

# The Fremont Peak Observer

— Bringing Astronomy to the Public —

Vol 39 No. 3

August 2022

## President's Message



Pat Donnelly

I am happy to report to you that FPOA will host our 2022 Annual Members Meeting (a.k.a. Star-B-Que, SBQ). The Annual Meeting is scheduled for Saturday, August 20, 2022. In order to avoid crowds (a COVID concern), the 2022 SBQ will be an abbreviated version. FPOA will provide grilled BBQ foods: burgers, hot dogs, and veggie sausage, as well as buns, soft drinks, condiments, paper plates, a garbage bag, and plastic utensils. Guests may bring their own side dishes and will also be responsible for their own clean up and their unused food brought to the peak. There will be no guest speaker or raffle; the raffles relegate to fond historical memory. Instead, following the cleanup of the picnic area, FPOA will conduct tours of the refurbished observatory. The evening will conclude with observing through various telescopes, including the 30" Challenger. Guests can still RSVP through [info@fpoa.net](mailto:info@fpoa.net). Please identify how many will be in your party. One last item – Please monitor the status of the event frequently on the FPOA website. Although highly unlikely, a very small possibility still exists that the event may be cancelled due to COVID concerns. We will provide any update, if necessary. I hope to see you at the peak on August 20. We've had many weather status inquiries this year and in response, FPOA has been

## Fall 2022 Program Dates

### Saturday Evening Programs

July 2, 23, 30      August 6, 27  
Sept. 3, 17, 24      Oct. 1, 22, 29

### Solar Programs

July 23, Aug. 6, Sept. 17, Oct. 22

### Board Meetings

August 27, Sept. 24, Oct. 29, Nov. 19

### Annual Members Meeting (SBQ)

August 20<sup>th</sup>

Check our web [Schedule](#) for updates

✚ We're not out of this yet, Public and Observer programs remain open depending on weather and improved COVID variant positivity

busy revising the website to provide current weather status at the peak. We have a couple of new features. The CAL FIRE [website](#) provides a new view of the observatory area. Two views of current observatory cloud status are provided with links on the FPOA website members' page. In addition, meteorological information is provided from the Reeves Ranch Station, the Fort Ord Profiler (This site provides a

vertical temperature profile and gives the temperature at the peak quite accurately.), the Clear Outside tables, the Salinas aviation forecast, and the GOES West Satellite. With all of this data available to our observers, it should be relatively easy to determine whether to travel to the peak. I check the Fremont Peak webcam (The webcam is on the KSBW tower on Fremont Peak.) just about every day. Most of time the webcam is pointing at the observatory. The year 2022 has not been kind for conducting evening public programs. As of July 16, there have been ten scheduled public programs. However, the programs have been anything but successful. Only three of the ten programs were conducted. The weather failed to cooperate for the other seven. I am hopeful, at this time, that the conditions, which caused the cancellation of the programs, are behind us. Because of the bad luck with the weather this year, I ask all of you to please check the weather conditions before travelling to the peak.

PD

## Observations



Rob Hawley

*Member news and insights from observing at FPOA and abroad. Send stories to **editor at fpoa.net**.*

---

### Weather forecasting at the Peak

We've had an unprecedented string of bad luck with weather this year. Seven out of ten Spring evening programs have been cancelled. This year I started posting weather outlooks on the *fpoa.net* front page to warn people when it was prudent to stay away. Several people asked how I make my forecasts. Here are the steps I use.

All of the forecast tools I mention below are located on the FPOA website Members page with links below.

Full disclosure – I am not a professional meteorologist (although I came close to retraining as one 50 years ago). What I do have is 20 years of observing at the peak and a lifelong passion for my almost profession.

### Salinas Aviation

The local airport (code: SNS) makes a Terminal Aerodrome Forecast (TAF) twice daily at 0000Z (5 PM PST in the summer) and 1200Z (6 AM PST). This is a detailed forecast of the local cloud layers including base height and sky coverage (few, scattered, broken, overcast). A “low” forecast cloud base (say 800 ft) suggests a very good dark night. The low clouds we typically get are about 500 ft thick. So, an 800 ft base means the tops would be about 1300 ft. Still well below us.

