

Star Dust

Newsletter of National Capital Astronomers, Inc.

capitalastronomers.org

January 2019

Volume 77, Issue 5

**Celebrating 82 Years
of Astronomy**

Next Meeting

When: Sat. Jan. 12th, 2019

Time: 7:30 pm

Where: UMD Observatory

Speakers: Dean Howarth and
Rachel O'Connell

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Directions to Dinner/Meeting

Our time and location for dinner with the speaker before this meeting is 5:30 pm at "Hunan Treasure" at 7537 Greenbelt Road, Greenbelt, MD 20770 in Greenway Center just east of where Greenbelt Road crosses the Baltimore-Washington Parkway.

The National Capital Astronomers meeting is held at the UMD Astronomy Observatory on Metzertott Rd about halfway between Adelphi Rd and University Blvd.

Observing after the Meeting

Following the meeting, members and guests are welcome to tour through the Observatory. Weather-permitting, several of the telescopes will also be set up for viewing.

An Interview with Einstein

Dean Howarth and Rachel O'Connell

Abstract: The year 2019 marks the centennial of the observational proof of Einstein's General Theory of Relativity by British astronomer, Arthur Eddington. At the time, the newspapers were agog with claims that all was "askew in the heavens" and claimed that only a dozen wise men could even understand the theory! Today, relativity is part of the fabric of science, but many are still "agog" at the thought of warped space-time.

Enjoy an "Interview with Herr Professor" and hear some of Einstein's insights and recollections on the events of 100 years ago, when Newton was unseated as the master of gravity. Historical interpreter Dean Howarth portrays Dr. Einstein as he is interviewed by a curious journalist (played by Rachel O'Connell).



Biographies: Dean Howarth is a veteran physics teacher in northern Virginia. He has developed a unique set of living history skits - *Living Histories of Science* - that vividly convey the personalities and the achievements that led to our present understanding of the physical world. In many of these skits Dean is accompanied by a colleague. Rachel O'Connell, an adjunct performer with *Living Histories of Science*, has collaborated with Dean for 11 years. Dean and Rachel conduct historical

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Recent Astronomy Highlights

Carbon-Rich Ceres Surface

The Dawn Mission to Ceres ended on Nov. 1, 2018, but findings continue to come from the data that the spacecraft gathered. One such finding is that the surface of the dwarf planet may contain up to 20% carbon by weight, several times the amount of carbon typically found in carbon-rich meteorites. The finding implies that carbon, one of the building blocks of life, may be more plentiful throughout the solar system than previously thought. More information can be found at:

<https://earthsky.org/space/dwarf-planet-ceres-has-more-carbon-rich-organics-than-previously-thought>

Stellar Growth Spurt Detected

Recent brightening of a young star known as Gaia 17bpi indicates that it is taking in material from the disk of dust surrounding it. The star is an example of the FU Ori class of stars, named after FU Orionis, a star located in the constellation of Orion. Few such stars have been observed in part because they can be very obscured by their disks of dust. The brightening actually comes from light given off by the heating of material from the disk as it approaches and is consumed by the star. Study of the brightening is leading to new insights into how young stars gain mass. More information is available at:

<https://www.sciencedaily.com/releases/2018/12/181219115527.htm>

Pristine Cloud of Gas Discovered

Astronomers have discovered a cloud of gas that has at most 1/10,000 of the concentration of heavy elements in the Sun. This discovery was accomplished by taking a spectrum of light from a quasar behind the gas cloud. The spectrum of that light gives the fingerprints of the elements in the gas it has traveled through. Having such a low concentration of heavy elements indicates that the cloud has largely avoided star formation. So far scientists have only discovered two other such clouds. Studying these clouds may help in understanding mechanisms that help and hinder the formation of stars. For more information, go to:

<http://www.keckobservatory.org/fossil/>

continued on page 4

• *Biographies – continued from page 1*

• science narratives at museums and historic sites under the moniker, *The Natural Philosopher LLC*. Their work can be seen at <http://www.livinghistoriesofscience.com/>. Their presentations are designed for all ages, and have been given at sites such as Mount Vernon, Gadsby's Tavern, Claude Moore Farm, the Banneker Historic Park, the Society of the Cincinnati, Rippon Lodge, and the Stabler-Leadbeater and Hugh Mercer Apothecaries.

