

# The Focal Point

The Atlanta Astronomy Club  
Established 1947  
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Editor: Tom Faber

## Table of Contents

- Page 1...** Dec AAC & CE Mtgs, Fernbank Virtual Programs  
**Page 2...** The “Great Conjunction” of 2020 Images by Tom Faber  
**Page 3...** Conjunction photos continued.  
**Page 4...** Conjunction by Dan Llewellyn; Moon & Mercury Image  
**Page 5...** M35 and NGC 2158 by Richard Jakiel, Old Supernova  
**Page 6...** IC 342 by Richard Jakiel  
**Page 7...** AAC Online, Memberships, Contact Info  
**Page 8...** Calendar, AAC List Serv Info, Focal Point Deadline

## January AAC Meeting Cancelled

There will be no January meeting of the Atlanta Astronomy Club due to the ongoing COVID-19 pandemic and the requirements to limit group gatherings to prevent further spread of the disease. While we are not able to hold our monthly meetings right now, please continue to follow AAC on its web page and Facebook page for updates until we are able to have our regular meetings again.

In the mean time, you are encouraged to attend the Charlie Elliott Astronomy observing events when they are held. See the article to the right for details for their next one.



## Fernbank Science Center's Planetarium At Home Programs

While we have been unable to have in-person AAC meetings at the Fernbank Science Center for a while now, our host, Fernbank Science Center's planetary geologist Scott Harris, has been having a series of virtual programs about astronomy and planetary sciences on Fernbank's Facebook page. Recent programs have been about the Pluto system and the findings of the New Horizons mission, and the upcoming launch of the James Webb Space Telescope. For more information about Scott's upcoming programs check out Fernbank's Facebook page here: <https://www.facebook.com/fernbankcenter>

## Charlie Elliott Chapter Meetings

With the Covid pandemic still with us in a major way, we will have — weather permitting — another informal observing event the following evening, January 16, at the Jon Wood Astronomy Field (which is on the right, shortly after turning onto Elliott Trail from Marben Farm Rd). As always, this event is free.

Note that the Elliott Trail automatic road gate closes for incoming traffic at 5 p.m. Afterwards, a four-digit combination must be entered on a keypad near the gate for it to open. That combination is available only to dues-paying Club members. Therefore, non-Club members planning to join us on the observing field should enter the park before 5 p.m. Club members who may arrive after 5 p.m. and do not have the gate combination should contact a club officer at least 24 hours prior to their visit to obtain the gate combination.

The gate opens automatically for exiting traffic as you approach it to leave no matter what time it is.

According to the Sky Safari astronomy app, sunset at our location near Mansfield, Georgia, will be at 5:51 p.m., so those with scopes and related equipment to set up should plan on an earlier arrival. In consideration of any astro-imagers, astronomical dusk ends at 7:18 p.m.

Please check out our Facebook Page at <https://www.facebook.com/groups/ceastronomy>. There you'll find a welcoming group of people sharing ideas and tips as well as organizing ad-hoc observing and imaging sessions on the Jon Wood Astronomy Field.

For those not familiar with the Charlie Elliott Wildlife Center, go to <https://georgiawildlife.com/charlie-elliott-wildlife-center>

The CEWC phone is 770-784-3059, Monday - Saturday 9 a.m. – 4:30 p.m.

## Covid Requirements

**IMPORTANT!** Face masks are required and we remind all attendees that the CDC's 6-foot social distancing requirement remains in effect. Note also that NO refreshments will be served, so bring your own.

## Workshops

If you have an idea for a 15 to 20-minute pre-meeting presentation about something you've learned or a project you're working on, contact Steve Siedentop or Ken Poshedly.

## Our Monthly Meetings and Public Observing Nights

The status of in-person meetings will be announced monthly as the COVID situation changes. Visit the “Our Calendar” tab at the top of the page for our 2020-2021 meeting, observing, and outreach schedule. Start times vary throughout the year so please check back for details.



## The Great Conjunction of 2020

About once every 20 years Jupiter overtakes Saturn during their endless circuits around the sun. This rare event is referred to as a “Great Conjunction”. But sometimes more than 20 years passes between easily visible events. The previous great conjunction, on May 31, 2000, occurred when the planets were only about 12-degrees from the sun and were only visible in bright twilight when at their closest. The great conjunction before that one, in 1981, was an even rarer “Triple Conjunction”. Jupiter and Saturn had conjunctions in right ascension on January 14, February 19, and July 30 of that year. But at each of these conjunction the two planets were over 1 degree apart, as were they during the May 2000 conjunction.

