

# Star Dust

Newsletter of National Capital Astronomers, Inc.

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

June 2023

Volume 81, Issue 10

**Celebrating 86 Years  
of Astronomy**

## Next Meeting

**When:** Sat. June 10th, 2023

**Time:** 7:30 pm

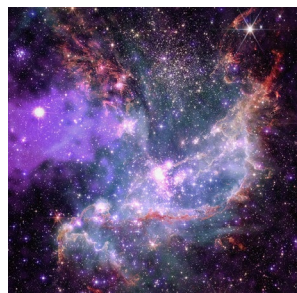
**Where:** Online (Zoom)

See instructions for joining the meeting on Page 8.

**Speakers: Science Fair Winners**

## Table of Contents

Science Fair Winners.....	1
Elections and Astro-photos.....	2
Recent Astronomy Highlights.....	2
President's Corner.....	2
Exploring the Sky.....	3
Asteroid (2102) Tantalus.....	3
Sky Watchers.....	5
Occultations.....	6
Calendar of Events.....	9



**Image Credit - Chandra:**  
NASA/CXC/SAO, XMM: ESA/XMM-Newton; IR: JWST;  
NASA/ESA/CSA/STScI, Spitzer:  
NASA/JPL/CalTech; Optical: Hubble:  
NASA/ESA/STScI, ESO; Image  
Processing: L. Frattare, J. Major, N. Wolk, and K. Arcand

NGC 346 is a star cluster in the Small Magellanic Cloud. More info is at [chandra.si.edu/photo/2023/chandrawebb2/](http://chandra.si.edu/photo/2023/chandrawebb2/).

## Science Fair Winners

This year's NCA Science Fair Winners are:

**Stephen Chen**

### Inference of Distant Gravity from Local Measurements

**Abstract:** The anomalous fluctuations of the gravity field in a region are spatially correlated due to their common cause in gravitating matter. In this investigation we use spatial covariance functions to model the relationship between gravity seen at one set of locations to gravity expected at another set of locations. The fidelity of covariance-based gravity reconstruction is assessed as a function of gravity model correlation length.

**Saragaha Surendra**

### Onboard Spacecraft computing on NASA Project Dragonfly

**Abstract:** Data from NASA missions is brought down to Earth in the form of CCSDS packets (space packets containing binary data) which are organized into multiple sections containing information. The time it takes for these packets to travel between Earth and far away destinations in space such as planets and stars depends on the distance, the size of the data packets, and the placement of the spacecraft respectively to Earth. My research findings indicate that by utilizing a Python Interpreter on the spacecraft, scientists can get higher quality image data from missions. The Python Interpreter reduces static caused by extraneous sources such as disruptive instrument noise to compile an image, such as of stars, with features that are relevant to research done by scientists. Real image data from the New Horizons mission to Pluto was used to verify these findings and demonstrate the feasibility of the Python Interpreter. Furthermore, my research demonstrates a low-cost solution to increasing the amount of high-quality data received from spacecraft because by using software to complete onboard computing, expensive equipment does not need to be purchased to improve data quality as it was on New Horizons. Plans to implement the software onto NASA's Project Dragonfly, a mission to Titan set to launch in 2027, are underway in order to increase the amount of high-quality and relevant data received.

Each of the winners will receive the following awards from NCA:

- A certificate
- An invitation to speak at our June meeting
- One year of free membership in the NCA
- A one-year subscription to Sky & Telescope

## Recent Astronomy Highlights

### Most Energetic Explosion Ever Observed

A cosmic explosion that took place eight billion light years away, labeled AT2021lwx, has been proclaimed the most energetic ever recorded. It is believed to have been caused by the accretion of an enormous cloud of gas by a supermassive black hole. Despite the vast distance of the explosion, the energy streaming from it is still visible even three years after it was first detected. While other events, such as gamma-ray bursts have been brighter, they are much shorter lived and therefore have not released as much energy. For comparison, even the most energetic supernovae are generally only visible for several months. Based on the duration of the event, the cloud of disrupted gas may have been thousands of times the mass of the Sun. Interestingly, no host galaxy for the explosion has been detected so far. More information on the explosion is available at [scitechdaily.com/cosmic-kaboom-astronomers-reveal-the-largest-explosion-ever-witnessed/](https://scitechdaily.com/cosmic-kaboom-astronomers-reveal-the-largest-explosion-ever-witnessed/).

### Perhaps Not a Runaway Supermassive Black Hole After All

In March, astronomers reported evidence of a possible runaway supermassive black hole, ejected from its host galaxy. (See Page 2 of the March issue of Star Dust - [capitalastronomers.org/SD\\_year/2023/S tarDust\\_2023\\_03.pdf](https://capitalastronomers.org/SD_year/2023/S tarDust_2023_03.pdf).) While the SMBH itself was not detected, astronomers claimed to have observed a long line of stars, in theory formed from gas disrupted by that supermassive black hole. However other astronomers were skeptical of the proposition and have studied the evidence. Their counter theory is that the 'line of stars' is actually a galaxy seen edge on. The dispute may be resolved when improved images from Hubble Space Telescope are released in upcoming months. Meanwhile more information on the new theory is available at [www.sciencenews.org/article/light-black-hole-spiral-galaxy](https://www.sciencenews.org/article/light-black-hole-spiral-galaxy).

