

5000 NEO Discoveries for Catalina Sky Survey

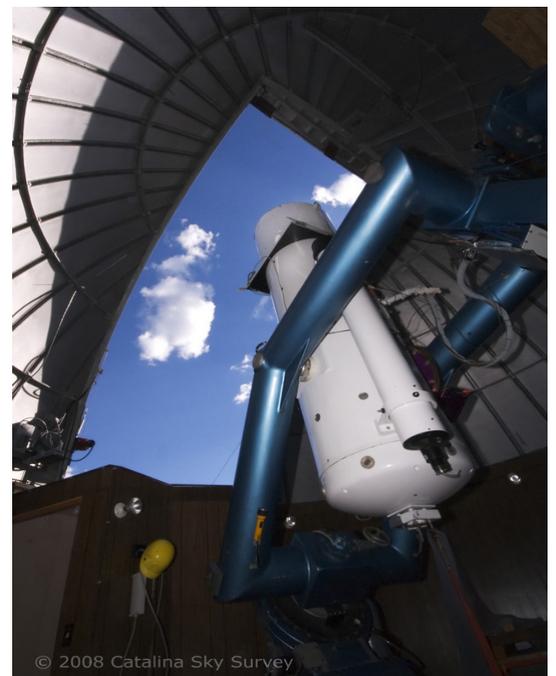


The Catalina Sky Survey Team reached an important milestone, and also discovered two highly unusual asteroids in the last few months. The milestone was that CSS discovered its 5000th Near-Earth Object (NEO). On March 31, CSS Astronomer Jess Johnson discovered NEO 2014 FS52 using the 60" reflector on Mt. Lemmon. According to CSS PI Eric Christensen, "This is a fairly ordinary NEO, but an extraordinary statistic! Given that the overall NEO tally stands at 10,758, that means that CSS is responsible for 47% of all NEO discoveries, period." Coupled with the 813 discoveries by the Spacewatch program, that means that LPL astronomers have discovered more than half of all known NEOs.

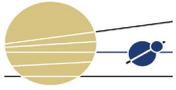
While 2014 FS52 may have been "fairly ordinary," two other CSS discoveries were anything but that.

In March, Senior Staff Scientist Steve Larson forwarded news that Catalina Sky Survey observer Rik Hill (Research Specialist, Senior) discovered the "crumbling" asteroid P/2013 R3. Hubble Space Telescope provided likely the first known observation of an asteroid breaking up through spin-up by the YORP effect.

And on New Year's Eve, observer Rich Kowalski discovered an asteroid that impacted Earth the next day. 2014 AA represented only the second time in human history that an object first observed with a telescope hit the Earth. The other, 2008 TC3, was also discovered by Rich, also at CSS. Incidentally, 2014 AA broke up harmlessly over the Atlantic.



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Welcome from the Director

Welcome to the Spring 2014 newsletter from the Lunar and Planetary Laboratory, a newsletter with a slightly different focus than usual. It's been a busy spring, with the normal extraordinary goings-on—Catalina Sky Survey found another asteroid just before it hit Earth, the OSIRIS-REx mission passed in Critical Design Review, and the HiRISE mission just keeps turning out spectacular images of the surface of Mars. But we also keep working to bring in new people and fresh ideas—Christopher Hamilton and Gilda Ballester joined the LPL faculty, we have a faculty search going in the multi-departmental Theoretical Astrophysics Program, and we've gone through an Academic Program Review to try to figure out how we can move on to even greater accomplishments (hopefully, you'll hear the results of the latter two in the next newsletter).

We've got links to a lot of interesting news items relating to the science we do, and to the various awards that our talented graduate students keep winning (of note, Juan Lora won the department's prestigious Kuiper Award and Ali Bramson won the College of Science's Graduate Teaching Award). But, and here's where we're highlighting some things you might not be aware of, we also have links to stories about things we do that aren't exactly science. The graduate students (led by Jamie Molaro and James Keane) put on a spectacularly successful "Art of Planetary Science" art show, our building hosted the roll-out of "Orbiting Ray Bradbury's Mars," a book consisting of essays about science-fiction author Ray Bradbury (edited by LPL Kuiper Circle regular Gloria McMillan, spouse of Spacewatch director Bob McMillan), and the OSIRIS-REx team has started posting a set of videos called "321Science" on YouTube (I knew they were good when I realized I'd told someone about an "entertaining video about the Yarkovsky Effect"). And somewhere in the middle, between pure public outreach and pure science, Catalina Sky Survey is working with Planetary Resources Inc. (a company with Chris Lewicki, whose ties to LPL go back 20 years, as president) to crowdsource asteroid detection.



