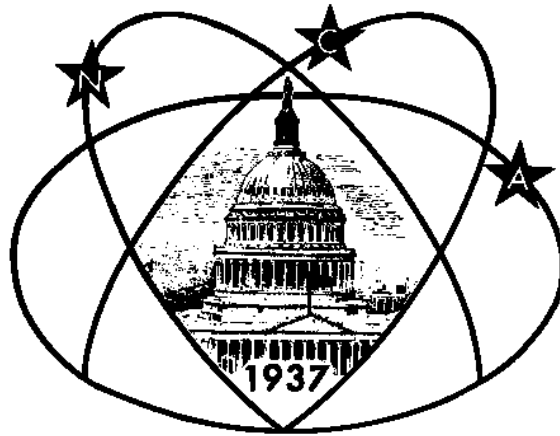


# Star



# Dust

National Capital Astronomers, Inc.

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## Dr. Thomas E. Moore to talk about "Imaging the Plasma Universe" *submitted by Gary Joaquin*

Dr. Thomas E. Moore will present the featured talk for the June 2 meeting of National Capital Astronomers, "Imaging the Plasma Universe." The meeting will be held in the Lipsett Amphitheater in Building 10 (Clinical Center) of the National Institutes of Health in Bethesda at 7:30 P.M.

### Synopsis

The first views of Earth from space showed little evidence for the solar wind, radiation belts, or plasmasphere that had been discovered using early spacecraft measurements. Space views of telltale auroral displays did show us that something fascinating was going on in space

around the Earth, but more effort went into imaging other planets than the Earth, in those early years. In the 1980's, we began to realize that even diffuse space plasmas can be imaged. This led to the development of the NASA Imager for Magnetopause to Aurora Global Exploration (IMAGE) in the late 1990's. Using several different imaging techniques, IMAGE completed its first year of operations in May 2001, and changed forever the way we view space plasma storms.

The SOHO mission had given us dramatic evidence that the sun is anything but quiescent and constant, that huge ex-

*(Continued on page 2)*

## Elections at June Meeting

*Andrew W. Seacord, II*

The nominating committee has nominated the following candidates to be voted on during the 2001 June meeting.

President: Jay H. Miller  
Vice President: Gary L. Joaquin  
Secretary: Nancy Grace Roman  
Treasurer: Jeffrey B. Norman  
Trustee: Harold A. Williams  
Trustee: Jeffrey R. Guerber

In addition to these candidates, nominations can be made from the floor prior to the election.

### Nominating Committee

Andrew W. Seacord, II, Chair  
Wayne H. Warren, Jr.  
Joseph C. Morris

## A Talk by Kirk D. Borne

### Data Mining with the National Virtual Observatory *reviewed by Wayne H. Warren Jr.*

At the May 5, 2001 monthly meeting, NCA members and guests were treated to a lecture about a new international initiative known as The National Virtual Observatory (NVO). Our guest speaker was Dr. Kirk D. Borne, the manager of the Raytheon support staff of the Astrophysics Data Facility at the National Space Science Data Center located at NASA's Goddard Space Flight Center. Dr. Borne explained that he has been interested in and involved with the NVO effort for a few years now, having become interested in the concept after hearing a lecture about an educational outreach program conducted by IBM to computerize the play action during NBA basketball games.

This problem, being of interest to the inner city students in the program, was used to motivate the students to learn more about the field of computer science.

### **Analogy to the study of $\gamma$ -ray bursts**

Dr. Borne began his lecture by relating the history of the discovery and interpretation of  $\gamma$ -ray bursts, using the study of this phenomenon as an example of how data are gathered, interpreted (or misinterpreted), and used to produce knowledge about events in our Universe. He emphasized during the discussion that the origin (or origins) of the  $\gamma$ -ray bursts is still not definitely

*(Continued on page 3)*

## NCA Science Fair Winner to Present at June Meeting

Sabrina Snell NCA winner at the DC Science Fair will talk about her project, *The Optical Divide* at the June meeting of National Capital Astronomers.

Christina Dwyer, NCA winner at the Prince George's Regional Science Fair will talk about her project, *Asteroidal Occultations of Stars* at a meeting in the Fall.

## NCA Events This Month

The Public is Welcome!

NCA Home Page: <http://capitalastronomers.org>

**Fridays, June 1, 8, 15, 22, and 29, from 7:00 to 10:00 P.M.** Telescope-making and mirror-grinding, -polishing, -figuring and -testing classes at American University, McKinley Hall, Basement (Room 9), Nebraska and Massachusetts Avenues, NW. Classes are very informal, and you can start or finish a mirror at any time. We can also aluminize the finished product. Call or e-mail Guy Brandenburg for details and prices for materials: 202-635-1860 or [gbranden@earthlink.net](mailto:gbranden@earthlink.net).

**Fridays, June 1, 15, 22, 29; July 13, 20, 27, 9:30 p.m.**

Open nights with NCA's 14-inch telescope at Ridgeview Observatory near Alexandria, Virginia; 6007 Ridge View Drive (off Franconia Road between Telegraph Road and Rose Hill Drive). Call Bob Bolster, (703) 960-9126 before 6:00 p.m.

