

## September Speaker: Dr. David E. Smith, "Update on Mars Research: What's been Discovered and Future Missions"

*Submitted by Jeff Guerber*

Dr. David E. Smith will present the featured talk for the September 6 meeting of the National Capital Astronomers. Dr. Smith will give us an update on Mars research: what's been discovered by the recent missions (Mars Global Surveyor and Mars Odyssey), and look ahead to the upcoming ones. 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.

### Biography

Dr. David E. Smith is Chief of the Lab for

Terrestrial Physics at NASA Goddard. He was the Principal Investigator for the Mars Orbiter Laser Altimeter (MOLA) instrument on Mars Global Surveyor, and is currently for the Mercury MESSENGER Laser Altimeter. He is also a member of the science team for the DAWN mission to asteroids Ceres and Vesta. He received his bachelor's and master's degrees from the University of Durham, and his Ph.D. in satellite geodesy in 1966 from the University of London. He is a member of the American Geophysical Union and the Royal Astronomical Society.

## "Disks Around Stars" A Talk by Alycia Weinberger

*Reviewed by Nancy Byrd*

At the June 7 meeting of National Capital Astronomers, Dr. Alycia Weinberger treated members to a fascinating talk of disks around stars and the implications for stellar system evolution and the formation of planets. Dr. Weinberger is a staff researcher at the Department of Terrestrial Magnetism of the Carnegie Institution of Washington.

After a brief introduction to infrared (IR) basics, Dr. Weinberger compared the very different kinds of information available from the Great Nebula of Orion in infrared and visible light. She pointed out how the stars in the Trapezium heat their surrounding dust from tens to hundreds of degrees Kelvin, causing it to reradiate in the infra-

red. Throughout her talk, she displayed many images in both infrared and visible light, inferring the information available from each and the comparison between them.

### Zodiacal Light

To launch her discussion of young stellar disks as sites of planetary formation, Dr. Weinberger showed us a composite photo of the IRAS sky scans taken in wavelengths from 12  $\mu\text{m}$  (colored blue) to 100  $\mu\text{m}$  (colored red). This photo showed the galactic plane, a horizontal swatch, centered vertically, in yellow and red with a wide blue S-shaped band, which corresponds to the position of the Plane of the Ecliptic of our Solar System. This blue

## The President's Corner

Welcome to the 2003-2004 NCA series of meetings. I hope people have been able to observe Mars through the rain and clouds.

I've been interested in rejoining the Astronomical League and there are "pro" and "con" paragraphs in this month's issue of *Star Dust* on this. Please vote on this (once) at the September meeting or by contacting Nancy Grace Roman.

Note that the October meeting will be on the 11th rather than the 4th to avoid conflicting with the "Taste of Bethesda."

If you are interested in ordering a copy of the RASC Observer's Handbook, contact Nancy Byrd\*.

We are considering going to Greenbank to look at the new radio telescope and maybe do some observing at Blackwater Falls Park. If you're interested, contact Jeff Norman.

*Jay Miller, President*

\* If you are interested in ordering a copy of the RASC Observer's Handbook, contact Nancy Byrd at [nancy@pangean.com](mailto:nancy@pangean.com). (If you don't have email capability, sign up at the September meeting or call 703-978-3440.)

band is the Zodiacal dust, is also called the "Zodiacal Light." It is the disk of our star. From this picture, we could see that the Zodiacal Dust (at about 300 Kelvin) is sig-

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## NCA Events This Month

The Public is Welcome!

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

**Fridays, September 5, 12, 19, & 26, at 6:30 to 9:30 P.M.**, NCA mirror- and 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](mailto:gfbrandenburg@yahoo.com). Also, see article at right.

**Saturday, September 6, and Fridays, September 12, 19, & 26, at 9:30 P.M.** Open nights with NCA's 14-inch telescope at Ridgeview Observatory near Alexandria, Virginia. For more information, see article below.

**Saturday, September 6, 3:00 P.M.** NCA meeting in the Bethesda-Chevy Chase Regional Services Center of Montgomery County, 4805 Edgemoor Lane, (Second Floor), Bethesda, MD.

Dr. David E. Smith will present the featured talk: "Update on Mars Research: What's been Discovered and Future Missions".

