



Dutch Steger / JPL Photo Lab

In honor of the women of JPL

JPL women gathered for a group photo on Thursday, March 8, which is International Women's Day. It was one of several events sponsored by JPL's Advisory Council for Women during Women's History Month in March.

On March 10 a JPL team of 13 raised

\$750 at the Susan G. Komen Race for the Cure at Dodger Stadium, a 5K run/walk to support the breast cancer movement. The organization is collecting funds through the end of March.

A Women's History Month luncheon was scheduled for March 15 at Oakmont

Country Club in Glendale with Christine Darden, one of the women featured in the book "Hidden Figures."

JPL is also supporting the Downtown Women's Center Supply Drive March 26-29, with collection bins at the visitors center and parking structure.

Pitch Day brings out innovative ideas

By Taylor Hill

JPLers with ideas big and small converged on the fourth edition of JPL Pitch Day Feb. 14, airing proposals that ranged from measuring 98 billion unstudied galaxies, to better preserving and displaying history's first close-up image of another planet from space, unceremoniously hung in a hallway on Lab.

"This is an opportunity for you to give us ideas that are things that normally wouldn't be heard; there's no clear way to fund stuff like this, but somebody needs to hear it," said Stacey Boland, JPL sys-



Fernando Mier-Hicks proposed creating standard cables that would lower the cost of missions.

tems engineer and Pitch Day organizer. "That's what Pitch Day is all about."

Participants presented a total of 11 pitches, each allotted three minutes for persuading a panel of judges.

"This really came out of the Spark initiative, about changing and evolving how we work," said Tom Soderstrom, chief technology and innovation officer at JPL. "We're not looking for million-dollar projects here. Some require a little bit of funding, and some don't require any, and we're here to help you figure out ways to get them done."

Continued on page 2

Highlights of the day included robotics electrical engineer Fernando Mier-Hicks and his pitch for creating standard cables that would lower the cost of missions such as Mars 2020 — where he saw the high price of custom cables while designing the ground support equipment for the sampling and caching subsystem aboard the rover.

“The custom cables used to connect a spacecraft to its electrical ground support equipment are sometimes as expensive as the GSE itself,” Mier-Hicks said. “The complexity of interconnecting spacecraft and GSE should be handled by a custom printed circuit board, thus allowing cables to be simpler, become more standard across Lab, and be more affordable.”

The panel of judges directed Mier-Hicks to work with supervisors in the Autonomous Systems Division (34) and collaborate on a prototype GSE cable-build and potentially into future projects.

One of the most ambitious pitches came from U.S. Euclid deputy project scientist Jason Rhodes, who called on JPL to take the lead in developing two technologies needed to measure the properties of all of the galaxies in the known universe — about 98 billion of them.

“There are approximately 100 billion galaxies in the universe. By 2030, we’ll have measured the detailed properties of 2 billion of them. Measuring the shapes, colors, and locations of the remaining 98 billion is within our technological grasp in the coming decades; this would be the ultimate astrophysics experiment.”

Rhodes said he got the idea from the success of the European Space Agency’s Planck mission, which used JPL technology to gauge temperature fluctuations in the Cosmic Microwave Background — radiation left over from the Big Bang. “Those small temperature fluctuations in the CMB tell us almost everything we know about the early universe, and the Planck mea-



Engineer Evan Hilgemann proposed this hand-drawn image taken by Mariner 4 be housed in a prominent location.

surements are so good that there is no more information to be gleaned about the early universe from temperature fluctuations in the CMB.”

The next way to learn about the more mature universe, some billions of years after the Big Bang, is to study galaxies, Rhodes said. That would require deploying massive mirrors and assembling 10-meter-plus telescopes in space and developing ultra-large focal planes or cameras capable of producing 10-plus gigapixel images.

Soderstrom noted the “huge effort” needed for such a program, but planned further discussion with Rhodes.

