

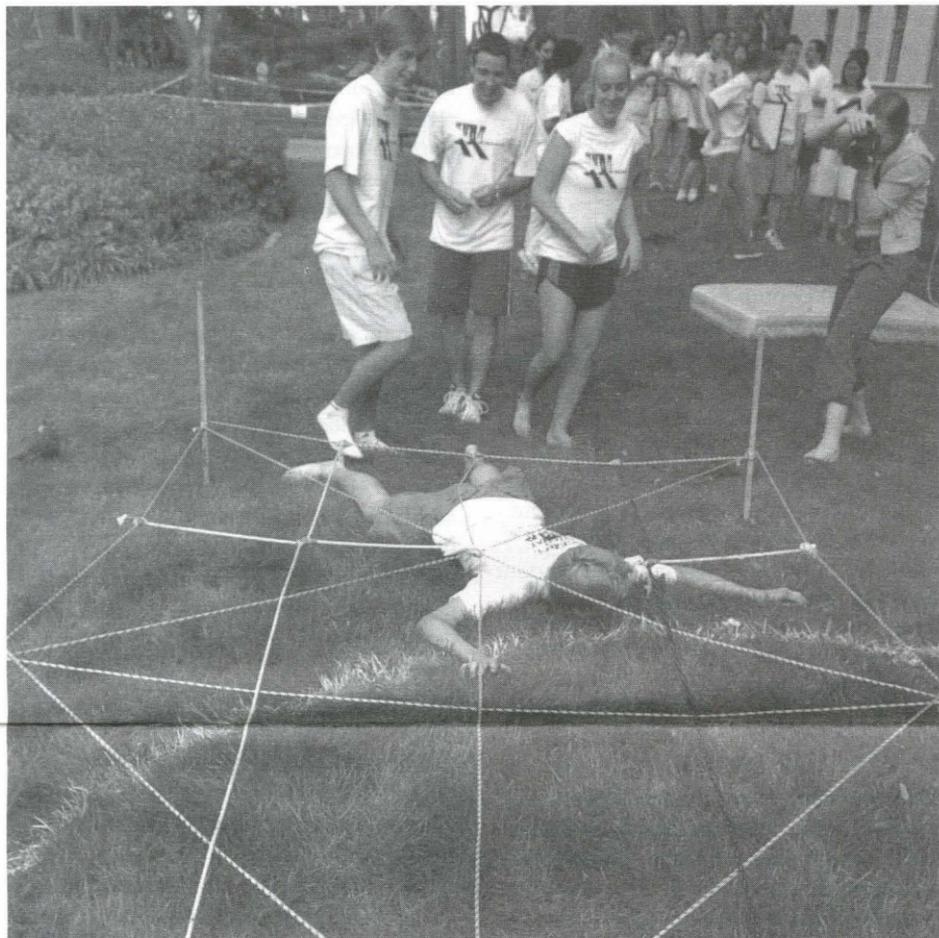
# Caltech 336

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

The campus community biweekly

June 2, 2005, vol. 5, no. 11

## Crawl this way



Ditch Day stacks posed physical as well as mental challenges to teams of Caltech freshmen, sophomores, and juniors trying to solve them. Whether it meant sloshing in pools or engaging in water-balloon fights, the students were game. In this stack, a member of the Ocean's 11 team crawls under a rope net, boot-camp style. Ditch Day took place on May 17.

## Of JPL and javelin propulsion

Speeding down a track runway with a javelin in her hand, Kristen Zortman '05 probably doesn't fit many people's image of a rocket scientist.

In fact, the 22-year-old senior is both a track-and-field star and a future rocket scientist. Last weekend, while waiting to hear whether she'll land her dream job at JPL, Zortman was hurling the javelin at the NCAA Division III track-and-field national championship in Waverly, Iowa.

The first Caltech undergrad to compete in the nationals in nearly a decade, Zortman placed 14th in a field of 19. Although she would have liked to do better, she notes that she rose several notches from her entry ranking (18th). And any disappointment she felt was offset by the sheer excitement of being there, as well as the support from family, friends, and strangers.

"I really enjoyed it," she says, describing the stadium packed with cheering spectators and having "so many experiences that I wouldn't have anywhere else." She was "a little nervous" stepping onto the runway: "I looked out on

see Zortman, page 6

## How the brain is wired for sex

Two brain structures a mouse just can't do without when hooking up with its dream mate—and trying not to become lunch for the neighborhood cat—are the amygdala and hypothalamus. The former is involved in the initial response to cues that signal love or war, while the latter coordinates innate reproductive or defensive behaviors triggered by these cues.

Now, neuroscientists have traced out the wiring between the amygdala and hypothalamus, and may have identified the genes involved in laying down the wiring itself. The researchers have also gained an understanding of how the circuitry works to make behavioral decisions, such as when a mouse is confronted simultaneously with an opportunity to reproduce and an imminent threat.

In the May 19 issue of the journal *Neuron*, David Anderson, Caltech's Sperry Professor of Biology and a Howard Hughes Medical Institute investigator, his graduate student Gloria Choi, and colleagues Hongwei Dong and Larry Swanson (USC) and Andrew Murphy, David Valenzuela, and

see Brain, page 2

## Andromeda: a gift that keeps giving

The lovely Andromeda galaxy appeared as a warm fuzzy blob to the ancients. To modern astronomers millennia later, it appeared as an excellent opportunity to better understand the universe. In the latter regard, our nearest galactic neighbor is a gift that keeps on giving.

Caltech postdoctoral researcher Scott Chapman and Rodrigo Ibata of the Observatoire Astronomique de Strasbourg in France have led a team of astronomers in mapping the detailed motions of stars on Andromeda's outskirts. Their recent observations with the Keck Telescopes show that the tenuous sprinkle of stars extending outward from the galaxy is actually part of the main disk itself. This means that the spiral disk of Andromeda is three times larger in diameter than previously estimated.

At the annual summer meeting of the American Astronomical Society on May 30, Chapman outlined evidence of a vast, extended stellar disk that makes the galaxy more than 220,000 light-years in diameter. Previously, astronomers thought Andromeda was about 70,000 to 80,000 light-years across. Andromeda itself is about 2 million light-years from Earth.

The new dimensional measure is based on the motions of about 3,000 of the stars some distance from the disk that were once thought to be merely the "halo" of stars in the region and not part of the disk itself. By taking very careful measurements of the "radial velocities," the researchers were able to determine precisely how each star was moving in relation to the galaxy.

