



PAStimes

Phoenix Astronomical Society

www.pasaz.org

April 2022

Volume 73 Issue 8

PHOENIX ASTRONOMICAL SOCIETY — ESTABLISHED 1948

Mike Mackowski to Speak at Apr 7th Meeting

“Creating a Space-Faring Civilization – An Introduction to the National Space Society”

By Mike Mackowski

The National Space Society (NSS) is a space advocacy organization dedicated to the creation of a spacefaring civilization. Their vision is to use the vast resources of space for the benefit of humanity. —While the concept of “space settlement” may seem like science fiction, industrialists like Elon Musk (SpaceX) and Jeff Bezos (Blue Origin) consider the establishment of human settlements off the Earth as part of their business plan and essential to the survival of the human race. This ambitious vision can be accomplished one small step at a time, and NSS has established a set of milestones needed to make progress towards this goal. There are local chapters all over the world, including here in Phoenix.

Michael J. Mackowski retired from his position as an electrical systems engineer at Orbital ATK (now Northrop Grumman) in October 2018, after over forty years in the

spacecraft design and development field. He has worked on such programs as Landsat 8, the Fermi and Swift gamma ray observatories, the Iridium communications satellite constellation, several NASA science satellites, and the Space Shuttle.

Mike is a long time NSS member and was co-founder of the NSS chapter in St. Louis Space Frontier in the early 1980s. He has been involved in the Phoenix NSS chapter since 2000. He is the former president of the Phoenix chapters of both the National Space Society and the Phoenix Section of the American Institute of Aeronautics and Astronautics (AIAA). Mr. Mackowski also is an Associate Fellow of AIAA, a member of the AIAA History Committee, a fellow of the British Interplanetary Society, a member of the International Plastic Modelers Society, and a member of the International Association of Astronomical Artists. His main websites are:

See “April 7th Meeting” on top of page 4.

<https://www.space-city-mike.net>
<https://www.spaceinminiature.com/index.html>



*Mike Mackowski will be the April 7th Guest Speaker at the virtual PAS Meeting. You don't want to miss this meeting.
Photo provide by Mike.*

“Migratory Planets and Chaos in the Young Solar System”

March 3, 2022 Lecture Review

by: Stu Brackney, President PAS

Be careful my friends, if you think you have a clear understanding of what is happening in our cosmos you are in for a rude awakening. Dr. Renu Malhotra gave all of us an awakening on the forces in play up there on planets, stars, asteroids and of course comets to name a few.

To do this she discussed the placement of planets and the gravitational forces that align them in our solar system, and then she reminded us that where these planets are

now is not where they started billions of years ago. These strong gravitational forces of planets interacting with each other both attract and reject cosmic objects made for a wonderful story of chaos, which Dr. Malhotra shared.

We who have looked at the moon with binoculars and medium telescopes have observed the impact craters on its surface. The moon is some four billion years old, so there is a long story about those impact craters, and Dr. Malhotra was, through her research and that of others, able to explain

See “Migratory Planets,” middle of page 3.



Dr. Malhotra was the spectacular guest speaker for the March 3rd PAS Meeting. Photo provided by Dr. Malhotra.

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Past PAS Recorded Presentations

By Terri Finch, Event Manager

Did you miss a PAS Meeting and wish you could see it? You can get to the link of Past Recorded PAS Meetings with Guest Speakers any time by going to the left hand navigation tool on the PASaz.org website and clicking on "PAS Monthly Meetings." From there a drop down item will appear

and please click on "Videos of Speaker Presentations." You will then find recordings of Past PAS Meetings for your viewing pleasure. The collection is in oldest to newest order. Please work your way to the bottom of the collection to find the most recently recorded PAS Guest Speaker Presentation.

As long as PAS can record the PAS Meetings, PAS will continue to add more recordings to this page. Here is the direct link to the recorded PAS Meetings collection: <https://www.pasaz.org/pas-monthly-meetings/videos-of-speaker-presentations>. Enjoy!

Spring 2022 PAS GUEST SPEAKERS

By Terri Finch, Event Manager

Events@pasaz.org

Due to the Covid-19 pandemic, PAS Meetings are being held via Zoom over the internet. The Zoom link has been added to the calendar listing for that night's meeting and in the Newsletter in the article about the next PAS Meeting. Please visit the PAS calendar at PASaz.org to find out more about these upcoming Meetings and Guest Speakers. If a Meeting will happen

In-Person, the Calendar Listing will give you that info. For a complete list of Guest Speakers, visit: <https://docs.google.com/document/d/1OO-UpaYNvw3p7JCRXCKSjDcbsK60DnvWOoifbqPrNp8/edit?usp=sharing>

Do you have an idea for a guest speaker? Email Paul Facuna VicePresident@pasaz.org the details and contact info for that possible Guest Speaker.

Here are the next scheduled guest speakers at PAS:

V = Virtual Meeting through Zoom

P = In Person at PVCC Main Campus

May 5: Ted Blank, Topic: Mars Ingenuity Helicopter + PAS Election of Officers

Sept 1: TBA

Oct 6: TBA

What's Up For April?

