Star Dust

Newsletter of National Capital Astronomers, Inc.

capitalastronomers.org

February 2025 ***Volume 83, Issue 6***

Celebrating 88 Years of Astronomy

Next Meeting

When: Sat. Feb. 8th, 2025

Time: 7:30 pm

Speaker: Dr. Matt Clement

Where: In-Person (UMD Obs.) and Online (Zoom)

See instructions for joining the meeting via Zoom on Page 8.

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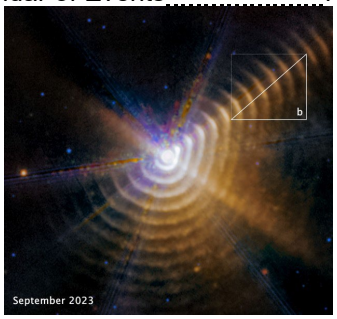

Image Credits – NASA, ESA, CSA, STScI

The JWST image of Wolf-Rayet 140, taken in 2023, can be compared to a similar one taken in 2022 to see actual movement in the waves of dust and gas leaving the binary-star system at webbtelescope.org/contents/media/images/2025/103/01JFGANX12WR2ZTE

Planet Formation at Home and Abroad

Dr. Matt Clement – Johns Hopkins University Applied Physics Laboratory

In the wake of the discovery of thousands of planets around other stars (exoplanets), our understanding of the process of planet formation has grown markedly over the past 20 years. Nevertheless, key questions remain unanswered. I will review the history of solar system planet formation theories, and highlight the number of ways in which these models required revising in the era of exoplanet science. In particular, I will highlight how two key processes – orbital migration and dynamical instability – might explain the range of different types of systems that have been observed. Additionally, I will discuss how the Solar System is also thought to have been sculpted by a violent epoch of orbital instability where the orbits of the giant planets evolved rapidly and chaotically. I will highlight some of my own work on this topic that aims to reconcile several Solar-System mysteries such as the low masses of Mars and Mercury within the framework of a Solar System shaped by an instability.

Biography: Matt Clement received his undergraduate degree from the US Naval Academy in 2010. After completing Navy Dive School, Nuclear Power School and Submarine Officer School, he spent 3 years onboard the fast attack submarine USS Topeka. He first served as the ship's Chemistry and Radiological Controls Officer, and later as the Assistant Engineer. Matt has been an active Navy reservist since he started graduate school at the University of Oklahoma in 2015. Prior to receiving his PhD from OU in 2019, he spent a year in Bordeaux, France as a Chateaubriand Graduate Fellow. He completed a postdoc at the Carnegie Earth and Planets Laboratory, and is currently a research scientist at the Johns Hopkins University Applied Physics Laboratory (APL). His research interests include the formation and dynamical evolution of planetary systems.

5TKPSTYHJC.

Recent Astronomy Highlights

Possible Super Venus Discovered by JWST

An exoplanet that was named Enaiposha when it was believed to be a water world may turn out to have a very different nature according to data received from the James Webb Space Telescope, JWST. Discovered in 2009, the exoplanet, originally designated GJ 1214 b, is approximately 48 light years from Earth and orbits a red dwarf. Its mass is greater than that of Earth, but less than that of Neptune. Astronomers, using the JWST data and running simulations on it, have found that most likely Enaiposha has an atmosphere much like that of Venus, dominated by carbon dioxide, thus the tentative categorization as a Super Venus. However astronomers remain cautious and hope to gather additional data in order to confirm the discovery. More information on Enaiposha is available at www.sciencedaily.com/releases/2025/01/250115125704.htm.

Vampire Star Eating Its Way to a Fiery End

A white dwarf star, designated RX J0648.0–4418, that is consuming material from its companion star, HD 49798, has been found to be spinning once every 13 seconds, almost twice as fast as the previous record holder. Known as a vampire star, the white dwarf and its companion are approximately 1,700 light-years from Earth. Such vampire stars are known to experience increases in rotational speed as the incoming gas provides additional rotational velocity. In the case of RX J0648.0–4418, however, the gas that it is consuming does not seem to have the velocity necessary to speed it up to such a high rate of spin. The most likely explanation for its speed is that the white dwarf is actually getting smaller, due to the increased gravitational force, as it accumulates more material, like when an ice skater speeds up his/her spin by pulling in the arms. It is expected that the continued feeding will eventually cause the self destruction of RX J0648.0–4418 in a supernova. More information is available at www.space.com/fastest-spinning-white-dwarf-cosmic-vampire.