**Saturday, June 2, 5:30 P.M.**

Dinner with the speaker and NCA members at

Matuba Japanese Restaurant  
4918 Cordell Ave  
Bethesda, MD 20814-2510  
301-652-7449

See the map and directions on Page 8.

**Saturday, June 2, 7:30 P.M. - NCA meeting**

at the Lipsitt Auditorium in Building 10 at NIH, will feature Dr. Thomas E. Moore talking about "Imaging the Plasma Universe" and Sabrina Snell, DC Science Fair winner, telling us about her science fair project, "The Optical Divide".

See Page 6 for more National Capital area astronomical doings.

To join NCA, use the membership application on Page 9.

## WANTED

Dobsonian under \$2000. Contact [bill.broderick@jhuapl.edu](mailto:bill.broderick@jhuapl.edu) or [bvbb@starpower.net](mailto:bvbb@starpower.net)

## From Gary Joaquin

Go to the following URL to get information about a lecture being presented by Dr. Steven J Dick of the USNO.

<http://www.uusterling.org/events/index.htm>

## Deadline for September *Star* Dust: August 15



Please send submissions to Elliott Fein at [elliott.fein@erols.com](mailto:elliott.fein@erols.com). Text must be in ASCII, MS Word, or WordPerfect.  
Thanks.

## Thomas E. Moore

*(Continued from page 1)*

plosions launch billion-ton coronal mass ejections into the solar system at a million miles per hour, some of which hit the Earth on their way to the heliopause. Now, IMAGE gives us corresponding images of plasmas around the Earth and their response to the solar wind buffeting they receive. We see both electron and ion aurora develop in multi-spectral movies, as the solar wind scours the outer boundaries of our magnetosphere. We see the ionosphere respond to auroral energy by flowing out into space. We see the formation of clouds of hot plasma near midnight and their rapid drift as they encircle the Earth, inflating our geomagnetic field. We see the cold plasma near the Earth swept sunward by the return flow through the center of the magnetosphere. Finally, we also see the galactic gas flowing through the solar system, the residual nebular dust disk, and their interactions with the solar wind.

### Biography

Dr. Moore earned a B.S. in Physics from the University of New Hampshire, Durham, in 1970, the M.A. in Teaching from

the same institution in 1971, and taught in New Hampshire and Vermont secondary schools until 1974. He earned his Ph.D. in Astrogeophysics from the University of Colorado in Boulder in 1978, developing a mass spectrometer for energetic ions precipitating into the terrestrial atmosphere in the aurora, as his thesis research. At the University of New Hampshire he worked as a postdoctoral scientist on the dynamics of the plasma environment at geosynchronous orbit and in the observation of plasma and energetic particles above auroral displays from sounding rocket platforms, including the results of active ionospheric perturbation experiments involving the use of plasma source devices.

Moving to the Marshall Space Flight Center in 1983, he became a member of the science team for the Retarding Ion Mass Spectrometer on the Dynamics Explorer Satellite, and has worked actively on the acceleration and outflow of ionospheric plasma, the resulting source of plasma for the magnetosphere, and the acceleration of ionospheric plasma by magnetospheric circulation and substorm

phenomena. He was the initiator and principal investigator for the TOPside Probe of the Auroral Zone (TOPAZ) series of sounding rocket payloads, and has provided instrumentation for the ARCS series of active experiment payloads, and the SCIFER payload. He is the principal investigator for the Thermal Ion Dynamics Experiment and Plasma Source Instrument for the ISTP POLAR spacecraft.

Dr. Moore moved to the Goddard Space Flight Center in May 1997, to serve as mission scientist for the IMAGE mission and as lead co-investigator for the Low Energy Neutral Atom camera on that mission, and to pursue broader interests in heliospheric plasma dynamics and heating. In addition to his observational activities, Dr. Moore pursues an active interest in numerical modeling of space plasmas, and has strong interests in data acquisition, manipulation and visualization technologies.

Go to <http://tem692.gsfc.nasa.gov/bio/> to see a listing of some of Dr. Moore's publications.

## Kirk D. Borne

*(Continued from page 1)*

known, but that a lot of progress has been made toward their interpretation over the last several years.

The first search for  $\gamma$ -ray bursts began during the 1960s cold-war era when the U.S. launched the Vela satellites to monitor for Soviet nuclear tests. To the surprise of astronomers, the Vela program discovered  $\gamma$ -rays of extraterrestrial origin. This discovery began a 30-year debate about the origin of the  $\gamma$ -ray bursts. Some argued for a local origin in the Oort Cloud surrounding the Solar System or in the halo of the Milky Way, while others insisted that the bursts originated in the distant Universe. As the Compton Gamma-Ray Observatory (CGRO) and the European BeppoSAX satellite gathered observational data, it became clear that the distribution of  $\gamma$ -ray bursts is isotropic and nonhomogeneous, thus supporting a cosmological distance interpretation. Observing campaigns to network space- and ground-based observations finally began to reveal that  $\gamma$ -ray bursters are the most energetic objects in the Universe for several seconds during a burst. It is now believed that the bursts come from merging neutron stars or black holes, or from the deaths of massive stars via hypernova explosions. The most recent evidence tends to support a provenience of stellar explosions of 10 solar masses or larger. In this case, the energy would be beamed and we would only see those events whose orientation allowed us to observe them. We may eventually learn that a combination of the above events is responsible for the  $\gamma$ -ray bursts that we see.

