I interviewed for my current job at Lowell the day New Horizons launched, January 19, 2006. As part of my interview Director Bob Millis drove me out to Happy Jack and showed me the bare concrete foundation on top of a cinder cone that would become the 4.3-m Discovery Channel Telescope. One of my first tasks when I started at Lowell later that year was to be part of a “Tiger Team” of several Lowell astronomers to consider first-light instruments for our imminent new telescope. We were tasked with determining the specifications for an instrument that could be built on a modest budget and be used for several “Key Projects” that we wanted to undertake with our new telescope.

The instrument that emerged from these discussions was a low-resolution, high-efficiency, wide-bandwidth, near-infrared spectrograph that could be used simultaneously with a facility imager (now known as LMI). The ‘trick’ to simultaneously using the two instruments is to use a special type of mirror known as a “dichroic” to split the light. This dichroic reflects infrared light to the spectrograph, but lets visible wavelength light through to LMI. This simultaneous capability is appealing, both for the efficiencies gained by not switching back-and-forth between instruments, but also for projects where simultaneity is required, such as studying a tumbling asteroid with an unknown period.

The projects envisioned by the Tiger Team for this conceptual instrument included: efficient classification of brown dwarf candidates, studies of weather on brown dwarfs and cool stars, and a spectral survey of 350 Kuiper

Continued on page 11
There is an article on Page 7 of this Observer about a special program we held on October 15 to honor the cultural and scientific legacy of our founder, Percival Lowell. Percival died 100 years ago, on November 12, 1916, rather abruptly of a stroke, but his legacy continues at his observatory.

I bet Percival would be thrilled to see the observatory today. Given his wide-ranging interests, he’d enjoy walking the halls and chatting with the scientific staff. He’d be delighted to see our expansion to sites at Anderson Mesa and Happy Jack and by the mammoth descendants of the Mars Hill telescopes he’d find there. Being the traveler he was, he’d have loved seeing the great southern hemisphere observatories on the trip Lowell Putnam describes in his column. The stunning images of what Planet X turned out to be would no doubt be very gratifying. And being the tireless, passionate public advocate for science and astronomy Percival was, he’d be thrilled by what we bring to nearly 100,000 visitors to Lowell each year: astronomy outreach of a quality perhaps equaled by a few others, but exceeded by none.

As 2016 draws to a close, the thing I find myself most grateful for is the care with which our present team acts as stewards of Percival’s legacy. This care shows in the excellence of our research papers, the glowing feedback about our outreach, the maintenance and operation of our telescopes old and new, the appearance of our grounds, and many more ways. Each day, we’ll do our best to continue this stewardship of what Percival Lowell left to us 100 years ago.

As we visited the professional observatories, it was very gratifying to hear their regard for the work done at Lowell and by Lowell astronomers. Folks at Gemini were very interested about how IGRINs was performing at DCT since it will be coming their way for a 6-month run in a little over a year. The director at Paranal talked about his visit to Flagstaff as part of the technical team evaluating site for the Cherenkov Telescope Array and how pleasantly surprised they were at the combination of dark skies and civilized amenities in the Flagstaff area. These are rarely found together in the world of astronomy.

On this 100th anniversary of the formation of the Trust of Percival Lowell, it is good to know that his vision and forethought continue to stay in the forefront of modern research.

My thanks to all of you for your support which helps make this happen, and best wishes to you and all your families in this holiday season.

DIRECTOR’S UPDATE
By Jeffrey Hall

TRUSTEE’S UPDATE
By W. Lowell Putnam

George Jacoby, Deputy Director for Technology

This past May, George Jacoby accepted the position of Deputy Director for Technology. George is a familiar face at Lowell, having previously served as a member of the Advisory Board. He will lead the technology department’s efforts to design, fabricate, install, and maintain the observatory’s expanding research facilities.