The results showed that the outlying stars are sitting in the plane of the Andromeda disk itself and, moreover, are moving at a velocity that shows them to be in orbit around the center of the galaxy.

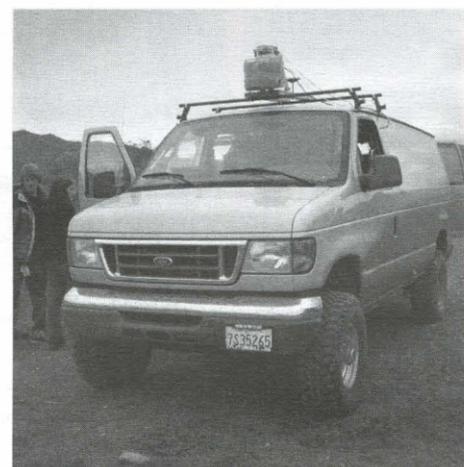
see Andromeda, page 6

## Grant will fund study of autism

One of the classic symptoms of autism is difficulty in interpreting other people's emotions. Caltech professor of psychology and neuroscience Ralph Adolphs has received a \$120,000 grant from the foundation Cure Autism Now to study how autistic patients process information about other people's facial expressions. The award will supplement Adolphs's ongoing work to understand the role of the amygdala, a structure in the brain, in certain disorders.

There is tantalizing evidence that the challenge for autistic persons may not

see Autism, page 2



## Bob, meet Alice

"We Went! We Raced! We Ate Barbed Wire!" stated Team Caltech's unabashedly honest website headline on the performance of the truck "Bob" in last year's DARPA Grand Challenge road race.

The race from L.A. to Las Vegas called for a completely autonomous vehicle (no driver or remote control) that could travel 142 miles over dirt trails and open desert in 10 hours or less. Bob went about 1.3 miles before getting tangled in barbed wire. The farthest any entry got was 7.4 miles.

Enter "Alice," the new vehicle from Team Caltech 2005—a group of undergrads, grad students, and faculty advisers—that will compete this year on October 8. "We are light-years ahead with Alice with respect to where we were last year at the same point with Bob," says project manager Richard Murray, a professor of control and dynamical systems, and the chair of the Division of Engineering and Applied Science. That may explain why Alice sports the license plate, "I 8 Bob."

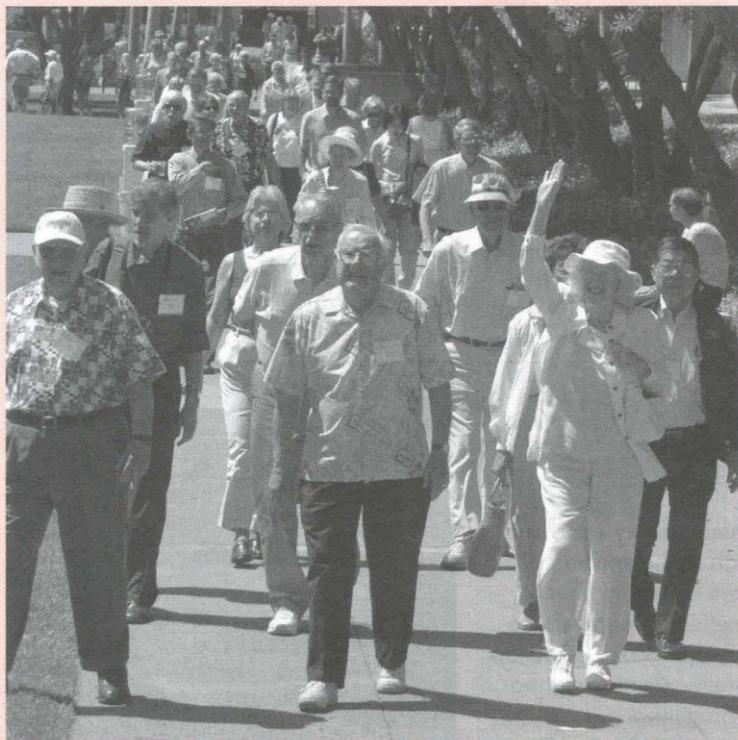
The DARPA (Defense Advanced Research Projects Agency) Grand Challenge is intended to hasten the research and development of driverless ground vehicles that could be used to transport supplies or soldiers on the front lines. According to Joel Burdick, a professor of mechanical engineering and bioengineering and a technical adviser, the technology may also have future ramifications for automobile design, especially for disabled drivers, and for space exploration.

With a \$2 million first prize, the race is open to individuals and organizations. Like last year, the exact route won't be announced until two hours before the start.

Bob, the 1996 Chevrolet Tahoe SUV used last year, has been replaced by a Ford E-350 van customized by Sportsmobile, a company specializing in 4x4 vehicles. A six-liter diesel engine allows Alice to idle for long periods with low fuel consumption. Special hardware on the bumper and roof holds various sensors that serve as "eyes." Inside is a complete

see Alice, page 6

# NewsBriefs



The Institute welcomed hundreds of alumni and their families back for the Alumni Reunion Weekend May 19–21, and Seminar Day, which took place on May 21. Visitors learned about advances in various fields of research, partook of meals and barbecues, and caught up with professors and former classmates.

## Personals

### Welcome to Caltech

#### April

Visitors **Misato Fukagawa**, in astronomy, and **Idoia Gimferrer**, in biology.

#### May

**Maria Aguirre**, host, Athenaeum; **David Ardila**, staff scientist, Spitzer Science Center; **Diana Autrey**, administrative assistant, chemistry and chemical engineering; **Gloria Bain**, administrative assistant, control and dynamical systems; **Rachel Berquist**, postdoctoral scholar in mechanical engineering; **Haixia Huang**, research technician associate, biology; **Jun-Bae Hong**, postdoctoral scholar in chemistry; **Steve Meinel**, system administrator, Administrative Technology Center; **Arindam Samanta**, visitor in geology; **Ariel Shores**, administrative assistant, geological and planetary sciences; **Diana Stefanescu**, postdoctoral scholar in environmental science and engineering; **Harald Stoegbauer**, postdoctoral scholar in biology; **Mara Sweet**, associate director of foundation relations, Development and Alumni Relations; **Chiara Vanni**, assistant research technician, Laser Interferometer Gravitational-Wave Observatory.

