

SPECTRUM

Northern Cross Science Foundation Newsletter

November 2021

North American Splendor

The North American and Pelican Nebulae are revealed in crisp detail by NCSF member Rick Sell, who took this October 16 with a Atik Horizon II camera and a Redcat 51 ED refractor (just 2 inches of aperture). He made 100 exposures of 1 minute each for this final image. See another photo by Rick and more from other members on page 5.

NCSF Holiday meeting returns

Save the date for an in-person holiday celebration meeting on Thursday December 2 starting at 6:00 pm. This will be a social gathering and dinner at the Libby Montana restaurant. 5616 W Donges Bay Rd., Mequon. This is the same place that we held our last in-person meeting on March 5, 2020. We won't, however, have the traditional astronomy White Elephant gift exchange this year. You may bring a guest. RSVP to Gene 262-675-0941, or grdupree@charter.net no later than Wednesday, November 24. Drinks at 6, the meal at 7.



Public observing and event highlights from September and October

By Charlotte and Gene DuPree

We had a clear sky for the observing night at the Reuss Ice Age Visitor Center in Campbellsport on Saturday September 4. It started with Jeff Setzer's talk, then moved outside to the parking lot for viewing after Jackie Scharfenberg, the naturalist educator, turned off the parking lot and inside building lights. Because of the pandemic, the public viewing numbers have been low, although about 60 visitors still attended.

We had another clear sky at the Harrington Beach observatory for public viewing on Sept 10. We looked at Venus, Jupiter, and Saturn, and many other objects. Later on Neptune looked pretty

good. Thanks to Rick Dusenberry and Rick and Susan Sell who set up with their telescopes in the parking lot.

The next night, we were at the Pike Lake Unit state forest. This was the rescheduled Discovery Day at Pike Lake,

November program

For November's meeting, club member Mike Borchert's presentation will be on the sun. We often overlook our closest star. Looking closer, we can learn what is happening to many of its distant relatives. My goal is to have everyone learn something new about our nearest star.

originally slated for June 1. The day started at noon with solar viewing. It was mostly clear with the clouds moving across the sun. Rick and Susan were using their Ha filter looking at a small prominence or two. Al Steinberg and Gene and Charlotte had their scopes with equipped with white light filters and handouts for visitors.

There was an hour dinner break followed by the annual Discovery Day campfire and sing-a-long followed. The clouds had gotten pretty thick by then. We were able to see Jupiter, and Saturn, off and on, but not for very long.

The Moon was only 26 percent full, but we never did see it. We only had a

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Observing report

Observing the Moon Night brings dozens to Harrington Beach and West Bend

The moon was bright and the sky was clear for several Northern Cross Science Foundation members last month, who set up their telescopes at Harrington Beach State Park to participate in the NASA-sponsored [International Observe the Moon Night](#) on Oct. 16. A few dozen people came to the park for a night with comfortable temperatures and light winds.

While NCSF public viewing events normally involve the Plunkett Observatory, the roof was closed on this evening as portable telescopes sufficed to see the waxing gibbous moon lined up with Jupiter and Saturn across the southern sky.

Attending the event were members Joyce Jentges, Jerry Kohlmann, Ernie Mastroianni, Jeff Setzer, Steve Sweeney and Ken and Ann Vallier, bringing gear that ranged from spotting scopes, binoculars, 5-inch Cassegrain and Maksutov telescopes, and Joyce's 8-inch Dobsonian. The prominent lunar craters Gassendi and Kepler were visible in sharp relief along the moon's terminator.

Crowd favorites included the showpiece planets Jupiter and Saturn. Familiar gasps could be heard from those who viewed Saturn's rings for the first time. Jupiter's four moons also provided a visual treat: all were lined up to one side of the gas giant.

Viewing ran from about 7 to 9 pm and was one of nearly 4,000 public lunar-observing events all over the world that registered, according to the NASA website.

