

## Featured Stories



Carol Raymond with a Vesta meteorite (Photos by Ryan Lannom).

## Dusk approaches for Dawn

JPL veterans and relative newcomers to the Lab joined to make Dawn a success well beyond expectations. Over its 11-year mission powered by ion propulsion, the spacecraft was the first to orbit an object in the main asteroid belt between Mars and Jupiter and the only spacecraft to orbit two extraterrestrial targets—the planet-like world Vesta and dwarf planet Ceres. The pair serve as time capsules back to the dawn of the Solar System.

Each of Dawn's three 12-inch-diameter ion thrust units is movable in two axes to allow for migration of the spacecraft's center of mass, allowing the attitude-control system to use the ion thrusters to help control spacecraft attitude. The thrusters use an electrical charge to accelerate ions from xenon fuel to a speed seven to 10 times that of chemical engines. At maximum thrust, each of Dawn's three ion propulsion engines produces about the same amount of force involved in holding a single piece of notebook paper in your hand.

The mission overcame significant engineering challenges, most notably the loss of the reaction wheels that control the spacecraft's orientation in space. But ingenuity, creativity and teamwork allowed Dawn to proceed and achieve its science goals and beyond.

Dawn reached Vesta in 2011 and investigated it from surface to core during 14 months in orbit. Vesta was shown to be a dry, rocky, differentiated body with a basaltic crust on the surface, and an iron core, similar to terrestrial planets and Earth's moon. Dawn confirmed that many meteorites here on Earth came from Vesta.

In 2012, Dawn left Vesta and traveled for more than two years before entering orbit around Ceres, where it has been collecting data since 2015. Ceres surprised scientists with its heavily cratered surface, a mixture of clays, salt and ice. Young deposits on Ceres indicated there is a process still active inside of the body that's mobilizing salty materials and bringing them to the surface.

As Dawn runs out of hydrazine and the mission comes to a close sometime between late September and mid-October, team members shared their experiences and best memories with Universe.

**Q:** The way Dawn has turned out is a lot different from when it was first conceived and also from when it was launched. How did the team respond, particularly to the loss of reaction wheels?

**Carol Raymond, principal investigator**

We used all the capability of the mission to achieve science beyond expectations. Even though we launched with defective reaction wheels, the team responded in their usual extraordinary way to rise up and overcome this challenge by programming a new hybrid attitude control system using the remaining two wheels and hydrazine jets. If the team and the spacecraft had not been so capable, the loss of the reaction wheels could have been devastating.

