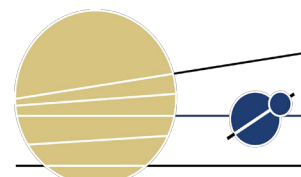




UA SCIENCE

LUNAR & PLANETARY LABORATORY



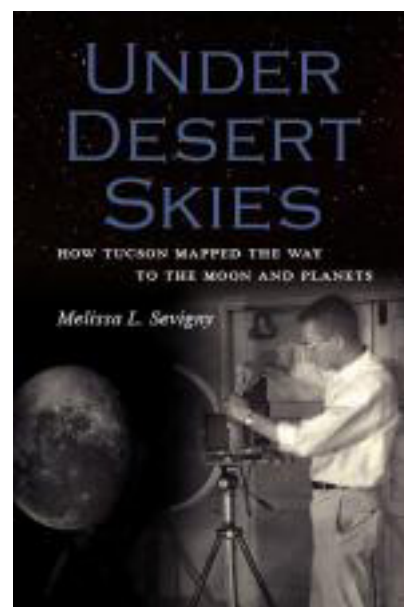
Department of Planetary Sciences

LUNAR AND PLANETARY LABORATORY NEWSLETTER

SPRING 2016

New Book Maps Tucson's Path to the Planets

LPL and the city of Tucson are the subject of a new book titled *Under Desert Skies: How Tucson Mapped the Way to the Moon and Planets*. The book's author is University of Arizona (UA) alumna [Melissa Sevigny](#), who grew up in Tucson. As an undergraduate, Melissa studied creative writing and environmental sciences; she went on to complete a M.F.A. in Creative Writing and Environment from Iowa State University, and is currently a science and technology reporter for KNAU (Arizona Public Radio) in Flagstaff. As an undergraduate Arizona NASA Space Grant intern in 2006, Melissa and her mentor, Professor Michael J. Drake, began an oral history project with LPL as the topic. The interviews and research continued beyond the Space Grant year, thanks to funding from Mike Drake, and were eventually transcribed into the text for the book, which has been published by The University of Arizona Press. Melissa has donated the royalties to LPL for outreach activities.

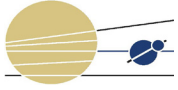


On April 25, UA Library Special Collections, The University of Arizona Press, and LPL hosted a panel discussion and reception to introduce *Under Desert Skies*. The panel discussion, moderated by Melissa Sevigny, featured William Hartmann, Peter Smith, and Ewen Whitaker, with opening remarks from Tim Swindle. The event was a wonderful opportunity to honor those who pioneered planetary science and to inspire planetary scientists of the future. *Under Desert Skies* is available for purchase from <http://www.uapress.arizona.edu/>



Images courtesy of University of Arizona Libraries

Save the Date!
OSIRIS-REx
Launch
September 8, 2016



Welcome from the Director

Welcome to the Spring 2016 LPL Newsletter. This has been one of those periods of transition, a time for looking back with pride, and some sadness, and looking forward with optimism for great things to come.

In terms of the past, [Melissa Sevigny's](#) history of LPL, *Under Desert Skies* has been published, allowing those who were here in the early days to relive their glory, and allowing those who weren't here to learn something about how we got to be what we are today. But there has been some sadness, too. [Professor Elizabeth Roemer](#), who chaired the task force that set up the Department of Planetary Sciences based on the research-focused Lunar and Planetary Laboratory, passed away this spring. So did [Mildred Matthews](#), who shepherded the University of Arizona Press Space Science series when it was headquartered here.

But the future looks as bright as the past. On September 8, OSIRIS-REx is scheduled to launch from Kennedy Space Center, on its way to asteroid Bennu to perform the most detailed study of an asteroid ever, and then to return a sample. The instruments have been delivered, the spacecraft is passing every test so far, and we're all trying to figure out how best to get to the launch and/or celebrate the mission. Meanwhile, the faculty, staff and students have had a grueling interview schedule, as multiple opportunities to hire new faculty converged on a single six-month window, bringing lots of candidates for faculty positions. None of those searches is complete yet, but they brought excellent candidates, the kind of men and women who will make LPL as much of a center for planetary science in the 2020s as it ever was in the "golden days" that Melissa Sevigny recounted. And, of course, we have had the usual amount of first-rate science, award-winning faculty, students and staff, and inspiring outreach.



Enjoy the newsletter. And as always, for alumni, retirees, and others who have been a part of the LPL family but are no longer at LPL, if you have news about you, your career, or your family, please let us know, so that we can pass it along to all the people who would be interested.