The bottom line is that LPL is a fantastic organization, full of people with a myriad of talents. Enjoy finding out what's been going on with the LPL family, and if you haven't been mentioned recently, let us know what's happening in your life and career.

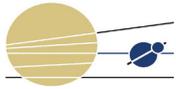
Timothy D. Swindle, Ph.D.

Department Head and Laboratory Director

Breaking the Barriers: HiRISE Translations

People around the globe can now read information that accompanies images of Mars captured by the University of Arizona's Lunar and Planetary Laboratory's High Resolution Imaging Science Experiment (HiRISE). HiRISE, which is aboard NASA's Mars Reconnaissance Orbiter, captures images of the red planet in never-before-seen detail and resolution. Earth's people can read these descriptions in 16 languages, with the newest addition being Hebrew, thanks to the UA's Beautiful Mars Project. "There are people across the world that want to learn about Mars but have little-to-no English skills," said Ari Espinoza, HiRISE Project Coordinator. "The project is a unique way to speak to them in their language and let them in on what we're seeing and learning about Mars. For educators, it's another tool to spark interest with their students when they see their language describing the surface of another planet." Languages in the Beautiful Mars Project include Hebrew, German, French, Spanish, Portuguese, Italian, Latin, Polish, Arabic, Chinese and Turkish. Image captions can be read in these languages on HiRISE's Tumblr and Twitter sites. So far, these sites are the only NASA resources available to the public in many of these languages, including Hebrew.





Department

Faculty Updates

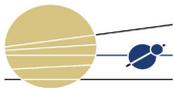


Dr. Christopher Hamilton joined LPL this spring as an Assistant Professor. Christopher is a planetary volcanologist with an interest in field-based analogs for geologic surface processes on terrestrial planets and satellites. He comes to LPL after three years at the NASA Goddard Space Flight Center's Planetary Geodynamics Laboratory where he worked as a Postdoctoral Fellow investigating active lava flow emplacement in Hawaii, flood lava volcanism on Mars, and tidal heating processes within Jupiter's moon Io. He earned his Ph.D. in Geology and Geophysics at the University of Hawaii researching lava-water interactions on Earth and Mars, with a focus on ice-contact volcanism in Iceland. He has also worked on volcanically triggered floods in New Zealand, volcanic successions in the Canadian Arctic, and impacts into volatile-bearing martian substrates. Christopher's research employs a combination of field observations, planetary mapping, geospatial analysis, and thermodynamic modeling. At LPL, he will continue to develop these research themes to study volcanism and aqueous floods on Earth and

Mars, as well as explore new opportunities in terrestrial analog studies using unmanned aerial vehicles, machine learning systems, and industrial-scale simulation of lava and impact melt flows using metallurgical smelting techniques.



Dr. Gilda Ballester has been named a Senior Research Scientist in the Department of Planetary Sciences/Lunar and Planetary Laboratory. Gilda has been an Associate Staff Scientist at LPL since 2000. Before coming to Tucson, she conducted her research at the University of Michigan as an Associate Research Scientist in the Department of Atmospheric, Oceanic and Space Sciences, Space Physics Research Laboratory. Gilda earned her Ph.D. in Physics (Astronomy minor) at Johns Hopkins University. Her research interests include characterization of exoplanets with transit observations at UV, optical and near-IR wavelengths with the Hubble Space Telescope and through collaborative ground-based observations. This research focuses on the properties of both the upper and lower atmospheres of hot Jupiters and low-density super Earths, and of magnetospheric interactions on these exoplanets. Her early research interests included Io's atmosphere and plasma torus, and on the upper atmospheres, auroras and magnetospheric interactions of Jupiter, Saturn and Uranus with both imaging and spectroscopy.