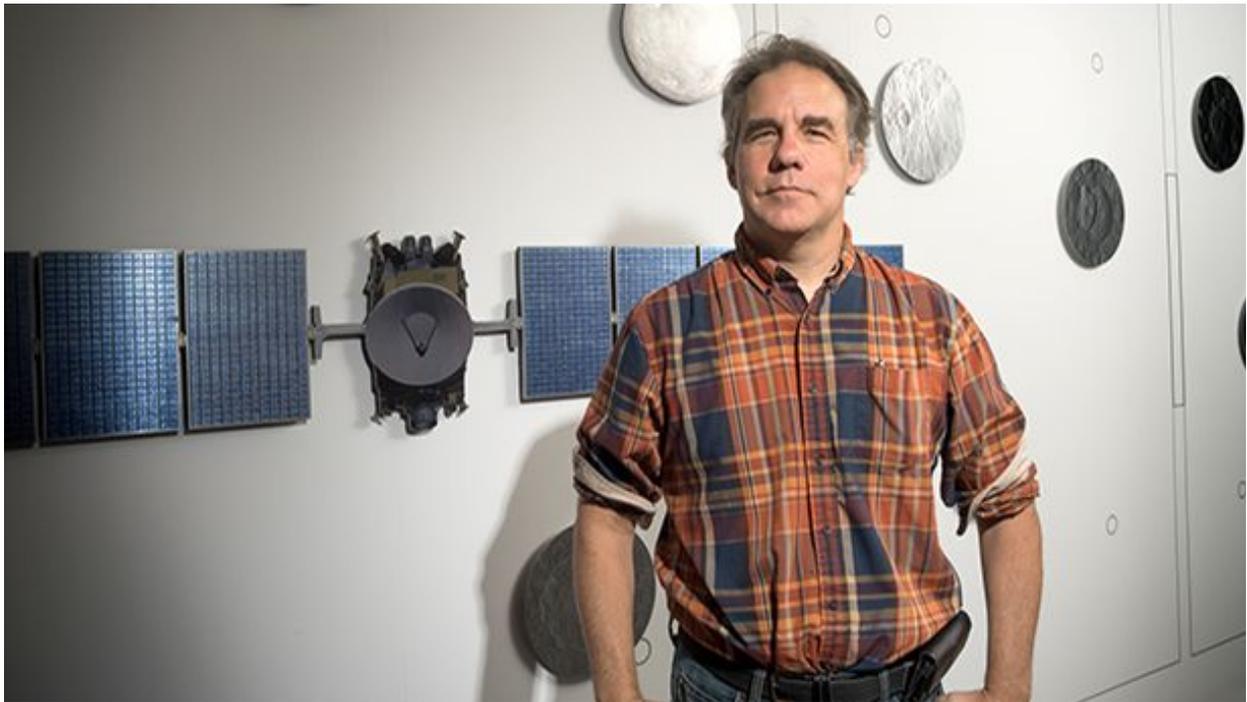


**Marc Rayman, chief engineer and mission manager**

The spacecraft we're flying now and the mission we're doing were not envisioned in the proposal; for that matter, even when we arrived at Vesta. Having lost all reaction-wheel control, we were flying a different spacecraft. In addition, over the course of the mission, we uploaded new software that gave us new functionality and capability. The mission we're doing right now at Ceres has an elliptical orbit that dips down so low, every 27 hours the spacecraft gets down to only about three times the height above the

ground than you are when you fly across country on a commercial aircraft. That's pretty amazing. We never thought about doing that. Yet we're doing it successfully and this team is doing it flawlessly.

**Q:** Please describe what attracted you to the Dawn mission. What are your personal highlights?



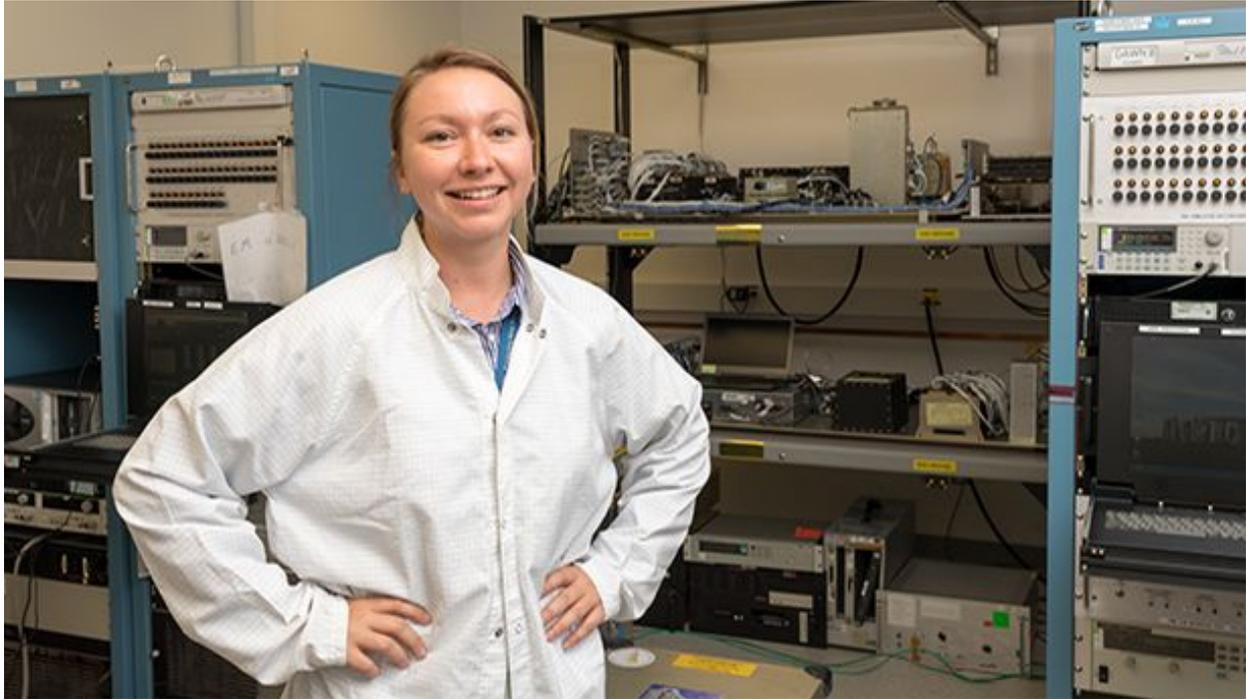
**Paul Fieseler, spacecraft team chief, systems engineer**

