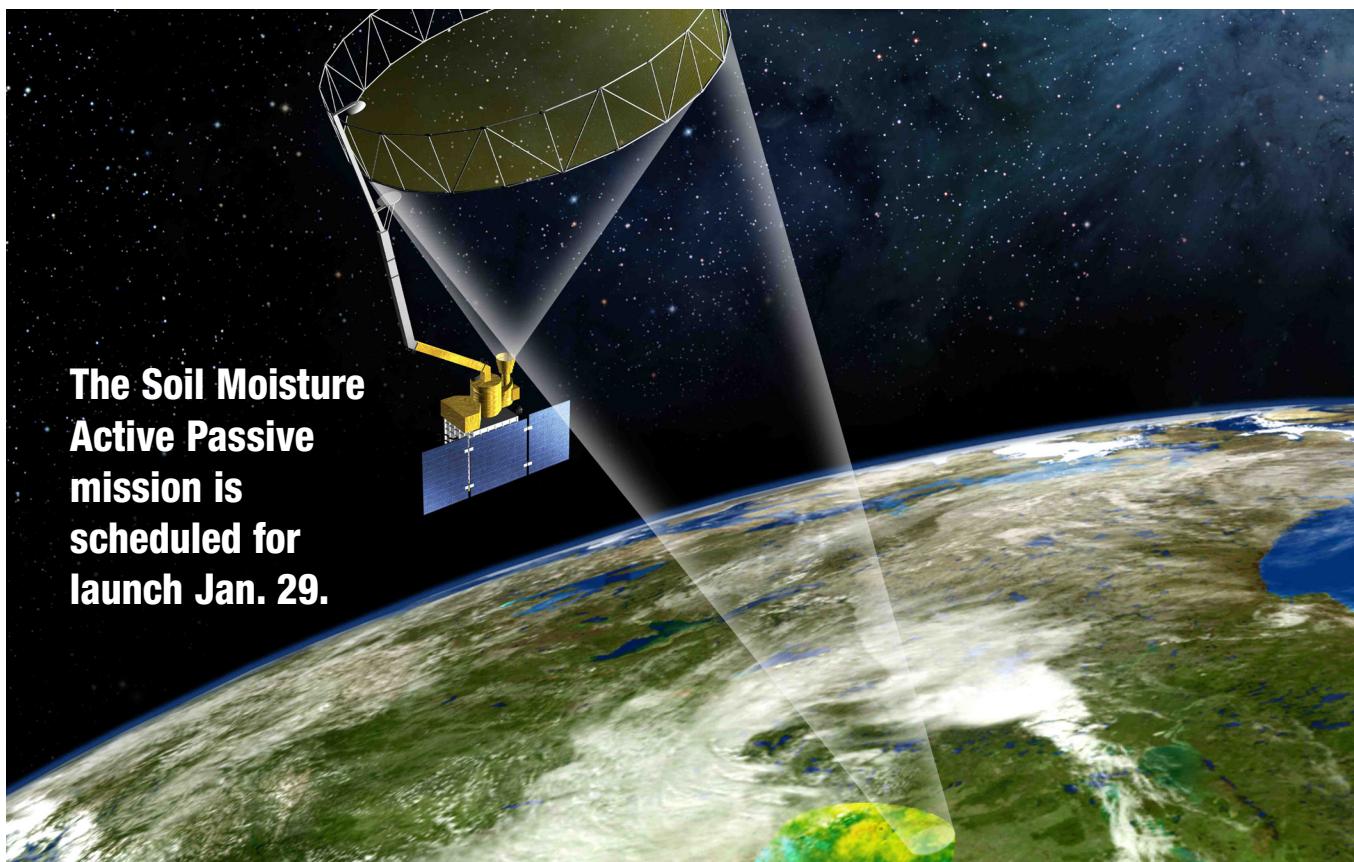


Universe

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2015: A look forward



SOIL MOISTURE ACTIVE PASSIVE

JPL kicks off 2015 with the scheduled Jan. 29 Vandenberg Air Force Base launch of the Soil Moisture Active Passive mission, the last of five NASA Earth science missions to launch since February 2014.