George earned a B.S. in Aeronautical Engineering from New York University in 1969, then accepted a position on the technical staff at the Rocketdyne Division of Rockwell International, where he helped develop Space Shuttle main engines. While working there, he began graduate studies at UCLA and went on to earn his Ph.D. in astronomy in 1978.

George spent most of his career working at the National Optical Astronomy Observatory (NOAO) in Tucson. He began as a postdoc at Kitt Peak National Observatory and ultimately took on the roles of support scientist, astronomer, director of WIYN Observatory, and program head of the NOAO Office of Science. Most recently, he serves as instrumentation scientist for the Giant Magellan Telescope.
Antoinette Beiser to Retire from Lowell

December 31st sees the departure of former librarian and current Leadership Gifts Officer Antoinette Beiser.

Antoinette began her career at Lowell in August 1990, when she took over management of the library and archives. She began the monumental task of cataloging and archiving the Lowell Observatory collections with assistance from many loyal volunteers and student interns. At the request of former director Robert Millis, Antoinette moved into the development department in 2009. Perhaps her most significant contribution in development was spearheading the fundraising efforts for construction of the Putnam Collection Center.

Lowell Celebrates Science and the Stars

This past September, Lowell scientists and educators led several activities for two of Flagstaff’s signature public science events. The Flagstaff Festival of Science (FFS) featured activities that highlight the rich diversity of scientific pursuits in northern Arizona. Now in its 27th year, the FFS is the longest running free science festival in the country. The 3rd annual Flagstaff Star Party celebrated Flagstaff’s dark skies and, in cooperation with the FFS, ran for three days.

One of Flagstaff’s most cherished natural resources is its dark skies, celebrated by both the Flagstaff Festival of Science and the Flagstaff Star Party. Credit: Dan & Cindy Duriscoe, FDSC, Lowell Observatory, USNO

Marcus Cometary Research Fund

The Lowell Observatory Foundation is pleased to announce the establishment of the Marcus Cometary Research Fund, created by long-time Lowell Observatory member Dr. Joseph Marcus. The endowment, with initial funding of $200,000, will help extend the rich comet history at the observatory by providing funding for comet research and related activities in perpetuity.

Joe is a recently retired pathologist with a longstanding interest in comets. While a pathology resident at Washington University, he founded and edited Comet News Service, a quarterly newsletter published by the McDonnell Planetarium in St. Louis from 1975 to 1986. As an amateur astronomer, he has long been involved in comet research. He recently documented the history of such work at Lowell, which he has kindly offered to share in the Lowell Observer (see story on page 4).

Joe has long supported the observatory, as a member of the Friends of Lowell Observatory for 23 years and now with establishment of the Marcus Cometary Research Fund. Thanks Joe!
Cometary astronomy has been strong and deeply rooted at Lowell Observatory on a continuous basis since near the time of its inception in 1894. The summary which follows is based on thorough searches of the online Lowell Observatory archives and Lowell authors in the Astrophysical Data Service.

The first comet plates at Lowell were of C/1905 X1 (Giacobini). Carl Lampland obtained spectacular photographs of the brilliant January comet of 1910 (C/1910 A1). They showed rich stria structures in the tail similar to what we saw in comets C/1975 V1 (West) and C/2006 P1 (McNaught) in modern times. His detailed descriptions and analysis of their motions presaged modern studies. Spectrograms were also obtained showing sodium emission lines.

Percival Lowell himself was very active in the scientific study of Halley’s Comet, the second great comet of 1910. He mathematically analyzed the motions of both dust and molecules in the tail, and as the Carl Sagan of his times, he wrote popular accounts of the comet for newspapers. V.M. Slipher took numerous spectra of Halley’s Comet throughout its apparition, using a slit spectrograph attached to the 24-inch refractor. As testament to their enduring value, these old plates were used in a modern-day analysis of the differences in the comet between the 1910 and 1986 apparitions, with Slipher as a posthumous coauthor. In all, there are 334 direct photographs and spectrograms of Halley’s Comet in the 1910 apparition in the Lowell Observatory plate archives. I used the iconic one of Halley’s Comet near Venus in 1910, supplied to me by Lowell Director Art Hoag, in Comet News Service (which I edited from 1975-1987) during the run-up to the 1985-86 apparition.