## Honors and awards

**Jacqueline Barton**, Hanisch Memorial Professor and professor of chemistry, has received an honorary doctor of science degree from Yale University. Barton joined Caltech as professor of chemistry in 1989 and was named Hanisch Professor in 1997. She received her AB from Barnard College in 1974 and her PhD from Columbia University in 1978, and she has received honorary degrees from the New Jersey Institute, Kenyon College, and Skidmore College.

**Charles Elachi**, Caltech vice president, director of the Jet Propulsion Laboratory, and professor of electrical engineering and planetary science, has been honored with a Laureates Hall of Fame Award at Aviation Week and Space Technology's 48th Annual Aerospace Laurels Awards. Honorees are nominated by the editors of the aerospace magazine for "extraordinary individual and team accomplishments in the global aviation, aerospace and defense industries." The award recognizes Elachi's leadership of the Mars Exploration Rover program, whose team is searching for signs of life on Mars, and of the

Cassini mission team, which is investigating the mysteries of Saturn's moon Titan. Elachi received his bachelor's degree at the University of Grenoble in 1968 and his Caltech PhD in electrical engineering in 1971, the same year he began working for Caltech/JPL.

## Media minute

Professor of Mathematics and Executive Officer for Mathematics **Gary Lorden** discusses his role as a consultant to the *Numbers* television series in the "Insider" section of *TV Guide Online*. The article, "Math Whiz Crunches TV's *Numbers*," by Mark Nollinger, begins, "Though they look like scribble-scrabble to the uninitiated, the equations Charlie Eppes (David Krumholtz) solves on CBS' FBI crime-drama *Numbers* are real. Mathematician Gary Lorden makes sure of it." Lorden, who reads the scripts to ensure that the math terminology and usage are correct, and also provides the numerical formulas, describes the challenge of striving to remain technically accurate without being either too arcane or too simplistic. Speaking from his personal experience in classified research on terrorism, he also confirms the notion that his field has been at the heart of real-life crime-fighting for years, and says that he's become "a sort of local hero" to students happy about math's newfound prime-time status. *Numbers* airs on Fridays at 10 p.m. on CBS. Visit [www.tvguide.com/news/insider/050427c.asp](http://www.tvguide.com/news/insider/050427c.asp) (registration required).

Boswell Professor of Neuroscience, Emeritus, **Seymour Benzer** is featured in the May 27 issue of the *L.A. Weekly*. "What the Doctor Orders," in the newspaper's "Counter Intelligence" restaurant review section, mentions the highlights of Benzer's research career, particularly his current work on the relationship of genes and dietary preference. Reviewer Jonathan Gold describes his happiness at "learning that a great biologist has spent even a small amount of his time genetically manipulating fruit flies to enjoy wasabi and hot chile," and mentions Benzer's attempts to find a particular shrimp dish in local Sichuan Chinese restaurants. "He once put an order of the shrimp under his lab microscope, attempting to isolate the secret ingredient," which the professor believes may have been cardamom. Although they don't have the dish, Benzer nonetheless recommends the Lucky Dragon restaurant in Monterey Park. "The restaurant is good," he is quoted as saying. He adds, however, "Stay away from the duck with dried tulips." Visit [www.laweekly.com/ink/05/27/counter-gold.php](http://www.laweekly.com/ink/05/27/counter-gold.php).

## Chen, Hummel win Ford Awards

Winners of Henry Ford II Scholar Awards this year are Yang Chen and Patrick Hummel.

Yang Chen is a junior in electrical engineering. In his two years at Caltech, Chen has concentrated his research activities on the design of analog circuits, computer vision recognition systems, and microprocessor-based systems. A transfer student from Tsinghua University in Beijing, Chen was the first-prize winner of that institution's Freshman Scholarship. He was also a Gold Medal recipient in the 3rd Asian Physics Olympiad, held in Singapore, and the 33rd International Physics Olympiad, held in Bali.

Patrick Hummel, a junior in applied and computational mathematics, was selected as a freshman for a merit-based Axline Award. He has authored and co-authored seven papers in biology, chemistry, game theory, and mathematics. Hummel is currently working on detailed theoretical projects in noncooperative game theory and in inorganic spectroscopy. He is a founder of the Caltech Chess Club and is a past winner of the U.S. National High School Chess Championship. He hails from Las Vegas, Nevada.

The Henry Ford II Scholar Awards are funded under an endowment provided by the Ford Motor Company Fund. Each annual award, which can total \$5,000, is made to the Caltech undergraduate engineering student with the best academic record at the end of the third year of study, or to the engineering grad student with the best first-year record.

## Brain, from page 1

George Yancopoulos (Regeneron Pharmaceuticals) describe their discovery that the neural pathway between the amygdala and hypothalamus thought to govern reproductive behaviors is marked by a gene with the unromantic name of Lhx6.

To confirm their work, the researchers checked the suspected neurons when the mice were sexually aroused. In male mice, the smell of female mouse urine containing pheromones is a sexual stimulus, evoking such behaviors as ultrasonic vocalization, a sort of "courtship song." Therefore, the detection of neural pathway activity when the mouse smelled the pheromones was the giveaway.

The idea that Lhx6 actually specifies the pathway wiring is still based on inference, because when the researchers knocked out the gene, the mutation caused mouse embryos to die of other causes too early to detect an effect on brain wiring. But the Lhx6 gene encodes a transcription factor in a family of genes that are known to control the pathfinding of axons—tiny wires that jut out from neurons and send messages to other neurons.

The pathway between the amygdala and hypothalamus involved in danger avoidance appears to be marked by other genes, Lhx9 and Lhx5, in the same family. However, the function of these circuits is not as clear, because a test involving smells to confirm the pathways was more ambiguous than the one involving sexual attraction. The smell of a cat did not clearly light up Lhx9- or Lhx5-positive cells. Nevertheless, the fact that those cells are found in brain regions implicated in defensive behaviors suggests they might be involved in other forms of behaviors, such as aggression between male mice.

## Autism, from page 1

be entirely an inability to read facial expressions, but rather the lack of ability or inclination to focus on faces so that expressions can be processed. Better knowledge of how people with autism look at faces could result in interventions that coach patients to concentrate their attention on facial expressions, ultimately helping them improve their social functioning.

The two-year pilot research award will first fund a close study of how subjects view faces, followed the second year with fMRI (functional magnetic resonance imaging) research using Caltech's new scanners.

"If our hypotheses are supported, the implications might be dramatic for rehabilitation," Adolphs says. "In a sense, we could be helping people with autism to see the world socially by telling them specifically how to look at the world with their eye movements."