The mission will provide the most accurate, highest-resolution global measurements of soil moisture ever obtained from space and enhance scientists' understanding of Earth's water, energy and carbon cycles. Among its many expected applications, SMAP observations could improve seasonal forecasts of water availability and fore-

casts of flood and drought risks.

GRIFEX

Cubesats, the ultra-small satellites flown as auxiliary payloads aboard traditional satellites, are growing up. First used to demonstrate and test various technologies, the 10 x 10 x 10

Continued on page 2

2015 look forward *Continued from page 1*

square centimeter platforms are being developed to perform science as well.

JPL's next cubesat launch, GEO-CAPE ROIC In-Flight Performance Experiment (GRIFEX), is targeted for liftoff Jan. 29 onboard the Delta-II launcher carrying SMAP. The project is a 3U cubesat that will assess a JPL-developed Read-Out Integrated Circuit (ROIC). It will enable the proposed Geostationary Coastal and Air Pollution Events (GEO-CAPE) mission concept to make hourly high spatial and spectral resolution measurements of rapidly changing atmospheric chemistry and pollution transport.

JPL has eight additional cubesats in the active development pipeline, with more on the way. A new cubesat lab was dedicated in December (see page 6), and this summer JPL will complete an analysis of proposals from 10 universities to study cubesat concepts that could enhance a proposed Europa Clipper mission.

DAWN

Having entered its approach phase to the dwarf planet Ceres, JPL's Dawn spacecraft will begin to obtain the best-yet images of the body in late January and will arrive at Ceres March 6. Its first science orbit begins in April.

Dawn's arrival at Ceres—the first dwarf planet ever discovered—will mark the first time that a spacecraft has ever orbited two solar system targets. Dawn previously explored the protoplanet Vesta for 14 months, from 2011 to 2012, capturing detailed images and data. Ceres, with an average diameter of 590 miles (950 kilometers),

is the largest body in the asteroid belt between Mars and Jupiter.

LOW DENSITY SUPERSONIC DECELERATOR

To continue the quest to refine op-



timized landing systems at Mars, last year's successful tests of the Low Density Supersonic Decelerator (LDSD) will be followed up in February at China Lake with parachute tests with the system's rocket sled. A supersonic flight test at Kauai, Hawaii is targeted for June.

In addition, in October or November a rocket sled test of the larger supersonic inflatable aerodynamic decelerator will take place at China Lake. The decelerator is an inflatable doughnut that increases the vehicle's size and drag.

The innovative project earned recognition from Popular Science magazine, being recognized in the publication's "Best of What's New" Award in the aerospace category.

JASON 3

Extending the ocean-surface topography measurements begun by Topepx/Poseidon, Jason 3 is scheduled to launch in 2015 from Vandenberg Air Force Base. Jason 3 is a follow-on to the Ocean Surface Topography Mission on the Jason-2 satellite and represents the first truly operational satellite altimeter for oceanography applications.

Jason 3 will make highly detailed measurements of sea level to gain insight into ocean circulation and climate change. Its primary instrument, a radar altimeter, will measure sea-level variations over the global ocean with a very high accuracy of 1.3 inches or 3.3 centimeters, with a goal of achieving 1 inch or 2.5 centimeters.

MARS

Scientists on the Mars Science Laboratory mission will follow up on puzzling findings by the Curiosity rover of a temporary tenfold spike in methane, an organic chemical. Reports of plumes or patches of methane in the Martian atmosphere that vary over monthly timescales have defied explanation to date.

Curiosity will examine multiple layers of Mount Sharp after reaching its base and determining that the mountain originally formed as sediments deposited in lakes and rivers.

Continued on page 3

2015 look forward *Continued from page 2*

NASA's next mission to Mars, InSight, continues making progress toward a March 2016 launch. Assembly, test and launch operations are taking place this year.

The two long-lived Mars orbiters managed by JPL, Odyssey and Mars Reconnaissance Orbiter, are examining seasonal and longer-term changes on the Red Planet while continuing to provide relay-radio duty for rovers.

