

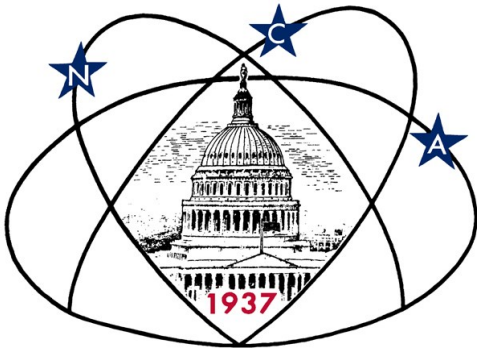
# Star Dust

Newsletter of National Capital Astronomers, Inc.

[capitalastronomers.org](http://capitalastronomers.org)

September 2016

Volume 75, Issue 1



## Next Meeting

**When:** Sat. Sept. 10th, 2016

**Time:** 7:30 pm

**Where:** UMD Observatory

**Speakers:** Matthew Knight

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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 "The Common," the restaurant in the UMD University College building located at 3501 University Blvd.

The meeting is held at the UMD Astronomy Observatory on Metzert Rd about halfway between Adelphi Rd and University Blvd.

## Need a Ride?

Please contact Jay Miller, 240-401-8693, if you need a ride from the metro to dinner or to the meeting @ observatory. Please try to let him know in advance by e-mail at [rigel1@starpower.net](mailto:rigel1@starpower.net).

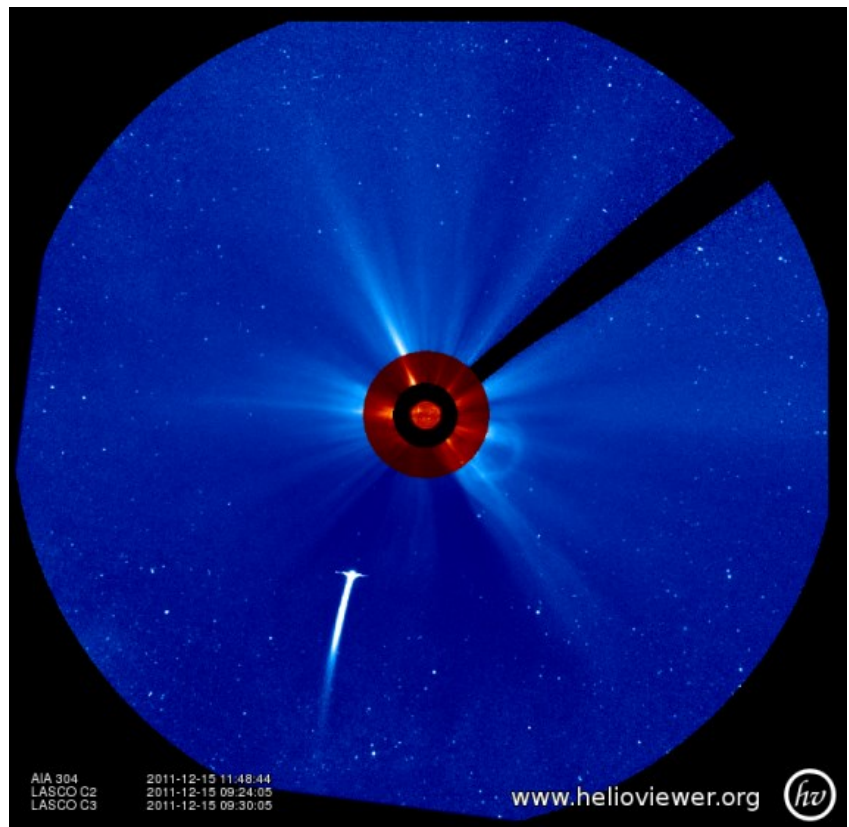
## Observing after the Meeting

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.

