UA SCIENCE
LUNAR & PLANETARY LABORATORY
Department of Planetary Sciences

LUNAR AND PLANETARY LABORATORY NEWSLETTER SPRING 2017

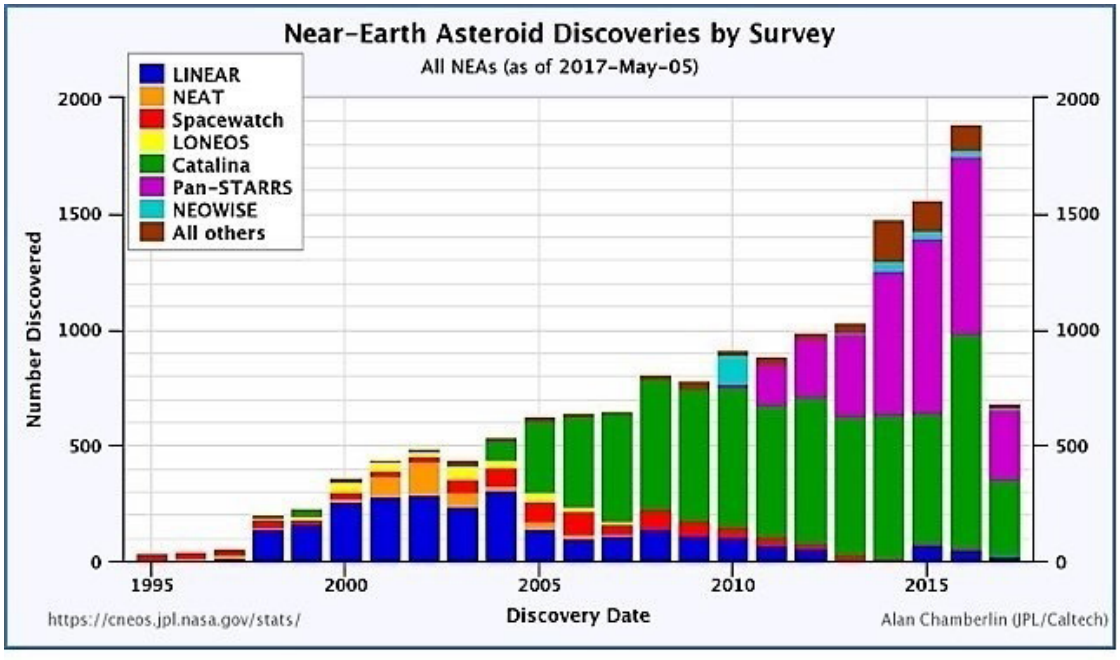
Great Year for Catalina Sky Survey

by Eric Christensen

The Catalina Sky Survey (CSS) operates two survey telescopes on Mt. Lemmon (Tucson, AZ) in search of Near-Earth Objects (NEOs), or asteroids and comets that can approach the orbit of the Earth to less than 45 million kilometers. In 2016, CSS deployed new cameras at both survey telescopes: the 1.5-m prime focus reflector and the 0.7-m Schmidt. These cameras, built locally in Tucson by Spectral Instruments Inc., increased the fields of view of each telescope by factors of 4x and 2.4x, respectively. These upgrades have allowed CSS telescopes to survey significantly larger areas of sky, leading to an uptick in the discovery rate.

2016 was a record year for NEO discovery: CSS led the league with 930 discoveries (a factor of 1.5x better than CSS's previous best year), and together with other surveys, found a total of 1,889 NEOs (a factor of 1.2x more than the previous best year). The first four months of 2017 show similarly encouraging results. CSS is a long-term leader in the NEO discovery effort, accounting for over 45% of the known catalog of NEOs.

At CSS we continue to work to optimize our workflow, modify our survey strategies, and tune our systems to maximum sensitivity. The recent instrumentation upgrades have provided a significant boost in discovery capacity, leading to new opportunities and challenges for the survey.



Welcome from the Director

Welcome to the Spring 2017 newsletter. I was trying to think of what I should say, and concluded that the best summary of what's been going on is that the more things stay the same, the more they change. LPL remains, at least in my opinion, one of the premier places in the world to work on planetary sciences, filled with faculty and other researchers who define the cutting edge of our field, graduate students who are changing from just-out-of-college neophytes into world experts, and staff who provide the glue that keeps pieces of the organization from flying off.