Entering its 11th year on Mars, the Opportunity is exploring the west rim

of Endeavour Crater. The ground team at JPL is working on a fix for recurrent problems with the rover's flash memory. Opportunity will next explore "Marathon Valley," a location that may have abundant clay minerals only about a half-mile (800 meters) to the south.

CASSINI

Dozens of flybys are scheduled throughout 2015 for the Saturn warhorse. In particular, four moon flybys are considered extremely close, including June 16 over Dione (altitude 321 miles). Three flybys of Enceladus

will follow: Oct. 14 (1,142 miles), Oct. 28 (30 miles) and Dec. 19 (3,106 miles).

For the super-close plume fly-through on Oct. 28, this will be the first-ever pass through the plume when its output is at its maximum. Cassini will be flying through the Enceladus plume for the last time.

JPL OPEN HOUSE

The Laboratory's annual showcase for the public will be held Saturday and Sunday, Oct. 10-11. ■

Welcome back to Oak Grove

By Mark Whalen

The last group of JPLers working under a lease of Woodbury complex property have returned to the Oak Grove site, for a total of 300 people who have moved.

Under a separate lease deal, about 150 members of the Office of the Chief Information Officer still work at Woodbury through September 2016.

JPL lease manager Gary Gray said NASA requested that JPL vacate Woodbury's buildings 601 and 602 by Dec. 31. The move took place mostly in October and November; the final group was in its new home Dec. 4.

The move actually affected about 550 people, noted Woodbury move manager Jose Coito. To make space for Woodbury staff, over the last 18 months about 250 JPLers at Oak Grove were relocated for renovations to buildings 171 and 202. Another 35 personnel moved into Building 111 and trailers 1711 and 1716.

Several optical labs and data centers also were consolidated, Coito added.

"People's expectations have been exceeded," noted Enterprise Business

Information Systems Manager Peter Rinde, whose team moved into Building 171, second floor.

Added Finance and Contract Management Manager Diane Newmark: "We love our new home in 202. We had to downsize, but in the end we are enjoying our new, cozy workspace."

Mary Ellen Derro of JPL Professional Development and consultant Branka Olson led the effort for reduced cubicle footprint design and collocation for Enterprise Business Information Systems, Human Resources Information Systems, Finance and Contract Management, and the Office of the Chief Information Officer.

About 150 employees from the Office of the Chief Information Officer now work at Oak Grove.

"I'm so pleased to have more OCIO people on Lab now!" said Chief Informa-



Facilities planner Mike Ascensio on the second floor of Building 171 with a new cubicle standard for JPL.

tion Officer Jim Rinaldi. "The updated facilities and even the temporary ones at least give us the ability to support the Lab more collaboratively. I look forward to having the whole team on Lab in the future."

"Moving a total of 550 people was a monumental task, noted JPL Deputy Director Larry James. "It took a complete team effort, from the NASA Facilities and Real Property Division as well as the JPL team, to make this happen. A great accomplishment!" ■

Workplace of the future

JPL 2025 initiative moves forward with JPLers' input

By Mark Whalen



Jakob van Zyl

Last summer, JPLers were invited to weigh in on what should be the Lab's areas of major focus over the next 10 years and what the workplace of the future might look like. Universe caught up with JPL Associate Director for Project Formulation and Strategy Jakob van Zyl, who is leading the 2025 initiative and discusses progress.

What is the background of the 2025 effort to plan so far ahead?

It began in 2013 with a survey in which JPLers identified “big picture” visions and program-scale ideas for the next decade and beyond. The result was called JPL’s “grand challenges.” By and large, these were in sync with our existing Lab strategy. Since then, I have coordinated discussions within the Executive Council about how to get from where we are today to the vision of these grand challenges. We came up with six “JPL will” statements outlining what we need to realize the ambitions of these challenges. These six thrust areas can be seen at <http://goto.jpl.nasa.gov/jpl2025>.