However, the great conjunction of December 21, 2020 was noteworthy because Jupiter and Saturn were as close as only 0.1 degree apart at their closest - about 1/5 the apparent diameter of the moon. This was their closest approach since 1623, 14 years after Galileo first turned his telescope to the skies. But again, that great conjunction occurred when the planets were only about 15 degrees from the Sun, so it was only visible in bright twilight. The last time such a close great conjunction occurred with the planets in dark skies was in the year 1226!

The next great conjunction will be on November 5, 2040, but during this one once again the two planets will be over 1 degree apart at their closest approach. It won't be until March 15, 2080 that they will again approach each other to within 0.1 degree.

Below and on the next page are some images of the event. Photos by Tom Faber unless noted otherwise.



Jupiter approaching Saturn. The above photos are from December 14, 2020, one week before their conjunction. Taken with a Canon EOS T5i on a tripod with a 18-135mm lens.



By the next clear night, December 17, crescent moon had passed the two planets. Taken with a Canon EOS T5i on a tripod with a 18-135mm lens.



On December 18, Jupiter is closer to Saturn, but the moon has moved farther away. Some high cirrus added some “atmospherics” to the scene. Taken with a Canon EOS T5i on a tripod with a 18-135mm lens.



The next clear night was the 21st, the night of the conjunction! Taken with a Canon EOS T5i on a tripod with a 18-135mm lens.



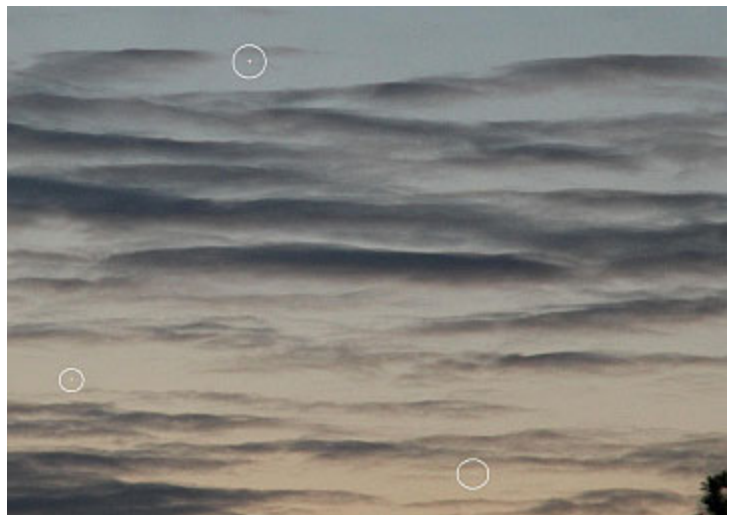
On the night of December 22 Jupiter has passed Saturn. Taken with a Canon EOS T5i on a tripod with a 18-135mm lens.



