



PAStimes

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PHOENIX ASTRONOMICAL SOCIETY — ESTABLISHED 1948

Emily Levesque to Speak at Jan 20th Meeting

By Emily Levesque

“Betelgeuse Is Pretty Cool: Cosmic Questions for our Naked-Eye Neighbor”

Betelgeuse's "Great Dimming" in the winter of 2020 quickly became a source of fascination for both professional and amateur astronomers. Drastic enough to be easily detected with the naked eye, the star's drop in brightness was unprecedented in observational memory and revealed the extent to which the workings of red supergiants (RSGs) are still a mystery. RSGs are the coldest and physically-largest members of the massive star population, making them ideal sources for studying the extremes of stellar physics and a key turning point in the evolution of post-main-sequence massive stars. They are also the precursors of supernovae and a crucial step in the formation of the same binary systems that violently collide and produce gravitational waves. However, our recent studies of Betelgeuse have forced us to confront the many unanswered questions that still surround these strange stars. Using Betelgeuse and its recent behavior as an archetype, this talk will provide an overview of

our current knowledge of RSGs, identify some of the most pressing open questions about these stars, and consider the importance of studying RSGs in the coming decade as the next generation of observatories comes online.

Emily Levesque is an astronomy professor at the University of Washington. Her work explores how the most massive stars in the universe evolve and die. She has observed for upwards of fifty nights on many of the planet's largest telescopes and flown over the Antarctic stratosphere in an experimental aircraft for her research. Her academic accolades include the 2014 Annie Jump Cannon Award, a 2017 Alfred P. Sloan fellowship, a 2019 Cottrell Scholar award, and the 2020 Newton Lacy Pierce Prize. She earned a bachelor's degree in physics from MIT and a PhD in astronomy from the University of Hawaii. She recently published her first popular science book, *The Last Stargazers*, which takes readers on a behind-the-scenes tour through the world of professional astronomy. Emily is an American Astronomer, author, and sought-



Emily Levesque comes to PAS on Jan 20, 2022 to entice our Zoom audience with info about Betelgeuse. Please join the meeting. Photo provided by Emily.

after speaker on astronomy topics.

https://en.wikipedia.org/wiki/Emily_Levesque

See "January 20th Meeting" top of page 3

PAS Meeting: December 2nd in Review

By President Stu Brackney

Speaker: Dr. David Williams

Topic: Rocky, Gassy, Icy, and Dwarf Planets: Exploring the Strange New Worlds of Our Solar System Through NASA's Planetary Missions

Consider yourself lucky if you were able to attend the stellar (pun intended) presentation at our organization's ZOOM meeting on December 2nd. If not, you can go to our website, PASAZ.org under the heading of meetings to view the recording of his lecture.

Dr. David Williams joined us during the first half hour of chat with visitors,

answering various questions before his "Oscar Award" winning presentation. Dr. Williams is no stranger to PAS, having visited on many occasions, updating us on the scientific research he and his colleagues are involved with at Arizona State University and other research facilities.

A little background on this very busy man. Dr. David A. Williams is a Research Professor in the School of Earth and Space Exploration at Arizona State University, Tempe, Arizona. Dr. Williams is the Director of the Ronald Greeley Center for Planetary Studies, a NASA-funded planetary

See "December 2nd Meeting" on page 3.



Photo provided by Dr. David Williams.

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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-UpaYNvw3p7JCRXCKSjDcbsK60DnvW0oifbqPrNp8/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.

at PAS:

V = Virtual Meeting through Zoom

P = In Person at PVCC Main Campus

Feb 3: Alex Woronow, "The Stellina Telescope"

Mar 3: TBA

Apr 7: TBA

May 5: Ted Blank, Topic: Mars Ingenuity Helicopter

Here are the next scheduled guest speakers

What's Up For January?