Dr. Borne emphasized that the point of all this is that the  $\gamma$ -ray burst mystery has been enlightened by combining and correlating data from many different sources and that this technique holds great promise for future research in astronomy and astrophysics.

### The state of the NVO

The NVO is still a concept and does not yet exist. It is intended to be virtual in the sense that it is a desktop system that allows access to data from many different sources. Some examples of large data sets are the Sloan Digital Sky Survey, the 2MASS (2-micrometer Sky Survey), etc. Other planned surveys,

such as the Large Synoptic Survey, plan to image the sky every three days and will produce petabytes ( $10^{15}$ ) of data. The goal of the NVO is to make it possible to mine these data from a single location, even though the data will be stored in many different places.

At this point, the NVO has been recommended by the Decadal Astronomy Survey Committee of the U.S. National Academy of Sciences for funding at a level of approximately \$60 million. The data system would be distributed in the sense that the archives would exist in many locations and the data would be combined only electronically. A software system would allow sophisticated queries to locate objects of particular types, brightness, etc. The queries and query results, as well as data documentation, would be in the form of XML (Extensible Markup Language), thus making the whole process seem transparent and seamless to the end user. Since XML is being used and supported extensively in the business world, development and implementation costs are minimized for scientific use. The NVO will not be restricted to scientists, but will be made available to the general public, too.

### Specifications for the VO

Dr. Borne then showed a list of specifications for the VO and described each item:

1. The data archive should be seamless in that the user needn't be concerned about intermediate steps, but only in the final result of a query
2. There must be efficient simultaneous access to multiple terabyte databases
3. Statistical and mathematical tools for the analysis of data should be made available to the user
4. Model and simulation data should be included so that comparisons with observations can be made

The primary use of the NVO will be for data mining, which is defined as "an information extraction activity whose goal is to discover hidden facts contained in databases." Using a knowledge model, the data produce information that leads to knowledge of phenomena occurring in the natural world. The knowledge, when interpreted correctly, leads to understanding, which is the ultimate goal of scientific investigation.

## The President's Corner

As Andrew Seacord has noted elsewhere in this newsletter, NCA Elections will be held at the June meeting.

The nominating committee has produced a fine slate of nominees for NCA officers for the forthcoming year, 2001-2002, and for two trustee positions.

One important position is still unfilled: we are in need of a person to take on the job of youth coordinator. We have the interested young people; we need the adults to facilitate their getting together and doing astronomy.

If you feel you'd like to help someone else to do this job, your help would be very much appreciated. Your services could make the difference. Contact Nancy Byrd at [nancy@pangean.com](mailto:nancy@pangean.com) or at 703-978 3440 if interested.

*Nancy Byrd*

Dr. Borne listed ongoing and future surveys and space missions that will not be reproduced here. These lists show, however, that new techniques and systems will be necessary to handle the volume of data that will be produced. The NVO merges computer science, information technology and statistics with astronomy to accomplish these goals. Perceived users include power users who will want to correlate large numbers of databases, typical astronomers who will access a limited number of objects, and the general public who will want to look at the sky in a more general way.

The NVO will provide a single gateway for users to access large numbers of data and to do it in the comfort of their offices via desktop computers. Such techniques are expected to produce a large amount of new information in astronomy, which will inevitably lead to much new knowledge and understanding.

The NCA is indebted to Dr. Borne for presenting this interesting lecture. The writer thanks him for reviewing this material prior to publication and for useful comments. He also thanks Dick Byrd for producing a video of the lecture that was used to prepare this review.

# Support the IDA

Join the International  
Dark-Sky Association

3225 N. First Avenue  
Tucson, AZ 85719-  
2103

[www.darksky.org](http://www.darksky.org)

## Meteor Showers

### June Radiants

Full Moon: June 6  
Major Activity – None

#### Minor Activity

Radiant	Duration	Maximum
June Aquilids	June 2-July 2	June 16/17
June Bootids	June 27-July 5	June 28/29
Corvids	June 25-July 3	June 27/28
Tau Herculids	May 19-June 19	June 9/10
June Lyrids	June 10-21	June 15/16
Ophiuchids	May 19-July 2	June 20/21
Theta Ophiuchids	May 21-June 16	June 10/11
Sagittariids	June 10-16	June 10/11
Phi Sagittariids	June 1-July 15	June 18/19
Chi Scorpiids	May 6-July 2	May 28-June 5
Omega Scorpiids	May 19-July 11	June 3-6
June Scutids	June 2-July 29	June 27/28

#### Daylight Activity

Radiant	Duration	Maximum
Arietids	May 22-July 2	June 7/8
Zeta Perseids	May 20-July 5	June 13/14
Beta Taurids	June 5-July 18	June 29/30

Source: <http://comets.amsmeteors.org/meteors>

## Come See the Stars!

by Joe Morris

### Exploring the Sky - 2001 Schedule

Date	Time	Notes
6/23	9:00 P.M. (EDT)	Longest day 6/21; latest sunset 6/27
7/21	9:00 P.M. (EDT)	Thin crescent Moon visible
8/18	8:30 P.M. (EDT)	Perseid meteors 8/12
9/22	8:00 P.M. (EDT)	Fall equinox
10/13	7:30 P.M. (EDT)	Mars bright in the con- stellation Sagittarius
11/10	7:00 P.M. (EST)	Leonids peak 11/18

*Exploring the Sky* is an informal program that for nearly fifty 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.