Schedule of Upcoming NCA Meetings and Speakers

Carl Biagetti

Feb 8, 2025 -- Matt Clement (JHU/APL) *Planet Formation at Home and Abroad*

Mar 8, 2025 -- Heidi Hammel (AURA) *Exploring the Solar System with the James Webb Space Telescope*

Apr 12, 2025 -- Kevin Stevenson (JHU/APL) *Searching for Rocky Exoplanet Atmospheres with JWST (exact title tbd)*

May 10, 2025 -- Rob Zellem (GSFC/RST) *The Nancy Grace Roman Space Telescope (exact title tbd)*

Sep 13, 2025 -- Kristin Sotzen (JHU/APL) *The Dragonfly Mission*

Oct 11, 2025 -- David DeVorkin (NASM) *George R. Carruthers: The Quiet Genius Who Was the First to Send an Astronomical Telescope to the Moon*

President's Corner

Guy Brandenburg

If you missed Tom Brown's talk on January 11, make sure you download and watch it when Elizabeth Warner posts the recording on the NCA website. The topic was the extremely old stars in globular clusters and dwarf galaxies. I plan to watch it again myself, because (as Tom said near the beginning of his lecture) he talks fast, and he delivered a huge amount of information I'd like to digest again. The implications of his talk for us humans are very profound: These oldest stars are still so metal-poor that I bet that almost none of them were formed along with any rocky planets. And in globular clusters, the stars are so close that any planet that got formed would be flung out into space - as are a majority of all planets that get formed anywhere. We are extremely lucky even to exist!

The vast majority of the exoplanetary systems discovered so far are almost all incredibly different from the one we live in – we are very lucky to live in our nice little Solar System, with a nice calm Sun, mostly protected by Jupiter from asteroid impacts, and during a time period of a hundred centuries or so of extremely stable climate.

Of the hundred or so rocky exoplanets so far discovered, even though a few dozen of them lie in the 'habitable zone' for their systems, Dr. Brown pointed out that the only 'rocky' planet with a detected atmosphere to date is our Earth. (55 Cancri doesn't count, because its surface is molten.) He added later that the lack of atmospheres around rocky exoplanets is quite a big question right now, and that Hubble and Webb will be taking a good look at the spectra from other rocky planets around stars that are not M-class dwarfs.

I claim that in at least our corner of the Milky Way, a planet with life might be quite rare. And, of course, the distances are so vast that even if our telescopes can detect the chemicals we think correspond to a living planet, we can never, ever visit the place. The fastest space probe ever built so far (the Parker Solar Probe) would take about 67 centuries to visit the very closest known exoplanet system.

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Exploring the Sky

The Exploring the Sky program will take a hiatus until April of 2025.

Exploring the Sky is a joint program between the National Capital Astronomers and the National Park Service Rock Creek Park Nature Center and has been run since 1948 at this location, the field at the corner of Glover and Military Roads in the District. There is an adjacent parking lot. It is free and all are welcome who have an interest in observing the heavens. It's not an ideal dark-sky location but we can see Solar System objects, open and globular clusters and maybe a fuzzy galaxy or two.

More information can be found at NCA's web site, www.capitalastronomers.org or the Rock Creek Park web site, www.nps.gov/rocr/planyourvisit/expsky .htm. You can also call the Nature Center at (202) 895-6070. For general information on other local astronomical events, please visit

www.astronomyindc.org.

The submission deadline for March's Star Dust is February 21st.

Clear Skies

President's Corner – continued from page 2

As you may know, Jeffrey Norman, our Assistant Secretary-Treasurer, recently passed away. (See an obituary on Page 4.) A long-time member of the NCA, his efforts for the organization are very much appreciated. He will be sorely missed.

With Jeff's passing, we are looking for a volunteer to take over the position of Assistant Secretary-Treasurer:

Back in 2007, when Michael Brabanski took over from Nancy Grace Roman as NCA Treasurer, the organization combined the posts of Secretary and Treasurer, and also combined the posts of the assistants to those positions.

