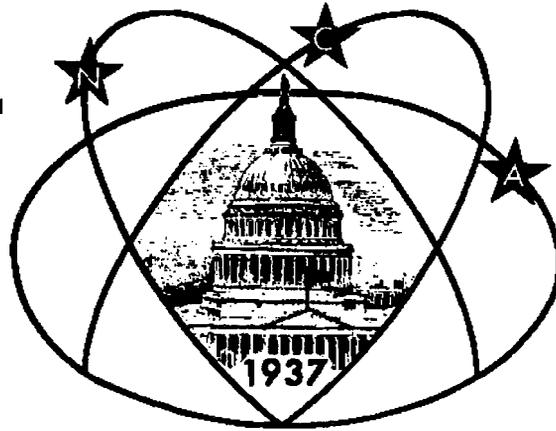


1999-08-31  
X \* ✓

# Star



# Dust

National Capital Astronomers, Inc.

Phone: 301/565-3709

Volume 58, Number 1

September, 1999

ISSN 0898-7548

## Open House at Hopewell Observatory

NCA members, families, and guests are invited to enjoy the autumn sky at Hopewell Observatory on Saturday evening, September 11. View the Milky Way and numerous deep-sky objects as well as the planets Jupiter, Saturn, Uranus, and Neptune. Sunset will be at 7:26 pm. Astronomical twilight ends at 8:57. If you wish, come any time after 6:00 pm and bring your prepared picnic dinner. Coffee, tea, and cocoa will be provided by the Hopewell Corporation.

If it is raining or hopelessly cloudy, the event will be cancelled. Another open house is scheduled for Saturday, October 9 when sunset will be at 6:42 pm. Twilight ends at 8:10. For further information call (703) 960-9126. Observatory phone: (703) 754-2317.

### Directions:

(1) From the Beltway (I-495) go west on I-66 25 miles to Exit 40 at Haymarket onto U.S. 15. (2) Turn left on U.S. 15 at the end of the exit ramp. (3) Go 0.3 mile to the traffic light and turn right onto Va. 55. (4) Go 0.8 mile to Antioch Road (Rt. 681) and turn right. (5) Go 3.2 miles to the end of Antioch Rd. and turn left onto Waterfall Road (601). (6) Go one mile and bear right onto Bull Run Mountain Rd. (Rt. 629). (7) Go 0.9 mile on 629 to the narrow paved road on the right with an orange pipe gate (directly across from an entrance gate with stone fac-

*Hopewell, continues on page 2*

## President's Message: No September Meeting

This is the time to start the new NCA year. Normally, NCA starts its new year on the first Saturday of September. This year, however, the first Saturday, September 4, falls during the Labor Day weekend. When an NCA-Saturday falls on a holiday, the meeting is postponed until the following Saturday. However, this year the second Saturday, September 11, falls on Rosh Hashanah. Postponing the NCA meeting to the 18th will conflict with several astronomical events. Since our speaker for the September meeting, John Gra-

ham, will not be available on August 28 — precluding that date for the first meeting of the year — the Board decided to have the first NCA meeting of the year on October 2. Enjoy the Holiday.

### Calling All Eclipse Viewers

Please share your eclipse (and earthquake?) reports and pictures for the October Star Dust!

## Telescope Making Class

For many years, Jerry Schnall has taught the NCA telescope-making class. We are grateful for his many years of service. Circumstances are now such that he will be unable to continue teaching the class. We are indeed fortunate that Guy Brandenburg has agreed to take over as the teacher. Guy has considerable experience with telescope making. He has built two telescopes, a 6-inch and an 8-inch, under the guidance of Jerry Schnall. Guy is currently working on a 12-inch telescope. Bob Bolster, an experienced telescope builder himself, has offered his assistance as well. Also, Jerry Schnall may be able to help.

Telescope-making classes will be taught on Friday nights from 6:30 until about 9:30 in the basement of Hurst Hall at the American University. Anyone who is interested in building a small- or medium-sized Newtonian reflector is welcomed to attend.