## Insights from 20 Years of SOHO Comets

*Matthew M. Knight*  
*University of Maryland*

**Abstract:** Solar and Heliospheric Observatory (SOHO) recently completed its 20th year of observing. Despite being a solar mission, SOHO is the most prolific comet hunting platform of all time, with more than 3,000 comets discovered in its images. SOHO has revealed that the inner Solar System is far more populous than previously believed, with a steady stream of small comets reaching perihelion at sungrazing and sunskirting distances every few days. The majority of these comets are



*Courtesy Matthew Knight*

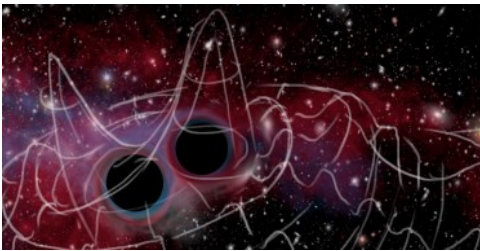
Comet C/2011 W3 Lovejoy as viewed by SOHO (December 15, 2011). Image created using [Helioviewer Project](http://helioviewer.org) (funded by the ESA and NASA).

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## Sungrazers

These comets pass very close to the Sun when they reach perihelion (sometimes within a few thousand miles of the Sun). Kreutz sungrazers are fragments believed to originate from one larger comet. Some of the famous Kreutz sungrazers are the Great Comet of 1843, Comet Ikeya-Seki (1965) and C/2011 W3 Lovejoy (2011). Since smaller comets are unlikely to survive a single solar pass, SOHO has made it possible to discover smaller Kreutz sungrazers before they disintegrate at perihelion.

### GW150914 (aka "First Gravitational Wave Detection")



1.4 Billion Years Ago...  
(on the other side of...wherever...)



September 14<sup>th</sup>, 2015 CE  
(Earth, on a far arm of the Milky Way)



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on page 3

### SOHO – continued from page 1

dynamically related to each other as members of the well known Kreutz group, but many belong to previously unknown groups, and some may even be asteroidal in origin. In addition, SOHO has occasionally obtained spectacular observations of bright comets that passed close to the Sun, such as C/2012 S1 ISON. This presentation will address SOHO's various comet observations and how these comets aid in our understanding of Solar System evolution, act as probes of the solar environment, reveal unique information about properties of dust, and possibly yield insight into exo-planetary systems.

### Biographical Sketch:

Matthew Knight is a research scientist in the Department of Astronomy at the University of Maryland (UMD). He received his PhD from UMD in 2008 and worked at Lowell Observatory in Flagstaff, AZ from 2008-2015 before returning to UMD last year. He has spent hundreds of nights observing comets at optical and near-IR wavelengths and was awarded a NASA Early Career Fellowship for his work on near-Sun comets.



He is also active in many forms of outreach. He earned NASA group achievement awards for his involvement in facilitating worldwide professional and amateur observing campaigns for two recent comets, has been recognized for his outreach teaching in Baltimore through Towson University's Project ASTRO program, and has written several popular articles including the November 2013 cover story for Astronomy Magazine.

## Team Apocalypse, the Planets and the All-Seeing Eye

Guy Brandenburg

The [Astronomy Festival on the National Mall](#) (organized by HOFSTRA University) is an annual event with speakers, demonstrations and local, amateur astronomers who set up telescopes for public daylight and night time star-gazing. NCA participates by hosting an information table, providing telescopes for public use and educating the public on objects seen via the telescopes.

For this year's festival, I brought my 40 mm Coronado PST (Personal Solar Telescope) and Jay Miller brought NCA's Solar Max 60 mm Coronado; we both were letting people look at the Sun using H-alpha filters. Before sunset, I had a small 4.25" Dobsonian made by my middle-school students ("Team Apocalypse") participating in the Saturday program, [First Light](#), sponsored by the Carnegie Academy for Science Education (CASE), Carnegie Institute of Washington. I trained the

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**The Great North American Eclipse**