By Don K. Boyd, PAStimes Editor

Name	Date	Rise	Set
Mercury	01-15-22	08:19	18:53
Venus	01/15/22	06:32	17:06
Mars	01-15-22	05:25	15:16
Jupiter	01-15-22	11:24	22:16
Saturn	01-15-22	08:39	19:06
Uranus	01-15-22	12:39	02:06
Neptune	01-15-21	10:26	20:05
Pluto	01-15-22	07:45	17:42

All Times Arizona Time

Bold means the object is "visible" in the evening

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January 15, 2022

Sunrise: 07:33

Sunset: 17:44

New: January 2



Q1: January 9



Full: January 17



Q3: January 31



Continued from page 1.

By Terri Finch, Event Manager

Another opportunity to hear Emily present... She is giving another virtual talk in the Phoenix area on January 5th. Poisoned Pen bookstore in Scottsdale will be hosting a virtual conversation between Emily and Dana Stabenow that evening at 5PM MT as part of the paperback release of *The Last Stargazers*. If PAS members are interested, they can attend

January 20th Meeting

<https://calendar.time.ly/9plshfqx/posterboard?event=68694499;instance=20220105170000>

Many thanks to Mark Johnston for finding this engaging Guest Speaker for our January 20th meeting. We all look forward to hearing from Emily. She has fantastic presentation reviews and has been seen by many.

Please join PAS in welcoming Emily

to the PAS meeting. The meeting opens at 7pm on Zoom at this link: <https://us02web.zoom.us/j/86482384302?pwd=ek5IK3BseDdyZnNMMzN4WjhSVXVFUT09>. The meeting begins promptly at 7:30pm with a few short announcements from President Stu. You don't want to miss this meeting! Please invite everyone you know! It will be spectacular! See you there!!!

Continued from Page 1.

data center at ASU. He is also the Director of the NASA Planetary Aeolian Laboratory, which administers wind tunnels at the Ames Research Center in California. David is currently performing research in volcanology and planetary geology, with a focus on planetary mapping, geochemical, and remote sensing studies. His current research focuses on planetary geologic mapping of bodies across the Solar System, and computer modeling of the physical and geochemical evolution of lava flows in a variety of planetary environments. He was involved with NASA's Magellan Mission to Venus, Galileo Mission to Jupiter, Dawn Mission to asteroid Vesta and dwarf planet Ceres, and ESA's Mars Express orbiter mission.

Dr. Dave, as he is often referred to, took us on a geographical tour of our solar system and galaxy, listing the previous and more current research missions of NASA and other international space organizations. We all sensed his proud feeling about the

fact that ASU is deeply involved in many of NASA's projects. Most notably we were excited to hear that the James Webb Space Telescope is still a go for launch later this month. What makes this scientific explorer of the cosmos unique is his ability to combine extremely detailed visual slides with easy to understand explanations of very sophisticated missions in outer space. He truly is more than a scientist, he is an educator and explorer rolled into one, and we were fortunate to work our way into his busy schedule.

Paul Facuna, PAS Vice President adds: Dr. Dave, On behalf of the Phoenix Astronomical Society, thank you for the excellent and very interesting presentation comparing Star Trek planet classification to planets and moons found in our solar system and exoplanets. That was a very creative way to create a presentation on the variety of planets, moons and exoplanets that have been found and explored in some way and to some degree. Your presenta-

tions are always informative, interesting and fun.

Thank you Dr. Dave. On behalf of the Phoenix Astronomical Society I wish you and Dr. Kim a very happy, safe and healthy holiday season.

In an email to Dr. Dave, President **Stu** writes: Excellent presentation, I am in awe of what you do for a living.

Terri Finch, Event Manager writes: There were eighteen participants at this meeting. Dr. David Williams always presents to the club the most interesting, informative and fun information. If you missed this meeting and would like to enjoy seeing it, the recording is located on the PASaz.org website here: <https://www.pasaz.org/pas-monthly-meetings/videos-of-speaker-presentations> Many thanks to Dr. Williams. PAS looks forward to a return visit with more great info and another fascinating presentation in 2022.