## Exploring The Sky

Exploring the Sky is an informal program that, for nearly fifty years, has offered monthly opportunities for anyone in the Washington metropolitan area to see stars, planets, and some deep sky objects through telescopes located within the District of Columbia. Sessions are held on Saturday nights in

Rock Creek Park in the field just south of the intersection of Military and Glover Roads. Glover Road leads to the Nature Center. These sessions, which are free, are presented jointly by the National Park Service and the National Capital As-

*Sky, continues on page 2*

# Calendar of Monthly Events

The Public is Welcome!

NCA Home Page: <http://myhouse.com/NCA/home.htm>

## No Meeting in September

**Fridays, September 3, 10, 17, and 24, 7:30 PM** - Telescope making classes at American University, McKinley Hall Basement. Information: Guy Brandenburg, 202/635-1860.

**Mondays, September 6, 13, 20, and 27, 7:30 PM** - Public nights at U.S. Naval Observatory (USNO), in Northwest Washington, D.C. (off Massachusetts Avenue). Includes orientation on USNO's mission, viewing of operating atomic clocks, and glimpses through the finest optical telescopes in the Washington-Baltimore region. Held regardless of cloud cover. Information: USNO Public Affairs Office, 202/762-1438. Home page: <http://www.usno.navy.mil>.

**Saturday, September 11, beginning 6:00 PM** - Open House at Hopewell Observatory. See article on page 1 for directions.

**Friday, September 17, 8:30 PM** - Open nights with NCA's Celestron C-14 telescope at Ridge View Observatory; near Alexandria, Virginia; 6007 Ridge View Drive (off Franconia Road between Telegraph Road and Rose Hill Drive). Information: Bob Bolster, 703/960-9126. Call before 6:00 PM.

**Saturday, September 18, 8:00 PM** - Exploring the Sky at Rock Creek Park in the field south of the intersection of Military and Glover Roads near the Nature Center. Information: 202/426-6829. Note the time change.

See page 6 for more Washington area astronomical events. Other events too numerous to list in *Star Dust* are listed in the publications, *Sky & Telescope*, the *Astronomical Calendar 1999*, the *Observer's Handbook 1999*. NCA members can purchase all these (and much more) at a discount. Information can also be found in numerous software packages, and links available on the NCA Home Page (see above for address). To join NCA, use the membership application on page 7.

*Hopewell, continued from page 1*

ing). (8) Turn right through the pipe gates and go 0.3 mile to the top of ridge and around the microwave station. (9) Continue on the dirt road through the white gate and woods a few hundred feet to the observatory. Park along the road short of the buildings. For further information call (703) 960-9126. ○

*Sky, continued from page 1*

tronomers. Telescopes, usually ranging in size from 8 to 11 inches, are provided by the Nature Center and members of NCA. For further information, call the Nature Center at (202) 426-6829. The schedule for the remainder of 1999 is as follows.

August 14	8:30 PM EDT
September 18	8:00 PM EDT
October 9	7:30 PM EDT
November 13	7:00 PM EST

## Formation of Planets

### Review of Talk by Steve Kortenkamp

by Nancy Byrd with assistance from Stephen Kortenkamp

At the June 5, 1999 meeting of National Capital Astronomers, Dr. Stephen Kortenkamp of the Department of Terrestrial Magnetism (DTM) at the Carnegie Institution of Washington spoke to us on the subject of the formation of planets and planetary systems. He began by reviewing the observational criteria available for constructing theories of planet formation. Many of these criteria have been known for a long time, such as orbital characteristics; others, such as isotopic abundance measurements have awaited the availability of modern tools.

#### Observational Constraints

The older observations include the fact that the orbits of our Solar System's planets are nearly coplanar and lie nearly in the plane of the Sun's rota-

tional equator. With the exception of Neptune and Pluto, which are in resonance with each other, planetary orbits do not cross. The orbits are nearly circular with a spacing that increases with distance from the Sun approximately obeying a simple empirically derived formula: Bode's law. We have observed that the inner planets are rocky, whereas the outer planets include a number of gas giants. The inner planets have only 2% of the total mass of the planets, and Jupiter dominates the mass of the planets. We also observe many smaller bodies, including comets (Kuiper Belt comets and Oort Cloud comets), asteroids and moons. Studies of isotopic abundances in meteorites can tell us much about the origin, history and age of these small bodies which fall to Earth. These data, taken together with other informa-

tion, can provide major constraints on the formation of planets.