On a more terrestrial level, mechanical engineer Evan Hilgemann pitched a simple idea: “I think that the first picture from Mars ideally represents who we are and what we’ve accomplished as leaders in robotic exploration of space,” Hilgemann said. “It should be celebrated! Not hidden from view in an office corridor.”

Hilgemann was referring to an image taken by Mariner 4 in its flyby of the Red Planet in 1965. At the time, a “data translator” machine converted the digital image data into numbers printed on strips of paper. JPL employees too anxious to

wait for the official processed image took the strips, placed them side by side, and hand-colored the numbers with crayons, like a paint-by-numbers picture. Today, the framed image hangs in Building 186 — coincidentally just down the hall from Pitch Day panel judge and director of communications Michael Greene.

“After this meeting we’re going to walk over to my office and we’re going to unhook the picture,” Greene joked. “But seriously, I love the fact that you’re passionate about that. I think really important objects need to be preserved, so I’d like to help and take some steps to see what we need to do for that.”

Hilgemann hopes the picture will be moved to a prominent location, and steps are taken to make sure the image is properly preserved. He also hopes others take advantage of Pitch Day in the future.

“It’s a great way to get your voice heard and see actionable steps being taken towards future improvements,” Hilgemann said. “I’m looking forward to working with my assigned champion from the panel to ensure that ‘The First Picture from Mars’ can be enjoyed by everyone!”

All of the pitches can be seen at <https://jpltube.jpl.nasa.gov/Watch=c2zfeZ>.

How JPL is going green

Lab-wide changes have reduced energy consumption more than 15 percent

By Carl Marziali

Sustainability on Lab goes mostly unnoticed, save for one very large and prominent exception to come.

In a boon for the planet, but not for punctuality, a massive solar array will shade the roof of the structure by late 2018. Late arrivals to work currently are shunted to the rooftop level of the parking structure. They are punished with a sweltering car on their return, with seats like hot plates.

The 1 megawatt system will be more than three times more powerful than the 300 kW array mounted on top of 301 in 2016, and 30 times bigger than a pilot project on 302 installed in 2007.

At peak, the arrays will offset nearly 7 percent of the Lab's power use. They also reduce air conditioning costs for the cars or buildings in their shadow. And they save money in the long run, after 10 to 15 years.

JPL's sustainability team is eyeing solar arrays for the parking lot on Cardiac Hill and other buildings on Lab. Future projects will depend on NASA approval and funding.

Not all buildings are suited for rooftop solar, and even if they were, the Lab could not rely on solar energy alone to power itself sustainably. Solar at best could supply about 12 percent of the Lab's electricity.

JPL is making progress in other ways. Water use has dropped from 45 gallons per square foot of Lab space in 2007 to 30 gallons today. As people use less water, their energy use decreases. About



one fifth of the state's electricity goes into moving and treating water.

Bob Develle, the Lab's recently retired sustainability manager, credits more efficient landscaping and irrigation for most of the water reduction. Starting in 2009, the Facilities' team modernized the outdoor watering system by computerizing irrigation controls, planting less thirsty species, removing thousands of square feet of turf — even changing sprinkler heads to spray larger droplets so the water has a chance to seep into the soil before it evaporates.

The biggest improvements have been invisible. The Facilities team has replaced 37 HVAC chillers around Lab with more efficient models. Every chiller uses as much power as generated by all the solar panels on building 301. Environmental researchers rank improvements in air con-

ditioning as the most effective measure to fight climate change, well ahead of electric vehicles and solar farms.

Facilities plans to focus on other unglamorous projects, such as weatherstripping and better windows. All of the Lab's outdoor lights have already been converted to LEDs.

The Lab's combined sustainability efforts have reduced energy intensity — energy use per square foot of floor space — by 16 percent since 2003.

The latest effort may be the most significant, even though energy savings are not the prime motivation. The Flex-work program has the potential to cut thousands of vehicle miles of carbon emissions — and, ironically, to make solar shade in the parking structure a bit less valuable.

