Dance Class

Winnett lounge, 8 p.m.—This is the seventh class in an eight-week series. The first hour will cover standard ballroom and the second will feature the Latin style.

Voices of Vision Series

Ramo Auditorium, 8 p.m.—Charles Phoenix presents "God Bless Americana," a "retro" holiday slide show featuring vintage family and travel slides that form a kaleidoscope of American culture from the '40s to the '60s. His witty observations and inspired narration blend the hysterical with the historical and the ironic with the iconic. No tickets or reservations are required.

Friday, November 19

PERT Training: Disaster Search and Rescue

Pasadena Civil Defense Center, 9 a.m. to 3 p.m.—Disaster Search and Rescue is the final of three required sessions of PERT (Pasadena Emergency Response Training). Offered in conjunction with the Pasadena Fire Department, Caltech Safety Office, and American Red Cross. Information: 395-6727 or safety.training@caltech.edu.

The Misanthrope

Dabney Lounge, 8 p.m.—Theater Arts at Caltech presents Molière's satiric play. (See Public Events contact information on this page.)

Saturday, November 20

Belly-Dancing Classes

Braun Gym, multipurpose room, 12:45 p.m.—Learn to belly dance with Leela, a popular performer and instructor. Fee for trial class: \$5 for Caltech students, \$8 for others. Fee for full 8-week series: \$20 for Caltech students, \$50 for other Caltech community members.

Mark Nizer: Juggling and Technology

Beckman Auditorium, 2 p.m.—Mark Nizer's Laser Diablo merges juggling, light, and technology. This event is suitable for ages 8 and older. (See Public Events contact information on this page.)

The Misanthrope

Dabney Lounge, 8 p.m.—Theater Arts at Caltech presents Molière's satiric play. (See Public Events contact information on this page.)

Sunday, November 21

The Misanthrope

Dabney Lounge, 2 p.m.—Theater Arts at Caltech presents Molière's satiric play. (See Public Events contact information on this page.)

Skeptics Society Lecture

Baxter Lecture Hall, 2 p.m.—"The Ancestor's Tale: A Pilgrimage to the Dawn of Evolution," Dr. Richard Dawkins, evolutionary biologist. Donation is \$8 for nonmembers and non-Caltech students. Free to the Caltech/JPL community. Tickets and information: 794-3119 or skepticmag@aol.com. Book signing to follow the lecture.

Coleman Chamber Concert

Beckman Auditorium, 3:30 p.m.—The Guarneri String Quartet will perform works by Mozart, Bridge, and Ravel. (See Public Events contact information on this page.)

Beginning International-Style Ballroom Dance Class

Winnett lounge, 4:30 p.m.—This is the seventh class in an eight-week series. No partner or previous experience is required.

Amnesty International Book Discussion Group

Vroman's Bookstore, 695 E. Colorado Boulevard, second floor, 6:30 p.m.—This month's book is *Triangle*, by David Von Drehle. All are welcome. Sponsored by Caltech/Pasadena AI Group 22. Visit Group 22 at www.its.caltech.edu/~aigp22.

Regular notices

Tuesdays

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: 584-0970 or kimdeman@yahoo.com.

Caltech Shorinji Kempo Club

Brown Gymnasium, 7 p.m.—Learn effective self-defense and martial arts. Sessions are free. No experience required. Wear comfortable clothing.

Caltech Tai Chi Club

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

Wednesdays

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. Stop by and make new friends from around the world. Information: 793-2535 or nancyhewett@earthlink.net.

Thursdays

Caltech Shorinji Kempo Club

Brown Gymnasium, 7 p.m.—Learn effective self-defense and martial arts. Sessions are free. No experience required. Wear comfortable clothing.

Fridays

Caltech Tai Chi Club

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

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: <http://www.its.caltech.edu/~citchess>.

Sundays

Caltech Shorinji Kempo

Braun Athletic Center, aerobics room, 3:30 p.m.—Learn effective self-defense and martial arts. Sessions are free. No experience required. Wear comfortable clothing.