By Don K. Boyd, PAStimes Editor

Name	Date	Rise	Set
Mercury	04-15-22	06:34	16:04
Venus	04-15-22	04:03	15:25
Mars	04-15-22	03:38	14:34
Jupiter	04-15-22	04:42	16:29
Saturn	04-15-22	03:15	13:59
Uranus	04-15-22	06:54	20:22
Neptune	04-15-21	04:40	16:26
Pluto	04-15-22	02:59	11:58

All Times Arizona Time

Bold means the object is "visible" in the evening

PAS is incorporated in the state of Arizona as a non-profit, scientific and educational 501(c)(3) organization. Our newsletter PAStimes is published monthly from September to May and distributed via the Internet. All Issues are available for download on our website www.pasaz.org. Ads for astronomy equipment are provided as a courtesy to sellers and buyers, and do not constitute any endorsement by PAS. All Photos by Don Boyd unless otherwise credited. All articles and photos are copyright their authors or PAStimes.

April 15, 2022

Sunrise: 05:58

Sunset: 19:00

Q1: April 8



Full: April 16



Q3: April 23



New: April 30



Stu's VIEWS

President's Corner April 2022



President Stuart Brackney. Photo provided by Stu.

By Stuart Brackney, PAS President

What a beautiful time of year here in the Phoenix area. Winter night skies are full of fun objects to view with the naked eye, binoculars, and of course your telescope. Your PAS has been busy these past few weeks. We believe we have solved our

emailing issues, which means all of you will now be hearing from us more often, with timely information regarding upcoming events, meetings on ZOOM and of course NASA updates. A loud shout out of appreciation to the task force (Pete Turner, Terri Finch, Eric Steinberg, Alex Vrenios, and Richard Sauerbrun) that addressed this issue. The Task Force was led by one of our PAS members, Mr. Richard Sauerbrun. Thank you, Richard!

Did you know: Our website has tons of information that will help you with your searches regarding astronomy, whether it is viewable objects in the current night sky or how to join our society. It's all there at www.pasaz.org. Take a look. Currently we meet monthly (first Thursday) with our Guest Lecture Series on ZOOM.

Volunteers needed: No one in this or-

ganization is being paid by PAS for their service on the board of directors or as special staff, such as web site Webmaster or Events Chairperson. We do this because we love the mission of PAS, which is, as stated in our Articles of Incorporation:

1. To encourage amateur astronomy.
2. For research, investigation and experimentation into the science of astronomy.
3. To encourage the interest and education of the general public in the science of astronomy.

So, if you are wanting to get involved, we need volunteers to help us to meet our mission goals. One very important task is titled Events Chairperson. There will soon to be two positions available for this activity. If you are interested in lending a hand in scheduling some of our events, coordinating events and promoting them, please contact me at Stubrackney@pasaz.org.

Continued from page 1.

the history of the large versus the small craters, and why their numbers differed. Without much of an atmosphere on the moon, its surface remains stagnant, thus one sees unchanged craters that are millions of years old. Physics as usual in astronomy, was used to explain the data they gathered and why the number of large versus small craters was not the same.

This is a lecture by an amazing re-

Migratory Planets

search professor that you need to see, and can. It can be found on our pasaz.org website under "Videos of Speaker Presentations" meetings, and it's well worth your time. More about Dr. Malhotra:

Dr. Renu Malhotra is Louise Foucar Marshall Science Research Professor and Regents Professor of Planetary Sciences at The University of Arizona in Tucson, where she directed the Theoretical Astro-

physics Program during 2011-2016. She was born in New Delhi and grew up in Hyderabad, India. She earned her M.S. in Physics from the Indian Institute of Technology in Delhi in 1983, and her Ph.D. in Physics from Cornell University in 1988. She did post-doctoral research at Cornell and at Caltech, and worked as a staff scientist at the Lunar and Planetary Institute in Houston.

