

THE

LOWELL OBSERVER

ISSUE 116 FALL 2019

THE QUARTERLY NEWSLETTER OF LOWELL OBSERVATORY

CELEBRATING 125 YEARS

IN THIS ISSUE

- 2 Director's Update
- 2 Trustee's Update
- 3 Giovale Open Deck Observatory Now Open
- 4 Introducing Ultima Thule



- 5 Changes to Navajo-Hopi Program
- 6 Dispatches from the Universe



- 7 Research that Breeds Discovery
- 8 Meet Danielle Adams
- 9 The Red Shirts of Lowell
- 10 What Our Guests Are Saying
- 12 Upcoming Events



Lowell Receives \$14.5 Million for New Education Center

By Danielle Adams, Deputy Director for Marketing and Communications

On the heels of record visitation and the celebration of our 125th anniversary, Lowell Observatory has received a \$14.5 million grant to build a new "Astronomy Discovery Center" (ADC) on the Mars Hill campus in Flagstaff, Arizona.

A \$29 million project that is planned to open in 2023, the ADC will increase the observatory's public education capacity to more than 250,000 guests per year, making it a top destination for astrotourism. The new facility will feature several innovative guest experiences, including the Universe Theatre—a large auditorium that will supplement live presentations with video projected onto

a wrap-around screen—and the Dark Sky Planetarium—a roof-top amphitheater that will use the famously dark skies of Flagstaff as a natural planetarium dome. The ADC is part of an ambitious Mars Hill master plan, the first stage of which is the Giovale Open Deck Observatory, set to open on October 5, 2019.

The \$14.5 million grant to establish the ADC came from the Kemper and Ethel Marley Foundation. Now in its 30th year, the Marley Foundation is again honored to be part of Lowell Observatory's scientific and education mission, having granted the observatory \$1.4 million in 2017 to support

continued on page 11



Lowell Celebrates 125th Anniversary

By Kevin Schindler, Historian

The year 2019 marks Lowell Observatory's 125th anniversary, an opportune time for reflecting on past successes while laying the groundwork for a future whose possibilities are limited only by our imagination.

The beginnings of what Astronomy magazine editor Dave Eicher has called "America's Observatory" may be dated back to 1858, when a three-year-old boy in

Boston stood in awe "halfway up a winding staircase, gazing with all his soul where (a) stranger stood," as the lad later recalled. The mesmerized observer was Percival Lowell and the specter-like stranger was Donati's Comet.

This tantalizing experience sparked a fire of imagination deep within Percival's soul that ultimately drove him to erect a

continued on page 11



DIRECTOR'S UPDATE

By Jeffrey Hall

As you will see in the pictures and articles in this issue of the Observer, things are moving rapidly with our capital expansion projects.

It has been a pleasure working with the fine folks at the Kemper and Ethel Marley Foundation to arrive at a magnificent lead gift for the future Astronomy Discovery Center (ADC). They are now true partners in the project, and we look forward to a long and wonderful relationship with them.

It was likewise a thrill to wander around the Giovale Open Deck Observatory (GODO) at our members' preview celebration on September 14. Over 200 people

had the chance to see all the exhibits and, of course, the six instruments that comprise the telescope suite. Our outreach and technology staff worked long hours to get everything shipshape in time for the event, as did our contractors from BEC Southwest. The result is a beautiful facility entirely worthy of gracing Mars Hill.

These facilities will help us realize our vision of being the premier astronomy education destination for visitors from around the world. Initially, the price tag for all of this made achieving our vision seem somewhere between daunting and impossible. But now, momentum is building, as is excitement, and the goal seems ever more attainable. As I often put it, the GODO is just the appetizer – now we start on the entrée, the ADC!

Thank you for your continued interest and for helping us to communicate astronomy to professional and public audiences alike at the highest level. 🍷



TRUSTEE'S UPDATE

By W. Lowell Putnam

Percival Lowell was passionate about astronomy and devoted the second “half” of his life to researching our solar system and the universe we are part of. For him, and therefore for the institution, research is as much about communication as it is about study and discovery. It was important to Percival to engage with the general public in a way to make them feel like “co-discoverers”. This creates a dual nature to the mission of Lowell that makes it unique.

Much of this issue talks about the new public facilities we are or will be building, thanks to very generous and supportive donors. But there

are many other articles in here that showcase the active work of our scientists and the ways in which they are engaging with the public about their work and what it is teaching us about the solar system, planetary and star formation, and the formation of galaxies. And that research creates more opportunities to engage with people and share that sense of curiosity, wonder and joy of learning new things.

We work very hard to communicate about our science not just through publications for our peers, but to excite and intrigue everyone with the wonder and awe of the universe. It can sometime be challenging, but it is always rewarding. Thank you for helping make that happen! 🍷



Don Trantow and the Moonraker Telescope

An 8-inch Moonraker refracting telescope serves as the stunning centerpiece of the Giovale Open Deck Observatory. This instrument was funded by Don Trantow, a member of the Lowell Observatory Advisory Board for twenty years and who supported research for scientists, as well as various efforts of our education program. Don sadly passed on August 4 and we will dearly miss him, but we will continue to feel his compassion for years to come, as he left nearly his entire estate—accounts and real property—to Lowell.