I have been with this mission since the spacecraft was being built and will follow it through to its last day. I liked the fact that the mission was going someplace completely unexplored, and doing it with the futuristic sounding "ion propulsion." My job is to allow Dawn to be operated in a way to acquire as much scientific data as possible, while staying within the limits of what the spacecraft is capable of.



**Carol Polansky, science operations system engineer**

Once the hardware was delivered for testing I became deeply involved in the instrument functional and operations scenario testing. It was incredible to be sending commands to these instruments as if they were in space but they were really only several meters away bolted to the spacecraft within plain sight. This was the most exhausting and stressful time of the mission but a period I now look back on with much fondness.



**Kristina Larson, lead systems engineer**

I joined as a summer intern in 2008 and have been part of the spacecraft team ever since. When Dawn launched in 2007, we really did not know what to expect from Vesta and Ceres. I have witnessed approaching both bodies, watching them grow from a pixel into a blurry blob and then into magnificent, cratered, fascinating bodies. It reminds me of how it feels to be backpacking, days into the wilderness, and crest a pass to find a hidden alpine lake. To be able to do that same sort of exploration but in space is beyond my wildest childhood dreams!



**Greg Whiffen, lead mission designer and maneuver designer**

Before launch, I contributed an algorithm to steer the spacecraft that was needed as a proof of concept in 2001, because at that time there were no methods available to reliably and optimally maneuver a spacecraft like Dawn into and out of orbits around bodies like Vesta and Ceres. To have designed and guided Dawn throughout its mission is a trajectory and maneuver designer's dream come true.



**Chuck Garner, ion propulsion system operations**

I was hired into JPL's Electric Propulsion Group in 1981. In those days, electric propulsion was viewed as a technology of the future and always would be. It was always my dream to work on a mission that uses electric propulsion, and when the opportunity to support Dawn materialized I jumped on it. I began working on Dawn around 2002 and have been supporting the mission ever since.



**Dan Grebow, mission designer and maneuver designer**

I started at JPL in 2010, three years after Dawn launched. I began working on Dawn when the spacecraft left Vesta in 2012. Because of its unique ion propulsion system, the mission seemed more challenging than conventional space missions, which is what I was looking for. I worked on early stages of development of Dawn's mission at Ceres, designing the spacecraft's trajectory even before it arrived there. And when the project decided to fly over Occator Crater for the second extended mission, I helped design the orbit that flew directly over the crater and verified it was stable.

**Q:** Career wise, has Dawn allowed you to grow, to be better than you were before you started on it?

**Garner**

How many people can say they helped operate an ion propulsion system on a deep-space mission for 11 years? That's been very cool.