IMAGED A QUASAR Feb 27th Early Morning

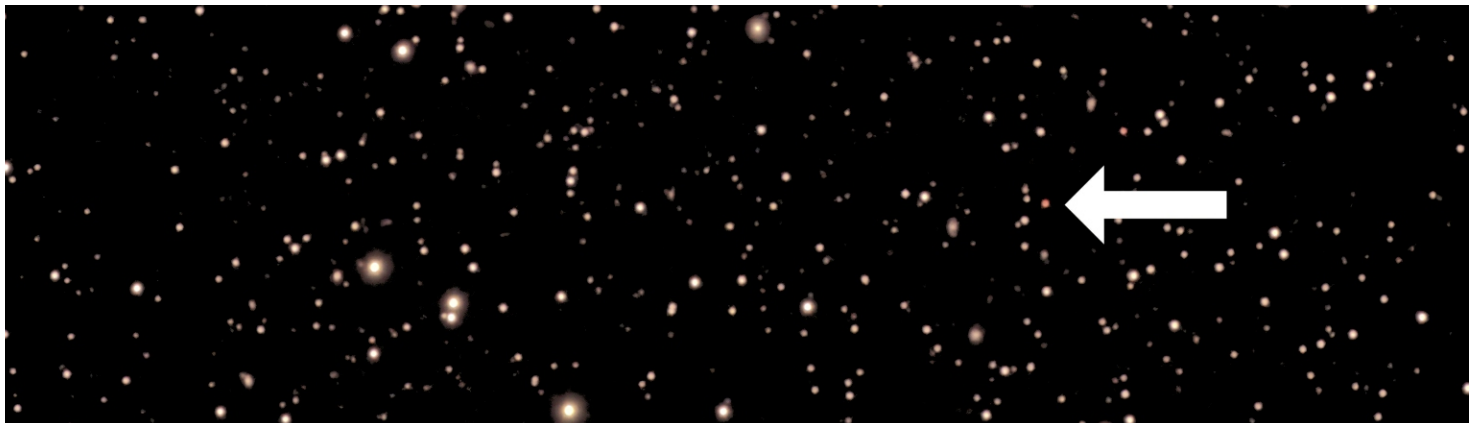
By Mark Johnston, PAS Member

I just imaged APM 08279+5255, a quasar whose light left 12B years ago, just 1.8B years after the Big Bang. What's amazing about it is the quasar itself is now

23B LY away due to the expansion of the universe. High overhead in Lynx tonight. Also in the field several galaxies 190 - 240 M LY away. At the time of its discovery in 1998 it was the most luminous object in the

universe.

Kris Mlak and I braved the cold at the Doney site Saturday night - had super dark skies and zero wind. Also saw the zodiacal light quite prominent after sunset.



This is the furthest thing you have ever seen!!! APM 08279+5255 is a quasar whose light left it 12B years ago. Image taken by Mark Johnston, PAS Member.

April 7th PAS Meeting

By Terri, Event Manager

Please join PAS in welcoming Mike Mackowski as our guest speaker for the April PAS Meeting. Zoom doors open at 7pm for discussion and set up of the Guest

Speaker, and the meeting begins promptly at 7:30pm with a few brief announcements and then Mike takes the floor.

Bring your family and friends to this

meeting. Here's the Zoom Link: <https://us02web.zoom.us/j/86308465940?pwd=S3ZlNmQrU2lpZEV5MzNrUzZRYkNMZz09> See you there!

PAS Bylaws Meeting of the Minds Feb 10

Attending this meeting: Stuart Brackney, Alex Vrenios, Richard Saurebraun, Robert Ewing, Eric Steinberg, Paul Facuna

Changes with minor modifications were passed unanimously.

Final copy of amended bylaws will be published and posted on the website in the near future.

A reminder to all, these were mostly cosmetic changes, not any policy changes.

Minutes of the February 10, 2022 Meeting to Amend PAS Bylaws

7:00 pm President Stuart Brackney opened the meeting with an introduction.

7:05 pm Acting Secretary Alex Vrenios previewed the meeting's events.

7:15 pm Alex presented the 2016 Bylaws, proposed amendments, and bylaws as-amended documents together, for consideration by those in attendance. Being a small meeting with only a few in attendance, attendees were encouraged to interrupt the presentation with their questions. The dozen or so amendments, being cosmetic in nature, were accepted unanimously. Minor alterations were suggested and agreed upon.

The changes that were made:

The change from "Host" to "Host or Hostess" was dropped, being contrary to the modern trend to de-gender nouns.

7:45 pm Alex called for a vote to accept these amendments, per Article 8 of the Bylaws: ARTICLE 8: Amend of the Bylaws This Bylaws may be amended or repealed by a two-thirds vote of the members present at a meeting called for that purpose, for which a summary of all proposed changes have been given to the entire membership. The amendments were unanimously accepted. Alex passed control of the meeting back to President Stuart.

8:00 pm After some final comments and general announcements, President Stuart adjourned the meeting.

Alex agreed to create formal copies of the 2022 Bylaws and post them online.

Minutes of this Meeting were Respectfully Submitted by Alex Vrenios, Acting

Secretary.

List of Changes to the 2016 Bylaws - Actual Amendments

Pream: Center "Preamble" over paragraph.

Last Line: "2nd" to "2"

Article 1: Align header with other articles

b. 1. add "Lifetime" to list of memberships

4. "Groups," to "Groups, Students for example,"

Article 2 d. Underline Secretary

Line 8 "behalf of organization." to "behalf of the organization."

Line 10 "e-mail" to "email"

Line 10 "process if necessary" to "process, if necessary,"

e. Underline "Editor"

f. "Host and or Hostess" to "Host"

Line 1 Underline "Host"

g. Underline "Past President"

Line 2 "officers" to "officer's"

Line 4 "elected and the" to "elected. The"

h. Underline "Board of Directors"

Line 2 "(9)." to "(9), given an active Past President."

Article 3 a. Line 2 "Candidates" to "Nominated candidates"

c. Underline "Terms of Office"

Line 1 "one year." to "one year, beginning in September of the year in which their elections were held."