Department

Staff Updates

Phil Bloomenthal began work at LPL as a Systems Administrator on the OSIRIS-REx mission in January. Currently, his primary responsibilities include network security and maintenance of all Microsoft servers, mostly focusing on Active Directory and MS Exchange. Prior to joining LPL, Phil spent six years as part of the staff of a local behavioral health organization, eventually taking over as IT Director in 2012. Phil is originally from Ridgewood, N.J., but grew up in Tucson; he returned to Arizona in 2002 after studying creative writing and filmmaking at The New School for Social Research in New York City. In his free time, Phil enjoys writing and directing short films for children, wearing cardboard robot costumes to the Renaissance Faire and wrangling his two very

active Queensland Heelers, Laika Eloise and Dalton Wade. His favorite food is boxed macaroni and cheese, but he tells people it's truffled risotto.

Amy Brenton joined LPL in March as Administrative Associate for Professor Timothy D. Swindle. Amy comes from the Flowing Wells School District where she spent 10 years, most recently at Walter Douglas Elementary working as an administrative assistant to the principal. Amy is an Arizona native, having spent most of her life in Tucson and southern Arizona. She spends most of her non work time keeping up with her husband, two kids, three dogs, and twelve chickens. Amy says she has had a great welcome from LPL and is very excited to be here.

Sue Robison is Business Manager for the HiRISE group. She started work at

LPL in May 2012, but recently assumed duties performed by Senior Business Manager Linda Hickcox, who retired in February. Sue began her career at the University of Arizona 20 years ago in the Department of Geosciences. She has also worked in the College of Science Dean's office, with the Associate Dean of Academic Affairs, the RRUFF Project, and the Office of the Provost, as a Senior Program Coordinator. As much as Sue enjoyed her other positions, it is working on the business side of the University that she most enjoys. When a position opened in Planetary Sciences as a Business Manager, she decided to apply. She is pleased to be back in a department that is part of the College of Science community, and working with the HiRISE and administrative teams in the Lunar and Planetary Laboratory.



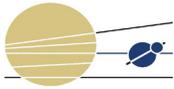
Get to Know a Post-Doc: Elisabetta Rigliaco

Elisabetta Rigliaco joined LPL in September 2011, working as a post-doctoral fellow on the evolution and dispersal of protoplanetary disks around young stars with Dr. Ilaria Pascucci. Her current research primarily focuses on understanding how protoplanetary disks evolve and disperse, leading to the formation of planets. In particular she focuses on the observational analysis of the mechanisms involved in the dispersion of protoplanetary disks around young stars. Elisabetta is from southern Italy. She studied at the University of Bologna where she earned a B.S. in Astronomy, and a M.S. in Astrophysics and Cosmology (2007) with a thesis on radio-galaxies. Elisabetta earned her Ph.D. in 2011 from the University of Florence conducting research on accretion and ejection properties of young low-mass stars. In her spare time, Elisabetta enjoys running, cooking and spending time with friends.



Get to Know a Staff Scientist: Eric Christensen

Staff Scientist **Eric Christensen** is director of the Catalina Sky Survey for near-Earth objects. He returned to LPL in 2012 after a 5-year stay in Chile at the Gemini South Observatory, where he was part of the science operations group responsible for daytime and nighttime operations of the telescope and instruments. Prior to moving to Chile, he worked as an observer and software developer for CSS for four years. In addition to near-Earth asteroid discovery and follow-up, Eric's interests include survey modeling and optimization, observatory operations, instrument commissioning, and efficient software design. He found many similarities between asteroid surveying and meteorite hunting during multiple expeditions to the Atacama Desert, which resulted in the recovery of several achondrites and carbonaceous chondrites, as well as many ordinary chondrites. Eric holds a BFA from the University of Arizona, with a concentration in ceramic sculpture.