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

Department

Faculty Honors and Promotions

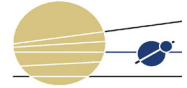
[Professor Renu Malhotra](#) has garnered two high honors this spring. In January, she received a Louise Foucar Marshall Science Research Professorship at the University of Arizona. This award, from the Tucson-based Marshall Foundation, is in recognition of her work in orbital dynamics.

In April, Professor Malhotra was named a Regents' Professor by the Arizona Board of Regents. The title of Regents' Professor is the highest level of recognition bestowed on faculty in the Arizona state university system. It recognizes full professors whose work has garnered national and international distinction; no more than 3 percent of faculty can hold the title at any given time. In 2015, Professor Malhotra was elected to both the American Academy of Arts and Sciences and to the National Academy of Sciences.



The following faculty have been notified by the University of Arizona Provost of promotions effective August 2016:

- [Dr. Travis Barman](#), promoted from Associate Professor to Associate Professor with tenure
- [Dr. Ilaria Pascucci](#), promoted from Assistant Professor to Associate Professor with tenure
- [Dr. Tom Zega](#), promoted from Assistant Professor to Associate Professor with tenure

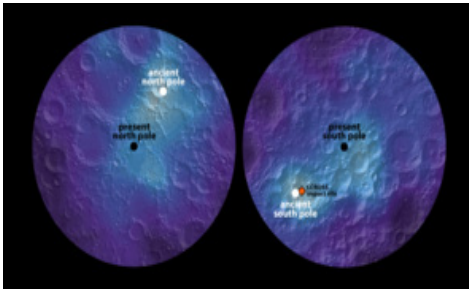


Department

Tales of a Tilting Moon Hidden in Its Polar Ice

A recent study reports that the moon may not have always had the same face pointed toward the Earth. Instead, the “Man in the Moon” nodded up and down because of heating and volcanic eruptions on the Earth-facing side of the moon.

A team including LPL scientists James Keane and Isamu Matsuyama made the discovery while trying to explain maps of lunar polar hydrogen. This hydrogen is believed to represent water ice, protected from the sun’s rays in cold craters near the moon’s north and south poles. If ice were exposed to direct sunlight on the moon, it would boil off into space, so it is a very sensitive tracer of the moon’s orientation with time.



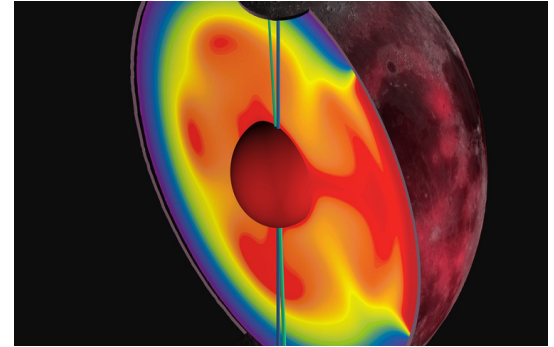
The moon’s ancient north pole was located near the impact site of NASA’s Lunar Crater Observation and Sensing Satellite, or LCROSS, which provided evidence for the presence of water ice on today’s lunar surface. (Image by James Keane)

The moon’s polar ice is shifted off the poles by about six degrees, and in exact opposite directions at either pole. This precisely opposite relationship indicates that the moon’s spin axis shifted over the last few billion years. As the moon reoriented, it left behind a trail of water ice, effectively “painting out” the path that the poles took with time. “Usually we think of planets as ‘spinning on’ in the same unchanging way with time, but that’s not true,” said LPL graduate student Keane. “We know that the Earth and a handful of other planetary bodies have changed their spin axes with time.”

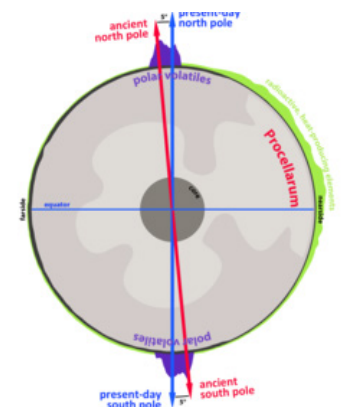
that the moon’s ice traces an earlier spin pole, Keane used a combination of theoretical models and measurements of the moon’s mass distribution to identify the cause this polar wander. “I was shocked when the models outlined Oceanus Procellarum as the only possible geologic feature that could have done this,” Keane said.

Oceanus Procellarum, a volcanic province on the Earth-facing side of the moon, contains the dark splotches forming the “face” of the moon, actually a giant field of ancient lava flows. When the moon formed, many of its radioactive elements massed in the Procellarum. The Procellarum hotspot, less dense than the rest of the moon, caused the whole moon to move. As the moon slowly moved over billions of years, it etched a path into the polar ice.