In 1927, V. M. Slipher was the first of whom I am aware to publish a realistic size estimate for a comet nucleus, that of Earth-grazing Comet 7P/Pons-Winnecke, as two to three miles in diameter, although it was based upon a dicey sub-arcsecond estimate of the angular size of the nucleus rather than of its brightness.

After failing with Pons-Winnecke, Lampland got the first infrared measures ever of a comet, in 1927, with C/1927 X1 (Skjellerup-Maristany) during its visibility in broad daylight just 5° from the Sun. He employed the famous stellar radiometer, designed by his collaborator William Coblenz, rigged to the 42-inch reflector (the instrument is on display today outside Lowell Observatory’s Steele Visitor Center). Lampland and the Slipher brothers, who had obtained spectra of the comet in daylight with the 24-inch Clark refractor (see below), scrambled to get their data on C/1927 X1 together for presentation at the American Astronomical Society meeting later that month in New Haven, Connecticut. Their papers were read by Lowell Observatory trustee Roger Putnam, and were reported to be the “sensation of the meeting”. Lampland’s are among the most remarkable and important comet observations of the 20th century but still are not recognized as the “first”, owing to his failure to publish a formal paper. I have pulled these observations from his logbooks in the Lowell archives and analyzed them, and find them to be eminently usable if proper models for data reduction are employed. I hope to formally publish this study, which is still in progress.

The Sliphers’ spectrograms of C/1927 X1 also sat idle until the Arthur Adel, the brilliant and ambitious spectroscopist who joined the Lowell staff in the early 1930s from the University of Michigan as a new Ph.D., reduced and published them in an influential paper in the Astrophysical Journal. He also published on the violet CN bands in cometary spectra.

Own Alan Stern’s 2nd Fastest Vehicle!

“My other vehicle is on its way to Pluto.”

-Bumper sticker on Alan Stern’s Nissan 350Z

Starting December 15, Lowell Observatory will auction the 2006 sports car purchased by Stern as New Horizons sped toward Pluto. With just over 77,000 miles, the Nissan 350Z has many more miles to travel. Funds raised will benefit Lowell Observatory’s Annual Fund. Go to the webpage https://www.lowell.edu/own-alans-car/ for more details.
The second annual Flagstaff Astronomy Symposium was held on September 14 in the Steele Visitor Center’s Giclas Lecture Hall. Organized by Phil Massey (Lowell Observatory) and David Trilling (Northern Arizona University - NAU), the symposium offered the opportunity for Flagstaff astronomers (including those from the United States Geological Survey and the Naval Observatory Flagstaff Station) to talk about their recent research. There was strong participation by both junior and senior researchers, including NAU undergraduate and graduate students. In all, thirty short (five minute!) talks were given during the session.

Talks covered the full range from studies of solar system bodies to distant galaxies. Fireballs, solar cycles, comets, asteroids, exoplanets, massive stars, low-mass stars, dwarf galaxies, active galactic nuclei, Pluto, Planet X, Mars, primordial goo, eutectic liquids, ices, and the interstellar medium were among the topics discussed.

Drs. Massey and Trilling also organized last year’s inaugural version of the event, and have plans to continue the symposium annually, at least as long as interest continues.

The rainy weather on October 8 didn’t stop our members event from being an enjoyable experience and an opportunity to learn something new. Our Sole Trustee, Lowell Putnam, welcomed members and Director Jeff Hall gave a presentation about his research on the Sun. Matt Francis of Prescott Observatory presented incredible photos of the Sun and shared how he is able to successfully make his images. The event ended with fun science experiments and a special presentation by Science Educator Todd Gonzales about V.M. Slipher and the expanding universe. Thanks to all who attended!
Our ancestors assumed the world was flat because that’s how it looks from where we stand. But things aren’t always as they appear.