As long ago as the 1700s, continued our speaker, Kant and Laplace put forward the Solar Nebula Hypothesis, the theory that the Solar System began as a gas cloud and collapsed into a protoplanetary disk. This disk then formed dust, planetesimals, and finally the planets and other solar system objects. You can simulate this process with computer models. Because of the Conservation of Angular Momentum, a rotating cloud will collapse into a disk. Only recently, thanks to the Hubble telescope, have we gotten observational evidence from outside the Solar System, to support this hypothesis. Dr. Kortenamp called attention to the Hubble photographs reproduced in the June issue of *Star Dust*. ("NICMOS Peers Through Dust to Reveal Young Stellar Disks.") He observed that the diameters of these objects are quite large (50 to 100 billion miles), while the masses are comparable to those of the Solar System. He also showed a ground-based, face-on view of a young stellar disk which showed a spiral structure; such a structure is exactly what you would expect of a disk on its way to becoming a planetary system.

But how do such disks form? They form in molecular clouds, which somehow have been disturbed so that portions of them begin to collapse to form dense cores. He showed the now famous Hubble (WFPC2) photo of finger shaped clouds in the vicinity of a young star. The fingers, explained Kortenamp, are regions of higher density, the collapsing cores of the molecular cloud, which resist the ablation due to radiation and material ejected by a nearby hot young star. Because of the Conservation of Angular Momentum, such a core will collapse into a rotating disk.

Our speaker referred to the following explanation as the "hand-waving part of planet formation theory." At this point the disk consists of a lot of gas and more than enough dust to form the planets. As this dust settles to the mid-plane of the disk countless neighboring dust particles collide and clump together into planetesimals. These grow in size until at some point, from tens of meters to tens of kilometers, self-gravity becomes an important factor in their behavior. The planetesimals (the clumps) will then decouple from the rotating nebula and move through the nebula, experiencing drag, which will confine them to a thin disk and more circular orbits and will cause them to migrate toward the protostar.

#### **Modeling Planetary Evolution**

This is the starting point for modeling planetary evolution. Dr. Kortenamp showed the results of a number of model runs. Each starts with a swarm of planetesimals from tens of meters to tens of kilometers in size. The planetesimals collide and grow. In  $10^5$  years the models produce dozens of bodies in the inner Solar System from Mercury-to-Mars size, so-called planetary embryos. Models of the continued evolution of these embryos typically produce one or two Earth-size planets and two or three other smaller planets within  $10^8$  years. One problem with these model planetary systems is that the orbits are usually inclined and highly eccentric. In fact, it has been exceedingly difficult to find realistic conditions which routinely result in the nearly coplanar and circular orbits of our Solar System. Is the regularity of our Solar System an aberration in nature?

Our speaker then described the results of computer simulations which model the growth of gas giants like Jupiter and Saturn. If a solid ice/rock body becomes as large as about 10 Earth-masses, its gravity will be significant enough to capture gas from the solar nebula. These simulations show that Jupiter may have required as much as 10 million years in this gas accretion phase to reach its current mass. One problem is that the

solar nebula may not have persisted for 10 million years. A second problem is why are there no planet-size bodies in the asteroid belt? It appears that the formation of Jupiter prevented their formation, but how could this be, given that the models require 10 million years for the formation of Jupiter but only  $10^5$  years for Mercury-to-Mars size embryos to form?

#### **New Insights**

Several recent developments have offered some insights. Newer estimates of the core mass of Saturn and Jupiter are much lower than earlier estimates. The new estimate is 1 to 13 Earth-masses for Saturn and 0 to 12 Earth-masses for Jupiter. The low-mass ends of these estimates are too low to capture an abundant amount of gas from the nebula. Moreover, we now have visual evidence of extra-solar planetary systems. Dr. Kortenamp showed a schematic of the Upsilon Andromedae system, with three giant planets all within what would be our inner Solar System. We did not believe that they could have formed there as there would not be enough material to make the planets. One explanation is that they formed much farther out and then migrated towards the central star. But this migration requires the presences of gas and may push the lifetime of the nebula beyond 10 million years, an unlikely age.