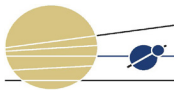
The paper shows that the moon may have once had more ice near its poles; the ice we see today is the tiny portion that survived this polar migration. Large amounts of ice could have been brought to the moon by comets and icy asteroids early in the moon’s history or potentially outgassed from the lunar mare themselves. Figuring out the origin of this ancient lunar water might help scientists understand how water was delivered to the early Earth. “Up until this work, most researchers thought that the moon’s water was just recently deposited, as a late veneer,” Keane said. “Since we’ve shown that the moon’s water is linked to volcanic activity on the moon several billion years ago, this means it might be a time capsule of primordial water. Directly sampling this ancient ice will allow us to investigate many still unanswered questions around the origin of the Earth’s water.”



A vast hotspot of intense volcanism underneath the dark, blotchy “face” of the moon known as Oceanus Procellarum (red area on right) resulted in less density there than in other parts of the moon. To restore balance, the moon’s axis shifted by six degrees. Traces of water ice deposits near the poles outline the movement from the location of the ancient (blue) to the present pole (teal). (Image by James Keane)



A schematic drawing of the moon’s polar wander. The shift in the moon’s axis covered a latitudinal distance equivalent to that between Tucson and Los Angeles. (Image by James Keane)



Department

2016 AP and Classified Staff Excellence Awards

Congratulations to the 2016 recipients of the LPL Outstanding Staff Awards: Anjani Polit (Appointed Personnel) and Joshua Sosa (Classified Staff Excellence Award)!



Anjani Polit became Uplink Operations Lead for the HiRISE project in 2010. Anjani's work is complex; each observa-

tion requires individual attention in terms of targeting and camera parameters; instrument temperatures require constant modeling and monitoring

to avoid noise or shutdown; and the spacecraft recorder's data storage requires constant modeling and monitoring to avoid underutilizing the downlink or overfilling the recorder. Anjani also contributes often to education and public outreach efforts. Anjani's nominating letters cited her astounding competence and reliability, good humor, dedication, attention to detail, and patience in educating inexperienced scientists on the operations process. Anjani's ongoing efforts to improve performance to maximize science returns and improve procedure efficiencies, are further examples of what makes her an outstanding member of the LPL staff.

Since 2010, Joshua Sosa has supported Susan Brew and Arizona Space Grant Consortium as an assistant and program webmaster. In 2013, he assumed



duties as Web Site Designer/ Developer for LPL. And in 2014, Joshua's job description expanded to include AV support for LPL and the Kuiper

Building. This responsibility supports a wide-ranging set of tasks: equipment maintenance; recording lectures; researching equipment; improving output quality; supporting tele/video conferencing, and more. With Space Grant, Joshua helps carry-out the day-to-day ASGC program business. Joshua has been key in helping AZSGC managers work smarter and more efficiently by identifying solutions, and updating and improving online systems for conducting daily business.

Elizabeth Roemer (1929-2016)

Professor Emerita Elizabeth (Pat) Roemer, passed away on April 8, 2016. Pat joined LPL in 1966, and retired in 1997. In 1972, Dr. Roemer chaired the committee tasked with organizing a department of planetary sciences for the University of Arizona. She specialized in comets and asteroids, starting at a time long before those were popular topics, and was a female professor in a male-dominated community long before that was commonplace. She was also a staunch friend and supporter of the LPL library for many years.

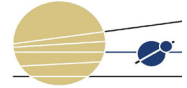
Mildred Shapley Matthews (1915-2016)

Mildred Matthews spent 26 years at LPL, beginning in 1970, working on the Space Science Series with Professor Tom Gehrels. The text below is from Rick Binzel, Professor of Planetary Sciences and Margaret MacVicar Faculty Fellow, Massachusetts Institute of Technology.

On February 11, just four days short of her 101st birthday, Mildred Shapley Matthews passed away peacefully at her home in California with her family present. Mildred was the daughter of Harvard College Observatory Director Harlow Shapley and she held the interesting distinction of being "lost in the solar system" for 75 years. As a commemoration of his newborn daughter, Shapley bestowed the name Mildred to asteroid 878 discovered in 1916. Unfortunately the initial observations of the asteroid were limited, and the object was "lost" with highly uncertain orbital elements until recovered in 1991. Friends and colleagues seeing Mildred over the years would always ask, "are you found yet?"