- Ernie Mastroianni

Gene DuPree decided he wanted to be a host for the International Observe the Moon night at our home near West Bend. He had a large sign in the front yard for about a week, with the event's name and a time line for public telescope viewing. He put red flashing lights at our dead end street for visitors to find the way. We had between 20 and 25 newcomers that had seen his advertising over the years but never stopped before. - Charlotte DuPree



The moon, Jupiter and Saturn are lined up as 10-year-old Amelia views Jupiter and its moons through Mastroianni's 5-inch Maksutov telescope.



Binoculars, a spotting scope and telescopes offered a variety of views for the moon and planets. At right, a crisp lunar view taken by Jeff Setzer with his iPhone and 5-inch Celestron.



Observing highlights

From page one

 few visitors before it got dark, and no one after then, so we packed up around 8:00. Thanks to Richard and Susan Sell, Rick and Georgine Poulin, Rick Kazmeirski, and Al Steinberg for bringing their telescopes.

Binocular night at Harrington Beach on Wednesday, September 29 was mostly clear, with lightning well to the south and northwest. With the thunder and lightning got closer around 8:30, we decided it was time to leave.

Even after packing up, a few of us spent the next hour standing around talking. It never did rain.

Attending were Gene and Charlotte Dupree, Rick Dusenberry, Jeff Setzer, Joyce Jentges, and Katie Zens.

The Harrington Beach public viewing night on Friday, October 8 was cloudy, without a chance clearing. This was the first time club member Steve Sweeney had been to the observatory. Dan had asked if we could show Steve the operations, so Gene did a mini training session with him. Thanks to Joyce for her support. We did have a few visitors.

Pike Lake public viewing on Saturday, October 9 started with a mostly clear sky and about 20 visitors. Early visitors got a look at Venus, but a high tree line to the west blocked the planet soon after. Jupiter and Saturn were seen by all. Many Messier objects and a few NGC objects were seen before the clouds chased us away. Thanks to Al, Rick, Steve for their assistance.

Observing report

Seeing Western skies with modest aperture on a low-tech mount

Story and photos by Ernie Mastroianni

Joining the traveling hordes this year, my wife and I explored several national parks in Utah and Colorado. Our ambitious four-week driving trip went from mid-September and into October, with stays in resorts, cabins, a glamping tent, and even a mud hut.

For this long-time stargazer, it was a priceless opportunity. Our car is small, so I took only my compact 5-inch SkyWatcher

Maksutov with an alt-azimuth mount. No computer, no batteries, no motors. Just manual controls, a red-dot finder, and the SkySafari app. I had several nights of observing at six venues under some of the darkest skies in the United States. All have [Bortle 2](#) sky ratings.



Ridgway, Colorado: This small southwestern Colorado town is certified by the [International Dark-Sky Association](#) as a dark sky community. I set up my scope in a dew-laden park near our resort at about 1:30 a.m. after moonset. The only unshielded lights were at least a mile or two away. High overhead, the **Andromeda Galaxy** was an easy oblong expanse visible to the naked eye, much wider than I've seen at Harrington. Just below, **M33, the Triangulum Galaxy**, was also naked eye. Through the telescope, its distinct spiral arms were easily visible. Shifting to Andromeda, I could see contrasty dark lanes, and at 47x, the dark lanes and galaxy were visible over four eyepiece fields.

The **Orion Nebula** glowed a pale green and pink to me, and nebulosity filled the eyepiece. **M1, the Crab Nebula**, was as bright as I've ever seen it (rivaling Wisconsin views through my 9.25 inch Celestron) with much more contrast. It was also visible in my 8x42 binoculars.

Monument Valley: We stayed in a mud hut (called a [Hogan](#)) on the Navajo reservation near the Arizona-Utah border. It was luxuriously-appointed and cozy. Outside, the nearly full moon drowned out the stars, and our host's unshielded security light flooded their yard.