So, for the past 18 years we have had a Treasurer-Secretary who has done most of the financial work and record-keeping of memberships and so on. The Assistant Secretary-treasurer for all that time was Jeff Norman. He handled the taking of notes during the annual NCA Board meetings over the summer, as well as the biannual non-profit filings for the DC government, and acted as a backup in case the regular Secretary-Treasurer got sick.

It would not take very much time and effort to do this job, but it would be very helpful if someone would step up and volunteer.

NCA once again is accumulating an assortment of donated telescopes, ranging at present from a 3" refractor to an 8" SCT and 6", 8" and 12" Dobsonians. Some of them needed some work, but they are all now functional.

We can certainly put these up for auction again, but the club doesn't really need the money. Other astronomy clubs (ie NOVAC) have loaner programs, and I think NCA could do so as well, as long as we can put together a procedure for such a program.

It would be a great reason for folks to join NCA! Can we get volunteers to organize a loaner scope program and volunteer to host loaner scopes?

I have a review of StarSense, a program that uses a mirror and cellphone to assist in guiding a small telescope to a desired object in the sky, at my blog: guysmathastro.com/2025/01/24/some-surprises-with-new-astro-gizmos/.

Bottom line: when it works, it's great! And it allows any Dobsonian scope to find nearly any deep-sky object from inside the Beltway, using your current cell phone and a special plastic-and-glass-mirror holder that attaches to any scope.

But it sometimes fails and gives totally incorrect directions, and I so far have not been able to solve that difficulty. Any insights would be greatly appreciated.

Sky Watchers

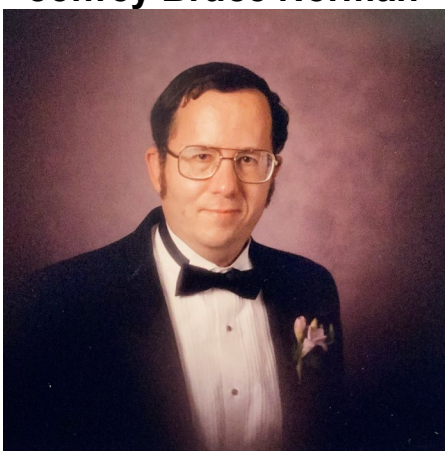
February/March

Mercury will be extremely low in the evening sky, setting soon after the Sun. Venus remains high and bright in the western sky at sunset. Mars will be in the eastern sky at sunset and remain visible throughout most of the night. Jupiter will rise higher in the eastern sky each evening. Saturn will drop lower in the western evening sky as the period progresses. Despite predictions that it would already have happened, there is still no sign of the expected nova of T CrB.

2/12	Full Moon – 8:55 a.m.

Time is in EST (Eastern Standard Time)

Jeffrey Bruce Norman



On January 5th, Jeff Norman passed away due to complications from a fall. He lived and worked for most of his life as a proud Washingtonian. His undergraduate studies were at George Washington University, and his law degree was completed at UCLA. He was elected and served as Advisory Neighborhood Commissioner for the DC Government. He worked for the federal government as an attorney for the Federal Energy Regulatory Commission and was involved with several charities devoted to improving the environment, restoring and saving historic buildings, and other similar causes. Always civic-minded, he served on the board of The Avalon Theater and his condominium association.

Also having an interest in astronomy, Jeff was a long-time member of the National Capital Astronomers. He served for almost two decades as NCA's Assistant Secretary-Treasurer. With his knowledge of the DC government, he often took care of thankless, but important tasks such as filing NCA's non-profit business registration with the DC government and tax forms with the IRS. He also served many years as an editorial advisor for Star Dust, NCA's newsletter, giving invaluable and insightful input. Jeff's contributions to the success of the National Capital Astronomers will be missed.

(Editor's Note – Thank you to Robin (George) Depaoli (Jeff's sister) for providing information about Jeff's life.)