Forecast period: 2100 UTC 14 July 2022 to 0200 UTC 15 July 2022

Forecast type: FROM: standard forecast or significant change

Winds: from the NNW (330 degrees) at 12 MPH (10 knots; 5.1 m/s) gusting to 23 MPH (20 knots; 10.3 m/s)

Visibility: 6 or more sm (10+ km)

Ceiling: 14000 feet AGL

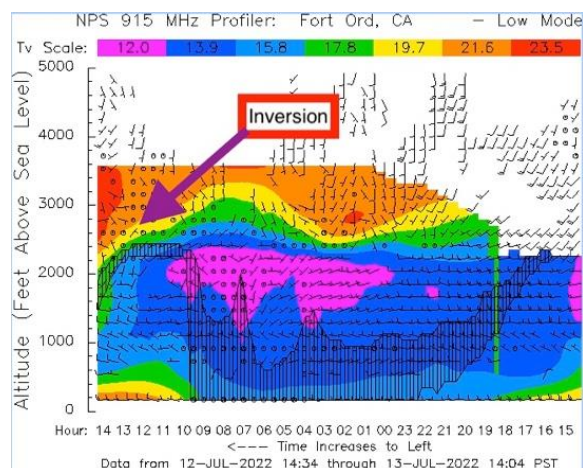
Clouds: scattered clouds at 12000 feet AGL, broken clouds at 14000 feet AGL, broken clouds at 20000 feet AGL

If they are higher (say 1500 or more), especially when paired with a west wind, then this could be a problem. That is where the tool in the next section becomes useful.

They also publish a METAR (actual observation) each hour. The observation agreeing with the forecast, at the forecast time, makes the forecast more credible.

## Ft Ord Profiler

The NWS publishes a measurement of the temperature profile above the Naval Postgraduate School. In a normal sky, temperature decreases as altitude increases. In this area, we typically get a situation where temperature reverses and warms with altitude. That allows us shorts weather at the peak while people in Monterey have their sweaters on. This is called a *temperature inversion*.



For this discussion, an inversion is important since it acts to cap clouds below it. With an inversion, you could chase your hat in San Juan and still have calm, clear weather at the peak.

On most nights this year we have not had an inversion. As a result, we have had an unwanted visitor.

## Clear Outside

This is one of the most popular astronomy weather websites. It has the advantage of predicting cloud layers. The TAF will generally stop at the first overcast layer (and SNS may not bother with high clouds). This will predict low, medium, and high layers. I do not use the other tool Clear Dark Sky since it only provides a “from the

surface” forecast that is generally wrong for us 2600 feet off the ground.

## High Clouds

The last forecast tool is to have a look at the weather satellite. Animations of the “Geo Color” (visible or NIR) or water vapor can give an idea of what high clouds have been doing. We’ve been shut down by high clouds a couple of times this year. In image animations, we could see the clouds approaching.

As an advanced technique, I sometimes look at the water vapor images. These give an indication of how transparent the sky will be. More moisture -> less transparent. An easier way is to look at contrails. A short trail is a dry sky. If a jet leaves a long thick trail then it is a poor night to look for that mag 15 galaxy.

## Humidity

This is a measurement not a forecast. We can get a humidity measurement from Reeve’s Ranch far below us, but it’s unreliable for conditions up at the Peak. We are about to install a new weather station at FPOA. While we can’t access it remotely it will allow us to take continuous humidity readings at 4 sensor locations while we are operating (two outside readings when we are closed). It is unsafe to operate the telescope when the humidity is high. At present we are using 80% as our definition of “high”. For an inexperienced operator, I would drop that to 75%.

## Weather Cameras

CalFire maintains a camera on one of the radio towers. The camera points according to CalFire needs and sometimes directly at FPOA for extended periods. This gives the best “actual conditions” available. The link

for this camera is right below the status on the main page.

### Summary

So, this is the technique I use. So far this year there have been evenings where I was confident that the program was at risk. There have been others where I felt it could go either way. Sadly, the sum of those this year was 7 evenings (all of our weather losses). The status updates at [fpoa.net](http://fpoa.net) reflect our best understanding of the likely outcome and our certainty of the outcome. But forecasts are not contracts. Especially on those evening when we are not sure it is best to do one final check of [fpoa.net](http://fpoa.net) before coming up the hill.