The Milky Way and bright Jupiter are visible in the dark skies at the tiny house in Teasdale, Utah, near Capitol Reef National Park. **Right:** Mastroianni poses near the Stargazer tent near Canyonlands N.P.

Nevertheless, the seeing was superb, so Saturn and Jupiter were crisp and steady, even at 190x with an 8mm eyepiece.

Orderville, Utah: (between Zion and Bryce Canyon National Parks): Much to my dismay, a neighbor's barn-blaster security light flooded much of our cabin's yard, leaving just a wedge of darkness in the cabin's shadow. But from that shadow, the southern sky was transparent down to the horizon. The **Lagoon and Trifid Nebulas** (M8 and M20), though fairly low, showed extensive nebulosity, with more contrast than I've previously seen. Farther up, the **Eagle and Swan Nebulas** (M16 and M17) also revealed extensive nebulosity among the rich fields of stars of the summer Milky Way.

Teasdale, Utah (near Capitol Reef National Park): We stayed in a tiny house in a tiny town unblemished by local light trespass, but scattered clouds blocked some parts of the sky. **M13** was big, bright and resolved to the core. The 11.6 magnitude galaxy **NGC 6207**, just an eyepiece-field away, was visible as a small dim wedge.

The biggest treat was **Jupiter**. With rock-steady seeing at 136x, I watched for nearly 20 minutes as **Europa** began a transit, progressing from a white point in the blackness to a distinct white dot moving slowly across the darker cloud bands below.

Glamping tent: [Glamping Canyonlands](#) is far from any city, but close

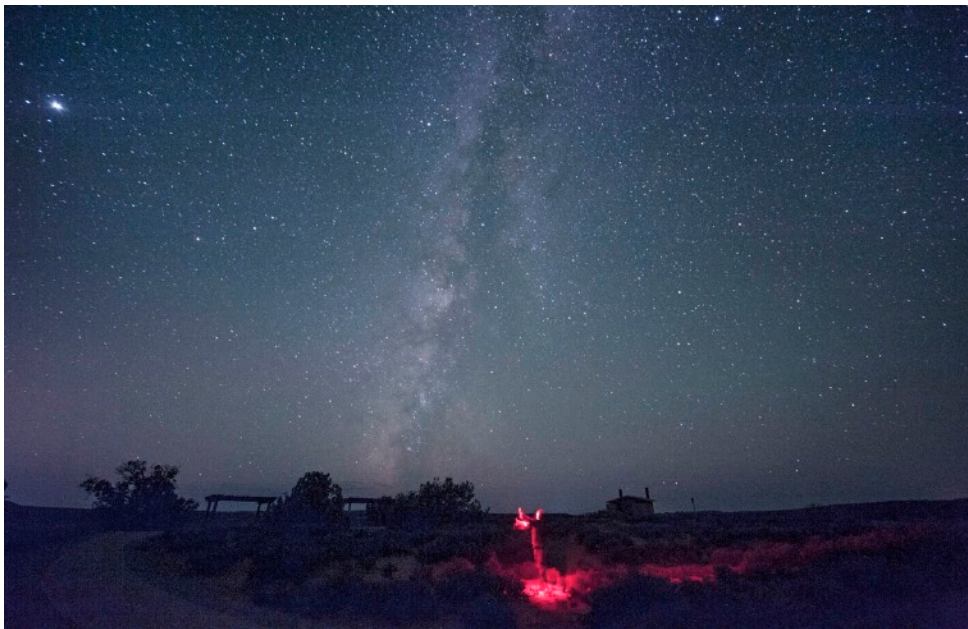


to [Newspaper Rock](#) and Canyonlands National Park. It features luxury tents with beds, linens and a Bortle 2 sky. There was no moon but hazy skies prevailed, perhaps from western wildfire smoke. We stayed in the Stargazer Tent, and stargaze I did. Our nearest neighbor was 50 yards away. But the sky conditions made viewing similar to what we might see at Harrington Beach on a good night.