Virtual vs In-Person PAS Meetings

By Terri Finch, Event Manager

At this time, PAS does not plan to conduct in-person meetings for Spring 2022. The latest COVID-19 variant is more contagious than the previous versions, so in an abundance of caution, PAS will continue to provide virtual meetings and events until the Covid threat is reduced. Here is the list of virtual meeting zoom links and the dates those links will be used for PAS Spring 2022 meetings. Please watch for announcements of if and when PAS offers in-person meetings again. Your patience is appreciat-

ed.

Jan 20 2022:

<https://us02web.zoom.us/j/86482384302?pwd=ek5IK3BseDdyZnNMMzN4WjhSVXVFUT09>

Feb 3 2022:

<https://us02web.zoom.us/j/82279362985?pwd=OEIHCnVaWlJrOVMyeFZJcTRaZEJlUT09>

Mar 3 2022:

<https://us02web.zoom.us/j/88905330174?pwd=N3V2THhpdzdrM1pJQTVGUjc>

5eDhZQT09

Apr 7 2022:

<https://us02web.zoom.us/j/86308465940?pwd=S3ZNQmQrU2lpZEV5MzNrUzZRYkNMZz09>

May 5 2022

<https://us02web.zoom.us/j/81032563398?pwd=UWpSOEZWRS96S3NTL3BDbCtFaGlPQT09>

Wishing you and your family a healthy new year 2022!!! ***

Place your Astronomy Equipment Ad in this Newsletter

Do you have some astronomy-related items you'd like to sell? Prepare an ad and send it my way so that Don and I can help you sell it through the club newsletter. PAS members get this service for free. Items you may wish to sell: Books, Star Charts, Telescopes, Eyepieces, Finder Scopes, and more. As long as it is astronomy-related, I will happily add it to the newsletter. Please include all items you wish to sell, and what is included with those items. Price them, and provide contact info for the way you wish to be notified, such as email or phone

For Sale: 3 Astronomy Items

* William brand. Zenith star refractor 73mm f5.9 PFL APO white body /gold trim rack and pinion 2.5" focuser, 430 focal length \$500. Used 3 times.....new condition.

number. I await your submissions to Starstuff@gmail.com.

Ads for items for sale listed in PAS-times Newsletter are written by the seller. PAS is not responsible for the ads and does not guarantee the quality of the items for sale. PAS reminds everyone, you purchase at your own risk, so do your research beforehand.

Ads in PAStimes run for one month and may be renewed on a month-to-month basis, space permitting, as long as the request to run the ad again is submitted by

* Explore Scientific 2" 2X focal extender, 2 X 2001747 \$200. Used once.....new condition in box.

* iOptron Az mount Pro level and go Alt-Azimuth with the heavy duty 2' tubuler

heavy duty tripod legs. Includes metal carry case. Very good condition. Asking \$880.

The deadline for the February issue will be Dec 25th. These items can also be seen with photos on the PASaz.org website here: <https://www.pasaz.org/items-for-sale>

Contact Roger twinklescope@yahoo.com 602 466 5141

For Sale: A lot of Astronomy Equipment.

* Asking \$1800.00 Takahaski scope
* \$250.00 Takahaski Finder Scope #552
* \$400.00 Takahaski Extender-Q 1.6x
* \$120.00 Takahaski Tube holders of which there are two and a small one
A Starlight 2" Feather Touch Focuser \$344.00
B Celestron #94175 Reducer \$110.00
C TeleVue 2" Mirror Diagonal DPC- 2002 \$120.00
D Meade #918A Diagonal Prism \$25.00
E Meade Series 4000 8-24mm Zoom Eye-

piece \$66.00
F Meade #918A Diagonal Prism \$24.00
G Meade Ultra-Wide angle 8.8 \$40.00
H Celestron # 93506 1 1/4 Japan \$60.00
I Meade #8x50 Finder scope #544 Blue Japan \$34.00
J Mack 111 Hyperion Zoom 8-24mm \$266.00
K Orion 9x50 Right-Angle Image finder \$54.00
L ScopeTronix MaxView 40mm Eyepiece \$34.00
M Orion Black Right-Angle Correct Image \$30.00
(225.00)

N Vixen LV 15mm Lanthanum EyePiece 08626 \$36.00

* Celestron Mount with Pelican Case. Also has a Pier made of 1/4" heavy case pipe. The plate is 1/2 inch. Asking \$1800.00 for all three.