Public Events Information and Tickets

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.

Carbs, from page 1

a specialist in organic synthesis. "We simplified this to two steps by the invention of two new chemical reactions that are based on an old but powerful chemical transformation known as the aldol reaction. Furthermore, we have devised methods to selectively build oxygen differentiated glucose, mannose, or allose in just two chemical steps."

MacMillan has also shown that the new method allows easy access to synthetic carbohydrates for use in medicinal chemistry, glycobiology, and diagnostic techniques. In the case of one type of carbohydrate involving carbon-13, a rare form of carbon, he and Northrup used the readily available and inexpensive ¹³C-labeled form of ethylene glycol to construct the molecules in a mere four chemical steps—compared to the 44 steps previously needed.

Carbohydrates are a key component of numerous aspects of human biology and in bacteria, viruses, and other organisms that have critical implications for humans, notes John Schwab of the National Institute of General Medical Sciences, which supported the research.

"But because they are so difficult to work with, carbohydrates are not nearly as well understood as DNA and proteins," he says. "MacMillan's technique will allow scientists to more easily synthesize and study carbohydrates, paving the way for a deeper understanding of these molecules, which in turn may lead to new classes of drugs and diagnostic tools."

The entire article may be viewed online at http://pr.caltech.edu/media/Press_Releases/PR12569.html.

Cancer, from page 1

Baltimore, who won the Nobel Prize in 1975 for his work in virology and cancer research. "It is an innovative research project that holds special significance for the future of biomedical sciences."

In the fight against HIV, the virus that causes AIDS, T-cell immunity and T-cell-focused therapies and vaccines have been methods widely investigated and pursued. However, antibodies often provide the best protection against viruses, and virtually all vaccines for other viral diseases are designed to elicit antibody-based immunity. Antibodies against HIV do appear during HIV infections, but heretofore they had not been able to provide therapeutic advantage to most patients. Rare neutralizing antibodies have been identified, but have not proven valuable because a general way to elicit their production in all patients has not been found. Moreover, most of them are effective only at very high concentrations that are hard to maintain in a person by conventional means. Thus, early attempts to elicit antibody-based immunity against HIV have largely failed.

The Engineering Immunity integrated methodology involves utilizing retroviruses, which are natural carriers of genes. Retrovirus vectors will be produced that encode antibodies found to be effective against HIV. Utilizing retroviruses, the Baltimore Laboratory at Caltech, in collaboration with Caltech structural biologist Pamela Bjorkman, will introduce specific genes into stem cells. These genes will encode specificity molecules on the immune cells, thereby arming the immune cells to kill selected agents or cells, i.e., the cells that are growing HIV or particular cancer cells.

The Engineering Immunity initiative will provide a new route to the production of antibodies with therapeutic, and even protective, ability for a potential cure of AIDS, melanoma, and ultimately other diseases.

The entire article may be viewed online at http://pr.caltech.edu/media/Press_Releases/PR12598.html.

Systems biology, from page 1

type, the partition of the disease into categories defined by critical therapeutic targets, and the measurement of how drugs alter the disease patterns. The key is that the more questions you want answered, the more measurements you need to make. It is the systems biology approach that defines what needs to be measured to answer the questions."

The entire article may be viewed online at http://pr.caltech.edu/media/Press_Releases/PR12602.html.

TACIT, from page 1

on excess—characters get stuck on one point." She sums up, "People either love Molière or they don't, and if not, they're not thinking at all." Adds Claypool, "If you're going to see only one Molière, this is the one."

Again adapting to the global nature of the cast, a number of characters will change in name and become further developed. For example, Célimène's servant, originally a French butler called Basque, has morphed into the Irish maid Kate, played by grad student Lisa Goggin; the male courtier Clitandre has become the marquise Claudia, portrayed by grad student Tosin Otitoju, who is originally from Nigeria.

The play has now come full circle for Marneus, who appeared in *The Misanthrope* as an undergraduate in the mid-1950s. "I've been waiting to do this for a long time, and now is a good time," she says, noting that with the updated setting, the production "fits well in Dabney" as well as with the cast.