**Larson**

Dawn is the mission on which I've learned how to operate a spacecraft. Starting as an intern during undergrad, I came in with a bunch of knowledge of how to build a plane but near none on how to operate something in space, let alone something going as far away from Earth as Dawn. My mentors on the project answered my millions of daily questions, and continued to expand my responsibilities over the years, providing me with a really invaluable education.

**Fieseler**

Dawn has certainly given me the opportunity to learn on the go. The toughest parts, and the parts where you learn the most, are the same. That is, when the mission is attempting to do something new, be it the first time lighting the thrusters, entering orbit about an asteroid, or diving the spacecraft down to altitudes lower than it was ever supposed to go.

**Whiffen**

Dawn has defined my career. As soon as I showed up on Lab in 2001, I had a little involvement in the proposal. Given my specialty in low-thrust trajectory design and Dawn's status as the greatest low-thrust mission to date, it has undeniably been fantastic for my career. My goals of development of methods to

best design missions for and operate electric propulsion/low-thrust spacecraft could not have been better served than by being a part of the Dawn team.

### **Grebow**

Absolutely. Dawn gave me the opportunity to work with an amazing group of people. We encountered problems, like when the spacecraft lost its second reaction wheel, or when the spacecraft safed on approach to Ceres, but the team worked as a unit to come up with a solution, and in the end the mission was a success. The knowledge and experiences I gained from Dawn have made me better equipped to work on future JPL missions.

### **Polanskey**

Dawn introduced me to the development process of a mission, starting midway through the design and build cycle. I feel a strong sense of ownership for architecting the science observation concepts for this unique orbital mapping mission. My experience working with the science instrument on the ground allowed me to understand them so deeply that now it almost feels like I am there with them. Sometimes I catch myself saying things like, “we are in orbit around Ceres,” which causes people to ask if Dawn is a manned spacecraft.

### **Raymond**

I’ve learned a tremendous amount from the team of scientists and engineers during the 17 years I’ve been on the project. That has led me to work towards future missions by playing a role in the mission formulation process, especially in the small bodies area, to become principal investigator of the magnetometer instrument on Europa Clipper, to join the Psyche team as a science co-investigator and to lead several competitive mission proposals. But the best part is that I got to join in the thrill of exploring new worlds, and they turned out to be super interesting and important to understanding the early solar system. I used to explore the ocean floor in remote areas of our planet, then I worked in the beautiful, hostile environment of Antarctica. Exploring the asteroid belt and seeing alien landscapes for the first time has been an absolute thrill that rivals anything in my professional life.

For more information on Dawn, visit <https://dawn.jpl.nasa.gov/mission/toolkit>.





## The Universe may never be the same

For the past 26 years, the Universe has been created—either in print, PDF or newsletter form—by Internal Communications features writer and editor Mark Whalen. This week mark’s Whalen’s last at JPL, as he is set to retire.

Whalen came to JPL in July 1992, after a series of editing and production jobs in the news industry, including Los Angeles Magazine. Born in New York, Whalen’s family moved to California in the early 1960s. He earned a journalism degree at Cal State Northridge.

Universe caught up with Whalen for a chat about his time at JPL, running the Universe, and what he’ll miss most about the Lab.

### **Q: What are your first memories of JPL?**

The first thing I noticed—and decided to do a story on—was on my first day. I noticed there was a full-sized model of Cassini out in the middle of the Mall, and I wondered what it was doing out there. I called the project manager at the time, and I ended up doing a story on the Cassini team’s efforts to lighten the spacecraft—it had been determined to be too heavy for launch, so they were checking out the model to make those determinations. So, my introduction to JPL was really Cassini, years before her launch.

### **Q: What was the Universe like back then?**

When I started, there were two other people on internal staff. This was before there was an internet. There was no email, we were using paper memos, and the Universe was really the communications distribution channel through the Lab. It was delivered every payday, and people came to expect it. And it was printed at a real printing press off-Lab.