Matthews' foundational contributions to planetary science began around the time of her nominal retirement age, when in the 1970s she began working as the production editor in the inaugural years of the UA Press Space Science Series created by Tom Gehrels. Her role became most prominently recognized as co-editor on more than a dozen volumes extending in to the 1990s. Overall for more than 20 Space Science Series volumes she edited, operating through friendly (then increasingly stern, but always polite) post cards and phone calls to delinquent authors, it was Matthews who brought the books into their final published form.

Matthews leaves behind a legacy of books that have served as the gateway for countless planetary science careers and insights toward future advancements in our field.



Department

LPL Fieldtrip Spring 2016

By Margaret Landis

Many LPL field trips could be retitled “Effects of the Farallon Plate Subduction,” and this spring’s trip to the San Bernardino Valley and Chiricahua Mountains was no exception. For three days (Feb. 26-28), LPL field trip group (PTY5 594A) explored an area shaped by the volcanic and tectonic consequences of plate subduction in addition to the consequences of changing water availability.

On day one, our group stopped at the spheroidally weathered rocks off the I-10 freeway (east toward New Mexico) before moving on to Willcox Playa, where we discussed how playas form and searched for signs of large desiccation cracks, drying due to climate change, and signs of earth fissures. Earth fissures in Arizona are caused by subsidence due to artificial groundwater pumping, a process so far constrained to the Earth. We also discussed the biological and human history of the area, noting that Geronimo, the Apache leader, surrendered on what is now private land not far from the field trip route.

Day two was focused more on the consequences of the Farallon Plate subduction, including the basin and range province formation and the multiple episodes of volcanism. We saw cinder cones and maar craters, and reviewed the formation of mantle xenoliths, discussing the consequences of the still-active basin and range formation in the Southwest (including an 1887 earthquake that had its epicenter in Mexico but was felt in Tucson). Field trippers also took the opportunity to discuss border issues, which seemed especially pertinent as later that day, we saw a mounted border patrol officer making rounds.

Finally, on day three, we drove across the Chiricahua Mountains and arrived at the national monument. Our hikes brought us close to hoodoos as well as precariously balanced rocks (PBRs), resulting in discussion about their formation in tuff deposits from from a large eruption about 30 million years ago, similarly timed to the formation of some of the cinder cones observed the day before. Due to construction within the national monument, there were features that we were unable to see, including fossil fumaroles, but our group discussed them and the economic role that the volcanic activity has played in Arizona’s history (Arizona has high grade copper deposits that are still being mined).



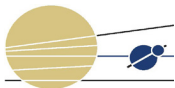
The Spring 2016 LPL field trip group photo at Chiricahua National Monument. (Photo credit: Hamish Hay)



Shane Byrne explains to the group how plate subduction can lead to volcanic activity and basin and range terrain. (Photo credit: Margaret Landis)



The field trip group listens to talks about the formation of the Turkey Creek volcanic deposit, hoodoos, and precariously balanced rocks within Chiricahua National Monument. (Photo credit: Margaret Landis)



Department

Get to Know a Post-doc: Jennifer Fernando



Jennifer Fernando joined LPL in November 2015 as a postdoctoral researcher working on the High Resolution Imaging Science Experiment (HiRISE) processing and analysis with Dr. Alfred McEwen and Dr. Shane Byrne. As a planetary geologist, her research focuses on the characterization of the martian past (e.g., volcanic, sedimentary) and present (seasonal processes linked to the surface-atmosphere exchanges) processes in order to better understand the planet's internal (volcanism) and external (climate) dynamic systems and to evaluate their impact in surface changes. To constrain these processes, Jennifer uses orbital visible and near-infrared remote sensing observations to derive quantitative information about the chemical (e.g., composition, mineral abundances) and physical properties (grain size, morphology, internal structure) of surface materials.

On the HiRISE team, Jennifer is working on the development of an innovative and quantitative processing tool that includes a sophisticated correction for the atmospheric and surface scattering contributions of the HiRISE color images in order to estimate quantitative information about the surface materials. This development will also enable analysis of images taken under variable geometric acquisitions and atmospheric conditions useful to track current surface changes (e.g., CO₂ defrosting and Recurring Slope Lineae features). Jennifer is from Paris, France. She earned a B.S. and a M.S. in Earth and Universe Science with a specialty in Planetary Science (2011) at the University of Pierre and Marie Curie (Paris, France). She earned her Ph.D. in 2014 from the University of Paris-Sud 11 (Orsay, France). Her thesis focuses on the estimates of the martian surface microtexture using visible hyper spectral and multi-angular data in order to give new constraints about the geological processes responsible for Mars evolution. Jennifer enjoys traveling, hiking and cooking (bon appétit!).