But the only way to stay at the top is to change with the times. Having a graduate program helps with that, because just as one distinguished group graduates and moves on, another group comes in (this fall, we'll have 10, but you'll read more about them in the fall newsletter). However, the faculty have to change, too, for the laboratory to stay vital. The amazing cohort of faculty hired in the 1970s, who led the way to the founding of the academic arm of LPL (the Department of Planetary Sciences) and who were leaders in the field for decades, are almost all gone. With the retirement of Bill Hubbard, we have only one tenure-track faculty member left who was hired before 1986. Meanwhile, we have added 10 new tenure-track faculty (Jeff Andrews-Hanna, highlighted in this issue, is the latest) and three new Research Scientists since 2010. Their challenge will be to achieve the greatness of their predecessors, but it's a talented group and the place has a buzz about it.

Finally, even the physical facilities, at least in the Kuiper Building, are changing to keep up with the times. Several laboratories have been remodeled, in preparation for new faculty moving in, the rooftop observatory on Kuiper will soon be operational for the first time in years, the Kuiper basement has gotten a long-needed extreme makeover, and the outside stairway (the "gantry") got a long-needed repainting. I don't know if it's those changes, or the little things like the new artwork on many of the walls (some from artists at The Art of Planetary Science show, some from spacecraft images or images of our research that Maria Schuchardt has produced), but two different visitors have recently asked me if this is a fairly new building. Those of you who remember the condition of much of it 10 years ago will appreciate how surprised (but pleased) I was. Now if we can just update the Sonett Building….

Enjoy finding out about the latest going on with the people and science at LPL, and please let us know things that we can highlight in coming newsletters.

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

Toby Owen, 1936-2017

Tobias ("Toby") Owen passed away on March 4. Toby was one of the very early graduate students in LPL; he received his Ph.D. in Astronomy in 1965, with Gerard Kuiper as his thesis advisor. He spent his career at IIT Research Institute, SUNY-Stony Brook, and the University of Hawai'i. In 2009, he received the DPS Gerard P. Kuiper Prize in recognition of his work. More information about Toby's life and career is available in the AAS obituary by Dale Cruikshank.

This photo by Dale Cruikshank captures Tobias Owen (R) and Gerard Kuiper (L) at a radio telescope in Texas circa 1970.

Department

Jeffrey Andrews-Hanna Joins LPL Faculty

Dr. Jeff Andrews-Hanna joined LPL in January as an Associate Professor. Jeff is a planetary scientist, interested in all aspects of the evolution and structure of the terrestrial planets. He joined LPL after working at the Southwest Research Institute in Boulder where he was a staff scientist. Jeff earned his Ph.D. in Earth and Planetary Science at Washington University in St Louis, where he focused on the hydrology of Mars; he then pursued a post-doc position at MIT, where he worked on martian geophysics. Jeff's primary research interests are in hydrologic, tectonic, volcanic, and geodynamic processes on the terrestrial planets, making use of a combination of numerical modeling and data analysis. Ongoing research topics include the analysis of gravity data from NASA's GRAIL mission to investigate subsurface structures on the Moon, hydrological modeling applied to the formation of sedimentary deposits on Mars, data and modeling applied to understanding volcanic eruption products on Mars, and geophysical studies of tectonics across the inner Solar System.

Recognition for Shane Byrne

Congratulations to Associate Professor Shane Byrne, who won second place for the 2017 Outstanding Faculty for Graduate and Professional Student Achievement Award, sponsored by the University of Arizona Graduate and Professional Student Council. The award is presented to faculty who have made outstanding efforts to mentor and advise graduate or professional students in their college or department; criteria include: creating opportunities for the graduate/professional students, faculty, and staff with whom they work to achieve excellence; demonstrating outstanding efforts of mentorship and develop mentees' research and professional skills; mentoring a wide persity of students; assisting students to present and publish their work, find financial aid, and to provide career guidance; offering psychological support, and essential strategies for life in the scholarly community; demonstrating continued interest in the student's professional advancement.

Giacalone Honored with Blitzer Award

Professor Joe Giacalone was the recipient of the 12th Annual Professor Leon and Pauline Blitzer Award for Excellence in the Teaching of Physics and Related Sciences. Jacob Mallott and Eric Blitzer presented Professor Giacalone with the award at a special afternoon program held on March 2, 2017. Professor Giacalone's award lecture was titled Solar Storms, Space Radiation and their Effects on Earth and Space Travel. A reception followed in the Kuiper Space Sciences atrium.