Sessions are held in Rock Creek Park once each month on a Saturday night from April through November, in the field south of the intersection of Military and Glover Roads, near the Nature Center.

Beginners (including children) and experienced stargazers are all welcome - and it's free!

Questions? Call the Nature Center at (202) 426-6829 or check the Internet sites: <http://www.nps.gov/rocr/planetarium> or <http://www.capitalastronomers.org>

## Meteor Showers July Radiants

Full Moon: July 5

### Major Activity

Radiant	Duration	Maximum
Southern Delta Aquarids (SDA)	July 14-August 18	July 28/29

### Minor Activity

Radiant	Duration	Maximum
Alpha Lyrids	July 9-20	July 14/15
July Phoenicids (PHE)	July 9-17	July 14/15
Alpha Pisces Australids	July 16-August 13	July 30/31
Sigma Capricornids	June 18-July 30	July 10-20
Tau Capricornids	June 27-July 29	July 12/13
Omicron Draconids	July 6-28	July 17/18

### Daylight Activity – None

Source: <http://comets.amsmeteors.org/meteors>

## Meteor Showers August Radiants

Full Moon: August 4

### Major Activity

Radiant	Duration	Maximum
Perseids (PER)	July 23-August 22	Aug. 12 at 08:49 UT
Northern Iota Aquarids (NIA)	August 11-September 10	August 25/26
Southern Iota	July 1-September 18	August 6/7
Alpha Capricornids	July 15-September 11	August 1/2

### Minor Activity

Radiant	Duration	Maximum
Northern Delta	July 16-September 10	August 13/14
Kappa Cygnids	July 26-September 1	August 18
August Eridanids	August 2-27	August 11/12
Upsilon Pegasids	July 25-August 19	August 8/9
Alpha Ursa Majorids	August 9-30	August 13/14

### Daylight Activity

Radiant	Duration	Maximum
Gamma Leonids	August 14-September 12	August 25/26

Source: <http://comets.amsmeteors.org/meteors>

## Presentations by Science Fair Winners

by Nancy Grace Roman

NCA honored the winners of the 2001 science fair judging at the May NCA meeting by inviting them to dinner before the meeting and having them present their projects at the meeting. President Nancy Byrd presented a certificate to each student. NCA also gave each student a one-year membership in NCA which included a one-year subscription to *Sky and Telescope*.

Information about the students that attended the meeting: their names, the science fairs in which they competed, and their projects, follows.

**Kelly Johnson** (15) - Fairfax County - "The Effect of Sunspot Rotation; Determining How Fast the Sun Rotates"

Kelly observed the Sun each day between 2:30 and 3:30, sketching the position of each spot for each observation. From these sketches, she made a three-D model of the sun. Most spots move only with the Sun but some near the poles move a little faster. Kelly was inspired by her father.

**Abigail Fraeman** (14) - Montgomery County - "The Effect of Star Color on Perceived Apparent Visual Magnitude"

After reading about the Pirkinje effect, Abigail wanted to find out if the color of a star affected her perception. From a catalog of spectra, she chose stars of two brightness classes. Three stars of each color were brighter than 3<sup>m</sup> and three were fainter. In addition, she chose nearby stars of classes F and G assuming that they would be white. She observed each program star three times on different nights. She found that color did affect the perceived magnitudes: blue stars (O and B) appeared slightly dimmer than their catalog magnitudes; red stars appeared much brighter.

**Brinda Thomas** (17) - Montgomery County - "Multifractal Properties of the Solar-Wind-Magnetosphere System"

Brinda chose this topic as a result of working at the University of Maryland. She is interested in solar physics. The object was to understand the correlation between solar wind velocities and magnetic fields in the magnetosphere as an aid to predictions of the latter. She plotted the wind/magnetic interactions in phase space and compared the multifractal results with results of simple systems.

## Other National Capital Area Meetings, etc.

### Department of Terrestrial Magnetism

Carnegie Institution of Washington  
5241 Broad Branch Road, N.W.,  
Washington, D.C. 20015. (202) 478-8820

June 6 Thomas H. Burbine, Jr., National Museum of Natural History, Smithsonian Institution, "Linking Asteroids and Meteorites through Reflectance Spectroscopy"

June 13 Satoshi Inaba, Department of Terrestrial Magnetism, "Formation of Jovian Planets: Core Accretion Model with Fragmentation"

June 20 Hans-Peter Bunge, Department of Geosciences, Princeton University

"The Mantle Circulation Inverse Problem"

Seminars are all at 11:00 a.m. and are generally held on Wednesdays in the Seminar Room of the Main Building. DTM is located on 32nd Street one block south of its intersection with Military Road. Proceed south on 32nd Street one block to Jocelyn Street, turn left on Jocelyn and right into the parking lot. Coffee and tea will be served at 10:45 a.m. Please call to confirm that there have been no cancellations.