• Previous NCA presentations by Dean Howarth and his fellow performers (Jennifer Horwitz, Jeff Jones and Rachel O'Connell) can be viewed at the links below. The videos were created by Rupert Chappelle, Harold Williams and Nicholas Leger.

• "The Natural Philosopher", January 9, 2016 -

• <https://www.youtube.com/watch?v=9duJ9xhbPGI&t=49s>

• "Kepler Debates Tycho: Does the Earth Orbit the Sun?", January 14, 2017 - https://www.youtube.com/watch?v=xjf_KD9D85g&t=139s

• "An Evening with Isaac Newton", January 13, 2018 -

• <https://www.youtube.com/watch?v=zirlcJARBzk&t=30s>

LIGO Website

• For those whose interest was piqued by Dr. Peter Shawhan's December NCA talk on gravitational waves, the website <https://www.ligo.org/> provides the latest articles and information on this new branch of astronomy. The website also has *LIGO Magazine*, a free downloadable publication that comes out twice a year. The most recent issue, September 2018, contains articles on such topics as dealing with noise in the data from the gravitational-wave detectors as well as an article on the commissioning of the Kamioka Gravitational Wave Detector. KAGRA will join with the LIGO and Virgo facilities in detecting gravitational-wave sources in the third run which is currently expected to begin in early 2019. The September issue also has a collection of brief reminiscences from team members about what it was like and what they did on the day of the detection of the first binary-neutron-star merger, August 17, 2017. *LIGO Magazine* is available at <https://www.ligo.org/magazine/>.

Ultima Thule Becomes Ultima and Thule

• The New Horizons flyby of Ultima Thule on January 1st appears to have been a complete success. Now comes the waiting as all of the data is downloaded over upcoming months. As of January 3rd, when this issue of *Star Dust* was submitted for printing, the pictures downloaded so far show a 'contact binary' or bilobate body, where two separate objects have come together, Ultima being the larger lobe and Thule being the smaller. Pictures can be seen at: <http://time.com/5492165/ultima-thule-pictures/>

• Updates on Ultima Thule will be in future issues of *Star Dust*. Stay tuned.

Exploring the Sky



"Exploring the Sky" is an informal program that, for 70 years, has offered monthly opportunities for anyone in the Washington area to see the stars and planets through telescopes from a location within the District of Columbia.

Presented by the National Park Service and National Capital Astronomers, sessions are held in Rock Creek Park once each month on a Saturday night from April through November. Beginners (including children) and experienced stargazers are all welcome—and it's free!

Hosted by: [National Capital Astronomers, Inc](#) and [Rock Creek Park](#)

With the winter months, the Exploring the Sky program will take a hiatus until April of 2019.

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 local astronomical events visit www.astronomyindc.org

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

Clear Skies!

Nancy Grace Roman



"If I brought anything to it, it was perseverance and belief that it was possible." This was the way Nancy Grace Roman described her efforts to bring the Hubble Telescope into existence. The quote, from a PBS NOVA episode entitled "Invisible Universe Revealed", is a modest self-assessment from the woman called the Mother of the Hubble Telescope.

Born in 1925, Nancy developed an early fascination with astronomy, even starting an astronomy club in her school when she was eleven. Of course, young women of the time were usually discouraged from pursuing any interest in the sciences. Nancy herself was even discouraged by a school councilor when she wanted to take a second course in algebra. Despite such obstacles, she ultimately went on to earn her PhD in Astronomy from the University of Chicago in 1949. Her research included studies of the compositions of stars and their distribution in the galaxy. After six more years at the university, which included work at the Yerkes Observatory, she went to work at the Naval Research Laboratory in its radio-astronomy program.

In 1959 she joined NASA. The first woman in an executive position at the agency, she was Chief of Astronomy in NASA's Office of Space Science, a position in which she helped in the development of dozens of orbital astronomical observatories that made many major discoveries. She played a decisive role in enabling the COBE mission, which ushered in the era of precision cosmology. But she is best known for her efforts to sell astronomers, the public and the government on the idea of a space telescope, efforts that led to the development of the Hubble Telescope.