Founded in 1995, Cure Autism Now is an organization comprising parents, clinicians, and leading scientists committed to accelerating the pace of autism research. Since its beginning, the organization has committed more than \$23 million to research, outreach, and education efforts.



Autistic people may lack the ability or inclination to focus on faces so that expressions can be processed.

The researchers also located the brain area in the hypothalamus where a circuit-overriding mechanism exists when a mouse is exposed both to a potential mate and to danger. The layout of axons in the wiring shows that, in such a situation, a mouse is clearly hardwired to get out of harm's way. The researchers' prediction was also behaviorally confirmed. Mice are known to freeze or hide when they sense danger, and when exposed to cat odor and female urine simultaneously, the male mice stopped their pheromone-induced "singing." "So the asymmetry in the cross talk suggests that the system is prioritized for survival first, mating second," Anderson says.

Anderson believes similarities are likely in humans, as mice and humans both have these brain structures, "and we, like mice, are likely to have some hardwired circuits for reproductive behavior and for defense," he says.

However, humans can also consciously override the hardwired circuitry. For example, two teenagers in an amorous embrace in a theater can ignore an on-screen monster. In real-life circumstances, they would more likely postpone the groping until they were out of danger. "We obviously have the conscious ability to interrupt the circuit-overriding mechanism, to see if the threat is really important," Anderson says.

# 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](mailto:debbieb@caltech.edu).

## June 6–19, 2005

M T W T F S S

### Tuesday, June 7

#### Carnegie Observatories Colloquium Series

William T. Golden Auditorium, 813 Santa Barbara Street, 3:30 to 5 p.m.—“RCS Clusters: Three Years of Follow-up,” Mike Gladders, Observatories of the Carnegie Institution of Washington. Refreshments, 3:30 p.m.

### Wednesday, June 8

#### Astronomy Colloquium

155 Arms, Robert Sharp Lecture Hall, 4 p.m.—“Black Holes in Galaxy Mergers,” Lars Hernquist, professor of astronomy, Harvard-Smithsonian Center for Astrophysics.

#### Organic Chemistry Seminar

147 Noyes, Sturdivant Lecture Hall, 4 p.m.—“Crystallization in Two and Three Dimensions,” Professor Adam Matzger, department of chemistry, University of Michigan, Ann Arbor.

### Thursday, June 9

#### ESE & Society Discussion Group

151 Arms, Buwalda Room, 9 a.m.—Discussion groups are held on Thursday mornings from 9 to 10. Refreshments.

#### Thesis Seminar

151 Crellin, 1 p.m.—“Chelating N-Heterocyclic Carbene Ligands for Group 10 Ethylene Polymerization Catalysts: Toward the Incorporation of Polar Comonomers,” Andrew Waltman, graduate student in chemistry, Caltech.

#### Herbert Newby McCoy Award Seminar

153 Noyes, Sturdivant Lecture Hall, 3:30 p.m.—“Coordination Chemistry from Trigonally Coordinated Iron Platforms: Chemistry Relevant to Dinitrogen Reduction,” Theodore Betley, graduate student in chemistry, Caltech.

#### Herbert Newby McCoy Award Seminar

153 Noyes, Sturdivant Lecture Hall, 4 p.m.—“The Total Synthesis of Dragmacidins D and F,” Neil Garg, graduate student in chemistry, Caltech.

#### Herbert Newby McCoy Award Seminar

153 Noyes, Sturdivant Lecture Hall, 4:30 p.m.—“Development of Tools for Studying Learning and Memory with Unnatural Amino Acids,” E. James Petersson, graduate student in chemistry, Caltech.

#### Thesis Seminar

147 Noyes, Sturdivant Lecture Hall, 5:30 p.m.—“The Development of Organocatalytic Reactions Pertaining to Indoles,” Joel Austin, graduate student in chemistry, Caltech.

### Friday, June 10

#### Commencement

Beckman Mall, 10 a.m.

### Tuesday, June 14

#### Carnegie Observatories Colloquium Series

William T. Golden Auditorium, 813 Santa Barbara Street, 3:30 to 5 p.m.—Topic and speaker to be announced. Refreshments, 3:30 p.m.

### Thursday, June 16

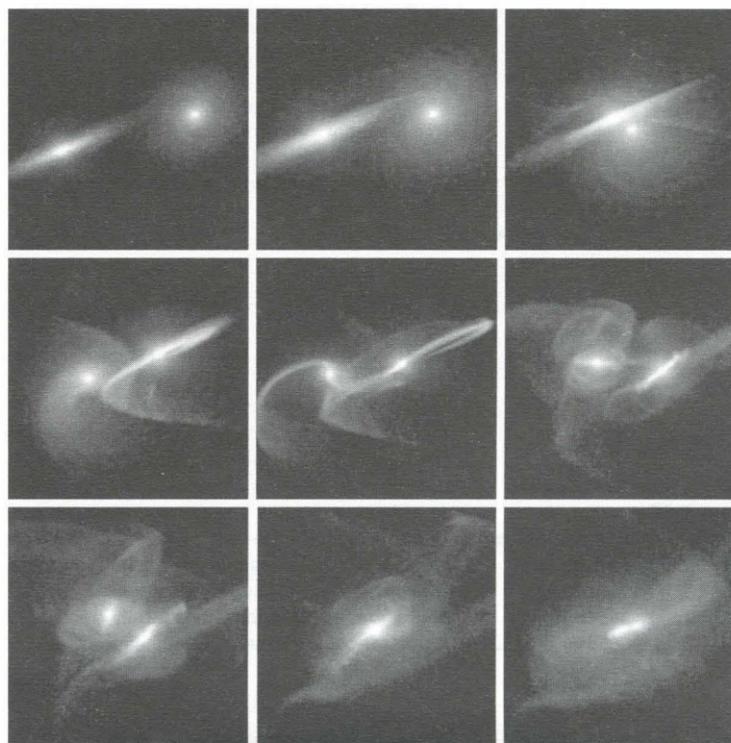
#### Von Karman Lecture Series

JPL, von Karman Auditorium, 7 p.m.—“A Bipolar Year: What We Can Learn About Looking for Life on Other Planets from Working in Cold Deserts on Our Own,” Dr. Pamela Conrad, research scientist, JPL.

### Friday, June 17

#### Von Karman Lecture Series

Pasadena City College, 1570 E. Colorado, the Vosloh Forum (south of Colorado on Bonnie), 7 p.m.—“A Bipolar Year: What We Can Learn About Looking for Life on Other Planets from Working in Cold Deserts on Our Own,” Dr. Pamela Conrad, research scientist, JPL.