New canopy to aid Lab guests

By Mark Whalen

It's safe to say that most of the thousands of visitors to JPL think it's a really cool place. Soon, they can literally cool off while waiting to enter the Lab on tour.

JPL Facilities has constructed a canopy aside the Visitors Center, Building 249, to provide protection from the elements for visitors to the Laboratory.

The new area will also help relieve the bottleneck of people waiting to sign in inside the Visitors Center, said Carl Cristiano of Facilities. The project will ease congestion by providing an area for visitors awaiting tours who previously had to stand on the sidewalk, he added. The structure can accommodate up to 80 people.

Drought-resistant landscaping was added around the structure in mid-February. A translucent roof has been added, and benches provided for visitors.

Two proposals for the structure were considered. Facilities chose a steel and



aluminum noncombustible framework that negates fire concerns and requires less future maintenance. The other proposal, a wood canopy, would have required fire sprinklers at an additional cost of \$15,000, as well as additional safety approvals.

Cristiano noted that the shape of the structure was designed to echo the soar-

ing feeling emblematic of the motion of a spacecraft lifting off.

"This project provides added protection from the elements while keeping the project's environmental footprint to a minimum," added Cristiano.

Pasadena-based architecture and engineering firm Parsons designed the canopy.

Passings

Clifford Heindl, 94, retired deputy manager of the Science Division, died Dec. 25.

Heindl came to JPL from Oak Ridge National Lab in 1959 as a group supervisor in what was then the predecessor of the Science Division. The group investigated the feasibility of nuclear propulsion for JPL spacecraft, through both theory and experimental work. Heindl served as deputy manager of the Earth and Space Sciences Division (Division 32) from its inception in 1976 until his retirement in 2005.

Eugene Reiz, 93, a retired senior contract negotiator specialist, died Jan. 1.

Reiz, who worked at the Lab from 1966 to 1989, contributed to many JPL missions, including Mariner-Venus-Mercury, Ulysses and Magellan. He received NASA's Exceptional Service Medal in 1993.

Reiz is survived by his wife, Jane; daughters Jan, Jeni, Jamie and Julie; and four grandchildren.

Retirees

The following JPL employees recently announced their retirements:

February

Bryan Huneycutt, 44 years, Section 334C; **Edward Olsen**, 43 years, Section 329E; **Dennis Kern**, 39 years, Section 352; **William Patzert**, 35 years, Section 329B; **Miguel Marina**, 32 years, Section 9220; **Martha Scarbrough**, 31 years, Section 2672; **Julie Reiz**, 29 years, Section 3011; **John Ewing**, 28 years, Section 2821; **Dara Sabahi**, 27 years, Section 3000; **Rebecca Edick**, 27 years, Section 3812; **Alfred Kwan**, 25 years, Section 333E; **Robert Develle Jr.**, 17 years, Section 2800; **Keith Fields**, 17 years, Section 357F; **Reynaldo Garcia**, 17 years, Section 2220; **Cliffon Fredericks**, 14 years, Section 2512; **Ronald Korniski**, 10 years, Section 383.

January

John Gieselman, 44 years, Section 329E; **Gary Gutt**, 29 years, Section 383D; **Carolyn Chester**, 12 years, Section 5020.

News Briefs

Chahat honored as future leader

Nacer Chahat, technical section staff and product delivery manager in the Flight Communications Systems Section (337), was awarded the Future Technology Leader Award from the Engineers' Council for "antenna innovations that are enabling for NASA missions and commercial enterprise operating in extreme thermal, radiation, high power and electrostatic discharge environments."

Presented at an awards banquet in February, the honor recognizes early career professionals who have achieved significant accomplishments in a particular area of engineering activity.

Chahat has authored and co-authored more than 100 technical journal articles and conference papers, has written four book chapters, holds seven patents, and received 10 international and national awards.

Classifieds

Ads submitted Feb. 26–March 9.

