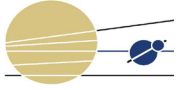


Desert Moon: A documentary about LPL's founding and early years

On June 27, LPL hosted the first viewing of the film "Desert Moon," a documentary about some of the ways that southern Arizona was involved with the early days of the lunar exploration program in the 1960s. Naturally, a lot of it is about people who were at LPL at the time (e.g., Gerard P. Kuiper, Ewen A. Whitaker, Alan Binder, Charles Wood, Dale Cruikshank, William Hartmann). The film was produced by recent UA Journalism graduate Jason Davis as part of a NASA Arizona Space Grant graduate fellowship. Captain Mark Kelly, a former astronaut who was commander of the last Space Shuttle mission, is the film's narrator.

"Desert Moon" shows regularly at the Flandrau Planetarium on the UA campus. Visit the "Desert Moon" (<http://www.desertmoonfilm.com/>) to see the film trailer, read the "short stories," and access bonus scenes. Some of the story behind "Desert Moon" is also available from UA News at uanews.org.



Welcome from the Director

Welcome to the LPL newsletter for Fall of 2014!

When Gerard Kuiper moved his small operation to the University of Arizona in 1960, and renamed it the Lunar and Planetary Laboratory, he planned on establishing the pre-eminent research program in planetary sciences. I'm not sure that he realized how large the field would become, or how large LPL would become in the process of remaining at or near the top of that field. We were reminded of LPL's fascinating beginnings by a series of events this past summer, including the release of a documentary about LPL's early years ("Desert Moon"), the 50th anniversary of the Ranger 7 mission (on which Kuiper was PI) that took the first close-up images of the moon, and the 45th anniversary of the Apollo 11 moon landing.

But while a little nostalgia is nice once in a while, plenty of people are still breaking ground in a variety of ways. Within the last month, HiRISE (led by LPL's Alfred McEwen) has taken the highest-resolution images of an Oort Cloud comet as Comet Siding Spring whizzed past Mars; nearly 1000 people came to the Kuiper Building to view The Art of Planetary Science (a show organized by LPL graduate students); and two proposals with LPL researchers as PI, plus at least one more with an LPL Co-I, have been submitted for science instruments aboard a proposed NASA mission to Europa (you'll hear details of the winners). In addition, I suspect that some high-quality research papers, which serve as backbone of our endeavors although they come with less fanfare, have been submitted as well.



Besides the multi-million dollar missions and the high-profile public programs, there are the individual honors and transitions that occupy our everyday lives. You can read about a lot of those here, too. We don't have any new faculty to report, but the Theoretical Astrophysics Program (TAP), of which LPL is one of the three sponsoring departments, completed a successful faculty search. Dr. Sam Gralla, an astrophysicist who specializes in general relativity, was hired by TAP; his home department will be in Physics.

I hope you enjoy reading about what's going on in the LPL family, and please send us any news you have, so that we can include it in the next newsletter.

Timothy D. Swindle, Ph.D.
Department Head and Laboratory Director

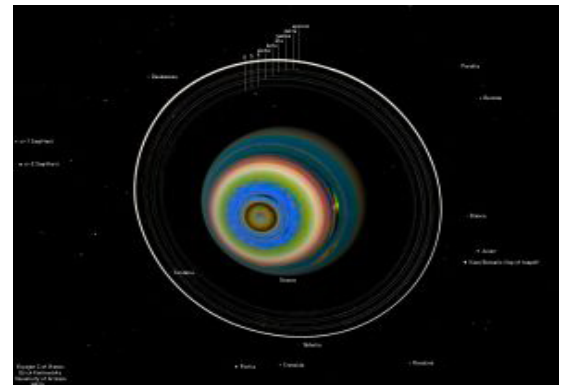
Clues Revealed About Hidden Interior of Uranus

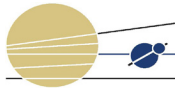
By re-analyzing images that NASA's Voyager-2 spacecraft took 28 years ago, LPL Staff Scientist [Erich Karkoschka](#) has teased out hidden features in Uranus' atmosphere that reveal an unexpected, strange rotation pattern and point to the possible existence of an unusual feature inside the planet's interior. The findings shed light on the interior structures of giant gas planets, not only of Uranus, a planet for which observational data are sparse, but also those of the many extrasolar planets that are being discovered.

"All previous observations of the giant planets indicated that these planets rotate in a regular way, meaning the rotational rates in their respective southern and northern latitudes are about the same," Karkoschka said. "My analysis suggests rotational rates in the high latitudes of Uranus are highly asymmetrical, with some southern latitudes possibly rotating as much as 15 percent faster than their northern counterparts."