Line 2 "with 1 Member-at" to "with one Member-at"

d. Underline "Succession"

Line 2 "Host" to "Host or Hostess"

Article 5 a. Underline "Regular Meeting"

c. Line 2 "written" to "receipt of a written"

d. "place if" to "place"

Article 6 Line 1 "incur an obligation" to "incur any obligation"

Bottom: Add a right-justified most recent date of amendment at end:

For example, "As amended, January 6,

2022"

PAS Leadership Team At Work

Membership meeting Held on Feb. 10 to amend PAS Bylaws

By: Stu Brackney, President PAS

The leadership team of PAS conducted a members' meeting on February 10, 2022 to amend our bylaws. This was a house cleaning chore, in that there were no policy changes implemented, but rather some cosmetic changes that re-formatted some typo and grammatical errors that needed attention.

Although the meeting did not register a strong turn-out of members, the core group of Stu Brackney, Eric Steinberg, Richard Sauerbrun, Paul Facuna, Alex Vrenios and Robert Ewing got the job done. Kudos to Alex Vrenios our Acting Secretary for his stellar work on reviewing the bylaws and drafting the changes that were required. This meeting is another example of how members volunteer their time and expertise to make sure this organization operates to its maximum potential. Thank you, gentlemen.

2022 Total Lunar Eclipses

Data borrowed from <https://www.timeanddate.com> by Terri Finch. These events will be visible from Phoenix AZ.

* **May 15-16, 2022** Total Lunar Eclipse

Local Type: total Lunar Eclipse, in Phoenix

Begins: Sun 5/15/2022 at 7:12 PM

Maximum: Sun 5/15/2022 at 9:11 PM

1.413 Magnitude

Ends: Sun 5/15/2022 at 11:50 PM

Duration: 4 hours, 38 minutes

* **Nov 8, 2022** Total Lunar Eclipse

Local Type: Total Lunar Eclipse, in Phoenix

Begins: Tue 11/8/2022 at 1:02 AM

Maximum: Tue 11/8/2022 at 3:59 AM

1.359 Magnitude

Ends: Tue 11/8/2022 at 6:56 AM

Duration: 5 hours, 54 minutes

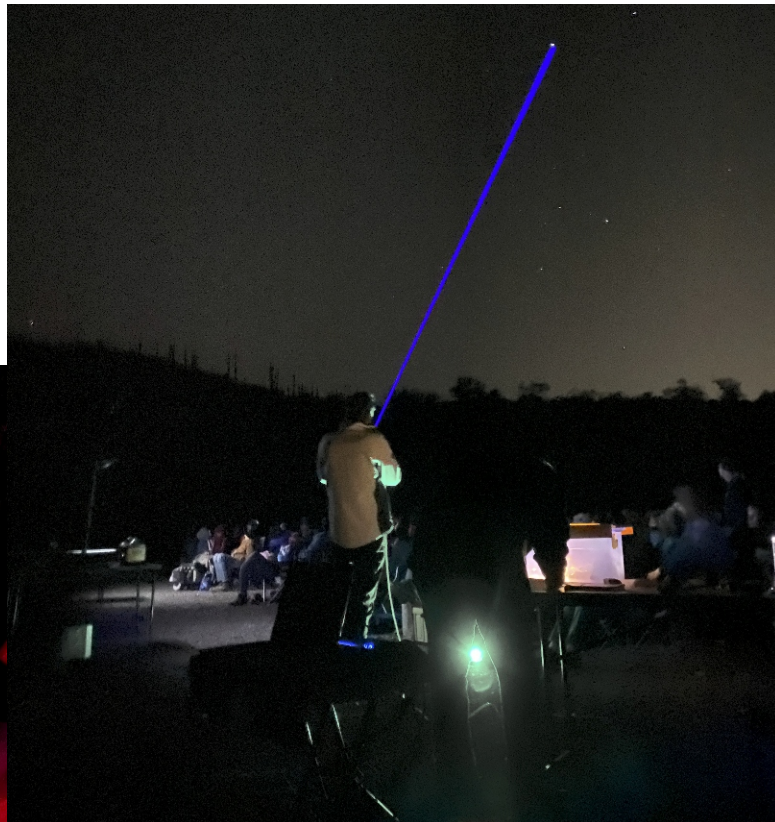
Cave Creek / Spur Cross Star Party Feb 19

By Mark Johnston, PAS Member

Saturday February 19th Stu Brackney and I presented at what may have been the largest star party ever in the state of Arizona. Over 500 guests were educated and entertained in Cave Creek as I pointed my telescope and used Electronically Assisted Astronomy to beam live images through a video camera and PC to 4 large monitors in parallel. We had a PA system and lighting provided by Tonality Tools. A great time was had by all, and we received very positive feedback. The event was in support of the Cave Creek Dark Sky Initiative. Our next major event looks to be in October 2022.



Mark provided many NASA souvenirs for the attendees to take home. Photo by Stu Brackney.



