

THE LOWELL OBSERVER

EXPANDING OUR UNIVERSE

The quarterly newsletter of Lowell Observatory

Issue 101

Fall 2014

Lowell Hosts Cool Stars 18 Conference

by Gerard van Belle

Lowell Observatory recently had the honor of hosting a major international astronomy conference, “Cool Stars 18”, from June 8 to 13, 2014. More than 350 astronomers from 28 different countries attended – including Germany, Australia, India, Chile, Japan, Turkey, and of course from throughout the United States. I served as the meeting chair, with Lowell’s Evgenya Shkolnik as my deputy chair.

The formal name of the meeting was “The 18th Cambridge Workshop on Cool Stars, Stellar Systems, and the Sun”, and represented the 18th installment of a meeting series that has been convening on a roughly biennial basis since 1980. Cool Stars 17 was held in Barcelona, Spain, and it was at this meeting that Lowell Observatory led an ultimately successful bid to have the following Cool Stars come to Flagstaff.

In astronomy, researchers tend to specialize in specific topics, in part due to the tools and techniques that are unique to the investigation of those topics. These topics include stellar astrophysics – the study of stars – and heliophysics – the study of our sun. In each of these two cases, the telescopes and instruments designed for observations are quite disparate from each other; a solar telescope typically looks quite different from a telescope that is intended to look at distant, faint stars. However, the underlying physics is the same.

The Cool Stars series offers a unique opportunity for astronomers who specialize in these two often-separated communities to discuss areas of common interest. The proximity of the sun provides us with a unique star for which a wealth and detail of knowledge can be obtained, unparalleled by any other star. The study of other stars gives us multiple laboratories with varying conditions – different sizes, temperatures, compositions, and ages all provide us with additional insight into the behavior of

Chairman Gerard van Belle acted as emcee during the conference. Here he introduces invited speaker Marc Pinsonneault (OSU) for the conference’s debate between Pinsonneault and Martin Asplund (ANU) on “The Ins and Out of Solar Abundances”.

our own star. This is especially pertinent as we consider questions of how the sun influences our own world.

The discovery in 1995 of planets orbiting other sun-like stars has expanded the relevance of considering stars as entire systems of hosts and companion planets. An indication of the importance of the Cool Stars series is that astronomers who obtained the first extrasolar planet discovery chose Cool Stars 9 as the venue for their announcement. Results from the wildly successful Kepler spacecraft (on which Lowell astronomer Ted Dunham is a co-investigator) were a featured part of this year’s Cool Stars, including new extrasolar planet discoveries, and ‘asteroseismology’ results, where the internal vibrations of stars have been sensed through varying brightness levels, giving insight into the internal structure of these stars. A similar technique, helioseismology, has been used on the sun; both of these techniques provide exquisite constraints on the otherwise hidden interiors of these objects.

The focus on cool stars is connected to the physics of stellar interiors. Stars that are the temperature of our sun and cooler tend to be structured internally and behave in very similar ways. Indeed, the discussion of the very coolest stars and even the sub-stellar ‘brown dwarf’ objects has come to be a significant recurring theme throughout the Cool Stars meetings.

Multiple proposals from Europe were evaluated during Cool Stars 18 for the next hosting opportunity (continuing



a trans-Atlantic switching tradition of the series), and at the closing banquet for the meeting, Lowell Observatory announced it was passing the torch for Cool Stars 19 to our colleagues at Uppsala University in Uppsala, Sweden. It was a tremendous amount of work to organize this meeting, but also a tremendous honor. The entire Lowell staff – including, in particular, Catie Blazek, Mattie Harrington, and Sarah Conant – pitched in magnificently and the overwhelming success of this event is due to their dedication. 🍷

IN THIS ISSUE



Director's Update

by Jeffrey Hall

Unlike the status quo at Lake Wobegon, June

8-13 was not a quiet week at Lowell Observatory. The 18th Cambridge Workshop on Cool Stars, Stellar Systems, and the Sun convened at the High Country Conference Center, ably led by Gerard van Belle and with outstanding support from Mattie Harrington, Catie Blazek, Sarah Conant, and many volunteers. Nearly 400 astronomers from around the world gathered for a week of sharing the latest discoveries in stellar atmospheres, star and planet formation, exoplanets, and the sun itself. At the end of the week, they all went their ways with many compliments

about the organizers, the science, and the venue and setting. During the conference, I was especially struck by two things.

First, it was a clear demonstration of Flagstaff's status as a major hub of research in astronomy and planetary science — not merely at Lowell, but at the U.S. Naval Observatory, Northern Arizona University, and the U.S. Geological Survey. Being selected for a Cool Stars conference is a testament to Flagstaff's long tradition and outstanding reputation in astronomy.

Second, I was again reminded just how much *fun* astronomy is. Hearing the talks and reading the posters was exciting, intellectually stimulating, and generated lots of good conversations with colleagues I hadn't seen in some time. I've heard many astronomers — at Lowell and elsewhere — comment that we are lucky to be able to do what we do. I hope that through the *Observer* and our other programs, we convey that excitement and sense of happy wonder at the Universe to all of you. ☺



Trustee's Update

by W. Lowell Putnam

I hope your summer is going well. It has certainly gotten off to a great start at the observatory. The annual Advisory Board meeting was well attended and produced a number of good conversations and recommendations. Add to that the official opening of the new Collection Center and then a successful Gala with a great talk from Mark Kelly and you have a very good and busy week. Since it was

immediately followed by the observatory hosting one of the largest annual astronomical gatherings, the "Cool Stars" convention for the next several days, the staff was flat out making sure everything came off well. My thanks to Gerard van Belle for his work over the past year as chair of the Cool Stars organizing committee and to the entire team at Lowell for their hard work.

A primary part of my job is making sure the observatory has the long term financial underpinnings to operate successfully. On an annual basis a major difference is the amount of either unrestricted or specific program support we receive from our Friends. Your contributions in this way help us keep innovating new programs and sustaining efforts across the organization. If you are interested in supporting specific programs or research, I urge you to reach out to Antoinette Beiser or me and we will be happy to discuss what works well for you. ☺

Big Red Leads Flagstaff's Fourth of July Parade

Percival Lowell's 1911 Stevens-Duryea Model "Y" touring automobile, a.k.a Big Red, led this year's Fourth of July parade in downtown Flagstaff. The car carried Grand Marshal and Trustee Emeritus Bill Putnam, Flagstaff Mayor Jerry Nabours and his family, Earl and Gloria Slipher, and Mike and Karen Kitt. Several Flagstaff landmarks are visible in this photo, including Lowell's historic Clark Telescope dome in the distance on Mars Hill.





Camp counselor Joshua Begay uses an inflatable model of Jupiter to teach kids about the difference between a planet's revolution and its rotation around the sun, represented here by a light bulb.

Youth Camps a Big Hit

by Cecile LeBlanc

It's a Saturday morning at Lowell Observatory and the children at camp are having fun. On one Saturday ten boisterous three-to-five-year-olds learned about the sun. They studied photos of the sun and then looked at it safely through a solar telescope. Then, with a paper plate colored and dotted with sunspots and pipe cleaners turned into looping prominences glued to the edges, they made a model of the sun. This is Tykes Camp, one of several programs for children put on by Lowell Observatory's Public Program.

The Public Program reaches out to children through its popular private tours for school groups. Classes from across

the country visit for special programs given by educators. These might include anything from a virtual tour through the solar system enhanced with demonstrations using dry ice and liquid nitrogen to an in-depth walking tour of the telescope used to discover Pluto.

Flagstaff organizations also contact Outreach Manager Samantha Christensen to request special programs. Observatory educators go to the Flagstaff Public Library, Bookmans, and Heritage Square to conduct demonstrations for children and the public and in doing so reach people who might not otherwise have been exposed to astronomy.

Kids Camps are a popular event for children at Lowell Observatory. Participants are separated into groups based on grade levels (first through third, fourth through fifth, and sixth through seventh). Camps


were sold out except for a couple of spots in the oldest age bracket.

Tykes Camp is offered year-round on Saturdays for three-to-five-year-olds and is in its second year. Currently 240 children participate yearly. Christensen said this is a unique program because Lowell educators are teaching astronomy and physics concepts to such a young age group. Tykes Camp has three years of curriculum and alternates between physics and astronomy topics. For example, after learning about the sun, campers learn about electricity and magnetism.

Christensen sees the Tykes Camp as not only a fun exercise for participants, but also a language experiment of sorts.

"Children at that age are geared toward learning languages," Christensen said. "We think of that so literally — English, Spanish, French — but math is really a language, and science in some sense is really a language...I think we do our children a disservice by not really exposing them to [science and math] at this age."

She gave an example of the power of these workshops. One boy camper learned about gravity in a Tykes Camp. Months later he was building a bird nest on a paper plate using glue and sticks after learning about Earth. He wanted to know why glue was needed to hold the sticks to the paper plate. Christensen asked him what would happen to the sticks if they didn't use glue. He said they would fall to the ground. "Why?" Christensen asked. He thought long and hard. Finally he answered, "Grasity."

"This shows they are learning," Christensen said. "Not so much the vocabulary but the concept." 



Phil Massey and Team Discover Bizarre New Hybrid Star

On June 4th, a team of astronomers including Lowell's Phil Massey and former Lowell summer student Emily Levesque announced the discovery of a candidate hybrid star first predicted nearly 40 years ago. In a discovery decades in the making, the team has detected the first of a "theoretical" class of stars first proposed in 1975 by physicist Kip Thorne and astronomer Anna Žytkow. These so-called Thorne-Žytkow objects (TZO) are hybrids of red supergiant and neutron stars that superficially resemble normal red supergiants. They differ, however, in their distinct chemical signatures that result from unique activity in their stellar interiors. This work was partially supported by NASA and the National Science Foundation. (Image: NASA)



Docent Gene Hill Educates Visitors

by Mary DeMuth

Lowell docent Gene Hill was born in the small Texas railroad town of Canadian, where his parents worked for the Fred Harvey Company, his mother as a Harvey Girl and his father, a chef.

Gene attended West Texas State College and graduated with a degree in elementary education, teaching for a while in his home state before taking a job at

Gene stands with Lowell's solar telescope used to educate visitors about sunspots and solar flares.

an elementary school in Albuquerque. During lunchtime, students used the playground equipment or played softball, while some joined Gene for solar viewing and an exciting impromptu astronomy lesson at a 6" reflecting telescope, one of two in the school district. Sunspots were often scattered across the image of the sun, which Gene projected onto white cardboard.

The launch of Sputnik in 1957 shocked the United States and spurred Congress to sign into law the National Defense Education Act (NDEA). Set in motion by President Dwight D. Eisenhower, it provided student financial aid and funding for science and mathematics education programs. Gene was one of thousands of students who benefited from the initiatives. He was awarded an NDEA Fellowship to the University of Denver, where he earned Master's and Doctorate degrees in Education. An eastward teaching trek took him to Missouri and New York, then to Chile, where he worked as a school principal. Here, his career in education took a bit of a back seat to his real interest

— skiing in the Andes. "I would describe my time in Chile as two-and-a-half years, five semesters and three ski seasons," laughs Gene. It was there that he met his future wife, Glenda, who had accepted an overseas position as a general science and biology teacher. She also now volunteers at Lowell, archiving correspondence from the observatory's early years.

Fifty-four years have passed since Gene inspired students to learn more about their universe from a playground in Albuquerque. After four years as a Lowell docent, he's still plying his trade as an educator as he explores the sun's features, leads historic tours and brings the observatory to life for excited visitors. ☺



Master Gardener Grant

In June, Lowell Observatory was awarded a grant from the Coconino Master Gardener Association to assist with the purchase of landscaping materials including trees, shrubs, flowers, ground cover and mulch to beautify and fill in several areas of the campus. Master Gardener and volunteer Julie DeGroff (pictured above) and Grounds Manager Dave Shuck are working together on design plans for individual garden areas. Julie also provided expert advice during the grant-writing process.



Upward Bound

Earlier this year, the observatory was chosen as a Summer Academy Service Learning Site in the U.S. Department of Education's Upward Bound program, now in its 50th year. Under the guidance of Outreach Manager Samantha Christensen and Curator Samantha Thompson, the six Academy students volunteered almost 100 hours in June, cheerfully assisting with summer Kids Camps and greeting visitors in the New Views of the Universe exhibit — all while developing life-long learning skills and having a lot of fun!

Lowell Tour Leads to LARI Participation

by William Bucklew

In June of 2011, our local astronomy club, the Astronomical Society of the Palm Beaches, traveled to Lowell Observatory for a three-day program in which we toured the observatory's facilities, had a presentation on exoplanet research by one of their staff astronomers and had nighttime viewing with the 24-inch Clark refractor. Our facilities tour included not only the Mars Hill campus where we got to see the 13-inch telescope used in the discovery of Pluto and the original discovery plate, but also the NPOI and other telescopes at the Anderson Mesa site and to our delight, the "Happy Jack" site, home of the new Discovery Channel Telescope, which at the time was in its assembly and testing stages.

