

Sky WAA tch

The Newsletter of Westchester Amateur Astronomers

October 2025



The Cat's Eye Galaxy by Robin Stuart

Lying at a distance of 16 million light years in Canes Venatici, the Cat's Eye Galaxy (Messier 94) has the appearance of a bright central region surrounded two concentric rings of active star-forming regions. When observed with larger instruments across a range of wavelengths, the rings are actually extensions of the intricate spiral structure seen at the center of the image. The field of view here is 30.4' x 22.8' and north is up. At least four distant edgewise spiral galaxies are present in the image, a stack of 46 x 10 minute subframes for a total exposure of 7h 40m taken in Eustis, Maine over five nights with a ZWO ASI2600MC camera at the prime focus of a Tele Vue NP127 refractor. —RS

Our club meetings are held at the David Pecker Conference Room, Willcox Hall, Pace University, Pleasantville, NY, or on-line via Zoom (the link is on our web site, www.westchesterastronomers.org).

WAA October Meeting

Friday, October 10 at 7:30 pm

The Sloan Digital Sky Survey

Michael Blanton, PhD

Professor of Physics, New York University;
Director, The Center for Cosmology and Particle
Physics; Director, SDSS-IV

SDSS was conceived in the late 1980s as the first wide-field imaging survey using CCD technology, coupled to the first wide-field spectroscopic survey using optical fibers. It took until 1998 before there was a working imager on a new telescope. The resulting data, and its innovative public release, transformed astronomy and is the inspiration of numerous current programs such as the Rubin Observatory. Over the last 25 years, the SDSS has continued to diversify and grow. It currently operates on two 2.5-m telescopes, one in Chile and one in New Mexico, and a small array of 0.16-m telescopes, all observing the Milky Way and more distant objects in unique ways, still making its data public. Dr. Blanton will sketch this history and discuss the sorts of challenges SDSS has faced, and the people and teamwork that it took to overcome them.



Dr. Blanton is an observational astronomer who studies galaxy evolution with spectroscopic surveys. He received his PhD from Princeton University and was a postdoctoral researcher at Fermilab and New York University (NYU). For the last 20 years he has been on the NYU faculty.

New Members

Emily Eagan	Rye
Matthew Helt	Pleasantville
Emily Mirkin	Not supplied
Elmarita Pearson	Greenwich
Charles Seife	Scarsdale
Benjamin Weber	Irvington
Jude Westerfield	Dobbs Ferry
Stephen Wooten	Pelham

WAA November Meeting

Friday, November 14 at 7:30 pm

Great Comets of the Past

Joe Rao

Meteorologist, amateur astronomer, planetarium educator, contributing editor of *Sky & Telescope*, long-time friend of WAA

Starway to Heaven Star Party

**Ward Pound Ridge Reservation,
Cross River, NY**

Date	Sunset	Moon Phase	Moon Set/Rise
10/18	6:07 PM	0.06	New
10/25	5:57 PM	0.17	Sets 8:10 PM

Weather permitting. Check email and WAA phone.

Renewing Members

Justin Accetturi	Bethesda
Pramod Agrawal	Bardonia
Jason Antolik	Mt. Kisco
Orrin Beissinger	Warren
Anthony Bonaviso	New Rochelle
Melissa Brown	Croton on Hudson
Jorge and Priscilla Camino	Yorktown Heights
Jose E. Castillo	Pelham Manor
Jon Corrado	Ridgewood
Sameer Desawale	Briarcliff Manor
Rick Faery	Rye
Manish Jadhav	Ossining
Daniel Karpel	Mt. Kisco
Lucian Lipinsky de Orlov	Goldens Bridge
Michael Lomsky	Wilton
Kevin Mathisson	Millwood
Derrick McCall	White Plains
Geoffrey McFadden	Stamford
Mauri Rosenthal	Scarsdale
Susan Salant	Monsey
Harry Vanderslice	Mamaroneck
Cliff Wattley	Danbury
Shirley Williams	Yonkers

Call: **1-877-456-5778** (toll free) for announcements, weather cancellations, or questions. Also, don't forget to visit the [WAA website](http://www.westchesterastronomers.org).

ALMANAC for October 2025

Bob Kelly, WAA VP of Field Events



Bob
Kelly



Full
10/6



3Q
10/13



New
10/21

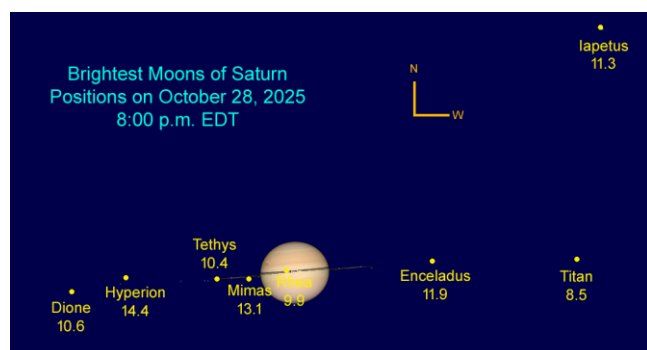


1Q
10/29

Saturn All-Nighter

Beautiful Saturn is up all night after its opposition in September. The rings' tilt decreases from 1.5 degrees to just half a degree during October. The rings look like a thin line, but that will help us see fainter moons. How many can you find in your telescope?

Iapetus (mag 11.3) passes Titan (mag 8.5) to the west of Saturn on the 28th, brightening along the way.



Titan's Shadow Transits Saturn

Titan, Saturn's largest moon, has been casting its shadow on the planet. The last in the series of Titan's shadow transits happens from 12:27 a.m. to 1:32 a.m. EDT on the 6th. The edge of Titan's shadow will touch the north pole region of the planet while Titan itself crosses the planet's face. Very high magnification will be needed to see this event.

Titan itself will transit Saturn on the 21st/22nd and every 16 days through Jan 24, 2026 (but without its umbra falling on the planet's surface). It's harder to see light colored Titan against the disk of Saturn than seeing its shadow.

John Paladini was able to capture both Titan's disc and its shadow during the September 20th transit. See page 5 for his remarkable image.

Jupiter's Moon Shadows

Jupiter's four largest moons can cast their shadows on the giant planet, sometimes two at a time, a frequent phenomenon this month. Here are dates and times for the best double shadow transits:

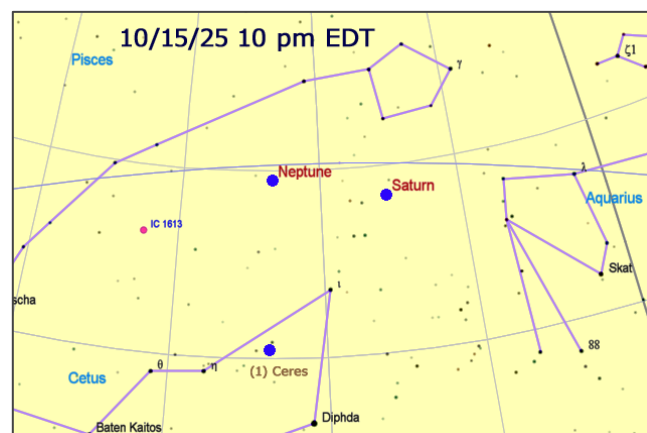
- Oct 4 from 2:49 to 4:17 a.m. EDT

- Oct 11 from 4:42 to 6:53 a.m. EDT
- Oct 20 from 2:24 to 3:18 a.m. EDT

Catch the Ice Giant Planets While Brightest

Uranus is near its maximum brightness at magnitude +5.6, as it approaches opposition in November. Neptune, in Saturn's neighborhood just three degrees northeast at the beginning of the month and four degrees at the end, is still near its maximum brightness at magnitude +7.9.

Catch a Dwarf Planet While Brightest



Ceres reaches its brightest at magnitude +7.8 in October. The largest of the asteroids (now graduated to dwarf planet status) is having a whale of a time in Cetus about 20 degrees of azimuth east of Neptune and Saturn.

Hard to Catch These Planets

Mars is settling into the glare of the setting Sun, while Mercury peeks into the evening sky. They pass each other on the 20th and 21st but are not easy to find since they set only an hour after the Sun, just 10 degrees above and 20 degrees to its south at sunset. By the time the sky darkens, they will be very near the horizon.

Mercury glows at magnitude -0.2 and Mars is the dimmer of the pair at +1.5. Mercury reaches its greatest elongation from the Sun on the 29th.

Venus hangs 18 degrees above the Sun in the morning sky, almost right above it, at magnitude -3.9,

easier to see than Mercury or Mars. The Moon joins it on the 19th, but it will be hard to see as only 4 percent of its disk is illuminated.

Full Moon Effects

Our Moon's perigee in October occurs just 34 hours before the full Moon. In September, the full Moon was not as close to us but still led to higher high tides than usual, so this month's perigee should have even more effect on our shorelines. The closest full Moon (max Supermoon!) is coming in November.

Moon Bowls the Pleiades

On the night of the 9th/10th, the 87% illuminated near-full Moon sweeps over the Seven Sisters, with the bright limb of the Moon leading the way. The best way to see this event is when the dark limb of the Moon uncovers the stars in the Pleiades, starting about 12:30 a.m. EDT on the 10th. It's a great sight when a star suddenly appears out of the darkness. You'll need a telescope for this. Since the Moon will be very bright, you may need a filter (neutral density or variable polarizer).

The dark limb of the Moon covers up magnitude +3.3 Tau Sagittarii on the evening of the 27th, just after 7:30 p.m. It reappears on the bright limb of the Moon about 8:42 p.m., but that will be very hard to see.

Comets!

There are three comets of interest for the last quarter of this calendar year.

Comet 3I/ATLAS is the third visitor we've spotted from interstellar space (thus the "I"). It won't get bright enough for most of us to see it, maxing out at magnitude +11. Viewing may be best in November, after its perihelion (closest approach to the Sun) on October 29th, at a distance of 1.4 AU.

C/2025 R2 SWAN is the surprise comet, popping out from behind the Sun in September. I tried to see it from Southern California but didn't catch the +6 magnitude object low in the evening twilight. Our latitude may get a better view of it in the evening sky this month. The comet gets within 20 million miles of Earth and we may pass through its debris field, with a resulting meteor shower between the 4th and 6th.