Panorama Point, Arches National Park: The sky was dark, dry and clear when I arrived. A few dozen casual stargazers were already there so I shifted into public-viewing mode. I shared views of Saturn and Jupiter with nearly a dozen people who were wowed at their first views of the planets. The seeing was excellent and the air was dead still.

When the crowds cleared, it was utterly quiet. No wind, no traffic noise, no light at all except the stars. I pointed the scope toward the **Veil Nebula**. Its' gossamer nebulosity was easy to see, even without a filter. I scanned the scope across the **Witch's Broom** (the Western Veil), the **Eastern Veil**, and the bright knot known as **Pickering's Triangle**. Nearby, the **Fireworks Galaxy (NGC 6946)** and its

See next page



With a red light, Mastroianni poses for a selfie at Arches National Park's Panorama Point. The Milky Way rises through the photo's center. Jupiter shines at upper left.

From page 3 open cluster companion, **NGC 6939**, made a nice pair at 47x. The galaxy showed small knots of nebulosity and was distinct against a rich background of stars. **NGC 7331** was an easy oblong glow, but I could not see the dimmer nearby galaxies known as the **Deerlick Group**. **M74**, in Pisces, which appears dim and unremarkable from Harrington, looked much brighter at Arches, with more contrast and a hint of galaxy arms.

The evening's surprise was **NGC 253**, also known as the **Sculptor Galaxy**. It appeared big and bright with a mottled texture. It glows at 8th magnitude, but its light is spread over a full-moon's width. And from Wisconsin, it sits low in the sky.

These are just the highlights from my nights out west. I saw many more Messier and NGC objects. But the total immersion under pristine skies was breathtaking. You don't need a large telescope to explore the universe. I can only imagine the experience with one much larger, but that's for another trip.

October General Meeting

During the October General Meeting via Zoom, numerous topics were discussed as club members kept up a busy schedule of outreach and participation. Mike Borchert mentioned the upcoming ALCON convention in Albuquerque next year on July 28-30. He also remarked on the surge in NCSF membership in recent months. Active members now tally 63.

Jeff Setzer noted the upcoming public events for October at Harrington Beach and Pike Lake. He also briefly reported on the October Wisconsin Observers Weekend (WOW), held at Hartman Creek State Park. The new event replicates the annual WOW event normally held in June. He said that the skies were clear only for a couple hours on Saturday, Oct. 2. NCSF members who attended included Gene and Charlotte DuPree, Rick Kazmierski, Joyce Jentges and the Zellners. Kevin Bert and his wife Kathy were also there, and Kevin brought a 4.5 inch table-top Dobsonian library telescope. Setzer said that Kevin made a robust stand for it. The weather was relatively warm, and Setzer said that the event should definitely be held again next year.

Joyce Jentges had the main program on the Webb Telescope, which she also presented on Oct. 27 at the Port Washington Library.

She added that teachers at the Random Lake school district have asked the NCSF to do an observing night. The event, now scheduled for Nov. 10, with a cloud/rain date of Nov. 11, will be held from 6 to 8 pm in the parking lot behind the Random Lake High School, 605 Random Lake Road. Members are encouraged to come with telescopes.

Treasurer Gene DuPree reported \$11,123.79 in the NCSF club account, and paid a \$19.10 electric bill for the Plunkett Observatory. - *Ernie Mastroianni*

Looking ahead

November 4, Thursday, 7:30 pm

General Meeting via Zoom

Topic: The Sun, by Mike Borchert

November 10, Wednesday 6-8 pm

Random Lake School observing night

605 Random Lake Rd. November 11 cloud date

December 2, Thursday, 6:00 pm

Holiday Dinner Meeting

Libby Montana restaurant

5616 W Donges Bay Rd., Mequon

December 18, 2021, 7:20 am

(Tentative launch date)

James Webb Telescope

European Spaceport,

Kourou, French Guiana

May 13-14, 2022

NCRAL convention

Port Washington

September General Meeting

At September's meeting, president Jeff Setzer reported on his attendance to the ALCON 2021 meeting last August, which was virtual this year. Joyce Jentges also attended. Among the speakers was astrophysicist Jocelyn Bell Burnell, who discovered the first Pulsar.