Mark locates and uses his bright laser pointer to "Get Sirius," which is the brightest star in the night sky, this time of year. Photo by Stu Brackney.



This is the Title Screen used at the Feb 19, 2022 Star Party at Spur Cross Ranch in Cave Creek. Image provided by Stu Brackney.



Mark explains how his EAA (Electronically Assisted Astronomy) system works. Photo by Stu Brackney.



While Mark set up his A/V, Stu gave a short presentation about the upcoming viewing session. Photo by Stu Brackney.

Mark Johnston: I was awarded “Solaractivity Picture of the day” with this March 8 photo of the Sun. Solaractivity is the biggest solar observing group on Facebook.



SOLARACTIVITY

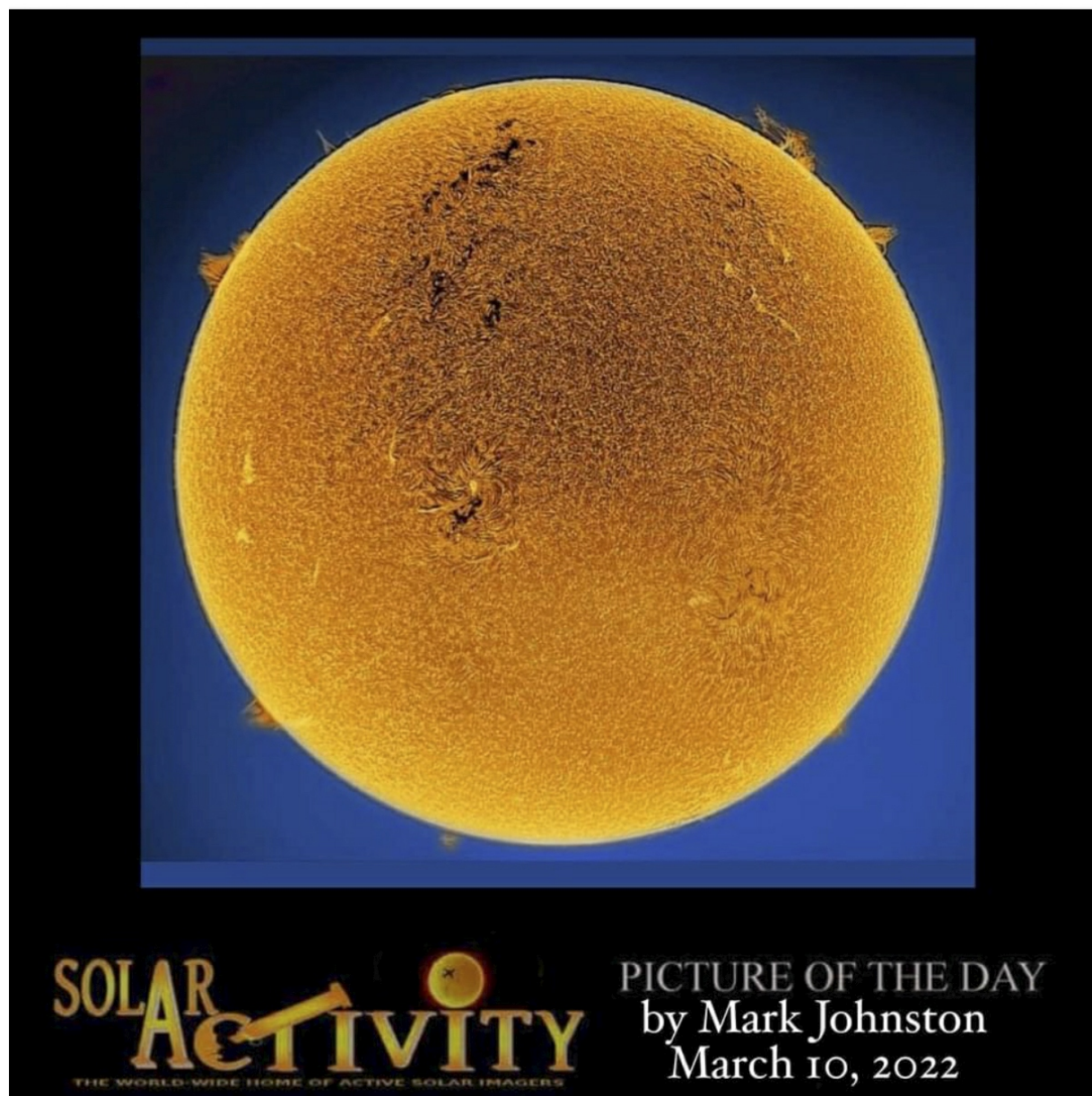


Pamela Shivak · 11m · 🌐

Our SOLARACTIVITY PICTURE OF THE DAY for March 10th, 2022 is this awesome full disk image by [Mark Johnston](#) from Arizona.

Equipment: Lunt 100MT with QHY 5III174

Congratulations Mark and thank you for sharing your work with our group.