A Chandra X-ray Observatory data simulation sequence (from left to right and top to bottom) begins with two galaxies that are about to merge. The two distinct point sources in the Chandra data are proof to scientists that two black holes are at the center of the newly formed galaxy. (Simulation: Josh Barnes, University of Hawaii/John Hibbard, NRAO; X-ray: NASA/CXC/MPE/S. Komossa et al.) “Black Holes in Galaxy Mergers” will be the subject of the Astronomy Colloquium on Wednesday, June 8.

<http://chandra.harvard.edu/>

# CampusEvents

## Monday, June 6

### CEC Summer Program Sign-up

The Child Educational Center's exciting and educational summer program, for children entering grades 1 through 7, will be held at two locations: on Michigan Avenue at Caltech, and Oak Grove, near JPL in La Cañada Flintridge. In August, a Performing Arts Camp will be introduced for children entering grades 3 through 7. In addition, before-and-after care will be offered for children attending summer school at Paradise Canyon Elementary School, and there will be a pre-kindergarten program at Oak Grove. Register today; call (818) 354-3418.

## Wednesday, June 8

### Caltech/JPL Toastmasters Club Meeting

Building 167 conference room, JPL, 5:30 p.m.—Enhance your speaking skills in a supportive and positive learning environment. The Toastmasters Club meets every second and fourth Wednesday of the month. Guests are welcome. If you are coming from outside JPL, please contact Frank Maiwald, at (818) 687-9487, three days before the event. Information: [www.jplcaltechoastmasters.com](http://www.jplcaltechoastmasters.com).

## Thursday, June 9

### How to Put "Steam" in Your Self-Esteem

Brown Gym classroom, 8:30 a.m. to 12:30 p.m.—In this workshop for supervisors and nonsupervisors, participants will learn skills with which to better handle difficult situations, and will discover ways to build self-esteem. Registration: 395-8055 or [diane.williams@caltech.edu](mailto:diane.williams@caltech.edu).

### Reel Women's Film Series: *Is Feminism Dead?*

Caltech Women's Center, noon—Years after the women's movement burst open doors of opportunity that had long been barred, a new generation of women seems to be questioning the meaning and the value of the battles fought by their mothers and grandmothers. The film *Is Feminism Dead?* appraises the women's movement as it currently exists and discusses its relevance in today's cultural climate.

## Tuesday, June 14

### Changes and Trends in Today's English Usage

Brown Gym classroom, 8:30 a.m. to 4 p.m.—This one-day program, for supervisors and non-supervisors, can help reduce your 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](mailto:diane.williams@caltech.edu).

### 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](mailto:lkamp@lively.jpl.nasa.gov). Visit our website at [www.its.caltech.edu/~aigp22](http://www.its.caltech.edu/~aigp22).

## Thursday, June 16

### Health & Wellness: Advanced Care Planning

Caltech Women's Center, noon—Advanced care planning is a process aimed at extending the rights of individuals to guide their medical care through periods of decisional incapacity. Patty Watson-Wood, a registered nurse at Huntington Memorial Hospital, will explain how to translate your values into medical treatment, maximize the likelihood that your care will serve your goals, and reduce family conflicts. Registration: [wcenter@studaff.caltech.edu](mailto:wcenter@studaff.caltech.edu).

## Saturday, June 18

### Caltech/MIT Enterprise Forum

Baxter Lecture Hall, 8 a.m. to noon—Join the Caltech/MIT Enterprise Forum and the Software Council of Southern California for their annual look at areas of software holding special entrepreneurial promise. The keynote speaker will be Peter Coffee, technology editor, *eWeek*. Information: [www.entforum.caltech.edu](http://www.entforum.caltech.edu).

### CEC's 25th Birthday Dinner and 16th Annual Wine-Tasting Benefit

The Child Educational Center's 25th birthday dinner will take place from 5:30 to 7:30 p.m. at Caltech's Steele House. Tickets are \$125 and include admission to the 16th annual wine-tasting benefit, which will take place on the same evening from 6:30 to 10:30 p.m. at Avery House. Tickets for the wine tasting alone are \$60 in advance, or \$70 at the door. Tickets for both events are available at the JPL Store, the Caltech Book Store, or the Child Educational Center. Information: (818) 354-3418.

## Sunday, June 19

### Amnesty International Book Discussion Group

Vroman's Bookstore, 695 E. Colorado Boulevard, second floor, 6:30 p.m.—This month's book is *Graceland*, by Chris Abani, the story of a teenage Elvis impersonator hoping to make his way out of the ghetto in Lagos, Nigeria. All are welcome. Sponsored by Caltech/Pasadena AI Group 22. Visit Group 22 at [www.its.caltech.edu/~aigp22](http://www.its.caltech.edu/~aigp22).

## Mondays

### Lunchtime Pickup Ultimate Frisbee

Fox Stanton Track and Field, 12:15 p.m.—The Caltech Penultimate Frisbee players make up an informal recreational group that plays pickup games of Ultimate Frisbee at lunchtime on Mondays, Wednesdays, and Fridays. No experience is needed, and complete novices are welcome. Information: <http://mailman.its.caltech.edu/penultimate>.

### Floorball Club

Brown Gymnasium, 9 p.m.—Caltech Floorball Club holds pickup floorball games on Mondays from 9 to 11 p.m.

## 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). Sponsored by the Caltech Women's Club. Open to Caltech/JPL community members only. Information: 578-0890 or [s\\_l\\_miller@hotmail.com](mailto:s_l_miller@hotmail.com).

### CIT Knitters Group Meeting

256 Mudd Laboratory, South, noon—All level of knitters and related handcrafters are welcome. We make items for others and ourselves. Information: 395-6905.

### Caltech Tai Chi Club

Dabney lounge, 7:30 p.m.—Meets Tuesdays and Fridays weekly. Sessions are free. Information: [www.its.caltech.edu/~taichi](http://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. Open only to Caltech/JPL community members. Sponsored by the Caltech Women's Club. Information: 791-4225 or [mcsutton10@hotmail.com](mailto:mcsutton10@hotmail.com).

### Lunchtime Pickup Ultimate Frisbee

Fox Stanton Track and Field, 12:15 p.m.—The Caltech Penultimate Frisbee players make up an informal recreational group that plays pickup games of Ultimate Frisbee at lunchtime on Mondays, Wednesdays, and Fridays. No experience is needed, and complete novices are welcome. Information: <http://mailman.its.caltech.edu/penultimate>.

