



# AU AstroNews

## The Newsletter of the Astronomical Unit

July 2018

Sponsored by the Santa Barbara Museum of Natural History



“Yeah. I see your concern. But I think that my maps will still show you how to get your space ship pretty close to Proxima Centauri.” Photo credit: Tom Totton.

### JULY GENERAL MEETING

Our scheduled speaker had to cancel for the July general meeting, so we will probably have a “question-and-answer” type meeting.

### OUTREACH SUMMARY

Since the last newsletter, AU volunteers Tim Crawford, Zak Dafaallah, Joe Doyle, John Edkins, Ruben Gutierrez, Art Harris, Baron Ron Herron, Sean Kelly, Ken Kihlstrom, Pat & Chuck McPartlin, Janet & Martin Meza, Bruce Murdock, Max Neufeldt, Edgar Ocampo, Javier Rivera, Peggy O’Rork, Dianne & Russell Ruiz, Tobias Schmidt, Tom Totton, Tom Whittemore, and Jerry Wilson showed cool astronomy stuff to 635 visitors.

### OUTREACH FOR JULY

The Telescope Workshop meets on Tuesday evenings at 7:30 PM at the Broder Building at SBMNH. Contact Tim Crawford at [tcrawf3@cox.net](mailto:tcrawf3@cox.net) for information.

Listen to the AU on the radio at KZSB 1290 AM at 9 AM on the second and fourth Monday of each month.

Here are the AU events scheduled so far for July. Events are subject to change, so to get the latest information on schedules, or directions, just contact Chuck at 964-8201 or [macpuzl@west.net](mailto:macpuzl@west.net)

### WEDNESDAY, JULY 4, SETUP 8 PM

Telescopes for Refugio State Beach, in the SW corner of their day use parking lot.

### FRIDAY, JULY 6, 7 PM

AU monthly meeting in Farrand Hall at SBMNH. Astronomy Q & A

### SATURDAY, JULY 7, SETUP 8 PM

Slide show and telescopes for campers at Cachuma Lake Campground. We set up on the grassy field at Dakota Plains.

### WEDNESDAY, JULY 11, SETUP 8 PM

Slide show and scopes for Carpinteria State Beach. We set up on the sidewalk toward the ocean from the entry kiosk.

### FRIDAY, JULY 13, SETUP 8 PM

Telescopes for Refugio State Beach, in the SW corner of their day use parking lot.

### SATURDAY, JULY 14, 6 PM

Planning meeting in the classroom next to Javier's office at SBMNH. Come plan your club's activities. All are welcome.

### SATURDAY, JULY 14, 8 PM

Monthly Public Star Party, next to Palmer Observatory at SBMNH

### TUESDAY, JULY 17, SETUP 7 PM

Telescope Tuesday at the Camino Real Marketplace in Goleta. We set up in the plaza by the theater.

### WEDNESDAY, JULY 18, SETUP 8 PM

Telescopes for Dunn School, up in the Santa Ynez Valley at 2555 CA-154 in Los Olivos, near the intersection with Santa Ynez Street. We'll set up on their soccer field.

### FRIDAY, JULY 20, 8 PM

Monthly Public Telescope Night at Westmont College, at their observatory, next to the baseball field. The big scope is still awaiting repair.

### SATURDAY, JULY 21, SETUP 8 PM

Slide show and telescopes for campers at Cachuma Lake Campground. We set up on the grassy field at Dakota Plains.

### WEDNESDAY, JULY 25, SETUP 8 PM

Slide show and scopes for Carpinteria State Beach. We set up on the sidewalk toward the ocean from the entry kiosk.

### FRIDAY, JULY 27, SETUP 8 PM

Telescopes for Refugio State Beach, in the SW corner of their day use parking lot.

### SATURDAY, JULY 28, SETUP 8 PM

Slide show and telescopes for campers at Cachuma Lake Campground. We set up on the grassy field at Dakota Plains.