RH

---

### *Creating “color” images from NIR*

This week (July 11<sup>th</sup>) we were treated with the first “color” images from the new Webb Telescope. However, the Webb Telescope is mostly a Near Infrared camera so how can it take color pictures?

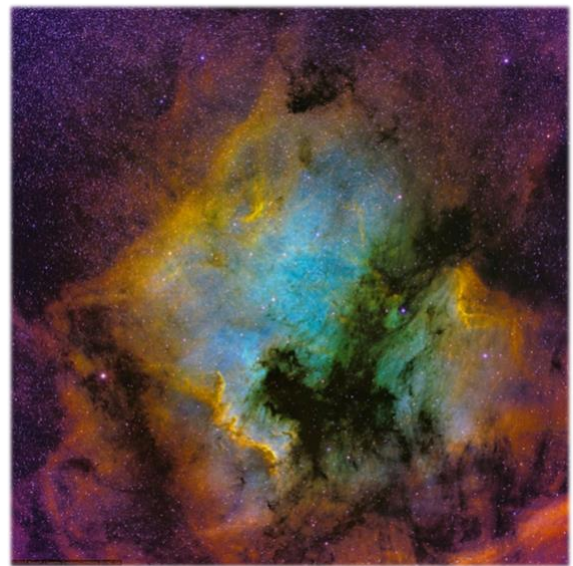
A color picture visible on a computer is composed of blue, green, and red images. The color of each pixel depends on how much of each color is used. Cameras such as your phone operate by being a matrix of very tiny combinations of color filters paired with a photosensor. The image you see is built by treating a set of these filters/sensors as a single pixel which has values for {R, G, B}. This triple is retained until it is time to display the image when your screen again is made up of tiny R, G, and B LEDs.

Astronomical cameras operate a bit differently. An astronomical camera is a

B&W device that only captures intensity. A filter wheel is in the Optical path. So, for example, you might just take an image of Hydrogen Alpha ( $\pm 1.5$  nm) or Red (600-700nm). This monochrome image will be used later.

### Building a Color Palette

In my own work I shot pictures of Narrowband Emission lines (Oxygen III, H Alpha, Nitrogen II, and Sulphur III). For the North American Nebula, I shot images with Nitrogen, Hydrogen, and Oxygen filters. Each filter/image pair was combined with other images from the same filter to improve the noise. To create the final image, I assigned each of these 3 combined monochrome images to be a single color; Nitrogen as Red, Hydrogen as Green, Oxygen as Blue. This process created it created the most interesting image below.



©2015 Robert Hawley copyrighted under a Creative Commons Attribution-Noncommercial-Share Alike 3.0 United States License

In other images I used the “Hubble palette” that the space telescope used for many of its pictures (S=R, H=G, O=B). However, one can get more creative (especially if you have a billion-dollar telescope with lots of filters).



For example, another Hubble image was built as follows

sulfur	White
nitrogen	Orange
hydrogen alpha	Brown

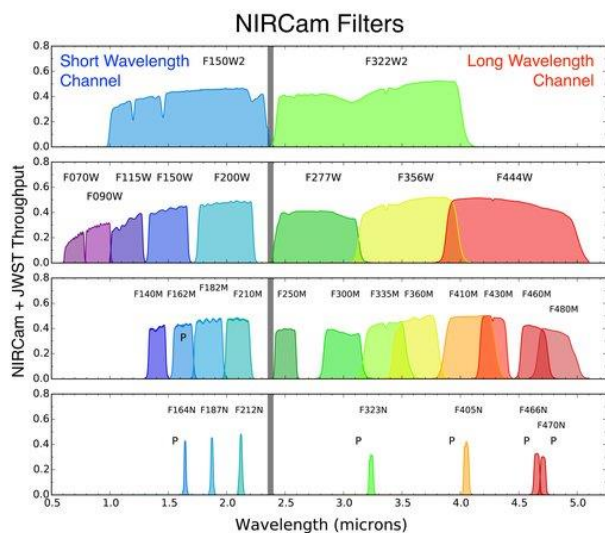
oxygen	Cyan
helium	Blue
oxygen	Violet

Note that many of these are not primary colors so addition of that filter would contribute to multiple RGB channels. This is the “art” portion of this.