## Thursdays

### Baby Furniture and Household Equipment

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 and JPL communities. Open on Thursdays from 10 a.m. to 1 p.m. No appointment is necessary. Information: 584-9773 or [furnpool@caltech.edu](mailto:furnpool@caltech.edu).

## Fridays

### Lunchtime Pickup Ultimate Frisbee

Fox Stanton Track and Field, 12:15 p.m.—The Caltech Penultimate Frisbee players make up an informal recreational group that plays pickup games of Ultimate Frisbee at lunchtime on Mondays, Wednesdays, and Fridays. No experience is needed, and complete novices are welcome. Information: <http://mailman.its.caltech.edu/penultimate>.

### Caltech Tai Chi Club

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

## Historian to speak on 1776

Renowned author and historian David McCullough will speak on campus on Wednesday, June 22. Part of Caltech Public Events' Voices of Vision Series, the lecture is free and open to the public, and will begin at 8 p.m. in Beckman Auditorium.

McCullough will discuss his newest book, *1776*, a riveting account of that year's hostilities between American and British forces. To show how an army of farmers under the unifying leadership of George Washington defeated the world's greatest military power, he focuses on the harrowing fight during the momentous first 12 months of the war for independence.

Born in 1933 in Pittsburgh, Pennsylvania, McCullough received a degree in English literature with honors from Yale. He has twice received the Pulitzer Prize—in 1993 for *Truman* and in 2001 for *John Adams*, which entered the *New York Times* best-seller list at number one and remained on the list for more than a year. His other books include *The Johnstown Flood*, *The Great Bridge*, *The Path Between the Seas*, *Mornings on Horseback*, and *Brave Companions*.

A lecturer, teacher, and public television host as well as author, McCullough has narrated numerous documentaries, including *The Civil War* and *Napoleon*, as well as the feature film *Seabiscuit*.

A book signing will immediately follow the talk. Please note that the author will sign one backlist title for every copy of *1776* purchased, up to a maximum of six books.

No tickets or reservations are required for this event, which is presented in partnership with Vroman's Bookstore. It is cosponsored by the Caltech Employees Federal Credit Union and the San Gabriel Valley Newspaper Group.

## Public Events information and tickets

Contact 395-4652, 1 (888) 2CALTECH, or [events@caltech.edu](mailto:events@caltech.edu). Individuals with a disability: 395-4688 (voice) or 395-3700 (TDD). Visit Public Events at [www.events.caltech.edu](http://www.events.caltech.edu).

# Longtime Caltech employees recognized

Chick Lackore came to the Owens Valley Radio Observatory (OVRO) in 1969 as a janitor. Pretty soon he made himself indispensable in the machine shop. Ever since then, the Bishop, California, native has worked at the astronomical facility in the eastern Sierra Nevada, where his expertise as welder and fabricator has proven critical to every major telescope project undertaken there.

But he modestly describes his fabrication work as making "bits and pieces" for the telescopes. "I've worked all my life, and I think if I sat down, I would stick," quips Lackore, 65, one of two Caltech employees recognized on June 1 for 35 years of dedicated service to the Institute.

The 50th annual Staff Service Award Program celebrated the work of 202 employees who were honored for 10 to 35 years of work, noted at five-year intervals. The event took place in Beckman Auditorium and featured speaker Richard Murray, professor of control and dynamical systems and chair of the Division of Engineering and Applied Science.

At OVRO, the largest university-operated radio observatory in the world, colleagues say that Lackore has demonstrated "exacting standards" in projects including the new millimeter-wavelength array's assembly, baseline rail, and concrete work. And the machinist, whose work area is affectionately known as the "chicken coop," was "loaned" to the Caltech Submillimeter Observatory during telescope construction on Mauna Kea, Hawaii. He's currently working to move telescopes 13 miles uphill to a 9,000-foot-elevation site for the Combined Array for Research in Millimeter-wave Astronomy (CARMA). CARMA's combined 15-telescope capabilities will allow researchers to carry out studies of the formation of planets, stars, and galaxies, and of the large-scale structure of the universe.

Back on campus, 30-year employee Dave Spellman has made his own indelible mark. In 1981 he took on the role of stage manager at Beckman and Ramo auditoriums—a position he still holds—smoothly orchestrating events starring such artists as Vincent Price, Sarah Vaughan, John Houseman, Marcel Marceau, and Hal Holbrook. A graduate of UCLA and a lighting and scenic designer for many area theater productions, Spellman came to the Office of Public Events in 1970, having passed through Caltech a year earlier with a touring production of Jules Feiffer's *Little Murders*.

He recalls, "My first paycheck from Caltech was a whopping \$173.27. Eight hundred and forty-one paychecks later, I've reached the conclusion that the true rewards of working at Caltech are not monetary, but experiential. The campus staff and faculty are a great bunch of people to work with. And although numerous equipment upgrades to the auditoriums have made my work easier over the years, and scheduling adjustments have taken a big bite out of the 18- to 20-hour days that were so common back in the '70s and '80s, the icing on the cake has been the continued help and support from my coworkers in the Public Events Office."

In the Division of Chemistry and Chemical Engineering, Priscilla Boon not only assists four division professors, but she also helps incoming students understand the open-door policy of the