In late August, Lowell staff installed the 8-inch Moonraker telescope, a Victorian refractor ideal for viewing planets. | Credit: Jim Cole



The Giovale Open Deck Observatory is Now Open

A record one-day attendance of 1,813 people joined Lowell Observatory staff and supporters on October 5 for the grand opening of the Giovale Open Deck Observatory. Stay tuned to the next issue of the *Lowell Observer* for stories and pictures.

The Giovale Open Deck Observatory, named for longtime Lowell supporters John and Ginger Giovale, also features daytime exhibits that highlight the science of spectroscopy, the types of telescopes astronomers use, and how to preserve dark skies in Arizona and beyond. A set of six plinths along the perimeter of the observing plaza align to the locations of the Sun during sunrise and sunset on the equinoxes and solstices.

National Volunteer Day

Every year in April, organizations across the country celebrate National Volunteer Week. Lowell is proud to recognize and thank all of the individuals who so generously give their time cataloging and digitizing collections in the archives, engaging with the public in our outreach

programs, assisting the development staff with fundraising efforts, beautifying our grounds, and helping with various business office functions. We're very grateful for their dedication!

Volunteers Jeff Pickens, Karen Kitt, and Rich Comnick in the Putnam Collection Center during National Volunteer Week.

Credit: Mary DeMuth



amazonsmile
You shop. Amazon gives.

AmazonSmile

As the holidays approach, [Smile.Amazon.com](https://www.smile.amazon.com) is a great way to support Lowell Observatory. If you order from Amazon, simply go to [Smile.Amazon.com](https://www.smile.amazon.com) and select Lowell Observatory as your preferred charitable organization. Amazon will send .5% of your purchased items' cost to the observatory as a contribution.



Image of Ultima Thule captured during the New Horizons flyby on January 1.

Credit: NASA/JHUAPL/SwRI

Introducing Ultima Thule

By Will Grundy, Astronomer


As 2019 was being rung in around the world, NASA's New Horizons spacecraft was exploring something truly out-of-this-world, the Kuiper belt object 486958 2014 MU69, nicknamed "Ultima Thule."

The contrast with Pluto, New Horizons' 2015 target, could not have been more stark. New Horizons revealed what a dynamic planet Pluto is, with a complex interior, surface, and atmosphere all interacting through a rich interplay of processes. MU69 looks like little has changed from the time of its formation at the birth of the Solar System, four and one-half billion years ago. It owes its unscathed survival to its small size, only about 20 miles long, and the fact that it formed so far from the Sun, about 44 astronomical units (an astronomical unit being the Earth-Sun distance, 93 million miles). These factors prevented MU69 from ever warming enough to melt internally, which would have caused its shape to collapse into something more spherical. Its surface is barely even scarred by impact craters, unlike the battering suffered by comparably-sized objects in the asteroid belt. The reason MU69 escaped such a fate is that at its distance from the Sun, there is little debris to collide with. What little there is moves comparatively slowly, reducing the damage collisions can do.

The scarcity of small objects in the Kuiper belt presented the New Horizons

team with a serious challenge in finding an object the spacecraft could reach with its limited reserve of propellant. In the asteroid belt, each violent collision produces a spray of smaller fragments, which lead to more collisions, creating more fragments, etc. The result is a "collisional cascade," with numerous smaller objects for every large one. In such a setting, if you want to find an object in a particular place, the odds get better and better as you look to smaller and smaller objects. In the Kuiper belt, the supply of small objects is much more limited, having been inherited from the process that created them in the first place.

A heroic multi-year search using the premier ground-based telescopes as well as the Hubble Space Telescope found just a handful of objects that New Horizons could reach. But from a scientific perspective,