*continued on page 5*

## NCA Elections and Astro-photos

John Hornstein

All members of the NCA can vote during the elections at the NCA meeting on June 10th. Self nominations are encouraged. If you are nominating someone else, please contact that person to make sure they are willing to serve in that office before nominating them. Nominations can be taken during the election.

Currently the candidates are:

**President**

**Guy Brandenburg**

**Vice President**

**John Hornstein**

**Asst. Secy-Treasurer**

**Jeff Norman**

**Secy-Treasurer**



**Jim Simpson**

**Trustee**

**Tom Crone (to June 2024)**

**Trustee**

**Bernard Kaufman (to June 2027)**

When the beginning of the voting is announced, go to the bottom of your Zoom screen and note the 'Reactions' icon. To vote, click on that icon to see the options. When each combination of a candidate and a position is announced, select either  or  to indicate your choice. If there are multiple candidates for any office, alternate procedures for that election will be explained at that time.

**There has not been a lot of response in recent years, however at the end of the meeting, we would like to see any interesting astro-photos that you have taken since last June. When Elizabeth tells you go ahead, either share your screen, or hold the photo up in front of you. We will be eager to hear how you made the photo.**

## President's Corner

Guy Brandenburg

1. ELECTIONS: As noted elsewhere, NCA will be holding elections for next year's officers during the June 10<sup>th</sup> meeting. We have a candidate for every position, but next year, we will most likely need a new vice-president. The VP hosts monthly meetings in case the president is unable to attend, but more importantly, searches for speakers at those meetings. We will be voting via Zoom as explained above.
2. SCIENCE FAIR JUDGES NEEDED: We need more volunteers to go to local middle- and high-school science or STEM fairs in DC and the surrounding counties to help judge astronomy-related projects and award prizes to the best ones. I am positive that we missed some excellent exhibits because we lacked judges!

Many, but not all, of these STEM fairs events occur on just a handful of weekends in March, and our current judges haven't mastered the skill of being at two science fairs at the same time. Speaking to these young people and looking at the very best projects can give you a lot of hope about the next generation. Note: You do not need to be a professional astronomer or any kind of technical expert to be a judge, and it's only a single weekend morning or two!

This web page gives dates and other information about local science (or STEM) fairs that occurred this year within about 50 miles of the White House: [www.washacadsci.org/stem-fair-events/](https://www.washacadsci.org/stem-fair-events/), which gives you a general idea of when they will occur next spring.

*continued on page 3*

## Exploring the Sky



### Exploring the Sky – 2023 Sessions

- 17 June 9:00 P.M. Venus, Mars, M13  
 15 July 9:00 P.M. Venus, Mars, M13,  
 Summer Triangle  
 19 Aug. 8:30 P.M. Moon, Venus, Mars,  
 M13, summer triangle  
 23 Sept. 8:00 P.M. Moon, M31,  
 Venus, Mars  
 21 Oct. 7:30 P.M. Moon, Jupiter  
 18 Nov. 7:00 P.M. Jupiter, M45,  
 outer planets

**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 still see solar system objects (even the occasional comet), open and globular clusters and maybe a fuzzy galaxy or two.

This year, as an added feature, you can come one hour early and see a planetarium program in the Nature Center and then come to the field to observe. Also, if the sky is cloudy or it's raining there will be a planetarium program at that one hour earlier time so Exploring the Sky will no longer be canceled! Planetarium programs can be found at:

[www.nps.gov/rocr/planyourvisit/calendar.htm](http://www.nps.gov/rocr/planyourvisit/calendar.htm). You can also search "astronomy", "dark skies" or call the Nature Center at: (202)-895-6070.

*President's Corner – continued from page 2*

3. **EXPLORING THE SKY:** As noted in earlier issues of Star Dust, Rock Creek National Park is now putting on a show at the planetarium at the Rock Creek Nature Center exactly one hour before the start of each session of Exploring the Sky during this 75th year of the joint program.

The late Bob McCracken, a long-time NCA member and officer, was instrumental in establishing that planetarium, completed in 1960. (See [www.npca.org/articles/895-the-only-national-park-planetarium](http://www.npca.org/articles/895-the-only-national-park-planetarium)) Ranger Renee, who generally runs the hardware and software part of the 60-seat planetarium show, told us that she very much enjoys having knowledgeable NCA members in the audience to ask pertinent questions, to suggest objects to zoom to, and to add additional information during the presentations. These indoor sessions occur regardless of the weather, so even if the telescope portion of the event is clouded out, the planetarium show will continue. Jay Miller deserves our thanks for running the telescope-observing side of this program for so many years!