Joe has taught courses at all levels including introductory courses in planetary sciences, advanced undergraduate and graduate courses in the physics of the solar system, and an advanced graduate course on the physics of the Sun. His research focus is on understanding the origin and physical processes involved in creating high-energy charged particles near the Sun and how they move throughout the solar system. Joe earned a B.A. in Mathematics (1985) and B.S. in Physics (1986) from Ft. Lewis College; he completed a Ph.D. in Physics from the University of Kansas in 1991. Joe began his career at LPL in 1993 as a post-doctoral research associate and joined the tenure-track faculty in 2004. He was a winner of a NASA Early Career award in 2005. He has been directly involved with number of NASA missions, including Ulysses, ACE, and Voyager, and is currently a Co-Investigator for the upcoming NASA mission Solar Probe Plus, launching next year, which will explore the outer atmosphere of the Sun.

The Blitzer Award is funded through the Blitzer Teaching Award Fund, and commemorates Professor Leon Blitzer and his wife, Pauline Meyer Blitzer.

Department

Spring 2017 Staff Excellence Award

Congratulations to Glinda Davidson, the 2017 recipient of the LPL Outstanding Staff Award! Glinda is a longtime member of the LPL administrative staff, with over 30 years of service to the department. Her many responsibilities include review and approval of grant submissions, budget changes, no-cost extensions, and grant correspondence, as well as pre-award and post-award compliance. Glinda performs cost projections and meets regularly with the faculty and principal investigators to avoid project deficits and resolve problems. Her work extends beyond preparing and managing budgets—she helps to ensure funding continuity for students, post-doctoral researchers, faculty, and staff. Despite the frustrations that Glinda might encounter in a day she is unfailingly courteous and cooperative. She overcomes the obstacles with a smile every day.

In addition to her responsibilities as the Grants Manager, Glinda also supervises several administrative associates and two members of the business office staff. She is recognized as an outstanding supervisor and a great mentor and coach. Glinda always makes herself available to the staff regardless of other pending priorities. In the words of one faculty member, "I don't know what my group would do without her...She enables me to be successful." Glinda's outstanding work previously earned her the staff award in 2000.

Meet LPL Staff: Francine Wetzel and Cheri Winfield

Francine Wetzel is an Administrative Associate who began her career at LPL in January 2017. She works with several groups located on the second floor of the Kuiper Building, including Space Watch, and the Harris and Reddy research groups. Thanks to her mother's love of travel, Francine spent her youth moving around the western U.S. and attending 18 different elementary schools. Her family settled in Tucson and her house transitioned to an assisted living home. This background was the beginning of her career as a caregiver. Francine moved into a position as human resources assistant and payroll administrator at United Cerebral Palsy of Southern Arizona. Francine hopes to return to school at the University of Arizona to earn a master's degree. Francine is "happy to have ended up in Tucson where there are so many outdoor activities to enjoy such as hiking and camping all year round."

Chéri Winfield joined LPL in December 2016 as an Administrative Associate. She supports several faculty members and groups, including Tim Swindle, NASA Arizona Space Grant, Jeff Andrews-Hanna, and Lynn Carter. Chéri's professional background includes administrative support experience for the Dean of Engineering at the University of New Mexico and 14 years at Raytheon. Before coming to LPL, Chéri worked for a not-for-profit in Tucson. Chéri is a Michigan native, but as a military family member, had the opportunity to live in Europe for 5 years. She enjoyed traveling the world and visiting historic sites. Chéri has called Tucson home for 15 years. Her hobbies include reading graphic novels and collecting swords and suits of armor. Chéri also enjoys spending time with her husband, Ken, and her dog Xena, a boxer.

Whitaker Papers to Pioneers of Planetary Science Collection

The papers of Ewen Whitaker, who passed away last October (2016), have been added to the University of Arizona Libraries History of Science (Pioneers of Planetary Science) collection. The Whitaker materials are indexed along with documents from Gerard P. Kuiper, Charles P. Sonett, Donald M. Hunten, Tom Gehrels, Michael J. Drake, and Peter Smith.

Department

Meet LPL Postdocs: Pierre Haenecour and Andrea Banzatti

Postdoctoral research associate Pierre Haenecour joined LPL in January 2017. He works with Associate Professor Tom Zega as part of the NASA Nexus Earths in Other Solar Systems (EOS) team. Pierre's research is on the characterization and coordinated in-situ study of primitive organic matter in meteorites and interplanetary dust particles using ultrahigh-resolution ion- and electron-microscopy techniques. His research background is in geochemistry and cosmochemistry from terrestrial samples (e.g., Pb and Zn isotopes in Archean komatiitic lava flows) to primitive extraterrestrial samples (e.g., meteorites and micrometeorites) using a variety of analytical techniques (e.g., multi-collector inductively coupled plasma mass spectrometry and secondary ion mass spectrometry, Auger and Raman spectroscopy, and electron microscopy). His research interests encompass the study of the building blocks and early history of the Solar System history, and the origin of life.