### Webb Filter set



Webb has a filter wheel somewhat more sophisticated than what I have in my backyard. Webb has a total of 29 different filters. Some of these are broadband (think “green”). Some are narrowband (for particular emissions).



To take an image, Science technicians send instructions to the telescope software which rotates one of the filters to the operational position and exposes for a period of time. The resulting monochrome image transmits back to earth. Technicians then combine it with images from other filters to form the image that we see. After some serious digging I finally found the recipe for the Deep Sky image

Red: F444W  
 Orange: F356W  
 Green: F200W + F277W  
 Blue: F090W + F150W

Stated another way the color roughly corresponds to red shift which corresponds to distance. Other images are built with different criteria. For example, the Stephens Image used

Red: F356W+ F444W  
 Orange: F1000W  
 Yellow: F277W + F770W  
 Green: F200W  
 Blue: F090W + F150W

The Southern Ring was presented as two different images. The planet image is the output of a spectrograph demonstrating the intensity of light at different wavelengths instead of capturing a band of wavelengths and providing a single intensity.

Ultimately the display of astronomical images is a combination of art and science. Technicians work to highlight scientifically interesting information such as subtle texture without introducing processing artifacts

RH

## Facilities



Eric Egland

Thanks to the California Conservation Core for helping us weed whack along the south pads, they did a great job.

Following installation of Windell Oskay's beautiful new roof stops, we needed to replace the roof brushes to close the track gaps. Closing the north track gaps helps keep out rodents. Closed gaps also keep out wind and fog by increasing wind penetration resistance at the south shutter and along the east and west track skirts. The new roof brushes are a couple rows of 4" industrial HDPE brushes inserted into two-track aluminum brackets. The completed brush assemblies were mounted directly under the north roof flashing skirt with 5 1/4" bolts each and rubber sealing washers.



Our new bench maintenance door got a test drive. I lowered it to give the shutter torsion springs a lube job. Mfg. prescribes 10W-30 motor oil across the top of each spring and I worked it in by cycling the shutter through its range of motion.



Terminix rep Chris visited our facility a couple weeks ago and all went well during our tenting August 8, 9, and 10. We removed sensitive, valuable, and any enclosed optics for safekeeping during the procedure. Also, cushion pads, SBQ foodstuffs, coolers, foam furniture, etc. We'll air it out well before the following program August 27<sup>th</sup>.

ETE



## Support



Rob Hawley

Thanks to those who renewed in 2022. FPOA receives most of its income from Memberships. Most of the annual members are now Observers.

For those that have not renewed we still need your support. Contributions cover our observers, our phone, insurance, etc.

Please also consider volunteering, it's great fun and a service to our community. Please see [back page](#) for details.

---

### *Would You like to join the Board?*

At the Annual Members Meeting August 20, 2022, we'll elect the 2023 FPOA board members. Board members will be elected for a three-year term by paper ballot. If you would like to be placed on the ballot for a seat on the FPOA Board of Directors, please contact any board member. The FPOA is always looking for members interested in joining the board. Please submit requests by August 13 to allow time to add your name to the ballot.

## Membership Renewal



Rob Hawley

FPOA Memberships are for 12 months with Observer memberships available as a separate option. Please use our web enrollment forms on the membership page to join or renew.

Members [may pay with PayPal](#) or mail a check to the address below:



FPOA Membership  
c/o Rob Hawley  
1233 Hillcrest Dr.  
San Jose, CA 95120

## Feature Photos



Please submit Fall issue photos to the [editor](#) by Aug 1<sup>st</sup>

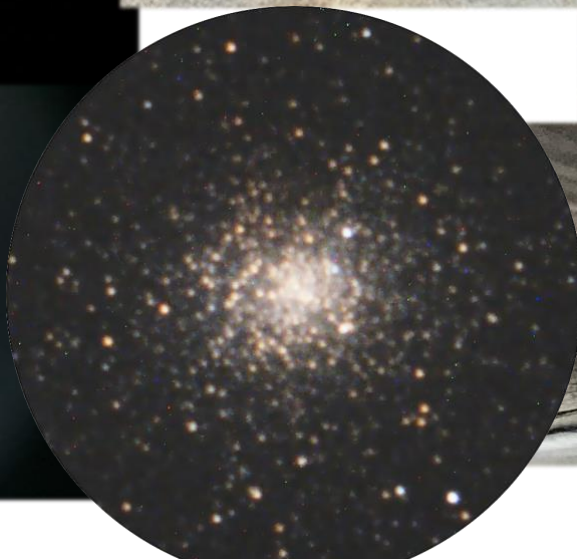




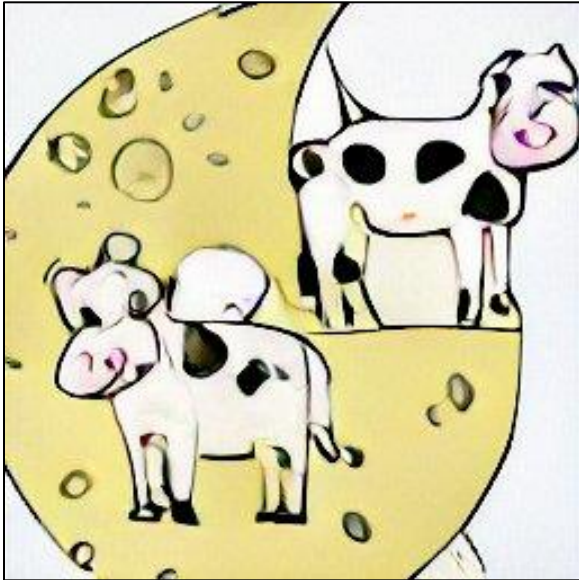
## Feature Photos (contd.)



Photos CW from prev. page: a foggy summer; lunar view south toward Kepler crater; Stack photos of M16, M57, and M19 courtesy of Mateusz Kulikowski; a great horned owl balances in sunset winds; Dall-e mini AI concept of a "stable telescope"; an unknown red beetle, a baby bordered plant bug; a mouse on the southeast parapet; clearing the chip pile; the one-skipper Messier crater in Fecunditatis; the "two foxes" on the east shore of Mare Tranquillitatis (rotated 90 CW). Apollo 11 landed just above the left fox's left ear.







Dall-e mini AI "moon cows"

## Observing Reservations



Please send the following information  
**48 hours in advance** to:

*schedule at fpoa.net*

- Member name
- Reservation date
- Estimated arrival time
- Duration of stay
- Number in party
- Vehicle description and license plate
- Specific observing site request (pad)

## Public Program Volunteers



- Complete the updated [2022 liability waiver](#) and return to *membership at fpoa.net*.
- Also, please email name, vehicle, and the program date to *schedule at fpoa.net*.

## Fremont Peak Observatory Association

Box 1376, San Juan Bautista, CA 95045

Phone Number: (831) 623-2465

General info *info at fpoa.net*  
 Schedule *schedule at fpoa.net*  
 Membership *membership at fpoa.net*  
 Editor *editor at fpoa.net*  
 Treasurer *treasurer at fpoa.net*

Website: [fpoa.net](http://fpoa.net)  
 Facebook: [fpoa.observatory](https://www.facebook.com/fpoa.observatory)  
 Twitter: [fpoa\\_info](https://twitter.com/fpoa_info)

## Officers and Directors 2022

<b>President</b>	Pat Donnelly
<b>Vice President</b>	Chris Angelos
<b>Instruments</b>	Ron Dammann
<b>Treasurer, IT</b>	Rob Hawley
<b>Facilities</b>	Loren Dynneson
<b>Secretary, Editor</b>	Eric Egland
<b>Vice IT</b>	Windell Oskay
	Lenore Edman
	Tom Kellogg

<b>Instruments and: Schedule</b>	Ron Dammann
--------------------------------------	-------------

<b>Membership and: Distribution</b>	Rob Hawley
---	------------

<b>Website</b>	Rob Hawley Windell Oskay
----------------	-----------------------------

<b>Directors Emeritus</b>	Kevin Medlock Denni Medlock
---------------------------	--------------------------------



## Dates and Delivery

Members, The Observer is now sent by email and posted on our website at [FPOA Observer online](#). Please send email updates to *membership at fpoa.net*.

The *Fremont Peak Observer* publishes four times a year (Winter, Spring, Summer, Fall). We welcome articles and photos from our members. Please email those to *editor at fpoa.net* by Feb. 1, May 1, Aug. 1 and Nov 1 in plain text or Word format.