Over the years, it has changed to a monthly, then to a PDF, and now it’s a weekly newsletter. It was always my goal to focus on the milestone achievements that occur on-Lab: Mission launches, flybys, new findings—so everyone could see and take part in the accomplishments here. I was also interested in the

more personal profiles and features in addition to the more straight-laced space mission-based stories, but really, every story about JPL should lead to the people. The people are doing great things.

**Q: What are some of the biggest changes you've seen at JPL over that time?**

The advent of the internet. The biggest event that was happening then was the Mars Pathfinder and Sojourner landing, July 4, 1997, which broke online records at that time. That's when the Universe was printed, and it almost always was about 4 pages. For this issue, it was 8 pages. I actually went down to the printer in Long Beach the night they were printing, because we used color photos for that edition, which was unusual for us at the time. But I wanted to get those photos in there to show the Lab, here's our rover, it's on Mars. That was so fun, because so many people on-Lab were working on that, and if they weren't they were rooting for it.

I'll also always remember the Spirit and Opportunity landings. I was in a news conference in von Karman, and people were on the stage answering questions from the media. And from the back of von Karman, dozens of people came in whooping it up and cheering, interrupting the whole thing because they were so excited to have confirmation that one of the rovers had landed. That was a fun day.

**Q: Looking back, are there any individuals at JPL who stand out to you?**

Alan Wood. He was a veteran media rep in JPL. He actually used to cut out, glue and paste newspaper clippings for JPL stories in the news. I don't remember how the story came up, but he told me he was a Navy officer during the Battle of Iwo Jima. And the flag depicted in one of World War II's most iconic images was actually provided by Alan. He told me that the Marines came up to the Navy sailors asking for a flag to hoist, and he grabbed one and gave it to them. I ended up writing a story about him for the Universe, and it's something I'll never forget.

**Q: What are you planning on doing after JPL?**

For me, it's wide open. I'm taking it one day at a time. I expected to be more nervous, but really I'm excited.

**Q: What will you miss about JPL?**

I'll miss helping people. On top of being editor of JPL, I was often assisting JPLers who were trying to promote an event or get the word out about a conference. And I was able to help them. It was nice to be able to accommodate what people need.

**Q: Final thoughts?**

Remember that all of the people here are top-notch. Everybody. No matter what their job is. They're at the top level. Don't be fooled (laughing). Everybody in the Communications and Education Directorate is the best in the business, and I feel privileged that I got to be a part of it. And of course, everybody out in the Lab, making science history, is the best in the world. And for me to think about that, to have the opportunity to help communicate what the best people are accomplishing to the best people in the world, has been pretty amazing.

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## **#coffee-buddies bring the Lab together**

With 6,000-plus employees across a 177-acre campus, it can be hard for JPLers to break free of their cloistered workspaces and make connections across Lab.

To help break down communication barriers, JPL has turned to technology, utilizing the group chat tool Slack to bring together team members from across the Lab. Thanks to the new Donut app, those Slack channel discussions are taking place face to face.

“It’s really a way to encourage meetings between diverse individuals working in all facets at JPL,” said David Mittman (3190), who has been the Lab’s de facto Slack manager since JPL started subscribing to the platform in 2013.

Mittman installed the Donut app in January this year to give JPL’s Slack members a chance to meet outside the chat channels. Every two weeks, Donut takes all the members of the Slack channel, titled #coffee-buddies, puts them into pairs, and then sends a message to each pair, encouraging them to set up a coffee date. The app attempts to pair members who don’t normally interact with each other on Lab, as measured by the small overlap between their preferred Slack channels.

Mittman, who has participated in every Coffee Buddies match cycle so far, said the in-person meetups have given him a new perspective on the work being done at JPL—even after 32 years on Lab.

“One match I got was with a gentleman doing research related to the Deep Space Network, and my section does work related to the DSN as well,” Mittman said. “He was using radio signals captured by DSN, and they were looking at signals that most of us would consider noise or static, but to him, they were indications of Martian lightning. I would never have known that work was being done here without Coffee Buddies.”