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- Brian Tomich
- Elizabeth Warner
- Marjorie Weissberg

Electronic Distributor: Elizabeth Warner

Recent Astronomy Highlights – continued from page 2

Amateur Astronomer Helps in Key Discovery About Jupiter's Atmosphere

Image Credit - Gael Gomez (featured in the January 2025 issue of Star Dust)

It has long been assumed that the condensates in Jupiter's picturesque clouds were predominantly composed of ammonia ice, however recent observations seem to indicate otherwise. The initial observations were made by Dr. Steven Hill, an amateur astronomer, using telescopes that are commercially available, along with several filters, to measure the composition of the clouds. Professional astronomers used Dr. Hill's data, along with data gathered by other means, to show that the condensates were in regions too deep and warm for ammonia to condense. Instead, the condensates seem to be comprised of ammonium hydrosulphide. More information is at www.sciencedaily.com/releases/2025/01/250106133204.htm.

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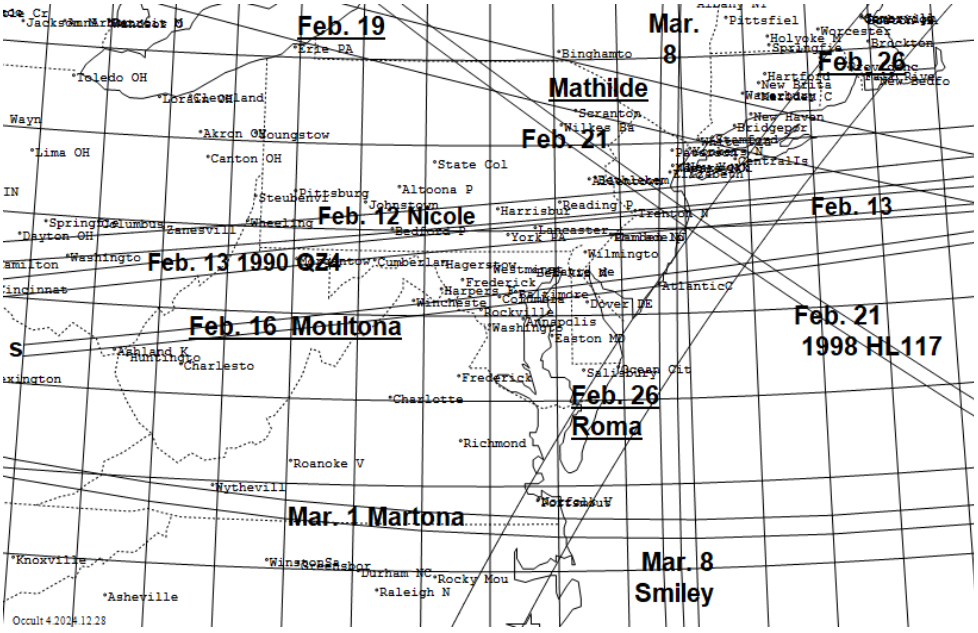
Occultation Notes

- D following the time denotes a disappearance, while R indicates that the event is a reappearance.
- The times are for Greenbelt, MD, and will be good to within +/-1 min. for other locations in the Washington-Baltimore metropolitan areas unless the cusp angle (CA) is less than 30 deg., in which case, it might be as much as 5 minutes different for other locations across the region.
- Some stars in Flamsteed's catalog are in the wrong constellation, according to the official IAU constellation boundaries that were established well after Flamsteed's catalog was published. In these cases, Flamsteed's constellation is in parentheses and the actual constellation is given in the notes following a /.
- Mag is the star's magnitude.
- % is the percent of the Moon's visible disk that is sunlit, followed by a + indicating that the Moon is waxing and - showing that it is waning. So 0 is new moon, 50+ is first quarter, 100+ or - is full moon, and 50- is last quarter. The Moon is crescent if % is less than 50 and is gibbous if it is more than 50. E indicates a lunar eclipse is in progress, and the value is the percent of the Moon's disk that is NOT in the umbra. So 0E means during the total phase.
- Cusp Angle is described more fully at the main IOTA Web site.
- Sp. is the star's spectral type (color), O,B,blue; A,F,white; G,yellow; K,orange; M,N,S,C red.
- Also in the notes, information about double stars is often given. "Close double" with no other information usually means nearly equal components with a separation less than 0.2". "mg2" or "m2" means the magnitude of the secondary component, followed by its separation in arc seconds ("), and sometimes its PA from the primary. If there is a 3rd component (for a triple star), it might be indicated with "mg3" or "m3". Double is sometime abbreviated "dbl". Often, rather than the separation, I give “dTime” or “dT”, the time difference of the secondary star occultation relative to the primary star’s occultation.
- Sometimes the Axis angle (AA) is given. It is the angle measured around the Moon's disk, from the Moon's axis of rotation. It can be used with a lunar map to tell where a star will reappear relative to lunar features.