To better explain such systems, Alan Boss, a colleague of our speaker at DTM, decided to revisit an older model for the formation of giant planets: the gravitational instability model. He modeled a disk of gas orbiting a solar-mass star. He found that within a mere 700 years, two areas of instability had developed in the disk near the orbits of Jupiter and Saturn. These instabilities collapse to form gas giants in a short time (about 7000 years). If such an instability led to the formation of Jupiter and Saturn they would have been present before the planetesimals could develop in the asteroid belt and thus could have prevented the formation of planet-size bodies there, allowing growth only to reach the size of the largest asteroids.

The reviewer wishes to thank Dr. Kortenamp for his considerable assistance in the preparation of this article. ○

### **Newsletter Deadline for October *Star Dust*, September 15, 1999**

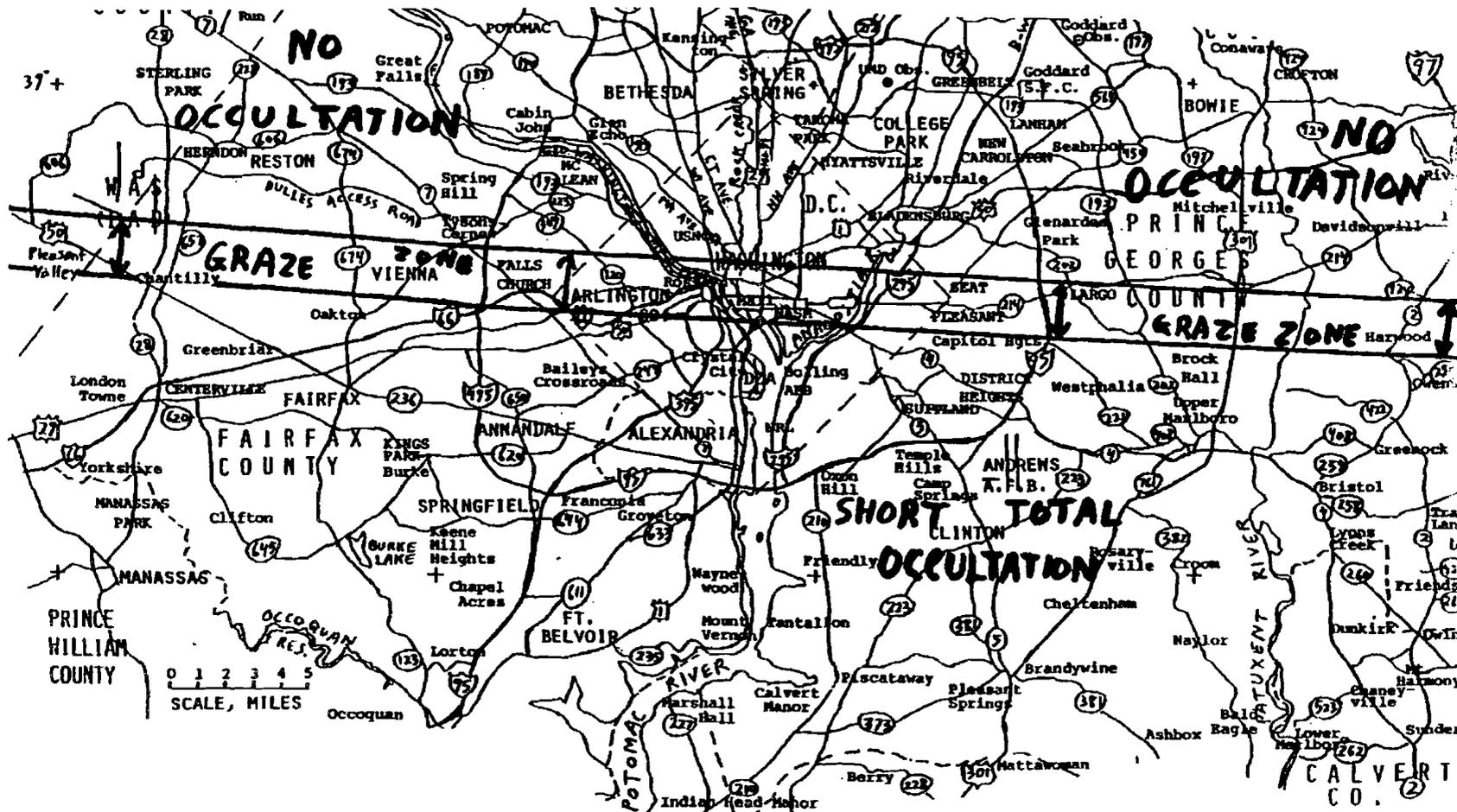
Please send submissions to Alisa & Gary Joaquin, at [ajlj@erols.com](mailto:ajlj@erols.com) or fax submissions to 703/658-2233. Text must be in ASCII or Word. Graphics submitted must be in TIFF, GIF, or JPEG. Thank you.