And there's C/2025 A6 (Lemmon), which has over-performed. It may reach magnitude +4. It will be

viewed best in the morning sky, moving west under the legs of Ursa Major. Good databases for updated comet information include the Comet Observation Database (<https://cobs.si/>), aerith.net, and TheSkyLive (<https://theskylive.com/>).

Meteor Showers

Besides the possible meteors from Comet SWAN, the Orionid shower might show us a dozen or so meteors an hour after midnight on the 20th/21st. They are very fast, with few bright meteors. The 2% illuminated Moon rising before sunrise won't hurt this show at all.

Mare Orientale Tips Toward Us

On the 6th, the edge of the Moon near Mare Orientale is rotated a tiny bit toward us. Lunar libration gives us a peek at the peaks surrounding the Mare. Look at the 8 o'clock position on the Moon's disk. It's the "Eastern Sea" because lunar directions East and West used to reflect the orientation as seen from Earth. Once astronauts visited, that alignment made no sense and directions were officially reversed, so you wouldn't get lost if you were on the surface. The Moon's south pole, perhaps a location for a future moon base, is tipped a bit toward us on the 9th.

Crewed Space Station Overflights

The International Space Station makes passes in our evening sky on the 1st and 2nd. Morning overflights start on the 13th and continue for the rest of the month. Tiangong is visible in mornings from the 8th through the 22nd. A set of evening appearances starts on the 30th.

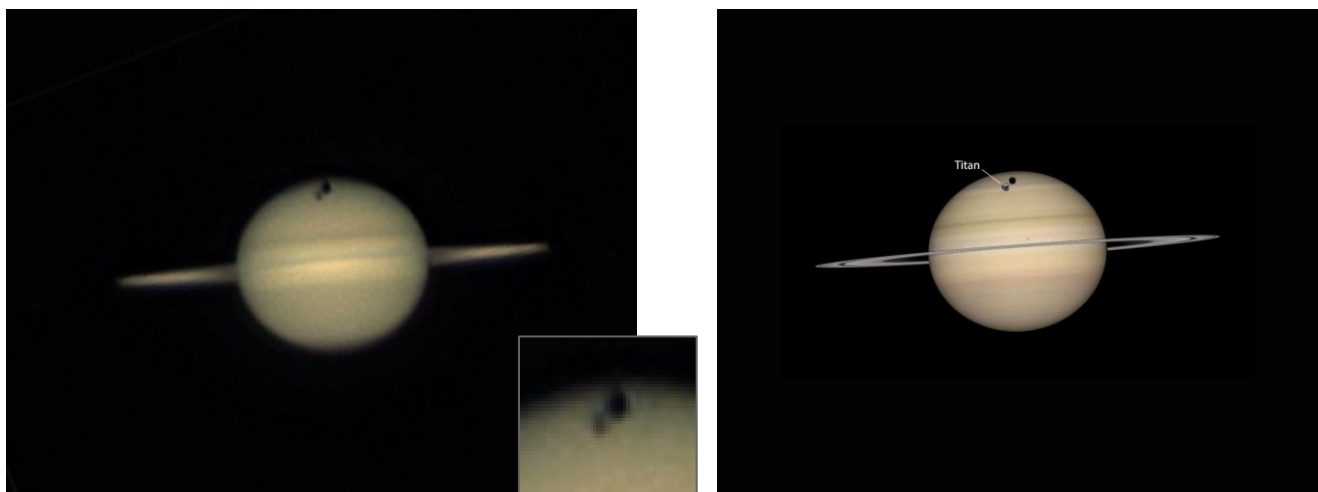
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The September 20th Transit of Titan

John Paladini

John sent us an image (left) of the next-to-last transit this season. He made it in the early morning of September 20th with a Criterion RV-6 Dynascope, a 6-inch f/8 reflector.



When the Editor asked him if the double shadow image was a photographic problem, he replied with *Sky & Telescope's* simulation for the event (right), which clearly shows that the lower dot is the actual disc of Titan!

From the Editor: More on Robert Burnham, Jr.

When we edited Eli Goldfine's article on Robert Burnham, Jr. for the September 2025 *SkyWAAtch*, we left out a reference to a major source of information and images, a biography of Burnham that WAA member Tony Ortega had written for the *Phoenix New Times* back in 1997. Tony recently posted this fascinating 11,000-word essay on his Substack, which you can find at <https://is.gd/ortegaburnham>. We met Tony, a knowledgeable and experienced observer, for the first time at the August 16 star party, where he was imaging with an iOptron 6-inch RC telescope. His report and images from that evening begins on page 8 of this issue of *SkyWAAtch*.

While researching the 1997 article, Tony tracked down Robert Burnham Jr.'s sister Viola, who was living in Phoenix. She helped him piece together much of Burnham's story. Then she gave him the IBM Selectric typewriter that Burnham used to produce the three-volume *Celestial Handbook*. Tony wrote, "For years, and through a dozen moves across the country, I lugged that thing with me as my most prized possession." Then, at the 2019 Northeast Astronomy Forum (NEAF) he met Kevin Schindler, Lowell Observatory's Historian and Public Information Officer, and arranged for the typewriter to be donated to Lowell.

On August 1, 2022, Tony wrote an article describing how he got the typewriter. The article is also on his Substack at <https://is.gd/burnhamtypewriter>. It was published in anticipation of a seminar about Burnham at Lowell on August 13, 2022, at which Tony was a speaker, along with Schindler, astronomy historian William Sheehan, Lowell astronomer Brian Skiff, and Donna Courtney, Burnham's niece and only living relative.

The Lowell seminar is posted on YouTube (<https://is.gd/burnsem>). Unfortunately, the audio quality is substandard, but most of it is intelligible. The seminar inaugurated a permanent exhibit dedicated to Burnham at the Rotunda Museum on the Lowell campus. You can see a promo for the exhibit at <https://is.gd/brunpromo>. A card on the typewriter acknowledges Tony's contribution.

I'm a member of Lowell and an annual donor, even though I've only been there once, in 2011 (see the [June 2011 SkyWAAtch](#), p. 3). I think their combined program of research and outreach has no equal in the world. Lowell was named the Best Science Museum in the US by *Newsweek* magazine. It's a special place that should be on every astronomy enthusiast's travel itinerary. Online at <https://lowell.edu/>.

Another Movie Telescope: *Mountainhead*



Jessie Alexander, the creator of *Succession*, TV's wildly successful soap opera send-up of the Murdoch media empire, wrote and directed this satirical dissection of modern Silicon Valley wealth. Four tech bros, three of whom are among the richest people in the world (the fourth is merely a semi-billionaire), gather for a weekend of relaxation and bonding, which turns out to be anything but. They think that their ridiculous ideas for humanity's future are profound but they are deeply narcissistic and vacuous, reveling in self-importance while their social-media creations are destroying the world. And they are not all that bright. As targets of satire, they are based on people whose names you'd likely recognize and already may not respect.

The film was shot in an over-the-top (21,000 square feet, 7 bedrooms, 16 bathrooms) mountain retreat at the upscale Deer Valley ski resort in Utah. Why a house needs 16 bathrooms when there

are only 7 bedrooms seems silly, until we realized that it's a locale for one-percenter parties with free-flowing booze. Several guests may have to whiz at the same time, and God forbid the wealthy should have to wait outside the lavatory. The house has, among other amenities, a private gondola for access to and from the *pistes*, a regulation-size NBA basketball court (complete with electronic scoreboard), a bowling alley and a climbing wall. The home was listed for sale in late 2024 at \$65 million. Read more about it at <https://is.gd/Tnn9MP>.

Many telescopes in movies are mass-produced "consumer grade" instruments, inserted by the prop department without any clue of context or value. Trying to reflect wealth, a shiny brass doublet refractor is often chosen. The telescope in *Mountainhead*, on the other hand, is properly consistent with the property's modern opulence. It is a Stellarvue SVX 127D, an f/8 apo doublet with a Strehl ratio of ≥ 0.97 . In its basic configuration, the OTA costs \$2,995. The scope is mounted on a Stellarvue M002C manual alt-az mount (\$449), which appears to be atop a Losmandy LW tripod (\$600). The current Stellarvue version of this tripod has chrome steel legs, while the film's tripod legs are anodized. Stellarvue makes an apochromatic triplet, the SVX 130T, a 130-mm f/7 three element scope that lists for \$5,499. Among the premium-brand telescopes in this aperture range, the Televue NP127 is an f/5.2 Petzval design with four elements, listing for \$7,373. Astro-Physics makes the 130mm f/6.3 StarFire GTX "Gran Turismo" triplet listing at \$7,950, but the current production run is sold out and new orders are not being accepted. These rare scopes sell almost instantly on the used market. On Astromart, there is a current "wanted" offer of \$11,000 for the GTX. ■

Deep Sky Object of the Month: NGC 891

NGC 891 is often referred to as the “Silver Sliver Galaxy,” although to us it’s not as slivery as the “Needle Galaxy” NGC 4565 in Coma Berenices.

It’s thought to be similar in size and structure to the Milky Way. It’s what our galaxy might look like if viewed from some alien observatory located in a galaxy in the “Zone of Avoidance” along the galactic plane.

High-resolution photographs with large telescopes (or amateurs who know what they are doing) reveal that the galaxy’s dust has a filamentary pattern, perhaps caused by



supernova explosions or even just light pressure. NGC 891 has a high star-forming rate, which would be consistent with supernova explosions that compress the interstellar medium (ISM).