Meet LPL Staff: Sharon Hooven and Emily Joseph

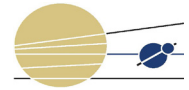


Sharon Hooven joined LPL in August 2011 as a Business Manager, Senior, for the OSIRIS-REx mission. Prior to joining LPL, she worked for the University of Arizona Department of Pathology business office; and, prior to that, “well, a long time ago,” according to Sharon, she was with the marketing department of a simulation computer company in Michigan. Sharon has one son (Lewis, his wife Rebecca), one daughter (Monique, her husband Shawn), and three grandsons (Cameron-10, Danye-8, and Kristopher-6) who are her greatest joy. In her spare time, she enjoys the outdoors, with hiking being one of her favorite activities. Retirement is not far off and Sharon looks forward to purchasing a motor home, adopting a dog, and traveling the United States to cross items off her bucket list—the Northern lights, moonbow at Cumberland Falls in Kentucky, swimming with the manatees in Florida. The list goes on

and on, according to Sharon: “I think I’ve passed the point where I could hike the Appalachian Trail but maybe in a whole bunch of pieces over a very long period of time.”

Emily Joseph is a member of the operations team for Cassini’s Visual and Infrared Mapping Spectrometer (VIMS). Emily grew up in Tucson and began working in astronomy as a high school intern at the Planetary Science Institute (PSI). She has a B.S. in Astronomy from Case Western Reserve University in Cleveland, Ohio. After graduation, she returned to Tucson (and the warm weather!) and continued her work at PSI as a research assistant. Emily joined the VIMS team half-time in January 2015 and loves the opportunity to work with the mission that first got her interested in space. Her job involves creating instructions for the spacecraft based on mission scientists’ goals to allow Cassini to meet those goals safely and efficiently. In her spare time, she enjoys cycling, baking, and doing craft projects.





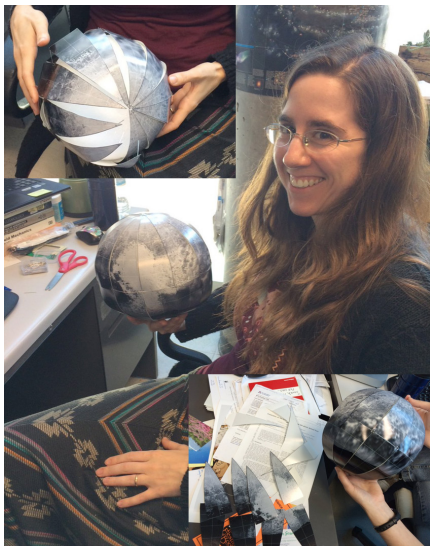
Outreach

LPL Outreach: 2015-2016 Academic Year

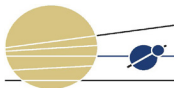
by Sarah Morrison

It has been a busy year for LPL Outreach, with events ranging from wowing young children with our new Pluto globe to giving popular monthly lectures at Borderlands Brewery as part of our Space Drafts Public Talk Series (in collaboration with Steward Observatory and NOAO). The Space Drafts concept expanded this year, with the result being that Tucson has its own flavor of the broader movement, called Astronomy on Tap.

LPL's Pluto globe trended on social media and our "how-to" was promoted as a guest blog entry at the Planetary Society. We also showcased planetary science with interactive exhibits at many community events such as What If? Weekends at Biosphere 2, the Connect2STEM event in Phoenix, Tucson Festival of Books, Tucson Hebrew Academy's Community STEM Festival, and SARSEF Future Innovator's Night. These were often group outreach efforts including Maria Schuchardt (Space Imagery Center), Dolores Hill (OSIREX-REx), Sarah Morrison (LPL graduate outreach coordinator), and the rest of our outreach volunteers. The LPL graduate students themselves have talked directly with over 4,500 people so far this year about our Solar System and beyond, growing our ties to the community and developing better ways to communicate our science! Most recently, LPL graduate students have discussed their research and career paths with several hundred college-bound high schoolers at UA's STEAMworks expo held April 14, 2016. We have had a great year for outreach so far, and we continue to develop our community connections for more to come!



Top left: LPL graduate student Sarah Morrison making a Pluto globe for outreach activities. Image credit: LPL graduate student Alessondra Springmann.
Top right: April's Space Drafts audience enjoys 3D HiRISE anaglyphs presented by LPL graduate student Margaret Landis (off screen) in her discussion of the climate history on Mars. Image credit: LPL graduate student Sarah Morrison. Bottom left: Maria Schuchardt (far right) shows the world to a family at Connect2STEM on Jan. 9, 2016. Image credit: UA College of Medicine-Phoenix. Bottom right: LPL graduate student Donna Viola discusses her research on Mars at STEAMworks on April 14, 2016. Image credit: University of Arizona.