Source: [esparza@dtm.ciw.edu](mailto:esparza@dtm.ciw.edu)

### Goddard Scientific Colloquia

The Scientific Colloquia will be held at 3:30 p.m. on Fridays in the Building 3 auditorium, except as noted.

June 1 Raymond Chiao, University of California, Berkeley, "Faster-than-c Propagation Effects and their Possible Applications"

June 8 Michael Perryman, ESA/ESTEC, The John C. Lindsay Memorial Lecture "Our Galaxy - In Three Dimensions", Building 8 Auditorium.

If you plan to attend and do not have a NASA badge, please contact Carol Krueger, at (301) 286-6878, at least 24 hours beforehand.

Source:

[lheawww.gsfc.nasa.gov/users/djt/colloq/](http://lheawww.gsfc.nasa.gov/users/djt/colloq/)

**Northern Virginia Astronomy Club** (NOVAC) meets 7:00 p.m. at Lecture Hall 1 on the Fairfax campus of George Mason University. 703 803-3153.

June 10 Bob Bunge "Observing Mars and Drawing at the Eyepiece".

This is a great time for observing Mars, but it is still a challenging object to observe, as many of the interesting features are of very low contrast. Practice, training, and drawing what you observe will increase your skills, enabling you to see more. Bob is an old hand, who has made many drawings of Mars and other objects. Come and pick up a few tips.

July 8 Bob Stewart & Tony Cook, "Video Astronomy Adventures and More". July will be a NOVAC doubleheader. Tony will speak on "Things that go bump in the lunar night". This will mainly be about videotaping lunar impact flashes, but will also include a bit about relevant observing techniques and examples of things Tony has seen in Lunar Earthshine which are not lunar impacts, e.g.. cosmic rays, satellites, aircraft etc.

Bob Stewart will show his videos of lunar occultations, grazes, and a potential lunar impact flash. Sounds like a blast.

Source: <http://novac.com>

### Laboratory for Astronomy and Solar Physics (LASP)

Seminars are on Thursday at 3:30 P. M. in GSFC Bldg. 21, Room 183.

June 7 Michael A. C. Perryman, ESA-ESTEC, "The GAIA Project - Galactic Structure from 1 Billion Stars"

Coffee, Tea, and Cookies served before the seminar. For additional information contact Eli Dwek at 301-286-6209 ([edwek@stars.gsfc.nasa.gov](mailto:edwek@stars.gsfc.nasa.gov)) or

Jon Gardner at 301-286-3938 ([gardner@harmony.gsfc.nasa.gov](mailto:gardner@harmony.gsfc.nasa.gov)). Source: [http://stars.gsfc.nasa.gov/www/lasp\\_colloq](http://stars.gsfc.nasa.gov/www/lasp_colloq)

### Greenbelt Astronomy Club

Meetings, star parties, and other events are open to the general public. You do not need to be a member, nor even own a telescope, to attend. Star parties are usually held at the James Wolfe ballfields at the end of the Northway extension in Greenbelt, unless otherwise noted below. You can find it on the map where it is labeled as Northway Field. Members

are usually setting up their telescopes at dusk so the actual time varies depending on the time of the year.

### Star Parties and the Weather

Since star parties are dedicated to observing the night sky, they will only be held if the sky is clear enough to permit observing. Star parties will not be held if skies are overcast or mostly cloudy.

June 28 Meeting.

June 16 Star Party (June 23 cloud date).

The web site is maintained by Tom Bridgman (301) 286-1346. Send comments and other feedback to [bridgman@wyeth.gsfc.nasa.gov](mailto:bridgman@wyeth.gsfc.nasa.gov) A service of the Laboratory for High Energy Astrophysics (LHEA) at NASA's GSFC

Source: [lheawww.gsfc.nasa.gov/docs/outreach/gac/GAC.html](http://lheawww.gsfc.nasa.gov/docs/outreach/gac/GAC.html)

### Stellar & Extragalactic Astronomy Lunch

Talks are Wednesdays at 12:00 Noon in room 242 of Building 21, except as noted.

Tuesday, June 12, Room 191 Chris Conselice, STScI, TBD (BWSS)

June 20 Dave Bazell, Eureka Scientific, Using Machine Learning for Automated Data Analysis

Talks labeled BWSS are part of the Baltimore-Washington Starburst Seminar Series, and will be held on Tuesdays at 12:00 Noon.

Source: <http://hires.gsfc.nasa.gov/~gardner/seal>

## Star Dust Is Now Available Electronically



Any member wishing to receive *Star Dust*, the newsletter of the National Capital Astronomers, via e-mail as a PDF file attachment, instead of hardcopy via U.S. Mail, should contact Nancy Grace Roman, the NCA Secretary, at [ngroman@erols.com](mailto:ngroman@erols.com), or via telephone at 301-656-6092 (home)