Karkoschka found several sharp kinks in the rotational profile, defying all previous observations and theoretical considerations. By teasing out subtle differences from the information contained in Voyager's images, Karkoschka discovered previously unseen features in Uranus' atmosphere, revealing that Uranus' southern hemisphere rotates unlike any region observed on the giant gas planets before.

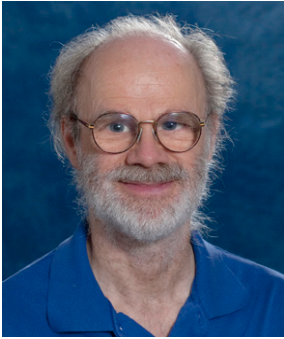
Karkoschka's work illustrates the scientific value that can be gleaned from data that have been around for a long time, available to anyone with Internet access. Read the full story at usnews.org.





Department

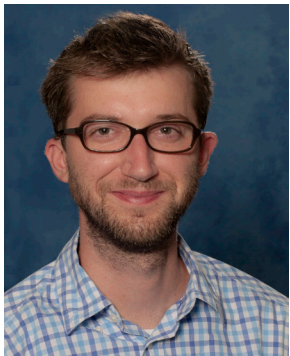
Get to Know a Staff Scientist: Erich Karkoschka



Senior Staff Scientist [Erich Karkoschka](#) began his career at LPL in 1983 as a graduate student working with advisor Dr. Martin Tomasko. He defended his dissertation, “Saturn’s atmosphere in the visible and near infrared, 1986-1989,” in 1990.

Erich has observed the giant planets and Titan on telescopes around Tucson and in Chile, and using the Hubble Space Telescope, in order to understand the structures of their atmospheres. From this work he determined the vertical and horizontal distribution of hazes, clouds, and methane, and refined the methane absorption spectrum in the process. Using Voyager 2 images of Uranus and Neptune decades after the fly-bys, Erich discovered a satellite (S/1986 U 10, later named Perdita) and revealed peculiar rotation of parts of their atmospheres. Before the launch of the Cassini-Huygens spacecraft in 1997, he helped Martin Tomasko, the principal investigator of the Descent Imager/Spectral Radiometer, to optimize the instrument. After DISR collected data during the descent in Titan’s atmosphere in 2005, Erich helped to interpret even the smallest anomalies in the data. In his free time, Erich enjoys sharing his enthusiasm for astronomy with the public using his telescopes.

Get to Know a Post-Doc: Justin Erwin



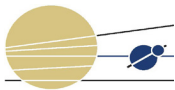
[Justin Erwin](#) joined LPL in May 2013, working as a post-doctoral fellow on the aeronomy of solar and extra-solar planets with Dr. Roger Yelle. His research focuses on the influence of close-in orbits on the escape of hydrogen from extrasolar gas giants. In particular, his research is focused on the enhancement of kinetic escape due to the 3D gravitational and non-inertial forces, and the non-thermal escape due to various stellar interactions. He also studies non-LTE radiative transfer in the atmospheres planets in our own solar system.

Justin is from Redding, Connecticut. He studied at the New Mexico Institute of Mining and Technology (New Mexico Tech), where he earned a B.S. in Mathematics (2006), a B.S. in Physics (2006), and a M.S. in Applied Mathematics (2008) with a thesis on control theory. Justin earned his Ph.D. in 2013 from the University of Virginia, conducting research on the atmosphere of Pluto and developing a radiative-conductive-escape atmospheric model. In his free time, Justin enjoys biking, cooking, and enjoying the weather outdoors in the southwest.

Undergraduate Minor: Nathaniel Hendler



[Nathaniel Hendler](#) is an undergraduate minor in the Department of Planetary Sciences. Before beginning his studies at the UA, Nathaniel worked for over ten years as a software developer (most recently as a game developer for Sony). He then took a job at Amundsen-Scott Station at the South Pole for one season. That experience motivated him to pursue an undergraduate degree (beginning with coursework at Pima Community College) with a major in geology and a minor in planetary science and mathematics. Nathaniel has been assisting Dr. Ilaria Pascucci with research involving protoplanetary disk dispersal; next semester, he’ll work with her to investigate the disk mass stellar mass relation using the Atacama Large Millimeter Array. Nathaniel has been involved with other science projects, including the fabrication and spectroscopy of ice dwarf analogue ices at Northern Arizona University, OSIRIS-REx stereophotoclinometry software maintenance through NASA Space Grant, paleoseismology field-work in Southern California, and Salt River Canyon detrital zircon dating. After graduation, Nathaniel hopes to pursue a career in academic research.



