Star Dust

National Capital Astronomers, Inc. **http://capitalastronomers.org**

Volume 61, Number 10 June 2003 ISSN 0898-7548

June Speaker: Dr. Alycia Weinberger, "Planet Formation"

Submitted by Gary Joaquin

Dr. Alycia Weinberger will present the featured talk for the June 7 meeting of the National Capital Astronomers: "Planet Formation." The meeting will be held at 3:00 P.M. in the Bethesda-Chevy Chase Regional Services Center of Montgomery County, 4805 Edgemoor Lane (Second Floor), Bethesda, MD.

Synopsis: The general question of planet formation inspires us on two fronts. We seek to understand the processes which created our own solar system and resulted in a planet able to develop intelligent life. We further wish to explore the conditions of formation for the ~100 extrasolar planetary systems which have been discovered and which are quite unlike our own. Thus, we would like to understand the progression of material from the disks left over from the star formation process into mature planets.

"The general question of planet formation inspires us on two fronts. We seek to understand the processes which created our own solar system and resulted in a planet able to develop intelligent life. . ."

The last twenty years have been revolutionary in the study of disks. First, the detection of circumstellar material made possible by early ground-based infrared observations was extended enormously by the mid and far-infrared capability of the Infrared Astronomical Satellite (IRAS) and by large ground based telescopes. Second, techniques for high contrast imaging enabled by coronagraphs, especially on the Hubble Space Telescope (HST), and mid-infrared imaging with 10-meter class telescopes resulted in spatially resolved images of a handful of disks.

The observations elucidate disk geometries and dust composition and in an ensemble fashion teach us about the evolution of disks and the timescales for planet formation within them. In this talk, Dr. Weinberger will show visual and near-infrared imaging and mid-infrared imaging and spectroscopy of disks around stars which are all about 10 Myr old, yet which vary dramatically in physical size, morphology and composition. Even at this young age, embryonic planets may be modifying their environments.

Biography

Alycia Weinberger has been a staff researcher at the Carnegie Institution of Washington's Department of Terrestrial Magnetism since 2001. She earned her Bachelor's degree in physics from the University of Pennsylvania in Philadelphia and her Ph.D. in physics from the California Institute of Technology in Pasadena. She was a postdoctoral scholar at UCLA, first as a member of the Hubble Space Telescope near-infrared camera (NICMOS) science team and then as a NASA Astrobiology Institute postdoctoral fellow. In 2000, she was awarded the Annie Jump Cannon prize by the American Association of University Women and American Astronomical Society for significant research by a female postdoctoral scholar. In 2002, she was awarded the Vainu Bappu Gold Medal by the Astronomical Society of India for her work.

Alycia specializes in observations of circumstellar disks and almost always observes in the infrared part of the spectrum, at wavelengths from 1 - 20 microns. She admits that she has never met a big telescope she doesn't like. However, her trusty 4-inch Astroscan, bought with the prize money from an 8th grade science competition, often travels with her to dark skies around the country (yes, it fits under the seat in front of you on an airplane!).

The President's Corner

Last month some of the NCA Science Fair winners made presentations about their projects. This month we expect to have presentations from the other NCA Science Fair winners.

This spring we received a lot of helpful rain (helpful for crops, water table, etc.) but not so great for photon-starved amateur astronomers. I hope members are able to get in lots of good observing during the summer.

Jay H. Miller

NCA Events This Month

The Public is Welcome!

NCA Home Page: http://capitalastronomers.org

Fridays, June 6, 13, 20, &27, 6:30 to 9:30 P.M., NCA Telescope-making Classes at the Chevy Chase Community Center, at the northeast corner of the intersection of McKinley Street and Connecticut Avenue, N.W. Contact instructor Guy Brandenburg at 202-635-1860 or email him at gfbrandenburg @yahoo.com. Also, see below.

Fridays, June 6, 20, & 27, 9:30 P.M. Open nights with NCA's 14-inch telescope at Ridgeview Observatory near Alexandria, Virginia. For more information, see below.