Aug 21<sup>st</sup> 2017

<http://www.greatamericaneclipse.com/>

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**Sky Watchers**

**Early Autumn Schedule**

September

15	4:00 pm - <b>Planets</b> , N. Hemisphere. Neptune 1.2° south of Moon.
16	3:05 pm – <b>Full Moon</b> , Global. Other Moon Names: <i>Harvest Moon, Full Corn Moon (corn, squash, beans &amp; rice are ready for harvest).</i>
17	7:00 pm - <b>Planets</b> , N. Hemisphere. Venus 3° north of Spica ( <i>Constellation Virgo</i> ).
22	10:21 am – <b>Autumnal Equinox</b> , N. Hemisphere. 
22-30	Evening – <b>Globe at Night</b> , Global. Features: <i>Constellation Cygnus</i> (N. Hemisphere) & <i>Grus</i> (S. Hemisphere).
28	4:00 pm - <b>Planets</b> , N. Hemisphere. Mercury at greatest western elongation (18°).

October

8	 <b>International Astronomy Day!</b> Global.
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Times EDT

**Exploring the Sky**



“*Exploring the Sky*” is an informal program that, for over 60 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!

**2016 Observation Dates for Autumn**

- 3 September (8:00 pm) – Mars, Saturn, Antares & Vega
- 1 October (7:30 pm) – Summer Triangle
- 5 November (7:00 pm) – Pleiades & Winter Constellations

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

Team Apocalypse – continued from page 2

telescope on the little aluminum cap on the tip of the Washington Monument. We discovered that the all-seeing eye that's on the dollar bill is also carved into that cap! I never knew that before; the light was perfect for making it visible, and many viewers confirmed it.

After sundown, I put away the PST and started showing people the Moon, Jupiter, Mars and Saturn, with the expert assistance of NCA member and local amateur telescope-maker, Mike Laugherty, who showed up specifically to help out. Jay Miller brought out a short Stellarvue refractor (IIRC) and had it set on Jupiter most of the time. I was surprised to discover that, as the night got darker, the lines to look through the little red student-made scope got longer and longer! Mike and I ended up turning the red Dob to either Jupiter and its moons, Saturn and its rings and moons, or Mars, as folks preferred. At one point, I counted and discovered that there were about as many folks watching as Jupiter has moons; and, when the 11:00 pm closing hour rolled around, we still had a line! People patiently waited for 15-20

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• **Star Dust** is published ten times yearly  
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**Please Get Star Dust Electronically**

• NCA members able to receive Star Dust,  
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• PDF file attachment, instead of hardcopy via  
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• switch from paper to digital, please contact  
• Henry Bofinger, the NCA Secretary-  
• Treasurer, at [hbofinger@earthlink.net](mailto:hbofinger@earthlink.net)

*Thank you!*



## 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 Watts angle (WA) is given; it is aligned with the Moon's rotation axis and can be used to estimate where a star will reappear relative to lunar features. The selenographic latitude is WA -270. For example, WA 305 - 310 is near Mare Crisium.

## Mid-Atlantic Occultations

David Dunham

### Asteroidal and Planetary Occultations

2016						dur.		Ap.		Location, Notes	
Date	Day	EDT	Star	Mag	Asteroid	dmag	s	"			
Sep 8	Thu	23:01	4U341120979	13.5	Cohnia	1.5	9	10	WV,WMD,PA;DC,VA?		
Sep 9	Fri	6:09	4U550034656	13.3	Endymion	2.0	1.7	9	WV,VA,MD,DE;DC?		
Sep 13	Tue	23:12	TYC52230545	10.3	Palma	2.1	15	5	NY,nNJ,PA,nOH		
Sep 16	Fri	2:04	SAO 128881	9.7	Sharonov	5.8	2	4	seMD,seVA,eNC		
Sep 16	Fri	6:09	4U572018987	13.3	Brita	2.2	3	10	WV,nVA,DC,MD,DE		
Sep 24	Sat	4:13	4U570030159	12.8	Mannucci	3.9	2	9	nwSC,cNC,swVA		
Sep 26	Mon	23:23	4U531003668	13.0	Tercidina	0.3	16	9	LI,seMD,seVA;DC?		
Sep 28	wed	23:50	TYC46980743	10.0	Melpomene	0.2	25	5	wPA,wMD,eWV,eVA		
Oct 1	Sat	4:01	4U552017317	13.5	Miriam	0.7	9	10	VA,SMD,DE;DC?		
Oct 2	Sun	4:47	2UC46926268	12.0	Hippo	2.0	12	8	c&nVA,DC,MD,ePA		
Oct 5	wed	2:02	SAO 191730	9.7	Patientia	1.9	27	4	NY,PA,MD,DC,nVA		
Oct 5	wed	4:56	4U500033852	13.0	Watsonia	2.0	3	9	nOH,PA,NJ;nMD?		
Oct 6	Thu	6:44	SAO 119126	8.5	Mercury	0.0	87	3	e USA Sun -5		
Oct 8	Sat	6:13	4U555021587	13.3	Eulalia	1.7	4	10	WV,MD,DE;DC,nVA?		