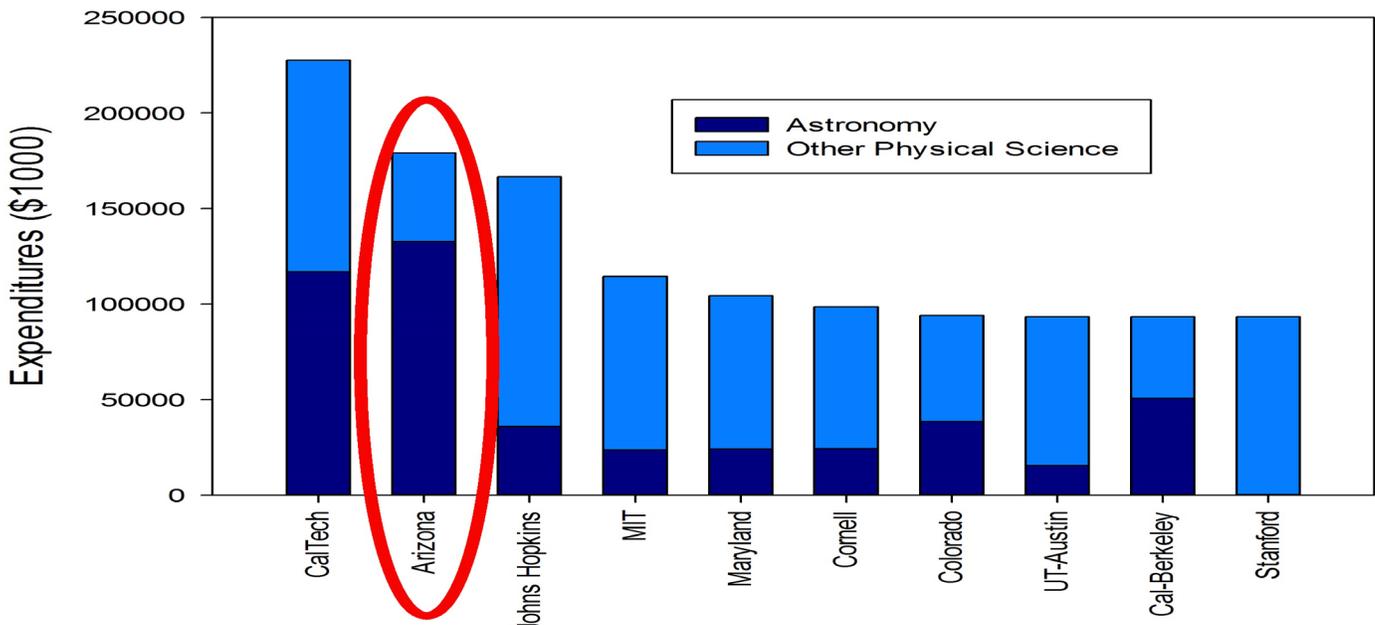
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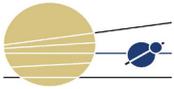
UA Ranked Second for Physical Science Research Funding

The University of Arizona is first in astronomy in a national ranking of 539 public and private universities for research expenditures and second in the physical sciences, according to data from the National Science Foundation Higher Education Research and Development Survey. The report, which compares higher education institutions in terms of their research expenditures in astronomy including space exploration, physics and chemistry for the 2012 fiscal year, places only the California Institute of Technology higher than the UA in R&D expenditures overall. Of \$4.8 billion being spent in physical sciences, UA scientists appropriated almost \$179 million in research grants and contracts from federal, state and private sources to create new knowledge or advance new technologies in 2012. Overall, R&D spending at U.S. universities in all fields of research—mostly science, but also engineering, education, law and others—totaled \$65.8 billion in fiscal year 2012. Out of 539 universities, the UA ranks No. 29 for scientific research expenditures across all fields. These fiscal statistics represent an indirect measure of the capability of the University to perform high-caliber research, because most grants and contracts are awarded if they pass muster in a highly competitive and selective peer-review process.