People also once believed—not surprisingly—that the Sun, stars and planets all revolve around Earth, because that’s how it seems from our perspective. It wasn’t until 1543 that Polish astronomer Nicolaus Copernicus suggested that the Sun might actually be the center of things, other objects—including light—that pass nearby. This leads to a phenomenon known as ‘gravitational lensing’ in which gravity acts like an enormous funhouse mirror, stretching and distorting light from distant objects to create optical illusions on the grandest scale.

The night sky is filled with illusions. Constellations are groups of stars that appear to form patterns in the sky, yet the individual stars are often nowhere near each other in space. Some of those stars might no longer shine, yet the light emitted during their lifetimes continues its journey through space long after they’ve died, illuminating the sky like a memory, the past masquerading as the present.

Only a small percent of all the matter in the universe is visible. There’s strong evidence that the vast majority is in an invisible form. We can’t see it. We don’t know what it’s made of. But we’re sure it exists because we see its gravitational influence on stars and galaxies. Everything we see around us, all the visible stuff, is just the tip of the iceberg. Most of the universe remains hidden from our view.

Even gravity can be deceptive. Albert Einstein showed that an object’s gravitational pull can deflect the motion of other objects—including light—that pass nearby. This leads to a phenomenon known as ‘gravitational lensing’ in which gravity acts like an enormous funhouse mirror, stretching and distorting light from distant objects to create optical illusions on the grandest scale.

The greatest delusion of all comes courtesy of the Big Bang. Galaxies are moving away from us in all directions, as if we were at the center of some enormous explosion. The truth, however, is quite different. Because every place in the universe today was once part of the same infinitesimally small point from which the entire cosmos sprang, every place continues to see itself as if it were at the center of the ongoing expansion. Here in our home galaxy, the Milky Way, we see other galaxies receding from us in all directions. But every galaxy sees itself as the center of this expansion. The center of the universe is everywhere and nowhere. Despite appearances, there’s nothing special about our location.

In life, as in astronomy, reality isn’t always what we think we see. Our view of someone or something is at best an incomplete picture, at worst an illusion. The neighbor who staggers a few steps on their front lawn might have the early stages of Parkinson’s disease rather than a drinking problem. The rude, short-tempered store clerk whose mother died recently might be working today just to save enough money to pay funeral costs. The jerk who impatiently honks her horn as soon as the traffic light turns green might actually be hurrying to pick up an injured son or daughter at school, and spends her weekends volunteering at the local hospice. The pious politician who espouses family values might be secretly cheating on his wife.

As the universe teaches us, sometimes there’s much more to the picture than meets the eye. Oscar Wilde, the great Irish writer and poet, said it well: “The truth is rarely pure and never simple.”

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Social Media Videos

Lowell videographer Molly Baker is producing several video series that are shared via Lowell’s Facebook page and Youtube channel. Kelly’s Space features Education Coordinator Kelly Ferguson sharing lively science experiments that viewers can try at home. For people interested in Lowell history, From the Archives spotlights Historian Kevin Schindler sharing fascinating stories about artifacts and documents in the observatory’s historic collections.
Tim Yamamura, a lecturer in NAU’s English department and expert on Asian American literature and science fiction, then spoke about Lowell’s writings. He focused on Lowell’s impact on the development of science fiction and the representation of Asia within American letters.

After Yamamura finished speaking, NAU history professor (and husband of Lowell Librarian/Archivist Lauren Amundson) Michael Amundson compared Lowell’s theories of Mars as a dying, deserted planet to the views of irrigation proponents of the time. Arizona featured a similarly parched landscape and, like Lowell’s Mars, could be turned into a Garden of Eden if water was appropriately brought in. Lowell Historian Kevin Schindler wrapped up the program with a discussion of Lowell’s long-term impact on the development of Flagstaff as a center for scientific research and education.