### Lunar Grazing Occultations

2016								CA		Location & Remarks	
Date	Day	EDT	Star	Mag	% alt						
Sep 25	Sun	6:40	SAO 97439	7.5	28- 55	7N					Charlottesville&Port Royal, VA
Oct 8	Sat	21:32	ZC 2763	6.5	48+ 20	4S					*Somerset & Lewisburg, PA

\*\*\* No expedition from the DC region expected \*\*\*

### Total Lunar Occultations

2016													
Date	Day	EDT	Ph Star	Mag	% alt	CA	Sp.	Notes					
Sep 10	Sat	19:57	D SAO 161424	7.7	65+ 32	53S	K5	Sun alt. -7 deg.					
Sep 10	Sat	22:28	D SAO 161482	8.0	65+ 24	20N	B8						
Sep 11	Sun	20:04	D 43 Sgr	4.9	74+ 31	24S	K0	Sun -9, ZC2814, double?					
Sep 11	Sun	20:10	D ZC 2816*	7.0	74+ 31	52S	B5	Sun-10,mg2 10 37" PA158					
Sep 11	Sun	23:10	D 45 Sgr	5.8	75+ 26	14N	K0	ZC2828,mg2 7 .02" PA106					
Sep 12	Mon	0:39	D ZC 2833	7.0	75+ 14	54S	K0	Azimuth 232 deg.					
Sep 13	Tue	22:16	D EW Aquarii	6.5	91+ 36	79N	F*	ZC 3100					
Sep 15	Thu	21:14	D 81 Aquarii	6.2	99+ 26	53N	K5	ZC 3379, Term. Dist. 8"					
Sep 16	Fri	4:49	D phi Aqu	4.2	100+ 17	28S	M2	ZC 3412, Term. Dist. 1"					
Sep 19	Mon	5:21	R ZC 303	6.4	91- 48	29S	K0	Maybe close double?					
Sep 19	Mon	6:34	R WZ Piscium	6.3	90- 37	66N	A4	Sun alt. -4 deg, ZC 308					
Sep 22	Thu	1:42	R SAO 94206	7.2	63- 31	63S	M0						
Sep 22	Thu	2:28	R SAO 94220	7.3	62- 39	69S	K0	Maybe close double??					
Sep 23	Fri	6:48	R SAO 95174	7.7	50- 69	53N	B8	Sun -2, mg2 9 2" PA148d					
Sep 24	Sat	1:35	R SAO 96203	7.9	40- 9	68S	K2	Azimuth 75 degrees					
Sep 24	Sat	2:50	R SAO 96261	7.7	40- 23	60S	K2						
Sep 24	Sat	3:38	R ZC 1057	6.8	39- 32	67S	K0						
Sep 24	Sat	4:23	R QY Gem	7.2	39- 40	80N	B3	SAO 96318					
Sep 24	Sat	4:59	R SAO 96339	8.4	39- 47	85S	K5						
Sep 24	Sat	6:40	R SAO 96393	7.6	38- 64	65N	A2	Sun alt. -4 deg.					
Sep 24	Sat	7:09	R NP Gem	6.0	38- 67	68S	M1	Sun +2,ZC1072,double?					
Sep 25	Sun	2:30	R ZC 1184	8.0	30- 8	34N	G5	Azimuth 75 degrees					
Sep 25	Sun	3:50	R SAO 97338	7.4	29- 23	42N	K0						
Sep 25	Sun	6:58	R ZC 1198	6.1	28- 57	78S	K0	Sun -1, close dbl?					
Oct 4	Tue	19:30	D gamma Lib	3.9	14+ 15	53N	K0	Sun-10,Az.236,ZC2223					
Oct 7	Fri	21:17	D ZC 2613	8.0	38+ 17	6N	A3	Mag2 10 sep 37" PA207					
Oct 8	Sat	19:46	D ZC 2758	7.0	48+ 31	74S	B2						
Oct 10	Mon	20:24	D ZC 3029	7.0	68+ 35	64N	F2	Maybe close double??					
Oct 10	Mon	23:44	D ZC 3044	8.0	69+ 20	84S	K0						