Advanced Catspotting: Lynx and Leo Minor

David Prosper

Many constellations are bright, big, and fairly easy to spot. Others can be surprisingly small and faint, but with practice even these challenging star patterns become easier to discern. A couple of fun fainter constellations can be found in between the brighter stars of Ursa Major, Leo, and Gemini: Lynx and Leo Minor, two wild cats hunting among the menagerie of animal-themed northern star patterns!

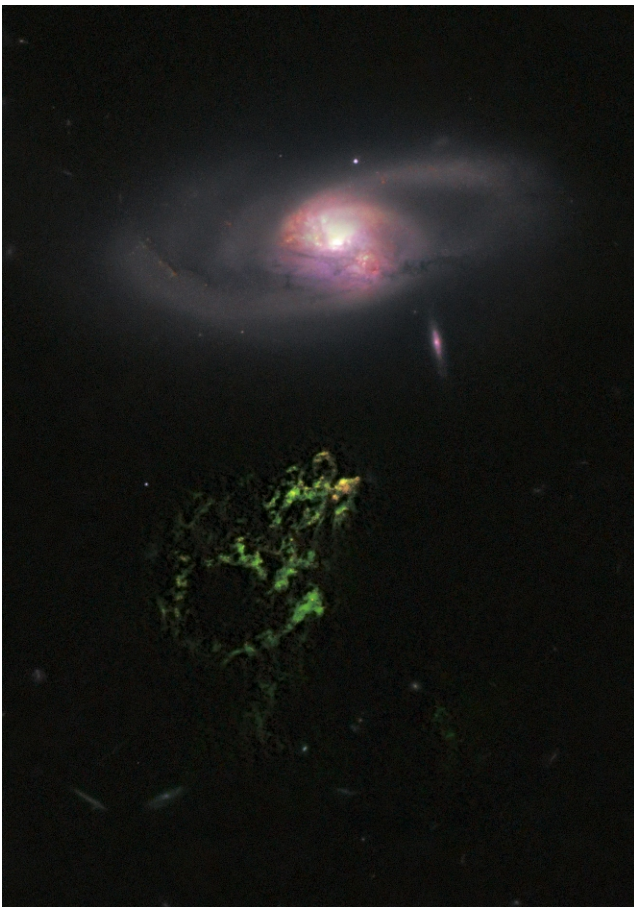
Lynx, named for the species of wild cat, is seen as a faint zigzag pattern found between Ursa Major, Gemini, and Auriga. Grab a telescope and try to spot the remote starry orb of globular cluster NGC 2419. As it is so distant compared to other globular clusters - 300,000 light years from both our solar system and the center of the Milky Way - it was thought that this cluster may be the remnants of a dwarf galaxy consumed by our own. Additional studies have muddled the waters concerning its possible

origins, revealing two distinct populations of stars residing in NGC 2419, which is unusual for normally-homogenous globular clusters and marks it as a fascinating object for further research.

Leo Minor is a faint and diminutive set of stars. Its "triangle" is most noticeable, tucked in between Leo and Ursa Major. Leo Minor is the cub of Leo the Lion, similar to Ursa Minor being the cub to the Great Bear of Ursa Major. While home to some interesting galaxies that can be observed from large amateur scopes under dark skies, perhaps the most intriguing object found within Leo Minor's borders is Hanny's Voorwerp. This unusual deep-space object is thought to be a possible "light echo" of a quasar in neighboring galaxy IC 2497 that has recently "switched off." It was found by Hanny van Arkel, a Dutch schoolteacher, via her participation in the Galaxy Zoo citizen science project. Since then a few more intriguing objects similar to Hanny's

discovery have been found, called "Voorwerpjes."

Lynx and Leo Minor are relatively "new" constellations, as they were both created by the legendary sharp-eyed European astronomer Johannes Hevelius in the late 1600s. A few other constellations originated by Hevelius are still in official use: Canes Venatici, Lacerta, Scutum, Sextans, and Vulpecula. What if your eyes aren't quite as sharp as Johannes Hevelius or if your weather and light pollution make searching for fainter stars more difficult than enjoyable? See if you can spot the next Voorwerp by participating in one of the many citizen science programs offered by NASA at science.nasa.gov/citizenscience/! And of course, you can find the latest updates and observations of even more dim and distant objects at nasa.gov.



Hanny's Voorwerp and the neighboring galaxy IC 2497, as imaged by Hubble. Credits: NASA, ESA, W. Keel (University of Alabama), and the Galaxy Zoo Team Source:

<https://hubblesite.org/contents/news-releases/2011/news-2011-01.html>



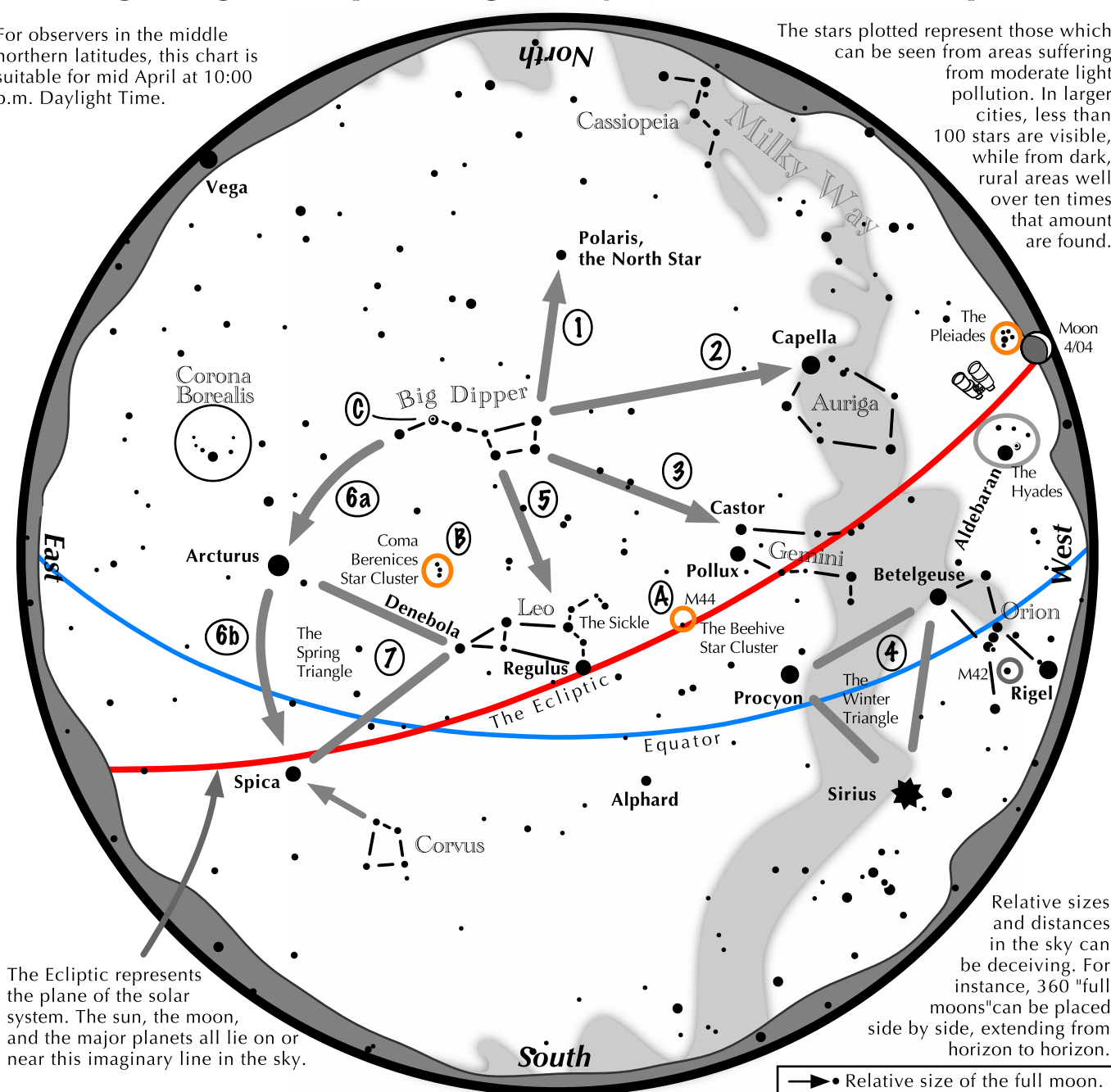
Map of the sky around Lynx and Leo Minor. Notice the prevalence of animal-themed constellations in this area, making it a sort of celestial menagerie. If you are having difficulty locating the fainter stars of Leo Minor and Lynx, don't fret; they are indeed a challenge. Hevelius even named the constellation as reference to the quality of eyesight one needs in order to discern these faint stars, since supposedly one would need eyes as sharp as a Lynx to see it! Darker skies will indeed make your search easier; light pollution, even a relatively bright Moon, will overwhelm the faint stars for both of these celestial wildcats. While you will be able to see NGC 2419 with a backyard telescope, Hanny's Voorwerp is far too faint, but its location is still marked. A few fainter constellation labels and diagrams in this region have been omitted for clarity.

Image created with assistance from Stellarium

Navigating the April Night Sky, Northern Hemisphere

For observers in the middle northern latitudes, this chart is suitable for mid April at 10:00 p.m. Daylight Time.

The stars plotted represent those which can be seen from areas suffering from moderate light pollution. In larger cities, less than 100 stars are visible, while from dark, rural areas well over ten times that amount are found.



Navigating the April night sky: Simply start with what you know or with what you can easily find.

- 1 Extend an imaginary line north from the two stars at the tip of the Big Dipper's bowl. It passes Polaris, the North Star.
- 2 Draw another imaginary line west across the top two stars of the Dipper's bowl. It strikes Capella low in the northwest.
- 3 Through the two diagonal stars of the Dipper's bowl, draw a line pointing to the twin stars of Castor and Pollux in Gemini.
- 4 Look in the west-southwest for the bright Winter Triangle stars of Sirius, Procyon, and Betelgeuse.
- 5 Directly below the Dipper's bowl reclines the constellation Leo with its primary star, Regulus.
- 6 Follow the arc of the Dipper's handle. It first intersects Arcturus, then continues to Spica.
- 7 Arcturus, Spica, and Denebola form the Spring Triangle, a large equilateral triangle.