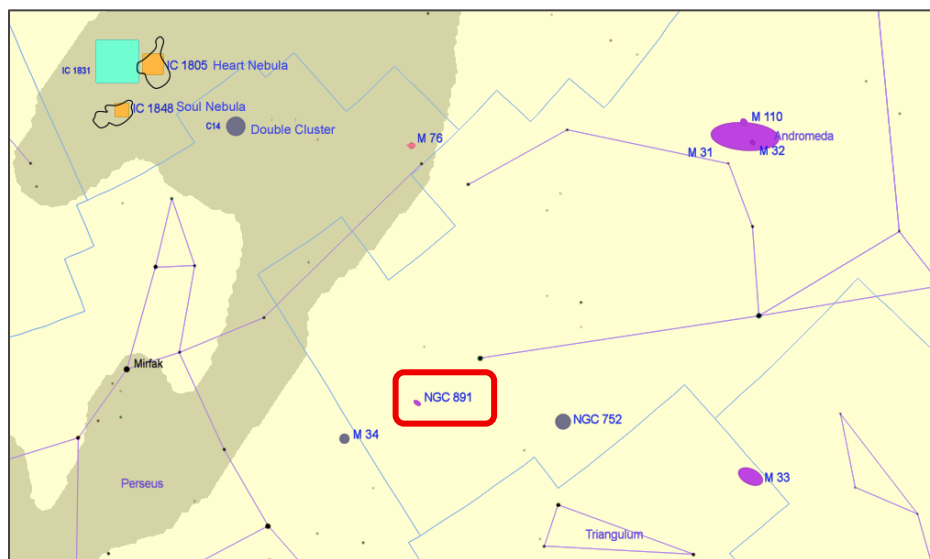
What can we learn about the structure of a galaxy if we are seeing it edge-on? It turns out that the edge-on orientation does not necessarily hide details about a galaxy’s structure. For example, in a paper on star formation in the *Astronomical Journal* in 2011, Yim, et al. note, “Edge-on galaxies have long been recognized as powerful probes of galaxy formation and evolution. The thickness of the stellar disk is sensitive to the merging history of a galaxy, while the thickness of the interstellar medium may reveal the imprint of gravitational instability. The vertical structure of galaxy bulges can also place constraints on their formation: Combes et al. (1990) have used N-body simulations to show that ‘boxy/peanut’ bulges seen in many edge-on spiral galaxies may form from disk material via a bar instability.”

(<https://is.gd/891fil>).



NGC 891	
Constellation	Andromeda
Object type	Edge-on spiral galaxy
Right Ascension J2000	02h 22m 33.4s
Declination J2000	+42° 20′ 57″
Magnitude	10.8
Size	13.5 x 2.5 arcminutes
Distance	27.3 million LY
Other designation	Caldwell 38
Discovery	William Herschel, October 6, 1784.

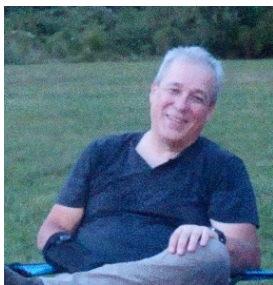
Visibility for NGC 891			
2200 EDT	10/1	10/15	10/30
Altitude	40° 23′	49° 55′	61° 11′
Azimuth	64° 30′	69° 21′	74° 24′



Imaging Report

Tony Ortega

I've been a club member for several years, but inertia has kept me exploring the cosmos from my own backyard. In all this time I had not been to a WAA star party. From my backyard, however, I am limited to observing objects only once they clear my roof and then only to the meridian. My entire western sky is blocked by trees, and they also limit my southern horizon to about 20 degrees altitude.



So when I got the message from Jordan that the August 16 star party was a go, I decided it was time to take my rig to the field and get it under a full sky.

I'm a lifelong amateur astronomer, but I've only been imaging for a few years. I'm on a limited budget, but I've gradually moved from a DSLR on a small refractor to a cooled CMOS astro camera on a 6-inch Ritchey-Chrétien. I was looking forward, for once, to getting to aim it at the zenith and the far south.

And of course a star party is a social gathering, so it was fun to get to know Jorge and Priscilla Camino, who set up next to me, and to get to meet Larry Faltz after reading WAA's excellent newsletters for years.

I've been to numerous star parties over the years in Southern California, where I'm from, and in Arizona, where I was fortunate to live for several years. So I'm familiar with the scene, the characters, and the odds and ends. (Like the guy who had a panel of bright white LEDs literally strapped to his forehead as he worked on his telescope and treated the rest of us to his illumination as well. What was up with that?)

But late in the evening, when most of the folks had left, I had the place pretty much to myself while I imaged, at least until a couple of carfulls of people arrived at 3:30 a.m. and threw blankets on the ground, apparently to look for meteors. They were boisterous but at least they didn't have white lights.

Even with the cars coming and going, it doesn't appear that my images were affected by stray light.

I started at the zenith to get the darkest possible sky. The weather had been marginal, and I would end up having to throw away a number of subs for cloudy conditions, but I started with something I knew would not be too large or impressive: I wanted to get William Herschel's one discovery in Lyra, the small galaxy NGC 6646, which is centered in the frame.

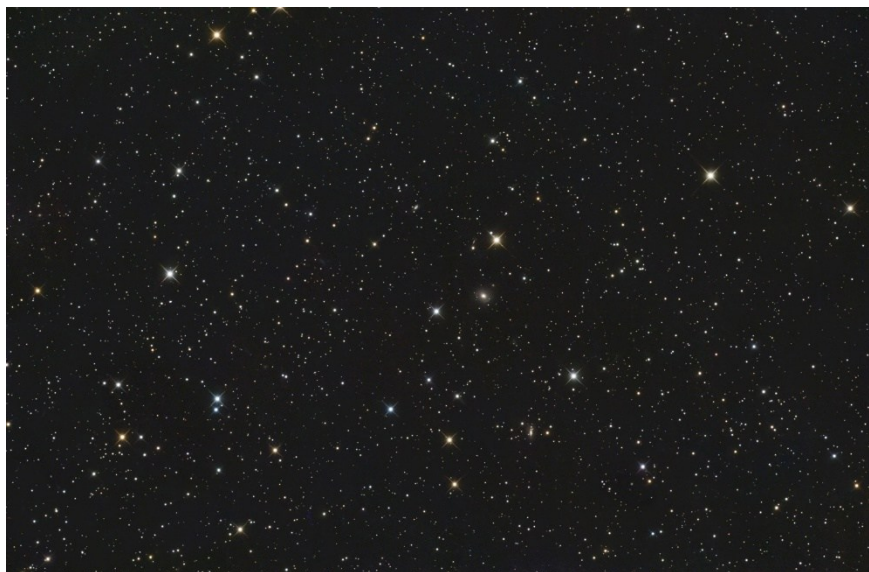
By the time I'd soaked up 90 minutes on that, I could see that Sadr had passed the meridian, so I aimed at the cross-star in Cygnus, then moved south a little, aiming for two open clusters, Dolidze 5 and van den Bergh 130. The Dolidze cluster's brightest star is the binary $\Sigma 2668$.

Those two shots near the zenith were fun, but I also wanted to look south. At this time, about 2 a.m., I noticed that there was a bright star just passing the meridian near the southern horizon—it was Fomalhaut, a star I never get to see at home. So I put in ten minutes of exposure on it. What a grand star it is.

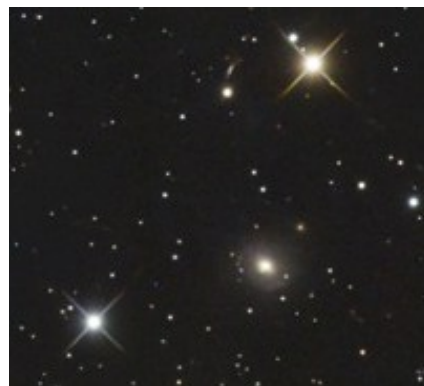
While that was exposing, I was looking at Aquarius above it and realized I had maybe my best shot at something that is usually too low in the muck from my house. I really like the color I got out of the Helix Nebula in this shot, but I would certainly like to see what detail I could get out of it if it were higher in our sky.

Finally, I had just enough time for one more shot before morning twilight, and I made an effort for NGC 247, the huge galaxy in Cetus. Unfortunately, some high clouds were moving in, and I only managed about 20 minutes of usable frames. But at least it gives a sense of the massive size and grandeur of this southern galaxy.

Well, except for the mosquitoes (and that white light), this was a great experience, and I'm very glad I finally got my rig out of my backyard and out to a nice site like the Meadow parking lot. After packing up, I stopped for a bagel in Cross River and then headed home. ■



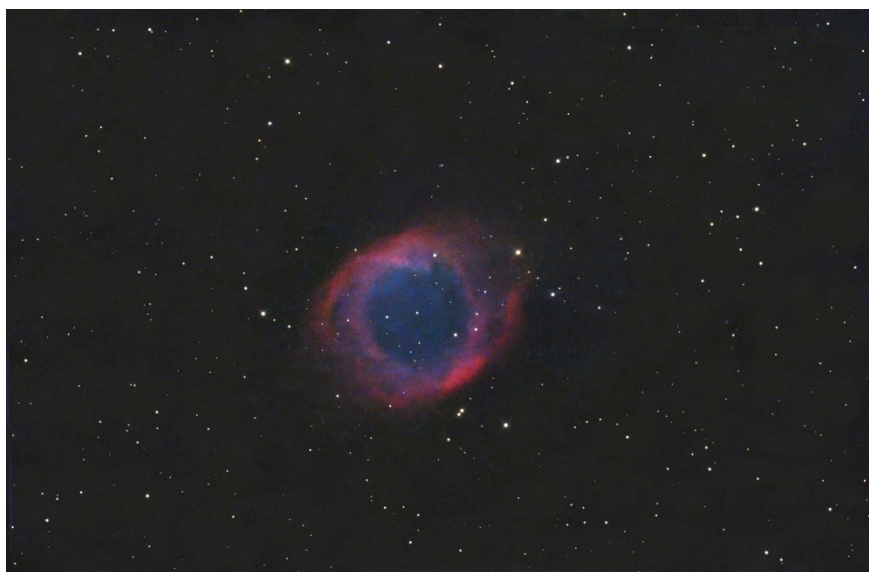
The small smudge in the center of the image is NGC 6646. Here's an enlargement:



Open clusters Dolidze 5 (left), and van den Bergh 130 (right). The Dolidze catalog was published in 1966, listing sparse open clusters that don't appear in the usual catalogs (NGC, Collinder). The van den Bergh catalog of reflection nebulas, some of which are associated with open clusters, was also published in 1966.



Fomalhaut (Alpha Piscis Austrini) is a magnitude +1.17 class A4V star located 25.1 light years from Earth. The bright star on the left is HD 217236, magnitude 5.5, class F2IV-V. Of the other stars, the brightest one at 5 o'clock below Fomalhaut is the 9.05 magnitude Gaia EDR3 6606095485809721856. The name Fomalhaut comes from the Arabic "Fum al Haut" فم الحوت meaning "the mouth of the fish," in this case the Southern Fish to distinguish it from Pisces.



Although quite far south (20 degrees below the celestial equator) and never rising more than 27° above the horizon in Westchester, the planetary nebula NGC 7293, a.k.a the Helix, is a colorful treat for imagers. It is about half as wide as the full Moon.