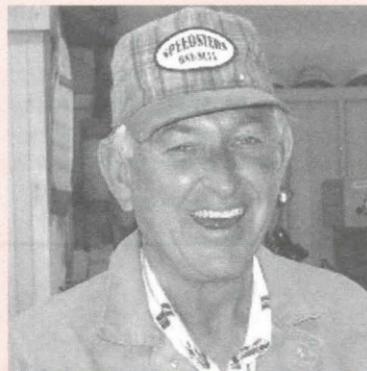
see *Service Awards*, page 6

## 10 years of service

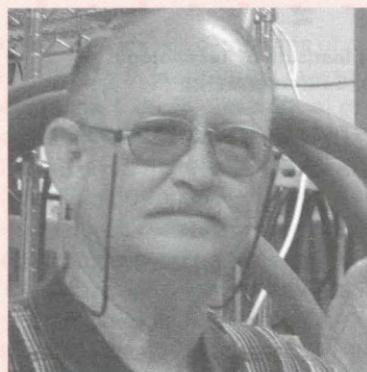
Rich Abbott  
Ruby Bales  
Dino Barbiera  
John Baskin  
Divina Bautista  
Bidushi Bhattacharya  
GariLynn Billingsley  
James Blackburn  
Minerva Calderon  
Jose Cervera  
Kerry Coman  
Roc Cutri  
Andrew Davis  
Ever De La Torre  
Ramiro De La Torre  
Rich Dekany  
Kathy Deniston  
Mamadou Diallo  
Joe Drew  
Louise Foucher  
Bob Gallagher  
Mark Garcia  
Andrew Gaston  
Sylvie Gertmenian  
Larry Gilbert  
Sandra Harlan  
Anna Marie Hetman  
Ann Hilgenfeldt  
Anne Hormann  
Viktor Hristov  
Angelica Ibarra  
Thomas Jarrett  
Dexter Jeremiah  
Marisu Jimenez  
Cheryl LaGue  
Albert Lazzarini  
Philip Lindquist  
Margaret Lindstrom  
Christopher Malek  
Fran Manley  
Carol Mann  
Cierina Marks  
Sue McHugh  
Sherri McKinney  
Ann Miguel  
Joe Monaly  
Beth Moore  
Roger Murray  
Debra Navarrete  
Jim O'Dea  
Nick Oldark  
Carlton Potts  
Henry Riley  
Ian Roberts  
Janeen Romie  
Alan Rosenstein  
Michael Roy  
Viveca Sapin  
Allen Sibley  
Nancy Silbermann  
Chris Silva  
Renee Smith  
Diana St. James  
Linwood Tabata  
Camilo Toribio  
Chaozhi Wan  
Desheng Wang  
Johnny Williams  
Tim Winiacki  
Rosario Zedan  
Anzhen Zhang

## 15 years of service

Samir Abi-Rached  
Rosa Anguiano  
Rudy Arvizu  
Michael Black  
Charmaine Boyd  
Corey Campbell  
Paul Carroad  
Susie Clark  
Al Coleman  
Manuel De La Torre  
Alberto Devora  
Kitty Dua  
Sandra Durkee  
Susan Egerman  
Marionne Epalle  
Sandra Estes  
Kerry Etheridge  
Steven Gould  
Ronald Graham  
Blanca Granados  
Barbara Green  
Suresha Guptha  
William Harris  
Oscar Hernandez  
Branislav Kecman  
Jacob Kooi  
Exie Marie Leagons  
Jodie Lee  
Jan Lindheim  
Victoria Lopez  
Erick Lopez  
Valeria Mancino  
Joseph Mazzarella  
Purie Miklja  
Roy Miller  
Gita Patel  
Andrew Ransick  
Raul Resendiz  
Guillermina Robles  
Leslie Schenker  
Cheryl Lynn Southard  
Helen Ticehurst  
Donna Tomlinson  
Juana Turcios  
Bahram Valiferdowski  
Luis Vega  
Alvaro Velado  
Margo Villalobos  
Kwanghsi Wang  
Jay Winkler  
Peggy Winstanley  
Elizabeth Wood  
Xiuqin Wu  
Miki Yun  
Margoth Zamarripa



Chick Lackore



Bob Taylor

## 20 years of service

Bovan Bang  
Jose Barrios  
John Beckett  
Steve Benson  
Lynn Bryant  
Karen Carlson  
Janet Couch  
Darryl Denning  
Donna Driscoll  
Delmy Emerson  
Anthony Guzman  
Shirley Hampton  
John Henning  
Cliff Ho  
Haick Issaian  
Dorothy Jennings  
Kathy Kelly  
Daniel Lang  
De Ann Lewis  
Ya-Yun Liu  
Elisa Loeffen  
Barry Madore  
William McKinley  
Rosemary Miller  
Mehrdad Moshir  
James Pendlay  
Rosetta Pillow  
John Rector  
Belinda Ross  
Patricia Somer  
Linda Syme  
Gilbert Tiscareno  
Laurinda Truong  
Tony Valespino  
Khiem Van Du  
Carole Wells  
Roy Williams

## 25 years of service

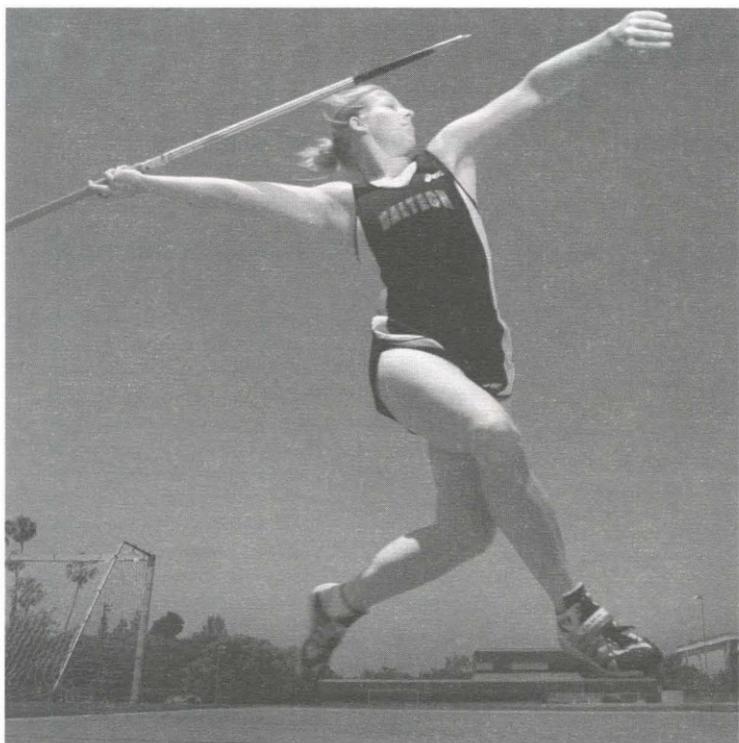
Thomas Biesek  
Priscilla Boon  
Phyllis Burton  
Sharlene Cartier  
Margaret Collins  
Tony Do  
John Dundas III  
Diane Engler  
Mike Gerfen  
David Guerrero  
Jack Guledjian  
Martha Gutierrez  
Mary Hoidahl  
Ron Isaacs  
Calvin Jackson, Jr.  
Ed Jasnow  
John Klemic  
Tess Legaspi  
Catherine May  
Lori Merager  
Bob Narron  
Ann Nelson-Wiegel  
Judith Nollar  
Ricardo Paniagua  
Alan Rice  
Bob Sanders  
Art Seiden  
Sheila Shull  
Jim Staub  
Sherry Wheelock

## 30 years of service

Sharon Borbon  
Stan Borodinsky  
Iffat Khan  
Dave Spellman  
Merle Sweet  
Bob Turring

## 35 years of service

Chick Lackore  
Bob Taylor



Keith Birmingham, Pasadena Star-News

Kristen Zortman, with javelin in hand.