Saturday, June 7, 9:00 P.M. Exploring the Sky at Rock Creek Park. See Page 4.

Saturday, June 7, 3:00 P.M. NCA meeting in the Bethesda-Chevy Chase Regional Services Center of Montgomery County, 4805 Edgemoor Lane, (Second Floor), Bethesda, MD.

Science fair winners will give short talks about their projects.

Dr. Alycia Weinberger will present the featured talk: "Planet Formation."

Saturday, June 7, following the meeting, dinner with the speaker and NCA members at
Il Forno Pizzeria
4926 Cordell Avenue
Bethesda, MD
301-652-7757

See map and directions on Page 6.

Support the IDA

Join the International Dark-Sky Association

3225 N. First Avenue Tucson, AZ 85719-2103

www.darksky.org

Mid-Atlantic Occultations and Expeditions

by David Dunham

Asteroidal Occultations

Date	Day	EDT	Star	Mag	Asteroid	dmag	dur. s	Ap. in.	Location
Jun 10	Tue	4:44	TYC68621168	11.3	Neckar	3.5	2	7	Richmond,seMD
Jun 16	Mon	21:02	SAO 205161	8.2	Helio	5.8	11	3	w.Atlantic Oc.
Jun 26	Thu	0:42	SAO 161454	9.4	Benjamina	4.1	7	3	North Carolina
Jun 28	Sat	23:22	TYC67840549	11.3	Tekmessa	3.5	6	7	s. Florida
Jul 6	Sun	22:15	SAO 182362	8.7	Argentina	4.9	18	2	cen. Florida
Jul 7	Mon	0:27	TYC52361194	10.0	Emanuela	3.5	15	6	Maine
Jul 12	Sat	22:44	TAC+2d 9343	11.9	Winchester	2.0	15	8	MD,DC,VA,DE,NJ
Jul 23	Wed	21:49	TYC57570250	11.8	Iclea	1.9	7	8	NC Outer Banks
Jul 24	Thu	2:12	TYC62640511	11.6	Lacadiera	1.1	15	8	n.Penn.,n.Ohio
Jul 29	Tue	2:50	TYC62853426	11.5	Zelinda	1.4	11	8	s.MD,DC,VA
Sep 6	Sat	21:01	PPM 709674	10.4	Ausonia	0.6	11	7	New England
Sep 10	Wed	23:30	TYC63421205	10.4	Turandot	2.9	29	6	Bermuda

Lunar Grazing Occultations

DATE	Day	EDT	Star	Mag	% alt	CA	Location
Jun 7	Sat	23:37	SAO 118905	7.9	53+ 28	9N	Burtonville,Atlee&Suffolk,VA
Jun 25	Wed	5:04	SAO 93156	8.3	17- 23	11N	Williamsport,MD & Sunbury,PA
Jul 7	Mon	23:04	SAO 139576	9.0	61+ 24	9N	New Windsor& Reisterstown,MD
Jul 21	Mon	4:17	SAO 110176	8.8	49- 42	16N	Beltsville & Silver Spring,MD
Jul 23	Wed	4:19	SAO 093405	8.8	31- 32	15N	Skippers & Williamsburg, VA

(Continued on page 5)

Meteor Showers

June & July Radiants

Full Moon: June 14, July 13

June

Moderate Activity

Radiant	Duration	Maximum
June Lyrids	June 10-21	June 15/16

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
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

July**

Moderate 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 2?-July 29	July 12/13
Omicron Draconids	July 6-28	July 17/18
Daylight Activity - None		

** Important Note: Although the July radiants do not individually produce strong rates, activity from the Aquarius and Capricornus regions in July and early August, as well as minor activity from other radiants, cause hourly rates to basically rise between the middle and end of July for observers in both the Northern and Southern Hemispheres. Therefore, clear, moonless nights can be quite enjoyable for anyone observing during late July.