By Kevin Schindler

On October 15, Lowell Observatory and Northern Arizona University (NAU) co-hosted a special evening program, A Century Later: Percival Lowell’s Cultural and Scientific Legacy. It featured presentations by several scholars and explored Lowell’s impact on science and culture a hundred years after his death.

Carol Bundy, independent scholar and great-great niece of Percival Lowell, evaluated how Lowell and several of his closest friends followed paths as adults that weren’t in line with family expectations, resulting in initial disappointment by their respective parents. Each youth ultimately blazed their own paths of success, becoming pioneers in a variety of new fields.

After Bundy spoke, independent scholar and historian of astronomy Bill Sheehan reviewed Lowell’s astronomical pursuits, with special emphasis on Lowell’s last year of life and how he might have focused his efforts in other directions had he lived.

Dagmara Oszkiewicz finished her term as a postdoctoral researcher at Lowell and took on a faculty position at the Astronomical Observatory of Adam Mickiewicz University in Poznan, Poland. Communication Manager Josh Bangle left to take on the role of managing partner at the Flagstaff Ski Haus, and electrician Steve Winchester retired after years of service at Lowell’s Anderson Mesa dark sky site.

Event Celebrates Percival Lowell

During a ceremony in 1966, Trustee Roger Putnam unveils a plaque designating Lowell Observatory as a Registered National Historic Landmark.

Historic Milestones in 2016

This year marks several Lowell anniversaries, most notably the centennial of the death of our founder, Percival Lowell. He died on November 12, 1916 at the age of 61, at which time his trust went into effect. Since then, observatory leaders have used money drawn from this fund to support operations, construction of the DCT, and other efforts. Another 2016 centennial celebrates the construction of the Slipher Building, while 50 years ago, in 1966, the National Park Service designated the observatory as a Registered National Historic Landmark.

Staff Departures

Carol Bundy, independent scholar and great-great niece of Percival Lowell, evaluated how Lowell and several of his closest friends followed paths as adults that weren’t in line with family expectations, resulting in initial disappointment by their respective parents. Each youth ultimately blazed their own paths of success, becoming pioneers in a variety of new fields.
Melding Research and Education

By Justin Toller

Being employed at Lowell Observatory for two years now, I have had some incredible opportunities and experiences. Since starting as a volunteer nearly three years ago, I jumped at a job working in the public program and was delighted in the opportunity to make a living learning and talking about one of life’s greatest wonders. What I love most about working in the public program and what I have now come to understand as being part of the culture here at Lowell is how readily we, as educators, are encouraged to be creative in our work.

I have been lucky enough to be hired recently as a research assistant to our Deputy Director of Science, Dr. Michael West. I decided to keep my position in the public program while also assisting Dr. West, mainly just because I enjoy the unique opportunities that are offered to those of us in that department. Since the get-go with Dr. West, things feel very different for me in the public program. Now, I feel near to the things I have been sharing with the public, as if everything I’ve said suddenly means something very important to me. I’m no longer a walking textbook. The sense of gratitude is sometimes overwhelming and I feel fortunate to be so near to the community I wanted so badly to be a part of.

This inevitably caused some major changes in the care and attention that I put into my words. Guests responded in kind to what I assume was a result of much more efficiently communicated concepts with questions that I had never gotten before. This is an important thing for me because I believe that anybody can memorize some facts and repeat them, but real knowledge is expressed in the capacity to articulate meaningful questions about a topic.

It became obvious after a little while that the two positions were co-creating one another. Every time I sat down to do research, I would learn something new about the universe and then share that with the public because it was interesting to me. They would respond by asking questions that would force me to go a little deeper which would then complete the cycle of me sitting back down to do more research and then share that next time around.

I look forward to my continued growth in both research and outreach and hope I can appropriately share my enthusiasm with colleagues and visitors.