Graduate

9th Annual College of Science Graduate Student Awards

The Department of Planetary Sciences/Lunar and Planetary Laboratory was pleased to honor the following students as recipients of the 2016 College of Science Graduate Student Awards. Each student received \$100 and recognition at a reception held on April 14.

Outstanding Scholarship: Michelle Thompson



Michelle Thompson will defend her dissertation, focused on deciphering the microstructural signatures of space weathering in lunar soils and samples returned from asteroid Itokawa by the Hayabusa mission, in May. She will leave graduate school having accumulated an unusually rich collection of honors and awards, including a Canadian NSERC, a NESSE, a Berkner Internship, the LPI Career Development Award,

a Dwornik Award (2014 LPSC), a Galileo Circle Scholarship, a Shandel Travel Award, the Wiley Award for Outstanding Student Presentation (2015 GSA), the Microbeam Analysis Society Scholar Award (2014 Microscopy and Microanalysis conference). Michelle recently served as co-lead for the Workshop on Space Weathering of Airless Bodies and she is active in various workshops and graduate-student initiatives within our department (e.g., LPLC, Academic Careers Seminars). She has given invited talks at both the 2013 Symposium on Hayabusa Samples and the 2015 Microscopy and Microanalysis Society meetings.

Michelle's dissertation research required her to master advanced transmission electron microscopy techniques to analyze the crystal structure and chemistry of the lunar and asteroidal materials to gain new insights into the modification of the surfaces of airless bodies to develop a comprehensive model for space weathering in the solar system. This is an important problem for understanding remotely sensed spectra of asteroids and correlating meteorites with their parent bodies. Michelle's work has resulted in two journal articles, and she is working on a third for her dissertation; a fourth publication is likely, post-dissertation. All of this is even more impres-

sive when coupled with the fact that her work had to be done using transmission electron microscopes at other research institutes because the UA did not have one capable of the kind of analyses she required.

Michelle's advisor is Assistant Professor Tom Zega, who describes his student as "a rising star in the field."

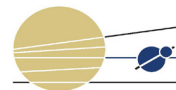
Outstanding Service and Outreach: Donna Viola

Donna Viola is this year's recipient of the LPL award for service and outreach, which includes attention to broader impacts and involvement in activities outside of academic responsibilities that benefit the department, university and the larger community. Her outreach development and leadership efforts have exceeded what may be expected of a full-time graduate student, and these efforts are in addition to volunteering her time for hands-on activities at various STEM-related festivals and summer camps over the past few years as well as her service representing LPL graduate students on the Associate Graduate Council for the College of Science from 2012-2015.



For three semesters, Donna has led workshops for middle and high school students in the Expanding Your Horizons conferences held at local schools. Donna's high school workshop on choosing landing sites for the future ExoMars rover mission was particularly ingenious. To give the students a glimpse into what it was like to be a planetary scientist, she guided the students using the same datasets that the European Space Agency was using to choose landing sites. She also developed and led an activity regarding Mars in an astrobiological context for the Sci-Fi versus Sci-Fact book club we held over the summer at the Dusenberry-River Library (Tucson) for children ages 9-12 in collaboration with the library's Children's Librarian.

Donna has been described by peers as a dependable volunteer and versatile outreach activity developer and leader for all audiences. She has shown an ease at adapting her hands-on



Graduate

activities to different types of audiences, such as modifying her Mars rover landing site activity successfully for both lifelong learners and middle/high school students. She is skilled at marketing her research regarding craters on Mars, as demonstrated by her presentation to a standing room only crowd in February 2015, the most well attended Space Drafts talks for the entire spring 2015 semester.

Donna has distinguished herself through her initiative in developing and leading engaging outreach activities, leveraging her expertise on both Mars and astrobiology along with her previous outreach experiences.

Outstanding Teaching and Mentoring: Ethan Schaefer



Ethan Schaefer earned the LPL Outstanding Graduate Teaching Assistant (GTA) Award for Spring 2015 and is the 2016 department recipient of the College of Science Teaching and Mentoring award. Ethan earned the LPL GTA award for his work as a GTA with Professor Joe Giacalone in the PTYS/ASTR 206 class, which is a General Education Natural Sciences Tier II course. He is a sixth-year graduate student working with Professor Alfred McEwen.

The nominating comments from Ethan's students cited his mentoring and thoughtful grading, which included taking the time to explain how to improve the answers to homework problems and why a particular answer was incorrect. The students noted that he was always available and open to suggestions—one student wrote, "I always come away with a much richer understanding after going over lecture topics with him. One of the best TAs I've had."