Contact Marge at lovins50@aol.com to set up a visit to see the items you are interested in. Pick up location will be near McDonald Drive & Granite Reef Rd in Scottsdale.

See ad with photos at this link: <https://www.dropbox.com/sh/wwwylpfb11jn9/AABMsoxs-cvpcagtEhqNnVSa?dl=0>

FOR SALE: Meade RCX-400 14-inch telescope. Condition is "like new". Prices listed are the original purchase price – asking price is at end of this Ad:

1. Enhanced diagonal 2-inch Series 5000 (\$180)
2. Meade 24mm wide angle eyepiece

3. Meade Model 1220 Field De-Rotator (\$600)

4. SBIG ST-7XME CCD Dual Sensor USB Camera with case (\$2000)

5. Meade manual and other pertinent manuals/software.

Equipment can be seen and picked up from a location in North Scottsdale, Arizona. Prefer not to ship. Local Pickup please. I will be glad to answer any questions. Total Asking Price for all items listed above is \$5,000.00 plus any shipping/packing costs if required. Contact: Richard rjkarizona@cox.net

Astronomy Outreach at Desert Botanical Garden July 19

By Mark Johnston

July 19 Pete Turner and I supported an event for Eurofins at Desert Botanical Gardens. Eurofins is a company that does substance testing so they had a mix of scientists and salespeople in attendance. It was too cloudy for telescopes, so Pete showed his meteorite collection and I showed a variety of astrophotos I've taken.

It wasn't too busy for us but we did have a few very interested people stop by and chat for a while. Pete had a microscope connected via bluetooth to a tablet to zoom in on the surface of his meteorites, which made it interesting. And, several people said they were impressed with the results of my first year in astrophotography.

Terri Finch, PAS Event Manager adds: Many thanks to Ali Reece at DBG for helping make this event a success with the scheduling of the electric carts to pick up Pete and Mark and all

their equipment for this event. Also, many thanks to Jacqueline Cordova for having PAS at this fantastic event.



Mark Johnston and Pete Turner set up at DBG to do the Eurofins event. Pete shares his meteorites and Mark shares astrophotos he has taken because the skies are too cloudy to provide views through a telescope. Photo taken by Mark.

EAA Cave Creek Nov 7

By Mark Johnston, PAS Member

On November 7, Mark Johnston and Stu Brackney hosted a star party at Spur Cross for the Cave Creek Dark Sky Initiative. About 160 people attended. We had Mark's telescope/camera projected to four 43" TV's so everyone could see.

We showed a variety of targets including M31, M33, M45, NGC 869, NGC457, NGC 7789, the Helix nebula, M27, the Pelican and North America nebulas, Jupiter, Saturn, and the Veil nebula.

There were some clouds so in a few cases we had to show photos Mark had taken instead of a live image but it worked out well and we had many positive written comments submitted afterwards.

The newspaper of Cave Creek, Sonoran News, provided a very good article of this event at this link: <http://sonorannews.com/2021/11/30/cave-creek-arizona-loves-dark-sky-stargazing/> Enjoy!



*It was an amazing turnout and a beautiful night sky to work with
Photo credits: Melissa Weijaczka and Bruce Arlen.*



*Blue Laser lights the sky for the crowd to be able to see what Stu points out in the sky.
Photo credits: Melissa Weijaczka and Bruce Arlen.*



Photo taken by Stu Brackney.



Stu with a big smile on his face. Photo credits: Melissa Weijaczka and Bruce Arlen.