4. **LOCAL-ish STAR PARTIES (ETC) THIS SUMMER:** These are great opportunities to look though and admire all sorts of telescopes and meet folks even more into astronomy than you are, under much darker skies than we have anywhere inside the Beltway. The multi-day events allow camping, but some of them are already sold out.
- C.M. Crockett Park Public Night (June 10, July 22 and August 12)
  - York County Star Party PA (June 14-18)
  - Sky Meadows State Park, VA (June 17, July 15 and August 19)
  - Cherry Springs Star Party, PA (June 15-18)
  - Green Bank Star Quest, WV (June 21-24)
  - Stellafane Convention VT (August 17-20)
  - Almost Heaven Star Party, WV (August 18-22) [sold out already!]
  - Black Forest Star Party PA (Sept 15-17)
5. NCA-labeled gear choices are coming soon! Four (out of over a dozen) initial mockups designed by Alexandra Brandenburg for a shopping bag, a T-shirt, a ball cap, and a sweatshirt, are shown on Page 4. Suggestions on designs and wording are most welcome. (I have a few myself.) Ordering details will be sent to all NCA members once details are finalized.
6. The current head of the International Dark-Sky Association, Tom Reinert, will be speaking at the Northern Virginia Astronomy Club meeting on the day after our NCA meeting, (Sun 11 Jun).

## The Potentially Hazardous Asteroid (2102) Tantalus

*David and Joan Dunham*

The asteroid (2102) Tantalus, discovered by C. Kowal at Palomar in 1975, is a little more than a kilometer across and is on a highly inclined (64° to the ecliptic) orbit that passes only 0.043 AU from Earth, less than the 0.05 AU limit for potentially-hazardous near-Earth asteroids (NEAs). With the very high inclination, if it struck the Earth, it would do so with a very high velocity, causing serious worldwide damage to human civilization. Fortunately, numerical integrations of its orbit show there will be no very close encounters with Earth during the next 1000 years, but the orbit is not known well enough to say what the chances are beyond that.

*continued on page 7*



## Options for NCA-labeled clothing and gear – Designed by Alexandra Brandenburg



(These are mockups of potential products.)

# Sky Watchers

## Summer Overview

Mercury will appear lower each morning in the predawn sky until it transitions to the night sky in early July, reaching Greatest Eastern Elongation on August 9<sup>th</sup> (see below). Venus will be in the evening sky until early August when it transitions to the predawn sky. In mid-June the planet will pass through the Beehive Cluster (see below) and on July 1<sup>st</sup> it will be in conjunction with Mars (see below). Meanwhile Mars remains in the evening sky throughout the Summer. Jupiter and Saturn will rise in the early morning hours, with Saturn reaching opposition on August 27<sup>th</sup> (see below).

### Late June

6/12, 13	Venus will be passing through the Beehive Cluster, an open cluster in the constellation of Cancer, on both nights. Viewable with binoculars
6/21	Summer Solstice – 10:51 a.m.

### July

7/1	Conjunction of Venus and Mars – Our two closest neighbors will be 3.5° apart (approximately seven times the diameter of the Moon) in the morning sky.
7/3	Full Moon and Supermoon – 7:40 a.m.
7/28, 29	Peak of the Delta Aquarids Meteor Shower – Approximately 20 meteors/hour. Unfortunately, a nearly full Moon will interfere with viewing this year.

### August

8/1	Full Moon and Supermoon – 2:33 p.m.
8/9	Mercury at Greatest Eastern Elongation. It will be 27.4° from the Sun in the evening sky.
8/12, 13	Peak of the Perseids Meteor Shower – 60 meteors/hour. Viewing conditions should be very good for much of the night this year, with a crescent Moon not rising until 3:11 a.m.
8/27	Saturn at Opposition, closest to Earth and viewable all night long.
8/30	Full Moon, Supermoon and Blue Moon – 9:37 p.m.

All times are in EDT (Eastern Daylight Savings Time)

**Star Dust** is published ten times yearly September through June, by the National Capital Astronomers, Inc. (NCA).

**ISSN: 0898-7548**

Editor: Todd Supple

Editorial Advisors:

- Michael Chesnes
- Jeffrey Norman
- Elizabeth Warner
- Wayne Warren
- Marjorie Weissberg

Electronic Distributor: Jay Miller

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

### LIGO Back Online and Already Detecting Possible Mergers

After being offline for three years, LIGO, the Laser Interferometric Gravitational-Wave Observatory, has returned to service, searching for gravitational waves, minute ripples in spacetime. In early May a brief engineering run started during which there was a detection of a possible black-hole-neutron-star merger. The three-year downtime allowed for improvements to the detectors to be implemented, leading to a 30% increase in sensitivity, which should result in many more gravitational-wave detections and even detections from events that took place even farther away. Improvements also include new algorithms which will allow for the detection of mergers more quickly, perhaps even in real time, so that various telescopes can be used as quickly as possible to also detect evidence of the mergers involving objects other than black holes. The Virgo Interferometer in Italy and the KAGRA, Kamioka Gravitational Wave Detector will also soon join in the run after various tests and upgrades are completed on them. This fourth observation run started on May 24<sup>th</sup> and is expected to last 20 months. More info about the run can be found at [www.ligo.caltech.edu/news/ligo20230524](http://www.ligo.caltech.edu/news/ligo20230524) as well as at [theconversation.com/gravitational-wave-detector-ligo-is-back-online-after-3-years-of-upgrades-how-the-worlds-most-sensitive-yardstick-reveals-secrets-of-the-universe-204339](http://theconversation.com/gravitational-wave-detector-ligo-is-back-online-after-3-years-of-upgrades-how-the-worlds-most-sensitive-yardstick-reveals-secrets-of-the-universe-204339).