# Northern-Limit Grazing Occultation of Z.C. 2697

Saturday Evening, September 18, 1999

Washington, DC Area, 7:47-7:53 pm EDT

60% sunlit Moon 30° above southwestern horizon,  
graze on the dark side 4° from the northern cusp



# Occultations, September and early October 1999

by David Dunham

## Planned Grazing Occultation Expeditions

DATE	Day	EDT	Star	Mag	%	alt	CA	Location
Sep 2	Thu	05:44	SAO 93760	7.8	57-	64	10D	Thurmont, MD & York, PA; Sun -11
Sep 4	Sat	04:30	64 Orionis	5.2	34-	35	10N	Pittsburgh, PA area
Sep 18	Sat	19:50	ZC 2697	6.5	60+	30	4N	Falls Church, VA; DC; Largo, MD
Sep 22	Wed	01:27	iota Cap	4.3	87+	21	3S	Pittsburgh, PA area; ZC 3126
Oct 1	Fri	06:36	ZC 0888	6.0	59-	69	6N	Lisburn, PA; Sun -6
Oct 2	Sat	05:45	ZC 1048	8.5	48-	63	8N	Barnesv., Ellicott C., Balto., MD

## Total Lunar Occultations

DATE	Day	EDT	Star	Mag	%	alt	CA	Notes
Sep 4	Sat	04:46	R 64 Orionis	5.1	33-	41	40N	24x; Close Dbl; Pittsburgh Graze
Sep 6	Mon	05:20	R ZC 1217	6.2	14-	25	58N	30x?
Sep 18	Sat	19:50	G ZC 2697	6.5	61+	30	4N	Sun -8; Graze McLean, VA-Bowie, MD
Sep 18	Sat	21:38	D ZC 2708	5.9	61+	25	88N	
Sep 20	Mon	22:26	D ZC 2977	6.8	79+	30	49S	
Sep 21	Tue	20:21	D ZC 3105	6.1	87+	27	38S	
Sep 22	Wed	19:39	D iota Cap	4.3	93+	18	44N	Sp.binary; ZC 3237; Graze, PA
Sep 23	Thu	02:33	D 42 Aquarii	5.3	94+	21	45N	ZC 3268
Sep 25	Sat	22:55	R ZC 0106	6.6	99-	36	68S	Terminator 5" - 13" away
Sep 28	Tue	01:39	R mu Ceti	4.3	89-	53	74N	mag. 8.5 2nd star 0.05", PA 133
Sep 28	Tue	23:50	R ZC 0526	6.7	82-	27	59N	
Sep 29	Wed	22:42	R Aldebaran	0.9	72-	5	30S	12x; Az. 73; Last occultation of a 1st-mag. star in the MidAtlantic area until 2005
Oct 1	Fri	01:44	R 127 Tauri	6.7	60-	29	35S	ZC 0863
Oct 1	Fri	06:51	R ZC 0888	6.0	58-	70	28N	Sun -3; Graze, s. Penn., Sun -6
Oct 3	Sun	06:31	R ZC 1186	6.0	36-	61	85N	Sun alt. -7 deg.