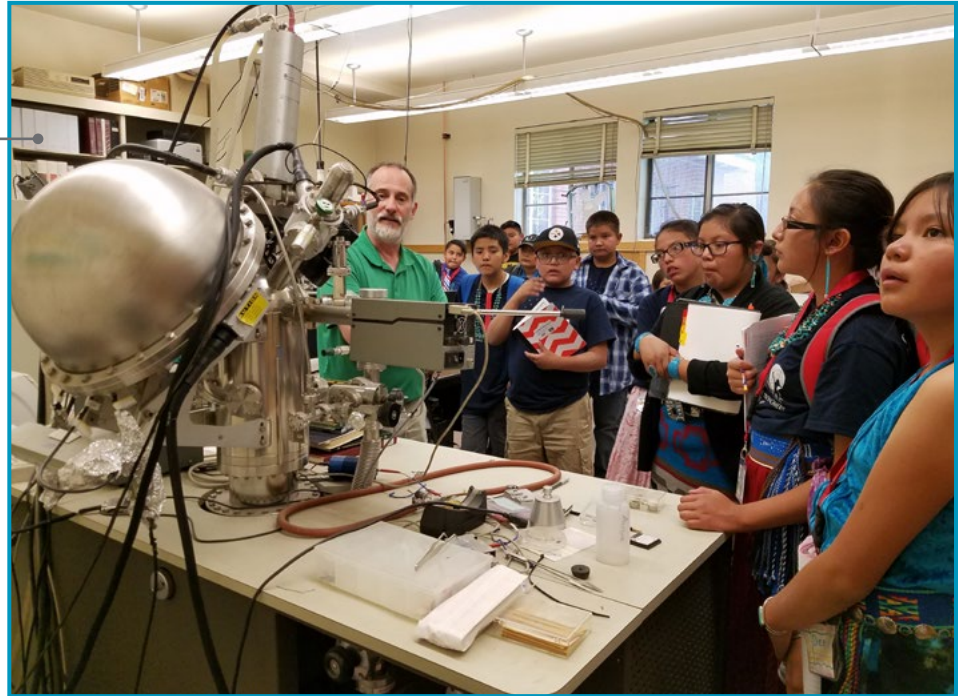
this difficulty was beneficial: the scarcity of small Kuiper belt objects argued that MU69 would be an intact relic from the time of planet formation. Its peculiarly flattened, bi-lobed shape hints at how the first large body "planetesimals" were assembled from nebular dust. The old idea of planetesimals accreting gradually, one dust grain at a time, would not create such a shape. Instead, it appears that each planetesimal formed abruptly, through gravitational collapse of a small cloud of nebular dust. In the case of MU69, the two lobes appear to have accreted separately before joining through an exceedingly gentle merger, more like a docking than a collision. With the unveiling of MU69 we are witnessing one of the most exciting stages of scientific progress, when a new discovery overturns long-standing paradigms, leading to new, better understanding that rewrites the textbooks. 

New Horizons team member (and former Lowell Observatory postdoc) Cathy Olkin holds a clay model of Ultima Thule, based on initial images returned from New Horizons, January 2, 2019.

Credit: Kevin Schindler



Students tour Northern Arizona University's ICE Lab as part of Lowell's Native American Astronomy Outreach Program.



Flagstaff Astronomy Symposium

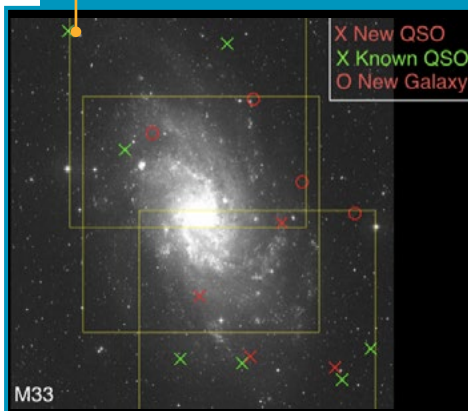
By Phil Massey, Astronomer

The Spring edition of the Flagstaff Astronomy Symposium was held at Lowell Observatory on March 13, and featured 21 five-minute talks by faculty, postdocs, and students from NAU, Lowell, the USGS, and the USNO.

Talks included such subjects as Arabian astronomy, how one might stabilize meds for long-duration space flight, polygonally shaped craters on Ceres, modeling Wolf-Rayet stars, the origin of galaxy and cluster alignments, and the discovery of quasars behind the disks of M31 and M33, to name just a few of the many diverse topics.

The Flagstaff Astronomy Symposium was started in September 2015 by Northern Arizona University professor David Trilling and Lowell astronomer Phil Massey. It was initially held annually until it grew a victim of its own success, forcing us to go to a twice-a-year schedule.

The location of quasars (QSOs) behind M33 is shown.



Changes to the Navajo-Hopi Program

By Hannah Rounds, Corporate and Foundation Relations Manager

The Navajo-Hopi Astronomy Outreach program is getting a new name to reflect our vision for its future. Now known as the Native American Astronomy Outreach Program, our new program strategy will broaden the reach and deepen the impact for Native Americans, a group extremely underrepresented in STEM fields.

The first two decades of the program were built around individual hands-on activities brought to reservation classrooms by Lowell astronomers and educators. Although the activities often shared a common thread, such as the nature of models, they were otherwise stand-alone. In 2016, a committee of advisors recommended that we develop curriculum to increase the program's impact on both teachers and students. We have since built week-long Project-Based Learning units that encourage students to see themselves

as scientists. The units have cultural and local connections woven throughout to help students see science as relevant to their lives. We incorporated math, reading, and writing to help teachers meet required standards.

In 2018, we began a three-year collaboration with the Kayenta Unified School District. We are working with seven teachers from grades four through seven to design, test, and revise curriculum units for each grade. District Instructional Content Specialist Anne Clasen said, "This is middle school science instruction at its best. Thank you so much!"

One of our long-term goals is to adapt the curriculum to include cultural connections to Native American tribes around the United States. We will share the curriculum with teachers in our partnerships and beyond. 🌐

Employer Matching Gifts

You can maximize a gift to Lowell Observatory with matching funds from your employer. Companies such as Intel will match a minimum of \$25 and a maximum of \$10,000 one-to-one. Not only is the program available to current staff, but it is also a benefit for retired employees. To learn more, contact Rachel Edelstein at redelstein@lowell.edu or (928) 255-0229.

