ORION Trapezium

July 2018 Volume 45, Issue 7

Who are we?

ORION was founded in April 1974, by a group of scientists at the United States Department of Energy facilities in Oak Ridge, Tennessee. Our original goal was to perform correlated, instrumented observations of atmospheric and astrophysical phenomena. Since then, we have expanded in many directions, including optical and radio astronomy and instrument design. Have a look at https://orioninc.org and https://orionastronomy.wordpress.com/meetings/upcoming-meetings/

What's Inside

Future Events

ORION Meeting

Wednesday, July 18
7:15PM
Goff Health Sciences & Technology Bldg., Room 104
Roane State Community College
Oak Ridge

TAO Public Stargazes

Saturday, July 7, 2018
Saturday, July 21, 2018
Roane State Community College
Tamke-Allan Observatory (TAO)
7:30 pm to 12:00 am
8:00 pm program
Look at
http://www.roanestate.edu/obs/

TAO Notes

ORION people are invited to arrive early (if announced on email) to prepare for evening viewing. Bring a telescope, red flashlight and munchies.
First time visitors – drive out before dark. Map available at www.roanestate.edu/obs.visit.htm

July 2018 Meeting

Wednesday, July 18, 7:15 PM, Goff Health Sciences and Technology Building, Room 104, Roane State Community College, Oak Ridge

Presentation: "Superconducting Magnets and their Applications"

Speaker: Adam Berryhill

Adam is a graduate of the University of Tennessee Physics department where he was the James and Barbara Marable Outstanding Senior in Physics. While there he studied under Dr. Norbert Thonnard and worked at the Institute for Rare Isotope Measurements. Upon graduation he was recruited to work for then EG&G ORTEC, now Ametek ORTEC, where he was part of the detector R&D group building detectors for Nuclear Spin Spectroscopy. During this time he returned to UT to pursue a Masters in Physics and Material Science however he returned to industry to design residual gas analysers and systems for Vacuum Technology Incorporated before arriving at Cryomagnetics Incorporated where he is now the Director of Engineering. Adam has spent the last 15 years designing and building superconducting magnet and cryogenics systems for various industries including accelerators, academia, military, and medical devices. Adam has been married to his lovely wife Tristy for 21 years and has two beautiful daughters MacKenna and Madelyn.

Abstract;

Superconducting magnets are found at the frontiers of most physics research, medical advances, and space exploration scenarios. Most superconducting magnets require cooling, thus the term “cryomagnets” is often applied. The basics of superconductivity will be introduced. Mechanical and cryogenic design of cryogen-free magnet systems for gyrotrons, ion cyclotron resonance, nuclear magnetic resonance, and laboratory superconducting magnets will be discussed. Advances in superconducting cyclotron hardware and in proton therapy magnets will be presented.

June 2018 Meeting

Wednesday, June 20, 7 PM, Goff Health Sciences and Technology Building, Room 104, Roane State Community College, Oak Ridge

Presentation: Extended Space Charge Theory in Electrically Stressed Dielectric Liquids

Speaker: John C. Mannone

Thanks to John for an interesting program. He received a thanks from the group, and a coveted ORION cup from VP David Fields.

ORION stargazes at Tamke-Allan Observatory

David Fields

Tamke-Allan Observatory (TAO) is an important astronomy facility in East Tennessee. Located on a remote hilltop and operated by Roane State Community College, TAO offers classes, public stargazes, and special astronomy events. Astronomy is a gateway to the sciences. Through astronomy, we recognize the relevance of biology and the necessity of physics and chemistry for understanding our place in the universe. Our universe offers our galaxy – the Milky Way – deep sky wonders in diffuse glow, jeweled clusters of stars, magnified glimpses of distant planets and their star-like moons, lunar craters, and elusive comets.