## SBAU ANNUAL FIELD TRIP

This year's annual field trip is just around the corner! We will be going by charter bus to the California Science Center on Tuesday, August 14th. We will leave promptly at 8 AM from the Santa Barbara Museum of Natural History, so make sure you come early. You can park in the museum's parking lot, but please use the spaces toward the back. We will return to Santa Barbara at 6 PM. The cost is only \$25, which includes entry into the Endeavour Space Shuttle Exhibit. There are many other incredible exhibits at the Center that are free, as well as food you can purchase. You may also bring your own food. You can send your check payable to the SBMNH, with notation that it's for

the SBAU field trip to the SBMNH, 2559 Puesta Del Sol Rd., SB, CA, 93105-2988. Please keep in mind that AU members have priority reservations until July 24th, at which time the trip will be opened to the museum membership.

## The James Webb Telescope

Jerry Wilson

The James Webb telescope has slipped its launch date to no earlier than March of 2021. The telescope is in the final stage of preparation called "integration and test." Each component is complete and tested, but now it's being put together and tested as a whole, and some problems are showing up that require more time and money. For one, the multilayer heat shield has torn itself in a test deployment.

When launched, the scope will be stationed in the Earth's number 2 Lagrange point (L2), over a million miles farther from the Sun than the Earth. At L2 it will orbit the Sun, not the Earth, and will always see the dark side of our planet.

The mission is to view the earliest galaxies, which are so far away their light is red-shifted into the infrared. The infrared bands the JWST uses are described as Near IR and Mid IR. This description is a bit misleading. Infrared bands are conventionally labeled by the wavelength regions that our atmosphere transmits. These bands are: visible, from 0.3 to 0.7 microns; near IR (NIR) from 0.7 to 1.0 microns; short wave IR (SWIR) from 1.0 to 2.5; mid wave IR (MWIR) from 3.0 to 5.0; long wave IR (LWIR) from 8.0 to 14; and anything beyond is Far IR.

Of course, atmospheric transmission and its nomenclature are not useful for JWST instruments. They use two very wide spectral bands, NIR and Mid IR, based on the photo sensitive material used. JWST NIR is from 0.6 to 5 microns, and uses HgCdTe as its IR absorber. Mid IR is from 5 to 28 microns, and uses Arsenic doped Silicon Impurity Band Conductor devices (As:Si IBC) as its absorber. These materials are semiconductors with an energy gap tuned to the longest wavelength in that band. The smaller the energy gap, the longer the wavelength that can be seen. Since heat can also cause electrons to be excited across these small energy gaps, just like weak IR photons, the heat

must be removed. Hence the whole telescope must be cooled to less than 50 Kelvin. But not too much below since conduction electrons begin to freeze out of Si around 35 K.



“Peek-a-boo!” Photo credit: T. Totton



“An alien walks into a bar....” Photo credit: T. Totton



Setting up for Foucault testing at the mirror-making workshop. Photo credit: Tom Totton.

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### AU annual membership rates:

Single = \$20 Family = \$25

### AU mailing address:

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**On the Web:** <http://www.sbau.org>

# The Astronomical Unit

c/o Santa Barbara Museum of Natural History

2559 Puesta Del Sol Road

Santa Barbara, CA 93105-2998

July 2018						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3	4 REFUGIO STATE BEACH 8PM	5	6 GENERAL MEETING 7PM	7 CACHUMA LAKE CAMPGROUND 8PM
8	9 TECH TALK KZSB (AM 1290) 9-10 AM	10	11 CARPINTERIA STATE BEACH 8PM	12	13 REFUGIO STATE BEACH 8PM	14 PLANNING MEETING 6 PM STAR PARTY 8 PM SBMNH
15	16	17 CAMINO REAL MARKETPLACE 7 PM	18 DUNN SCHOOL 8PM	19	20 WESTMONT COLLEGE 8PM	21 CACHUMA LAKE CAMPGROUND 8PM
22	23 TECH TALK KZSB (AM 1290) 9-10 AM	24	25 CARPINTERIA STATE BEACH 8PM	26	27 REFUGIO STATE BEACH 8PM	28 CACHUMA LAKE CAMPGROUND 8PM
29	30	31				