## Asteroidal Appulses

DATE	Day	EDT	Star	Mag	Asteroid	dmag	dur. s	ap. in.	Occultation Location
Sep 3	Fri	03:25	HIP 116206	8.6	Hermentaria	2.2	11	4	Bahamas
Sep 6	Mon	04:31	SAO 111458	9.5	Prokne	2.5	14	6	Georgia
Sep 8	Wed	05:44	GSC18480430	11.0	1995 WY2	12.9	16	8	James Bay
Oct 1	Fri	04:28	ACT18850275	10.0	Peraga	2.9	6	7	L.Erie - s. Maine
Oct 4	Mon	04:19	ACT24030249	10.6	Amphitrite	0.6	23	8	Bahamas, Bermuda

Sep 8: The path prediction for this Kuiper-Belt object is very uncertain.

Phone the IOTA occultation line, 301-474-4945, for updates and details, or check IOTA's Web site at <http://www.lunar-occultations.com/iota>. For asteroidal occultations, finder charts can be found at <http://members.home.net/dega/astchart.htm>. Good luck with your observations.

## National Capital Area Astronomical Events

Free Lectures at the Einstein Planetarium and Other Daily Events  
National Air & Space Museum

202/357-1550, 202/357-1686, or 202/357-1505 (TTY)  
Home page: <http://www.nasm.edu>

### Other Area Astronomical Events

**Arlington Planetarium** — “Stars Tonight for September,” Monday, Sept. 13, 7:30 PM, Admission: Adult \$2.50, Children & Seniors \$1.50. Information 703/228-6070 or 703/228-6019.

**Maryland Space Grant Observatory** — Open House every Friday evening (weather permitting), Bloomberg Center of Physics and Astronomy, Johns Hopkins University, Baltimore, MD. Information: 401/516-6525 or check their web site at [www.pha.jhu.edu/facilities/observatory/telescope.html](http://www.pha.jhu.edu/facilities/observatory/telescope.html).

**Montgomery College’s Planetarium, Takoma Park** — “When the Sky Falls,” Sept. 23, 7:00 PM.

**Associated Universities Incorporated and National Radio Astronomy Observatory Conference** — “Science with the Atacama Large Millimeter Array,” Oct. 6-8. Carnegie Institute, Washington, DC. Registration fee for the conference is \$95.00. Cost for the dinner is \$40 per person. Total cost is \$135.00. Register online at their website at: [www.mma.nrao.edu/science.html](http://www.mma.nrao.edu/science.html). Send questions or comments to [kwether@nrao.edu](mailto:kwether@nrao.edu).

**10th Annual Astrophysics Conference in Maryland** — “Cosmic Explosions,” Oct. 11-13. University Conference Center, University of Maryland, College Park, MD. Registration fee \$250 (prior to September 15). Fee for late registrants will be \$300. Registration fee includes lunches and light refreshments served during the conference (including an informal reception on the evening of Monday, October 11), a banquet on Tuesday evening, October 12, a souvenir t-shirt, a book bag, and one copy of the published (hardcover) Proceedings. You may register using the form at their website located at: [www.astro.umd.edu/october.html](http://www.astro.umd.edu/october.html). For additional information, email at [october@astro.umd.edu](mailto:october@astro.umd.edu).

**High Energy Solar Physics Workshop** — “Anticipating HESSI,” Oct. 18-20. University Conference Center, University of Maryland, College Park, MD. Send abstracts and registration emails to [ramaty@gsfc.nasa.gov](mailto:ramaty@gsfc.nasa.gov). Registration fee is \$150 payable at the meeting. For more information, check out their website at: [lheawww.gsfc.nasa.gov/users/ramaty/hessisymp.html](http://lheawww.gsfc.nasa.gov/users/ramaty/hessisymp.html).