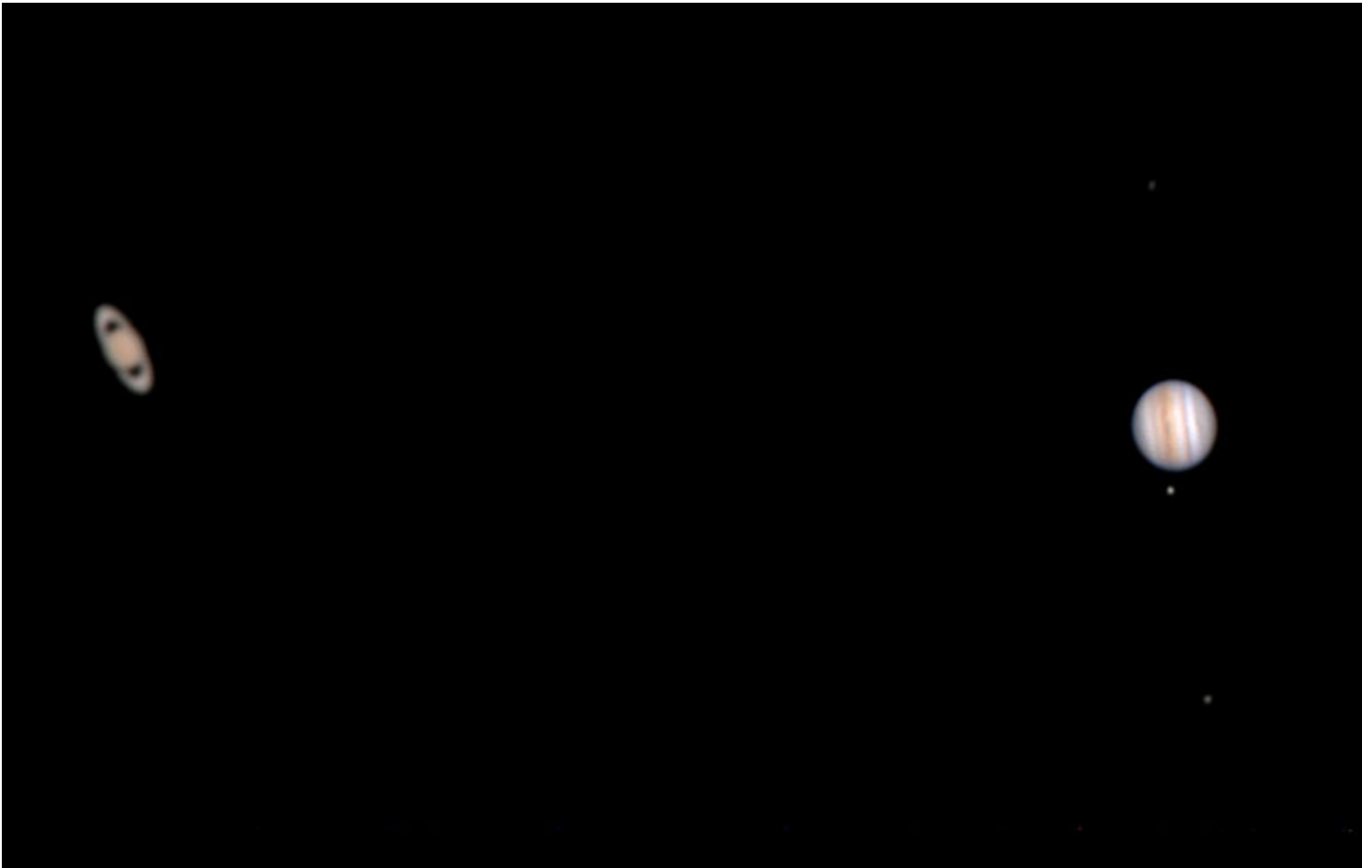
By December 25 their separation had increased more. Taken with a Canon EOS T5i on a tripod with a 18-135mm lens.



On December 29 Jupiter had moved well past Saturn. Taken with a Canon EOS T5i on a tripod with a 18-135mm lens.



By January 10, Mercury had joined the show as Jupiter continued to pull away from Saturn. Saturn was rapidly disappearing into the evening twilight heading to its conjunction with the sun on the 23rd. In this photo Jupiter is near the top, Mercury is in the lower left, and Saturn, barely visible, is in the lower right. Taken with a Canon EOS T5i on a tripod with a 18-135mm lens.



## The Great Conjunction by Dan Llewellyn

The Jupiter-Saturn Conjunction on December 21, 2020 from Deerlick. Seeing was bad, I'm glad I got this. I have more to go through, and the day before might turn out a bit sharper, but this is it for now. Taken on an Esprit 150 APO with a TMB 1.8 barlow.

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## Moon and Mercury by Tom Faber

By January 14, Saturn had disappeared into the evening twilight, and Jupiter was barely visible in bright twilight before sinking below the trees. But Mercury (lower right just above wires) had moved into the evening sky and was joined by a crescent moon approximately 42 hours past new moon. Taken with a Canon EOS T5i on a tripod with a 18-135mm lens.





## Open Clusters M35 and NGC 2158 by Richard Jakiel

The relatively close cluster M35 (left and center) and the much more distant NGC 2158 in the lower right. These clusters are in the constellation Gemini. Rich used a 6-inch RC telescope and a Canon XS. The image consists of 10 x 3 min subs. Imaged from the Suburbs. ISO 400.

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## Researchers Rewind the Clock to Calculate Age and Site of Supernova Blast

NASA/STScI News Release - January 14, 2021

Sometime during the third century, a brilliant burst of light from the explosion of a massive star was visible from Earth.

If the supernova blast had flashed over the northern hemisphere, it might have been considered an evil omen. At that time, Western Civilization was in upheaval. The Roman Empire was beginning to crumble. An emperor was assassinated, followed by political upheavals, civil wars, and barbarian attacks.

But the violent supernova death could only be seen in the southern skies. The blast occurred in the nearby satellite galaxy, the Small Magellanic Cloud. No record exists of the titanic event. However, like the smoke and ash drifting across the sky after an aerial fireworks blast, the supernova left behind a cloud of debris that is still rapidly expanding today. This cloud provides forensic evidence for astronomical detectives to retrace the explosion.