*continued on page 9*

# 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

2023 Date	Day	EDT	Star	Mag.	Asteroid	dmag	dur. s	Ap. " Location
Jun 13	Tue	1:48	TYC61630226	10.1	1995 UQ4	7.2	1.3	4 SNJ,swMD,CVA,CTX
Jun 26	Mon	2:49	TYC68000046	12.1	Klymene	2.0	10	9 SNJ,eMD,DC,VA,AZ
Jun 28	wed	1:20	4U312227647	12.8	Lagrangea	2.7	3	8 SNJ,CMD,DC;nVA?
Jul 5	wed	3:48	4U425118270	11.8	Gunila	2.3	6	5 SMD,SDC,nVA,COH
Jul 6	Thu	3:58	SAO 146959	9.7	Marlene	6.0	5	3 nMO,COH,cw-nePA
Jul 11	Tue	23:52	4UC46184895	11.5	Vecherka	4.3	1.1	5 CVA,swV,KY,nOK
Jul 17	Mon	0:18	TYC68640325	11.2	Astronomia	3.8	5	5 nNJ,nMD,nVA,nKY
Jul 25	Tue	3:00	4U416141013	11.9	Barbara	0.3	6	5 SNJ,SMD,eVA,cNC
Jul 25	Tue	23:59	4U335112875	12.3	Ophelia	1.8	18	6 NJ,MD,DC,n+cVA
Jul 31	Mon	3:22	TYC58240586	10.1	Adriana	5.1	9	3 ne-scPA,wMD,nVA
Aug 15	Sat	22:48	4U488143179	13.0	2002 YE25	6.6	0.3	8 SNJ,CMD,nVA,nOK

## Lunar Grazing Occultations

2023 Date	Day	EDT	Star	Mag	% alt	CA	Location, Notes
Aug 6	Sun	2:05	SAO 109599	7.7	73-	37	15N DalC,VA;Mall,DC;ClgPk,Balt,MD
Aug 6	Sun	5:01	ZC 153	6.0	72-	56	19N Cedn,VA;sLaPlata,MD;wPhily,PA
Aug 7	Mon	1:44	54 Ceti	5.9	62-	29	13N nLeesbg,VA;Urbana,nWstmstr,MD
Sep 6	wed	0:23	ZC 611	7.0	57-	17	12N Lorne,VA;Easton,MD;n.Dover,DE