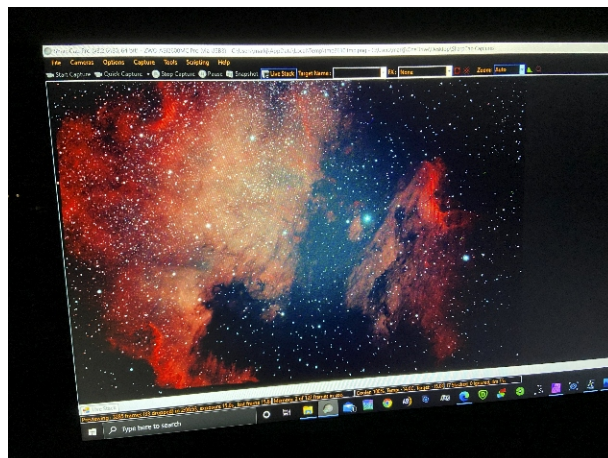
Mark at his telescope. Photo credits: Melissa Weijaczka and Bruce Arlen.

EAA at PPP Nov 26

By Mark Johnston, PAS Member

Nov 26 I did a public EAA star party at Pinnacle Peak Park in Scottsdale. We had a full house of 30 guests. Weather was perfect: clear, calm, good seeing, not too cold. We looked at Venus, Jupiter, Saturn, M31, M33, M45, M27, as well as many nebulae: the Helix, California, both Veils, the Crescent, the Pelican, North America, and the Wizard.

On Dec 17 Mark E-mails: Just found out my California Nebula photo was chosen to be included in the Astronomy January 2022 issue on 101 Must-See Cosmic Objects. It's spread across pages 28-29. First time I've been published in a major magazine!



This is a close up of the California nebula and Mark's telescope set-up. The California Nebula is an emission nebula located in the constellation Perseus. It is so named because it appears to resemble the outline of the U.S. State of California on long exposure photographs.



Hunting the Hunter: Observing Orion

David Prosper

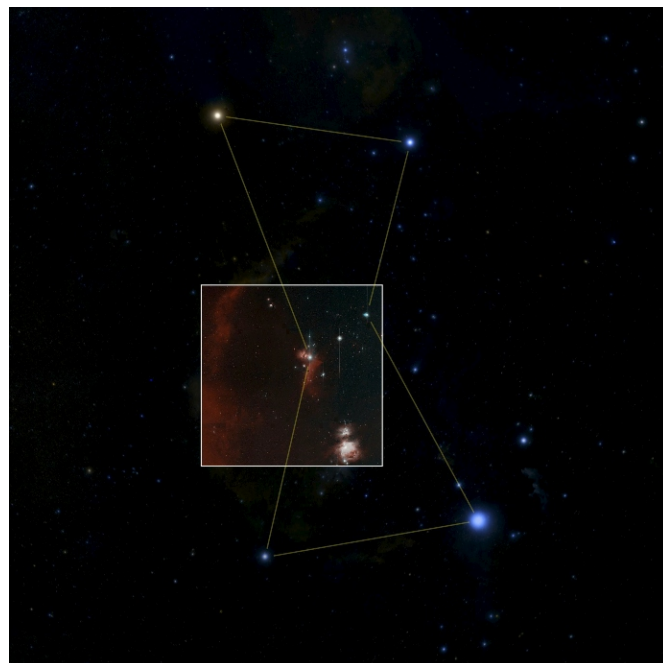
If you are outside on a clear January night, it's hard not to notice one distinctive star pattern above all: **Orion!** While we've covered Orion in earlier articles, we've never discussed observing the constellation as a whole. Perhaps you've received a new telescope, camera, or binoculars, and are eager to test it out. Orion, being large, prominent, and full of interesting, bright objects, is a perfect constellation to test out your new equipment and practice your observing skills - for beginners and seasoned stargazers alike.

In Greek mythology, Orion is a strong hunter, with numerous legends about his adventures. Being such a striking group of stars, cultures from all around the world have many myths about this star pattern. There are so many that we can't list them all here, but you can find a wonderful interactive chart detailing many cultures' legends on the Figures in the Sky website at figuresinthesky.visualcinnamon.com.