Department

Alumni Updates

Michael Bland (2008) moved to a position as Research Space Scientist with USGS Astrogeology.

Brian Jackson (2009) is now Assistant Professor in the Department of Physics, Boise State University. He was recently a co-author on the paper titled, "Sliding Rocks on Racetrack Playa, Death Valley National Park: First Observation of Rocks in Motion" (PLOS ONE, Aug 27, 2014; DOI: 10.1371/journal.pone.0105948)

Sarah Hörst (2011) began a new position as Assistant Professor, Morton K. Blaustein Department of Earth & Planetary Sciences, Johns Hopkins Krieger School of Arts & Sciences in Fall 2014.

Catherine Neish (2008) is Assistant Pro-

fessor, Department of Physics and Space Sciences, Florida Institute of Technology) as of August 2013.

Priyanka Sharma (2012) was one of a group of students (at the time of the work) notified by the President of COSPAR that they were awarded the Paper Award for Young Scientists for the manuscript entitled "Identification and characterization of science-rich landing sites for lunar lander missions using integrated remote sensing observations." The paper was published in the journal *Advances in Space Research*. Priyanka is currently a postdoc at JPL.

PTYS alumnus **Dr. Guy Consolmagno, S.J.** (1978) is the recipient of the 2014 Carl Sagan Medal for Excellence in Public Communication in Planetary Science from the Division for Planetary Sciences (DPS) of the American Astronomical Society. The Sagan Medal was

"established by the DPS to recognize and honor outstanding communication by an active planetary scientist to the general public. It is to be awarded to scientists whose efforts have significantly contributed to a public understanding of, and enthusiasm for, planetary science."

Brother Guy is an astronomer at the Vatican Observatory. His Sagan award lecture titled, *Discarded Worlds: Astronomical Ideas That Were Almost Correct*, was given at Centennial Hall on the University of Arizona campus during the 46th annual DPS meeting held in Tucson, November 9-14. Keep up with Brother Guy by reading his blog, *Speculations* (<http://brotherguy.livejournal.com/>).

Kathi Baker, 1955-2014



Longtime LPL staff member **Kathi Baker** passed away on November 8, 2014, after a battle with cancer. Kathi was originally from Yuma, but made her home in Tucson with her husband, Tom, and their 3 children, Mackinzie, Kyle, and Zachary. Zac also has roots in LPL,

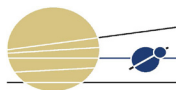
having worked as a courier for the Main Office and most recently as an Administrative Assistant in the Business Office.

Kathi was an active member of her faith community. She enjoyed singing and gardening, often bringing her sweet peas and snapdragons into the office when they were in bloom each spring. Kathi was a much loved member of the LPL community and will be missed by all.

Meet LPL Staff

Ron Richards joined LPL as an Administrative Associate with the OSIRIS-REx project in April 2014. He recently returned to the University of Arizona after a six-year whirlwind employment tour of some of the other institutions of higher learning in the U.S. (University of South Florida, Nevada State College, and Southern Oregon University). Ron is currently Facilities Manager for the Michael J. Drake Building (home of the OSIRIS-REx project); his previous UA positions included Information Specialist for the Department of Chemistry and Biochemistry, and Office Assistant, Senior, in the Office of Career Services. He is "delighted to have been given the opportunity to work with OSIRIS-REx, and with the chance to return to Tucson."

Vicki Robles de Serino began her career at LPL in January 2014. She is an Administrative Assistant supporting several research groups in the Kuiper building. Before coming to LPL, Vicki worked at UApresents for more than 6 years in various roles, beginning as a part-time Receptionist and transitioning to a Development Assistant and Administrative Assistant. She assisted the Executive Director, planned donor-related events, administered donations, helped with processing day-to-day financial transactions, and assisted with hiring as needed. When she's not at work supporting successful research endeavors, Vicki says she loves spending time with her family and enjoying her hobbies: reading, running, and photography.



Department

LPL Fieldtrip Spring 2014: Hawaii

by Shane Byrne and Christopher Hamilton

Thanks to the generosity of donors, we were able to roam farther afield than usual this semester—much farther. The southwestern United States is gifted with exceptionally diverse geology, but there are some processes, such as active volcanism, that cannot be seen in our local area.