## Lunar Total Occultations

2023 Date	Day	EDT	Ph Star	Mag	% alt	CA	Sp. Notes
Jun 13	Tue	5:05	R ZC 226	6.5	23-	26	74N K0 Sun -7, close double??
Jun 15	Thu	5:18	R ZC 467	6.5	8-	17	78N K5 Sun altitude -5 degrees
Jul 1	Sat	1:00	D Alniyat =	2.9	93+	19	51S B1 ZC2349,mg2 5 sep 0.4"
Jul 1	Sat	2:05	R sigma Sco	2.9	93+	12	-67S B1 Az. 223, Axis Angle 242
Jul 2	Sun	0:15	D 43 Oph	5.3	97+	23	40S K4 ZC 2505
Jul 6	Thu	0:14	R ZC 3178	6.2	89-	12	89S A0 Az. 127, spec. binary
Jul 6	Thu	5:14	R ZC 3202	6.2	88-	30	80S F0 Sun alt. -6 deg.
Jul 12	wed	3:22	R SAO 93209	7.0	27-	18	50N K0
Jul 12	wed	4:49	R 50 Arietis	6.7	26-	34	89N A0 Sun-11,ZC442,mg2 9 dT+5
Jul 13	Thu	4:17	R ZC 573	6.7	18-	21	79S K0 close double??
Jul 25	Tue	21:51	D ER Vir	6.6	51+	24	85N M4 ZC 2021
Jul 27	Thu	23:38	D ZC 2270	5.4	72+	15	84S B2 Azimuth 222 deg.
Aug 4	Fri	1:58	R psi1 Aqr	4.2	91-	37	71N K0 ZC3419,mg2 10 dT +52s
Aug 4	Fri	2:40	R psi2 Aqr	4.4	91-	40	25S B5 ZC3425,close double??
Aug 5	Sat	1:06	R 4 Ceti	6.4	83-	29	88S B8 ZC 12; actually in Psc
Aug 5	Sat	1:24	R AP Piscium	6.2	83-	32	88N K2 ZC 13, spec. binary
Aug 7	Mon	1:37	D 54 Ceti	5.9	63-	26	2N F2 ZC 272,TrmDst 8",DMVgrz
Aug 7	Mon	1:49	R 54 Ceti	5.9	62-	29	24N F2 actually in Aries;dbl??
Aug 13	Sun	4:30	R ZC 1105	6.5	8-	11	57S Az. 65, close double?
Aug 13	Sun	5:37	R ZC 1108	7.0	8-	23	82S G8 Sun -8, close double?
Aug 24	Thu	17:36	D Alniyat =	2.9	56+	21	70N B1 Sun+25,ZC2349,close dbl
Aug 24	Thu	18:43	R sigma Sco	2.9	56+	25	-42N B1 Sun+12,Axis Angle 319
Aug 24	Thu	22:54	D Antares	1.1	57+	9	43S M1 Azimuth 226, ZC 2366, mg2 5, dTime -6s
Aug 25	Fri	20:21	D SAO 185400	7.2	67+	23	78S F5 Sun alt. -7 deg.
Aug 25	Fri	20:26	D SAO 185394	7.8	67+	23	48S G8 Sun alt. -8 deg.
Aug 26	Sat	20:01	D ZC 2677	6.9	77+	20	6S F5 Sun -4, Term. Dist. 12"
Aug 26	Sat	20:26	D ZC 2681	7.8	77+	21	48N A1 Sun -8, close double
Aug 26	Sat	21:21	D ZC 2688	7.0	78+	22	38S G6
Aug 27	Sun	22:37	D SAO 188429	7.7	87+	23	40S K4
Aug 30	wed	0:46	D ZC 3202	6.2	99+	33	62S F0
Sep 2	Sat	23:53	R ZC 214	6.2	86-	29	27S K1 mg2 8 sep 69",dTime-13s
Sep 4	Mon	0:05	R ZC 342	8.0	77-	26	80S K0
Sep 5	Tue	4:28	R ZC 485	7.0	66-	67	79S K2 mg2 11, dTime +3sec
Sep 5	Tue	5:46	R 63 Arietis	5.2	66-	72	75S K3 Sun-11,ZC 487,close dbl
Sep 6	wed	1:13	R SAO 76483	7.2	57-	25	36N G5
Sep 7	Thu	1:25	R ZC 762	6.6	46-	19	80N B5 close double?
Sep 7	Thu	2:09	R SAO 76970	7.6	46-	27	44S G5
Sep 8	Fri	1:10	R ZC 909	6.0	37-	8	78N B9 Az. 61, close double?
Sep 8	Fri	2:26	R SAO 77909	7.6	36-	21	71S A0 mg2 11,sep 22",dTime+22
Sep 9	Sat	3:09	R ZC 1067	7.1	27-	19	34S K2 close double??
Sep 9	Sat	3:30	R SAO 78976	8.2	27-	23	87S A0 mg2 12,sep 30",dTime-57
Sep 10	Sun	6:38	R omega Cnc	5.9	18-	47	30S G8 Sun alt. -2, ZC 1206

More information at <http://iota.jhuapl.edu/exped.htm>.  
David Dunham, [dunham@starpower.net](mailto:dunham@starpower.net)



## 2022-2023 Officers

### President:

Guy Brandenburg  
[gfbrandenburg@yahoo.com](mailto:gfbrandenburg@yahoo.com)  
 202-635-1860 (leave message)

### Vice-President:

John Hornstein  
[jshgwave@yahoo.com](mailto:jshgwave@yahoo.com)  
 301-593-1095 (h)

### Secretary-Treasurer:

Jim Simpson  
[simpsonj@verizon.net](mailto:simpsonj@verizon.net)  
 240-232-2820

### Asst. Secretary-Treasurer:

Jeffrey B. Norman  
[jeffreynorman@comcast.net](mailto:jeffreynorman@comcast.net)

### Trustees:

- Michael Chesnes (2023)
- Jay Miller (2023)
- Benson Simon (2025)
- Michael Brabanski (2026)

### Appointed Officers and Committee Heads:

#### Exploring the Sky

Jay Miller  
[jhmiller@me.com](mailto:jhmiller@me.com)

#### Telescope Making

Guy Brandenburg  
[gfbrandenburg@yahoo.com](mailto:gfbrandenburg@yahoo.com)  
 202-635-1860 (leave message)

#### NCA Webmaster

Elizabeth Warner  
[warnerem@astro.umd.edu](mailto:warnerem@astro.umd.edu)  
 301-405-6555

#### Star Dust Editor

Todd Supple  
[NCAStardust@gmail.com](mailto:NCAStardust@gmail.com)  
 301-595-2482 (h)

#### Social Media

Twitter: [@NatCapAstro](https://twitter.com/NatCapAstro)

### *The Potentially Hazardous Asteroid (2102) Tantalus – continued from page 3*

As explained in a paper presented at the 2021 Planetary Defense Conference (PDC) available at [jota.jhuapl.edu/NEOccultationsDunham.pdf](https://jota.jhuapl.edu/NEOccultationsDunham.pdf), observations of occultations of stars by NEAs provide a powerful method for determining the accurate orbits of NEAs, especially when used in conjunction with radar observations, to assess the threat of NEAs far into the future. If the occulted star is bright, the NEA occultation can be recorded with small telescopes. Last May 7th, we had such an opportunity with Tantalus, when it occulted an 8.4-mag. SAO 164452 (= HIP 106281) in a path crossing s.w. Oregon to s. Texas, as shown in the map at the top of p. 2 of [occultations.org/publications/rasc/2023/nam23NEAoccs.pdf](https://occultations.org/publications/rasc/2023/nam23NEAoccs.pdf).