So, what are other users saying about #coffee-buddies? Here are a few reviews from real JPLers on their algorithmically chosen meetups:

**Melissa Piedrahita, Procurement Quality Assurance Engineer (5127)**

“JPL is so large and complex that as a new employee it can be hard to understand how all the pieces of the Lab fit together. Coffee buddies has helped me better understand how other areas of the Lab work and to get to know the people there. And hopefully they have learned a little about what I do as well!”

**Rob Donnelly, FPGA Engineer, Payload Systems & Motion Control Electronics (349F)**

“Coffee Buddies is a good way for putting a face to the name. Want to meet more JPLers? Join Slack. Want to meet them in person? Join Coffee Buddies.”

**David Horres, Software Systems Engineer, Software System Architecture (397J)**

“More than once I’ve encountered a Coffee Buddy who has heard about or specifically worked on a software solution that could be useful to Mars 2020. There are so many things going on at JPL, it’s hard to know when two parties at different corners of the Lab are addressing a similar problem. I’ve been able to evaluate certain software tools that, otherwise, I would have had no idea existed on Lab.

“I also hope that Coffee Buddies is helping to expose new JPLers to the variety of experiences that are available on Lab. I remember being a fresh engineer (before JPL) and, although I understood my role at the time, I didn’t have a good sense of what future opportunities were out there. I think Coffee Buddies is helping to reduce that kind of concern.”

**Alyssa Deardorff, Systems Engineer, External Build Mission Project Systems Engineering (312E)**

“As a new employee, I’ve enjoyed having the opportunity to meet with individuals from across the Lab to hear about their perspectives, interests and projects. None of the people that I have met through the Coffee Buddies program are people that I likely would have had the chance to meet otherwise. Meeting people from different divisions and projects has been fun and taught me a lot about the Lab.”

**Mitch Nelson, Procurement Quality Assurance Engineer (5127)**

“Because my role keeps me off Lab a good portion of the time, I wasn’t meeting many people on Lab outside of my section. Coffee buddies has become my opportunity to learn more about JPL than I could in any other way. Each individual is contributing to something. Sometimes they are on a project that’s well known, but you end up finding out how they make that project successful in their own way. Sometimes you find out about projects you had no idea were going on. Plus, you get to meet interesting people with great backgrounds and personal stories. Every time I meet someone new, I end up learning and loving this place we work at just that much more.”

*Over the years, JPL’s Slack membership has grown to more than 1,400 active members using a range of channels to discuss work-related topics. In 2016, the OCIO funded an upgraded version of Slack with new security features and more Slack integration capabilities.*

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## JPL: A Tale of Two Cities

JPL is in Pasadena, California, right? Then why is there a sign on Oak Grove Drive heading north into JPL that says “Welcome to La Canada Flintridge, Home of the Jet Propulsion Laboratory?”

Is the Lab in Pasadena, or is it in La Canada Flintridge? The short answer is: both. A relatively small sliver at the eastern end is in Pasadena, but it is true that a large chunk of JPL -- most of the property west of the parking structure -- lies within La Canada Flintridge city limits. That is, until you get to the westernmost edge of the Lab, where Pasadena slithers back in. The modernist checkpoint at the “Y” intersection entrance to JPL on Oak Grove Drive straddles both cities: the left leg of it is in La Canada Flintridge, and the right leg is in Pasadena.

How did things become so complicated? It all started decades ago when the post office in La Canada was not able to handle the volume of mail coming into JPL. The post office in Pasadena stepped in, and that’s how we got the Pasadena, California, mailing address.

Follow so far? Good, because your car’s navigation and some online mapping sites may not. Since the Lab’s zip code, 91109, is also the zip code for Pasadena City Hall, if you enter 91109 into some navigation systems, you’ll be directed to the City Hall area of Pasadena. JPL acquired that zip code in 1963, when Pasadena and JPL were long-established, but before La Canada Flintridge was incorporated.