DISPATCHES FROM THE UNIVERSE

Laika's Ashes

By Michael West, Deputy Director for Science

The frog that famously photobombed a Moon launch in 2013 never saw it coming. NASA cameras captured the airborne frog's silhouette during the launch of the LADEE spacecraft, whose mission was to learn more about the Moon's tenuous atmosphere. There are undeniably comic and tragic elements of the image, the frog's arms and legs splayed against a backdrop of fiery fury as the thrust of the rocket lifted both spacecraft and amphibian skyward. It's unlikely he or she survived since, to paraphrase Douglas Adams, this is not a naturally tenable position for a frog.

But what is it about this photo that captivates us? It was accidental, of course, collateral damage of the space age. Like the dove killed in a flash of feathers when it flew in front of a 100-mph fastball thrown by Arizona Diamondbacks pitcher Randy Johnson in 2001, or the bird that died at the Australian Open the following year after it tried to occupy the same space as a fast moving tennis ball, such moments provide a stark reminder that existence is fragile and can end in the blink of an eye, sometimes in the most absurd ways.

Maybe it's schadenfreude—the guilty pleasure we sometimes take in the misfortune of others—that makes us both laugh at and sympathize with the frog. Most of us imagine our deaths as a quiet

passage, slipping gently into whatever form of afterlife we envision. That our final moment might instead involve us tumbling awkwardly through the air—captured on camera no less—well, we're glad it's the frog and not us.

Or maybe we empathize with the startled moment that the frog must have experienced as it suddenly found itself catapulted sky high by some invisible and incomprehensible blast, a visual embodiment of the nagging suspicion that there are forces at work in the universe beyond our ken.

Perhaps it's the David versus Goliath imagery of the powerful spaceship, emissary to another world, juxtaposed with the Earth-bound and defenseless frog that feeds our species' sense of superiority. Or a reminder that, despite our lofty aspirations, we remain rooted in the dust of the Earth and it's there that we'll inevitably return.

And I find myself thinking of Laika, the little Russian dog who in 1957 became the first earthling to orbit our planet. Unlike the frog, who was an unintended casualty, there was never any intention of returning Laika safely to Earth. In their rush to beat the Americans into space, Russian scientists hadn't worked out a re-entry plan. Laika died about six hours into the flight when her capsule overheated.

The Sputnik 2 spacecraft carrying Laika's body continued to orbit Earth for five months before finally burning up in the atmosphere in April 1958, her incinerated ashes falling like a soft snow over the world. Three years later, Yuri Gagarin became the first human to journey into space.

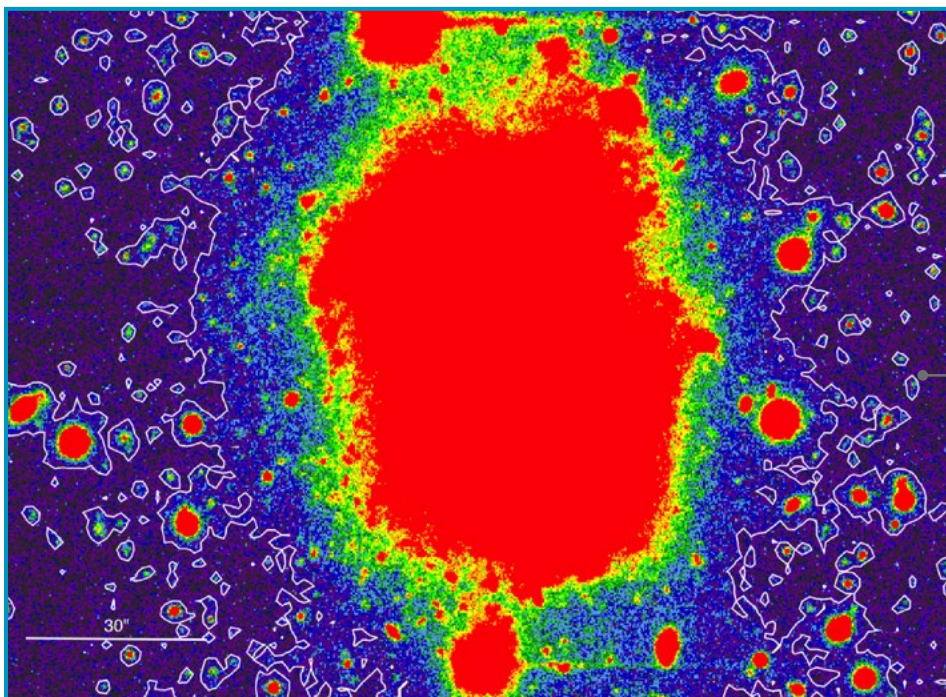
A menagerie of critters—cats, dogs, monkeys, turtles, flies, fish, spiders, mice, ants, rabbits, wasps, beetles, crickets, snails, sea urchins, newts and, yes, even frogs—has been launched into space since then. More animals than humans have died in our quest to reach the stars despite the fact that, as far as anyone can tell, they don't share our curiosity about the heavens.