Ted Blank, Norm Carlson, and we decided to try the occultation. Clouds were predicted for most of the path, but clear skies were forecast for central New Mexico, so we converged on Socorro, NM, near the path, the afternoon before the occultation. Ted Blank and we used 8cm “mighty midi” systems, like those used for the successful first Apophis occultation observations shown in figures 8 and 9 of p. 10 of the PDC 2021 paper; Norm Carlson used a 20cm SCT. Norm, with the larger scope, observed from the predicted central line, shown with the green line in Fig. 1 (Page 8 below). Ted set up his stations on the 5 parallel yellow lines, spaced 1 km apart on the sky plane and projected only slightly more on the ground, extending southwest from center, while we set up on those extending to the northeast. The first of the yellow lines in both directions are almost coincident with the blue limit lines. This way, we were able to cover most of the “1-sigma” path error range between the two red lines on the map where the occultation was most likely to occur. The predicted size of Tantalus was 2.1 km, so we thought this strategy would provide two positive chords with high confidence. Norm tracked the target star, while all of the stationary “midi” systems were pre-pointed to the altitude and azimuth of the occultation using stars and relying on the Earth’s rotation to bring the target into the field of view at the right time. This worked for all stations except Ted’s southernmost (farthest from center) station, where the battery of the laptop used to record the occultation there died before the event. As Fig. 2 (Page 8 below) shows, only Norm had an occultation; that provides an astrometric point accurate to about a kilometer in the sky plane that will greatly improve the accuracy of the current orbit and allow it to be propagated farther into the future for checking for possible collisions. It will also allow good predictions for occultations during the next few years so that the next Tantalus occultation can be observed from two or more stations, which will allow decreasing the orbital errors by another order of magnitude. The next chance for radar observations won’t be until 2038.

After the occultation, I (David) discovered online a paper about Tantalus, published only last year in M.N.R.A.S. (Rožek et al., Vol. 515, pp. 4551-4564, 2022) that gives the reliable radar diameter to be  $1.4 \pm 0.2$  km. If we had known that before the event, we would have used a smaller spacing between stations, to increase the chances for two positive chords with the smaller size. We also should have expected the prediction to be more accurate than the formal errors indicated, which was the case for another NEA occultation by the larger NEA, (1866) Sisyphus, successfully observed near the central line by just one observer, Steve Messner, in November last year. A better strategy would have been to space the 4 or 5 inner stations only a quarter of the asteroid’s diameter apart, then the others about 0.7 diameters apart; that would have resulted in 3 or 4 positive chords with a good prediction, and likely one chord for a poor prediction.