Pierre grew up in Brussels (Belgium) and graduated with B.A. and M.S. degrees in Geology and Geochemistry from the Université Libre de Bruxelles. He then moved to St. Louis (Missouri) and obtained a M.A. degree and a Ph.D. in Earth and Planetary Sciences from Washington University in St. Louis. His doctoral research work focused on the identification and coordinated micro-analytical study of circumstellar (presolar) grains in primitive meteorites and fine-grained micrometeorites. Pierre also enjoys exploring the Tucson area and Arizona, as well as travelling, discovering new places and cooking.

Andrea Banzatti joined LPL in October 2016 as a Postdoctoral Research Associate with Associate Professor Ilaria Pascucci. Andrea is trying to unveil unknown parts of the story of planet formation from multi-wavelength observations of protoplanetary disks. By observing them at UV, optical, infrared, and millimeter wavelengths, and especially using high-resolution spectrographs, Andrea is studying the presence of water in planet-forming regions at 0.1-10 AU from the central stars, the dispersal of molecular gas during planet formation, and the effects of variable irradiation on the molecular and organic chemistry in inner disks.

Andrea was born in Milan, Italy, where he lived and studied until 2008. He moved to Munich, Germany, at the European Southern Observatory headquarters for his Master's thesis on observations of grain growth towards planets in disks. He then moved to the ETH in Zurich, Switzerland, for his Ph.D. with Prof. Michael Meyer. Andrea's doctoral research was on infrared spectra of protoplanetary disks, with the goal of understanding the survival of water in planet-forming regions. After completing his Ph.D., Andrea moved to Baltimore for a postdoctoral position with Dr. Klaus Pontoppidan at the Space Telescope Science Institute (STScI); during this time at STScI, Andrea specialized in high-resolution infrared spectroscopy of molecular emission from disks, and on observations of their properties and dispersal during planet formation. Andrea now lives in Tucson with his family: wife, Giulia, and three international children (the first born in Italy, the second in Baltimore, the third in Tucson).

Malhotra at TEDx Portland

On April 15, Regents' Professor Renu Malhotra presented a TEDx Portland talk about Planet Nine. The talk will be available to view from http://history.tedxportland.com/

Arizona Loves OSIRIS-REx!

Congratulations to the OSIRIS-REx project, named Arizonan of the Year by the Arizona Republic newspaper (Phoenix). Take a moment to read about Arizona's appreciation for "the glittering constellation of scientists, engineers and others who made this happen."

Outreach

Outreach Highlights

by Dolores Hill, Sarah Morrison, and Maria Schuchardt

It's been another busy semester for LPL'ers who reach out to share their work at local schools and community events, big and small. The spring outreach season opened in January with the extremely popular Connect2Stem event in Phoenix, on January 28. The month of March began with LPL students and staff talking with approximately 650 visitors to Science City at the Tucson Festival of Books and wrapped up with presentations about impact cratering and the scale of solar system objects at the Southern Arizona Research Science and Engineering Foundation (SARSEF) Future Innovators Night, held during their roughly week-long science fair for K-12 students. LPL hosted its annual visit from a group of Norwegian high school students and counselors. Students from Tucson's La Cima Middle School spent a "career shadow" day at LPL that featured a lecture about meteorites from Postdoctoral Research Associate Prajkta Mane, a tour of the new Transmission Electron Microscope, and the opportunity to talk with three PTYS graduate students to learn about graduate school and life as a graduate student. Other opportunites for outreach included talks and demonstrations at local schools. Space Drafts, Tucson's flavor of Astronomy on Tap, featured four LPL speakers for the 2016/2017 season (Bapst, Keane, Sutton, and Volk). Graduate student outreach coordinators Sarah Morrison and Shane Stone estimate that LPL staff and students met approximately 3,151 people during spring 2017 events.

The LPL table at Connect2Stem featured globes of Earth, the moon, Venus, Mars, Europa, and Pluto. Outreach volunteers discussed the different scales of these planetary bodies and Senior Research Specialist Dolores Hill conducted demonstrations of the OSIRIS-REx TAGSAM.

Norwegian high school students spent the day with LPL research groups.

At Connect2Stem, LPL graduate student Sarah Morrison was interviewed by a meteorologist from a Phoenix news channel.