"We don't see things as they are, we see them as we are," wrote Anaïs Nin. Instead of seeing the demise of a frog who happened to be in the wrong place at the wrong time, perhaps the real takeaway from this photo is a momentary reflection on who we are and what it is that makes us human. 🐸



Deputy Director for Science Michael West





A false-color image of dwarf irregular galaxy DDO 43, captured by Dr. Deidre Hunter using the Large Monolithic Imager (LMI) on the Discovery Channel Telescope. The outer edge of the red area is what is usually considered the outer disk of galaxies, but Deidre's research takes her to the white contours in this image.

Research that Breeds Discovery

By Danielle Adams, Deputy Director for Marketing and Communications

This summer, Lowell Observatory marked 125 years of astronomical research and discovery. Discoveries tend to get the most press, but of course it is the grueling research that makes remarkable discoveries possible. In this, our quasiquintennial year, we remember our illustrious past, but we also look forward to our next 125 years of exploring the universe.

One of my objectives as the Deputy Director for Marketing and Communications is to elevate the visibility and standing of our astronomers, their research, and the instruments they use. I am an astronomer myself, but one of a different ilk: cultural astronomy, with a background in cultural anthropology and Arabic literature. It was the anthropologist in me who determined that the best way to really understand our astronomers was to dive into their worlds with some participant-observation. Here, I invite you to take a quick peek with me into the control rooms and laboratories where our research happens.

On a cold night in January, I accompanied Dr. Dave Schleicher to observe comets using the 42-inch Hall Telescope at Anderson Mesa. Using the Kron Photometer, an instrument that

is mounted to the telescope to quantify brightness, we measured the light through different filters in order to assess the compositions of several comets, a project that Dave joined back in 1982. These measurements gathered over the years have enabled him to classify comets according to six unique types, and to determine how much of their surfaces are vaporizing as the comets go through seasons in their orbits.

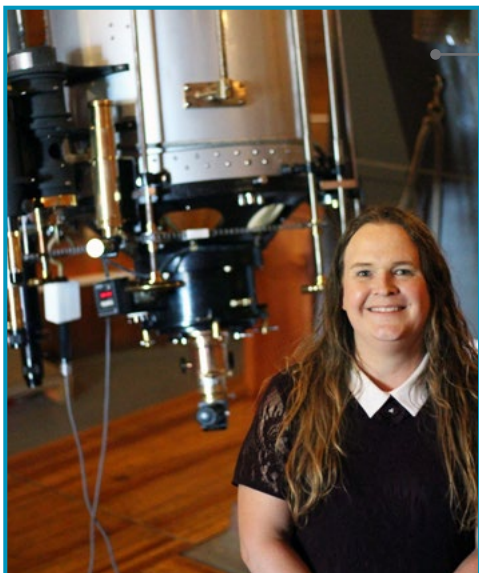
The Astrophysical Materials Lab at Northern Arizona University (commonly called the ice lab) was where I met up with Dr. Jennifer Hanley, who studies materials found in the outer solar system, in part by recreating them in the lab. The manner by which ices, salts and other materials reflect light changes with temperature, pressure and composition. Because of this, Jennifer spends much of her time in the lab producing samples in order to generate spectral catalogs that she uses to search for these materials across the solar system. Additionally, they can be used by all astronomers who research solar system bodies.

My most recent observing run took me back to the DCT, where Dr. Deidre Hunter was using the LMI (Large Monolithic Imager) to capture ultra-deep images of dwarf irregular galaxies. As large as the DCT's 4.3-meter primary mirror is, these galaxies are so faint that some require total exposure times of 10 hours, captured in 30-minute increments. Deidre is studying these galaxies in order to determine where star formation occurs in these tiny galaxies, and whether this process is able to occur at the edges of these galactic disks, where gas densities are very low.

The above snippets are just brief glimpses into the research lives of our astronomers. Stay tuned to Lowell Observatory's website (lowell.edu) for coming articles on our research and the people and instruments that make it all possible. 📧



A true-color image of Comet 46P/Wirtanen, one of the comets observed by Dr. Dave Schleicher.



Danielle Adams stands next to the 24-inch Clark Telescope at Lowell. | Credit: Sarah Gilbert

Meet Danielle Adams

By Elizabeth Labiner, Communications Specialist,
University of Arizona Graduate Center

Dr. Danielle Adams earned her PhD in the summer of 2018 from the University of Arizona's School of Middle Eastern and North African Studies, with a minor in Cultural Anthropology from the School of Anthropology. Initially it might seem somewhat surprising, then, that during her time at the U of A, Adams won the NASA Space Grant Graduate Fellowship. This fellowship was one of several exciting doors that would be opened due to her dissertation research on the development of Arabian astronomy from pre-Islam into the first centuries of the Abbasid Period, and a major step in the progress toward her eventual role as Deputy Director for Marketing and Communications at Lowell Observatory.