For Sale

LEAGUE OF LEGENDS FIGURES, assorted 4" official Riot Games collectables: Heimerdinger, Lux, Poppy, Nami, Blitzcrank, Lulu; does not include original boxes, exc. cond.; originally paid \$25/each, asking \$12/each or \$60 for all 6. murlocs76@gmail.com.

MASSAGE EQUIPMENT: table, \$100; Homedics TherapistSelect for back massage, \$30; Clark kneading fingers for massaging neck and shoulders, \$50. 818-353-2467.

MONITOR, Hanns.-G HZ201DPB, black, 20" 5ms wide-screen LCD w/ 2 x 1.5W speakers, 250 cd/m² X-Contrast 15,000:1 (1,000:1), 1600 x 900 resolution, D-Sub and DVI connections (incl. D-Sub cable), 160° (H) / 160° (V) viewing angle; \$40. lordig100@yahoo.com or 317-522-8866, Zach.

PET CARRIER, airline approved, quality, expandable, soft-sided, best for small or medium pet, fits under front airplane seat, never used, photos available; \$30. nuyrstar@hotmail.com.

SECURITY CAMERA KITS (2) (Ring Video doorbell, Ring stick up security camera with solar panel); see <https://www.amazon.com/Security-Vision-Motion-Ring-doorbell/dp/B01MG8QCGX>; \$280 each. 818-667-3114.

SKI LIFT TICKETS (2), all-day, adult vouchers/tickets to Mammoth Mountain; completely transferable and can be used any day; current ticket prices are \$150/each, sell for \$90/each. rogerkuch@gmail.com.

SOUND RECORDING SYSTEM, Zoom H4N recorder w/Sony MDR 7506 headphones, Tram TR50BNC Lav, Rode Videomic, K-Tek Bottom Boom, Doskocil Case plus more; picture: <https://losangeles.craigslist.org/sgv/pho/d/zoom-sound-recording-system/6520993329.html>; sell as a complete set, \$575. Dennis Hill: creator@dennishill.com, 626-345-0670.

VIDEO DOORBELLS (2), Ring Pro (with 1080HD video, two-way audio and customizable motion sensors), \$180/each. 818-667-3114.

Vehicles / Accessories

BIKE, Haro Metro Gomez disc brake commuter, 18" frame (medium), newly tuned, new parts include stem/grips/handlebar/tubes; slight scratches, no dents or dings, 700c tires, very rare full hard suspension bike; \$250. Text 818-370-5774.

BIKE, Softride 650cc, med. sized, purchased, assembled, stored away a rare, unique TT bike is mint, serious offers only, downsizing my collection; comes with a beam bag and larger aero water bottle, smaller water bottle, spd pedals and seat not included (I will include and install another bike seat and pedals); \$550. Text 818-370-5774.

'09 HONDA Civic SI 6-speed manual, 106,500 miles, red, fully maintained, runs great; \$7,000/obo. Padrix5@icloud.com.

Free

DESK, L-shape, man-made wood, 80 x 70 x W23-25; picture at <https://artbyamv.com/stuff>; you pick up. 818-353-2467.

Wanted

RENTAL, 2 bedrooms, with parking for 2 cars in the Pasadena, Altadena or Sierra Madre areas; budget \$2K, wanting to move in ASAP. 206-637-5333. MattFling@protonmail.com.

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

Real Estate for Sale

LEBEC-area mountaintop retreat, spectacular views, 4 bedrooms/2 baths, 3,210 sq. ft. custom-built house on 20 acres, surrounded by vast fields of wildflowers in spring but stunning year-round; only about an hour from JPL north on I-5; includes spacious workshop or artist's studio; see <http://tours.tourfactory.com/tours/tour.asp?t=1308594&idx=1>; \$524,500. 805-358-1626 or Robert.A.Preston@icloud.com.

For Rent

ALTADENA, furnished bedroom in a beautiful 4-bd./ 2-bath house; includes desk, dresser, bedding, towels, WiFi, etc.; share common areas w/2 considerate JPLers; large kitchen w/ample storage, quiet, safe neighborhood; large, fenced yard with mature shade trees, easy bike distance to JPL (1 mile); includes all utilities; \$825/month. Louise: 818-653-9600, louise@louiseh.org.