According to Tim Swindle, department head and director of the UA Department of Planetary Sciences/Lunar and Planetary Laboratory, the UA has been ranked between No. 20 and 30 across R&D expenditures in all science areas for the last 10 years; has traded the top three places in the Physical Sciences category with Caltech and Johns Hopkins; and has been first in astronomy—represented at the UA by Lunar and Planetary Sciences and the Department of Astronomy and Steward Observatory—every year during that period. "It is important to note that most of that money has been won in national competitions for grants and contracts, which means that our peers and the funding agencies are recognizing the UA's continuing strength," Swindle said. "From an economic perspective, most of the money spent on research actually goes to pay salaries and buy equipment, so we're creating jobs in Arizona."

Physical Sciences R&D (FY2012)





Outreach

The Art of Planetary Science

by Jamie Molaro

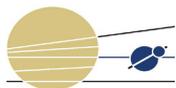


On December 4, 2013, the University of Arizona's Lunar and Planetary Laboratory (LPL) presented The Art of Planetary Science: An Exhibition (TAPS). This was a one night art exhibition and competition displaying works of art inspired by planetary science, alongside works created from scientific data. The goal of the event was to build community between the local art and science communities of Tucson, and to engage the public together in celebration of the beauty and elegance of the universe. The event was conceived of and organized by LPL graduate students Jamie Molaro and James Keane, with the assistance of Maria Schuchardt and other graduate student volunteers, as a voluntary outreach project.

The public often sees science as dull and boring. In reality, science is full of beauty, and the practice of creating scientific knowledge requires an enormous amount of creativity. The goal of the event was to give scientists the opportunity to show this to the public, by creating art out of science and their scientific data. These works utilized, equations, simulations, visual representations of spacecraft data, and images of extra-terrestrial rock and dust samples. Viewing these works of art alongside more traditional artwork inspired by those same scientific ideas provided the audience with a more complex, multifaceted view of the content that would not be possible viewing either alone.

Artists and scientists of all types and levels participated in the exhibition. Having a wide range of ability represented in the art, from professional to amateur, emphasized the community values, collaboration, and engagement that was central to the goals of the exhibition. Works were submitted by prominent local artists with galleries, art students, scientists and science students, amateur astronomers, and art hobbyists. While most participants were local artists and scientists, submissions were received from Northern Arizona, New Mexico, Texas, and even the UK. A wide range of mediums was also represented, including paintings, drawings, photographs, digital images, film, poetry, sculpture, textiles, and glasswork.





Outreach

One powerful aspect of the event was the ability to reach out to many sectors of the community. The winners of the TAPS competition, as well as a dozen additional selected works, were featured at Craft Tucson and the Tucson Museum of Art's Art on Tap: Art, Music, and Beer Fest the following weekend. This provided LPL and the TMA an opportunity to work together in engaging the public in art and science through cross promotion, and provided participating artists more than one opportunity to display their work. Prizes for the TAPS competition were sourced from local businesses such as art and book stores, as well as from private donors. This allowed these businesses and the contributing artists to actually participate in and collaborate with LPL in public engagement, which broadened the reach of the event beyond traditional attendance.



The inaugural TAPS exhibition was extremely successful, displaying over 150 works of art, from more than 70 artists and scientists, and drawing an audience of more than 300 art and science enthusiasts. The response from the art community was overwhelmingly positive. Many artists expressed their enthusiasm for exploring planetary science and astronomy as a theme, getting the chance to interact with and meet scientists, and having an additional venue (and audience) in which to display their work. The scientists who participated were equally as interested in seeing local art, meeting artists, and promoting the beauty of science.

The team has plans for a second Art of Planetary Science exhibition this fall, with the hopes that it can become an annual event. They expect this year to be even bigger and better than last! Pictures and details of last year's event are at www.lpl.arizona.edu/art/2013.

OSIRIS-REx Presents 321Science

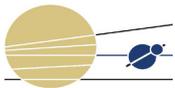
321Science produces fast-draw and other formatted videos to explain concepts in planetary science and promote communication about and public engagement in the mission and Solar System exploration. OSIRIS-REx Presents 321Science posts entertaining videos about asteroid science and OSIRIS-REx mission information. Regular installments are posted to the OSIRIS-REx YouTube page at <http://www.youtube.com/OSIRISREx>.