## MASP '99

- *Observing*
- *Astro Show and Tell*
- *Vendors*
- *Fellowship*
- *Speakers*
- *Swap Meet*
- *Camping & More*

Daily Fee is \$10 per adult  
Event Fee is \$20 per adult  
(\$15 'till Sept. 23)  
Children under 15 years old are free if accompanied by an adult.

MASP T-shirts are \$10 each, sweat shirts \$20 each, and hooded sweats \$25. Please specify quantity, and size, sm, m, l, xl, (xxl or xxxl +\$3).

### Directions:

About 8 miles West of Carthage and 8 miles south of Robbins, NC. The entrance will be the west most gate along SR 1261.

Pre-register by mailing your fees to:

Mid-Atlantic Star Party  
244 Deerfield Rd.  
Apex, NC 27502

Information: [www.masp.org](http://www.masp.org).  
[john@bsa.net](mailto:john@bsa.net), 919/362-5194.

## Meteor Showers

### Major Activity

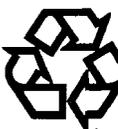
None

### Minor Activity

Radiant	Duration	Maximum
Gamma Aquarids	Sept. 1-14	Sept. 7/8
Alpha Triangulids	Sept. 5-15	Sept. 11/12
Alpha Aurigids	Aug. 25-Sept. 6	Sept. 1/2
Eta Draconids	Aug. 20-Sept. 23	Sept. 12/13
Gamma Piscids	Aug. 26-Oct. 22	Sept. 23/24
Southern Piscids	Aug. 12-Oct. 7	Sept. 11-20

### Daylight Activity

None



Don't throw this newsletter away. If you're finished with it, pass it on to someone else to read or recycle it. It's right for astronomy and the environment.

## National Capital Astronomers, Inc.

### SERVING SCIENCE & SOCIETY SINCE 1937

NCA is a non-profit, membership supported, volunteer run, public-service corporation dedicated to advancing space technology, astronomy, 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 as skilled observers frequently deploying to many parts of the National Capital region, and beyond, on campaigns and expeditions collecting vital scientific data for astronomy and related sciences. They also serve locally by assisting with scientific conferences, judging science fairs, and interpreting astronomy and related subjects during public programs.

**Discussion Groups** exchange information, ideas, and questions on preselected topics, moderated by an NCA member or guest expert.

**Publications** received by members include the monthly newsletter of NCA, *Star Dust*, and an optional discount subscription to *Sky & Telescope* magazine.

**NCA Information Service** answers a wide variety of inquiries about space technology, astronomy, and related subjects from the public, the media, and other organizations.

**Consumer Clinics** on selection, use, and care of binoculars and telescopes, provide myth-breaking information, guidance, and demonstrations for those contemplating acquiring their first astronomical instrument.

**Dark-Sky Protection Efforts** educate society at large about the serious environmental threat of light pollution, plus seek ways and means of light pollution avoidance and abatement. NCA is an organizational member of the International Dark-Sky Association (IDA), and the National Capital region's IDA representative.

**Classes** teach about subjects ranging from basic astronomy to hand-making a fine astronomical telescope. NCA's instructors also train educators in how to better teach astronomy and related subjects.

**Tours** travel to dark-sky sites, observatories, laboratories, museums, and other points of interest around the National Capital region, the Nation, and the World.

**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, the Smithsonian Institution, the U.S. Naval Observatory, and others.

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

**Fine Quality Telescopes** up to 36-cm (14-inch) aperture are available free for member's use. NCA also has access to several relatively dark-sky sites in Maryland, Virginia, and West Virginia.

### YES! I'D LIKE TO JOIN THE NATIONAL CAPITAL ASTRONOMERS

Enclosed is my payment for the following membership category:

Regular

*Sky & Telescope* and *Star Dust*. (\$54 per year)

*Star Dust* only (\$27 per year)

Junior (Only open to those under age 18) Date of birth: \_\_\_\_\_

*Sky & Telescope* and *Star Dust*. (\$42 per year)

*Star Dust* only (\$15 per year)

_____	_____	(____)	_____	_____
First name(s)	Last name		Telephone	E-mail
_____	_____	_____	_____	_____
Street or Box	Apartment	City	State	Zip Code + 4

If family membership, list names of additional participating immediate family members in same household, with birthdates of all those under 18 years old: \_\_\_\_\_

**Note:** If you already subscribe to *Sky & Telescope*, please attach a recent mailing label. You may renew this subscription through NCA for \$27 when it expires.