Department

LPL Field Trip Spring 2017

by Margaret Landis

This semester's fieldtrip, led by Joe Spitale, was to southwestern Utah, with major stops at Zion and Bryce Canyon National Parks, to explore the geology of the Colorado Plateau, especially the series of sedimentary layers that form the Grand Staircase. The faulting, stratigraphy, and uplift all contribute to the area's unique geological features.

While making the drive up to Utah, the group stopped at Walnut Canyon and the East Kaibab monocline to discuss the National Parks system/federal land management policy and the formation of monoclines, synclines, and anticlines. Once in Utah, we spent some time in Zion National Park, discussing the overall geology (including landslide deposits near the Springdale entrance to the park), cross bedding (spectacular examples were on the road through the park), and erosional/fluvial processes. One spectacular example was Weeping Rock, where groundwater has started to carve part of an amphitheater-shaped feature while it also cascaded over the side of the formation.

The stratigraphy and erosion observed in Zion was also showcased at Bryce Canyon National Park, where the limestone and other sedimentary rocks of the park had been modified by frost heave processes into hoodoos. After discussing the overall geology, formation of faults and joints, and hoodoos, we hiked down into the formation on the Navajo Loop trail. The sedimentary layers in these parks are part of the Grand Staircase formation, a classic example of a sedimentary sequence with the most recent layers exposed in Bryce Canyon, descending all the way to the Grand Canyon.

In addition to Bryce and Zion National Parks, the LPL field trippers made stops at points of interest including Mammoth Cave (a lava tube created during one of the sporadic periods of volcanism in the area) and Coral Pink Sand Dunes State Park. As formations like the Vermillion Cliffs continue to erode, the spectacularly colored sediment can concentrate in dune formations, like the Coral Pink dunes. We also stopped to see dinosaur tracks, an interesting feature of the Jurassic aged Kayenta and Moenave layers of the Grand Staircase.

Top left: Donna Viola gives a talk on the formation of dinosaur tracks in the Grand Staircase.

Top right: Spring 2017 field trip group at Brian Head, a vantage point where many layers of the upper Grand Staircase can be observed.

Bottom: Kyle Pearson speaking about the formation of Weeping Rock and sapping channels. Water can be seen cascading from the formation in the background.

Graduate

10th 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 2017 College of Science Graduate Student Awards. Each student received $100 and recognition at a reception held on April 26.

Outstanding Service and Outreach: Margaret Landis

Margaret Landis 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. In her 4 years as a graduate student, she has continually participated in activities that have benefited the department and, more importantly, the larger community as a whole. She has made outreach part of her work as a NSF Graduate Research Fellow.

Outstanding Scholarship: Tad Komacek

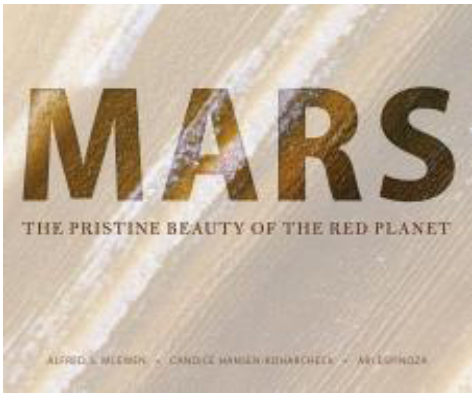
Tad Komacek, the 2017 LPL Kuiper Award recipient, was also named as Outstanding Scholar for the College of Science graduate student awards. Tad is a fourth year student working with Professor Adam Showman. His research interests include magnetohydrodynamics (MHD), the atmospheric dynamics of hot Jupiters, the interior evolution of giant planets, and long-term surface atmosphere climate feedbacks that control the climate and oceans of terrestrial planets; Tad has published 4 peer-reviewed papers on these topics. His scholarship has previously been recognized with the Carson Fellowship, 2 Galileo Circle Scholarships, and a NASA Earth and Space Science Fellowship. Tad plans to graduate in 2018.

Outstanding Teaching and Mentoring: Chet Maleszewski

Chet Maleszewski earned the LPL Outstanding Graduate Teaching Assistant (GTA) Award for Spring 2016 and is the 2017 department recipient of the College of Science Teaching and Mentoring award. Chet earned the LPL GTA award for his work as a GTA with Assistant Professor Vishnu Reddy in the PTYS/ASTR 170B2 class, which is a General Education Natural Sciences Tier I course. Chet was nominated for his efforts in involving the undergraduate students with the course material and helping them to succeed.