Magnitude 9.7 NGC 247 in Cetus is 21.0 arcminutes in length, distance 11 million light years. It's 4½ degrees north of the even larger and brighter NGC 253 in Sculptor. The map below shows quite a few interesting galaxies and galaxy groups in this region of the early morning summer sky. They may be difficult to view or image because of the light dome from New York City, Nassau County, and southern Connecticut. But it can be done!

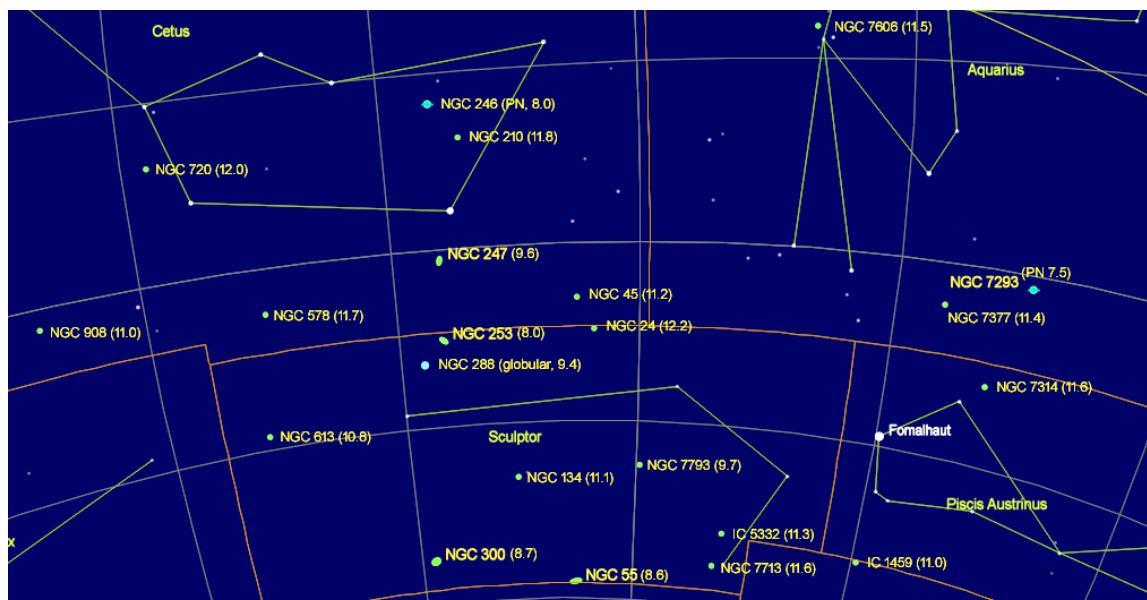


Image captions by the Editor.

WAA Member Picnic at Croton Point Park July 19, 2025

Eva Andersen

Over sixty WAA club members and invited guests attended our annual picnic at the scenic Croton Point Park on a lovely summer day. Also in attendance were four fetching doggies: Hamilton, Clyde, Dragon and Brodie. Mike Cefola suggested that in addition to our young astronomers' group (the Ursa Minors) we create a membership category for our furry friends, the Canis Majors. I love the idea will bring it up at our next board meeting!

We owe THANKS to the WAA Board for approving our annual picnic and having the club cover the expenses. I would especially like to offer my gratitude to Wendy Kutin who never misses the opportunity to stand over hot coals for 4 hours and cook for y'all, and my sister and brother-in-law Ingrid Ehrensbeck and Tracy Edwards of Binghamton, who arrived 3 hours early to set up, start the fires, cook for the masses and clean up the mess. Many thanks to my husband Erik who tolerates piles of picnic supplies heaped on the dining room table for weeks ahead of the big day, for setting up the PA system, and especially for the urgent run(s) to Shoptite when I forget things.

This year I noticed several new members in attendance. Thank you for contributing to our community and unity. So many of you brought delicious food and desserts this year. The group was relaxed. People were introducing themselves to other members and having conversations that lasted well into the afternoon. Many stayed till or past 4pm. *The vibe was picnic perfect!*

Thanks to Jordan Webber and Mike Virsinger for setting up solar scopes and sitting out in the hot sun for hours showing us spectacular images.

The Trivia contest was again one of friendly rivalries with big brainstormers, suspense and ultimately the thrill of victory and the agony of defeat. There were three rounds of assorted trivia: general science, famous mugshots and not-so-easy mnemonics. After the first round all three teams were tied. After the second round, two teams were tied. After the third round it was clear only one team would hoist the \$12 mighty fine Crown trophy.



First Place Winners

"Binary Pulsars"

Alex Zoubine, Hamilton,
Erik Andersen, Joe Lisle,
Claudia Parrington,
Louise Gantress and
Chris Plourde



Wendy Kutin



Kevin and Daisy Lopez



"Big Bang" Bill Newell



Patti Gelardo



Frank & Fran Jones



John Paladini & Paul Alimena



Mike & Angie Virsinger, Jordan Webber, Kevin Parrington



Charles Fulco, Frank Antinarella, Eli Goldfine, Joe Columbo, half of Charlie Gibson



Tim and Loriann Holden



Mark Lewis & Laura Brengleman



Hans Minnich & guest, Mary Anne & Mitch Feller



Kevin, Dave and Jeanette



Joe, Chris, Erik, Louise, Claudia



Joe Geller, Judy Alimena, Lori Wood, Hans Minnich & Pierre-Yves Sonke



Liv Andersen, Hamilton and Alex Zoubine



Your Editor was sadly not at the picnic this year, having gone to Colorado for two weeks to visit friends and observe under dark skies in the Rockies during the new moon week. Here's a photo from his preferred observing site, the Camp Hale National Historic Site, near Tennessee Pass, 15 miles north of Leadville, Colorado. Elevation 9,350 feet.

Medomak Astronomy Retreat 2025

Larry Faltz

How many star parties are attended by a herd of curious cows?

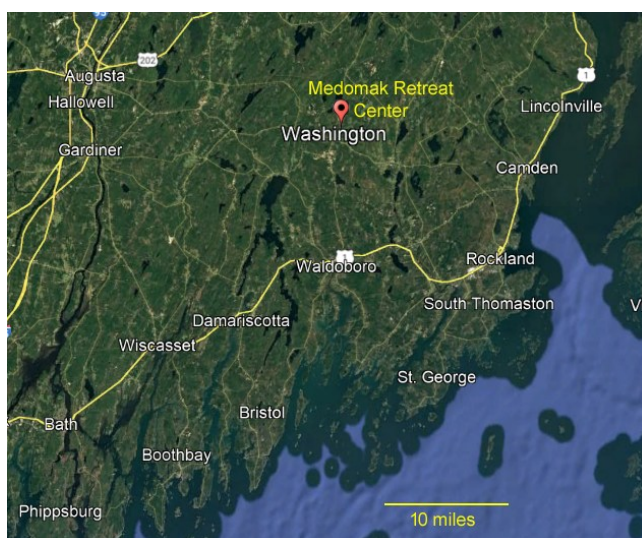


A bovine colleague may have jumped over the Moon, but at least this guy and his friends didn't jump over the fence.

As the Sun dropped towards the western horizon on August 18th, the first night of this year's Medomak Astronomy Retreat and Seminar (MARS), a dozen cows wandered over to watch us uncover our telescopes and gear up for the night. Fortunately, their pasture was separated from the observing field by an electric fence, giving 45 humans the comfort of knowing that neither they nor their equipment was in danger of being trampled by eager bovines wanting a peek through an Ethos eyepiece or checking out a computer display. As the evening progressed, the cows found better things to do than stare at a bunch of sky-besotted amateur astronomers. They headed back to their barn on the other side of the trees, leaving us only with the faint echo of an occasional moo.

MARS has been going for over a decade (there was a hiatus for Covid in 2020), although the Medomak Family Camp, just down the road on the eastern shore of Washington Pond in central Maine, has had an interest in astronomy for longer than that. The Medomak Retreat Center, just a little up the road, was developed to host a variety of adult special interest weeks and now schedules MARS for a new moon week in the summer, generally in August although next year it will begin around Labor Day. The location is about a 6½ hour drive from Larchmont (without traffic), about 2 hours north of Portland. The observing field is at 44° 17' 46.35 North latitude.

The week is organized by J. Kelly Beatty, Senior Editor of *Sky & Telescope*, and Bruce Berger, a member of the Amateur Telescope Makers of Boston, both of whom have become friends. In addition to myself, WAA was represented by Eric and Katherine Baumgartner, Peter Rothstein, Bill Caspe, and WAA Vice President Olivier Prache, all regulars. About a dozen other attendees are also regulars, and this year a sizable number of newcomers, some experienced amateurs and some just starting out in the hobby, filled out the roster, which is limited to at most 50 guests. It was an enthusiastic and friendly group.



Accommodations are simple but effective: cabins with beds (sheets, pillows and blankets provided), bathrooms and showers (towels provided), a newly enlarged dining hall and a recently constructed barn that serves as lecture hall and theater. The spacious observing field at the top of the hill has 110-volt outlets sufficient for all the telescopes. Long heavy-duty extension cords are provided, but we brought our own. The adjacent pavilion has a large central room, two bathrooms (one with shower) and a storage room. The Medomak staff lays out snacks, coffee, and hot and cold water for the night. Red lights are required after dark, and computer screens must be red filtered or kept in an enclosure to prevent light trespass. Strong wi-fi hubs in the dining area, barn and pavilion kept everyone connected.

Telescopes range from small refractors to giant Dobsonians. Our favorite instrument is Robert Werkman's 22-inch motorized Dob. Robert, a retired

gastroenterologist from Pennsylvania, is a dedicated visual observer with a vast knowledge of the night sky. He loves to show you 15th and 16th magnitude NGC and PGC galaxies at 300x through super high-quality 2-inch eyepieces, with glass by Leitz, Pentax, and Nikon, as well as a range of Televue Ethoses, and even a BiPH.

This was our seventh MARS, after a two-year hiatus due to Elyse's illness. It was sad for me to be there without her, and she was missed by many of the regulars, but it was great to reconnect and to make new friends.