Astronomers sifting through Hubble observations of the supernova remnant, taken 10 years apart, have calculated the cloud's expansion rate. Analyzing the data was like rewinding a movie. The researchers traced the

path of all the debris flung from the explosion back to the point in space where the doomed star blew apart. Their analysis reveals that the light from the exploded star reached Earth 1,700 years ago.

The victim is a star that exploded long ago in the Small Magellanic Cloud, a satellite galaxy to our Milky Way. The doomed star left behind an expanding, gaseous corpse, a supernova remnant named 1E 0102.2-7219, which NASA's Einstein Observatory first discovered in X-rays. Like detectives, researchers sifted through archival images taken by Hubble, analyzing visible-light observations made 10 years apart.

The research team, led by John Banovetz and Danny Milisavljevic of Purdue University in West Lafayette, Indiana, measured the velocities of 45 tadpole-shaped, oxygen-rich clumps of ejecta flung by the supernova blast. Ionized oxygen is an excellent tracer because it glows brightest in visible light.

To calculate an accurate explosion age, the astronomers picked the 22 fastest moving ejecta clumps, or knots. The researchers determined that these targets were the least likely to have been slowed down by passage through interstellar material. They then traced the knots' motion backward until the ejecta coalesced at one point, identifying the explosion site. Once that was known, they could calculate how long it took the speedy knots to travel from the explosion center to their current location.

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## IC 342 by Richard Jakiel

Here's the spiral galaxy IC 342 in Camelopardalis. Seen through the outer reaches of the Milky Way, it is heavily obscured by dust and gas. Otherwise, it would be one of the brightest galaxies in the sky. It is a member of the IC 342/Maffei Group, which is the closest galaxy group to the Local Group. Rich made this image using an 11-inch RASA telescope at the 2016 Peach State Star Gaze.

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According to their estimate, light from the blast arrived at Earth 1,700 years ago, during the decline of the Roman Empire. However, the supernova would only have been visible to inhabitants of Earth's southern hemisphere. Unfortunately, there are no known records of this titanic event.

The researchers' results differ from previous observations of the supernova's blast site and age. Earlier studies, for example, arrived at explosion ages of 2,000 and 1,000 years ago. However, Banovetz and Milisavljevic say their analysis is more robust.

"A prior study compared images taken years apart with two different cameras on Hubble, the Wide Field Planetary Camera 2 and the Advanced Camera for Surveys (ACS)," Milisavljevic said. "But our study compares data taken with the same camera, the ACS, making the comparison much more robust; the knots were much easier to track using the same instrument. It's a testament to the longevity of Hubble that we could do such a clean comparison of images taken 10 years apart."

The astronomers also took advantage of the sharp ACS images in selecting which ejecta clumps to analyze. In prior studies, researchers averaged the speed of all of the gaseous debris to calculate an explosion age. However, the ACS data revealed regions where the ejecta slowed down because it was slamming into denser material shed by the star before it exploded as a supernova. Researchers didn't include those knots in the sample. They needed the ejecta that best reflected their original velocities from the explosion, using them to determine an accurate age estimate of the supernova blast.

Hubble also clocked the speed of a suspected neutron star—the crushed core of the doomed star—that was ejected from the blast. Based on their estimates, the neutron star must be moving at more than 2 million miles per hour from the center of the explosion to have arrived at its current position. The suspected neutron star was identified in observations with the European Southern Observatory's Very Large Telescope in Chile, in combination with data from NASA's Chandra X-ray Observatory.

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“That is pretty fast and at the extreme end of how fast we think a neutron star can be moving, even if it got a kick from the supernova explosion,” Banovetz said. “More recent investigations call into question whether the object is actually the surviving neutron star of the supernova explosion. It is potentially just a compact clump of supernova ejecta that has been lit up, and our results generally support this conclusion.”

So the hunt may still be on for the neutron star. “Our study doesn't solve the mystery, but it gives an estimate of the velocity for the candidate neutron star,” Banovetz said.

Banovetz will present the team's findings Jan. 14 at the American Astronomical Society's winter meeting.