Now that we’ve established the fact that we are located in La Canada Flintridge and Pasadena, keep in mind that we also lay claim to another locale. As the plaque says on the floor of Building 230, aka the Space Flight Operations Facility, we are at “The center of the universe.”

## Events



### JPL National Coming Out Day Photo

Thursday, Oct. 11  
Noon  
Steps of building 180

October 11 is National Coming Out Day. JPL SPECTRUM is inviting all lesbian, gay, bisexual, transgender, queer, and intersex employees and their allies to take part in a photo on the steps of Building 180. JPLers in the LGBTQI+ community are asked by the sponsors to wear rainbow/pride attire for the photo, and allies to the community are invited to show support by wearing any JPL shirt.

The event supports the JPL value of Inclusion. National Coming Out Day was inspired by the Oct. 11, 1987 March on Washington for Lesbian and Gay Rights, and serves as a reminder that one of the most basic tools to further LGBTQI+ equality is the power and privilege of coming out.

For more information on National coming out Day, visit the [Human Rights Campaign's website](#).

For any questions about the event, please contact Amila Cooray at: [Amila.K.Cooray@jpl.nasa.gov](mailto:Amila.K.Cooray@jpl.nasa.gov).



## Volunteer opportunity: Inspire young readers at Fall Into Literacy

**Saturday, Oct. 13**  
**8 a.m. to noon and 11:30 a.m. to 3:30 p.m.**  
**The Banning Museum**  
**401 East M St., Wilmington 90744**

Join other JPLers and help United Way of Greater Los Angeles inspire hundreds of youth to be lifelong readers during the 8th annual Fall Into Literacy Community Book Festival, a celebration of literacy, culture and basic resources.

There are two volunteer shift opportunities on Saturday, Oct. 13: 8 a.m. to noon and 11:30 a.m. to 3:30 p.m. Visit <https://volunteer.unitedwayla.org/opportunity/a0C6A000002pUV3UAM>.

Street parking is available on M Street and North Banning Boulevard

Help make the 8th annual Fall Into Literacy Community Book Festival a success. As an afternoon shift volunteer, you'll help with one or more of the following areas:

- General public, volunteer, or speaker check-in
- Parking and crowd control
- Food and beverage station or water station
- Photographer, videographer, or social media
- Book giveaway or reading
- Everyone In or exhibitor marketplace
- Event cleanup

Individual volunteer assignments will be provided upon check-in at the event on Saturday, Oct. 13.

If you have specific needs or limitations, please email [volunteer@unitedwayla.org](mailto:volunteer@unitedwayla.org) so that you can be assigned a role that meets your needs.

This volunteer opportunity is open to adults and teenagers 14 to 17. Parents must sign a waiver for minors and be present at all times.

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## **Volunteer opportunity: College essay workshop**

**Saturday, Oct. 27**

**8:30 a.m.-noon**

**United Way of Greater Los Angeles, 1150 South Olive Street, Suite T500, Los Angeles**

Join other JPLers and volunteer to help high school students discover their unique story and create a competitive, compelling application essay at United Way's third annual College Essay Workshop.

### **What does a Writing Mentor do?**

- Writing Mentors coach students to put their best-self on paper in their college applications
- Inspire and build trust by sharing who you are and what your own post-graduation plans looked like.
- Ask pointed questions and learn about your mentee. They likely have incredible experiences, but do not realize how unique or inspirational their voice is.
- Help them formulate the details and come up with examples.
- Guide them in translating their thoughts into a cohesive structure and story.

Sign up at <https://volunteer.unitedwayla.org/>

## JPL Classifieds

Ads submitted September 2018

Submit an ad to: [universe@jpl.nasa.gov](mailto:universe@jpl.nasa.gov)

### For Sale

CARPET/UPHOLSTERY CLEANER, Bissell 1400B, multi-purpose, portable, unused but no box, \$50. Stacycats@yahoo.com.