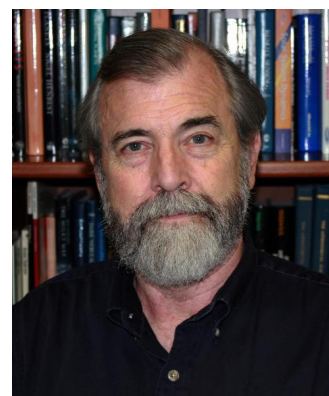
Ethan gave three lectures during the semester, augmenting the instructor's material with numerous well chosen online videos; students were impressed with his lecturing, praising him as a "phenomenal lecturer." Ethan also independently managed an in-class project that required students to present a report describing how science news is depicted by various media outlets.

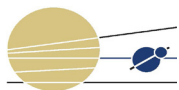
Alumni

Masursky Award to Mark Sykes

PTYS alumnus Dr. Mark Sykes (1986) is the 2016 recipient of the Harold Masursky Award for Meritorious Service to Planetary Science. The Masursky award, given by the American Astronomical Society Division for Planetary Sciences (DPS), recognizes individuals who have rendered outstanding service to planetary science and exploration through engineering, managerial, programmatic, or public service activities. Mark is CEO and Director of the Planetary Science Institute.

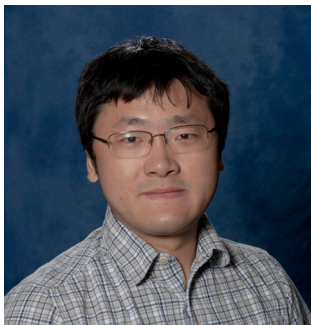
The Masursky Award will be presented at this year's DPS meeting (Oct. 16-21) in Pasadena. Read more about Mark and his accomplishments at <http://www.psi.edu/news/masursky>.





Graduate

Peng Sun, Ph.D.



Congratulations to [Peng Sun](#), who defended his dissertation on April 25! The research topic was titled, “Charged Particle Transport in the Turbulent Magnetic Field in Space and a Transport Model for the ENA Ribbon.” Peng’s advisor was Regents’ Professor Emeritus Randy Jokipii.

Molaro Receives 2016 Kuiper Award



[Jamie Molaro](#) is the 2016 recipient of the Gerard P. Kuiper Memorial Award, the department’s highest award for graduate student scholarship. Jamie defended her dissertation titled, “Stress, on the Rocks: Thermally Induced Stresses in Rocks and Microstructures on Airless Bodies, Implications for Breakdown,” in July 2015. She is currently a NASA Postdoctoral Program Fellow at JPL, where her research focus is modeling thermally induced breakdown on the Moon, asteroids, and comets.

While a graduate student at LPL, Jamie was the recipient of a NASA Earth and Space Science Fellowship (2012-2015) and a University of Arizona (UA) College of Science Galileo Circle Scholarship. She was active in the LPL community, serving on several departmental committees and volunteering with numerous recruitment and outreach programs and events. Jamie completed the UA Certificate in College Teaching. For fall 2014, she developed and taught “Introduction to Planetary Science for Teachers.”

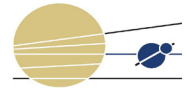
Jamie was founder and organizer (2013-2015) of The Art of Planetary Science at LPL. This annual art exhibition features science and space-themed artwork from local artists alongside artwork from scientists, made from scientific data. The event has grown each year and is much anticipated by the campus, as well as the larger Tucson community. In 2015, the UA College of Science recognized Jamie with the College of Science Graduate Student Service Award.

TAP 2015 Research Prize

[Youngmin JeongAhn](#) has been awarded the 2015 Theoretical Astrophysics Program (TAP) Research Prize. Youngmin won for his paper titled, “On the non-uniform distribution of the angular elements of near-Earth objects.” After graduating from LPL in August 2015, Youngmin began a postdoctoral position studying asteroid dynamics with Professor Wing-Huen Ip at the National Central University of Taiwan. As of March 1, 2016, Youngmin is working with Mauricio Reyes-Ruiz at the Instituto de Astronomía, UNAM, Ensenada.

Fall 2015 GTA Award to Donna Viola

[Donna Viola](#) is the recipient of the Outstanding Graduate Teaching Assistant Award for Fall 2015. She worked with Dr. Joe Spitale in the PTYS/ASTR/GEOS 214 course on Astrobiology, which is a General Education Natural Sciences Tier II course. Donna gave two lectures during the semester and was cited for her time and effort in communicating course content. Recipients of the Outstanding GTA Award receive funds of up to \$1,000 to support travel to a professional meeting of their choice. Donna is a fifth-year graduate student advised by Professor Alfred McEwen.