Source: http://comets.amsmeteors.org/meteors **

NCA Telescope/ Mirror-Making Workshop

Guy Brandenburg

The NCA Mirror-Making group will continue to meet every Friday evening at the Chevy Chase Community Center (CCCC) from 6:30 to 9:30 PM for the rest of the spring and summer. We have on hand all of the grits, abrasives, Pyrex glass mirror blanks, tools, testers, and pitch that you need to make your own hand-made Newtonian reflecting telescope in sizes from 4.25" to 12.5" in diameter. We can help you design, make and collimate the rest of the telescope as well. If you have some patience and don't drop the mirror on the concrete floor by accident, you can end up with a much *better* telescope than you can buy for three or four times the price, and if you make a Dobsonian alt-az mount, it will be easier to use, as well. You pay for the materials only — and since we re-use the tool after you are done, your cost is significantly less than you would pay for an entire Pyrex mirror kit from commercial vendors. Of course, you can also purchase a kit from elsewhere and we will be glad to help you make your mirror anyway.

During the process, you end up learning a lot about optics.

A 6" diameter mirror should take around 30 hours of work to complete, give or take 10 hours. Part of that time can be done at home. Our current price for materials for a 6" mirror is about $70.

We can also aluminize (or re-aluminize) your mirror as well, since we have a vacuum chamber that fits up to 12.5" mirrors. The only catch is that you have to help. The process is quite interesting.

For additional information, contact Guy Brandenburg at gfbranden@earthlink.net or 202-262-4274, or look at http://www.astro.umd.edu/openhouse/amateur/mirror_class.html.

Come See the Stars!

by Joe Morris

Exploring the Sky 2002-2003 Schedule

Date	Time	Notes
6/7	9:00 P.M.	Quarter moon. Summer solstice 6/21
7/19	9:00 P.M.	
8/23	8:30 P.M.	Perseid meteor shower 7/17-8/24
9/27	8:00 P.M	Rock Creek Park Visitor Day
10/18	7:30 P.M.	
11/15	7:00 P.M.	Leonid meteor shower 11/14-11/21

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, starting shortly after sunset. We meet in the field just south of the intersection of Military and Glover Roads NW, near the Nature Center. A parking lot is located immediately next to the field.

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
http://www.capitalastronomers.org

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 nancy.roman6@verizon.net or 301-656-6092 (home).

The deadline for the September Star Dust is August 15. Please send your material to Elliott Fein by that date to ensure inclusion.

Send submissions to Elliott Fein at elliott.fein@erols.com.

Text must be in ASCII, MS Word (97 or earlier), or WordPerfect.

All articles submitted may be edited to fit the space available.

Observing with the NCA C-14

Bob Bolster

Fridays at 9:30 p.m.	Prime Objects
June 6	Jupiter, first quarter Moon
June 20	CCD Camera Workshop
June 27	Backup date for above or M5, M13

Mars will be observable on: August 1 after 12:30 a.m.; August 10 after 11:50 p.m.; August 20 after 11:10 p.m., and August 30 after 10:30 p.m. The best viewing is 2 hr. 45 min. later at meridian transit. Mars is nearest to the Earth on August 27.

Call most any day when the weather looks favorable.

At Ridgeview Observatory in Bob Bolster's backyard, 6007 Ridge View Drive, Franconia, Virginia (off Franconia Rd. between Telegraph Rd. and Rose Hill Dr.). Call Bob at 703-960-9126 before 6:00 p.m., to let him know you are coming.