# Mid-Atlantic Occultations and Expeditions for May

by David Dunham

## Asteroidal Occultations

DATE	Day	EDT	Star	Mag	Asteroid	dmag	Dur	Ap. s in.	Location
Jun 17	Sun	22:59	ZC 2785	7.0	Ophelia	6.2	10	3	Yucatan
Jun 19	Tue	4:45	TYC52261173	11.2	Nemausa	1.1	25	7	Florida
Jun 21	Thu	5:26	SAO 210513	7.9	Dudu	4.6	5	4	s. Texas; CDT
Jun 25	Mon	3:45	TYC04480099	10.9	Philippina	2.4	5	7	N. Carolina
Jun 26	Tue	0:29	SAO 187999	8.1	Tomyris	6.5	3	2	Cuba
Jul 11	Wed	23:11	SAO 188447	8.7	Alauda	2.8	14	2	Florida?
Jul 12	Thu	1:06	TYC57520973	11.1	Carmen	2.5	5	7	Virginia
Aug 17	Fri	4:26	TYC12191522	11.0	Carnegia	4.5	6	7	n.w. Penn.
Aug 19	Sun	2:03	TYC51961596	10.5	Asterope	1.3	12	6	Cuba
Aug 22	Wed	2:27	TYC11690037	11.3	Luscina	2.1	15	8	Ohio
Aug 31	Fri	5:47	TYC06400186	11.0	Thetis	1.7	22	7	New England
Sep 7	Fri	2:45	ZC 0983	6.1	Metis	4.7	6	1	n.Calif.; PDT
Sep 7	Fri	22:02	ZC 3167	7.2	Titania	6.4	76	1	Venezuela
Sep 9	Sun	0:16	SAO 165635	8.4	Antigone	2.7	9	2	Iowa & El Paso

## Lunar Grazing Occultations and a Grazing Annular Solar Eclipse

DATE	Day	EDT	Star	Mag	% alt	CA	Location
Jun 16	Sat	4:52	ZC 0208	7.0	29-	27	5N Barco, NC; Sun alt. -10 deg.
Jul 13	Fri	1:33	ZC 0151	8.2	55-	10	4N St. James, MD
Jul 15	Sun	4:12	85 Ceti	6.3	34-	26	8N Butler, PA
Aug 13	Mon	2:40	ZC 0600	6.6	40-	22	11N se Salisbury, MD; s. Petersburg, VA
Aug 22	Wed	20:31	80 Vir.	5.7	20+	22	8N Currituck, NC; ZC 1950; Sun -9
Sep 9	Sun	5:36	ZC 0577	6.0	65-	69	14N La Plata, MD & Fredericksburg, VA
Dec 14	Fri	17:30	The Sun	-27	0	13	N Liberia, Costa Rica; eclipse*

\* For more, see <http://iota.jhuapl.edu>

## Total Lunar Occultations

DATE	Day	EDT	Star	Mag	% alt	CA	Notes
Jun 2	Sun	0:24	D 80 Vir	5.7	83+	35	79N G6 ZC 1950
Jun 7	Thu	1:33	R 4 Sgr	4.7	99-	27	57S B9 ZC 2589
Jun 23	Sat	21:27	D ZC 1304	6.7	9+	15	69N A2 dbl, Sun-9, outer Praesepe
Jun 29	Fri	1:06	D ZC 1923	6.8	61+	8	86S K0
Jul 4	Wed	22:12	D 24 Sgr	5.5	100+	17	86S K3 term. 5" away; ZC 2692
Jul 9	Mon	1:18	R 29 Aqr	6.4	88-	23	28N A0 ZC 3228; double
Jul 10	Tue	1:20	R tau2 Aqr	4.1	81-	19	35S K5 ZC 3349
Jul 15	Sun	4:15	R ZC 0398	6.5	34-	30	73N K0
Jul 15	Sun	4:25	R 85 Ceti	6.3	34-	32	36N A2 very close double
Jul 17	Tue	3:34	R ZC 0663	6.9	16-	8	38S A0
Jul 17	Tue	14:30	D Venus	-4.1	13-	32	-78N 38s to disappear
Jul 17	Tue	15:36	R Venus	-4.1	13-	19	71N 34s to reappear
Jul 27	Fri	22:26	D ZC 2110	6.3	57+	24	55S K0
Aug 7	Tue	22:40	R 30 Psc	4.4	87-	4	41N M3 Az. 101 deg.; ZC 3536
Aug 8	Wed	0:59	R 33 Psc	4.6	86-	28	67N K1 ZC 0005; close double
Aug 8	Wed	4:43	R ZC 0018	5.8	85-	45	42S K1 maybe close double
Aug 12	Sun	2:03	R ZC 0464	6.1	50-	21	56S K0 maybe close double
Aug 13	Mon	4:21	R ZC 0610	5.9	39-	40	26S K5 triple star
Aug 15	Wed	3:45	R 141 Tau	6.4	19-	16	87N B8 double?; ZC 0911
Aug 16	Thu	3:59	R 44 Gem	6.0	11-	8	34S B8 Az. 67 deg.; ZC 1078
Aug 24	Sat	20:11	D omicronLib	6.1	41+	29	58N F2 Sun alt. -5; ZC 2193
Aug 31	Fri	0:50	D 17 Cap	5.9	93+	26	77N A1 ZC 3031
Sep 10	Mon	9:17	D Saturn	0.0	53-	52	-71N Disk duration 47s; Sun +29

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. 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 <http://www.lunar-occultations.com/iota>. Sp. is spectral type-color, O,B,blue; A,F,white; G,yellow; K,orange; M,N,S,C red

Check IOTA's Web sites at <http://www.lunar-occultations.com/iota> or at <http://iota.jhuapl.edu> for weather go/cancel decisions, and other updates. David Dunham, [dunham@erols.com](mailto:dunham@erols.com) or 301-474-4722; car 301-526-5590.