At Lowell, Adams is responsible for the strategic marketing, including the observatory's ongoing astronomical research and its many opportunities for education and visitation by the general public. She enthusiastically recounts the myriad benefits of her doctoral work in preparing her for her current role:


“My academic program at UA was highly interdisciplinary, combining fields of MENA area studies, Arabic literature, cultural anthropology and astronomy. My advisors and mentors in both the School of Middle Eastern and North African Studies and the School of Anthropology supported my unique program of study and dissertation topic in cultural astronomy. Travel grants from these departments and the Center for Middle Eastern Studies allowed me to interface with diverse scholars at academic conferences around the world. I also earned a NASA Space Grant Graduate Fellowship, through which I was able to disseminate my cultural astronomy research to the general public (including a website I built at onesky.arizona.edu). Disseminating astronomical research to the public is also now one of my objectives at Lowell Observatory. This interdisciplinarity culminated in designing my dissertation defense as a public planetarium program at UA's Flandrau Planetarium and Science Center, the first time a defense had been held under the dome at Flandrau.

Interdisciplinary success was vital when Adams was contacted by a recruiter who had been tasked with finding a candidate who had both experience in strategic

marketing and a background in astronomy. Lowell Observatory wanted to fill the role with a marketer who could speak the language of astronomy, and Adams was one of the few candidates who possessed strong skills in both areas.

“I view marketing as applied anthropology, as both endeavors must begin with the ability to see the world through the eyes of other people,” she explains. “There is great emphasis on the customer experience in many companies today, and skills like participant-observation and ethnography make anthropologists well-suited to filling these kinds of roles in customer-centric organizations. Furthermore, the ability to work effectively across departmental boundaries in a company stems from having an interdisciplinary perspective in school, allowing me to connect the dots in patterns that sometimes others cannot see.”

Adams looks forward to a long, fruitful career at Lowell Observatory. “I get to spend every day operating from my strengths in marketing, anthropology, and astronomy, and I do this at one of America's great observatories. My marketing efforts help astronomers disseminate their research and offer people of all ages ways to experience the awe and wonder of the night sky. On top of all this, I get to deploy my own cultural astronomy research to enrich the public programs at Lowell Observatory and beyond. It's a perfect fit.”

Adams' continuing work bridges cultures and communities, bringing us all a little closer to the stars—and to each other. 

Processing Wes Lockwood's Papers

By Lauren Amundson, Librarian/Archivist

Northern Arizona University history graduate student Megan Nolan completed her spring semester internship in the Lowell Observatory Archives. She processed the papers of emeritus astronomer Dr. Wes Lockwood, arranging seventeen storage boxes into series including research, correspondence, publications, photos, newspaper clippings, drawings, and grant proposals. Nolan then re-housed the papers in archival folders and boxes. Major subject areas include light pollution, the Solar-Stellar Spectrograph, outer planet studies, and solar studies. The collection is housed in the Putnam Collection Center, and a finding aid will soon be available on Arizona Archives Online.

Megan Nolan shows off the collection of Wes Lockwood papers she processed.



Educator Victoria Girgis with the Omniglobe, located in the Rotunda Museum.

Credit: Sarah Gilbert



Rachel Edelstein has hit the ground running at Lowell.

Rachel Edelstein Joins Lowell

By Mattie Harrington, Executive Assistant

Rachel Edelstein joined the development team earlier this year. A longtime Flagstaff resident, she first came to northern Arizona for a fellowship at Northern Arizona University for returned Peace Corps volunteers. While serving in Togo, West Africa, she fell in love with dark skies, and feels at home in Flagstaff. She served on the Festival of Science board of directors and was impressed with Lowell's programs. Her goal as Annual Giving Officer is to raise general operating revenue through donations. Edelstein says, "There is a clear need for expanded facilities and programming. This is a good problem to have and I am up for the challenge!"

The Red Shirts of Lowell

By Megan Stanley, Educator

If you have ever taken the journey up to Mars Hill, you have probably noticed the iconic mainstays. The Clark Telescope dome is one, an ever-present Flagstaff landmark since 1896. You've probably also seen the uniquely colored amber lights that guide the way across the campus, a by-product of Flagstaff being the world's first international Dark Sky City. However, my personal favorite feature adorning Mars Hill is the red-shirted Public Program Educators.

Whether you are coming up from Phoenix to escape the heat or passing through on your way to the Grand Canyon, the "Red Shirts" are the people that will take you on a tour of Lowell's historic campus, guide you through the night sky, and captivate you while sharing the wonders of the universe. Typically the educators are working on or have earned a degree in the field of astronomy, but occasionally you will also run into an educator that is simply a passionate hobbyist like myself. Our goal is to get you as excited about the universe as we are and as excited as Percival himself was when he shared his idea that the universe and science should be available to all.

If you have visited Mars Hill in the past several months you have probably noticed some new structures dotting the hill including the new wash house and Giovale Open Deck Observatory (GODO).

These changes are happening because the visitor program is growing, going from 73,500 visitors in 2014 to 104,300 in 2018, and our team is actively working to meet the needs and wants of our guests. Another new feature on the hill is a presentation tool called the Omniglobe. Similar to a mini-planetarium, the Omniglobe projects images onto a sphere orb. It is a great hands-on tool to explore our solar system as well as our own planet in extreme detail. Facilitated talks are given on the Globe, but guests are also welcome to use the tool on their own.