Meteor Showers
August Radiants

Full Moon: August 12

Major Activity

Radiant	Duration	Maximum
Perseids (PER)	July 23-August 22	Aug. 13 @ 3:30 UT
Moderate Activity		
Radiant	**Duration**	**Maximum**
Northern Iota Aquarids (NIA)	August 11-September 10	August 25/26
Southern Iota Aquarids (SIA)	July 1-September 18	August 6/7
Alpha Capricornids (CAP)	July 15-September 11	August 1/2
Northern Delta Aquarids (NDA)	July 16-September 10	August 13/14
Kappa Cygnids (KCG)	July 26-September 1	August 18
Minor Activity		
Radiant	**Duration**	**Maximum**
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

Mid-Atlantic Occultations and Expeditions, continued

(Continued from page 2)

```
Jul 25 Fri  4:37 SAO 076915 8.1 15- 21 15N Bedford & Lewistown, PA
Aug  2 Sat 21:46 SAO 138934 8.6 25+ 14  8N Glencoe & Edgewood, MD
Aug  4 Mon 20:40 ZC 2065    6.5 46+ 33 12N BrewersXrds.&CapeHatteras,NC
Aug 18 Mon  1:20 SAO 092862 8.5 66- 27 14N Hughesville & Queenstown, MD
Aug 19 Tue  6:17 SAO 093290 7.7 57- 69 18N Altavista & Thornburg, VA
Aug 21 Thu  1:42 SAO 076683 7.5 38- 12 12N Hagerstown,MD& NaylorObs.,PA
Aug 22 Fri  5:58 125 Tauri  5.2 28- 52 17N Autryville & Barco,NC
Sep  1 Mon 19:09 delta Sco  2.3 43+ 23-10S Falmouth & Nantucket, MA
Sep  5 Fri 19:16 tau Sgr    3.3 76+ 18-11S Arlington,VA;Clinton&PocC,MD
Sep  5 Fri 20:53 ZC 2796    6.8 76+ 25  6N ColonialHgts&Williamsburg,VA
```