### Zortman, from page 1

the field and thought, "Wow, this one's really important. I hope it's a good one!"

Afterward, the smiles and praise from her father—who drove from Wisconsin to see Zortman throw for the first time—and from track coach Julie Levesque "made me feel happy more than the actual finish." She was also touched by the many congratulatory e-mails she received, some from people she'd never met, including Caltech coaches and Administrative Technology Center staff member Erin Lindsay, a former javelin thrower.

Zortman's qualifying throw of 40.84 meters set a Caltech record for women, and is the Institute's best throw since Philip Conley '56 set the men's record of 244 feet, one inch, and went on to the 1956 Summer Olympics in Melbourne. Recently named Caltech's outstanding athlete of the year, Zortman has also lettered for three years on the varsity volleyball team, and played first base on the men's baseball team her freshman and sophomore years. (A state championship softball player in high school, she had to convert to baseball at Caltech, which currently has no women's softball team.)

Levesque eventually spotted her running the 100-meter dash at an intramural event, and talked her into joining the track-and-field team. Since the baseball and track seasons overlap, Zortman

chose to focus on track. The javelin emerged as her best event, one for which Levesque thinks she is well suited physically and temperamentally.

"The javelin is all about technique," says Levesque, a three-time all-American at Cal Poly San Luis Obispo who finished second in the nationals in the heptathlon, which includes the javelin. "If you try to throw a javelin far or throw it hard, it usually doesn't go far."

Although as an aerospace engineer Zortman can wax technical on how a javelin flies, she says her training isn't really an advantage, as might be assumed. "You have to remember that the javelin throw is not a power event like the shot put or hammer throw," she says. "The javelin is a lot more technique because it's not a big, heavy thing—it's a light thing that interacts with the air. So it has flight dynamics, but I think lots of practice will get you farther than knowing lots about flight."

Zortman says her motivations are primarily confidence-building and nurturing her competitive nature. "The excitement of competing is enough for me, but it's also nice to see myself improving week by week."

As for whether javelin throwing impresses the guys, she says that her fiancé, for one, thinks it's "pretty cool."

### Andromeda, from page 1

In essence, this means that the disk is vastly larger than previously known.

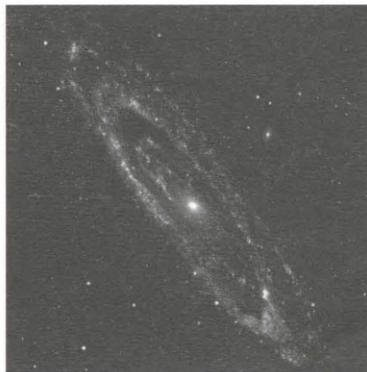
Further, the researchers have determined that the nature of the "inhomogeneous rotating disk"—in other words, the clumpy and blobby outer fringes of the disk—shows that Andromeda must be the result of satellite galaxies long ago slamming together. If that were not the case, the stars would be more evenly spaced. Ibata says, "This giant disk discovery will be very hard to reconcile with computer simulations of forming galaxies. You just don't get giant rotating disks from the accretion of small galaxy fragments."

The current results, which are the subject of two papers already available and a third yet to be published, are made possible by technological advances in astrophysics. In this case, the Keck/DEIMOS multi-object spectrograph on the Keck II Telescope possesses the mirror size and light-gathering capacity to image stars that are very faint, as well as the spectrographic sensitivity to obtain highly accurate radial velocities.

The extended stellar disk has previously gone undetected because stars in the region could not be known to be a part of the disk until their motions were calculated. In addition, the inhomogeneous "fuzz" that makes up the extended disk does not look like a disk, but appears to be a fragmented, messy halo built up from many previous galaxies crashing into Andromeda, and it was assumed that stars in this region would be going every which way.

"Finding all these stars in an orderly rotation was the last explanation anyone would think of," says Chapman. He adds that further work will determine whether the extended disk is merely a quirk of the Andromeda galaxy, or is perhaps typical of other galaxies.

*This article is adapted from a press release by Caltech Media Relations. For more information, visit [www.astro.caltech.edu/~schapman/m31.html](http://www.astro.caltech.edu/~schapman/m31.html) or [pr.caltech.edu/media/Press\\_Releases/PR12703.html](http://pr.caltech.edu/media/Press_Releases/PR12703.html).*



A GALEX image composite of the Andromeda galaxy.

### Alice, from page 1

software lab, including a brain—seven Dell servers in temperature-controlled, shock-resistant housing—and four seats with harnesses that, during off-road testing, strap students down enough to let them use a computer keyboard.

Although the team won't know officially until this month, presumably Alice passed an important progress check in May by DARPA officials, who will whittle the 100-plus entries to 40. During the officials' visit to the Santa Anita racetrack parking lot, Alice completed two course runs in about 45 seconds, but crunched a trashcan in its third run and made an unnecessary stop when it "thought" it spied an obstacle. On run four, it reran the first part of the course (including the obstacles from run three) at 15 mph, then demonstrated higher speeds while navigating a field of trashcans. To win the race in less than 10 hours, Murray notes, Alice will need to average 20 mph, but will have to drive as fast as 50 mph at times in order to maintain that average.

"We've learned some valuable lessons and have some advantages this year," says Murray. First, this year's race won't be during finals week, as last year's was. The team also now knows what the actual racecourse will be like, and has made Alice street legal so that it doesn't have to be hauled on a trailer, as Bob was.

While no one will go out on a limb and predict that Caltech will win, Burdick forecasts that someone will complete this year's course—"a remarkable evolution of the technology and a testament to the hard work of all the teams."

### Service Awards, from page 5

Institute's professors. "When new students arrive, most of them are terrified of faculty—tapping on doors, apologizing for disturbing them. By the time they leave they've transformed from wide-eyed kids into confident adults. I like to feel I had a small hand in the educational process." The senior administrative secretary has also worked as an editorial assistant in the division, and earlier spent seven years working for Caltech's library system.

Caltech president David Baltimore and Dean Currie, vice president for business and finance, presented the awards, after which refreshments were provided in Beckman Institute Courtyard amid a display of photos from previous years' service awards. Employees receiving awards of 20 years and above attended a special Athenaeum lunch afterward.

# Caltech 336

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