In May, we packed our bags for the Big Island of Hawai`i to take a look at some of the freshest and most diverse lava flows in the world. Usually we spend just 3–5 days on these trips, but this time we spent a full two weeks on the trip and we needed every day! This trip was especially well timed as Christopher Hamilton, a planetary volcanologist with ongoing fieldwork in Hawai`i, had just joined the LPL faculty and so was able to guide us through these sites.



Hawai`i is made up of several large shield volcanoes. We spent most of the trip on the Kilauea Volcano on the south side of the island and its two rift zones. Much of the recent volcanic activity has been concentrated there in an area that is largely covered by Volcanoes National Park. We identified two field sites that we would spend three days each at: the Ka`u Desert and Mauna Ulu. Before we left, we spent a significant amount of time working in small groups on remote sensing datasets of these areas so that by the time we got there we had projects in mind and ideas to test. We were also able to piggy-back on Christopher's other research projects and have access to equipment such as infrared radiometers, differential-GPS, and a terrestrial scanning LIDAR.

The Ka`u Desert is not really a desert in the southwestern sense of the word, as it rains there frequently. However, it is kept relatively free of vegetation by the corrosive fumes that are emitted by the Halema`uma`u Crater at the summit of Kilauea. The plume of these fumes frequently sweeps back and forth across this area, so this is the only fieldtrip where we all carried respirators with us—luckily we did not need to use them. Each day's work required hiking into the desert for about an hour from Hilina Pali Road. Many of our groups worked around the location of the fresh 1974 flow although one group drove further down this road to investigate fault scarps near Hilina Pali itself.

Mauna Ulu is a shield volcano that had a major eruption in the 1960s. We visited the caldera itself on the first day and saw the location of perched lava ponds on its flanks. We walked the length of a major flow southward to where it intersected Chain of Craters road and passed several breached lava dams along the way. Most of the subsequent fieldwork that people did at this site was close to where this flow crossed the road. Further along Chain of Craters Road, a flow from another eruption has blocked the road entirely before entering the sea and is now a tourist attraction.

About half the trip was devoted to investigating these two sites; on the other days we had shorter visits to additional places of interest. Lava-seawater interactions lead to spectacular explosions and we saw the results of that in two locations. Fine-grained debris from these explosions piles up in littoral cones that later can be eroded away by the waves. One of these cones is so rich in the mineral olivine that the sand on the adjoining beach is green. Another beach we visited had the more common black sand, which is basically the volcanic rock basalt that has been mechanically pounded into small pieces. Although it is not widespread on the Earth, this black sand is quite similar to the sand we see commonly on Mars. The staff at the Hawai`i Volcano Observatory also gave us a great tour and talked to us about Kilauea and Kilauea Iki. We had a chance to walk through the Kilauea Iki caldera, which hosted a lava lake during an eruption in 1959. There's still a hot heat under the surface—fissures there continue to vent steam 55 years after the eruption.

For some non-geologic planetary science, we visited the summit of Mauna Kea and thanks to the generosity of the IRTF staff had a tour of their telescope. After seeing a beautiful sunset from the summit we had a great time at a star party held in the visitors' center at lower elevation.

Most volcanism on Earth is related to tectonic plate boundaries and is not the best analog for volcanism on planets that lack plate tectonics. Hawaiian volcanism, on the other hand, occurs in the center of the Pacific plate and forms a great planetary analog. Lots of people vacation in Hawai`i, but few have the chance to dig into the geology like this. It was an extraordinary trip to a truly unique environment that we will all remember.



Outreach

The Art of Planetary Science

by Jamie Molaro

This year's Art of Planetary Science exhibition, held October 17-19, 2014, was an astounding success! More than 90 artists and scientists participated (up fifty percent from last year), and the exhibition displayed over 200 pieces of artwork. A variety of mediums were represented, including paintings, drawings, digital prints, textiles, sculpture, glasswork, poetry, and film. A range of professional levels was also represented, from students in various planetary science undergraduate level courses, to professional artists who own their own galleries. Artists who participated were primarily local to Arizona, but some came from as far away as Tennessee and New York. The show went over an entire weekend this year, drawing a crowd over more than 800 visitors. The UA Astronomy Club also set up telescopes on the mall for stargazing during the opening night. By directly connecting potential buyers and sellers, many artists sold artwork at the event, resulting in ~\$9000 worth of sales.