Setzer also added that the Astronomical League, which encompasses most amateur astronomy clubs in the US, has more than 21,000 members, including all who are members of this club. Future AL plans include a 2024 solar eclipse presence, most likely somewhere in Texas.

Other discussions included the upcoming public viewing events and more observatory training sessions. Setzer suggested reaching out to Dan and Kevin Bert for details on observatory training.

The evening's main program, presented by NASA Solar System Ambassador [Adam Brizendine](#), was on the Artemis launch system.

Newsletter editor Ernie Mastroianni, who is investigating wireless control of the club's 5-inch refractor mount, said that the Celestron WiFi SkyPortal would be the most useful. It comes with Celestron's free wireless app to run the mount via a smart phone or tablet. It is powered by the mount and is also compatible with SkySafari software. The item is currently on back order.

New member Mark Gibes, one of many new members, dialed in to the meeting and introduced himself and was welcomed by members. - *Ernie Mastroianni*

Imaging Report: IC 1396, the Andromeda Galaxy, and Pillars of Creation

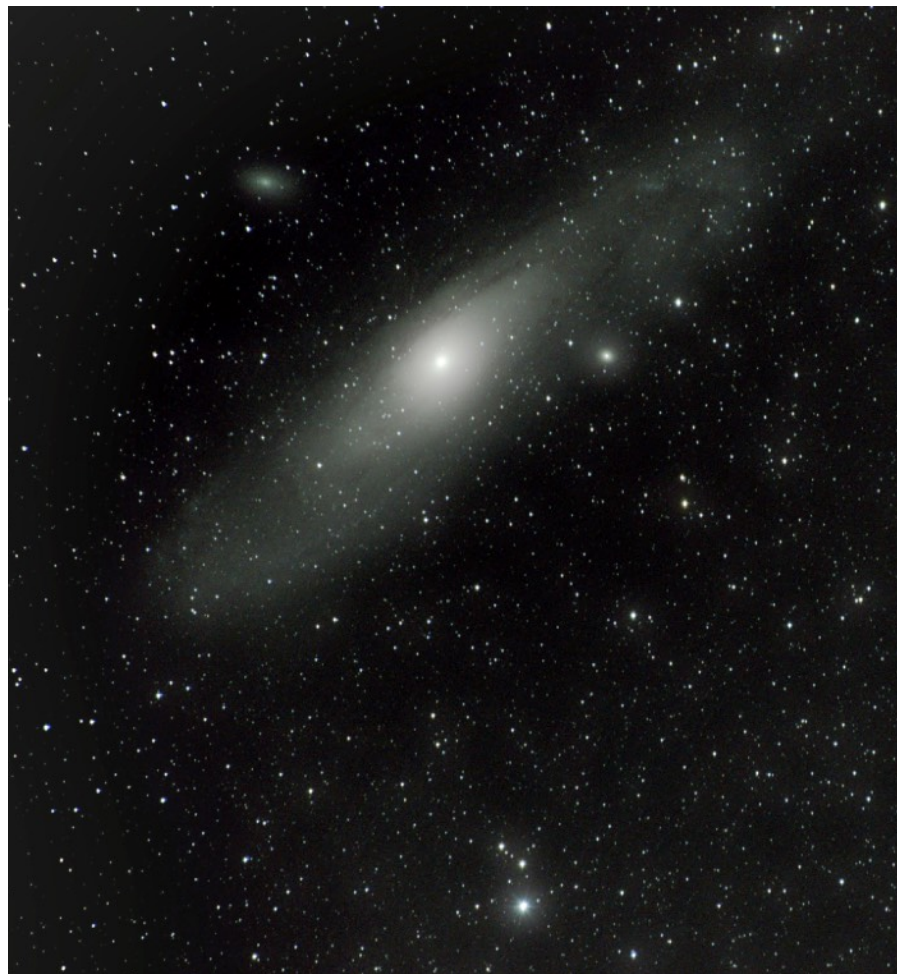


Left: Rick Sell made 155 exposures of one minute each for this final image of IC1396, a large diffuse nebula in Cepheus which includes the Elephant Trunk nebula (bottom center). He used his Redcat 51mm ED refractor, an [Atik Horizon](#) camera and a Celestron CGEM II mount, **pictured below**. His Optolong I-eNhanse filter blocked light pollution and glow from the waxing moon. He's been shooting deep sky photos with various cameras for about four years.



Above: Ernie Mastroianni took this closeup of M16's Pillars of Creation with a Celestron 925 at $f/10$, a QHY 168C camera and an Astro-Physics Mach2 mount. The final image was from 10 exposures at 4 minutes each.

Right: NCSF member Don Woelz used an unmodified Nikon D5600 DSLR and a 70-300mm zoom lens to capture the Andromeda galaxy as well as its satellite galaxies. He used a Sky Watcher Star Adventurer 2i mount and DeepSkyStacker and Photoshop for the post processing of the 38 frames at 45 seconds each.