A long-time member of the National Capital Astronomers, Nancy was known for her insightful questions and comments during the lectures at NCA meetings. For her efforts in astronomy and her contributions to the National Capital Astronomers, she was awarded a lifetime membership in the NCA by her fellow members. In addition, the Lego company included her in their "Ideas Women of NASA" set (see below).

Sadly, Nancy passed away on Christmas Day 2018, but her influence lives on, both in the many images still coming from the Hubble Telescope, and in the numerous women scientists and engineers inspired by her ground-breaking efforts in astronomy.

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Sky Watchers

January/February

Mercury, Venus, Jupiter and Saturn will be visible in the morning sky, with a conjunction of Venus and Jupiter on Jan. 22 nd (see below) Mars will be visible in the western sky after sunset.	
1/20-21	Full Moon, Supermoon and Total Lunar Eclipse – The Full Moon takes place at 12:16 a.m. The lunar eclipse, visible throughout North America, begins on 1/20 at 9:36 p.m., when the Moon enters the Earth's penumbra, and ends when it exits the penumbra at 2:48 a.m. The total eclipse, when the Moon is completely in the Earth's umbra, lasts from 11:41 p.m. until 12:43 a.m. Since the Moon will be near perigee, it will appear a bit larger. More information is at: https://eclipse.gsfc.nasa.gov/LEplot/LEplot2001/LE2019Jan21T.pdf
1/22	Conjunction of Venus and Jupiter. The two planets will come within 2.4° of each other in the morning sky.

Times in EST

Nancy Grace Roman – continued from page 3



Nancy with a model of the Orbiting Solar Observatory. Eight such observatories were placed in operation from 1962 to 1978.

The following links provide additional information about Nancy Grace Roman, her life and her achievements.

Hubblecast 113: Nancy Roman – The mother of Hubble -

<https://www.spacetelescope.org/videos/hubblecast113a/>

Nancy in her own words about her "lucky star."

<http://science.sciencemag.org/content/354/6317/1346>

An Interview by Current NCA President Harold Williams of Nancy -

<https://www.youtube.com/watch?v=hmMqxTrf7A>



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Please Get Star Dust Electronically

• NCA members able to receive Star Dust, the newsletter of the NCA, via e-mail as a PDF file attachment, instead of hardcopy via U.S. Mail, can save NCA a considerable amount of money on the printing and postage in the production of Star Dust (the NCA's single largest expense), save some trees and have one-click access to all the embedded links in the document. If you can switch from paper to digital, please contact Henry Bofinger, the NCA Secretary-Treasurer, at hbofinger@earthlink.net

Thank you!

• [Recent Astronomy Highlights – continued from page 2](#)

• **Asteroid 2003 SD220 Gets a Closeup**

• Comet 46P/Wirtanen wasn't the only object with a close flyby of the Earth this December. Asteroid 2003 SD220 came within 1.8 million miles of Earth on Dec. 22. Its close approach allowed radio astronomers to take the radar images shown below. The asteroid is 1.6 kilometers long and features a ridge at one end. For more information go to:

• <https://www.sciencedaily.com/releases/2018/12/181221162221.htm>

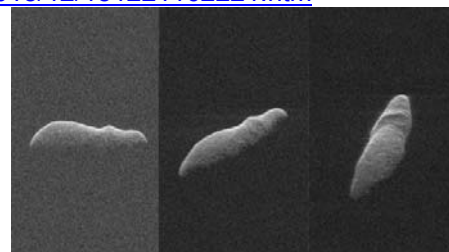


Image Credit: NASA/JPL Caltech/GSSR/NSF/GBO

Occultation Notes

- D following the time denotes a disappearance, while R indicates that the event is a reappearance.
- When a power (x; actually, zoom factor) is given in the notes, the event can probably be recorded directly with a camcorder of that power with no telescope needed.
- 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.
- 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".
- 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

2019	Day	EST	Star	Mag.	Asteroid	dmag	dur.	Ap. Location
Jan 13	Sun	22: 50	4UC49018811	10. 8	Hebe	. 15	19	7 sNE, LI, eNY, swOC
Jan 18	Fri	0: 34	4UC54239809	11. 5	Altona	2. 9	5	7 MD, DC, swPA; nVA?
Jan 19	Sat	21: 50	4UC67834414	11. 0	Niobe	1. 4	6	7 cPA, wMD, eWV, wVA
Jan 20	Sun	1: 16	4UC46639408	11. 5	Klepesta	4. 5	2	8 NJ, PA, nOH; nMD?