Department

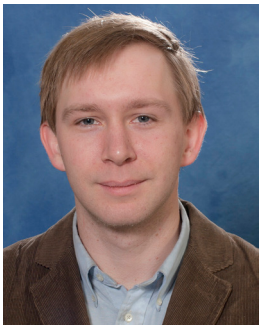
Mars: Pristine Beauty of the Red Planet



A gorgeous, sumptuous tome chock-full of stunning images taken by the most powerful camera ever sent to another planet now brings Mars to armchair explorers on Earth. The UA Press volume *Mars: The Pristine Beauty of the Red Planet* features nearly 200 photographs taken by LPL's HiRISE camera, which has been orbiting Mars on NASA's Mars Reconnaissance Orbiter since 2006. Chapters guide the reader from familiar features such as sand dunes to more alien landscapes. The photos and captions amount to 425 pages compiled by LPL HiRISE scientists. The volume is a "best of" from the treasure trove of high-resolution images snapped by HiRISE for more than a decade. Orbiting Mars anywhere from 125 to 186 miles above the surface, the HiRISE camera has revealed a Red Planet that is anything but dead—at least in geological and climatic terms. Each day, the HiRISE camera makes 13 trips around Mars, and it is scheduled to continue to do so for the foreseeable future.

Graduate

Kuiper Award to Tad Komacek



Thaddeus (Tad) Komacek is the 2017 recipient of the Gerard P. Kuiper Memorial Award, the department's highest award for graduate student scholarship. Tad is in his fourth year as a PTYS graduate student; Professor Adam Showman is his research advisor. Tad's research interests include magnetohydrodynamics (MHD), the atmospheric dynamics of hot Jupiters, the interior evolution of giant planets, and long-term surface-atmosphere climate feedbacks that control the climate and oceans of terrestrial planets. He has published work in each of these research areas. In addition, Tad makes time for science outreach to high school students and has presented conference posters on these outreach activities. He was awarded the LPL Carson Fellowship in his first year as a graduate student, and is a two-time recipient of the College of Science Galileo Circle Scholarship. In 2014, Tad won a NASA Earth and Space Science Fellowship (Magnetism in hot Jupiter atmospheres). Tad expects to graduate in 2018; his dissertation project involves investigating the dynamical mechanisms controlling the atmospheric circulation of hot Jupiters.

Fall 2016 GTA Award to Laci Brock

Laci Brock is the recipient of the PTYS Outstanding Graduate Teaching Assistant (GTA) Award for Fall 2016. Laci was awarded for her GTA with Dr. Steve Kortenkamp in the PTYS/ASTR 206 General Education course (Natural Sciences Tier II). The nominations from her students reference her passion for helping students understand the material, not simply memorize it, her encouragement, understanding, patience, responsiveness, and availability. Laci was instrumental in designing and implementing an experimental grading structure for the course and in gaining approval from the Institutional Review Board to seek consent from students to use their records and feedback for research on the effects of the new grading structure. Laci also helped to design a new term project offered to the 206 students for fall 2016. Morevoer, her handling of the more typical GTA duties (grading, office hours, and extra workshop sessions for paper writing) was exceptional.

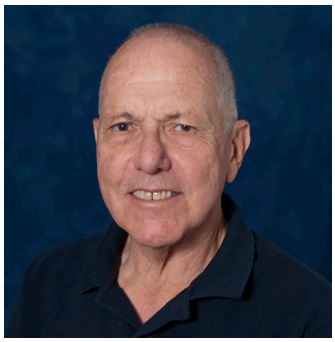
Graduate Student Honors and Kudos

James Keane is the winner of the 2017 Pellas-Ryder Award for best student paper in planetary sciences. The award, administered by The Meteoritical Society and the Planetary Geology Division of the Geological Society of America, includes a cash stipend and certificate. James will receive the award at the Annual Meeting of the Meteoritical Society in Santa Fe, July 2017.

Molly Simon was awarded a 2017 University of Arizona/NASA Space Grant Fellowship for The Development and Validation of the Planet Formation Concept Inventory. The Fellowship includes a stipend, tuition and fee waiver, student health insurance, and a travel grant.

Department

Retirement for Professor William Hubbard



After 45 years of service to the University of Arizona as a faculty member and as Director/Department Head (LPL/Planetary Sciences, 1977-1981), Professor William Hubbard will transition to Professor Emeritus in May.