# Getting to the NCA Monthly Meeting

**Saturday, June 2**

**5:30 P.M. - Dinner** with the speakers and NCA members at

Matuba Japanese Restaurant  
4918 Cordell Ave  
Bethesda, MD 20814-2510  
301-652-7449

**7:30 P.M. - NCA Meeting** at Lipsett Auditorium in Building 10 at NIH. Dr. Thomas E. Moore will talk about "Imaging the Plasma Universe" and Sabrina Snell, DC Science Fair winner, will tell us about her science fair project, "The Optical Divide".

## Directions to the Meeting Place

**From Rockville Pike (Wisconsin Ave., Rt. 355)**, to get to the parking lot at the South entrance (this will be the entrance for the next three years or so until they finish the new wing) from Rockville Pike, enter NIH at the Metro Entrance: South Drive (traffic light). Go straight ahead. At the third stop sign you will be at the parking lot, but you will have to make a left turn then a right to get to the entrance to the lot. Make a right turn into the lot. Building 10 is just north of the parking lot. Enter the building and follow the signs to the Lipsett Auditorium.

**From Old Georgetown Rd.**, enter at Lincoln Drive (traffic light nearest to Suburban Hospital). Go straight ahead. The second stop sign is at a T. Go left and left again, and the lot will be on the right. Make a right turn into the lot.

**Metrorail Riders** - From Medical Center Metro Station: Walk down the hill, past the bus stops. Continue straight past the anchor. At the second stop sign after the anchor, bear right up the incline into the entrance of Building 10, the tallest building on campus (walking time less than 10 minutes).

**Taking the J2 or J3 buses** from Silver Spring, get off at the Metro stop and follow the directions given for motorists from that point. If coming from Montgomery Mall, get off at the first stop in NIH, before the Clinical Center. There are signs near the ramp for the garage directing you into the side entrance. Walk straight through the building to the Lipsett amphitheater.

## Directions to the Restaurant

Dinner before the meeting will be at 5:30 P.M. at  
Matuba Japanese Restaurant  
4918 Cordell Ave  
Bethesda, MD 20814-2510  
301-652-7449

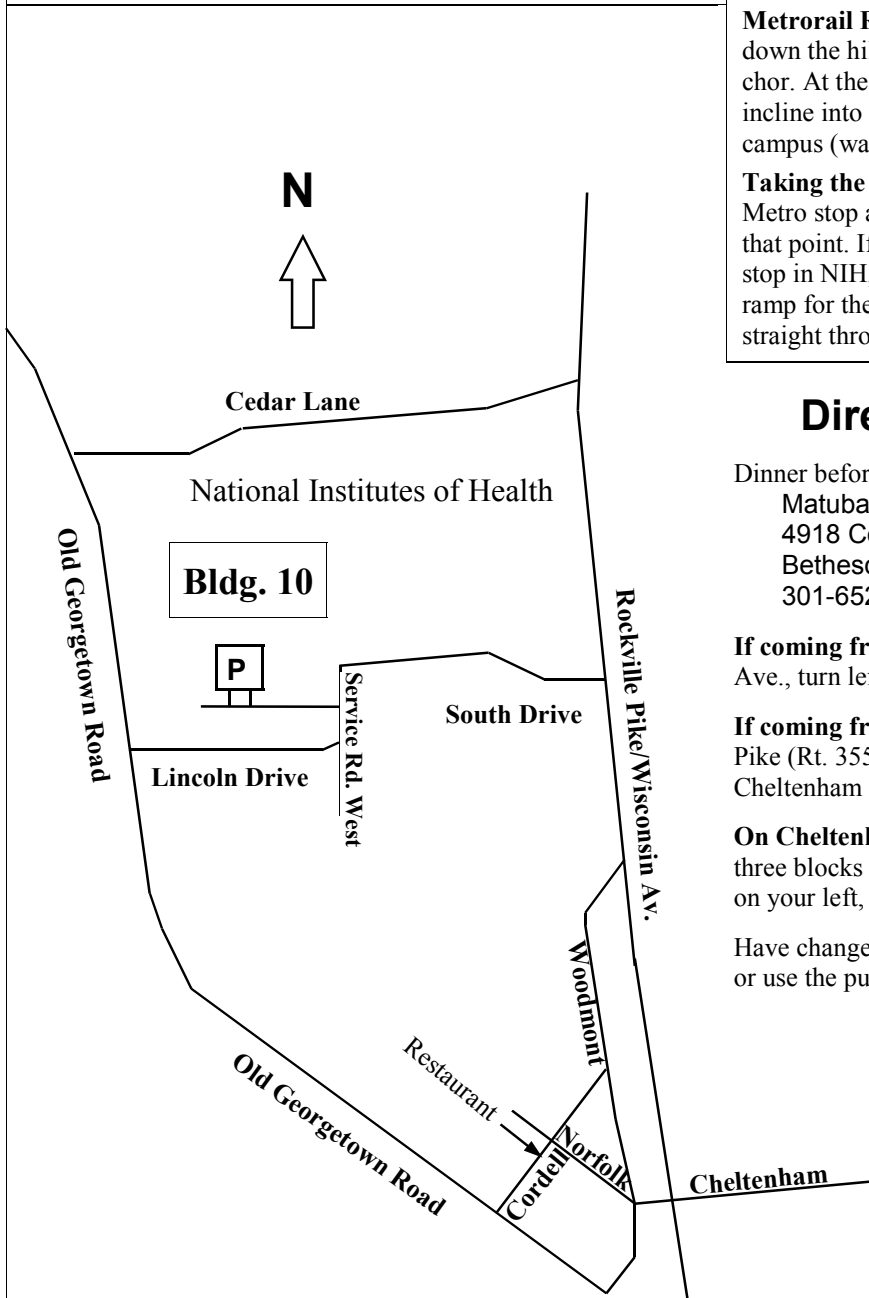
**If coming from south of Bethesda**, go north on Wisconsin Ave., turn left at Cheltenham Dr. (traffic light).