Recent 321Science clips include:

- *What is the Yarkovsky effect?*
- *What is Thermal Inertia?*
- *What is the difference between prograde and retrograde motion?*



Thanks to the 321Science team: Anna Spitz, Symeon Platts, Melissa Dykhuis, James Keane, Heather Roper, Zoe Bentley, Rose Patchell, Sarah Spitz, Ross Dubois, and OSIRIS-REx Scientists and Educators.



Graduate

Juan Lora Named Recipient of 2014 Gerald P. Kuiper Award



Congratulations to Juan M. Lora, recipient of the 2014 Gerard P. Kuiper Memorial Award.

Juan Lora earned his B.S. in Astronomy (magna cum laude) from the University of Southern California in 2009. His research objective as a graduate student at LPL has been to understand the dynamics and

history of Titan's atmosphere, the only other body in our solar system with an active "hydrological" cycle, and to develop the necessary tools for understanding the atmospheres of extra-solar, potentially "Earth-like" planets. By using his adaptation of an 'Earth-centric' coupled general circulation model for application to Titan, he efficiently achieved the necessary code modifications and now has a working model of the Titan atmosphere. His simulations will allow an integrated assessment of the diverse observations of Titan, ranging from the polar methane lakes to the longitudinal dunes seen at low latitudes.

As a graduate student in the Department of Planetary Sciences, Lora has already achieved excellence with his research into the patterns of insolation and the seasonal variability of cloudiness and temperature throughout Titan's troposphere. His analysis of Titan's troposphere is both insightful and creative and was recently published in *Icarus* (Lora et al., 2011). This paper clearly shows that previous modeling efforts employed unphysical parameterizations of the insolation and that the conclusions drawn from those simulations about Titan's wind and temperature profiles are likely erroneous. Lora's most recent work, exploring the orbitally-forced variability of the lake locations on Titan using a modern general circulation model, clearly shows his increased

expertise and technical skill, even considering the already high level of achievement present in his early work. Lora is the recipient of a NASA Earth and Space Science Fellowship (NESSF) for 2012-2014. He will defend his dissertation on "Radiation and Dynamics in Titan's Atmosphere: Investigations of Titan's Present and Past Climate" in 2014. Associate Professor Joellen Russell is Lora's advisor.

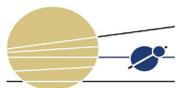
Ali Bramson Wins College of Science Outstanding Teaching Award

LPL's Ali Bramson won the award for Outstanding Teaching at the 7th Annual College of Science Graduate Student Awards. Bramson was recognized for her work in developing a year-long seminar course called "Entering Research (LASC 397A)." The course, which Bramson taught this year, introduces undergraduates to all facets of the research endeavor.



In addition to the award for teaching that Bramson won, the College of Science gives out awards to graduate students for Outstanding Scholarship and Outstanding Service and Outreach. Juan Lora and Melissa Dykhuis were LPL's nominees for the latter two awards.

The award was announced at a reception held on April 16, sponsored by the College of Science and the Associate Graduate Council for the College of Science (AGCCS). Bramson's award marks the third consecutive year that an LPL graduate student has won one of the three awards. Given that our graduate students are competing against excellent students from 11 other departments, having a winner three years in a row speaks to the excellence of the graduate students we have.



Graduate

Christa Van Laerhoven Graduates



Christa L. Van Laerhoven successfully defended her dissertation titled “Multi-Planet Extra-Solar Systems: Tides and Classical Secular Theory” on April 16. Christa began her career as a graduate student in 2008, with two years of support from a Canadian NSERC (National Science and Engineering Research Council of Canada) Fellowship. She was the recipient of a NESSF (NASA Earth and Space Sciences Fellowship) for 2012/2013 and 2013/2014. During her time as a graduate student, Christa also earned the PTYS Graduate Teaching Excellence Award (Fall 2011), and received a University of Arizona College of Science Galileo Scholarship in 2012. Professor Richard Greenberg was Christa’s dissertation advisor. Christa will begin a position as a postdoctoral fellow at the University of Toronto in the summer of 2014. Congratulations, Christa!

2014 LPL Graduate Student Awards for Service and Outreach

This year, the Department of Planetary Sciences/Lunar and Planetary Laboratory was proud to recognize and award three graduate students for their efforts toward 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.