Mid-Atlantic Occultations

David Dunham

Asteroidal Occultations



2025 Date	Day	EST	Star Name	Mag.	Asteroid #	Name	dur. dmag	s	Ap. "	Path
Feb 12	Wed	21:25	TYC19300866	9.6	1343	Nicole	6	2.4	4	NJ-OH
Feb 13	Thu	0:05	SAO 111866	8.7	7286	1990 QZ4	9	1.6	3	OH-NJ
Feb 16	Sun	18:48	SAO 98700	7.6	993	Moultona	8	1.2	3	NJ-KY
Feb 19	Wed	21:07	TYC08281888	9.5	253	Mathilde*	5	4	4	LI-ON
Feb 21	Fri	23:30	TYC18970914	9.7	9464	1998 HL117	9	5	4	NJ-NY
Feb 26	Wed	1:16	TYC13591365	10.4	472	Roma*	2.6	9	4	NC-MA
Mar 1	Sat	5:09	SAO 160722	9.5	1299	Martona	0.9	0.7	4	KY-NC
Mar 8	Sat	5:18	SAO 160722	8.9	1613	Smiley	8	4	3	NY-NJ

Underlined: bright, mag. <8.0 or important asteroid (* after name)

Lunar Grazing Occultations

2025 Date	Day	EST	Star	Mag	% alt	CA	# for 2025 grazes link or Dist. & az. from Greenbelt
Feb 15	Sat	22:21	FT Vir	6.2	88-	15	10S PA, #31 of 2025 grazes site
Feb 23	Sun	4:55	SAO 186825	8.1	24-	8	12S 37km, az. 220 deg.

2025 grazes link:
occultations.org/publications/rasc/2025/nam25grz.htm

Lunar Total Occultations

2025 Date	Day	EST	Ph	Star	Mag	% alt	CA	Sp.	Notes
Feb 8	Sat	19:22	D	49 Aurigae	5.3	87+	62	79S	A0 ZC 1008
Feb 8	Sat	22:18	D	54 Aurigae	6.0	87+	76	15N	B7 ZC 1022,mg2 8,dTime +9s
Feb 10	Mon	0:45	D	76 Gem	5.3	94+	59	56N	K5 ZC 1169
Feb 11	Tue	3:09	D	gamma Cnc	4.7	98+	39	47S	A1 ZC 1308, Asellus Bor.
Feb 21	Fri	6:55	D	tau Sco =	2.8	43-	23	-20S	B0 Sun 0, Axis Angle 160
Feb 21	Fri	7:34	R	ZC 2383	2.8	42-	22	30S	B0 Sun +7,mag2 6,close dbl
Feb 22	Sat	5:07	R	ZC 2519	7.3	33-	15	38N	M0 Azimuth 149 degrees
Mar 1	Sat	18:47	D	CF Psc	6.9	5+	16	59N	B8 Sun-10, ZC 53, mag2 13
Mar 5	Wed	19:25	D	SAO 76514	7.2	42+	62	47N	G5
Mar 6	Thu	21:32	D	ZC 797	6.4	54+	51	43S	B9 spectroscopic binary
Mar 7	Fri	19:30	D	SAO 78233	7.5	64+	80	89N	A3 close triple
Mar 8	Sat	19:14	D	ZC 1108	7.0	74+	72	49S	G8 close double?