She's happy to have "wonderful actors," who also include JPL staff member Dave Seal as Alceste, the misanthrope; undergrad Nicholas Rupprecht '05 as Philip; Caltech community member Erica Rolufs as Célimène, Alceste's beloved; grad student Robert Ward in his TACIT debut as Oronte, a "banal" sonneteer in love with Célimène; undergrad Cecilia Yu '07 as Mei Liang, a distant cousin of Célimène; former Seismo Lab staffer Karen Kähler as Arsinoé, Célimène's "acid-tongued 'friend'"; grad student James Karnesky as a guard of the Marshalsea; staff member Trevor Roper as Alceste's valet, Forrester; and JPL staffer Craig Peterson as the baron Andrej.

Undergrad Scott Wilbur '07 will design the lighting with help from consultant Dan Reed, who worked with TACIT early in his career and has since gone on to stage lighting for Academy Awards telecasts and recent Olympics ceremonies. Creating the period clothing will be costumer Diane Winesburg, who earned her MFA in costume design at New York University.

Three weekends of performances will take place: November 5 to 7, 12 to 14, and 19 to 21. Friday and Saturday performances begin at 8 p.m. and Sunday performances at 2 p.m. For ticket 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).

Ethiopia, from page 1

reported much success in Awassa, where it operates the school and medical facilities.

"He started four schools that serve 1,000 children, and two community clinics," Houser says. The success of these projects attracted the attention of officials in the Ethiopian government, who are eager to help further Bekele's endeavors. Thus was born the Ethiopia Library Project. A plot of land near Addis Ababa University has been promised for the building, which will likely become a center of learning in itself.

"Ethiopia has a good government right now," Houser says. "It's stable and solid, and the leaders want to understand government and leadership techniques, so they're just thirsty for this."

House says that what the students want is Western-style leadership training. "This is the first time they've thought about things like how to run an organization differently from the models of the past. They want a more industrialized model," he says. Older models of administration have relied on practices like nepotism that breed corruption and promote incompetence.

Hundreds of students in Bekele's classes need college-level texts on business, leadership, and management, as well as books on science and engineering, the social sciences, and education. These students are studying for certificates in leadership, and learning how to delegate responsibility and build teamwork. Bekele dreams of one day offering a doctoral program to produce able government leaders.

Although the donated textbooks will be in English and sent to a nation whose official language is Amharic, English is the language used to conduct business.

"They start learning English in grammar school," Houser says, adding that other aspects of the education system are not serving its residents' leadership training needs.

"Their education tradition relies a lot on memorization," he says, a practice that emphasizes recitation yet shirks critical thinking. Houser suspects these teaching methods led to the current situation where engineers can get the math and calculations right but can't work together to build a proper road.

With these books, Houser predicts that teachers will mold a new class of leaders who will prize original thinking, problem solving, and teamwork.

"The country is paying attention to productivity, efficiency, effectiveness, and the bottom line," he says. "They're measuring success in farming productivity, and they know that clean water and improved sanitation reduce infant mortality rates and improve the standard of living."

Donations of college textbooks, children's books, and computers—Pentium II or later—will be accepted from November 15 to 21 at the Caltech Y, located in building 62. For further information, contact Houser at jhouser@caltech.edu.

Calaveras y más

Whimsical paper skeletons and bouquets of marigolds adorn a Dia de los Muertos display. The altars, an ancient tradition in Mexico, pay tribute to the deceased. Students in Gloria Arjona's Spanish class assembled this one, located in a glass case on the first floor of Baxter Hall.

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ADDRESS SERVICE REQUESTED

Editor: Daryn Kobata
(626) 395-6240; daryn@caltech.edu
Assistant Editor: Javier Marquez
(626) 395-6624; jmarquez@caltech.edu
Calendar Administrator: Debbie Bradbury
(626) 395-3630; debbieb@caltech.edu
Graphic Artist: Doug Cummings
Photographer: Bob Paz
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