**Saturday, September 6, following the meeting**, dinner with the speaker and NCA members at a restaurant in Bethesda.

**Saturday, September 27, 8:00 P.M.** Exploring the Sky at Rock Creek Park. See article below.

## NCA Mirror- and Telescope-Making Class

### Guy Brandenburg

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Classes take place on Friday evenings from 6:30 to 9:30 p.m. at the Chevy Chase Community Center (CCCC), in the basement woodworking shop. The CCCC is located on the northeast corner of the intersection of McKinley Street and Connecticut Avenue, NW, a few blocks in from the Maryland line. There is parking off of McKinley Street.

This September, classes will be on the 5th, 12th, 19th, and 26th of the month (Fridays).

You can start or finish your mirror at any time. We only charge for materials, which are more inexpensive through us than what you would pay at a commercial supplier such as Newport, Cassaro, or even Willmann-Bell. Thus, a 6" mirror kit costs \$75, and one for an 8" mirror costs \$110. Both of those are good sizes to start your first telescope with. We also have a vacuum chamber where we can aluminize your mirror for a small extra fee.

It is not hard to build a much better telescope than you can buy for three times as much money. Honestly! And when you are done, you will have learned a lot more about optics and astronomy than you would have if you just purchased a telescope at a store or via mail order.

We are always in need of the following items, as long as they are clean: newspapers, toothbrushes, plastic squeeze bottles.

For more information, look at the following website: [http://home.earthlink.net/~gfbranden/GFB\\_Home\\_Page.html](http://home.earthlink.net/~gfbranden/GFB_Home_Page.html) or call the class leader, Guy Brandenburg, at 202-262-4274, or email him at [gfbranden@earthlink.net](mailto:gfbranden@earthlink.net).

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

## Observing with the NCA C-14

### Bob Bolster

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<u>All at</u> <u>9:30 p.m.</u>	<u>Mars</u> <u>Observable</u>	<u>MARS</u> <u>Culminates</u>	<u>Other Prime</u> <u>Objects</u>
Sat. Sept. 6	21:45	00:40	Gibbous Moon
Fri. Sept. 12	21:30	00:10	
Fri. Sept. 19	21:00	23:30	{Uranus, Neptune,
Fri. Sept. 26	20:50	23:05	M13, M57}

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.

## Come See the Stars!

### by Joe Morris

<u>Exploring the Sky 2002-2003 Schedule</u>		
<u>Date</u>	<u>Time</u>	<u>Notes</u>
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

# ASTRONOMICAL LEAGUE REFERENDUM

This page contains columns with arguments for rejoining or not rejoining the Astronomical League.

Following these columns are instructions for casting your vote on this topic.

Finally, the last item is a ballot to be used to cast your vote.

## PLEASE VOTE FOR REJOINING THE ASTRONOMICAL LEAGUE

by Jay Miller

The Astronomical League is THE organization of amateur astronomers in the U.S. with over 240 clubs and "members at large" for a total of about 20,000 members. NCA was an active member for many years and, in fact, several of the awards the AL presents are named for NCA members. Its purpose is to promote astronomy. It assists the amateur in many ways. It has a quarterly publication, *The Reflector*; a national convention frequently held with other organizations such as the Association of Lunar and Planetary Observers; it has a guide for club officers which discusses topics such as advertising and how to run a meeting; it publishes *Astro Notes* on topics such as polar alignment, setting circles and other aspects of observing; it supports juniors through awards (NCA's Sabrina Snell won this year and received a telescope); it promotes observing through special certificates to foster telescope and binocular use and publishes guides to aid in observing; it assists groups interested in hosting Astronomy Day activities; it has a 10% book discount and it is involved in setting up a telescope which will be attached to the International Space Station in several years for amateur use. While it does cost each club member an additional \$3.50 in dues, NCA should rejoin not only for the aforementioned reasons, but also because it is simply a shame that we are no longer members considering our early involvement with the AL. More information can be found at their web site, [www.astroleague.org](http://www.astroleague.org). By the way, for the first year the money would come out of other NCA accounts and dues would not have to increase until the following year. However, if we can increase our membership by at least 20, this would cover the expense and no dues increase would be necessary. Also note that NCA dues haven't increased for at least 10 years. Any recent increases have been due to Sky and Telescope magazine. In closing I hope you will support NCA's rejoining the Astronomical League.