Professor Hubbard earned his Ph.D. in Astronomy in 1967 from the University of California, Berkeley (Electron Conduction in Degenerate Stellar Matter with L.G. Henyey). He joined LPL in 1972 as Associate Professor, and was promoted to Professor in 1975. In No Longer Points of Light, Bill recalls his early days at LPL: "I was recruited by Gerard Kuiper. He was a very energetic person, especially given his age. He was very enthusiastic about his new department, and he took me on a tour of all of his observing sites around the area.... He talked to me about where he thought the Laboratory was heading and what he thought my role would be in it....The way he expressed it to me was that the Department was going to be an essential component for keeping the Laboratory in existence. At that time it was only LPL; there was no Department. He thought that in order to ensure the longevity of the whole enterprise that we needed an academic arm; we needed to have graduate students, we needed to have a teaching program."

Professor Hubbard has been the recipient of many honors and awards throughout the course of his distinguished career, including election as a Fellow to the American Geophysical Union (1991) and the American Association for the Advancement of Science (2003). He was awarded the Gerard P. Kuiper Prize in Planetary Sciences by the Division for Planetary Sciences (AAS) in 2005. In 2012, Professor Hubbard received NASA Group Achievement Awards for the Juno (mission) proposal and for Juno mission development, launch, and early operations. He was honored with the Blitzer Award for Excellence in the Teaching of Physics and Related Sciences (University of Arizona) in 2013. Professor Hubbard's former students include Jonathan Fortney (Ph.D., 2004), Maki Hattori (M.S., 2008), Joseph MacFarlane (Ph.D., 1983), Robert Marcialis (Ph.D., 1990), Mark Marley (Ph.D., 1990), and Wayne Slattery (Ph.D., 1976).

Mark Marley, Jonathan Fortney, Bob Marcialis, and Didier Saumon pose with their former advisor, Bill Hubbard.

On May 9, LPL hosted a reception to honor Professor Hubbard's long career and many contributions to the department and to the scientific community. Current and former faculty and students from LPL, the University of Arizona, and the Tucson community gathered to share their stories about Bill and to wish him well. Guests were invited to a "retirement" reception; however, Professor Hubbard is looking forward to working with students and continuing his role as a co-investigator on the Juno mission.

Michelle Thompson, Flying High

LPL congratulates recent PTYS graduate Michelle Thompson, who advanced to a pool of 32 candidates in the running to be one of two new astronauts with the Canadian Space Agency. Also, images from a paper on which Michelle was the senior author appeared on the cover of the journal *Meteoritics and Planetary Science* for the March 2017 issue. Michelle defended her dissertation in May 2016 and is currently a NASA Postdoctoral Program Fellow (RA) at Johnson Space Center.

Ciesla Promotion

Congratulations to LPL alumnus Fred Ciesla (2003), who was recently promoted from Associate Professor to Professor in the Department of the Geophysical Sciences, University of Chicago.