Much more on mid-Atlantic occ's page at iota.jhuapl.edu/exped.htm
David Dunham, dunham@starpower.net

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- Bernard Kaufman (2027)
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Hubble Telescope Provides Panoramic View of the Andromeda Galaxy

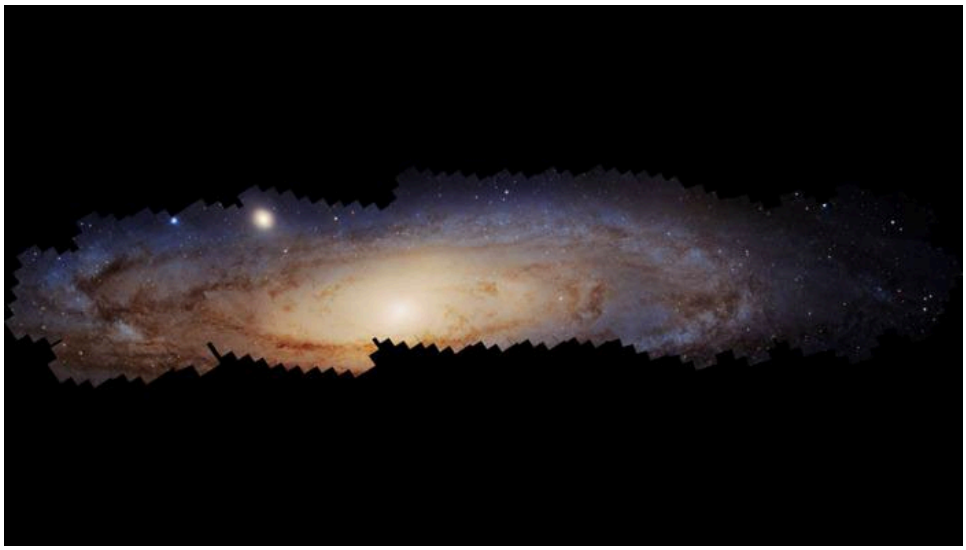

Image Credit - Science: NASA, ESA, Benjamin F. Williams and Zhuo Chen (University of Washington), L. Clifton Johnson (Northwestern). Image Processing: Joseph DePasquale (STScI)

The recently released photomosaic of the Andromeda Galaxy (shown above) took a decade to create. It required the observation time of 1000 Hubble Space Telescope orbits. The photomosaic features 200 million individual stars, one fifth of the galaxy's estimated trillion stars.

Studies have shown that the Andromeda Galaxy seems to have had much more star formation recently than the Milky Way Galaxy. Nevertheless, the photomosaic, and the findings that can be drawn from it, will help in discerning the history of our own galaxy.

More information about the contents of the photomosaic and the decade-long effort involved in its creation can be found at www.washington.edu/news/2025/01/16/panorama-of-our-nearest-galactic-neighbor-unveils-hundreds-of-millions-of-stars/.

Meteorite Strike Recording

In 2013, thanks to the prevalence of security and dashboard cameras, the world was able to witness the Chelyabinsk meteor streaking across the sky above Russia and exploding. On a much smaller scale, on July 25th, 2024, thanks to a front-door camera, what is believed to be the first video and audio recording of a meteorite striking the ground took place at a home in Marshfield on Prince Edward Island.

The actual recording of the meteorite strike, as well as more information on the event itself and the subsequent investigation, can be found at skyandtelescope.org/astronomy-news/hear-the-first-ever-recording-of-a-meteorite-slamming-into-the-ground/.

Recent Astronomy Highlights – continued from page 4

Black Hole Jet Formation Observed for the First Time

A galaxy 270 million light years away, designated 1ES 1927+654, is giving astronomers a chance to witness a phenomenon they've never seen before, the beginning of formation of plasma jets originating from an active galactic nucleus, AGN, a small region in a galaxy emitting a significant amount of energy. And the formation of those jets is taking place much faster than was once thought possible. Astronomers observed intense X-ray emission from the AGN and its supermassive black hole in 2018, but that activity died down by 2020. However in 2023, emissions once again flared up, with plasma jets forming and rapidly expanding away from the black hole, a process once thought to take at least thousands of years. More information on this discovery is available at www.eurekalert.org/news-releases/1070746.