Total Lunar Occultations

```
DATE   Day  EDT  Ph Star      Mag  %  alt  CA Sp. Notes
Jun  7 Sat 22:42 D ZC 1669    6.7 53+ 37  27S F5
Jun  8 Sun  0:10 D SAO 118916 8.2 53+ 21  80N K0
Jun  9 Mon  1:18 D SS Vir     6.0 65+ 13  50S C6 X54025
Jun 15 Sun  1:24 R ZC 2650    4.7 99- 24  48N K3 10" to terminator
Jun 16 Mon  4:55 R ZC 2848    5.5 95- 19  30S K1 Sun alt. -8 deg.
Jun 18 Wed  3:52 R 35 Cap     5.8 81- 28  75N K3 ZC 3141
Jun 26 Thu  5:08 R SAO 093538 8.2 10- 18  26S G5 Close double; Sun alt. -7
Jul  3 Thu 23:20 D ZC 1535    6.9 19+  3  51N K0 Azimuth 286 deg.
Jul  5 Sat 23:10 D SAO 119239 8.1 39+ 16  40N K2
Jul  7 Mon  0:12 D 46 Vir     6.0 50+  9  39N K2 ZC 1869
Jul  9 Wed  0:06 D 5 Librae   6.3 73+ 18  63N K2 ZC 2105;2nd mag.11,2.7"sep
Jul  9 Wed 21:08 D ZC 2230    6.7 82+ 31  44N F3 Sun -6; maybe close double
Jul 10 Thu 22:26 D ZC 2398    6.1 90+ 27  52S A7
Jul 11 Fri 23:52 D ZC 2558    6.3 96+ 24  42S B3
Jul 12 Sat  1:01 D ZC 2564    7.0 96+ 21  29S A3 17" to terminator
Jul 17 Thu  2:12 R tau1 Aqr   5.7 86- 30  64S B9 ZC 3343
Jul 17 Thu  3:50 R tau2 Aqr   4.1 86- 37  83N K5 ZC 3349
Jul 19 Sat  2:28 R SAO 128707 6.9 69- 29  61N K0
Jul 19 Sat  5:18 R ZC 0049    6.1 68- 48  49N K1 Sun -7;Pittsburgh graze
Jul 20 Sun  2:08 R SAO 109653 7.2 60- 22  76S K0
Jul 21 Mon  2:26 R ZC 0269    7.0 50- 21  85S K0 2nd mag.12 17" in PA 278
Jul 26 Sat  4:42 R SAO 077736 7.8  8- 14  34S A2 2nd star mg. 10, sep.0.4"
Jul 27 Sun  4:35 R ZC 1046    7.0  4-  4  54S F8 Azimuth 60 deg.
Jul 27 Sun  4:48 R ZC 1049    6.8  4-  6  21S A2 Azimuth 62 deg.
Aug  2 Sat 20:21 D gamma Vir  2.7 25+ 29  78S F0 Sun-2;equal dbl.,sep.1.2"
Aug  2 Sat 21:26 D ZC 1825    5.9 25+ 18  68N G8
Aug  2 Sat 21:27 R gamma Vir  2.7 25+ 18 -82N F0 = Porrima = ZC 1821
Aug  3 Sun 20:48 D ZC 1947    7.0 35+ 28  57N F0 Sun alt. -6 deg.
Aug  6 Wed 23:55 D rho1 Oph   6.8 70+ 12  54N B3 ZC 2357, Az. 227 deg.
Aug  7 Thu  0:02 D rho2 Oph   4.6 70+ 11  49N B2 ZC 2359;2nd mg.5.9,sep.3"
Aug  9 Sat 21:26 D ZC 2848    5.5 94+ 19  45S K1 2nd mag.8.6,sep.8",PA 142
Aug 14 Thu  0:53 R ZC 3413    6.1 95- 33  72N K5
Aug 21 Thu  1:48 R SAO 076683 7.5 38- 14  27N F5 graze, Hagerstown, MD
Aug 21 Thu  3:15 R tau Tauri  4.3 38- 30  12S B3 ZC 709, close double?
Aug 21 Thu  5:59 R ZC 0716    6.3 37- 61  88N B5 Sun alt. -6 deg.
Aug 30 Sat 20:24 D SAO 139272 7.6 13+ 13  90N K0 Sun alt. -9; Az. 251 deg.
Aug 31 Sun 20:44 D SAO 158416 7.9 22+ 13  70S K1 Azimuth 241 deg.
Sep  3 Wed 19:49 D 28 Oph     6.7 55+ 25  76N B9 ZC 2452 Sun -4 double?
Sep  3 Wed 20:20 D 31 Oph     6.6 55+ 24  54N A9 ZC 2455 Sun alt. -9 deg.
Sep  5 Fri 19:10 D tau Sgr    3.3 76+ 17  -4S K1 ZC 2784 Sun +3 double?
Sep  5 Fri 19:21 R tau Sgr    3.3 76+ 18 -18S K1 Graze, Arlington, VA
```

Phone the IOTA occultation line, 301-474-4945, for updates,
or check the local IOTA Web site at http://iota.jhuapl.edu
David Dunham, e-mail dunham@erols.com, phone 301-474-4722

Getting to the NCA Monthly Meeting

Saturday, June 7

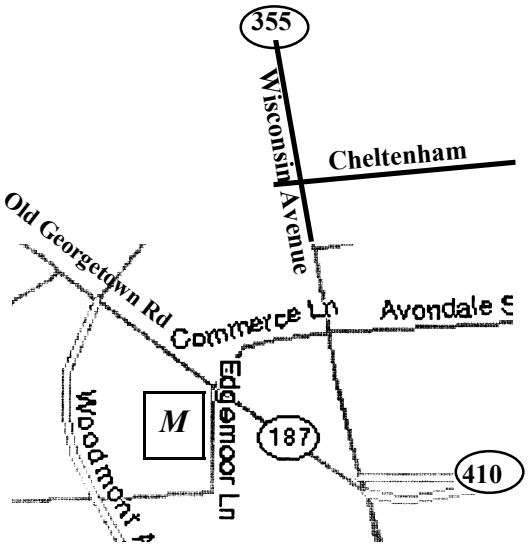
3:00 P.M. - NCA Meeting in the Bethesda-Chevy Chase Regional Services Center of Montgomery County, 4805 Edgemoor Lane **(2nd Floor)**, Bethesda, MD.