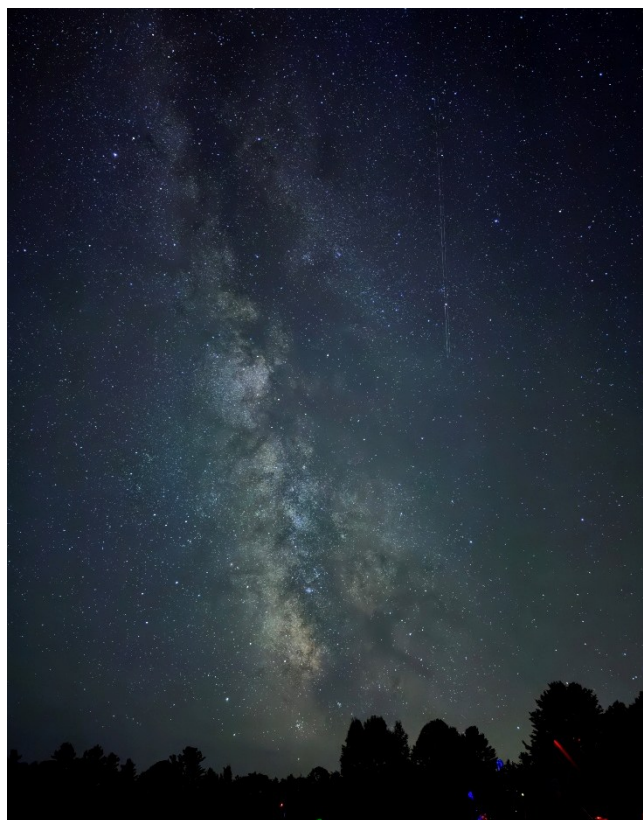
Scopes under cover during the daytime

This year's guest speaker was former astronaut Tom Jones. He gave three talks. One was about his personal story, which includes being a B-52 pilot, getting a PhD in planetary science, and flying four shuttle missions. He also spoke about the current state of asteroid defense and then gave a thorough analysis of the future of space travel. Kelly Beatty, a superb speaker who does *Sky & Telescope's* monthly podcasts and is in demand as an astronomy lecturer, discussed the astronomical basis of the Mayan calendar. He also reviewed coming solar and lunar eclipses. Several attendees, including me, gave short talks on a variety of topics. I spoke about stellar aberration, which I wrote about in the [February 2025 Sky-WAArch](#).



Photo by Bruce Berger

I brought two telescopes. For visual observing, I used my venerable Celestron CPC800, previously known as "Locutis" when it was tricked out with a Mallincam, video screen, and a million wires in the old days. I limited my eyepiece selection to a pair of Televue Panoptic 24's in a Denkmeier binoviewer. The Denks are heavy, but I have counterweights on a rail under the optical tube. I imaged with the deforked Celestron orange tube C5 I described in the [July-August 2025 Sky-WAArch](#), on a ZWO AM5 harmonic drive mount, controlled with ASIAir Plus and an iPad.



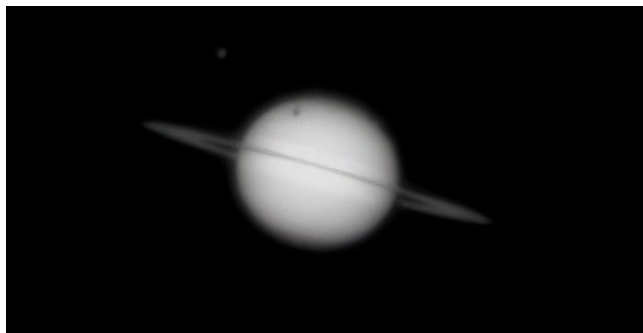
The Milky Way from Sagitta to Sagittarius. 9:58 p.m. iPhone 16 in night mode, 30 seconds. One airplane.

As the Sun set and twilight passed on the first night, everyone was excited to see a clear sky. The Milky Way became a dramatic white band across the sky, strongest to the south. Dust lanes in Aquila, Ophiuchus, Scutum, Serpens, and Sagittarius were splendidly defined against the background of stars. It was a real treat for those of us who spend most of our time observing in more light-polluted areas.

On that first night, I only did visual observing. The SQM measured 21.23 at around 11 p.m. The on-line app showed a very slight amount of Canadian smoke in the air, and the humidity was high despite

temperatures dropping into the low 50s. Smoke and water vapor scatter light, reducing darkness, transparency, and contrast. It wasn't too long before the grass, scopes, tables, chairs and other equipment were covered in dew, but those of us with dew heaters were spared an early end to the evening. I have four heating strips on the CPC (corrector plate, finder, and one for each bino eyepiece) and two on the imaging scope (corrector plate, guide scope) with individual heater controllers on each scope. It was nice not having to rely on batteries to power all the heating elements.

There were a number of attendees who were relatively new to the hobby. Kelly and Bruce, as well as others, helped show them the ropes, giving a brief sky show and teaching setup, alignment, eyepiece selection, and many other things experienced observers deal with autonomically, as soon they will too. As the evening proceeded, several of the retreat's staff, students from the Czech Republic working for the summer in the US, came on the field and looked through some of the scopes, comparing views M31, M11, M27, M13, and a few other summer classics. Views through the binos got a lot of wows.



Shadow Transit of Titan, August 19, 2:30 a.m.
Just 5% of 5,000 frames.

Early in the morning on the 19th there was a shadow transit of Titan on the face of Saturn. By the time it started, only four of us were still on the field. Robert Werkman's 22-inch had enough magnification and resolution to show the tiny dot, albeit with some difficulty. I made an image with the CPC800, an ASI290MM camera (used primarily as the guide camera on my imaging setup) and a Celestron 3X Barlow. The image was soft and focusing was difficult. The humidity definitely had something to do with it. Microscopic water droplets in the atmosphere scatter light through Mie scattering, and there was plenty of

water this night. Also, the Celestron X-Cel 3x Barlow might not be a particularly great piece of glass, and I probably should have been content with a 2x Barlow. With the seeing being way worse than the calculated resolution of the system, a smaller image covering fewer pixels wouldn't have shown any less detail on the planet's surface. But for sure it was a great start to the week. I got to bed at 3:15 a.m.



Left: CPC800 with binoviewer, Right: C5 on AM5

Tuesday was cloudy. We spent a lazy day, attended the afternoon lectures and watched a movie.

The weather prediction a few days before the retreat started had been concerning, but guess what? The weatherman isn't always right! It does seem we astronomers always get the meteorological rug pulled out from under us, but not this time. Wednesday, Thursday and Friday were excellent. The final night, Saturday, started out hazy and most of us packed up our gear rather than wait for Sunday morning when a quick getaway might be desirable. We didn't miss much, the sky not clearing until the wee hours.

I alternated between imaging and visual, although staring at my iPad screen to interact with the mount and camera took periodic tolls on my dark adaptation. Not being an experienced imager, I was somewhat confounded by the nuances of guiding calibration, a rather arcane and mystical exercise. The ASIAir app has several guiding parameters that need attention and adjustment, based on watching red and blue squiggles on the guiding graph, looking at a bunch of numbers, and making semi-intelligent guesses about whether a change in one parameter or another is the right thing to do. After a little while I managed to get a consistently low tracking error of less than one arcsecond, although I'm not really sure exactly how I ended up with the particular parameters I used. I

kept staring at the graph while the software accumulated subs, feeling somehow that if I took my eyes off of it the tracking would start deteriorating. However, once stable, guiding doesn't need any further input or mental energy as long as objects you are imaging are on the same side of the meridian as the calibration. Imaging a new object on the other side of the meridian means redoing the process, and the parameters may change.

The sharp Televue Panoptic 24's, coupled with the clever Denkmeier PowerSwitch, a combination focal reducer and Barlow built into the binoviewer body, meant I could alternate between 42, 84 and 169 power, with a 68° apparent field of view. Using both eyes is the most comfortable way to look through a telescope. Against the dark sky background, open and globular clusters, brighter galaxies, and nebulae were rich with detail, which is, after all, the primary point of going to dark skies to observe. The Double Cluster just fit into the field, a glorious scattering of pinpoint stars. The 11th magnitude Ghost of Mirach (NGC 404) was easily seen despite light from 2nd magnitude Mirach just 6 arcminutes away flooding the field of view. Early one evening I spent nearly an hour looking at globular clusters surrounding the Sagittarius teapot. Besides the bright M22, I looked at M28, M54, M69, M70, NGC 6522, NGC 6624, NGC 6652, NGC 6558, and NGC 6569. Throughout the week I frequently wandered over to Robert's 22-inch Dob to challenge my retina. Typical among the many faint exotic treasures were NGC 1 and NGC 2, an interacting pair of galaxies in Pegasus. Two fuzzy, slightly distorted blobs, filling the central part of a 100° eyepiece, magnitude 13.6 and 15 respectively.

I decided on the C5 for imaging because its 1250-mm focal length would give a better image scale for the smaller objects I was interested in than my Stellarvue SVR-105 (700-mm) and, not unimportantly, it would take up less room in the car. The Stellarvue, a triplet f/7 refractor with a sexy carbon fiber tube, comes in a rather large, well-padded case, while the C5 fits in a small canvas bag originally meant for an Orion Apex 127 Maksutov. The SCT seemed pretty well collimated, relieving me of one preparatory burden. Focusing an SCT for imaging is difficult because of mirror flop and the relative insensitivity of focus travel when reversing direction. When you're doing visual with an SCT you can rack in and out at will, but when