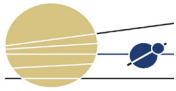


The response from the community has been overwhelmingly positive. Tucson is uniquely suited to bringing together the art and science communities to share and be inspired by what we do, and those communities have made it clear they would like to see this event become a fixture for art and education outreach. Overall, the success achieved by The Art of Planetary Science, even only in its second year, has really been inspiring to the organizers, the art community, and the general public. It has also put the Lunar and Planetary Laboratory in the spotlight for providing unique and quality science outreach.

This year, the Art of Planetary Science was run by graduate students Jamie Molaro, James Keane, Sarah Peacock, Hannah Tanquary, and Ethan Schaefer. They formed new collaborations with Flandrau Science Center, providing show-goers half off admission to the planetarium. They also held a pre-show event hosted by Borderlands Brewing Co. to help promote, and arranged for artwork from the show to be displayed at Biosphere 2 and Skybar, as well as at Craft Tucson and the Tucson Museum of Art's Art on Tap: Art, Music, and Beer Fest. A subset of the artwork will also be displayed in the exhibit hall during the Division for Planetary Sciences 2014 Annual Meeting. The show was featured on the front page of the Arizona Daily Star, in The Daily Wildcat, UANow, and on the SideStreets Podcast.



A number of artists have generously donated work to the department, including Cui Jing (who won Best in Show), Barbara Penn, Dante Lauretta, Alex Harrison Parker, Philip Christensen, and Adrian Cornejo (who won second place in the Data category). Thanks to the support of Dr. Swindle and the department, additional equipment was purchased to extend the amount of art featured at the show, filling the Kuiper atrium as well as the fourth and fifth floors. Dr. Joe Spitale hand-made and donated the custom designed brackets used to hang the artwork.



Outreach

The Art of Planetary Science *(cont.)*

Funds were donated by the HiRISE and OSIRIS-REx teams, as well as the Space Imagery Center (SIC), to print spectacular spacecraft images for the show, which will be hung in LPL and the Drake Building. Maria Schuchardt in the SIC provided invaluable support in preparing for the event. Pictures and details of the Art of Planetary Science event are at <https://www.lpl.arizona.edu/art/>. The competition aspect of the exhibition was sponsored by a number of local businesses. Prizes were donated by Borderlands Brewing Co., Bookman's, Arizona Art Supply, Biosphere 2, Flandrau Science Center and Planetarium, Pima Air and Space Museum, Posner's Art Store, Steward Observatory Mirror Laboratory, and The Loft Cinema. The competition was juried by Dr. Travis Barman, Dr. Renu Malhotra, and Teri Pursch.

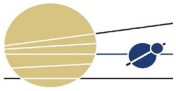
Pictures and details of the Art of Planetary Science event are at <https://www.lpl.arizona.edu/art/>.



OSIRIS-REx Asteroid Time Capsule

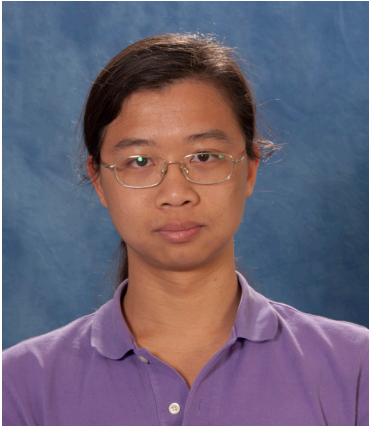
From September 2 to September 30, the OSIRIS-REx asteroid sample return mission and The Planetary Society collected tweets and images as part of the Asteroid Time Capsule Campaign, which invited the public to tweet or post an image on Instagram (with hashtag #asteroidmission) to answer the question: Where are we now and where will we be in 2023 in Solar System exploration? Top tweets and images will be etched on the silicon wafer, which will be placed in the Sample Return Capsule (SRC). An identical wafer will be placed on the spacecraft. All entries will be archived in a virtual Time Capsule kept at the University of Arizona and scheduled to be opened in 2023. More information about the mission, ways to get involved, and the campaign is available at asteroidmission.org. This campaign served as a complement to Messages to Bennu, which collected participant names for a ride on the spacecraft.





Graduate

2014 Carson Fellowship to Daniel Lo



Daniel Lo is the recipient of the 2014 Carson Fellowship Award, which provides one academic year of support, including salary, tuition and a small supply stipend. Daniel is beginning his first year of graduate studies at LPL.

Raised in Singapore, Daniel completed his high school at Raffles

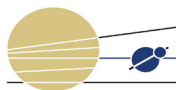
Junior College before graduating with a double major in Physics and Planetary Science with honors from the California Institute of Technology. Daniel has wide-ranging interests, especially in surfaces and atmospheres of the terrestrial planets. In particular, he is interested in understanding how surface processes shape local geomorphologies, surface-atmosphere interactions, hydrocarbons on Titan and water on Mars.