What sights can you see in Orion? Look above the variable orange-red supergiant "shoulder star" Betelgeuse to find the stars making up Orion's "club," then move across from Betelgeuse towards the bright star Bellatrix (Orion's other "shoulder") and the stars of his bow and arrow - both essential tools for the Hunter. Many interesting sights lie near Orion's "belt" and "sword." Orion's belt is made up of three bright giant stars forming an evenly spaced line: Alnitak, Alnilam, and Mintaka. Move from the belt stars towards the stars Rigel and Saiph (Orion's "feet" or "knees") to arrive at Orion's distinctive Sword, parts of which may appear fuzzy to your unaided eyes. Binoculars reveal that fuzz to be the famed Orion Nebula (M42), perched right next to the star Hatysa! Diving in deeper with a telescope will show star clusters and more cloud detail around the Nebula, and additional magnification brings out further detail inside the nebula itself, including the "baby stars" of the Trapezium and the next-door neighbor nebula M43. Want to dive deeper? Dark skies and a telescope will help to bring out the reflection nebula M78, the Flame Nebula (NGC 2024), along with many star clusters and traces of dark nebula throughout the constellation. Very careful observers under dark clear skies may be able to spot the dark nebula known as the Horsehead, tracing an equine outline below

both the Belt and the Flame Nebula. Warning: the Horsehead can be a difficult challenge for many stargazers, but very rewarding.

This is just a taste of the riches found within Orion's star fields and dust clouds; you can study Orion for a lifetime and never feel done with your observations. To be fair, that applies for the sky as a whole, but Orion has a special place for many. New telescopes often focus on one of Orion's treasures for their first test images. You can discover more of NASA's research into Orion's stars - as well as the rest of the cosmos - online at nasa.gov.



The inset image is the "first light" photo from the Zwicky Transient Facility, a large survey telescope designed to detect changes in the entire night sky by detecting "transient objects" like comets, supernovae, gamma ray bursts, and asteroids. For many astronomers, amateur and pro alike, Orion is often the "first light" constellation of choice for new equipment!

