

Paul Morgan Observatory

Annual Report 2021

Covid-19 in our community impacted many activities during 2021. The observatory was greatly impacted for in-person visits during much of 2021. . If Covid19 wanes in our region during the spring 2022, and the weather begins to offer clear days and nights the observatory may begin to offer the return to on site observing sessions as well as online outreach. (See Plans for 2022)

Observatory accomplishments during the pandemic 2021

1. As vaccines were becoming readily available in the spring of 2021 and Covid 19 infection rates declined, the observatory pivoted to an outdoor observing model. Help from U.C.C. Facilities workers and the IT department saw the implementation of a digital projector system in lieu of indoor TV monitors. Telescope camera images were sent to an outdoor projector that put the image onto an 8 ½ foot projection screen mounted onto the observatory's north wall. Tests were done in June and the outdoor observing was ready for students of GS 107 astronomy class in July 2021. During July, GS 107 students, masked and socially distanced, enjoyed outdoor observatory imaging of the moon, stars, star clusters and galaxies. Unfortunately, a sudden spike in Delta Covid 19 cases in August resulted in a return to online imaging. The outdoor observing concept works and will be available for 2022 for U.C.C. astronomy students and also for onsite visits as the Covid 19 cases decline.
2. Both Astro-Physics mounts were realigned. This process entails one or several nights of imaging specific points in the sky and having a computer program compare the actual image with expected sky coordinates to develop a model to correct for misalignment. The Atik 414 EX CCD camera was employed for imaging. A careful pre-alignment was done with each mount and cameras to assure no collisions with the mount piers would occur. On a few clear dark spring nights, with facility help to turn off all lights below the observatory, 140 image points were attempted with more than 80 points successfully logged. Previous years, only about 40 points were attempted with about 25 success correction points established.
3. Work was done to learn to use the new astronomy cameras from ZWO ASI. First, the planetary color camera, ZWO ASI 183C was tested on various Solar System targets including the sun, moon, Venus, Mercury, Mars, Jupiter and Saturn. Excellent images were demonstrated for all targets. This camera will be a workhorse for Solar System imaging. Second, the ZWO ASI 071 MC cooled camera was tested on Deep Space targets. The learning curve to operate this camera was steep at first but was mastered by late summer. Working with short exposures and variable live controls the 071 proved to be a reliable wide field to close-up camera. Live color images were found to be more subdued than the Atik Infinity camera but able to provide greater resolution and fine detail than the narrower field of the Atik Infinity camera.
4. A new solar filter from Lunt Solar was tested on the Skywatcher 4-inch refractor. The solar filter was for Calcium K light and could be used without external filters. It was tested with the ZWO ASI 183C camera. This filter can be quickly installed from an imaging set-up to take Calcium K light solar images. This will permit the 4-inch refractor to be permanently mounted and aligned

atop the Celestron C14 reflector telescope. PMO is the only public observatory in the Pacific Northwest providing solar imaging in white light, Hydrogen Alpha and Calcium K light.

5. The Lunt 100mm Hydrogen Alpha telescope was successfully tested on a loaned Celestron portable mount. This will likely be the configuration at PMO. It will allow imaging in white light on several telescopes from 9.25" to 14" with Hydrogen alpha imaging on the 100mm scope and Calcium K light imaging on the Skywatcher 4-inch simultaneously. PMO will be positioned to offer this array of solar observing found in few public observatories for school outreach, public outreach as well as for U.C.C. astronomy students.
6. The Celestron Skyris 278 camera was tested with a new spectral grating filter. Other cameras were tried but were not satisfactory in displaying high quality stellar spectra. After a steep learning curve and assistance from the manufacturer, the filter on the Skyris camera produced sharp stellar spectra of a variety of stars. This filter imaging system will provide a new ability to show how astronomers learn about stars in a graphic live manner.

Plans for 2022 at PMO

- With Covid-19 hopefully waning, work may be able to begin again at the observatory this spring/summer. Another quick alignment of the mounts is planned.
- The Skywatcher 4-inch refractor will be permanently mounted and aligned with the view from the C14 telescope permitting simultaneous close-up and wide field views of the same targets.
- The Lunt solar telescope will be tested for placement and operation at the observatory with the loaner Celestron mount. Tests will be conducted to operate white light, Hydrogen Alpha and Calcium K wavelength light simultaneously for online and local viewing.
- The loaner portable Celestron mount will be tested with a loaner 4-inch refractor scope for observing portions of the night sky obstructed by the trees and observatory permitting imaging of young crescent moons, planets in the west southwest and other transitory targets.
- Work will proceed using the subscription to SLOOH funded by the observatory to provide more reliable and unique daytime imaging of the Solar System and Deep space objects for local school online outreach. Outreach testing will occur in late February and into early March 2022.
- On conclusion of the testing several astronomy program modules will be available to offer to schools (grades 3-12) combining live images from SLOOH telescopes in the Canary Islands. Students of GS 107 summer class will be able to use SLOOH telescopes to explore the southern as well as the northern skies.
- Work will also resume on using an outdoor projector system to provide safe public observing programs later this spring and during the summer for U.C.C. astronomy GS 107 students.
- Also using the outdoor projector system, monthly public observing nights will be hosted in late spring into the early fall.