Event details at <http://www.asteroidoccul tation.com/>

Lunar Grazing Occultations

2018/ 2019	Day	EST	Star	Mag	% alt	CA	Location, Notes
Jan 18	Fri	20: 20	chi 1 Ori	4. 4	93+	59	6S Finzel, MD; Marysville, Bordnrsville, PA
Jan 20	Sun	23: 55	X107855	10. 3	OE	72	27U Lexngtn, Goochland, Mechani csville, VA
Jan 29	Tue	5: 25	ZC 2253	8. 4	34-	29	12S Rockville, CollegePark, Lake Arbor, MD

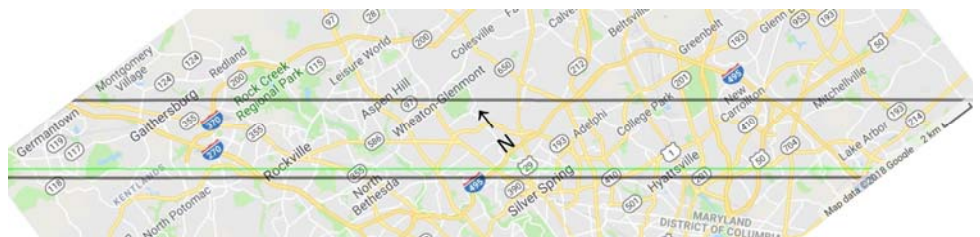
Interactive and static maps are at <http://iota.jhuapl.edu/exped.htm>

Lunar Total Occultations

2018/ 2019	Day	EST	Ph Star	Mag	% alt	CA	Sp.	Notes
Jan 13	Sun	21: 33	D SA0109875*	8. 6	48+	30	58N	F8 mag2 12 sep. 34" PA 262
Jan 13	Sun	21: 42	D ZC 208*	7. 0	48+	28	86S	F0 mag2 11 sep. 127" PA 43
Jan 18	Fri	19: 25	D ZC 892	6. 7	93+	50	43S	B9 mg2 10 sep. .3" PA 74
Jan 19	Sat	0: 48	D SA0 77889	6. 9	94+	53	42S	G5
Jan 19	Sat	4: 28	D ZC 935	6. 8	95+	12	48N	B5 Azimuth 287 degrees
Jan 19	Sat	18: 00	D ZC 1051	6. 6	98+	23	67N	K1 Sun -9,mg2 10 1.4"PA194
Jan 20	Sun	1: 51	D ZC 1086	6. 4	99+	53	65N	G9 maybe close double
Jan 20	Sun	23: 38	D X107855	10. 3	1E	69	34U	lunar eclipse; VA graze
Jan 20	Sun	23: 41	R SA0 79979	9. 1	OE	70	90U	F5 Axis Angle 259 deg.
Jan 20	Sun	23: 49	D X012383*	9. 7	OE	70	37U	F2
Jan 20	Sun	23: 53	D X107954*	10. 2	OE	71	80U	
Jan 21	Mon	0: 10	R X107855	10. 3	OE	71	25U	Axis Ang. 200; VA graze
Jan 21	Mon	1: 04	R X012383*	9. 7	24E	69	53U	F2 Axis Angle 251 deg.
Jan 23	Wed	0: 01	R 37 Leonis	5. 4	94-	51	60N	M1 AA 294, ZC1504
Jan 26	Sat	5: 46	R SA0 139227	7. 7	65-	47	28N	F8 mg2=mg3=10, sep .4" & 10"
Jan 26	Sat	6: 44	R SW Vir	7. 1	65-	42	57N	M7 Sun -7, SA0139236, max.6.2
Jan 27	Sun	2: 15	R ZC 2005	7. 0	56-	24	86N	G5
Jan 27	Sun	6: 49	R SA0139729*	8. 2	54-	41	64S	G0 Sun altitude -6 deg.
Jan 28	Mon	3: 15	R SA0 158868	8. 0	44-	22	28N	K0
Jan 28	Mon	5: 01	R 13 Librae	5. 8	44-	35	64N	G7 ZC 2128
Jan 29	Tue	4: 15	R eta Librae	5. 4	34-	21	88S	A6 ZC 2247
Jan 29	Tue	5: 25	G ZC 2253	8. 4	34-	29	12S	K0 College Park, MD graze
Jan 30	Wed	4: 17	R ZC 2382*	8. 7	25-	11	88N	K0
Jan 30	Wed	6: 05	R ZC 2391*	7. 0	24-	25	59N	K0
Feb 1	Fri	5: 36	R SA0 186721	7. 3	10-	6	36S	K3 Azimuth 125 degrees
Feb 7	Thu	18: 22	D ZC 3478*	6. 4	8+	20	6N	G5 Sun altitude -10 deg.
Feb 8	Fri	18: 01	D ZC 44	7. 4	14+	33	69N	F8 Sun altitude -5 deg.
Feb 8	Fri	19: 37	D SA0 128734	7. 8	14+	17	85N	G5