VIRTUALITY REALITY HEADSET, Oculus Rift, two controllers + two sensors, all cables and packaging included; like new, only used a couple of times; \$325. ezra.long@yahoo.com.

### Wanted

SPACE INFORMATION/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.

### For Rent

ALTADENA, furnished bedroom in a beautiful 4 bd / 2 bath house, good for new hire, short-term stays OK; includes furnishings, wifi, etc., share common areas with 2 considerate JPLers, easy bike distance to JPL (1 mile), includes all utilities; \$875/ month. Louise, 818-653-9600, [louise@louiseh.org](mailto:louise@louiseh.org).

ALTADENA (91001), furnished loft with awesome view for lease; non-smoker to share a beautiful 4-bedroom, 3-bath house across from community garden; close to local colleges, Pasadena city schools, walking distance to JPL; utilities are included, central air/heat, internet access; near 210/134/110, bus stop, shopping, banking, entertainment and restaurants; \$775/month. 818-370-0601.

ALTADENA, furnished room with awesome view for lease; non-smoker to share a beautiful 4-bedroom, 3-bath house across from community garden; close to local colleges, Pasadena city schools, walking distance to JPL; utilities are included, central air/heat, internet access; near 210/134/110, bus stop, shopping, banking, entertainment and restaurants; \$900/month. 818-370-0601.

### 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), great location by pond/meadow, new appliances, TVs, DVD players, free wireless Internet and 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>.

## JPL Family News

### Announcements

#### Caltech gym fees go up

Caltech Director of Athletics, Physical Education and Recreation Betsy Mitchell issued a letter to all recreation members on Monday, Sept. 10 informing them of a modest membership fee increase. The change will result in less than a \$30 increase annually for the majority of gym users, and approximately \$1 per pay period for those with payroll deduction.

### Awards

#### ASO honored for water-supply forecasts

For its efforts in implementing new, 21st century runoff forecasting tools for the San Joaquin watershed, JPL's Airborne Snow Observatory mission has received the John W. Keys III award from the San Joaquin River Restoration Program.

For more information on the award, visit

<https://www.usbr.gov/newsroom/newsrelease/detail.cfm?RecordID=63168>.

Visit <https://www.jpl.nasa.gov/missions/airborne-snow-observatory-aso> for more on the mission.

#### Bar-Cohen is editor/coauthor of new book

Yoseph Bar-Cohen, supervisor of the Electroactive Technologies Group (355N) and a senior research scientist, is the editor and coauthor of "Advances in manufacturing and processing of materials and structures," his 10th book.

The book covers the latest advances in materials and structures in manufacturing and processing, including additive and subtractive processes. Six chapters of the book were co-authored by JPLers, including three co-authored by Bar-Cohen.

## Passings

Richard Aragon, 81, died on Aug. 19, 2018. Aragon worked at JPL for 41 years and is survived by his wife, Marilyn, daughter Lisa, son Mark, and granddaughter Melanie.

William R. Woods died September 4th. He was 94. He worked for many years as the Lab's ESD guru and worked in the System Safety Office when it was first founded 30 years ago. There will be a Memorial Service on Friday, Oct. 12 at Descanso Gardens in La Canada at 1:30 p.m.

## Letters

Thank you to the Travel Accounting group for the support and card during my recent medical leave. Heartfelt thanks to the Conference Team and FTO group for the beautiful flower arrangement. I'm blessed to work with such an incredible group and appreciate the excellent support and coverage while I was out. -- **Laurie Lincoln**

Heartfelt thanks and appreciation to my JPL family for the beautiful plant I received following the passing of my mother. I appreciate your kindness and support during this difficult time. Special thanks to 4X Directorate Office, 402 Staff, Ethics Office, and Section 389 for your messages and cards. - **Martha Aviña**

To all my friends, colleagues and readers over these past 26 years, thanks for the memories! - **Mark Whalen**