*The stellar corpse, a supernova remnant named 1E 0102.2-7219, met its demise in the Small Magellanic Cloud, a satellite galaxy of our Milky Way.*

*The image shows ribbons of gaseous clumps speeding away from the explosion site at an average speed of 2 million miles per hour. At that velocity you could travel to the Moon and back in 15 minutes.*

*Because the gaseous knots are moving at different speeds and directions from the supernova explosion, those moving toward Earth are colored blue in this composition and the ones moving away are red.*

*Researchers plumbed the Hubble archive for visible-light images of the supernova remnant. They analyzed the data to calculate a more accurate estimate of the age and center of the supernova blast.*

*This image is a blend of exposures taken in 2014 by the Wide Field Camera 3.*

*Credits: NASA, ESA, STScI, and J. Banovetz and D. Milisavljevic (Purdue University)*

The **Atlanta Astronomy Club, Inc.**, one of the South's largest and oldest astronomical society, meets at **3:00 P.M.** on the 3rd Saturday of each month at the Fernbank Science Center in Decatur, or occasionally at other locations or times. Membership fees are **\$30** for a family or single person membership. College Students membership fee is **\$15**. These fees are for a one year membership.

Magazine subscriptions to *Sky & Telescope* or *Astronomy* can be purchased through the club for a reduced rate. The fees are **\$33** for Sky & Telescope and **\$34** for Astronomy. Renewal forms will be sent to you by the magazines. Send the renewal form along with your check to the Atlanta Astronomy Club treasurer.

**The Club address:** Atlanta Astronomy Club, Inc., P.O. Box 76155, Atlanta, GA 30358-1155. AAC Web Page: **http://www.AtlantaAstronomy.org**. Send suggestions, comments, or ideas about the website to [webmaster@AtlantaAstronomy.org](mailto:webmaster@AtlantaAstronomy.org). Also send information on upcoming observing events, meetings, and other events to the webmaster.

## Atlanta Astronomy Club Online

While this newsletter is the official information source for the Atlanta Astronomy Club, it is only up to date the day it is posted. So if you want more up to date information, go to our club's website. The website contains pictures, directions, membership applications, events, updates, and other information. <http://www.atlantaastronomy.org> You can also follow the AAC on Facebook by joining the AAC group, and on Twitter at <http://twitter.com/atlastro>.

### AAC Officers and Contacts

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## Calendar by Tom Faber (Times EDT/EST unless noted)

### AAC Events are listed in BOLD

- Jan 2nd, Saturday: Earth at Perihelion.
- Jan 3rd, Sunday: Quadrantids meteor shower peaks.
- Jan 4th, Monday: Latest Sunrise in Atlanta: ~7:42 AM. Quadrantid Meteor Shower Peak.
- Jan 5th, Tuesday: Moon Last Quarter.
- Jan 8th, Friday: Grouping of Mercury, Jupiter, and Saturn next few evenings (in twilight).
- Jan 13th, Wednesday: New Moon.
- Jan 20th, Wednesday: Moon First Quarter.
- Jan 23rd, Saturday: Mercury Greatest Elongation east. Saturn Conjunction with Sun.
- Jan 28th, Thursday: Full Moon. Jupiter Conjunction with Sun.
- Feb 4th, Thursday: Moon Last Quarter.
- Feb 6th, Saturday: **CE Observing night 6PM - tentative.**
- Feb 8th, Monday: Mercury conjunction with Sun.
- Feb 11th, Thursday: New Moon.
- Feb 14th, Sunday: Grouping of Mercury, Jupiter, and Saturn morning.
- Feb 18th, Thursday: Moon near Mars.
- Feb 19th, Friday: Moon First Quarter.
- Feb 25th, Thursday: Grouping of Mercury, Jupiter, and Saturn morning.
- Feb 27th, Saturday: Full Moon.
- Mar 5th, Friday: Moon Last Quarter.
- Mar 13th, Saturday: New Moon. **CE Observing night 6:30PM - tentative.**
- Mar 14th, Sunday: Daylight Saving Time begins at 2:00AM.
- Mar 20th, Saturday: Spring Equinox at 5:37AM.
- Mar 21st, Sunday: Moon First Quarter.

For more event listings and updates see the calendar at [www.atlantaastronomy.org](http://www.atlantaastronomy.org)

### Atlanta Astronomy Club Listserv

Because of the shutdown of Yahoo Groups, the Atlanta Astronomy Club Mailing List has been moved to IO Groups. You can visit the group, start reading messages and posting them here: <https://groups.io/g/AtlantaAstronomyClub>.

### Focal Point Deadline and Submission Information

Please send articles, pictures, and drawings in electronic format on anything astronomy, space, or sky related to Tom Faber at [focalpoint@atlantaastronomy.org](mailto:focalpoint@atlantaastronomy.org). Please send images separate from articles, not embedded in them. Articles are preferred as plain text files with images separate but Word documents or PDFs are okay. **The deadline for February is Sunday, January 24. Submissions received after the deadline will go in the following issue.**



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We're here to help! Here's how to reach us:

Newsletter of The Atlanta Astronomy Club, Inc.

*The Focal Point*

