

Public Outreach Guide

Great Lakes Association Of Astronomy Clubs
2019 Astronomy At The Beach, Sep. 13-14

Welcome Astronomers!

Every year for Astronomy At The Beach, amateur astronomers come from all over Southeast Michigan to set up their equipment and share the night sky with the public. The event planning is a collaborative effort, involving all the local astronomy clubs, and it hosts more than 5000 people and 50+ telescopes.



Event Guidelines

- Arrive to set up before 7:30 PM. No cars will be allowed to drive onto the beach. The Department of Natural Resources (DNR) staff will provide carts and assistance between 5:30PM and 7:30PM, to move your equipment from the Drop-Off Zone to the Telescope Area.
- **No cars will be allowed in the observing area.**
- Astronomers with very large scopes or limited mobility are encouraged to set up near the parking lot, in the area designated in blue on the site map.
- Use the gated access road at the far left of the parking lot to park your car.
- Leaving before Midnight: If you plan to leave before midnight you will have to carry your equipment back to your car. When the event ends the DNR staff will again be available to move your equipment back to the parking area.

Event Guidelines (Cont'd)

- Electrical Power for Telescopes: The only source of electricity for astronomers is a single 15A circuit at the Boathouse, at the west end of the beach. Please limit the use of laptops and dew heaters, or else you will trip the circuit breaker. Six plug-ins will be allowed; bring your own extension cord.
- **DO NOT drive any stakes into the ground, without first requesting permission from the DNR**
- There will be a food vendor at this event and free coffee will also be provided, while supplies last
- In response to public comments, we're doing our best to update AatB. This year, we are moving the 20-minute presentations to the smaller Presentation Tent, and the clubs, vendors, and demonstrators to the larger Expo Tent. There will be no keynote speaker this year, and therefore no Volunteers' Talk on Saturday afternoon.