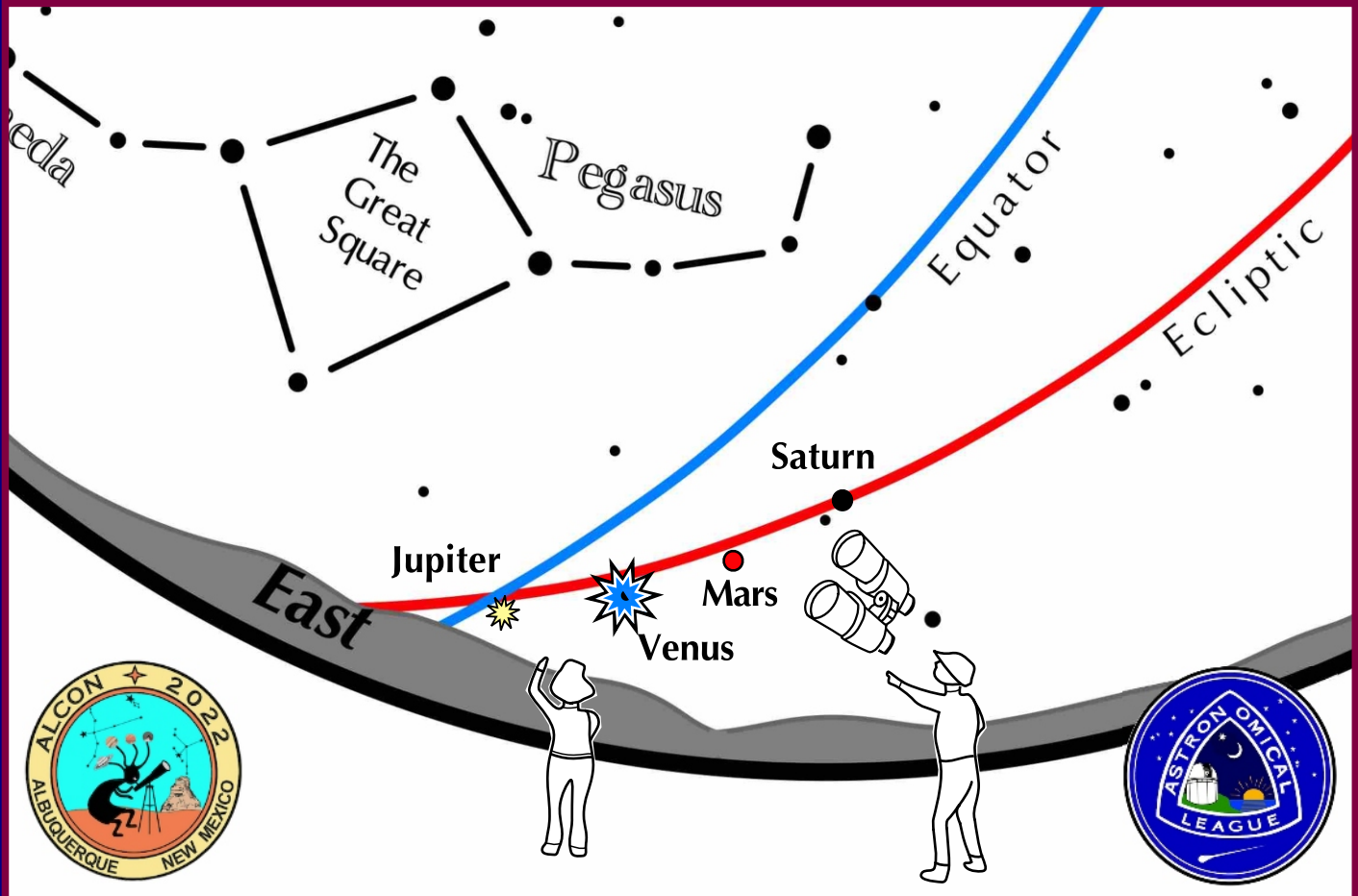
Binocular Highlights

- A:** M44, a star cluster barely visible to the naked eye, lies to the southeast of Pollux.
B: Look nearly overhead for the loose star cluster of Coma Berenices.
C: In the Big Dipper's handle shines Mizar next to a dimmer star, Alcor.



Astronomical League
www.astroleague.org/outreach

**If you can catch only one celestial event
in the morning this April, see this one.**



**Celestial necklace:
Jupiter, Venus, Mars, and Saturn
April 18 - 21**

Look in the east southeast 45 minutes before sunrise on April 18 - 21.

Jupiter climbs above the eastern horizon.

Dazzling Venus commands the area.

Red Mars and Saturn, both about the same brightness, lie further west along the ecliptic.

On those dates, the four planets are evenly spaced along the ecliptic forming a celestial necklace.