For the 2025 initiative, we asked employees for their input to identify the steps we need to take to achieve these goals. To realize the vision of the grand challenges, it was very important that we get input from the Laboratory population in general—to see the kinds of things the people in the trenches feel we need to be doing.

How many ideas were submitted, and have you looked at each of them?

About 1,100 came in. There was a lot of very interesting commentary, and we are considering each and every one of them. The fact that we got this many responses is a very good sign that people are interested in participating.

Is it possible to act on all of the good ideas?

Yes, I think so. Once you ask people for their input, you have a responsibility to do something about it. So we have taken it very seriously.

We have a very small team that's categorizing the input into things we can do relatively easily; things that will take a bit more effort; and others that we may not be able to accomplish because of regulations that we have to live with.

Nevertheless, we owe people a response, and we plan to give people an answer on all of them. We will post regular updates on the JPL2025 website.

What were the most common areas of concern put forth by JPLers??

There was a clear consensus that said we should continue to encourage a culture of innovation. And that innovative culture should go further than just the technical areas.

Many people said that JPL should be as innovative in our business practices and administrative areas as we are in our technical areas. Along with that is creating the environment in which innovation can flourish. For example, making spaces where people can come and tinker and try and build something quickly to see if it works or not.

Is that doable in JPL's existing facility?

Yes. As a matter of fact, there are already places where this happens. Very recently we opened the cubesat development lab (see article on page 6). We recognize that small satellites provide us with the opportunity to test

Continued on page 5

Workplace *Continued from page 4*

technology as well as implementation processes, testing innovation in what we are flying as well as how we develop it.

The question is, are we in a good position in terms of the balance between innovation and risk for a mission? “One size fits all” doesn’t work.

Is it important to also get the viewpoints of new employees, whether they have experience or are newly hired? Can outside opinions be of value?

Absolutely. In fact, one of the most gratifying experiences I had while briefing the divisions is that several people who recently joined JPL from other companies offered to talk to me about how those companies dealt with issues such as increased efficiency.

That’s a very valuable resource for us. The way in which people want to work these days is changing. We really need to make sure that we create the work environment of the future so that

we can attract the best to JPL.

We have already implemented a prime example—the Hub at the JPL library—where people can collaborate and have more interaction with their peers.

The fact that the work JPL does is performed nowhere else—is that enough to attract the best and brightest?

Clearly the spectacular things we do attracts a lot of great people, but that is not enough. We recognize that people the world over aspire to come work at JPL. But at the same time, there are lots of other exciting places that are very competitive for talent. While they don’t work directly in our field, companies such as Google and Apple also seek the talent we require.

So we are focusing on not just what we do, but how we do it, how we work, and the environment in which we work. A very key aspect to our new implementation plan is the first thrust area: “JPL, where you want to be.” It

focuses specifically on how we make JPL the place where the best talent wants to work.

Also, besides attracting new, excellent talent, we will focus on maintaining and growing the skills of our current workforce.

How effective can the 2025 study be when you don’t know the budget situation 10 years from now, or what JPL’s portfolio will be?

For the budget, flat is the new up. In this time, figuring out how to do things more efficiently can help shape the future. We want to be prepared for any eventuality so we are ready to capitalize when opportunities arise.

An important aspect of this is how to make it an ongoing process as opposed to a decadal process. So we are looking at ways in which we can get this kind of input on a much more regular basis so that we can update our plans more frequently than every 10 years. ■

SMALL SATELLITES, BIG RETURN

Cubesat lab will support a new area of strategic importance



JPL's new cubesat lab was dedicated in December. Workstations will initially support four cubesat projects.

By Mark Whalen

JPL has dedicated a newly constructed laboratory to help researchers develop cubesats, the small satellites that are graduating from technology demonstration to real science.

Four JPL-led cubesat projects will be the initial tenants of the facility in Building 198: Mars CubeSat One, a telecommunications relay for Mars InSight that will provide better real-time telemetry during entry, descent and landing; RainCube, the first cubesat Ka-band radar; Asteria, to test precision pointing capabilities; and Tempest, to measure rainfall using a constellation of satellites.