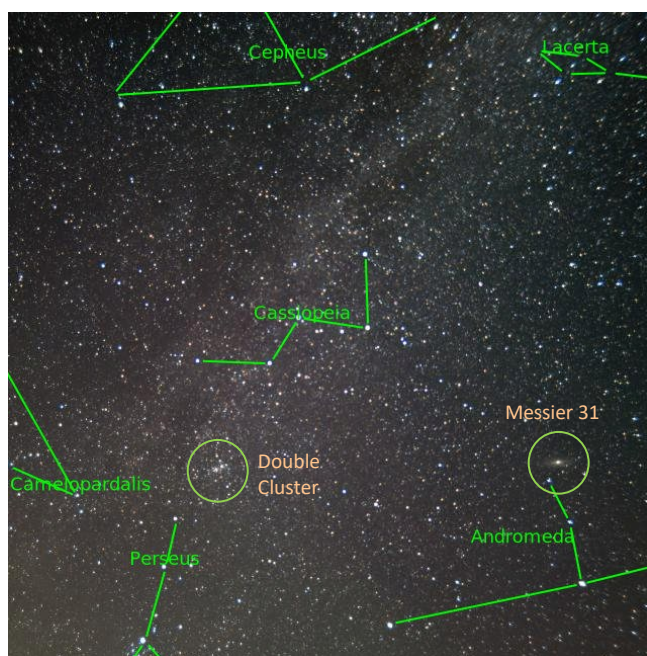
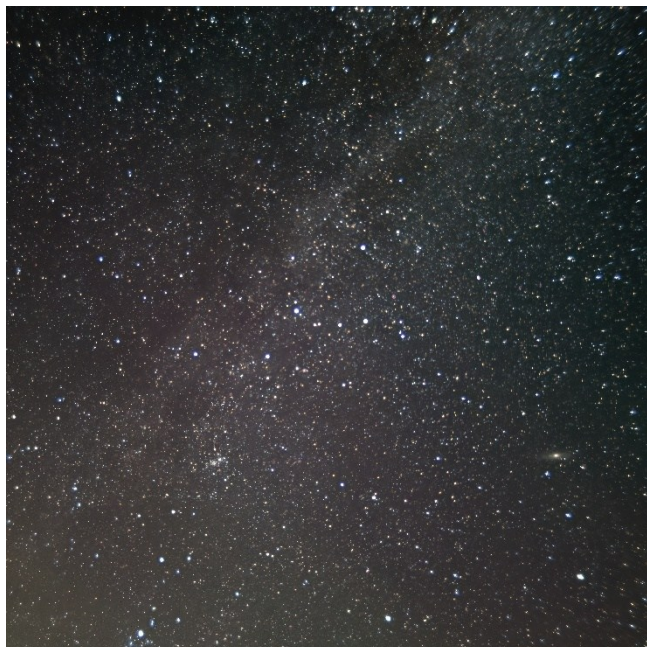
imaging you have to make a focus adjustment and wait a few seconds to see whether you hit your mark or went further askew, doing it over and over again until you finally decide you've made your best guess. I'll use a Bahtinov mask next time.

Not having a narrowband filter with me, I mostly stayed away from nebulae that need filtration to bring out color. While everyone else was imaging the North American Nebula, the Veil, or the Crescent, I was grabbing globular clusters and galaxies, although I did image the Trifid and the Helix, and tried something funky with an H-alpha filter as you will see. I haven't done enough deep-sky imaging to have learned any of the fine points of post-processing image manipulation (I'm too cheap for Pixinsight, and I haven't learned Siril yet). My goal was just to make some images to complement and amplify my visual experience and see a few things that might not be visible in the scope because they are too faint. It is essentially a personal form of Electronically Assisted Astronomy (EAA), similar to what I had been doing in the MallinCam days but giving far better results and at least the possibility of post-processing for artistic purposes. At most I spent one hour on an object, and often a good bit less, because I wanted to grab a bunch each evening. Image-gorging? Image bulimia?

The images are stacked subframes, denoised with Topaz AI. I made mild contrast and brightness adjustments and cropped just the edges with my 20-year old Photoshop Elements 2.0 (old dog, new tricks and all that), so the sizes of the objects are reasonably comparable. Although there were a few bright meteors each night, none of them made it into my images.

One evening I mounted a ProOptic 14-mm semi-fisheye lens onto the C5, connecting it to the camera with ZWO's Canon EF adapter. This combination gives a square field 45 degrees on a side. After going to an object, plate-solving and centering with the ASI533 on the telescope, I pulled the camera out of the scope, placed the lens on it, and piggy-backed it to the top of the scope on the ring mount ZWO makes to fit the ASI533 and similar-sized cameras. The guide scope continues to do its thing although with field of view being so wide the inherent periodic error of the mount might be a less than the size of a pixel! The image, centered on NGC 457, was made from ten 30-second exposures. The astrometry.net map is also

shown for orientation. You can see Cassiopeia in the middle, with the Double Cluster to the lower left and the Andromeda galaxy on the right. I'm not sure that this image is all that much better than a single shot with a tripod-mounted DSLR, but it would have potential making longer exposures using a narrowband filter mounted behind the lens, a future project. This lens unfortunately has significant coma at the corners. It was a relatively inexpensive purchase from Adorama some years ago.



45 x 45 degree image of the Milky Way centered on Cassiopeia. Map made by astrometry.net and annotated.

I was more pleased with my C5 shot of the Trifid Nebula, which was just 18 degrees above the horizon at 10:30 p.m. Even without a light pollution or, even better, a narrowband filter to enhance the H α and OIII, the colors came through.



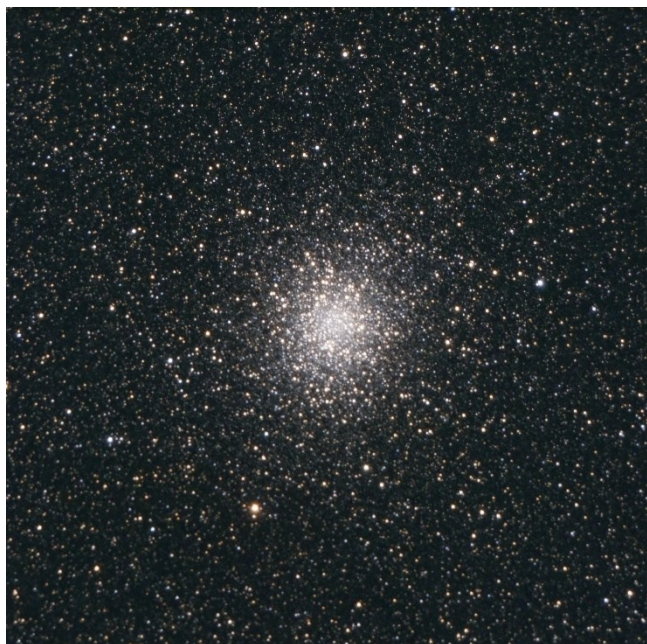
Trifid Nebula, M 20 (38 x 60 sec.)

Messier 13 in Hercules was a very impressive sight in the binoviewer. At 85x it filled the eyepiece with thousands of tiny stars down to its core. The image was even more detailed. It captured IC 4617, a 16th magnitude spiral galaxy just 14½ arcminutes from the center of cluster. It appears at 8 o'clock from M13, near the left edge of the image. I put markers along the edge of the image. Triangulate to find it.



Messier 13 (40 x 60 sec)

An even more impressive globular is Messier 22 in Sagittarius. It's close to the plane of the Milky Way, just $7\frac{1}{2}$ degrees from the galactic equator, so it's set among the "congeries of stars," as Galileo put it, that make up our galaxy. It has a larger apparent diameter than M13, 32 arcminutes vs. 20, and it's brighter as well (magnitude 5.1 vs. 5.8) even though its light has to pass through a large amount of galactic dust. In Westchester it's far enough south to be substantially washed out by the metropolitan area light dome, although it's still worth a view at a summer star party. There are no urban areas south of Medomak. Waldeboro, the town 13 miles south of Washington has a population of just 5,000 and no real downtown to speak of. (See map, page 15.)



M22 (12 x 60 sec)

Messier 3 is even further away from the plane of the Milky Way, hanging out among galaxies where the borders of Canes Venatici, Boötes, and Coma Berenices meet. It's just a little smaller (18 arcminutes) and fainter (magnitude 6.3) than M13 and M22, but it is surrounded by fewer Milky Way stars, being just 11 degrees from the North Galactic Pole.

I went through Ophiuchus looking at globulars M10, M12 and M14 and the Wild Duck open cluster M11. Of course, I also took a good look at M8 (Lagoon) and M17 (Swan/Omega), both beautiful in the dark sky, but I didn't put the camera on any of these.



M3 (39 x 60 sec)

Before the Big Dipper dropped towards the northern horizon, I looked at its brighter galaxies. M51, the Whirlpool (properly in Canes Venatici), is always a treat to show newcomers. Two interacting galaxies! At 10 p.m. M51 was 32° above the horizon, dropping to just 16° at midnight, so it was an early target. Visually its spiral arms appeared as homogeneous brightnesses around the galaxy's two nuclei but there was otherwise little internal detail at low power. A suggestion of structure was more evident at high power. In Westchester, with the 8-inch I only see the bright nuclei and nothing at all of the spiral arms. I've seen even more detail with a 6-inch reflector at Camp Hale in Colorado, but there the altitude is higher by 9,000 feet, and the sky is quite a bit darker, so it's not a fair comparison. Mie scattering is not a problem in the dry Colorado Rockies. The image I made at Medomak of M51 (next page) shows the spray of stars that are being ejected due to the gravitational interaction of the two galaxies.

M81 and M82 fit easily in the binoviewer's 1.61° field of view at 42x. More detail is apparent than when we observe them at home. The spiral arms of M82 are perceptible and the dust lane of M82 was visible even to the Medomak staffers who had never looked through a telescope before. I also looked at M106, M108 (in Canes Venatici) and M109, and even caught the Owl Nebula (M97) as a discernable puff of light.



M51 (41 x 60 sec)

An object that has always attracted my attention is NGC 7331 in Pegasus, the main galaxy of the so-called Deer Lick group. A 10.35-magnitude spiral, it's surrounded by 14th and 15th magnitude galaxies that are eight to ten times further away from us than NGC 7331, which is 45 million light years (LY) distant.



NGC 7331 and friends (23x120 sec)

As Steve Bellavia showed in the [September 2025 SkyWAArch](#), supernova SN2025rbs appeared close to the nucleus of NGC 7331 on July 14. It would still be near peak brightness, but it's too close to the core for my image to show it clearly. I could have tried for nearby Stephan's Quintet, but Robert Werkman showed it to me visually in the 22", a real treat, and so I moved on to other objects.