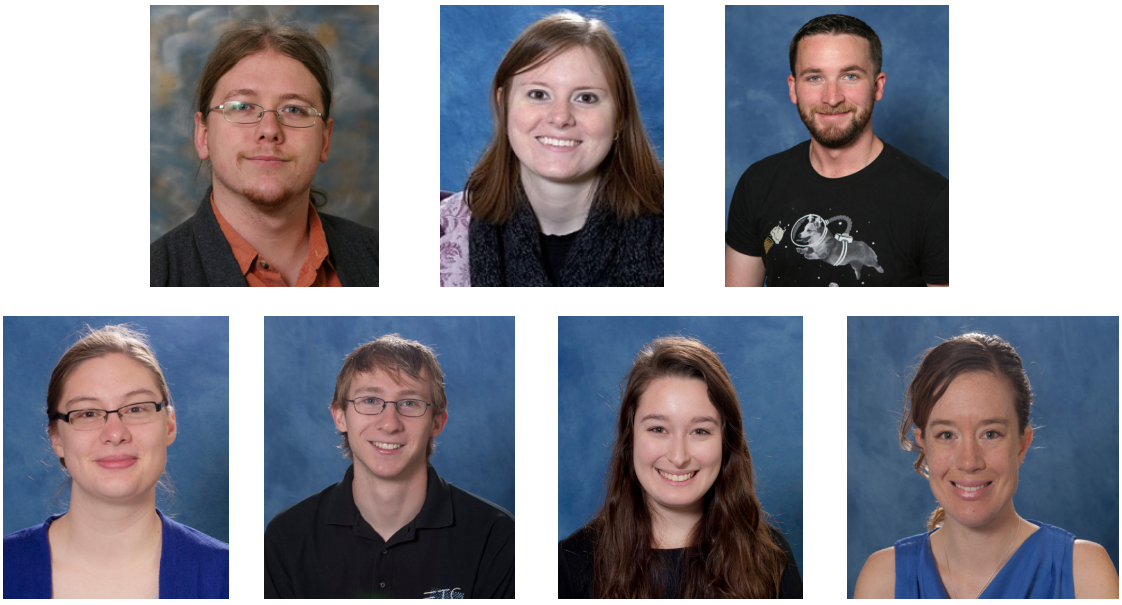
Invest in LPL

2017 Galileo Circle Scholarships

Congratulations to LPL's 2017 Galileo Circle Scholarship recipients: Corwin Atwood-Stone, Ali Bramson, James Keane, Margaret Landis, Joshua Lothringer, Molly Simon, and Alessondra Springmann. 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 12, 2017.

Congratulations to all our 2017 Galileo Scholars!



Top: Corwin Atwood-Stone (McEwen), Ali Bramson (Byrne), James Keane (Matsuyama)
Bottom: Margaret Landis (Byrne), Joshua Lothringer (Barman), Molly Simon (Impey), Alessondra Springmann (Harris)

2017 Curson Travel Award

Amanda Stadermann is the recipient of the 2017 Curson Travel Scholarship. Amanda will attend the International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI) conference to be held in Portland, Oregon, in August. Amanda, a first-year student working with Assistant Professor Christopher Hamilton, will present her research on the young lunar crater Giordano Bruno, with focus on its interior and exterior impact melt. The IAVCEI scientific assembly, Fostering Integrative Studies of Volcanism, is also an opportunity for Amanda to learn the most current methods for understanding terrestrial and planetary volcanism and to participate in discussions on igneous geochemistry and petrology.

We'll report on Amanda's travel and research in the LPL Fall Newsletter!

LPL in the News

Links to the news stories below and others are available at: http://www.lpl.arizona.edu/news/2017/spring

UA Press Brings the Red Planet's Beauty to Your Coffee Table - A new book invites the reader on a visual journey across the surface of Mars taken by the UA-led HiRISE project known as "the people's camera at Mars."

The Search for Water on Mars has Intrigued Scientists for Centuries - It seems that every so often, the discovery of water on Mars is announced again. Despite this, flowing, liquid water on Mars has never been found. So what gives?

No Trojan Asteroids Found, but OSIRIS-REx Successfully Prepares On-Board Cameras - The OSIRIS-REx spacecraft didn't find any Earth Trojans caught up in Earth's orbit during its February search for asteroids, but its cameras worked better than expected in a critical test of their capability.

Does Earth Have a Trojan Horde? Are there asteroids sharing Earth's orbit around the sun?

How Mars Got Its Layered North Polar Cap - Orbital wobbling shaped the dome of ice and dust at the planet's north pole.

The Mystery of Ahuna Mons, the Lonely Ice Volcano - New research led by Michael Sori shows that Ceres, a dwarf planet orbiting between Mars and Jupiter, may have vanishing ice volcanoes.

Ceres' Ice Volcanoes Might Have Oozed Into Oblivion - Millions of years ago, Ceres may have had loads of cryomagma-spewing mountains, but according to a new explanation, the cryovolcanoes flattened out over time.

New Cameras Put Tucson Sky Hunters on Top Again - Catalina Sky Survey has now reclaimed its status as world leader in discoveries of near-Earth objects.

Looking at Your Home Planet from Mars - A composite image, which was released by NASA, was created using the HiRISE camera aboard the agency's Mars Reconnaissance Orbiter, which is a spacecraft orbiting about 180 miles above the red planet.

New University of Arizona Center Hopes to Bring Order to Space Chaos - A new center at the University of Arizona proposes to bring some order to space chaos with a systematic attempt to find as many objects as possible and classify them to determine which are debris and which are operable.

Could There Really Be Life Under Pluto's Ice? - There's a small chance that Pluto's subsurface ocean might harbor primitive life, and that could expand the search for habitable worlds out into the rest of the Kuiper Belt.

It's a Bird … It's a Plane … It's the Tiniest Asteroid! - A team led by Vishnu Reddy has characterized the smallest known asteroid using Earth-based telescopes.

How NASA's Asteroid-Hunting Craft Will Spot an 'Armageddon' Space Rock Heading for Earth From a Million Miles Away - Three cameras on the spacecraft will point towards Bennu, giving OSIRIS-REx a clear view from all distances.