The Public Program has also been working diligently to make Mars Hill more accessible. Knowing that the hilly campus is difficult to traverse, folks with different needs are able to request the use of a golf cart to tour around campus. Lots of programming changes have been made as well, including more kid-focused nighttime activities like a maker lab and varied science demonstrations. Further changes and new lectures are coming to help us meet the expectations of our growing attendance, but for now we red shirts are as eager to inspire you to love the sky as much as you possibly can. 🌌



Percival Lowell Society members receive a bronze version of one of Percival Lowell's Mars maps.

Leave a Legacy at Lowell

By Stephen Riggs, Development Manager

The Percival Lowell Society was established in 2002 to recognize individuals who have made arrangements to support Lowell Observatory through their wills, trusts, life insurance, or other estate planning methods—and notified the observatory of their intentions. These individuals honor Lowell with their ultimate gift and we are humbled by their generosity and their commitment to furthering our mission of astronomical research and science education. Their support for the observatory in such a manner is not without precedence, either. Founder Percival Lowell himself created a trust from his estate to help fund the observatory's operations...and it still helps to support activities today.

Through this way of giving, Percival Lowell Society members ensure that future generations will experience the awe of the universe and the thrill of on-going discoveries.

To date, 73 members have notified us of their estate intentions and are now members of the Society. This marks a 30% increase during the past year. Society members are invited to an annual luncheon and are presented with a handsome globe of Mars based on Percival Lowell's observations of the red planet.

For more information about the Percival Lowell Society or about supporting the observatory through an estate plan, contact Stephen Riggs, Development Manager at (928) 255-0186 or email at sriggs@lowell.edu.



See our website:
lowell.edu/research/recent-publications
for more publications

Recent Publications

Keep up with our astronomers' research by reading their recent publications. Below are just two examples of their work. See our website for more.

Sickafoose, A. A.; Bosh, A. S.; **Levine, S. E.**; Zuluaga, C. A.; Genade, A.; Schindler, K.; Lister, T. A.; Person, M. J. A stellar occultation by Vanth, a satellite of (90482) Orcus. *Icarus*, Volume 319, p. 657-668

Schleicher, David G.; Knight, Matthew M.; Eisner, Nora L.; Thirouin, Audrey. Gas Jet Morphology and the Very Rapidly Increasing Rotation Period of Comet 41P/Tuttle-Giacobini-Kresák. *The Astronomical Journal*, Volume 157, Issue 3, article id. 108, 16 pp.

Image: Neugent/Massey/Lowell Obs./NSF

What Our Guests Are Saying

Compiled by Heather Craig, Marketing Specialist

"While staying overnight at Flagstaff, we planned for a quick visit to the Lowell Observatory. Instead, we were there four hours and could have stayed into the night. It was that interesting! The Lowell Observatory is pure Americana as it sits not a mile from Route 66 atop Mars Hill... Anyone with a smidgeon of interest in history and science would love to visit the Lowell Observatory."

Trip Advisor Reviewer, February 2019

Google Reviewer, August 2019

"Friendly staff are super knowledgeable about the night sky and will talk to you about it for hours if you let them... Skip the Grand Canyon and come here instead."

Corrections


On Page 8 of the Spring, 2019 *Lowell Observer*, author Bill Godby should read Bill Godwin. Also, in the first paragraph of this story, Frank Edson should read James Edson.

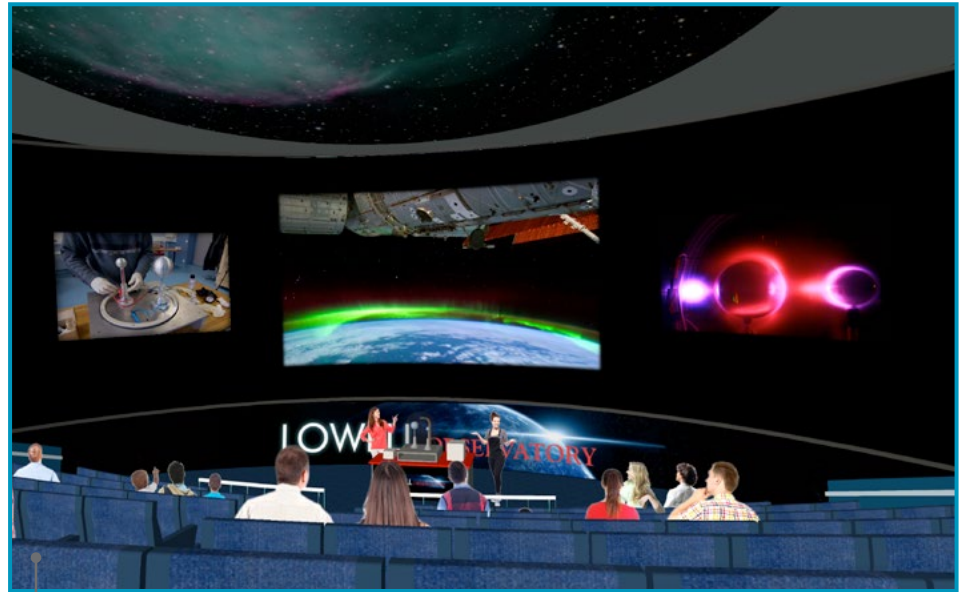
LOWELL RECEIVES \$14.5 MILLION FOR NEW EDUCATION CENTER

continued from page 1

astronomical research at Lowell’s Discovery Channel Telescope and long-range master planning efforts.