Invest in LPL

2016 Galileo Circle Scholarships



Congratulations to LPL's 2016 Galileo Circle Scholarship recipients. Galileo Circle Scholars receive \$1,000 each; these awards are supported through the generous donations of Galileo Circle members. The Galileo Scholars were honored at an early evening reception held on April 20, 2016.



*Top Row: Hamish Hay, James Keane, Tad Komacek
Bottom Row: Joshua Lothringer, Sarah Peacock, Xianyu Tan, Donna Viola*

2016 Curson Travel Award



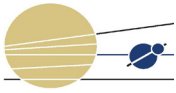
Margaret Landis and Sarah Sutton have been announced as recipients of funds from the 2016 Curson Travel Scholarship.

Margaret is a third-year graduate student working with Associate Professor Shane Byrne. She plans to use the Curson travel funds to support travel to the 6th International Conference on Mars Polar Science and Exploration, at the University of Iceland in Reykjavik; a one-day field trip is also scheduled as part of the meeting. Attendance at the meeting will provide Margaret with the opportunity to observe Earth analogs of the martian features she is studying and to discuss Mars polar science with experts from around the world.

Sarah is a first-year graduate student advised by Assistant Professor Christopher Hamilton. She will travel to Iceland for Professor Hamilton's four-week international workshop on planetary volcanism. This field work supports Sarah's research on a comparative study of channelized lava flows on Earth and Mars using field and remote sensing data.

Travel Funding for Ethan Schaefer

Sixth-year graduate student Ethan Schaefer (advised by Professor Alfred McEwen) is the recipient of a \$500 travel award courtesy of Mr. Dan Cavanagh, member of the LPL Advisory Board. Ethan will use the funds to support a field campaign to study lava flows in Hawaii. The study, advised by Assistant Professor Christopher Hamilton, will build on earlier field work to answer the question, "If all we can see in coarse, remotely-sensed data is the outline of a lava flow, what can we meaningfully infer, if anything, about that flow?"



LPL in the News

Links to the news stories below and others are available at: <http://www.lpl.arizona.edu/news/2016/spring>

Pluto Follows its Cold, Cold Heart - Pluto's "heart" may be cold as ice, but it's in the right place, according to two UA scientists who believe the dwarf planet's iconic, heart-shaped region of frozen ice may have shifted its location — and dragged the entire planet with it.

HiRISE: 45,000 Mars Orbits and Counting - Ten years ago on March 24, the UA-built camera began taking the most detailed images of the Martian surface to date. Since then, the camera has become the world's eye on Mars, bringing us detailed vistas of landscapes ranging from strangely alien to earthly familiar.

Kuiper Belt Objects Point the Way to Planet 9 - A LPL research team has indicated that the extreme eccentricity of distant Kuiper Belt Objects might indicate that they crossed paths with a massive planet in the past.

The Reason for Mars' Tumultuous Past - LPL planetary scientist Isamu Matsuyama has helped unravel dramatic events in the early history of Mars, casting a new light on the early life of our red planet neighbor.

OSIRIS-REx Invites Artwork - NASA Invites Public to Send Artwork to an Asteroid.

Catalina Sky Survey Helps Explain Puzzling Observations - A new study has found that most asteroids are destroyed long before a collision with the sun can occur, and Catalina's data was instrumental in reaching that conclusion.

Arizona Grad's Company Looks to Space for Resources - Including Water - A new federal law that allows U.S. companies to obtain resources from space has one University of Arizona graduate looking at the possibilities in our solar system.

International Instrument Delivered for OSIRIS-REx - A laser altimeter from the Canadian Space Agency will help in the asteroid mission's selection of a sample collection site.

Preferred Hosts for Short-Period Exoplanets - In an effort to learn more about how planets form around their host stars, a team of scientists has analyzed the population of Kepler-discovered exoplanet candidates, looking for trends in where they're found.

Galaxy May Be Teeming with Small Planets - In the past two decades, astronomers have discovered nearly 2,000 planets orbiting sun-like stars in the solar neighborhood of the Milky Way galaxy.

Anticipation Builds for OSIRIS-REx Launch - The LPL's leading-edge work in space exploration will come into sharp focus as final preparations are made for the September launch of NASA's asteroid sample return mission.

LPL Has Role in Search for Life Elsewhere - NASA wants to find habitable planets around relatively nearby stars and a LPL researcher heads up the effort to define optimal conditions for life on exoplanets and identify the kinds of stars that they orbit.