ALTADENA house, avail. early April, fully remodeled, 3 bedrooms, 2 baths, updated master bdrm. w/private updated bathroom & double sinks, updated guest bath, all-new flooring, paint, recessed lighting + windows, updated kitchen w/new stainless steel appliances; private 1/4-acre lot w/new landscaping, beautiful patio area + outdoor security cameras; 2-car garage w/lots of storage; new a/c and heater, laundry hookup, gas fireplace and formal dining room; less than 2

miles to JPL; pets open for discussion; \$3,500/month includes gardener and water with 2-year lease. Jennifer Franklin: 818-415-8334 or jenniferbfranklin@gmail.com.

GRANADA HILLS house, for lease, 4 bdrms., 1.75 baths, 1,486 sq. ft, quiet neighborhood near Knollwood Country Club, central air; 2-car attached garage w/laundry hookup; new carpet, tiles; \$2,700/mo. plus security deposit, no pets. homarellc@gmail.com.

ORANGE, for lease, beautiful 4 bedrooms, 3 baths, family room, living room, ranch-style home, on corner lot with pool and spa, totally renovated in 2015; open great room/kitchen with center island, 2 sinks, laundry room, 2-car garage; close to 55 and 57 fwy's, Chapman University, Cal State Fullerton, Disneyland, Honda Center, Angel Stadium and The Orange Circle; \$4,500/mo. bettyrs@earthlink.net or 626-429-3677.

PASADENA, excellent northeast neighborhood; hardwood floors, new paint, washer/dryer, refrigerator, stove, window a/c unit, floor heater, lots of natural sunlight, plenty of closet space, upgraded vanity in the bathroom, dining area in kitchen; surrounded by a large green yard w/lemon and fig trees, 1-car parking, quiet residential neighborhood, minutes drive to JPL; water, trash, gardening fees included in rent, available April 1; \$2,100/month. 818-430-1232 or derkevor@gmail.com.

PASADENA, furn. room in a lovely 4-bd./2-bath house, big backyard, hardwood floor, big closet, shared bathroom, kitchen/laundry privileges; 2 miles to JPL, close to public transportation; short- or long-term lease avail.; must like dogs and be very clean; \$900 + \$900 deposit. 818-960-8654.

SIERRA MADRE, 2-bedroom, 2-bath apartment (1,500 sq. ft.) in a 2-level townhouse (3 units) with fireplace, dishwasher, space for dryer + washer on 2nd floor and attached 2-car garage (connected to apt.); Metro bus stop to JPL in walking distance; \$2,600 monthly. 626-233-2047, Pauli.

Vacation Rentals

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, 626-840-3749 or valeriee@caltech.edu.

MAMMOTH, Snowcreek, beautiful updated condo, 2 bd., 2 ba. + loft (sleeps 6-8), near pond/meadow, new appliances, TVs, DVD players, free wireless internet, washer/dryer, no pets. 818-952-2696 or BigMtnPrettySky@gmail.com.

MAMMOTH, remodeled 2 bed/2 bath + loft, short walk to Canyon Lodge; Courchevel 6 features full kitchen, cable/Internet TV, DVD, Blu-Ray, wireless hi-speed Internet, 2-car garage, Jacuzzis, grill, pool; no pets. <http://Courchevel6.com>.

PALM DESERT, Waring Place community, 4 bd., 3 baths, pool, spa, BBQ, fully equipped kitchen, wireless internet, washer/dryer, photos by request, available April 2. 626-487-9437 or nuyrstar@hotmail.com.

Universe

Editor

Mark Whalen

universe@jpl.nasa.gov

Universe is published by the
Communications and Education
Directorate of the Jet Propulsion
Laboratory,
4800 Oak Grove Drive,
Pasadena, CA 91109.