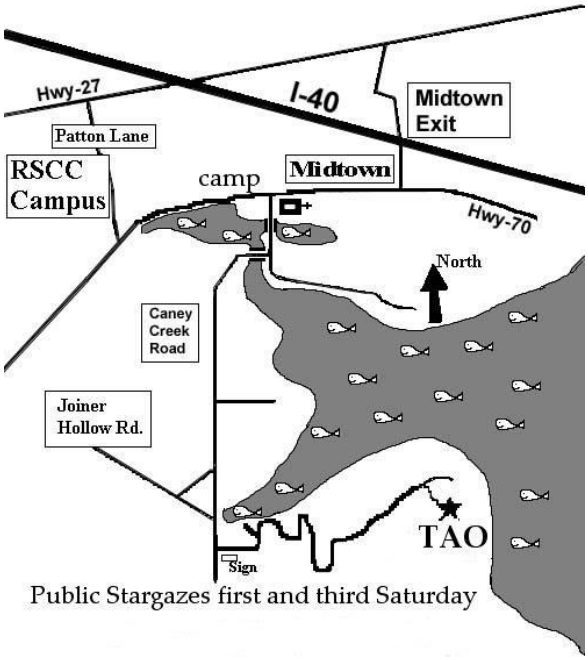
TAO has several telescopes, but two are especially useful. The favorite optical telescope for planetary viewing is our 8-foot refractor telescope, which offers an 8-inch diameter objective lens. Students and visitors enjoy this excellent telescope, which is housed in our large dome. A more impressive instrument—from the perspective of research and photography—is our 12-inch reflector telescope, a donation in honor or Marcus Morrow. It is computer controlled and offers spectacular vistas of more distant objects. Both telescopes routinely observe objects via light that is millions of years old.

TAO also has several radio telescopes that use radio waves to map and study our universe.

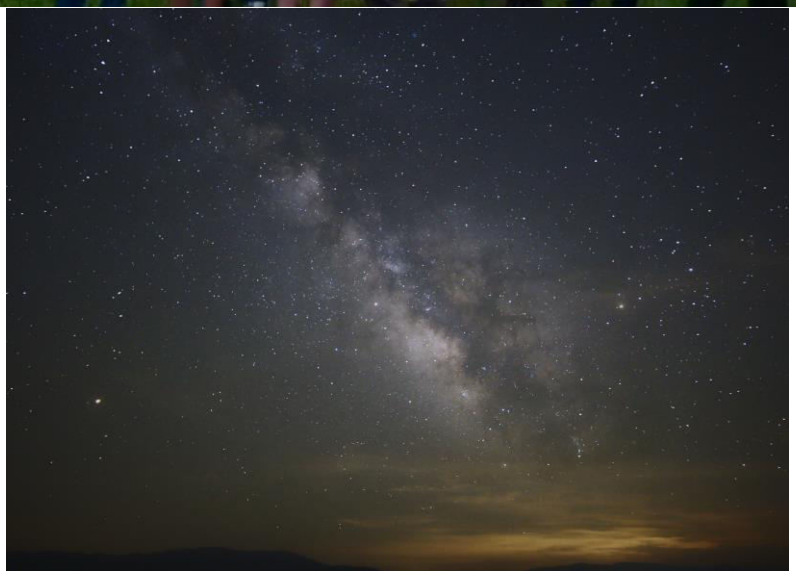
Tamke-Allan Observatory is an educational and research facility that supports the educational community in several important ways:

- The Observatory **supports college courses** in astronomy.
- **ORION Public Stargazes** are offered with no admission charge, at 7:30 PM on the 1st and 3rd Saturdays of each month. A lecture on astronomy and evening skies is offered at 8:00 PM. **Amateur astronomers** are invited to share their equipment and knowledge. Observing begins at dark at our public stargazes --bring binoculars, telescopes, red-light flashlights, cameras and cookies. If you'd like to bring a group to a stargaze, please check with the TAO Director, Dr. David Fields, at 865-927-5155.
- **Special events** are associated with significant astronomical events (eclipses, transits, and comets) and astronomy-related cultural events.
- TAO works with the Roane County community to actively **reduce unwanted illumination** from street lamps, car headlights and lighted signs. Because of their wasted skylight, our night skies are becoming less accessible. Only when we find an isolated mountain, such as the one on which the TAO is located, can we rediscover our astronomical heritage.

TAO is located 4 miles south of the Roane County Main Campus on a remote hilltop. From I-40 traveling west, take the Midtown exit (exit 350). Turn left off the exit ramp and go south 0.2 mile to US Hwy. 70. Turn right on US 70 and go 3.25 miles to Caney Creek Road (beside the church), just before Roane County Park. Turn left onto Caney Creek Road, then go 1 mile south and turn right across the bridge. Go 2 miles and continue straight through the 'Y' at Joiner Hollow Rd. Continue 1000 feet, turning left at the blacktop road at the Observatory sign. Follow the road up the hill for 0.9 miles to the observatory, coordinates 35.84 N and 84.37W.



For more information, please check our web sites, at http://www.roanestate.edu/obs and http://www.roanestate.edu/TAO or check our local ORION astronomy club website, at http://orioninc.org Photos from July 7.