Great American Eclipse

We now have less than a dozen new moons until the “Great American Eclipse” next August. At that time, the moon will pass directly in front of the Sun, casting a sixty-five mile wide shadow across a narrow strip of the United States. Lowell is planning an action-packed event in Madras, Oregon from August 20-23, 2017 and hope you can join us. Visit our website for details and information on how to participate. For more details and information on how you can participate, please visit the Lowell Observatory Solar Eclipse Experience page on our website: lowell.edu/lowell-observatory-solar-eclipse-experience/

In 1991, Dave Schleicher captured this image of a total solar eclipse visible from Baja California.
The beep, beep, beep of Sputnik sent a loud wake-up call to those of us interested in our country’s space program. At this spatial point in time, Dr. Wernher von Braun and his forward-looking views of space travel were quite well known, especially after the 1958 launch of Explorer I, the first United States satellite. But, it did not appear the existing administration was very enthusiastic about funding for longterm space goals. Thus, I got the wild idea in March, 1960 of writing Dr. von Braun to request his professional opinion of what action a civilian could take that would send a message to our government that a wide section of the country favored an increase in funding of an accelerated space program.

Dr. von Braun, in a fairly rapid reply, stated “My views re: a national space program are cataloged and housed in the Putnam Collection Center. Earlier this year, he donated two letters between himself and Dr. von Braun to the Lowell Observatory Archives. They are cataloged and housed in the Putnam Collection Center.

Dr. von Braun and I continued our correspondence. In November 1967. It was my congratulatory expression on the successful launch of the Saturn V/Apollo IV vehicle. The S-1C stage was the one we “walked through” at Marshall the previous year. I do not have a reply to that letter. My memory is such that I do not know if there ever was a reply, or if I misplaced it.

I believe we had reached a point where both of us became too busy within our lives to continue. Apollo 11 was in high gear for von Braun, and I was in a new job at the Aerospace Corp (after the Lowell mapping program came to an end). I was engaged in providing solar flare data to the three crews of the Skylab program, devising experiments for DOD to be flown on Shuttle missions, training the astronauts to operate said experiments at both Canaveral and Manned Spacecraft Center in Texas, and other detailed space projects. I had enjoyed the privilege of reciprocal correspondence with a champion of space exploration—Dr. Wernher von Braun—and I consider myself fortunate to have been accepted onto the Lowell Observatory staff as Supervisor of Photography for the ACIC Lunar Mapping program. My layman’s astronomy/space interest was transformed into active participation.

Robert Maulfair worked for four years at Lowell, helping with moon-mapping efforts in the 1960s. Earlier this year, he donated two letters between himself and Dr. von Braun to the Lowell Observatory Archives. They are cataloged and housed in the Putnam Collection Center.

By Robert Maulfair

Robert Maulfair

Corresponding with Dr. von Braun
Recent Publications

Keep up with our astronomers’ research by reading their recent publications. Below is just one example of their work. See our website for more.

Massey, Philip; Evans, Kate Anne (2016). The Red Supergiant Content of M31*. The Astrophysical Journal, Volume 826, Issue 2, article id. 224

Image: Neugent/Massey/Lowell Obs./NSF

From the LMI Gallery: The Dumbbell Nebula

M27, the Dumbbell Nebula, is a planetary nebula located 1,400 light-years away in the constellation Vulpecula. It was the first planetary nebula ever discovered, in 1764. The gas shell that makes up the nebula was ejected from its host star about 10,000 years ago, and is expanding outwards at a rate of about 70,000 miles per hour.

A planetary nebula forms when a star like our Sun evolves first to a red giant phase, and then to a white dwarf, shedding its outer layers. The central star is visible in this image as the white dot in the center of the nebula; it is the largest white dwarf known. This exposure was made as part of the recommissioning of the LMI “engineering” grade CCD on Aug 28, 2016, and provided an end-to-end test of the telescope system.