"We're on the ground floor of a new type of vehicle that has very complementary capabilities to the standard type of spacecraft that we build today," said Jim Fanson of the Instruments Division.

Fanson noted the growing popularity of the 10 centimeter x 10 centimeter x 10 centimeter building block.

"We have been using cubesats for a while as platforms to demonstrate and qualify various technologies, but we're now at the point where we see using them to do science—around Earth, at the moon and in deep space," Fanson said. "We want to take advantage of the emerging infrastructure around cubesats and find a way, working with universities and companies, to perform

actual science. With the science missions comes an expectation for longer mission duration and higher reliability—particularly if we are going to send them into deep space into hazardous environments or on dangerous missions."

The lab can support four cubesat projects at a time, but the long-term plan is to double its capacity by repurposing the east half of Building 189, which is now engaged in wet chemistry services and capabilities, Fanson said. Part of the purpose of the lab is to co-locate JPL's cubesat teams there, where they can make use of test facilities, vacuum chambers, vibration tables and other equipment.

Some of JPL's collaborations to date have involved the Laboratory delivering components to universities to integrate cubesats that they have been developing. There may be situations where the cubesat "bus" is delivered by another supplier to JPL for integration here.

"JPL's institutional commitment to find scientific uses for cubesats, and to better learn how to do small inexpensive spacecraft, will allow us to explore in ways we have never before, and leverage and expand the scientific return from our more conventional spacecraft," said Fanson.

News

Briefs



Ashwin Vasavada



Gerard Holzmann



David Halpern

Vasavada new Curiosity chief scientist

Ashwin Vasavada has been named project scientist for the Mars Curiosity mission. He previously served as deputy project scientist.

Vasavada has helped to see the project through development of the spacecraft, selection and integration of the science instruments, selection of the landing site in Mars' Gale Crater, activities of Curiosity since its August 2012 landing, and publication of many research findings.

Vasavada has also worked on the science teams for NASA's Lunar Reconnaissance Orbiter and for JPL's Cassini mission to Saturn. He holds a doctorate in planetary science from Caltech and a bachelor of science degree in geophysics and space physics from UCLA.

Holzmann feted for software quality

Gerard Holzmann, head of the Laboratory for Reliable Software at JPL, has been named recipient of the 2015 Institute of Electrical and Electronics Engineers Computer Society Harlan D. Mills Award.

The award recognizes researchers and practitioners who have demonstrated longstanding contributions to information science theory and practice, focusing on applying sound theory to software engineering practice. Holzmann's honor is for "fundamental contributions to improving software quality, in particular through model-checking tools and coding standards, and for successfully transferring these contributions to practitioners developing mission-critical software."

A JPL Fellow, Holzmann designed the coding standard that has become the standard for all flight software development at JPL.

Halpern receives AAAS honor

David Halpern of the Earth Sciences Section, a member of the Council of the American Association for the Advancement of Science and an AAAS Fellow, has been elected a member of the AAAS Committee on Council Affairs.

Halpern, a senior research scientist, has been with JPL since 1986. He formerly served as a senior policy analyst at the White House Office of Science and Technology Policy, and has taught at Caltech and UCLA. He earned NASA's Exceptional Service Medal in 2007.

Passings

Thomas Potter, 87, a retired engineer, died Nov. 14.

Potter joined JPL in 1953 while working at the White Sands Proving Ground in New Mexico. In 1959 he transferred to Barstow, Calif. to help establish JPL's Goldstone Tracking Station, where he worked until his 1984 retirement.

Potter is survived by his wife, Phyllis, children Ross and Peggy, six grandchildren, 17 great-grandchildren and three great-great-grandchildren.

Theodore Moyer, 78, a retired senior systems engineer in the Navigation and Mission Design Section, died Dec. 5.

Moyer served as cognizant engineer for Regres, an orbit determination program, shortly after arriving at JPL in 1963. The programs have been used to navigate all the deep-space probes and Earth orbiters that have been managed by JPL since then, as well as other U.S. missions and those of foreign space agencies.