Scavenger Hunt

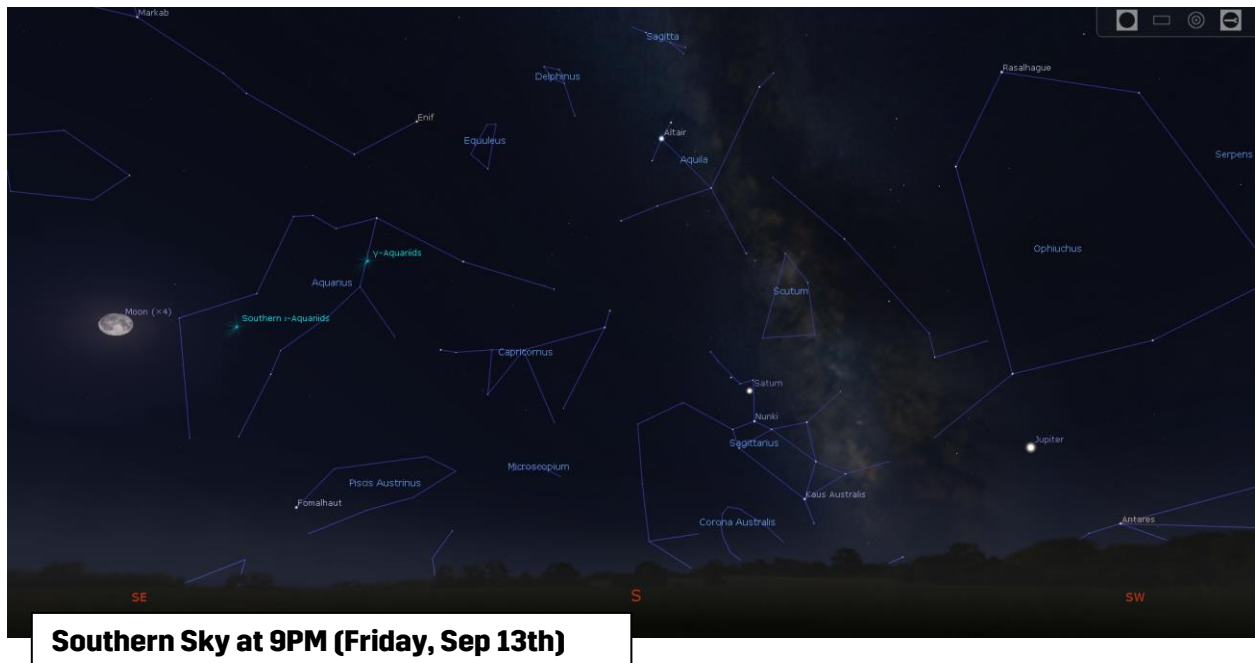
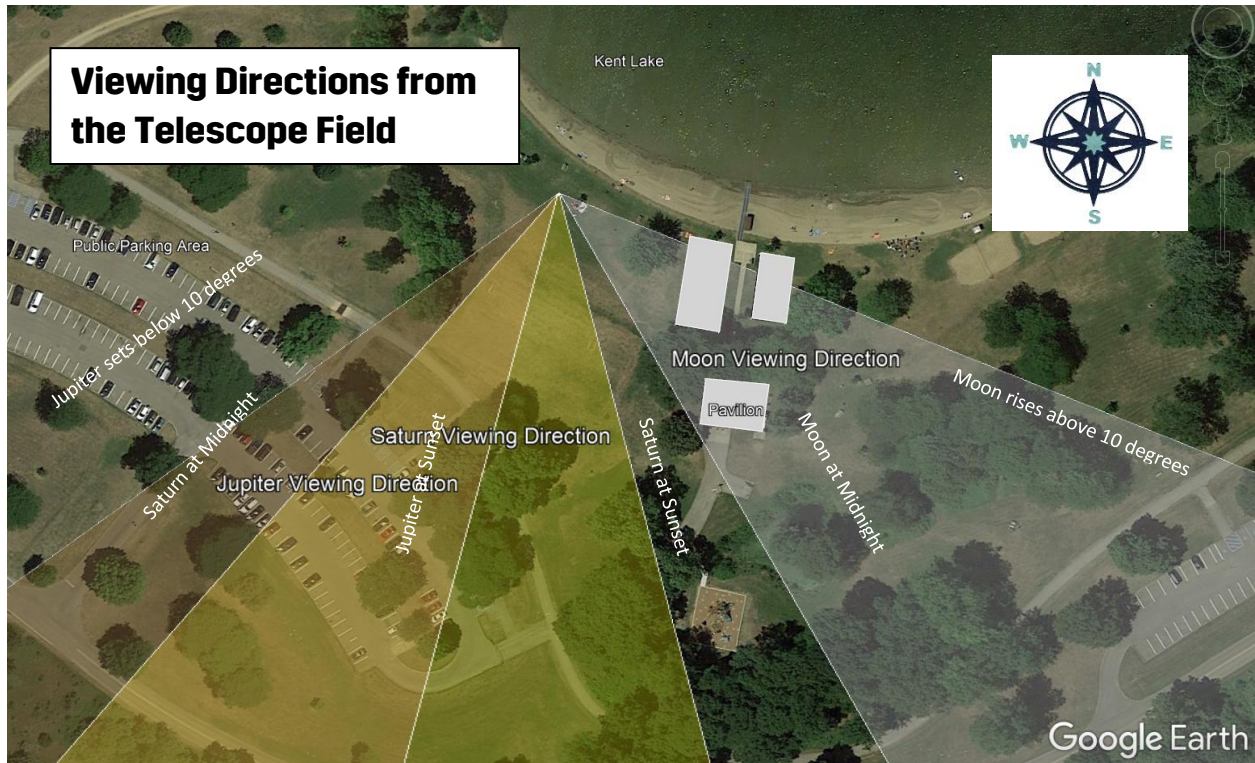
Some visitors will be given a scavenger hunt paper to complete for prizes. Some examples of scavenger hunt items that require a telescope are "Crater on the Moon" or "the Rings of Saturn." To receive credit for their finds, visitors will need astronomers to mark their scavenger hunt sheet in the appropriate square. Please support the scavenger hunt by keeping a pen handy to initial the form. Alternatively, you could also bring a pack of tiny stickers (e.g. gold stars) to attach to the form.

Tips for Successful Public Outreach

- Be prepared for long lines. It is not uncommon at this event to have lines of more than 20 people waiting to look through your scope.
- Don't assume your audience knows about the universe. For example, many people don't know the difference between Saturn and Jupiter, or the cause of Moon phases.
- Make an effort to communicate with other astronomers around you and be aware of what they are viewing. For example, when people are done looking at your object, you could say, "If you haven't seen Saturn yet, you should go visit Tony's scope over there."
- Memorize some fun facts about the objects you plan to observe and be prepared to answer questions about your equipment. Some fun facts and suggestions are listed below.
- A common question is "How much magnification is this?". Be prepared to answer for your setup:
Magnification = Telescope Focal Length / Eyepiece Focal Length
- Public feedback from previous events indicates that people are often frustrated by waiting in line to see the same object over and over. This year, we are encouraging clubs and individuals to communicate the target object (e.g. Saturn, the Moon, M57...) to visitors. For example, one might:
 - Attach a sign to a table or chair, lit by a dim red light (NO bright/white lights).
 - Announce the object to the visitors regularly or have a friend/volunteer to walk along the line and tell everyone what they are waiting to see.
- Don't get stuck at the scope for 4 hours! Arrange to have a friend or volunteer to relieve you for restroom/coffee breaks.