In high school, Daniel studied polynomial fields with Dr. Lang Mong Lung and the degradation of ascorbic acid with Dr. Leong Lai Peng, both from the National University of Singapore. He decided to pursue a research career after a year-long tenure as a coach for the Young Physicists' Tournaments, which ask participants to investigate a series of 17 pre-released open-ended problems, culminating in an oral defense. Daniel coached his high school team for the Singapore Young Physicists' Tournament to top rankings. He then coached the national team for its first appearance at the International Young Physicists' Tournament; the team emerged as champions. Daniel recalls, "That was probably when I first really comprehended the no-one-really-knows-the-answer component of research. I had all these problems that I don't have solutions to, and I just had to come up with a viable research methodology, guide my students along, and provide them with both the technical and financial resources to succeed. I felt like a professor."

This emphasis on research and exploration continued into his undergraduate career at Caltech, where he studied the North pole of Jupiter using Cassini images with Dr. Andrew Ingersoll; performed flume experiments to study the development of waterfall plunge pools with Dr. Michael Lamb; and, with Dr. Edward Stone, worked with numerical simulations to understand the electron response of the High Energy Telescope on the STEREO spacecraft. While a sophomore at Caltech, Daniel put together a team for the RASC-AL Exploration Robo-Ops Competition, which challenges students to build a remotely controlled rover that is capable of collecting rock samples. His team came in second.

Daniel is currently working with Dr. Roger Yelle on the MAVEN mission to study the atmosphere of Mars, but he's already planning for the future: "You will probably think I am crazy, but I am going to be a planetary scientist in Singapore. You may think there is hardly anything there now, but we have launched our first earth-observing satellite a few years ago, and we have just created our space agency. Also, space exploration is becoming more international in nature, which means it is easier for small countries like Singapore to participate. In a few years the soil will be fertile to support a couple of planetary scientists, and I believe that with the experience and network I would have built up by then, I can be one of them."

The Lt. Col. Kenneth Rondo Carson and Virginia Bryan Carson Graduate Fellowship is an endowment established by the estate of Virginia B. Carson, honoring her husband, a former member of the "Flying Tigers," a former member of the Joint Strategic Target Planning Staff Strategic Air Command, retired master navigator and enthusiast of space exploration. Colonel Carson greatly admired the professionalism and accomplishments of NASA's space program. The Carson Fellowship is awarded to students pursuing degrees in the Department of Planetary Sciences, Lunar and Planetary Laboratory, selected on the basis of academic achievement and the promise of further scholarly endeavor.



Graduate

Recent PTYS/LPL Graduates



Ingrid Daubar



Tiffany Kataria



Juan Lora

Congratulations to [Ingrid Daubar](#), [Tiffany Kataria](#), and [Juan Lora](#), LPL's most recent Ph.D. graduates!

On August 28, Ingrid Daubar defended her dissertation titled, "New Dated Craters on Mars and the Moon: Studies of the Freshest Craters in the Solar System." Ingrid's advisor was Professor Alfred McEwen. She will soon begin a NASA Postdoctoral Program appointment at the Jet Propulsion Laboratory.

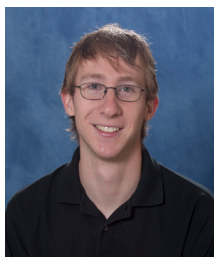
Tiffany Kataria defended her dissertation on August 22. Her advisor was Professor Adam Showman and the title of the dissertation is "Atmospheric Circulation of Hot Jupiters and Super Earths." Tiffany began a postdoctoral appointment as Research Fellow at the University of Exeter Department of Physics and Astronomy this fall, 2014.

Juan Lora, recipient of the 2014 Gerard P. Kuiper Memorial Award, defended on June 20. The dissertation is titled, "Radiation and Dynamics in Titan's Atmosphere: Investigations of Titan's Present and Past Climate." Juan was advised by Dr. Joellen Russell. He is now a Postdoctoral Scholar with the Department of Earth, Planetary, and Space Sciences at UCLA.

Welcome Incoming 2014/2015 Graduate Students



Hamish Hay; MSci Geophysics, Imperial College London; interests in planetary interiors/dynamics; impact cratering, numerical modeling



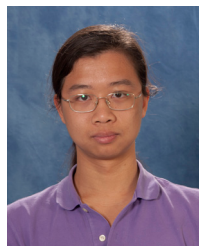
Joshua Lothringer; B.A. in Astronomy (emphasis in Astrophysics), University of Colorado, Boulder; interests in extrasolar planets and their atmospheres.