**If coming from north of Bethesda**, go south on the Rockville Pike (Rt. 355) which becomes Wisconsin Ave. Turn right at Cheltenham Dr. (traffic light).

**On Cheltenham Dr.**, go straight to go onto Norfolk Ave. Go three blocks and turn left on Cordell Ave. The restaurant will be on your left, about one-third of the way down the block.

Have change available for meters (still in operation at that time) or use the public parking garage on your left, past the restaurant.

**After dinner**, continue on Cordell to end of block. Turn right onto Old Georgetown Rd. Follow "Directions to the meeting place: From Old Georgetown Rd." at the top of this page.





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### SERVING SCIENCE & SOCIETY SINCE 1937

NCA is a nonprofit, membership-supported, volunteer-run, public-service corporation dedicated to advancing astronomy, space technology, and related sciences through information, participation, and inspiration, via research, lectures, presentations, publications, expeditions, tours, public interpretation, and education. NCA is the astronomy affiliate of the Washington Academy of Sciences. All are welcome to join NCA.

#### SERVICES & ACTIVITIES:

**Monthly Meetings** feature presentations of current work by researchers at the horizons of their fields. All are welcome; there is no charge. See monthly *Star Dust* for time and location.

**NCA Volunteers** serve in a number of capacities. Many members serve as teachers, clinicians, and science fair judges. Some members observe total or graze occultations of stars occulted by the Moon or asteroids. Most of these NCA members are also members of the International Occultation Timing Association (IOTA).

**Publications** received by members include the

monthly newsletter of NCA, *Star Dust*, and an optional discount subscription to *Sky & Telescope* magazine.

**Consumer Clinics:** Some members serve as clinicians and provide advice for the selection, use, and care of binoculars and telescopes and their accessories. One such clinic is the semiannual event held at the Smithsonian Institution National Air and Space Museum.

**Fighting Light Pollution:** NCA is concerned about light pollution and is interested in the technology for reducing or eliminating it. To that purpose, NCA is an Organization Member of the International Dark Sky Association (IDA). Some NCA members are also individual members of IDA.

**Classes:** Some NCA members are available for educational programs for schools and other organizations. The instruction settings include star parties, classroom instruction, and schoolteacher training programs that provide techniques for teaching astronomy. NCA sponsors a telescope-making class, which is described in the *Star Dust*

“Calendar of Monthly Events”.

**Tours:** On several occasions, NCA has sponsored tours of astronomical interest, mainly to observatories (such as the National Radio Astronomy Observatory) and to the solar eclipses of 1998 and 1999. Contact: Sue Bassett wb3enm@amsat.org

**Discounts** are available to members on many publications, products, and services, including *Sky & Telescope* magazine.

**Public Sky Viewing Programs** are offered jointly with the National Park Service, and others. Contact: Joe Morris. joemorris@erols.com or (703) 620-0996.

**Members-Only Viewing Programs** periodically, at a dark-sky site.

**NCA Juniors Program** fosters children’s and young adults’ interest in astronomy, space technology, and related sciences through discounted memberships, mentoring from dedicated members, and NCA’s annual Science Fair Awards.

**Fine Quality Telescope**, 14-inch aperture, see “Calendar of Monthly Events”.

**Yes! I'd like to join the NATIONAL CAPITAL ASTRONOMERS**

**Date:**

Name(s): \_\_\_\_\_

Address: \_\_\_\_\_

Telephone: \_\_\_\_\_ E-mail: \_\_\_\_\_

Other family members who should receive a membership card: \_\_\_\_\_

Dues:

\_\_\_ \$57 With *Star Dust* and a discount subscription to *Sky & Telescope*.

\_\_\_ \$27 With *Star Dust* ONLY.

\_\_\_ \$45 Junior membership with *Star Dust* and a discount subscription to *Sky & Telescope*.

\_\_\_ \$15 Junior membership with *Star Dust* ONLY.

\_\_\_ \$100 Contributing member (with *Sky & Telescope*) (\$43 tax-deductible).

\_\_\_ \$150 Sustaining member (with *Sky & Telescope*) (\$93 tax-deductible).

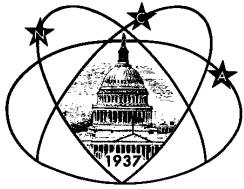
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Tax deductible contribution: \_\_\_\_\_ Thank You.

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