Want to try imaging with NCSF equipment?
Email [Ernie Mastroianni](#) for more details

Astronomy and spaceflight links

Any comprehensive list of online astronomy links could fill dozens of pages, and as such, this list is selective and is subject to change. All underlined websites are actively linked. Please email me with any more suggestions that you feel would be useful to NCSF members, and let me know if any links are no longer working. - *Ernie Mastroianni, editor*

Astronomy clubs, newsletters and websites

NCSF: <https://ncsf.info>
 Astronomical League: <https://www.astroleague.org/>
The Reflector magazine: <https://www.astroleague.org/reflector>
 Milwaukee Astronomical Society:
<http://milwaukeeastro.org/index.asp>
 North Central region of the AL: <https://ncral.wordpress.com/>
 NCRAL newsletter archive:
<https://ncral.wordpress.com/newsletter-archive/>
 US list of astronomy clubs:
<https://www.astroleague.org/astronomy-clubs-usa-state>

Astronomy gear, vendors and online sellers

<https://www.bhphotovideo.com/>
<https://www.highpointscientific.com/>
<https://optcorp.com>
<https://www.telescope.com/>

Astrophotographers

Astrobin (a paid site for astrophotography uploads):
<https://welcome.astrobin.com/>
 Rogelio Bernal Andreo <http://www.deepskycolors.com>
 Chad Andrist <https://www.astrobin.com/users/SparkyHT/>
 Bob Franke <http://bf-astro.com/>
 Harrington Beach Imagers Group (Ernie Mastroianni and Tom SchmidtKunz)
https://www.astrobin.com/users/Harrington_Beach_Imagers_Group/
 Trevor Jones <https://astrobackyard.com/>
 Rick Kazmierski <http://skyhawkobservatory.com>
 Jerry Lodriguss <http://www.astropix.com/index.html>
 Gabe Shaughnessy: <https://www.astrobin.com/users/AstroGabe/>
 Babak Tafreshi <https://babaktafreshi.com/>

Classifieds

<https://astromart.com/>
<https://www.cloudynights.com/>

Clear sky forecasts

Astrospheric <https://www.astrospheric.com/>
 Clear Dark Sky <https://www.cleardarksky.com/csk/>
 Clear Outside <https://clearoutside.com/forecast/50.7/-3.52>

Digital star atlases

Cartes du Ciel <https://www.ap-i.net/skychart/en/start>
 Stellarium <https://stellarium.org/>
 Sky Safari <https://skysafariastrometry.com/>