- * Melissa Dykhuis: OSIRIS-REx 321Science! project
- * James Keane: The Art of Planetary Science
- * Jamie Molaro: The Art of Planetary Science

Fall 2013 GTA Award to Molly Simon

Molly Simon is the recipient of the Outstanding Graduate Teaching Assistant Award for Fall 2013. Molly earned the award for her work as a GTA for Dr. Steve Kortenkamp’s PTYS/ASTR 206 course. Molly is a first-year graduate student; her advisor is Assistant Professor Ilaria Pascucci.

NSF Research Fellow

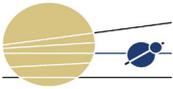
Margaret Landis has been named the recipient of a NSF Graduate Research Fellowship, which comes with three years of funding and tuition support. Margaret is a first-year student working with Associate Professor Shane Byrne.

LPI Career Development Awards

PTYS graduate students Patricio Becerra and Michelle Thompson were each awarded a Lunar and Planetary Institute (LPI) Career Development Award in February 2014. The award is given to graduate students who submitted a first-author abstract to the 45th Lunar and Planetary Science Conference (LPSC). The awards are based on a review of the application materials by a panel of planetary scientists, and recipients received a \$1000 travel stipend to help cover LPSC conference expenses. Patricio’s poster abstract was titled, “Martian Polar Stratigraphy from HiRISE Stereo Topography.” The title of Michelle’s abstract was, “Nanoscale Analysis of Space Weathering Features in Soils from Itokawa.”

AAS Dumcombe Prize

Third-year graduate student Melissa Dykhuis is the recipient of a 2014 Ray Duncombe Prize from the Division on Dynamical Astronomy of the American Astronomical Society. The prize provides a travel stipend to the 2014 DDA meeting in Philadelphia and waives meeting registration fees.



Outreach

Tucson Festival of Books 2014



The UA Campus played host again this spring to the annual Tucson Festival of Books. This year's event, the sixth annual festival, was held March 15-16, 2014. The Tucson Festival of Books is free and open to the public. It has become one of the most anticipated and well attended book fairs in the U.S., attracting approximately 100,000 attendees, 450 authors, and 300 exhibitors. LPL faculty, staff, and graduate students participated in the festival as part of the UA ScienceCity Science of Tomorrow Tent, which was this year located on the UA mall directly in front of the Meinel Optical Sciences building. LPL was well represented by students, faculty, and staff. Highlights of the LPL events included:

- OSIRIS-REx staff and ambassadors describing the mission and signing visitors up to send their names to Bennu;
- LPL graduate students educating the crowd about exoplanets;
- Dr. Steve Kortenkamp and preceptors from Teaching Teams creating comets, exhibiting meteorites, and discussing the properties of light;
- LPL Research Specialist Senior Dolores Hill talking meteorites.

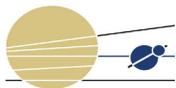
In addition to these hands-on activities, Associate Professor Travis Barman spoke on "Capturing Images of Planets that Orbit Distant Stars" as part of Science Café.



As if all this science weren't exciting enough, the Kuiper Space Sciences building was invaded by Martians! That's right... two Martians stepped off the pages of writer Ray Bradbury's science fiction and into the Kuiper Building. Martian tourists Mr. K. and his wife Ylla acted as the MCs of the book launch for *Orbiting Ray Bradbury's Mars* (edited by Gloria McMillan), which was held in Kuiper 308 on Saturday, March 15. The Martians were played by student actors Rainey Hinrichs and John Noble. Mr. K. and LPL Professor Emeritus Peter Smith got into a bit of a row when Mr. K. asked Smith if he had filed for a Martian parking permit before landing his Phoenix Mars Lander in their Mayor Ingo Nup's "back forty" acres on Mars. The audience laughed as Smith sighed, "Has it come to this?"



Orbiting Ray Bradbury's Mars is a unique volume that has space scientists and literary and film scholars writing about Bradbury's fiction, especially Bradbury's *The Martian Chronicles*. Dr. Peter Smith contributed a Foreword in which he explains how Bradbury's fiction helped him to envision a career in astronomy. Kuiper Circle Chair and retired aerospace engineer David Acklam traced his memories of Bradbury's fictional Mars and made engaging connections with the real world of space missions. NASA scientists from Smith's Phoenix Mars Lander Mission also wrote about the fictional vs real Mars. LPL alumnus Dr. William K. Hartmann played a role in creating the book and its artwork.