Make check payable to: **National Capital Astronomers, Inc.**, and send with this form to:

**NCA c/o Jeffrey B. Norman, 5410 Connecticut Avenue, NW, Apt. #717, Washington, D.C. 20015-2837.**

The following information is optional. Please indicate briefly any special interests, skills, education, experience, or other resources which you might contribute to NCA. **Thank you, and welcome to NCA!**

\_\_\_\_\_  
\_\_\_\_\_

# SpaceWatch

There is a new way to use the Internet to enjoy astronomy. Pseudo Programs, a New York new media company, is producing a series of live Internet broadcasts about astronomy and space exploration, called "SpaceWatch." One of the shows, "Deep Sky," is an interactive talk show that will feature prominent guests in the field of astrophysics and astronomy.

"Deep Sky" is fully interactive, which means you can join a chat room with the guest while the show is going on. You can ask your questions and get live responses.

*Star Dust* is published ten times yearly (September through June) by the National Capital Astronomers, Inc. (NCA), a nonprofit, astronomical organization serving the entire National Capital region, and beyond. NCA is the astronomy affiliate of the Washington Academy of Sciences and the National Capital region's representative of the International Dark-Sky Association. President: Andrew Seacord, 301/805-9741. Deadline for *Star Dust* is the 15th of the preceding month. Editors: Alisa & Gary Joaquin, 4910 Schuyler Dr., Annandale, VA 22003, 703/750-1636, E-mail: [ajglj@erols.com](mailto:ajglj@erols.com). Editorial Advisor: Nancy Byrd *Star Dust* © 1999, *Star Dust* may be reproduced with credit to National Capital Astronomers, Inc.

The show airs live from Pseudo's netcast studio in New York's Silicon Alley every Thursday at 8:00 p.m. Eastern Time. (We use the Real Player format, the standard in streaming media. The viewing software is a free download from [www.real.com](http://www.real.com).) Recent guests have included Michio Kaku, Fred Hess, and Bodhan Paczynski. The host of "Deep Sky," Michael O'Gara, is the Vice-President of the Amateur Astronomers Association of New York.

You can watch the live show, or check out past broadcasts, by visiting [www.spacewatch.com](http://www.spacewatch.com). The SpaceWatch site also has message boards and links where you can find out more about the topics discussed on the show and connect with other amateur astronomers to share your thoughts.

There are two other shows, "Cosmic Vi-

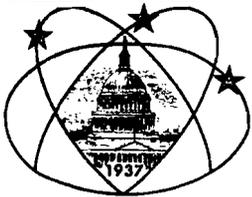
sions" and "Mission Control, Over," that are part of the SpaceWatch series. "Cosmic Visions" is a monthly magazine-style show; "Mission Control, Over" is also interactive, and is broadcast live from Space Center Houston.

I am the producer of "Deep Sky," by the way. Once you have a chance to check out the show, I would love hear your feedback! E-mail me at [elliott@spacewatch.com](mailto:elliott@spacewatch.com). Also, if there is anyone you want us to invite on the air, or any topic you want us to cover, let me know!

If you come through New York City, we'll be happy to arrange a seat for you to watch the show in the studio as well.

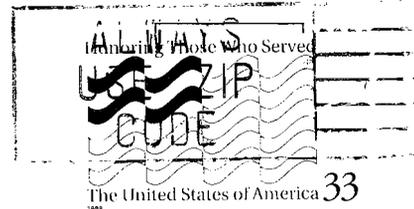
Thanks!

Elliott Kennerson  
Producer  
SpaceWatch Channel  
Pseudo Programs, Inc.  
<http://pseudo.com>



## National Capital Astronomers, Inc.

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Chevy Chase, MD 20815-4551



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