Image Credit: Caltech Optical Observatories



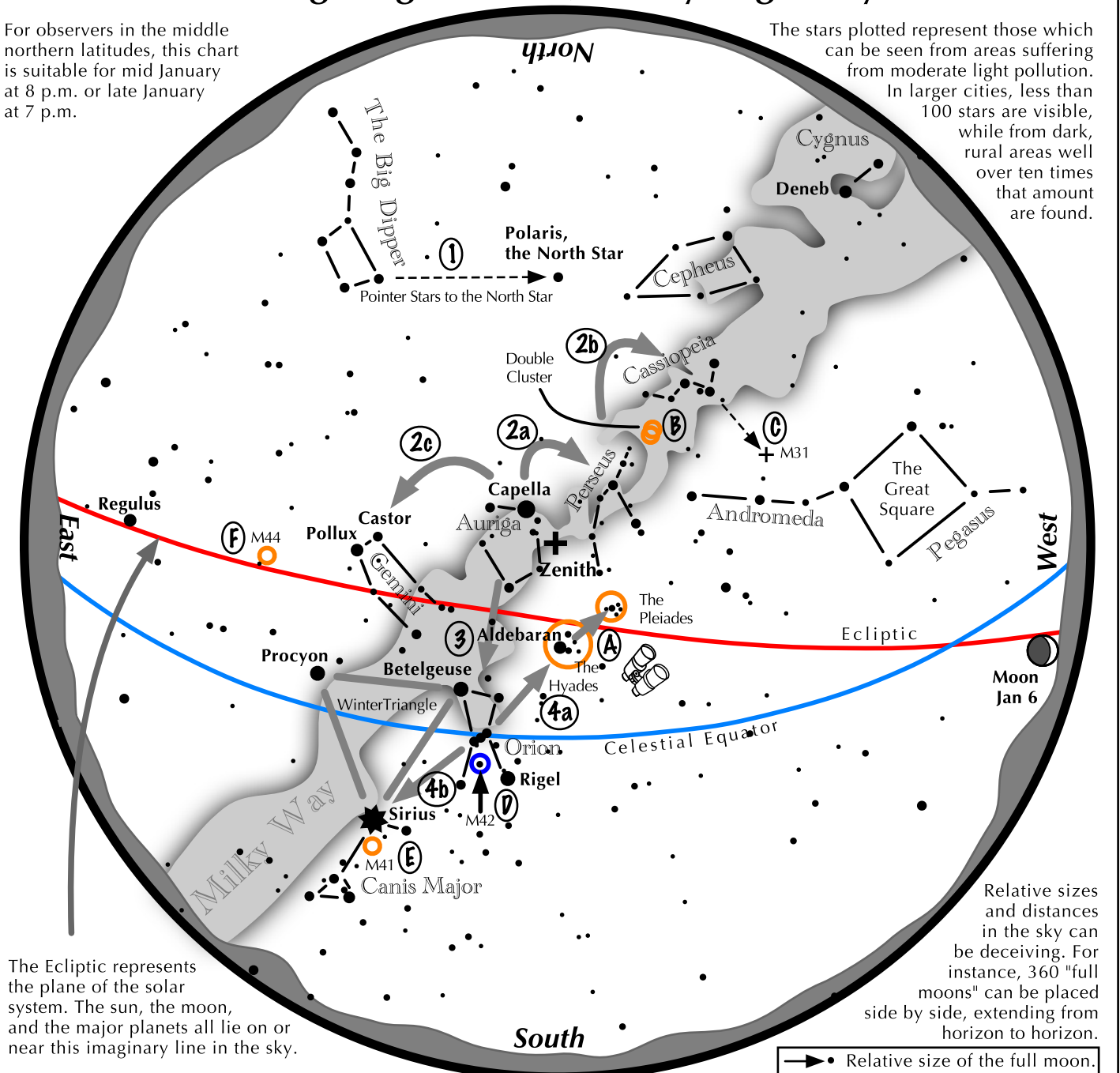
*Northern Hemisphere observers can find Orion during January evenings in the east/southeast skies. Can you spot the Orion nebula with your naked eye, in Orion's sword? How does it look via binoculars or a telescope? What other details can you discern? Please note that some deep sky objects aren't listed here for clarity's sake. For example, M43, a nebula located directly above M42 and separated by a dark dust lane, is not shown. Orion's Belt and Sword are crowded, since they star-forming regions! You can read more in our November 2019 article *Orion: Window Into a Stellar Nursery*, at bit.ly/orionlight.*

Image created with assistance from Stellarium.

Navigating the mid January Night Sky

For observers in the middle northern latitudes, this chart is suitable for mid January at 8 p.m. or late January at 7 p.m.

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 winter night sky: Simply start with what you know or with what you can easily find.

- 1 Above the northeast horizon rises the Big Dipper. Draw a line from its two end bowl stars upwards to the North Star.
- 2 Face south. Overhead twinkles the bright star Capella in Auriga. Jump northwestward along the Milky Way first to Perseus, then to the "W" of Cassiopeia. Next Jump southeastward from Capella to the twin stars Castor and Pollux of Gemini.
- 3 Directly south of Capella stands the constellation of Orion with its three Belt Stars, its bright red star Betelgeuse, and its bright blue-white star, Rigel.
- 4 Use Orion's three Belt stars to point to the red star Aldebaran, then to the Hyades, and the Pleiades star clusters. Travel to the southeast from the Belt stars to the brightest star in the night sky, Sirius.

Binocular Highlights

- A: Examine the stars of the Pleiades and Hyades, two naked eye star clusters.
- B: Between the "W" of Cassiopeia and Perseus lies the Double Cluster.
- C: The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval.
- D: M42 in Orion is a star forming nebula. E: Look south of Sirius for the star cluster M41. F: M44, a star cluster barely visible to the naked eye, lies to the southeast of Pollux.

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