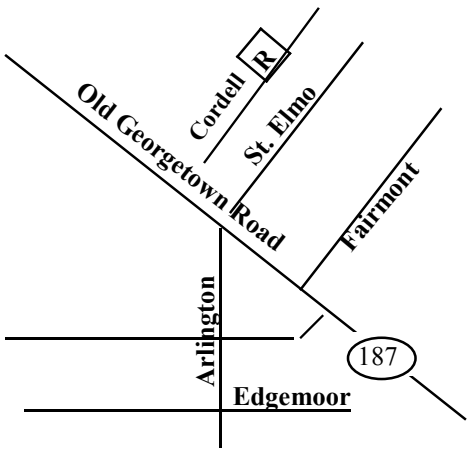
Science fair winners will give short talks about their projects.

Dr. Alycia Weinberger will present the featured talk: "Planet Formation."

Following the meeting, dinner with the speaker and NCA members at

Il Forno Pizzeria
4926 Cordell Avenue
Bethesda, MD
301-652-7757





Directions to the Meeting Place in the Bethesda-Chevy Chase Regional Services Center of Montgomery County, 4805 Edgemoor Lane, (Second Floor), Bethesda, MD.

From North of Bethesda

1. Take Rockville Pike/MD-355 South.
2. Rockville Pike/MD-355 S becomes MD-355/Wisconsin Ave.
3. Shortly after Cheltenham Dr. (and one block before reaching Rt. 410), turn right onto Commerce Lane.
4. Commerce Lane becomes Edgemoor Lane.
5. After crossing Old Georgetown Rd., 4805 is the second entrance on the right. (See **M** on map.)
6. To get to public parking, continue on Edgemoor Lane, which will make a sharp right turn. The parking garage is then on your right. See note below.

From South of Bethesda

1. Take MD-355/Wisconsin Ave. North.
2. Turn slight left onto MD-187/Old Georgetown Rd.
3. Turn next left onto Edgemoor Ln. 4805 is the second entrance on the right. (See ***M*** on map.)
4. To get to public parking, continue on Edgemoor Lane, which will make a sharp right turn. The parking garage is then on your right.

Note: there are two parking lots. The one on Woodmont is for the apartments and may have a fee. The one on Edgemoor is marked "Public" and does not charge on weekends.

Directions to the Restaurant

1. Following the meeting, turn right out of the parking garage.
2. Continue on Edgemoor Lane and cross Woodmont Ave.
3. Turn right onto Arlington Blvd.
4. Turn left onto MD-187/Old Georgetown Rd.

Turn right at Cordell Ave. The restaurant, Il Forno Pizzeria, will be on your right between the Betawi Grill (blue canopy with orange lettering) and Nam's (red canopy).
Have change available for meters (still in operation at that time) or use the public parking garage near the restaurant.

Star Dust is published ten times yearly, September through June, by the National Capital Astronomers, Inc. (NCA).
Editor: Elliott Fein, Co-editor: Adele Fein, Editorial Advisor: Nancy Byrd. Consultant: Jeffrey Norman

National Capital Astronomers, Inc.

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).

Junior members only: Date of Birth: _____ Only members under the age of 18 may join as juniors.

Tax deductible contribution: ____ Thank You.
_____ I prefer to receive *Star Dust* by e-mail.

Please send this form, with your check payable to National Capital Astronomers, Inc., to:
Mr. Jeffrey Norman, NCA Treasurer, 5410 Connecticut Ave NW #717, Washington DC 20015-2837

National Capital Astronomers, Inc.
If undeliverable, return to
NCA c/o Nancy Roman
4620 N. Park Ave., #306W
Chevy Chase, MD 20815-4551

FIRST CLASS
DATED MATERIAL

Inside this issue: