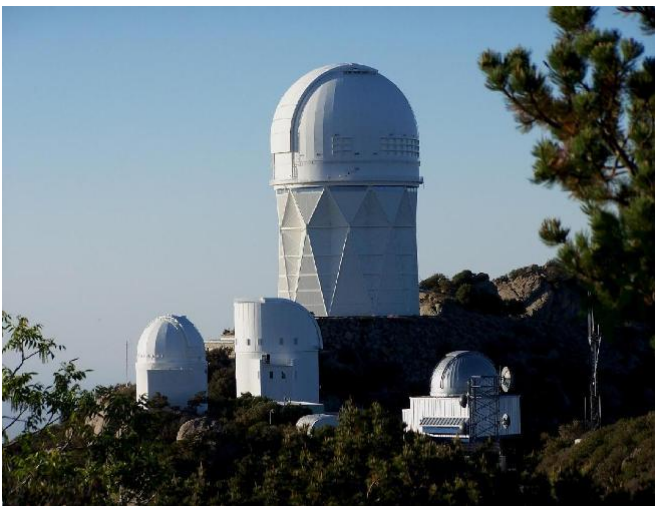


Astronomy is Back!

Fall 2022

Okay, everyone, way back in the spring issue of 2020 is when I first brought the subject of Covid and its impacts to this newsletter. Apart from this short mention, we will no longer talk about the subject of Covid, its infinite variants, Monkeypox, or any other “pox”. I am declaring now that Astronomy and my company, “Astronomy Adventures Arizona” is back in business! In fact, there are many opportunities which are once again available to individuals, the general public, students and teachers at all grade levels, and corporate gatherings. In this newsletter, I’ll point out astronomy programs and events that are again available to nearly everyone. Some of these are free programs, and some of them involve a bit of time or monetary expense, but they’re all affordable, and in my opinion, very much worthwhile!

First, though, I’m still concerned about the status at **The Kitt Peak National Observatory**. There are still no public programs and access is only granted to scheduled professional observers. Sources tell me this is not “totally” related to the unmentionable subject above...which we won’t mention. They say this is partly due to damage from the recent Contreras Fire. The damage, however, was not extensive and did not impact public areas. I remain dubious of this “too-convenient-two-step”, but I’m hopeful that public programs on Kitt Peak will soon resume. When the mountain does open, the **Nighttime Observing Program (NOP)** is an experience that should not be missed – whether you’re a resident, or out-of-town visitor. Yes, the NOP and AOP are a bit pricey, and reservations are often sold out well in advance. Not to worry; there are other options, including the daytime programs on Kitt Peak. Tours of the mountain facilities led by knowledgeable docents are certainly worth the trip, and very inexpensive. Check first with the visitor center at 520-318-8726 to verify if mountain access has been restored for the public; it’s a long trip just to find a locked gate! At this time, a date to open has not been set, but feel free to call or email me and I’ll tell you what I know.



While Kitt Peak boasts the largest collection of optical telescopes on any mountain anywhere in the world, daytime on “The Mountain” offers its own special sights and experiences. When they resume, docent-led programs provide background of the observatory’s history, discoveries, and mission. Each session would usually conclude with a visit to one of the publicly accessible facilities. Some visitors have even been invited onto the floor of the Mayall 4-meter Telescope! Then again, you may just choose to wander the mountain, taking in the unique plant and animal habitat of this very special “sky island”; that is also possible, and it is totally free.

Now, while Kitt Peak isn’t open, their parent organization is once again hosting one of their most popular astronomy outreach programs. And, just to keep everyone on the same page, the organization we have long known as **NOAO (The National Optical Astronomy Observatory)** has been re-organized under the name of **NOIRLab**. Yeah, it’s a confusing moniker, made even more so since it stands for **“The National Optical-Infrared Astronomy Research Laboratory”**, which doesn’t really match the acronym, and doesn’t exactly roll off the tongue. Still, they’ve announced that **Project ASTRO** will once again be running in-person programs for teachers and astronomer partners this fall. If you’re a teacher, or know of a teacher, or an amateur or professional astronomer (yeah, we take them too!) that would like to sign up, contact Rob Sparks at robert.sparks@noirlab.edu.

I've been involved professionally with Project ASTRO for two decades and I can honestly say that it is an incredible tool for helping teachers bring top-quality and entertaining astronomy information and demonstrations to their classrooms. I still have working partnerships with many of the teachers I've supported over the years. I often visit their schools and classes to give astronomy talks, in-class demos, and even day and night telescope observing programs. Besides actually looking through a telescope, below are just some of the programs I've done for students from 3rd grade through college:

Building a Comet in the Classroom

Play-Doh Planets – a Scale Model of the Solar System

Building and Using a Solar Clock

Moon Balls – Understanding the Phases of the Moon

Kinesthetic Astronomy – Using Your Body to Simulate the Cosmos

Setting Up and Using a Telescope



Over the years I've worked with fabulous teachers – and students. At top left is my Solar Viewing program for Monica Baden's Twin Peaks 5th graders. She and I have been ASTRO partners for about a decade! For this event I used a solar visual filter on my 8" reflector, paired with a Coronado H-alpha telescope. This setup allows two students at a time to see the sun in totally different filtered images. At right is the *Mercury transit* we watched from Donaldson Elementary back in 2016. My long-time partner Kathie Shotts is retired now, but I still work events at Donaldson from time to time. Students lined up in the shade as they awaited their turn to watch the tiny marble of Mercury cross the Solar disk in both a visual solar filter, and an H-alpha dedicated solar telescope.

Next up, don't forget our own world-famous local treasure, The ***Arizona Sonora Desert Museum***. ASDM has hosted astronomy programs featuring local telescope operators for years. Their annual "Summer Saturday Nights" events let the public visit after dark, when the museum is usually closed. While the annual event had been impacted by the pandemic, things were back to normal this year!

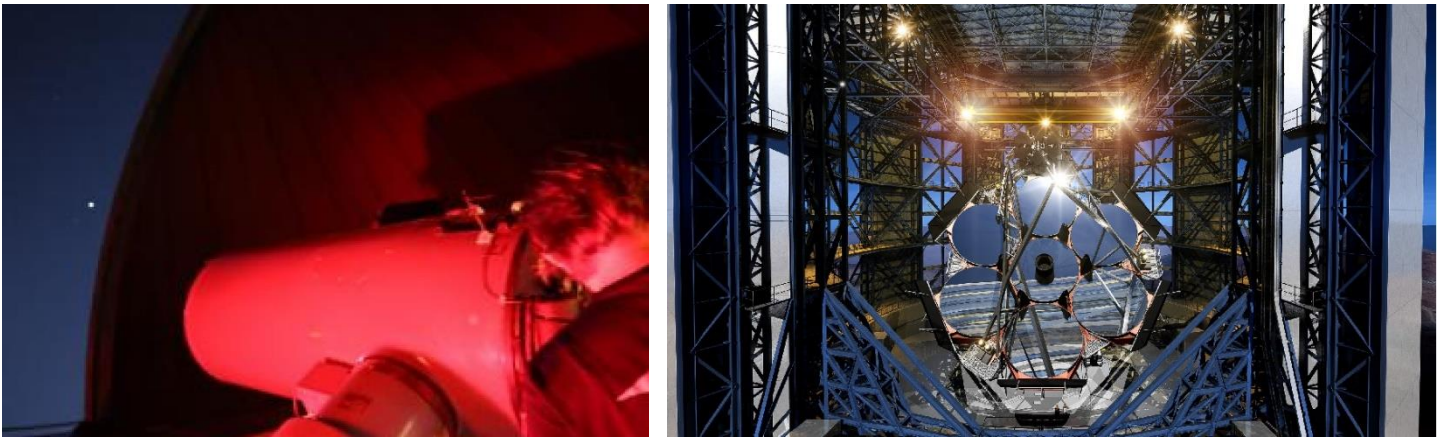


The "Summer Saturday Nights" program at ASDM is a great place to spend an evening learning about the Sonoran Desert, and the great astronomy-friendly skies we enjoy here in Southern Arizona. Not only do local volunteers present a half-dozen hands-on activities, but there are telescopes set up for observers to use throughout the museum grounds. At left, I recruit volunteer scientists to present the fun and educational "Build-a-Comet" activity. Students of all ages want to learn about these once-reviled space visitors!

In addition to its vast biological, botanical, educational, and natural resources mission, the Sonora Desert Museum is a beautiful locale to highlight the dark sky resources of southern Arizona. ASDM schedules telescope observing programs hosted by local astronomy outreach pro's at various times throughout the year. Make sure you give ASDM a call to see if they have any upcoming day or night telescope programs scheduled as part of their regular admission.

And then, there is **The University of Arizona**, the oldest university in the state, with its rich astronomical history. The University and Tucson were important considerations for selecting a permanent home for the National Observatory way back in 1958. While not directly associated with the Kitt Peak National Observatory, the UA does have its very own telescope (the **Bok Observatory**) on the mountain, and they are key members in several partnerships that operate other KP facilities. One of these is **Space-Watch**, which uses the oldest telescope on the mountain to find and track **Near Earth Objects (NEO's)** which could possibly pound our civilization back to the stone-age!

The UA is also home to the **Flandrau Planetarium and Science Center**, and the **Richard F. Caris Mirror Lab**, which is housed deep in the bowels of the UA Football Stadium. I often say that the Mirror Lab is the only good thing happening in Arizona's football stadium. Both the Mirror Lab (520-626-8792) and the planetarium (520-621-4516) are open for tours this fall, and while admission fees are minimal, there are some access restrictions, and reservations are usually required.



The Flandrau Science Center and Planetarium offers a number of physics and astronomy exhibits and hands on displays. It also puts on top-notch laser and planetarium shows – it is a planetarium after all! On many nights however, the dome is opened to share live night sky views through their telescope. While the mirror lab doesn't offer “live telescopic” views, you'll be treated to state-of-the-art mirror making magic. On most tours you can see the largest mirror ever constructed, 8.4-meters in diameter! The Large Binocular Telescope (LBT) on nearby Mt. Graham, was constructed with TWO of these monsters mounted side by side. Not to be outdone, the Giant Magellan Telescope (the GMT, shown above right) when completed soon, will employ SEVEN 8.4-meter mirrors to offer unmatched views.

The last of the UA programs is for business owners out there, and I do have a vested interest here. The University of Arizona's **Small Business Utilization Program** is designed to promote small and minority-owned businesses at all levels. The SBU Manager is my son, **Nick Dugan**, and his job (right from their own website) is to “assist in promoting and creating more opportunities for small businesses to obtain University contracts for goods and services, work to recruit small business to bid on University of Arizona contracts and help university departments meet federal and overall small business requirements.” He coordinates with a wide variety of federal, state, local, and even private agencies to make this happen. If you have a small or minority owned business and would like to take advantage of the resources offered by the UA, you should definitely reach out to Nick via email cfdugan@arizona.edu or phone: 520-621-2888 Fax: 520-626-5428. Tell him Chuck sent you!

Finally, before I offer my usual rundown of the Fall Celestial Delights, please allow me to submit my own company, **“Astronomy Adventures Arizona”**, as another option for everyone to consider for your astronomy, education, and entertainment needs. Over the past five months, I have had to deal with some health and personal challenges, which unfortunately resulted in the cancellation of a number of astronomy activities and programs. If you are one of my clients impacted by these cancellations, I offer my sincerest apologies, but know that the situation could not be avoided. I’ll make it up to you somehow! In the meantime, as I mentioned at the beginning, everything has been resolved, and we are open for business. I listed many of our activities and demonstrations earlier in this newsletter, but I can also deliver telescope programs to help you embark on an astronomy adventure of your own!



Above at left are just a few of the telescopes available for your astronomy night out. A 2-hour event with one hosted telescope can be as little as \$100 – and that’s for up to 10 people! Small fee increases can mean additional hosted telescopes or longer programs to accommodate larger groups. We’ve hosted programs for over 100 people. If you’d like the “big girl” we used at Flying Leap, that might cost a bit more, but she is definitely a showstopper, and does appropriate justice to faint deep sky objects! And, since 2021, we’ve gone mobile. All of our instruments and support equipment now travel with us in our 18-foot AAZ Trailer. This provides all the flexibility to deploy larger or more equipment at any event, at a moment’s notice! Call or send an email if we can bring astronomy to your next event.

Since these pictures were taken, we’ve added a second 16-inch monster, a 6-inch refractor for excellent lunar and planetary views, and two more 12-inch telescopes. We have also added an **Electronically Assisted Astronomy (EAA)** capability, to put real-time images up onto our 30-inch monitor for those people that don’t do well with eyepieces – or just to accommodate large groups at one time. See the Spring 2022 newsletter, “Astronomy a New Way with EAA” for more details on live EAA programs.

Finally, it’s time for the fall 2022 agenda of celestial happenings. For many of these items, you can get some details by reviewing the AAZ 2022 Calendar I sent out last December, but not for this first big thing...and I do mean BIG. On Monday, August 29, the newly re-invigorated lunar landing program starts off with a bang at 8am EST. The **Artemis-1** mission is set for liftoff from pad 39B in Florida, and it will likely be broadcast live on NASA TV. This first outing is a 43-day unmanned mission to send the **Orion capsule** on a lunar orbiting trajectory and return it to Earth in early October. Obviously, we’ve “been there and done that” with manned Apollo missions, but after a 50-year hiatus, Humanity’s return to the Moon will herald in a welcome and exciting era. I’ll definitely be watching!

Next, with monsoons waning, it’s time to get the telescopes out for some planetary viewing. **Saturn** came to opposition in mid-August, and on Monday, September 26th, **Jupiter** joins the planet parade. When **Mars** reaches its every-other-year opposition in December, we’ll be assured of beautiful planetary observing for at least a few months. And speaking of monsoons, right on cue, the **Perseid shower** of August was literally washed from the sky, but the fall meteors may offer us some compensation. Though waning gibbous moons will adversely affect both the **Leonid** and **Geminid**

meteor showers, the **Orionids of October** could be spectacular. When the Orionids reach their peak on the night of 10/21, the moon won't rise until nearly 4am. This will provide great views between the hours of 9pm and 3am! That's more than enough time to sit out under the stars with a warm adult beverage and get an accurate meteor count – the rate for this shower is usually 30 to 40 per hour.

October also offers a twin treat – both **“International Astronomy Day”**, and **“International Observe the Moon Night”** are on Saturday, October 1st! Either is a great opportunity to share our passion for astronomy with others in the neighborhood, or by going to the website and signing up for a formal observing program. You can get info and register at <https://moon.nasa.gov/observe-the-moon-night/>.



Above are two of my own images from International Observe the Moon Night (IOMN). At left is a shot of the entire lunar disk in 2019. At right, I zoomed in on the area around the Copernicus Crater for IOMN-2021. Both of these were captured with my 6” refractor, “Gal”. The IOMN date is set each year in September or October, based on the First Quarter Moon. At first quarter, the shadows are at their longest, providing the highest contrast of the lunar surface features.

And finally, there are still two more fall fun features. On November 8, most of the U.S. will be treated to a **Full Lunar Eclipse**. Here in Tucson, the timing is not ideal – the eclipse begins at about 2am, and will finish at approximately 6am, putting the Moon deepest into Earth's shadow at about 4am.

The last event is a bit more convenient. I'll be hosting my annual **“Nearly Halloween Star Party”** on Saturday, October 29th. The moon phase will be almost perfect for dark sky observing...4 days after new moon. This gives us a slim crescent for early observations, and a moonset soon after, allowing excellent views of faint deep fuzzies. My event is always held at my home, it is always FREE, and I always have a number of telescopes set up for a variety of targets and views. This is a great opportunity to experience the capabilities of our AAZ telescopes, so keep your eyes open for the flier detailing all the info about all the festivities at this 10th annual event. I hope to see you all here!

Enjoy Arizona's Fall Night Skies,

Chuck Dugan
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