Calendar of Events

NCA Telescope Making, Maintenance, and Modification Workshop (TM3W) (previously the NCA Mirror- or Telescope-making Classes): *The Chevy Chase Community Center has reopened and classes have resumed*. Classes will be Tuesdays and Fridays, from 6:00-9:00 pm at the Chevy Chase Community Center (intersection of McKinley Street and Connecticut Avenue, N.W.) Please contact instructor Guy Brandenburg at 202-635-1860 (leave message) or at gfbrandenburg@yahoo.com if you plan to attend. Info is at guysmathastro.com.

Open House talks and observing at the University of Maryland Observatory in College Park are temporarily suspended. When they resume, they will be on the 5th and 20th of every month at 8:00 pm (Nov.-Apr.) or 9:00 pm (May-Oct.). Updates are posted at www.astro.umd.edu/openhouse.

March 8, 2025 – Heidi Hammel (AURA) *Exploring the Solar System with the James Webb Space Telescope*

The APS Mid-Atlantic Senior Physicists Group: Thursday, Feb. 27th at 1:00 p.m., Dr Nicole Yunger Halpern, (NIST, Joint Center for Quantum Information and Computer Science, and UMD), will give a talk entitled "Beyond the first law: Peculiarly quantum conservation in thermodynamics." Participants can attend in person at the American Center for Physics at One Physics Ellipse, College Park, MD 20740 or via Zoom. There will also be a lunch with Dr. Halpern at the Olive Garden in Prince George's Plaza at 11:30 a.m. All talk attendees are welcome to attend that lunch. A Zoom link to register and attend is apsphysics.zoom.us/meeting/register/-NxDXh7ySlOlUib0CQhxjQ#/registration.

National Capital Astronomers

Online Membership Application and Renewal

To submit or renew a membership to the National Capital Astronomers, and pay dues, please visit capitalastronomers.org/. There is a Google form for membership on the upper right. Please fill out the Google form, including your email address, in order to continue receiving issues of Star Dust.

Membership Rates

$ 15 – 1 year Individual/Family
$ 35 – 3 years Individual/Family
$ 5 – 1 year Student
$200 -- Life Member

(Please note that membership dues will go up in coming years, so consider joining/renewing with the 3-year option in order to save money.)

If you prefer to pay membership dues by check,

- make check payable to ***National Capital Astronomers*** then
- mail to: **Jim Simpson, NCA Treasurer; 3845 Wayson Road, Davidsonville, MD 21035.**
- Don't forget to also fill out the membership Google form, even if renewing!

NCA can use your help! Please indicate on the membership Google form which astronomy activities are of interest to you. In addition, we are also looking for volunteers! We need new officers, help with our website and social media, and help with outreach and science fair events.

Thank you!

Celebrating 88 Years of Astronomy

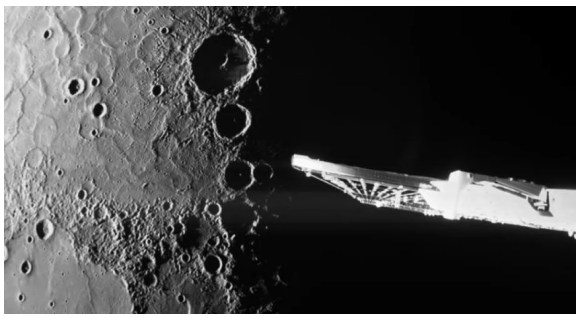

Image Credit - ESA/BepiColombo/MTM

The joint Japanese/European BepiColombo spacecraft captured the image above of craters at the north pole of Mercury. More information on the mission is at www.livescience.com/space/mercury/see-mercurys-frigid-north-pole-in-extraordinary-new-images-from-the-bepicolombo-spacecraft.

To join or renew online, visit capitalastronomers.org and look in the right column for the Membership Form and PayPal links.

Next NCA Meeting:

2025 Feb. 8th
7:30 pm
Dr. Matt Clement

- *Virtual attendees:* To join the meeting via Zoom, use the following link:

  umd.zoom.us/j/91273752763?pwd=XKZL9V94XIDzwWg7FYDKLbVUQb5YRP.1

- *In-person attendees*: The UMD Astronomy Observatory is at 3255 Metzerott Road, College Park, MD 20740. Directions: www.astro.umd.edu/openhouse/1visiting/directions.html

Please note that NCA Zoom meetings are often recorded.

Inside This Issue