\* The star is in the Kepler 2 exoplanet search program so lightcurves of the occultation are desired to check for close stellar duplicity.

Further explanations & more information is at <http://iota.jhuapl.edu>

David Dunham, [dunham@starpower.net](mailto:dunham@starpower.net)

## Hailing All Local Star Trek – Original Series Fans!

Submit your favorite episode from each of the 3 broadcast seasons in this short survey:

<https://www.surveymonkey.com/r/CHN7CLD>



Courtesy Panda ClipArt

## 2016-2017 Officers

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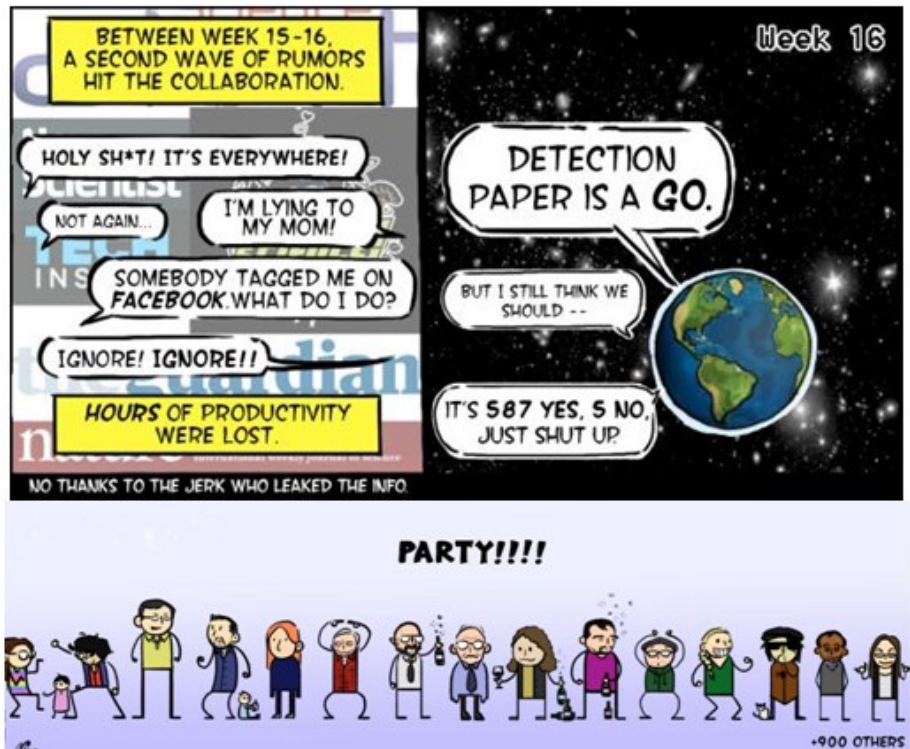
*Team Apocalypse – continued from page 4*

minutes each to look through the little red CASE First Light scope and often didn't believe that it was built by middle-schoolers!