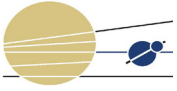
Shane Stone; M.Sc. in Chemistry, UCLA; B.Sc. in Chemistry, University of Texas at Dallas; interests in extrasolar planets.



Alessondra Springmann; M.S. in Earth and Planetary Science, Massachusetts Institute of Technology; B.A. in Astrophysics, Wellesley; interests in small bodies, theoretical modeling, mission planning.



Daniel Lo; B.S. in Planetary Sciences, B.S. in Physics, California Institute of Technology; interests in planetary surfaces, atmospheres, Mars.



Outreach

Everything Lunar at LPL

LPL's 2014 summer outreach event was themed "Everything Lunar: Celebrating the Past, Exploring the Future." The festivities were held on July 20 to mark the 45th anniversary of the Apollo 11 Moon landing; approximately 600 guests attended.

Activities and exhibits were varied and included:

- tours of the University of Arizona Electron Microprobe Lab
- robotics design and testing
- comet creations, cratering experiments, and telescopes
- exhibits of Apollo mission hardware
- meteorite exhibit, including a lunar meteorite
- information about the Apollo program
- story time with Mr. Nature Goes to the Moon

Professor Gene Giacomelli (Director, UA Controlled Environment Agriculture Center) lectured on "Creating a Lunar Greenhouse" and Professor Timothy D. Swindle (Head and Director, Department of Planetary Sciences/Lunar and Planetary Laboratory) spoke about "Studying the Apollo Lunar Samples Four Decades Later." LPL was also able to host a very well received showing of "Desert Moon," the documentary film by Jason Davis that tells the story of the origins of LPL and its contributions to the Apollo missions.

Visitors had the opportunity to speak with scientists about their research and work with the Apollo missions:

- Dr. Spencer Titley (Professor Emeritus, Department of Geosciences) trained the Apollo astronauts-to-be about the geology of the Moon and gave them field experience with moon-like geological features at Arizona's Meteor Crater and other locations
- Mr. Ewen Whitaker (Research Scientist, retired, Department of Planetary Sciences/LPL), worked with Dr. Gerard Kuiper to produce lunar atlases in preparation for the Apollo landings; he is an expert on lunar nomenclature and author of "Mapping and Naming the Moon"
- Mr. Jim Scotti (Research Specialist Senior, LPL Spacewatch)
- Dr. Veronica Bray (Associate Staff Scientist, Department of Planetary Sciences/LPL), Lunar Reconnaissance Orbiter (LRO) team
- Dr. Julia Bodnarik (Post-Doctoral Research Associate, Department of Planetary Sciences/LPL) uses lunar exploration neutron detectors onboard NASA's Lunar Reconnaissance Orbiter to understand hydrogen migration on the Moon
- Ms. Dolores Hill (Research Specialist, Senior, Department of Planetary Sciences/LPL) analyzes meteorites

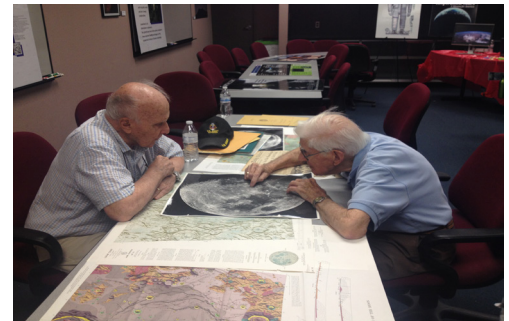
Thanks to all our exhibitors, volunteers, and guests for making the day so fun and educational!



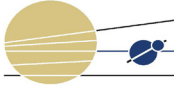
Dr. Veronica Bray answered a lot of great questions about the Moon!



Mr. Nature Goes to the Moon!



Spencer Titley and Ewen Whitaker



Invest in LPL

Donors to LPL

In previous LPL newsletters, we have acknowledged some of the major donors to LPL, but we wanted to publicly acknowledge all of our generous donors who have helped make many things possible, ranging from the LPL field trips to the Lunar and Planetary Laboratory Conference, to The Art of Planetary Science. This list is for support in 2013 and 2014. If you should be on this list but are not, please let us know. And if you haven't donated before, please consider it. Even small gifts can be of major help for specific projects.