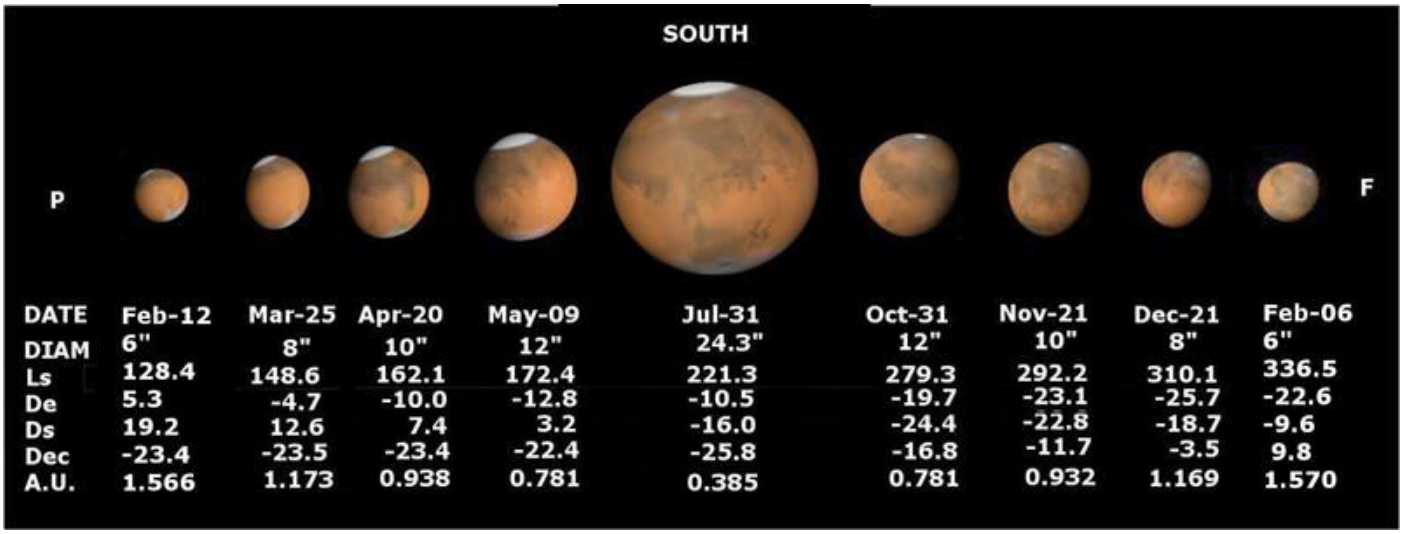


Do not miss Mars in July!

David Fields

That is, unless we have dust in the sky.

The angular size of Mars in the sky will be the best since 2003, which was the best viewing (as to angular size) in 60,000 years. Usually our Tennessee skies (lots of water in the TAO skies) are the limiting factor, but this year it's Mars' skies that are the limiting factor, since Mars is immersed in a global dust storm. If the dust clears, then the best viewing should be July 31:



DATE	Feb-12	Mar-25	Apr-20	May-09	Jul-31	Oct-31	Nov-21	Dec-21	Feb-06
DIAM	6"	8"	10"	12"	24.3"	12"	10"	8"	6"
Ls	128.4	148.6	162.1	172.4	221.3	279.3	292.2	310.1	336.5
De	5.3	-4.7	-10.0	-12.8	-10.5	-19.7	-23.1	-25.7	-22.6
Ds	19.2	12.6	7.4	3.2	-16.0	-24.4	-22.8	-18.7	-9.6
Dec	-23.4	-23.5	-23.4	-22.4	-25.8	-16.8	-11.7	-3.5	9.8
A.U.	1.566	1.173	0.938	0.781	0.385	0.781	0.932	1.169	1.570

An angular size of 24.3" is about half the angular size of Jupiter these days! Anyway, please have a look at the fine article here, where I found an excellent summary Mars information:

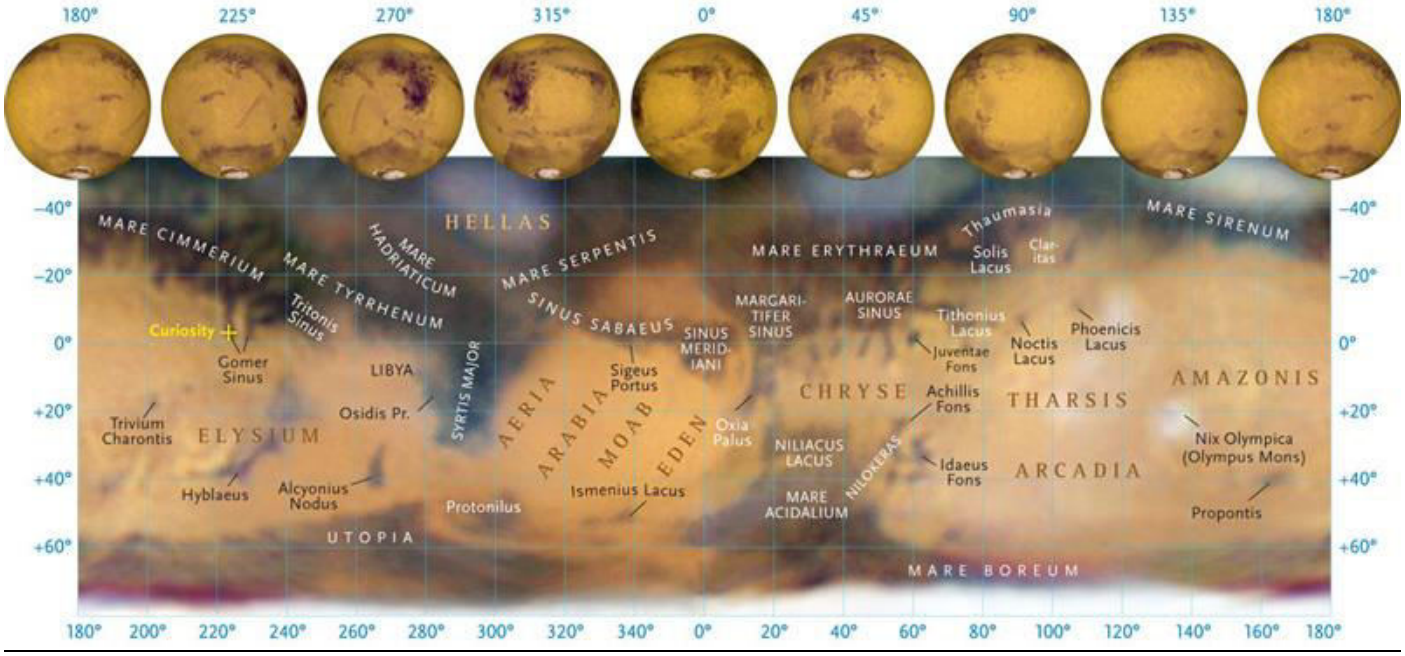
https://cosmicpursuits.com/2183/how-to-see-mars-in-2018/

Viewing from TAO: TAO has several telescopes that provide good resolution -- the 8" refractor, the 12" Meade, and DR's Dobsonian scope, should all give good views. Planetary imaging is challenging, since the angular size of the planets is much smaller than many of the deep sky objects.

Radio astronomy: Mars emits some radio energy, but not nearly as much as Jupiter, and I don't know of anyone who has detected Mars radio emissions with small radio telescopes.

Use of optical filters: Adding filters to the optical chain (usually the eyepiece) can enhance contrast. The best choice is probably a red filter, which will darken the more blue regions. The red will also help cut the TAO hazy skies, block some light pollution, and help slightly with the occasional Mars light clouds.

Identification of features: This map should help. South is up.



Take a photo and share it: Drew Bolce is getting up to speed with our TAO ccd camera. If the skies are clear July 21st (Saturday) maybe we can get a look at Hellas basin! Meanwhile, if the dust clears on Mars and you get a good view, take a photo!

More About ORION

ORION is an amateur science and astronomy club centered in Oak Ridge, TN that was founded in April 1974 by a group of scientists at the United States Department of Energy facility in Oak Ridge, Tennessee. We serve Oak Ridge, Knoxville, and the counties of Anderson, Knox, and Roane.

ORION's mission is to support science research, teaching, and amateur astronomy in East Tennessee, and therefore we are closely associated with and support TAO by volunteering to host their public events, share our knowledge of the skies with a variety of telescopes, and help provide intellectually stimulating programs at the observatory. ORION works to share the wonders of the cosmos and the culture of science to people from all walks of life.

Members are scientists, engineers, technicians, and others with varied talents and expertise. Over half have telescopes, many are amateur radio operators, and some have a technical interest in astrophotography.

ORION has working relationships with several organizations, including museums and amateur astronomy groups.

Membership is open to individuals who will actively contribute their time and ideas. Our annual membership dues are $20.00 and student discounts are available.

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