Credit: Massey/Neugent/Lowell Observatory/NSF

Enjoying a tour of the Pluto Telescope, from far left: Birgitta Gaud, Jim Roberts, Samantha Ward, Brian Skiff (kneeling), William Gaud (back) Jim Davies, Mica Gratton and Todd Gonzales (back).

Brian Skiff Leads Astro Chat

On September 17, Lowell Research Associate Brian Skiff complimented Northern Arizona’s first Astro Chat event with his life experience using the Pluto Telescope. Brian has been with the observatory since 1976 and has used the instrument to take photos of asteroids and comets. Astro Chats are small thank-you events that pair Lowell scientists with loyal observatory members. More Astro Chats will follow, so stay tuned.

Annuial Fund

As we proudly celebrate our legacy of astronomical excellence, we recognize the three pillars on which our success is built: cutting edge research, multifaceted educational programming, and an unparalleled history. Help us continue this important heritage by giving a gift through our Annual Fund. Call Mica Gratton at 928-255-0229 or email mica@lowell.edu.
Belt Objects (KBO), of which only a handful had been studied spectroscopically at the time. We named the instrument concept “Near-Infrared High-Throughput Spectrometer” (NIHTS, pronounced ‘nights’) and the last of those projects the “Kuiper Spectral Survey” (KSS). The KSS is like an archaeological dig of the outer solar system that will teach us about the chemistry and dynamics of how the outer solar system formed and evolved into its present state.

In 2008 I led a successful proposal to NASA to fund both the NIHTS instrument and the KSS. NASA provided the funding to build the instrument and perform the KSS in return for Lowell’s commitment of telescope time to acquire spectra of 350 KBOs over roughly 300 nights on sky.

Instrument construction schedules rarely proceed as planned. In the case of NIHTS, Lowell had to first finish construction of the telescope and build the instrument cube and imager (LMI). By mid-2015 we had achieved first light in the lab with NIHTS and on November 24, 2015 we achieved first light with NIHTS on the DCT, taking spectra of a few ‘easy’ targets such as Uranus and the large asteroid Vesta. These initial observations were all done with a conventional aluminum fold mirror, rather than the dichroic, which had not yet been purchased and installed. Through the winter and spring of 2016 we continued to commission the instrument, working out various bugs and refining the software and observing procedures. We scheduled the first science observing, both for the KSS and for users from the DCT partner institutions, for 2016Q4.

In September 2016 an equipment accident irreparably damaged the NIHTS fold mirror. While NIHTS is undamaged, without a fold mirror there is no way to direct light from the telescope to NIHTS. (All of the other instruments have been able to continue observing successfully.) Following the accident, we made the difficult decision to further delay NIHTS observations until the dichroic can be finished and installed, most likely in April of 2017. This decision came out of a careful consideration of the potential costs, risks, and benefits of a variety of options. While this delay is unfortunate, and badly impacts badly several projects including the KSS, it means that when the instrument resumes science observing in mid-2017 the full simultaneous NIHTS-LMI observing mode will be available.

If nothing else, instrument building and being an observer teach caution and patience. I am excited to get going on the Kuiper Spectral Survey with NIHTS in 2017!
RECURRING EVENTS

School is Out and Kids are Free | JAN 16 (Programs and activities will feature the Sun); FEB 20 (Programs and activities will feature the planets of our solar system)
10 a.m. - 5 p.m.

DECEMBER

TUE 13 | Geminid Meteor Shower
(6 p.m.) Family-friendly meteor shower activities
(7 p.m.) Lecture about the source of the meteor shower and viewing tips

JANUARY

TUE 3 | Quadrantid Meteor Shower
(6 p.m.) Family-friendly meteor shower activities
(7 p.m.) Lecture about the source of the meteor shower and viewing tips

SUN 15 | Holiday Star Fest
(10 a.m. - 10 p.m.) Hours extended until 10 p.m.

FEBRUARY

SUN 19 | Holiday Star Fest
(10 a.m. - 10 p.m.) Hours extended until 10 p.m.

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