Sky Guide – September 13-14, 2019

This section contains sky maps and celestial objects of interest, along with fun facts and recommended viewing locations and times. All viewing times are calculated for the observing site in Island Lake State Park on the event date and times are listed in Eastern Daylight Time (GMT -4).



Recommended Target Objects:

The Sun – Before 6:45 PM

Solar Observing is encouraged at AatB and the program states that solar scopes will be marked with a yellow balloon. If you plan to share your solar observing with the public, please follow safe solar observing practices, and you may obtain a yellow balloon from the GLAAC organizers on the day of the event.

Sunset:	7:45 PM
Civil Twilight:	8:14 PM
Nautical Twilight:	8:47 PM
Astronomical Twilight:	9:22 PM

The Moon – 9:15 PM to midnight

Although the full phase is not the best time to view the moon, it will definitely be a favorite for the public and many scopes will be pointing at it. Scopes close to the beach on the west end of the observing area, will be the first to catch a glimpse.

Moon Fun Facts:

Diameter: 1.079 miles (27% of Earth's diameter)
Orbital period: 29.5 days (synodic), 27.3 days (sidereal)
Orbital tilt: 5.14° relative to the ecliptic plane
Apparent Magnitude: -12 (total), -5 (surface brightness)
Surface temperature: 225°F during the day to -243°F at night.
Distance from Earth (tonight): 250,000 miles

Jupiter – 8:00 PM to 10:20 PM

The first object of the night to appear, Jupiter will be well placed for viewing early in the evening, for those on the east end of the observing field. After 10PM, most of the field will start to lose this object behind the trees. If the seeing conditions are agreeable, the Great Red Spot should be visible on Saturday, from twilight to 11 PM (the red spot will not be visible on Friday).

Jupiter Fun Facts:

Diameter: 87,000 miles (11 Earth diameters)
Apparent Magnitude: -1.8, including atmospheric effects
Has at least 79 moons. The 4 largest moons are Io, Europa, Ganymede, and Callisto
The largest moon, Ganymede, has a larger diameter than the planet Mercury
You could fit 1000 Earths inside of Jupiter!
Composition: 90% Hydrogen, 10% Helium
Day Length: 9.9 hours
Orbits the Sun every 11.9 years
Distance from Earth (tonight): 489 million miles away (488 on Friday, 490 on Saturday)

Saturn – 8:00 PM to Midnight

Very popular with the public, Saturn will be a prime viewing location for most of the observing field throughout the night.

Saturn Fun Facts:

Diameter: 37,000 miles (4.7 Earth diameters)

Composition: 97% hydrogen, 3% helium

Apparent Magnitude: 0.4, including atmospheric effects

The rings of Saturn extend more than 50,000 miles from the planet, but they are less than 100 feet thick!

Saturn has at least 62 moons. The largest moon, Titan is easily visible to most telescopes, at magnitude 9

Distance from Earth (tonight): 894 million miles (893 on Friday, 895 on Saturday)

Deep Sky and Other

Although the full moon will make it impossible to enjoy many deep sky objects, some of the brightest will still be visible. You may want to attempt some of those listed below.

Star Clusters:

- [M23](#) – a large open star cluster, located in Sagittarius
- [M25](#) – another large open star cluster in Sagittarius
- [M29](#) – an open cluster, located in the constellation Cygnus
- [NGC 869/884](#) – The Double Cluster, two large open clusters, located in Perseus
- [NGC457](#) – The Owl Cluster, an open cluster in Cassiopeia, said to look like E.T.

Globular Clusters:

- [M13](#) – The Great Cluster in Hercules, a very popular globular cluster

Binary Stars:

- [95 Herculis](#) – a pair of 5th magnitude giants, separated by 6.3 seconds of arc
- [Epsilon Lyrae](#) – The “Double Double”, a four star system with two close binaries
- [Albireo](#) – in Cygnus, great target for UofM fans, the binary colors are blue and gold!
- [Almach](#) – another binary pair with blue and gold colors, in Andromeda

Bright Nebulae:

- [NGC 6826](#) – “Blinking Planetary” in Cygnus, appears to blink when averting vision
- [M76](#) – The Little Dumbbell Nebula, a planetary nebula located in Perseus.
- [M57 \(Ring Nebula\)](#) – Ring Nebula, the remains of a supernova in Lyra

Bright Galaxies:

- [M31](#) – Andromeda Galaxy, a close neighboring galaxy, 2.5 million light years away
- [M81/M82](#) – A pair of galaxies, only 30 arc-minutes apart, in Ursa Major