Jay Miller, President of NCA

## PLEASE VOTE AGAINST REJOINING THE ASTRONOMICAL LEAGUE

by Jeffrey Norman

The cost of rejoining the Astronomical League (AL) will be approximately \$560. AL charges \$3.50 per member plus \$10 for the organization as a whole; and National Capital Astronomers (NCA) currently has 157 members. In order for an organization like NCA to get AL's discount price of \$3.50 per member, all of its members must join AL. Individuals may join AL for \$25. The 2004 NCA Fiscal Year budget already shows a deficit of \$150, and joining AL will increase that deficit to \$710, or more than 8% above the expected revenue of \$8600. (The surplus in NCA's Treasury for Fiscal Year 2003 was largely due to one large gift that is not likely to be repeated year after year.)

NCA was a member of AL until a few years ago. We dropped our membership not only because of the cost, but also because it seemed as if very few of our members were using any of AL's services. AL's quarterly publication, which accounts for most of the \$3.50 cost, is mainly a travelogue, telling its members about various star parties around the country and contains very little science. During the last few years in which we were members of AL, NCA's membership was declining, and apparently NCA's membership in AL did very little or nothing to bring new members to NCA. I also think that AL is too greedy because of its policy of insisting that all members of an organization must join AL in order to get the discount price. "Sky & Telescope" (S&T) magazine also had the same policy until a few years ago, but because of many complaints, S&T dropped that policy. Now about only 60-70% of NCA members get S&T, but still qualify for the discount price. AL should follow S&T's lead; and then NCA could charge an extra \$3 to only those NCA members who want to join AL.

Jeff Norman, Treasurer of NCA

## ASTRONOMICAL LEAGUE REFERENDUM

### Background

The Board of Directors of National Capital Astronomers (NCA) decided to hold a referendum on the issue of whether or not NCA should rejoin the Astronomical League. Please read both the "pro" and "con" statements on this issue which appear in this edition of *Star Dust* before casting your vote. You may use the ballot to vote at the September 6, 2003 meeting of NCA or you may mail the ballot to Nancy Roman at 4620 North Park Ave., #306W, Chevy Chase, MD 20815-4551 (be sure to put a return address on the envelope so that we can be assured that the ballot is from a member) no later than October 15, 2003 or you may e-mail your preference to Nancy Roman at [nancy.roman6@verizon.net](mailto:nancy.roman6@verizon.net) by that date.

Do you favor National Capital Astronomers rejoining the Astronomical League?

Please put your check or X in the appropriate space.

Yes..... No.....

# NCA TREASURER'S REPORT

## Jeffrey Norman

July 1, 2002 to June 30, 2003

INCOME	
Dues	\$ 7030.75
Gifts	1741.00
Interest	110.54
Telescope-making Classes	411.00
Total Income	\$ 9293.29
EXPENSES	
IDA Dues	\$ 100.00
Miscellaneous	18.14
Secretary	270.21
Sky & Telescope Subscriptions	3216.63
Speakers' Dinners	215.15
Star Dust	4346.36
Total Expenses	\$ 8166.49
Balance - July 1, 2002	\$ 11325.00
Excess Income over Expenses	1126.80
Balance - June 30, 2003	\$ 12451.80 *
Total number of paying members joining or renewing	
from 7-1-01 to 6-30-02	154 **
Total number of paying members joining or renewing	
from 7-1-02 to 6-30-03	146 **
Decrease in Membership (5.2%)	8

### MEMBERSHIP REVIEW

Total Paying Memberships as of 6-30 of Each Fiscal Year

1992 - 223	1995 - 201	1998 - 169	2001 - 162
1993 - 184	1996 - 179	1999 - 173	2002 - 154
1994 - 163	1997 - 194	2000 - 174	2003 - 146

\* The Balance includes \$5105.24 from the NCA Travel account.

\*\* This does not include life members or science fair winners because they receive free memberships.