Invest in LPL

2014 Galileo Circle Scholarships

Congratulations to LPL's 2014 Galileo Circle Scholarship recipients: Patricio Becerra, Ali Bramson, Melissa Dykhuis, Tiffany Kataria, James Keane, Cecilia Leung, and Kelly Miller. Galileo Circle Scholarships are awarded to the University of Arizona's finest science students and represent the tremendous breadth of research interests in the College of Science.

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 17, 2014.

Congratulations to all our 2014 Galileo Scholars!



Top Row: Ali Bramson

Middle Row: James Keane, Patricio Becerra

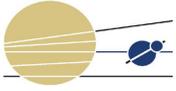
Bottom Row: Cecilia Leung, Kelly Miller, Melissa Dykhuis, Tiffany Kataria

2014 Shandel Travel Award



Michelle Thompson has been announced as the recipient of the 2014 Shandel Travel Scholarship. Michelle is a third-year graduate student working with Assistant Professor Tom Zega. She plans to use the funds for summer travel to the annual Microscopy and Microanalysis Conference in Hartford, Connecticut, August 2014. At the M&M Conference, she will present her work as a talk titled, "Electron Energy-Loss Spectroscopy of Iron Nanoparticles in Lunar Soil using an Aberration-Corrected Scanning Transmission Electron Microscope." Michelle was awarded a 2014 M&M Meeting Award for the submitted paper, and was invited to present her research.

We'll report on Michelle's summer travel in the LPL Fall Newsletter!



LPL in the News

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

Top NASA Fellowship Winners Head to the UA to Pursue Their Research - For the first time, the UA has attracted postdoctoral research fellows from each of NASA's top three fellowship programs.

Bray's Findings Light a Fire Under Europa Mission - A recent study by a UA scientist provides new evidence that Jupiter's moon Europa has a thin crust of ice over a vast ocean.

Scientists From Around the World Exchange Ideas on Space Exploration at Oro Valley Conference - 200 astrobiologists from around the world proposed a variety of techniques for finding and verifying candidates as prospects for life on other planets.

Fresh Impact Crater Spied on Mars - A NASA spacecraft in orbit around the Red Planet has spied a fresh impact crater on the Martian surface.

UA Ranked Second in the Nation for Physical Sciences Research Funding - Of more 539 universities ranked for research and development expenditures in the physical sciences – the UA comes in second and number one for astronomy.

HiRISE views Opportunity Rover on Ridge - The High Resolution Imaging Science Experiment (HiRISE) camera on NASA's Mars Reconnaissance Orbiter caught a view of NASA's Mars Exploration Rover Opportunity.

Former LPL Student Intern Ojha Finds Clues That There's Flowing Water On Mars - New images taken by the Mars Reconnaissance Orbiter have shown new clues that these recurring slope lineae do in fact contain flowing water.

Asteroids Scarred by Solar System's Violent Youth - Telltale evidence of the solar system's traumatic childhood can be found in the main asteroid belt, which contains a far more integrated assortment of bodies than previously believed.

Catalina Sky Survey: The Hunt for Killer Asteroids - NASA claims to know about 90% of the asteroids 1 kilometer across and larger. The goal is to someday track all of them.

Scientists Discover World With an 8-Hour Day - One day on Beta Pictoris b takes just eight hours, due to a rotation rate that's more than 50 times faster than Earth's.

OSIRIS-REx, LSST is Closer to Probing the Universe - OSIRIS-REx has been cleared by NASA to begin building a spacecraft, flight instruments, ground system and launch support facilities.

Epic Mars Flooding Triggered by Collapsed Crater Lake - Mars probably had its own colossal flood millions of years ago, when an ice-covered lake cracked open and gushed to the surface.

Astronomers Find First Asteroid with Rings - The asteroid is only the fifth solar system object whose rings have been detected.