This is the single largest gift the observatory has ever received and the largest grant the Kemper and Ethel Marley Foundation has awarded. Lowell Director Jeff Hall said, “This gift essentially makes our new Astronomy Discovery Center a reality. As usual per naming gifts, it’s exactly half the construction cost, it creates momentum, and we are already seeing that it’s inspiring other donors to step up.”

The Kemper and Ethel Marley Foundation was established in 1990 and principally supports higher education programs, human service organizations, historic preservation efforts, and the arts. 



Architect rendering of the Astronomy Discovery Center's Universe Theatre

LOWELL CELEBRATES 125TH ANNIVERSARY

continued from page 1

temple of knowledge where he could pursue firsthand his quest for exploration, discovery, and wonder. Thus was born Lowell Observatory, a factory of awe where generations of astronomers have pushed the boundaries of our knowledge and imagination while pilgrims from around the world come to experience that feeling of excitement that inspired young Percival.

To celebrate its 125th anniversary, the observatory hosted a ceremony on June 6 that was attended by officials from various levels of government, Lowell staff and board members, supporters, and other guests.

Arizona Secretary of State Katie Hobbs commented at the event, “Lowell was the state’s first scientific research center and played a key role in Arizona’s development as one of the world’s leading centers of space science research and education.” Coconino County Supervisor Art Babbott added, “Lowell Observatory is a major contributor to the Flagstaff economy, generating significant income annually via research, visitation, and education.”

Percival Lowell established his observatory initially to study Mars and the possibility of intelligent life there. He transcended science into pop culture by writing several popular books and lecturing widely. This standard set by Lowell to pursue scientific studies and share the wonder and awe of space with the public led to the observatory's dual mission of



FRONT COVER: Arizona Secretary of State Katie Hobbs speaks at Lowell’s 125th Anniversary celebration.


Flagstaff City Councilmember Regina Salas (right) joins other Lowell supporters at the celebration.

research and education, which Lowell Director Jeff Hall explained can really be boiled down to, “communicating science – that is really what we do, whether through our excellent research program or when we welcome guests to our visitor program.”

Today, scientists at Lowell use a variety of ground- and space-based instruments for research—including the observatory’s flagship Discovery Channel Telescope, one of the most versatile telescopes in the world. Meanwhile, more than 100,000 people visit per year and the observatory just opened the Giovale Open Deck Observatory, the first stage of a multi-year master plan that will expand the observatory’s educational reach.

Lowell has also played a leading role in dark sky protection, starting in 1958 when our astronomers urged the

Flagstaff City Council to create a lighting ordinance—the first in the world. In a proclamation recognizing Lowell’s importance to the Flagstaff community, Mayor Coral Evans read, “In 2001 the International Dark-Sky Association named Flagstaff the world’s first International Dark Sky City, with IDA Executive Director David Crawford commenting, ‘No other city or town has shown such an overall commitment to protecting the quality of its dark skies, not only for the observatories, but for all the citizens of northern Arizona.’”

With this foundation of excellence firmly established, Lowell’s next 125 years is sure to test the limits of our imagination. Onward we soar! 



FRIDAY NIGHTS | Cosmic Questions | 8 - 10 p.m.
LOCKs PRESCHOOL | NOV 2 & 16 Asteroids | DEC 7 & 21 Space Station 10:30 a.m. - Noon
SATURDAY NIGHTS | Meet an Astronomer | 8 - 10 p.m.
Subject to astronomer availability

NOVEMBER

MON 11 | Transit of Mercury Breakfast
 (6:30 - 10 a.m.) *Have breakfast while enjoying the transit of Mercury. See website for tickets.*
FRI 15 | Cosmic Questions: Meteor Shower Edition
 (8 - 10 p.m.) *Learn about the Leonids Meteor Shower during an informal discussion with one of our educators.*
SAT 16 | Lowell42
 (7 - 8 p.m.) *"Practical Aspects of Private Orbital Spaceflight" By Dr. Charles Simonyi*

DECEMBER

FRI 13 | Cosmic Questions: Meteor Shower Edition
 (8 - 10 p.m.) *Learn about the Geminids Meteor Shower during an informal discussion with one of our educators.*

HOLIDAY CLOSURES

THU, NOV 28 | Thanksgiving
TUE, DEC 24 | Christmas Eve (Closed at 5pm)
WED, DEC 25 | Christmas
WED, JAN 1 | New Years Day

For more special event information visit:
lowell.edu/visit/special-events

lowell.edu
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The Lowell Observer is published quarterly by Lowell Observatory, 1400 W Mars Hill Road, Flagstaff, AZ 86001
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 Layout and Design by Sarah Gilbert
 Contents Copyright 2019 by Lowell Observatory ISSN 1054-0059