*continued on page 8*

The Potentially Hazardous Asteroid (2102) Tantalus – continued from page 7

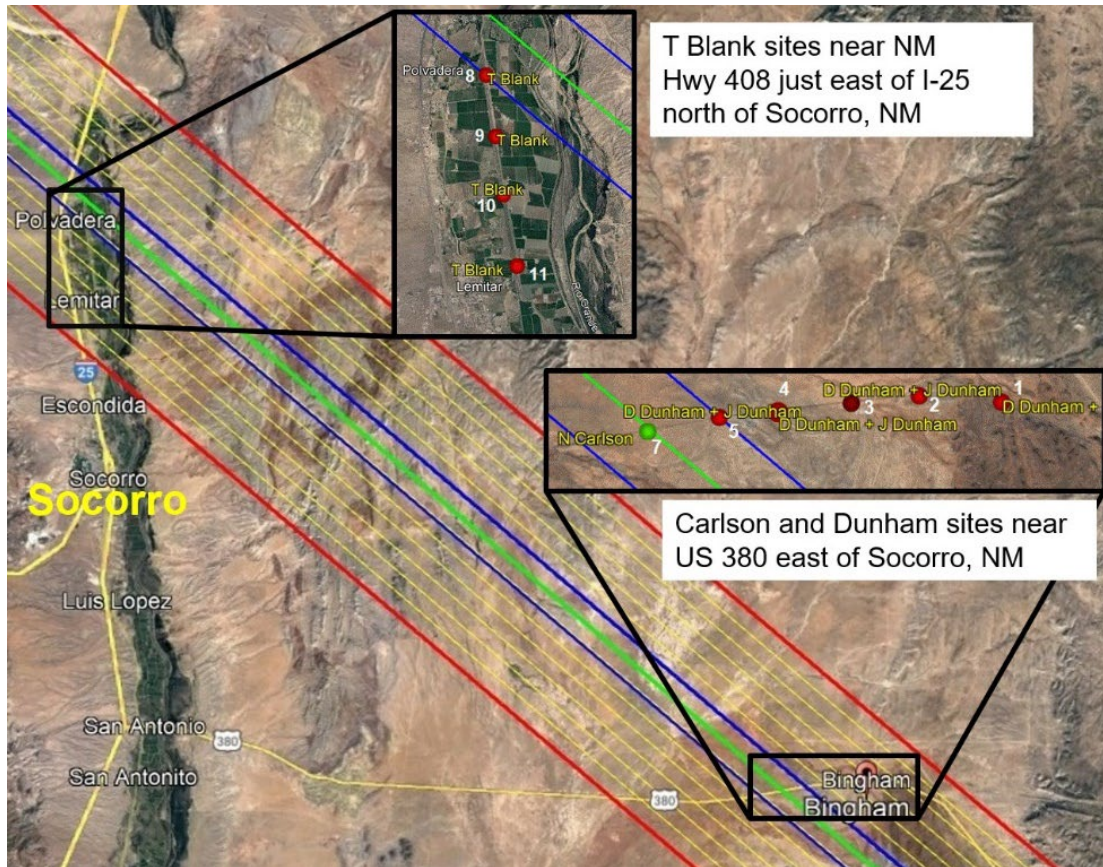


Fig. 1. Observation sites for the 2023 May 7 occultation by Tantalus in the Socorro, NM area. The station numbers are the same as those used in Fig. 2. Image credit - David Dunham and Norm Carlson, IOTA.

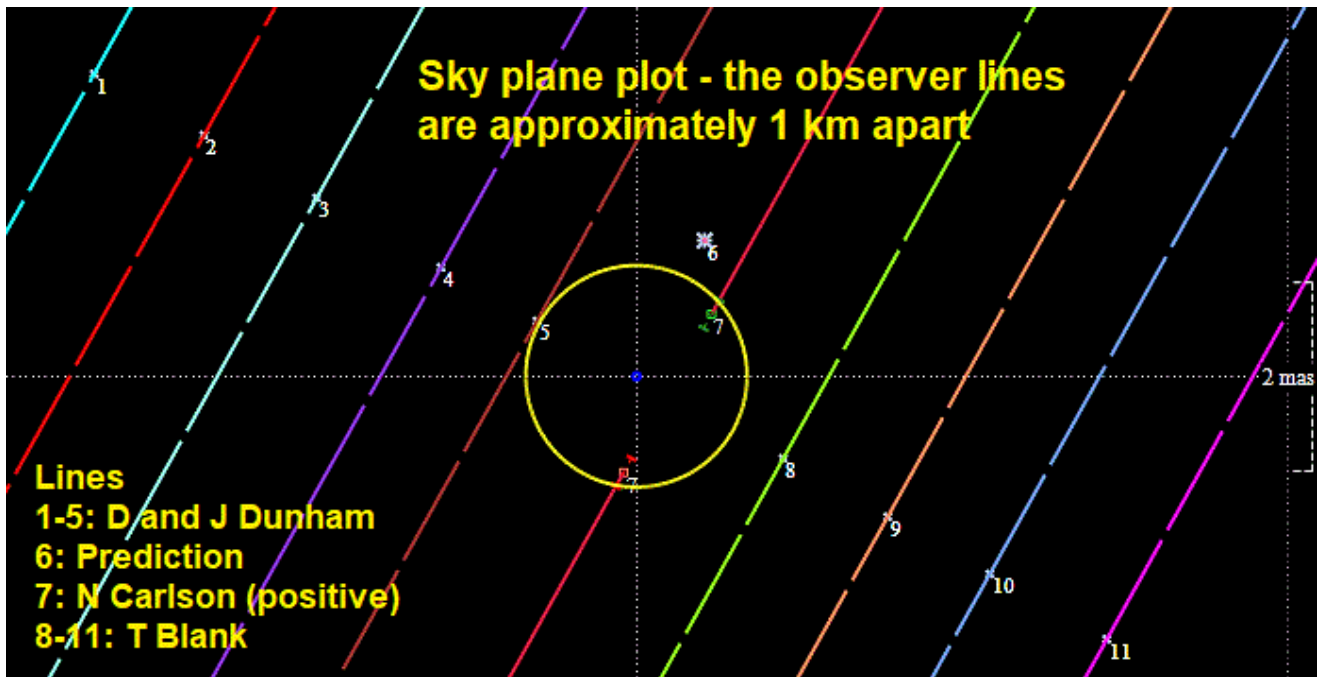


Fig. 2. Sky plane plot of the observations of the 2023 May 7 occultation by Tantalus. Image credit - David Dunham and Norm Carlson, IOTA.



*Recent Astronomy Highlights – continued from page 5*

**Astronomers Observe a Star Consuming a Planet**

For the first time, astronomers detected a star in the act of devouring one of its planets. The first evidence of the event in 2020 came from observations by the Zwicky Transient Facility at the Palomar Observatory in California which scans the northern sky once every two days. The evidence showed a star, approximately 12,000 light years away that had brightened by a factor of 100. Novae are often the cause of sudden brightening, but in this case the star was surrounded by cold gas, not hot gas which would be expected from a nova. In addition, astronomers detected molecules in the gas that could only exist at temperatures far below those of a star. Finally, the total energy given off by the event was consistent with the star consuming a planet approximately the size of Jupiter. More information on the discovery can be found at [www.space.com/astronomers-spot-star-devouring-planet](http://www.space.com/astronomers-spot-star-devouring-planet).