The staff members we met were all very glad that we were visiting and provided a top-quality program for us.

Fast forward to May of 2012 and the announcement of the LARI (Lowell Amateur Research Initiative) Program. After my very positive experience with our

club's visit I decided that I would like to participate in this program.

I was fortunate to be selected to participate in the BGBF research group. This group is tasked with the job of creating an accurate survey of bolometric flux values using a selected group of stars and the photometry that can be gathered from internet resources. With this photometric data, we used our computer power to model the stars in our list against the photometry collected in order to produce the desired results. Our lead astronomer was Dr. Gerard van Belle. He was instrumental in explaining the task at hand and providing us the tools to conduct this research. His helpful guidance along the way aided us when things were not quite working the way we expected them to and he provided insight and knowledge to get us back on track.

The experience has been a truly great opportunity and the knowledge I have gained from participating and



William Bucklew presents a program about Lowell at ALCON 2014 in San Antonio, July 12, 2014.

studying the background science of photometry and spectroscopy has been very beneficial. I would hope that when opportunities like this come along in the future that other amateur astronomers will join in and participate in this chance to make a small contribution to the professional community.

I would like to thank Lowell Observatory and their staff for creating the LARI Program and allowing me to participate, and I look forward to future collaborations where I may be helpful. 📧



Lowell Supporter Dr. Mayda Arias

by Antoinette Beiser

Dr. Mayda Arias is board certified in Internal Medicine, Oncology, Hematology, and Palliative Care. She practices in and around Fort Lauderdale,

Florida and is affiliated with multiple hospitals in the vicinity. Despite the busy schedule that goes along with treating patients in these specialty areas, Mayda has developed an interest in the beauty of the night sky and has made the time to learn about what she's seeing there.

The infectious enthusiasm of a pathologist friend got her interested in astronomy. An accomplished astrophotographer, he loaned Mayda books on stargazing and she became intrigued. Before long she bought a small telescope and joined a local astronomy club, the Astronomical Society of the Palm Beaches, the same club to which William Bucklew belongs. They offer enjoyable and informative monthly lectures on the night sky, which are most helpful to the novice observer.

Mayda joined the club's spring 2011 visit to Lowell and enjoyed excellent observing with the historic Clark Telescope. She remembers how wonderful the Milky Way and Saturn looked from Flagstaff's dark skies.

Since then, Mayda has been back to Lowell every year for the annual speaker series lecture and dinner. Her brother joined her last year and this year her sister and niece came along. A special treat this June was the opportunity to observe the Cat's Eye Nebula through the DCT.

Mayda has become very involved in preservation efforts at the observatory, donating generously to the building of the new Putnam Collection Center. She wants to ensure future generations also get to enjoy Percival Lowell's astronomical legacy. When asked what impresses her most about Lowell Observatory she quickly answered, "I have the impression of very special people who really love working here and who know they're doing very important work." We humbly agree and thank her for her enthusiastic support! 📧

Online versions of *The Lowell Observer* are available at

Recent Publications

The Observer now includes this listing of recent publications by our scientists so you can keep up with their latest research.



(Above) Ralph Nye, standing in front of a segment of the Clark Telescope tube and holding on to the collar that connects the tube segments, gives a television interview about the Clark renovation.

(Right) The Clark pier stand lonely in the dome, underneath a temporary shutter covering.



Clark Telescope Restoration Update

Work on the Clark Telescope renovation progresses well. Ralph Nye and his crew have nearly finished cleaning, fixing, and rebuilding telescope components. The team is now working on the dome – replacing the shutter doors and other poorly functioning parts, stabilizing the structure, and cleaning. The observatory plans to hold a grand reopening ceremony for the Clark in late winter/early spring, 2015.

In Memoriam



Jay Inge

(September 29, 1943 - April 1, 2014)

Jay Landon Inge, a resident of Flagstaff for more than 40 years, died at age 70 on April 1st, 2014 at St. Joseph's Hospital and Medical Center in Phoenix, AZ.

Born in 1943 in Hollywood, CA, Jay graduated from North Hollywood High and the University of California, Los Angeles (UCLA). Following his

graduation from UCLA, Jay worked for Lowell Observatory, where he produced one of the first maps of the moon. He then transitioned to National Geographic Magazine in Washington D.C., where his work in cartography resulted in several maps, including the moon and Mars, which are still available today.