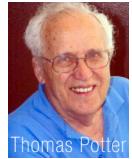
In 2003, Moyer authored the book "Formulation for Observed and Computed Values of Deep Space Network Data Types for Navigation," which documented the formulation of Regres.

Moyer is survived by his wife, Sue.

Jewel Beckert, 78, a retired engineering applications software engineer, died Dec. 24.

Beckert joined JPL in 1957 and retired in 1999 as a senior electrical engineer. He received NASA's Exceptional Service Medal in 1992 and 1994.

Beckert is survived by his wife, Donna; sons Barry, Jeffrey and Kevin; daughters April and Theresa; eight grandchildren and three great-grandchildren.



Thomas Potter

JPL researcher Alberto Behar, 47, died in a plane crash Jan. 9.

Behar had been with JPL since 1991. He played a key role in developing in-situ robotic systems for

measuring ice sheets in Antarctica and Greenland using submarines, ice rovers and boats. He was a team member for a January 2013 drilling project through the overlying ice sheet of Lake Whillans, marking the first successful retrieval of clean, whole samples from an Antarctic subglacial lake.

An expert on robotics for exploring extreme environments on Earth and other planets, Behar worked in the Avionics, Instruments, and Science divisions. While in the robotics group, he received his Ph.D. in electrical engineering from USC in 1998.

Behar also served as the investigation scientist for the Dynamic Albedo of Neutrons instrument on the Mars Curiosity rover and the High Energy Neutron Detector on the Mars Odyssey orbiter. He was also a research professor at Arizona State University.

Behar is survived by his wife and three children.



Alberto Behar

R_etirees

The following employee retired in December:
Jan Magee, 35 years, Section 3513.

C_lassifieds

Ads submitted Dec. 27-Jan. 8. To submit an ad, e-mail universe@jpl.nasa.gov.

For Sale

ELECTRONIC DRUM KIT, Yamaha DTXplorer Behringer Ultratone KT108 keyboard amplifier, drum throne (stool), 2 pairs of drumsticks, headphones and adapter and note stand, light and small footprint, excellent cond., \$390/obo. 818-726-7910.

FURNITURE: Coffee table, sandstone top with wood legs, \$250; matching end tables, sandstone top, wooden legs, \$100/ea.; oak dining table, 68" x 43," two leaves 18" wide, six chairs, \$1,000; oak hutch, two piece, 57" x 81," \$1,000; entertainment center, three piece wood, 90 "x 78," fits 27" TV, free. bbean@att.net, 805-239-8871.

KITCHEN APPLIANCES: Frigidaire dishwasher, 10 years old, see [\\$100](http://orangecounty.craigslist.org/app/4804098858.html); Whirlpool gas range, good condition, see [\\$100](http://orangecounty.craigslist.org/app/4820329579.html). pmkroger@verizon.net, 310-850-7845.

LOVE SEAT, rarely used and in excellent condition; no frays, worn spots or stains; olive green with tan piping; one large backrest pillow and two regular pillows; overall 64" wide x 45" deep x 31" height, seat cushion is 44" wide; picture available. 626-375-2552, Eric Clark.

Vehicles/Accessories

'08 HONDA CR-V; glacier blue, sunroof, moonroof, alloy wheels, GPS, backup camera, seat warmers, cruise control, etc., \$46.5K miles; great car for your child/student/graduating senior, excellent condition and very reliable; \$21K/obo OBO. 818-957-5848.

'03 LEXUS ES300, silver interior/exterior, 87,000 miles, \$8,500/obo. 818-957-8614, Mina.

'83 LARSON 16' 90 hp outboard motor boat, rebuilt to 190hp, reupholstered and carpeted, garaged, fresh water only, \$3,500 with trailer. bbean@att.net, 805-239-8871.

TRUCK TOOLBOX, 53" x 60" diamond plate, \$150. bbean@att.net, 805-239-8871.