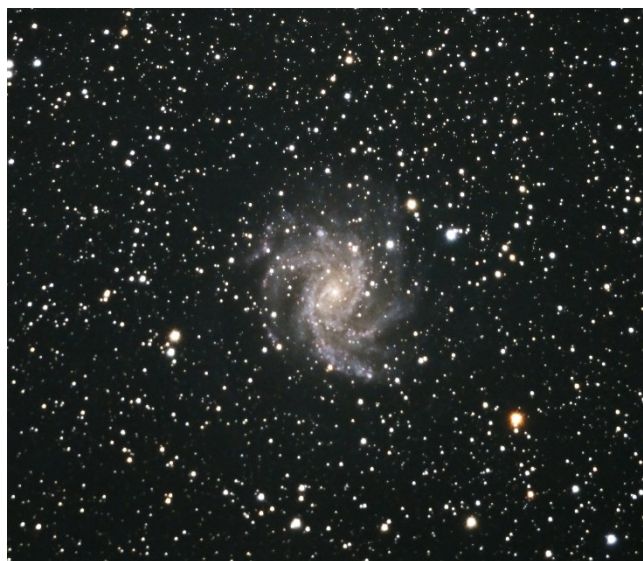
The dust lane of 10.8 magnitude edge-on spiral NGC 891 in Andromeda was evident visually. See page 7 for more on NGC 891.



NGC 891 (14 x 120 sec)

While in that area of the sky, I had a great look at Messier 31 through the binos. Both satellite galaxies, M32 and M110, fit in the field of view at 42x. M31's dust lanes were evident. This was a big hit with the folks who came by to try out the binos. I didn't try to image because the half-degree field of the C5 meant I could only grab the core.

I gave the Fireworks Galaxy (NGC 6946) in Draco a try with the C5. The slightly asymmetrical spiral arms are always intriguing. This is an image that could benefit from star removal and reconstitution with Starnet++.



NGC 6946 (30 x 120 sec)

One evening, Peter Rothstein mentioned that he was going for the 9th magnitude Sculptor Galaxy, NGC 253. As wide as the full Moon, it's a southern object, at declination -25° , and is usually lost in the NYC light dome (or the trees) when we try for it at our star parties. I've seen it only rarely. Even though it was only 20° above the southern horizon at 2 a.m. at Medomak, it was quite distinct in the binos. The image shows a lot of internal structure.



NGC 253 in Sculptor (21 x 60 sec)

At a similar southerly declination but 30° to the west is the often-imaged Helix Nebula (NGC 7293) in Aquarius, nominally 16 arcminutes in diameter and with a reported magnitude of 7.5. As with many extended objects the eye perceives it as much dimmer. I could barely make it out in the eyepiece, but even without a dual-band filter it made a colorful picture on my iPad screen.

The Helix is the closest planetary nebula to the solar system, just 655 LY away. Of the familiar planetaries, the Dumbbell is 1260 LY distant, the Owl 2,030 LY, the Ring 2,657 LY, and the Cat's Eye 3,300 LY. The Helix was formed about 10,000 years ago and is expanding at a rate of 31 km/sec.

Typical of a planetary nebula, it shines in $H\alpha$ and $OIII$ wavelengths and deserves a proper dual-band filter when using a color imaging camera, and single narrowband filters for more sophisticated imaging with monochrome cameras. Compare the color with Tony Ortega's image on page 10.



Helix Nebula (18 x 180 sec)

I did find one narrowband filter in my kit, a 12 nm $H\alpha$ filter, so I looked for something overhead that might be interesting. Using the ASIAir software's planetarium feature, I came upon the Cave Nebula (Caldwell 9, LBN 529, SH 2-155) in Cepheus. I put the filter on and imaged for an hour centered on the brightest part of the nebula. In color the nebulosity and stars are garish red, but since it's a single wavelength, I reduced it to monochrome. I think it's kind of a blah result. $H\alpha$ imaging really needs a monochrome camera, much more time and a wider field.



Cave Nebula SH2-155 in $H\alpha$ (20 x 180 sec)

By 3:30 a.m. on the morning of August 23, only four of us remained on the field, taking advantage of excellent transparency, palpably excited to see the winter constellations rising in the east. Astronomical twilight would begin at 4:08 a.m. The Moon was new. What to image last? The Pleiades and Hyades had risen and Jupiter had just peeked over the low line of trees to the east. The Crab Nebula (M1) was up and so I grabbed 24 minutes' worth of data on it. The image doesn't show much detail but clearly something is going on in that amazing object.



M1 (24 x 60 sec)

After shutting down and covering the equipment, leaving only Robert with his 22" Dob on the field to finish up his viewing program, I headed back to my cabin, 250 yards west of the observing field. Halfway there I turned around and looked again to the east. Venus had risen above the trees, brilliant at magnitude -4.0 . Ten degrees above it and a bit to the south, Jupiter was shining at magnitude -2.0 . Further south, Saiph, the star marking Orion's right knee, had just cleared the trees, and the entire constellation was visible, albeit leaning over on his side. The belt and sword were brilliant as well. It was a spectacular and dramatic sight. I had no camera, and anyway an image would not have been adequate to communicate the impact the view had on me. With all the instrumentation and technology at our disposal, there's still nothing like a great naked-eye view in a dark sky. It was a fabulous way to end a great week of observing.

When you look at the great images in *SkyWAatch* by Steve Bellavia, Robin Stuart, Oliver Prache and other WAA members, you can (and should) turn up your nose at my simplistic attempts. So why do I bother? First, it's the toy factor. It's just fun to do it. The AM5 strain wave mount/ASIAir combination is just so cool. It sounds almost musical when slewing. Second, there are beautiful objects that are barely perceivable in the eyepiece. They warrant a better view, but I'm not going to wrestle with a gigantic Dobsonian. In the pre-light pollution past a fuzzy blob in a 6" reflector was enough to satisfy, but "how are you going to keep them down on the farm after they've seen Pa-ree?" as the old World War I song goes. We've been exposed to great astronomy images and in this new world a fuzzy blob may *not* be enough, although it's clearly fulfilling for Robert Werkman and other dedicated, expert visual observers willing to grapple with big scopes to find rarities. Amateur astronomy benefits from the diversity of instrumentation and the advance of technology. No longer does a summer star party have to consist of just M13 and Albireo.

My imaging attempts are just a kind of "Seestar heavy." The advantage over a Seestar is larger aperture, image scale, and resolution. The main disadvantage (except for gearheads) is the equipment and software complexity. Imaging resolution is expressed as arcseconds per pixel, the calculation based on Dawes' limit, the theoretical threshold of an optical system to distinguish close objects. The atmosphere, however, plays a critical role. "Seeing" varies substantially. The atmosphere distorts wave fronts and limits resolution to about 0.4 arcsecond at very high altitudes, such as Mauna Kea. For us, the rare nights of excellent seeing yields about 1 arcsecond resolution but typical seeing is 2-4 arcseconds. The C5 has a calculated resolution of 0.62 arcseconds/pixel, so the detail of a view or image is what the atmosphere will allow. The Seestar S30 has a resolution of 3.99 arcseconds/pixel, so it's going to lose some detail. It's the nature of the beast. The Seestar S50 has a resolution of 2.39 arcseconds/pixel, so it's closer to capturing maximum resolution on nights of average seeing. A Seestar S70 is coming.

Don't get me wrong: Seestars are terrific. I have one. Amateur astronomers have a range of goals and a plethora of tools to accomplish those goals. The best telescope, or the best camera, is the one you use! ■

Images by Members

Bubble Nebula NGC 7635 with Seestar by Olivier Prache



Taken at the Medomak Astronomy Retreat in Maine. Seestar 50 in equatorial mode, total of 5 hours 13 minutes. Processed with PixInsight. Olivier cropped the image; the field is 22 x 30 arcminutes (astronomy.net). The Bubble is created by stellar wind from HD 220057, magnitude 6.94, class B3, the bright star on the right.

Messier 13 by Leandro Beno

In this 1.05 x 1.05 degree image, Leandro captured two distant galaxies. NGC 6207 is clearly seen on the upper left. It's an 11.7 magnitude spiral 30 million light-years distant. About halfway between the core of the cluster and the galaxy is IC 4617, a 16th-magnitude spiral at a distance of 550 million light years. You will have to enlarge the page to see it. See also page 19.

Askar 71f 490-mm f/6.9 telescope, ZWO IMX533MC camera, light pollution filter, 70 x 1 minute subs, from Leandro's backyard in Yonkers.

Crescent Nebula by Leandro Bento

Also from central Yonkers is this image of the Crescent Nebula (NGC 6888) in Cygnus, made with the same telescope and camera combination as Leandro's M13 image, but with an Optolong L-eNhance filter. There were 17 10-minute subs, which means the tracking of Leandro's Sky-Watcher EQM-35 Pro mount was *very good*!

The Crescent is an emission nebula that was created when particles from the stellar wind of Wolf-Rayet star WR 136 (HD 192163) collided with gas ejected from the star earlier in its evolution, as it was becoming a red giant. Shock waves heat the gas to temperatures so high that X-rays are emitted. The nebula is situated in a vast area of hydrogen, accounting for the surrounding nebulosity.

The Lasso Nebula by Steve Bellavia



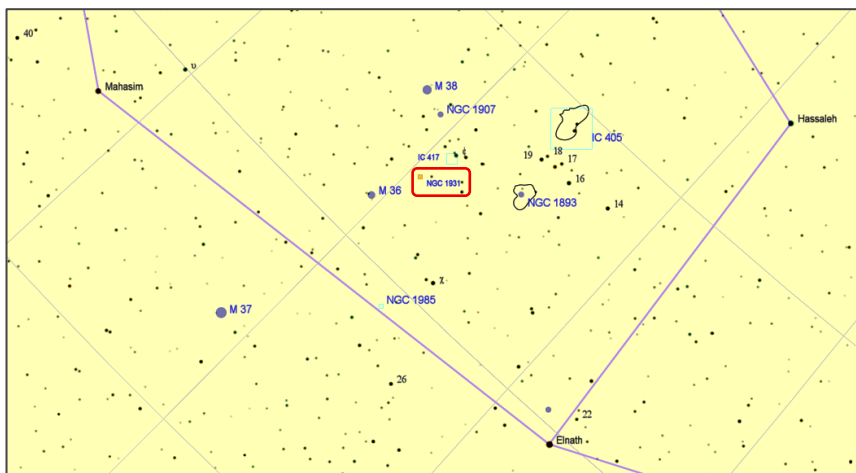
Steve writes, "If you have never heard of the 'Lasso nebula' it's because I just made up that name. Lynds Bright Nebula (LBN) 468 is an HII region that straddles the constellations Cepheus and Draco, 1,600 light-years from Earth. LBN 468 is a large complex of both bright and dark nebulosity. It contains regions of dusty interstellar matter where star formation is occurring. A notable feature within it is Gyulbudaghian's Nebula (HH 215), a small reflection nebula at the tip of the arrow-shaped formation. It's illuminated by the variable protostar PV Cephei and changes brightness and shape over time." It's the light blue object in line with the arrow. The field is 1.78 x 1.87 degrees. Technical details at <https://app.astrobin.com/i/mi0ocv>.