*Courtesy CA Brooks  
 NCA members with telescopes and public viewers*

*GW150914– continued from page 4*



*© Nutsinee Kijbunchoo (2016). Used with permission.*

### Air & Space Magazine's 4<sup>th</sup> Annual Photo Contest



Courtesy Ivan Eder (cc)  
Comet 17P/Holmes (2007)

If you are 18 years or older, you can enter your photographs in any of 4 categories: **Astronomy, Military, Civilian and People & Planes.** You can compete to win cash prizes.

The contest is free to enter and open until midnight (EST), November 1, 2016,

**The submission deadline for the October issue of Star Dust is September 24<sup>th</sup>.**

**Clear Skies!**

### Calendar of Events

- **NCA Mirror- or Telescope-making Classes:** Tuesdays and Fridays, from 6:30 to 9:45 pm at the Chevy Chase Community Center (intersection of McKinley Street and Connecticut Avenue, N.W.) Contact instructor Guy Brandenburg at 202-635-1860 or email him at [gfbrandenburg@yahoo.com](mailto:gfbrandenburg@yahoo.com).
- **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](http://www.astro.umd.edu/openhouse)
- **Steven F. Udvar-Hazy Center IMAX Theater** in Chantilly, VA: "Star Trek Beyond" (IMAX 3D Experience), \$15 (adults) and \$13.50 (youth), evening shows only. Check Sept. dates here: <https://www.si.edu/lmax/movie/1236>
- **Mid-Atlantic Senior Physicists Group:** "Supersymmetry" with Jim Gates (Univ. of MD-Physics Dept.), Wed. Sept. 21th, at 1 pm at the American Center for Physics (1<sup>st</sup> floor conference room). <http://www.aps.org/units/maspg/>
- **Owens Science Center Planetarium** (Planetarium Patty's Plaza): "Where the Extraordinary is now the Ordinary" with Patricia Seaton, Mon. Sept. 26, 7:30 pm; FREE. [www1.pgcps.org/howardbowens](http://www1.pgcps.org/howardbowens)
- **Owens Science Center Planetarium** (Concerts Under the Stars): "Songs of the Night," Fri. Sept. 30<sup>th</sup>, 7:30 - 8:30 pm; FREE. [www1.pgcps.org/howardbowens](http://www1.pgcps.org/howardbowens)
- **International Astronomy Day:** "Bringing Astronomy to the People," Sat. Oct. 8<sup>th</sup>.
- **Upcoming NCA Meetings** at the University of Maryland Observatory: 8 Oct: Erin Kara (UMd/GSFC), "How We See Black Holes."

## 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.?

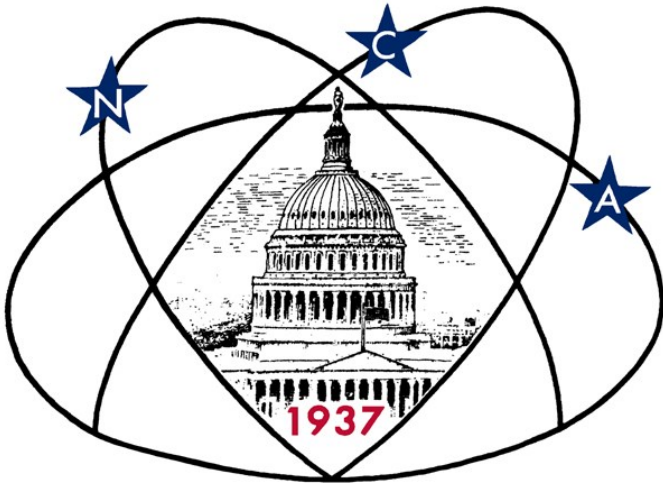
Are you interested in volunteering for: Telescope making, Exploring the Sky, Star Dust, NCA Officer, etc.?

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



*Next NCA Meeting:*

2016 September 10<sup>th</sup>

7:30 pm

@ UMD Observatory

Dr. Matthew  
Knight

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