Wanted

SINGLE FAMILY HOME, 3 bedrooms/2 baths; in the Valley, North Hollywood surrounding area; must be pet friendly; preferably a pool; available to move in Jan. 30; price range \$2,000-\$2,500. Sarah: 612-876-6385 or chat327@aol.com.

ROOMMATE for 3-bedrm./2-bath house in north Pasadena, just west of Lake Ave.; all appliances included, large yard, garage and gated off-street parking; close to Old Town, Rose Bowl and JPL; prefer early career hire, male, someone who will keep common areas clean; preference to those looking to lease ASAP and/or for more than one year; ~\$1,000/mo., with 1 month security deposit. Jeff: 765-620-4342, jrstuart1986@gmail.com.

SPACE INFO/memorabilia, U.S. & other countries, past/present, for personal use (<http://www.youtube.com/watch?v=S7PvjGp7mCU>). mrayman@alumni.princeton.edu, 818-790-8523, Marc Rayman.

Lost & Found

LOST: activity notes, April 2006–March 2007. SOSNotez@riseup.net.

For Rent

ALTADENA, one room in a lovely 3-bd./2-bath house, big backyard, hardwood floor, big closet, furnished or unfurnished, shared bathroom, kitchen and laundry privileges; 5-minute drive to JPL, close to public transportation; short- or long-term lease available; must like dogs and be very clean; \$750 furnished, \$700 not furnished, including utilities + \$650 deposit. 626-712-3451.

SIERRA MADRE, 1 bedroom, 1 bath, w/ofc, covered patio, new paint and wood floors throughout, laundry hookups, storage, parking, new bath, many upgrades, steps to JPL bus, more; no smoke/pets; \$1,700 + sec dep. 626-355-7991.

Vacation Rentals

BIG BEAR lakefront, luxury townhome, 2 decks, tennis, pool/spa, beautiful master bdrm. suite, sleeps 6. 949-786-6548.

HAWAII, Maui condo, NW coast, ocean-front view, 25 ft. from the surf, 1 bd. w/loft, completely furnished, phone, flat screen TV, VCR, DVD, CD, microwave, d/w, pool, private lanai, laundry facility, sleeps 4; photos: www.halekai.com, unit 202; please call Valerie, the office manager, for prices and reservations at 800-446-7307. 850-249-2860.

JACKSON HOLE, WY: Luxurious bed and breakfast nestled on 3 acres of solitude on the Snake River and down the road from the Jackson Hole Mountain Resort and the south entrance to Grand Teton National Park; see <http://www.bentwoodinn.com/>; mention JPL for employee discount. info@bentwoodinn.com, 307-739-1411.

MAMMOTH, Snowcreek, 2 bd., 2 ba. + loft, sleeps 6-8, fully equip'd kitchen incl. microwave, D/W, cable TV, VCR, phone, balcony w/mtn. vw., Jacz., sauna, streams, fishponds, close to Mammoth Creek, JPL discount, no pets. 626-798-9222, 626-794-0455 or valeriee@caltech.edu.

MAMMOTH, Snowcrk, beautiful updated condo, 2 bd., 2 ba. + loft (slps. 6-8), great loc. by pond & meadow, new appliances, TVs, DVD players, free wireless Internet access + washer/dryer, no pets. 818-952-2696 or BigMtnPrettySky@gmail.com.

OCEANSIDE beachfront condo, charming 1 bd., panoramic view, walk to pier or harbor, pool/spa, game room, sleeps 4. 949-786-6548.

OCEANSIDE white-water view beach condo; virtual tour: <http://www.previewfirst.com/mls/33034>; 2 bd., 2 ba., sleeps 6; well decorated and equip'd: boogie boards, wet suits, full kitchen, all linens, beach towels; Wi-Fi ready, new flat-screen TVs, daily paper, grocery stores nearby; 2-min. walk to sand, no roads; JPL and Caltech rates: winter \$1,195/week, summer \$2,150/week; monthly and nightly rates available, reserve with \$500 deposit; see www.beachvisitors.com. 760-433-4459, Grace; 831-425-5114, Ginger.



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universe@jpl.nasa.gov

Editor

Mark Whalen

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