He relocated back to Flagstaff, AZ to work at the US Geological Survey (USGS). While at USGS, he was instrumental in the creation of maps of Mars and Jupiter and was a member of the Voyager and Viking missions to survey the solar system. He was the author of several books cataloging interstellar maps, as well as cartography techniques for interstellar mapping.

In his free time, he was an accomplished artist and devoted husband, father, and friend. He is survived by his wife of 49 years, Mimi, daughter Michelle, son Landon, and four grandchildren. - *Antoinette Beiser*



Floyd Drinkard

(November 28, 1964 - June 11, 2014)

On June 11, 2014, we lost a valued member of the Lowell community, Floyd Drinkard. Floyd served as electrical technician at DCT and NPOI from December 2009 to January 2013.

Floyd came to us from Kingman, AZ, with a broad background in industrial electrical and electronic controls. He rapidly endeared himself to the DCT

team by his hard work, his initiative, and his easy-going manner.

Floyd left his mark on DCT with superbly-executed work including cabling and hardware installation for the active optics system, facility systems electrical work including dome controls, generator controls, the telescope temperature monitoring system, and much more. At NPOI, Floyd will always be remembered for his work in cable and electrical panel installations in the control building and throughout the array; the "hand paddle" controllers he built which are used nightly by the observers, and his support of array electrical upgrades by the Navy. He made a profound impression upon the NPOI staff and the Navy management which reflected well upon the observatory.

Floyd impressed all of us, not only with his skills, but with the care and concern he showed for his family, friends, and co-workers. We will not only remember – and miss – his technical capabilities, but also his sense of humor, his friendly nature, and his ever-present smile. - *Bill DeGross*

2014 PUBLIC PROGRAM FALL SPECIAL EVENTS

New Views of the Universe Exhibit
May 19, 2014 - Jan 4, 2015

Second Friday Science Nights
Sep 12, Oct 10, Nov 14

Meteor Shower Activities (6 - 9:30pm)
Oct 22-23, Nov 17

School is Out & Kids are Free
Sep 1, Nov 11

SEPTEMBER **Regular Public Hours:**
M - Sat 9 a.m. - 9:30 p.m.
Sun 9 a.m. - 5 p.m.

20-26 **Flagstaff Festival of Science** – Free programs
SAT 20 **Activities in Wheeler Park**
10 a.m. - 2 p.m.

SUN 21 **Open House at Lowell**
5 p.m. - 9:30 p.m.

22-26 **Festival of Science Programs at Lowell**
4 p.m. and 5 p.m.

OCTOBER **Regular Public Hours:**
M - Sat 9 a.m. - 9:30 p.m.
Sun 9 a.m. - 5 p.m.

SAT 4 **Astronomy Day**
9 a.m. - 9:30 p.m.

6 - 11 **Uranus Week**
6 p.m. - 9:30 p.m.

TUE 7 **Lunar Eclipse Talk**
7 p.m. – Note: Eclipse will not be visible during open hours

FRI 31 **Halloween Programs**
5 p.m. - 9:30 p.m.

NOVEMBER **Regular Public Hours:**
M, W, F, Sat Noon - 9:30 p.m.
T, Th, Sun Noon - 5 p.m.
Closed November 27

FRI 28 **Black Friday**
Noon - 9:30 p.m. – Sale at the Starry Skies Gift Shop

For more special event info visit



Pam and Charlie Ross Join Percival Lowell Society

Pam and Charlie Ross have been Friends of Lowell since 1992. Pam became involved with the observatory at the suggestion of longtime library and archive volunteer and former Advisory Board member Marty Hecht. She eventually also joined the Advisory Board and continues to be an enthusiastic and supportive member. They made the decision to include the observatory in their estate plans a few years ago and were presented with a bronze Mars Globe by Trustee Lowell Putnam at this year's Percival Lowell Society Brunch. For information about joining the Society and including Lowell Observatory in your estate plans, please contact Antoinette Beiser at asb@lowell.edu

ARRIVALS

- Joshua Bangle - *Fundraising Assistant*
- Joshua Begay - *Kids Camp Teacher*
- Sara Bruhns - *Research Assistant*
- Samantha Flagg - *Scheduler*
- Joseph Llama - *Postdoctoral Associate*
- Jacob McLane - *Research Assistant*



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