Magazines and online astronomy news

Sky & Telescope <https://skyandtelescope.org/>
Astronomy <https://astronomy.com/>
Astronomy Now <https://astronomynow.com/>
 Skynews <https://skynews.ca/>
The Reflector <https://www.astroleague.org/reflector>
Sky at Night <https://www.skyatnightmagazine.com/>
 Astronomy Picture of the Day
<https://apod.nasa.gov/apod/astropix.html>



This Hubble Space Telescope photo showcases the spiral galaxy UGC 2885, located 232 million light-years away in the constellation Perseus. The galaxy has been nicknamed "Rubin's galaxy," after astronomer Vera Rubin (1928 – 2016), who studied the galaxy's rotation rate in search of dark matter. - From Hubblesite.org and the [Astronomy Picture of the Day](#).

NASA images and missions

James Webb telescope https://www.nasa.gov/mission_pages/webb/main/index.html
 Hubble telescope <https://hubblesite.org/>
 NASA JPL Curiosity <https://www.jpl.nasa.gov/missions/mars-science-laboratory-curiosity-rover-msl>
 NASA JPL Juno at Jupiter <https://www.jpl.nasa.gov/missions/juno>
 NASA JPL Mars 2020 <https://www.jpl.nasa.gov/missions/mars-2020-perseverance-rover>
 NASA Johnson Space Center on Flickr
<https://www.flickr.com/photos/nasa2explore/>
 NASA Images
<https://www.nasa.gov/multimedia/imagegallery/index.html>
<https://images.nasa.gov/>
 NASA International Space Station
https://www.nasa.gov/mission_pages/station/main/index.html
 NASA Kennedy on Flickr
<https://www.flickr.com/photos/nasakennedy/>
 NASA Project Apollo Hasselblad scans:
<https://www.flickr.com/photos/projectapolloarchive/albums>

NASA Research Centers

Ames Research Center <https://www.nasa.gov/ames>
 Armstrong Flight Research Center
<https://www.nasa.gov/centers/armstrong/home/index.html>
 Jet Propulsion Laboratory
<https://www.nasa.gov/centers/jpl/home/index.html>
 White Sands https://www.nasa.gov/centers/wstf/index_new.html
 Johnson Space Center
<https://www.nasa.gov/centers/johnson/home/index.html>
 Marshall Space Flight Center
<https://www.nasa.gov/centers/marshall/home/index.html>
 Michoud Assembly Facility
<https://www.nasa.gov/centers/marshall/michoud/index.html>



Private SpaceX flight splashdown

After three days orbiting Earth, Dragon and the [Inspiration4](#) crew – the world's first civilian mission to orbit – splashed down off the coast of Florida at 7:06 p.m. EDT on Saturday, September 18, completing their historic mission.

The crew conducted research on human health in earth orbit. [Inspiration4](#) was commanded by Jared Isaacman, founder and CEO of Shift4 Payments.

Joining him were Medical Officer Hayley Arceneaux, a physician assistant at St. Jude Children's Research Hospital and pediatric cancer survivor; Mission Specialist Chris Sembroski, an Air Force veteran and aerospace data engineer; and Mission Pilot Sian Proctor, a geoscientist and trained pilot. The mission also raised more than \$210 million for [St. Jude Children's Research Hospital](#) - *From the SpaceX website*

NASA Research Centers (continued)

Stennis Space Center

<https://www.nasa.gov/centers/stennis/home/index.html>

Glenn Research Center

<https://www.nasa.gov/centers/glenn/home/index.html>

Plum Brook Station <https://www.nasa.gov/centers/glenn/about/testfacilities/index.html>