*in Kepler2 program so occultation light curves are sought.

More, esp. total lunar occultations, at <http://iota.jhuapl.edu/exped.htm>
David Dunham, dunham@starpower.net



Path for Jan. 29th graze of ZC 2253 over MD suburbs. See

<http://iota.jhuapl.edu/exped.htm> for details

Image Credit: D. Dunham & Google Map

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Comet 46P/Wirtanen Update



Hubble image of comet 46P/Wirtanen. *Image Credit: NASA, ESA, D. Bodewits (Auburn University) and J.-Y. Li (Planetary Science Institute)*

Comet 46P/Wirtanen has so far not been very visible to the naked eye, at least not in the too-well-lit night skies of the Washington Metropolitan area. Research on the comet however has been ongoing and the results are pouring in. One such result is that the Atacama Large Millimeter/submillimeter Array, ALMA, has imaged the HCN, hydrogen cyanide, that has been outgassing from the comet. The image along with more details are at: wirtanen.astro.umd.edu/46P/46P_status.shtml Information about other research can be found on **The Comet Wirtanen Observing Campaign** webpage at: wirtanen.astro.umd.edu/.

Auction of Donated Equipment

Recently, Robin and Toni Yeager donated an 8" Meade NexStar SCT along with other astronomy equipment, including eyepieces, astro cameras and much more, to the National Capital Astronomers. At the November NCA meeting the members voted to have an auction of the equipment to raise funds for the organization. Guy Brandenburg organized the online auction. The money raised will go toward helping NCA operations. The NCA thanks Robin and Toni for their generous donation, as well as Guy for his work in overseeing the auction.

Wayne Warren Awarded NCA Lifetime Membership

At the December 8th meeting of the National Capital Astronomers, members voted to bestow upon Wayne Warren a lifetime membership in recognition of his many years of service to the organization. Wayne served as Vice President and President in the early 1990s and he has served on the Board of Trustees for over two decades. In addition, he has been helping with Star Dust, proofreading the issues and providing editing and scientific advice, for decades. Wayne recently moved to Florida to be closer to family, but still plans to remain involved in the NCA.

Thank you for all of your service, Wayne, and congratulations on the lifetime membership.

New Telescope Owners Nights 2019
Elizabeth Warner

Is that new telescope you got for Christmas still in the box?? Have you tried setting up your new telescope a couple of times, but quit in frustration?? Does your telescope work fine, but you're tired of looking at the Moon and Saturn and wonder where to point next?? No matter which category you fit into, we can help! New Telescope Owners Nights provide an opportunity to get assistance with your new or not-so-new telescope from experienced volunteers. The dates are January 23rd (Wed.) and 26th (Sat.) 6-9 p.m. with half-hour slots at 6:00, 6:30, 7:00, 7:30, 8:00 and 8:30. To sign up, email Elizabeth at warnerem@astro.umd.edu or call 301-405-6555 to let us know the following:

- 1) Which night you will attend
- 2) Which time slot you would like
- 3) Type and size of your telescope
- 4) What kind of help you need

More information can be found at: www.astro.umd.edu/openhouse/2programs/new-telescope-owners-nights.html

Calendar of Events

- **NCA Mirror- or Telescope-making Classes:** Tuesdays AND Fridays, from 6:30 to 9:30 pm at the Chevy Chase Community Center (intersection of McKinley Street and Connecticut Avenue, N.W.) Contact instructor Guy Brandenburg at [202-635-1860](tel:202-635-1860) or at gfbrandenburg@yahoo.com. Additional information is at guysmathastro.wordpress.com/ and home.earthlink.net/~gfbranden/GFB_Home_Page.html
- **Open house talks and observing at the University of Maryland Observatory** in College Park on the 5th and 20th of every month at 8:00 pm (Nov.-Apr.) or 9:00 pm (May-Oct.). Details: www.astro.umd.edu/openhouse
- **Mid-Atlantic Senior Physicists Group:** "The Deep Carbon Cycle: Discoveries of the Deep Carbon Observatory", by Craig Schiffrin, Carnegie Institution for Science, Wed., January 16, at 1:00 p.m. at the American Center for Physics (1st floor conference room) with Q&A to follow. 1 Physics Ellipse, College Park, MD-- off River Rd., between Kenilworth Ave. and Paint Branch Parkway. www.aps.org/units/maspg/
- **Next NCA Meeting** at the University of Maryland Observatory: **9 February** 7:30 p.m., Elizabeth Ferrara (UMD/GSFC), *Pulsar Timing Arrays Look for Mergers of Super-Massive Black Holes*
- **Montgomery College's Planetarium** – "How are Stars Born?", Jan. 26th at 7:00 p.m. For more information and directions, go to: www2.montgomerycollege.edu/departments/planet/

National Capital Astronomers Membership Form

Name: _____ **Date:** ___/___/___

Address: _____ **ZIP Code:** _____

Home Phone: ____ - ____ - ____ **E-mail:** _____ **Print / E-mail Star Dust (circle one)**

Membership (circle one): Student..... \$ 5; Individual / Family.....\$10; Optional Contribution.....\$__

Please indicate which activities interest you:

- Attending monthly scientific lectures on some aspect of astronomy _____
- Making scientific astronomical observations _____
- Observing astronomical objects for personal pleasure at relatively dark sites _____
- Attending large regional star parties _____
- Doing outreach events to educate the public, such as Exploring the Sky _____
- Building or modifying telescopes _____
- Participating in travel/expeditions to view eclipses or occultations _____
- Combating light pollution _____

Do you have any special skills, such as videography, graphic arts, science education, electronics, machining, etc.?

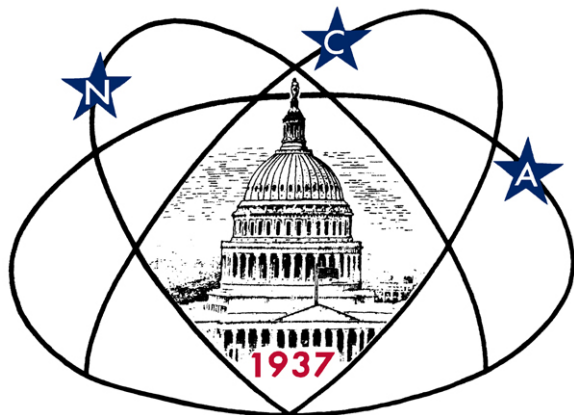
Are you interested in volunteering for: Telescope making, Exploring the Sky, Star Dust, NCA Officer, etc.?

Please mail this form with check payable to **National Capital Astronomers** to:
Henry Bofinger, NCA Treasurer; 727 Massachusetts Ave. NE, Washington, DC 20002-6007

National Capital Astronomers, Inc.

If undeliverable, return to
NCA c/o Elizabeth Warner
400 Madison St #2208
Alexandria, VA 22314

First Class
Dated Material



Celebrating 81 Years of Astronomy

Next NCA Meeting:

2019 January 12th

7:30 pm

@ UMD Observatory

**Dean Howarth and
Rachel O'Connell**

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