**Calendar of Events**

**NCA Telescope Making, Maintenance, and Modification Workshop (TM3W) (previously the NCA Mirror- or Telescope-making Classes)** is held on Tuesdays and Fridays, **from 6:00 to 8:45 pm** at the Chevy Chase Community Center (5601 Connecticut Avenue, N.W.) Please contact instructor Guy Brandenburg at 202-635-1860 (leave message) or at [gfbrandenburg@yahoo.com](mailto:gfbrandenburg@yahoo.com) if you plan to attend. More info is at [guysmathastro.com/](http://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](http://www.astro.umd.edu/openhouse).

**Next NCA Meeting: 10 June** 7:30 p.m. Elections, Astro-photos

**The APS Mid-Atlantic Senior Physicists Group: (Zoom Meeting)** June 21st at 1:00 p.m., John Suehle Ph.D., CTO of Image Engineering Inc., will give a talk entitled "The Magic of Lasers in Entertainment - Behind the Technology". Join the Zoom meeting using the following link [apsphysics.zoom.us/j/85429471204?pwd=MVJRQWdEbM9KTDVZbVRtME4rM0Vndz09](https://apsphysics.zoom.us/j/85429471204?pwd=MVJRQWdEbM9KTDVZbVRtME4rM0Vndz09).

**National Capital Astronomers Membership Form**

**Name:** \_\_\_\_\_ **Date:** \_\_\_/\_\_\_/\_\_\_

**Address:** \_\_\_\_\_ **ZIP Code:** \_\_\_\_\_

**Home Phone:** \_\_\_ - \_\_\_ - \_\_\_ **E-mail:** \_\_\_\_\_ (necessary for delivery of Star Dust)

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

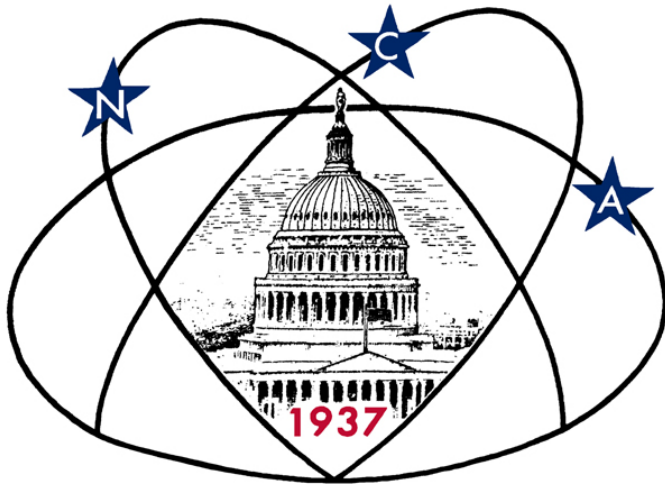
**Please indicate which activities interest you:**

- 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:  
Jim Simpson, NCA Treasurer; 3845 Wayson Road, Davidsonville, MD 21035



**Celebrating 86 Years of Astronomy**



**Image Credit – X-ray: Chandra: NASA/CXC/SAO, XMM: ESA/XMM-Newton; IR: JWST: NASA/ESA/CSA/STScI, Spitzer: NASA/JPL/CalTech; Optical: Hubble: NASA/ESA/STScI, ESO; Image Processing: L. Frattare, J. Major, N. Wolk, and K. Arcand)**

Like the image in the sidebar on Page 1, this is a composite of images from JWST and the Chandra X-Ray Observatory. The image is of M74, a spiral galaxy. More information on the image is at [www.space.com/james-webb-space-telescope-chandra-x-ray-observatory](http://www.space.com/james-webb-space-telescope-chandra-x-ray-observatory).

*To join or renew online, visit [capitalastronomers.org](http://capitalastronomers.org) and look in the right column for the Membership Form and PayPal links.*

**Next NCA Meeting:**  
**2023 June 10<sup>th</sup>**  
**7:30 pm**  
**(On Zoom)**

To join the Zoom meeting, use the following link:  
[umd.zoom.us/j/98702044833?pwd=UTg1bFJpMmxvcXpEU GtUcDNmZnNrdz09](https://umd.zoom.us/j/98702044833?pwd=UTg1bFJpMmxvcXpEU GtUcDNmZnNrdz09)

Please download and import the following iCalendar (.ics) files to your calendar system: [umd.zoom.us/meeting/tJwqd-uoqj8iGdfUoJKHH8U2tt2u7IPmVFFS/ics?icsToken=98tyKu CggTsoGtCRuBqERow-B4iga\\_TwiCIHjadbqRDPKAh7OjaklvYQJ-VzINXm](https://umd.zoom.us/meeting/tJwqd-uoqj8iGdfUoJKHH8U2tt2u7IPmVFFS/ics?icsToken=98tyKu CggTsoGtCRuBqERow-B4iga_TwiCIHjadbqRDPKAh7OjaklvYQJ-VzINXm)

Please note that NCA Zoom meetings are often recorded.

## Inside This Issue

Science Fair Winners.....	1
Elections and Astro-photos.....	2
Recent Astronomy Highlights.....	2
President’s Corner.....	2
Exploring the Sky.....	3
Asteroid (2102) Tantalus.....	3
Sky Watchers.....	5
Occultations.....	6
Calendar of Events.....	9