Donors of funds for various purposes include:

David and Teresa Acklam, Kathi Baker, Bill Bottke, Dan Cavanagh, David Choi, Serina Diniega, Brad Hauert, Kelly Kolb, Simon Kregar, Brad Lloyd, Laura McGill, Caroline Pyevich, Jani Radebaugh, Tim and Jane Reckart, John Reidy, Andy Rivkin, Michelle Rouch, Tim Swindle, Matt Tiscareno, and Laurel Wilkening.

Donors of funds for Galileo Circle Scholarships for LPL students include:

Charles and Karen Autrey, Arch and Lura Brown, Herb and Sylvia Burton, Susan Butler, Don and Barbara Carrig, Philip and Jane Lacovara, Bob and Judy Logan, Jane McCollum (Marshall Foundation), Laura and Jim McGill, Bernie Merwald, and John Wahl and Mary Lou Forier.

Donors of other gifts (including meteorites, art work, and prizes for the art show) include:

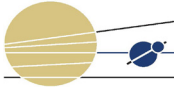
Leif Abrell, Madeline Blank, Adam Block, Suzanne Bloomfield, Veronica Bray, Dick Brown, Eric Christensen, Phil Christensen, Lexi Coburn, Adrian Cornejo, Marilyn Flynn, Leontine Greenberg, Dolores Hill, James Keane, Simon Kregar, Carol Kucera, Sarah Kucerova, Tad Lamb, Margaret Landis, Dante Lauretta, Juan Lora, Renu Malhotra, Jamie Molaro, Marty Mongan, Janelle Montenegro, Amy Robertson, Tad Sallee, Henry Sarnoff, Xeni Schiller, Jess Vriesema, Ray Watts, Tom Zega, and Rob Zellem.

Thanks to all our donors!

Shirley Curson, 1923-2014

Mrs. Shirley D. Curson-Weiss, friend and benefactor of LPL and the University of Arizona, died on April 21, 2014. Shirley (born Shandel Dauber) led a full, active life of travel and community involvement. She encouraged everyone, especially young people, to travel as part of the educational experience. To this end, she funded Shandel travel awards in several departments and colleges, including LPL, Journalism, and Fine Arts. Shirley generously supported other university groups as well and established the Shirley Curson Fund for Arizona Public Media. The 1774 Lepaute clock in the Kuiper Space Sciences building atrium is a gift of Mrs. Curson.





LPL in the News

Links to the news stories below and more are available at: <http://www.lpl.arizona.edu/news/2014/fall>

Surveyor Digitization Project Will Bring Thousands of Unseen Lunar Images to Light - A team of LPL scientists will digitize the entire Surveyor collection and release it into the public domain.

Martian Permafrost And Dust-Sculpted Surface Captured By NASA Spacecraft - Mars was once thought to be a fairly unchanging planet, but now we know it is a planet that was shaped by water and other forces.

Comet Fireworks on Mars - In October, Comet Siding Spring passed a mere 131,000 kilometers from Mars, giving scientists, including the HiRISE team and others from LPL, unprecedented opportunities to observe the icy visitor and its possible effects on the Red Planet.

Companion Planets Can Increase Old Worlds' Chance At Life - Having a companion in old age is good for people — and, it turns out, might extend the chance for life on certain Earth-sized planets in the cosmos as well.

Dusty Baby Solar System Gives Clues On How Our Sun And Planets Grew Up - University of Arizona scientists have identified a sweet spot for planet hunting around a distant star that is in the early stages of forming its solar system and already hosts one known mega-planet.

Catalina Sky Survey Discovery: 2014 RC's Close Pass to Earth - A small asteroid discovered by Catalina Sky Survey passed very close to the Earth.

UA Among Top 100 Research Universities in the World - The University of Arizona made the Academic Ranking of World Universities' list of top 100 research universities.

LPL Scientists, Japanese to Trade Hard-Rock Stories - Representatives of the Hayabusa2 asteroid sample return mission visited the UA to meet with their colleagues on OSIRIS-REx and explore how the two projects can benefit each other.

UA Scientists to Feature Prominently at Gathering - UA astronomers presented some of their discoveries at the 46th Annual Division of Planetary Science meeting.

50th Anniversary of Ranger 7 - Fifty years ago, UA scientists announced to the world NASA's Ranger 7 mission had captured lunar images 1,000 times greater than ever before.

Celebrating Apollo 11 – the UA's Role in the First Manned Lunar Landing to Space Exploration Today - For decades, UA scientists have contributed to the research that has shaped our understanding of our solar system and the universe – beginning with the Apollo 11 mission.