NGC 1931 by Arthur Miller

NGC 1931 is a reflection and emission nebula around a young star cluster in the constellation Auriga. The nebula shares similarities to the Orion Nebula as it is a mixed emission-reflection nebula that also contains a small trapezium of hot young stars. At around 2 million years of age, most of the ongoing star formation in the star cluster is hidden away inside the nebula. The object was discovered by William Herschel in 1793,

The Image was made with a Skywatcher 120 Esprit Edge HD with a QHY 268C color camera and Optolong L-extreme filter, all on an Astro-Physics 900GTO mount on a pier. Fifty 300-second exposures were processed with Photoshop 2025 with Topaz add-ins.

On the right side of the image is IC 417, an emission nebula and open cluster discovered photographically by Max Wolf in 1892. It is about 10,000 light years away from us, in the opposite direction from the galactic center. NGC 1931 and IC 417 are about 90 arcminutes apart.



Two DSOs in Cepheus with a Seestar 50 by Charles Seife

New WAA member Charles Seife made these two images in Scarsdale. The Iris Nebula (NGC 7023) (top) is a reflection nebula powered by the 7.4 magnitude B2 star HD 200775, located within it. It's 1,300 LY from us. The emission nebula NGC 7822 (bottom) is 2,900 LY distant. BD+66 1673, an O5V binary, is the small 10th magnitude star on the upper left edge of the nebula, in line with the arrow. It powers the emission, not the much cooler magnitude 5.6 K1 star HD 225216 in the middle of the nebula. It is only 305 LY from us.

Waning Gibbous Moon by Larry Faltz

Our nearest celestial neighbor was relatively low in the eastern sky on September 11 at 11:29 p.m. when I made this image in my Larchmont driveway. The scope was a Stellarvue 80-mm f/6 doublet and an ASI290MM monochrome camera. With a 0.5x focal reducer in front of the sensor (effective focal length 240 mm) I was able to get the whole lunar disc. Additionally, I put a Wratten 25A red filter in front of the reducer to boost contrast a little. The whole rig was on a Sky-Watcher AZ-GTI mount. The seeing was about 2/5, what with the Moon being so low and shooting over neighbors' houses. Best 50% of 5,000 frames stacked with Autostakkaert!3, gentle wavelets with Registax 6.1. Mild contrast and brightness adjustments in Photoshop Elements. Note bright Aristarchus on the upper left (see the [July-August 2025 SkyWAArch](#) for more on this interesting crater). Check out the eastern rim of the Mare Serenitatis, where the edges of several craters are still illuminated while night falls around them. Enlarging the image will help.

Research Highlight of the Month

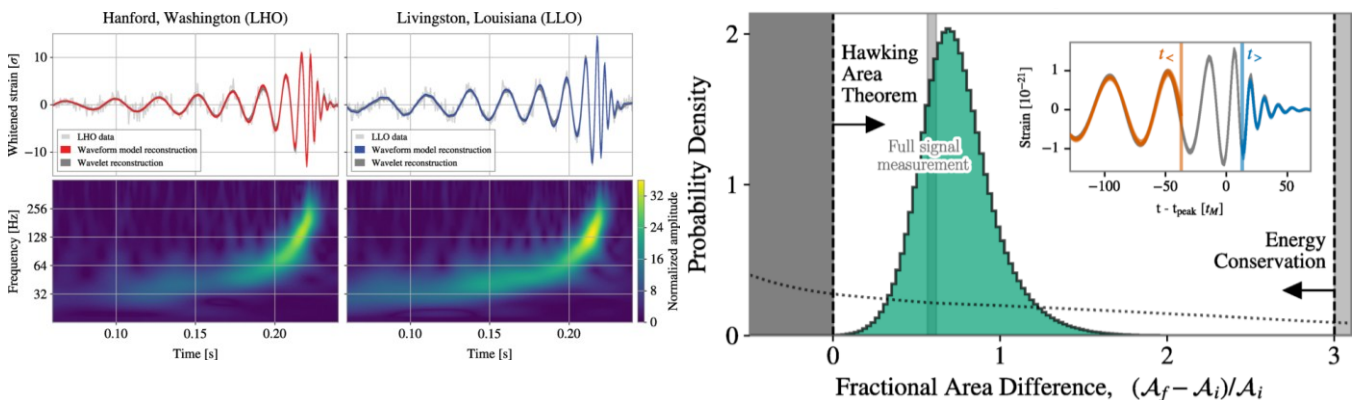
Abac AG, Abouelfettouh I, Acernese, F, et al. (LIGO Scientific, Virgo, and KAGRA Collaborations, 1,773 authors), GW250114: Testing Hawking's Area Law and the Kerr Nature of Black Holes, *Phys. Rev. Lett.* 135, 111403, Published 10 September, 2025 (<https://journals.aps.org/prl/abstract/10.1103/kw5g-d732>)

In the decade after the Nobel Prize-winning discovery of gravitational waves, hundreds of events have been detected, primarily binary black hole (BH) mergers. Advances in technology have improved detector performance and led to breakthroughs in quantum precision measurement. The signal-to-noise ratio of the GW250114 detection was more than three times better than the discovery event, GW150914. During the brief “ring-down” phase after the merger, the resulting BH, with the mass of the two merging BHs less the amount of mass converted to gravitational energy, has not yet completely stabilized. There are decaying vibrations which generate a small amount of GW energy for a short time. Gravitational wave astronomers can now measure the spin and surface area of these objects pre- and post-merger.

Electrically neutral rotating BHs (as all astrophysical BHs are expected to be) are completely described by the Kerr metric, a solution of Einstein's equations of general relativity that depends only on spin and mass (which implies that all spinning BHs are otherwise exactly alike). Kerr BHs form complete thermodynamic systems. Bekenstein showed in 1973 that the total entropy of a BH is proportional to its surface area and does not depend on what collapsed to create it or fell into it afterwards. A year earlier, Hawking had proven that BH event horizons cannot decrease over time. This is known as Hawking's area law, or the second law of black hole mechanics. For merging BHs, the surface area of the final event horizon must be larger than the sum of the areas of the event horizons of the infalling BHs, even though some of the mass-energy of the infalling BHs is radiated away. This may be counterintuitive, but much of black hole behavior seems contradictory, which is one of the things that makes them so fascinating.

The work reported in this article is an analysis of the “ringing modes” of the merged object during the brief 0.05 seconds between merger and stabilization. The merging BHs were fairly close in size, with a total mass of $65.8 (+1.1, -1.2) M_{\odot}$ and a low spin of ≤ 0.24 (a dimensionless quantity). The product BH had a mass of $62.7 (+1.0, -1.1) M_{\odot}$, and a higher spin of 0.68. Using several models, the event horizon areas of the pre- and post-merger BH were derived. The final BHs event horizon was larger than the combined surface areas of the two merged BHs, meaning it has higher entropy and thus proving Hawking's area law.

The authors conclude, “The merged BH is a rotating Kerr black hole and with a surface area consistent with Hawking's area law.... Our results suggest that astrophysical black holes are indeed extremely simple objects that follow general relativity and the Kerr description. The strongly perturbed merger remnant settles into a higher-entropy, quiescent state within a few dynamical timescales.”



Data from LIGO Hanford (left) and LIGO Livingston (right) and GW250114 signal reconstruction.

Fractional difference between the surface area of the final BH event horizon, $\mathcal{A}_f$, and the initial black holes, $\mathcal{A}_i$. Values >0 mean $\mathcal{A}_f > \mathcal{A}_i$.

Member & Club Equipment for Sale			
Item	Description	Asking Price	Name/Email
Sky-Watcher 8" Dobsonian	With Synscan. 8x50 finder scope, 20mm and 12.5mm eyepieces. Only used once, works great. Manufacturer's page here . List \$1,400.	\$650	Anthony Maida LVAM1521@yahoo.com
Meade 2080 8" SCT	A complete, nearly mint condition 8" Meade SCT dating from the 1980s. These were rivals of the Celestron orange tube telescopes and were nearly identical optically and mechanically, with a better RA gear system. 110-volt motor drive on the RA axis, tangent arm on the declination axis. Wedge, excellent Bausch and Lomb tripod (better than the Celestron fixed height tripod). Aluminum dew shield. Telrad finder. This is a non-go-to scope of classic vintage. Image here . If the non-go-to fork mounting is a disincentive, consider deforking the optical tube and mating it to a new strain-wave drive. A Celestron 8" SCT OTA (the equivalent to this Meade) lists at \$1,299. An alt-az go-to 8" Celestron CPC is \$2,800. You could put this OTA on a ZWO AM5n (does both alt-az and EQ) for the same total price and have a scope that's great for both visual and imaging (which the purely alt-az CPC is not).	\$400	WAA ads@westchesterastronomers.org
Steel 2" tripod	From a deceased iOptron mount. Like this one but larger diameter legs. Spreader bar. Center post for azimuth adjustment with a GEM, removable. 3/8" screw thread. A great upgrade for a good mount head that came with a flimsy aluminum tripod. Some wear, mechanically perfect. Donated to WAA.	\$100	WAA ads@westchesterastronomers.org
8-inch f/5 reflector optical tube	Celestron-branded Newtonian OTA with tube rings and Vixen style dovetail plate. Can take 1 1/4 or 2" eyepieces. Like new condition. Donated to WAA.	\$100	WAA ads@westchesterastronomers.org
6-inch f/5 reflector optical tube	Orion-branded scope. 1.25" rack and pinion focuser. Excellent condition optically and mechanically. New 6" f/5 OTAs cost over \$300. Donated to WAA.	\$100	WAA ads@westchesterastronomers.org
1.25" Filters	Thousand Oaks LP-3 Oxygen III (2 available)	\$50	Eugene Lewis genelew1@gmail.com
	Astronomic UHC (2 available)	\$75	
	High Point Neutral Density (2 available)	\$10	
Want to list something for sale in the next issue of the WAA newsletter? Send the description and asking price to ads@westchesterastronomers.org . Member submissions only. Please offer only serious and useful astronomy equipment. WAA reserves the right not to list items we think are not of value to our members. All receipts for items owned by WAA goes to support club activities.			
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