Katherine Johnson IV&V facility

<https://www.nasa.gov/centers/ivv/home/index.html>

Goddard Space Flight Center <https://www.nasa.gov/goddard>

Mary W. Jackson NASA headquarters

<https://www.nasa.gov/centers/hq/home/index.html>

Wallops Flight Facility

<https://www.nasa.gov/centers/wallops/home>

Langley Research Center <https://www.nasa.gov/langley>

Kennedy Space Center

<https://www.nasa.gov/centers/kennedy/home/index.html>

Observatories

UW Astronomy <http://www.astro.wisc.edu/>

Gemini <http://www.gemini.edu/>

WM Keck <http://www.keckobservatory.org/>

European Southern Observatory <https://www.eso.org/public/>

ESO images <https://www.eso.org/public/images/>

National Optical Astronomy Observatory

https://www.noao.edu/image_gallery/

National Radio Astronomy Observatory <https://public.nrao.edu/>

Lowell Observatory: <https://lowell.edu/>

Observing

Clear Skies Observing Guides <https://clearskies.eu/csog/>

Current comets: <http://www.aerith.net/comet/weekly/current.html>

Fred Espanek's eclipse guide: <http://mreclipse.com>

Upcoming and seasonal events: <https://in-the-sky.org/>

ISS transits: transit-finder.com

CCD calculator: <https://new-astronomy-ccdcalc.software.informer.com/>

Tonight's Sky localized <https://telescopius.com/>

Jupiter's Great Red Spot transit

Outreach organizations

Planetary Society <https://www.planetary.org/>

Night Sky Network from JPL/NASA <https://nightsky.jpl.nasa.gov>

Citizen science participation <https://cosmoquest.org>

NASA Solar System Ambassadors <https://solarsystem.nasa.gov/solar-system-ambassadors/events/>

Sky calendars

<https://skyandtelescope.org/observing/sky-at-a-glance/>

<https://astronomy.com/observing>

Upcoming and seasonal events <https://in-the-sky.org/>

Spaceflight news, blogs, commercial and foreign space agencies

Earth and Sky: <https://earthsky.org/>

NASA blogs: <https://blogs.nasa.gov>

NASA Spaceflight <https://www.nasaspaceflight.com/>

NASA Watch <http://www.nasawatch.com>

Spaceflight Now <https://spaceflightnow.com/>

Spaceflight Insider: <https://www.spaceflightinsider.com/>

Space News: <https://spacenews.com/>

Space Weather <https://spaceweather.com/>

Space Journal of Asgardia (a borderless nation of space enthusiasts) <https://room.eu.com/>

Universe Today <https://www.universetoday.com/>

Spaceflight: commercial and foreign space agencies

Blue Origin <https://www.blueorigin.com/>

Boeing <https://www.boeing.com/space/>

China National Space Agency : <http://www.cnsa.gov.cn/english/>

European Space Agency <http://www.esa.int/>

India space agency: <https://www.isro.gov.in/>

Lockheed Martin Space

<https://www.lockheedmartin.com/en-us/capabilities/space.html>

Roscosmos (Russian space agency): <http://en.roscosmos.ru/>

Sierra Nevada Corp. <https://www.sncorp.com/space-systems/>

SpaceX: <https://www.spacex.com/>

United Launch Alliance <https://www.ulalaunch.com/>

Virgin Galactic: <https://www.virgingalactic.com/>

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NCSF is a member of the [North-Central Region of the Astronomical League](#).



NCSF supports the [International Dark Sky Association](#)

**Tools for Exploration**

Technicians test the [James Webb telescope](#) at the European Space Center in Kourou, French Guiana last month. The telescope will soon travel a million miles to a stable orbit from where it will view the earliest structures of the universe. But you don't have to travel beyond your back yard or spend billions. Even a small telescope, like Jeff Setzer's Halloween-themed Celestron C90, can give awe-inspiring views of the moon, planets, and stars beyond. Photos by NASA and Jeff Setzer

**SPECTRUM newsletter**

Published monthly by the Northern Cross Science Foundation, Inc. (NCSF), a nonprofit amateur astronomy organization based in southeastern Wisconsin. <https://ncsf.info>

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