### NCA BUDGET - FISCAL 2004

<u>Income</u>	
Dues	\$ 7350
Gifts	\$ 750
Interest	\$ 100
Telescope-making Classes	\$ 400
Total Income	\$ 8600
<u>Expenses</u>	
Int. Dark-Sky Assn. Dues	\$ 100
Miscellaneous (includes cost of NCA banner)	\$ 200
Secretary	\$ 350
Sky & Telescope subscriptions	\$ 3550
Speakers Dinners	\$ 200
Star Dust	\$ 4350
Total Expenses	\$ 8750
<u>Deficit</u>	\$ 150

## Review of Talk by Alycia Weinberger

*(Continued from page 1)*

nificantly hotter than most of the dust in the plane of the galaxy. We can see the Zodiacal light from Earth in a clear sky, before dawn or just after sunset, as a glow above the horizon.

An observer from outside the Solar System would see the Zodiacal Dust as a disk with structure caused by the orbits of the planets in our solar system. This disk is one of the two most significant features that this observer would note about our solar system. The other is the wobble of the Sun caused by Jupiter.

Dust in the inner Solar System, explained Dr. Weinberger, cannot be part of the original disk around our Sun, since these dust particles gradually fall into the Sun in hundreds of thousands of years. The Solar System is 4.7 billion years old. Therefore the fact that we see a disk, tells us that something is continually replenishing this disk. Dust in the inner Solar System is generated by collisions of asteroids. Thus, the presence of our disk tells our extra-Solar observer that we have bodies larger than dust grains in our system. Our speaker noted that we have not yet seen significant dust outside the Asteroid Belt. Presumably, dust is generated also in the Kuiper Belt, but we have yet to detect it.

### A Timeline for Stellar System Evolution

By looking at craters on moons and on the terrestrial planets, we can see that in our solar system, there was an era of heavy bombardment ending about 4 billion years ago. But what was the era of gas giant formation? For that information, our speaker said that we must look at other solar (or stellar) systems. The youngest stars are obscured by dark lanes of dust. Their disks are big, on the order of several hundred AU, whereas the disk of our solar system is only 50 AU. (1 AU is the distance from Earth to the Sun.)

What Dr. Weinberger and her colleagues have found is that stellar system evolution takes place rapidly compared to the age of our solar system. She displayed this information in a timeline authored by Rich Webb and herself. According to the timeline, within 100,000 years the collapsing protostar forms a planetary disk. Within 10 million years the giant planets form, and

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# Review of Talk by Alycia Weinberger

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by the end of that time have accreted gaseous atmospheres. Thereafter, the terrestrial planets form, and within 100 million years, the chaos of heavy bombardment subsides. Before the solar system is 1 billion years old, debris has pretty much been cleared out of the inner part and a Kuiper Belt has formed.

## Young Stars with Disks

To illustrate this timeline, Dr. Weinberger described several young stars with disks. A Hubble image in the near infrared of IRAS 0432+2247 shows a huge disk, about 900 AU with lots of dust and gas (typical for a young star); the central star is totally obscured by a dust lane. Researchers estimate the age of this system to be between 0.1 and 1 million years old.

$\beta$  Pictoris-like disks were discovered by the IRAS Mission. When calibrating the instrument in 1983 on Vega, a zero magnitude star at visible wavelengths, workers found a surprising amount of energy at IR wavelengths. At first they worried that it might be a problem with their instrument, but finally concluded that the energy is real and comes from a disk that absorbs and reradiates energy from the star.  $\beta$  Pictoris shows even more energy in the IR than Vega, a surprising 3/1000 of the total energy of the system. For comparison, our Solar System disk reradiates  $10^{-7}$  of the Sun's luminosity. After hearing of these energy distributions, astronomer Rich Terrile was inspired to take the first coronagraphic image of  $\beta$  Pictoris at the du Pont Telescope at Las Campanas in Chile. The image shows a significant disk around the star. Now  $\beta$  Pictoris is a main sequence star; so the original disk must have blown away. Therefore, from the disk's presence, you can infer bigger objects.

Dr. Weinberger then described three nearby stars of 5 to 12 million year ages with luminosities 7 to 22 times Solar luminosity as a means of finding out what is going on in the disks at different times and what the findings imply for planet formation. (She cautioned that the error bars around the ages were so large that all three stars could be 8 million years old.)

## HD141569A

The first star, HD141569A, is a 5 Myr-old

star of 22 X the luminosity of the Sun, located about 99 parsecs (about 323 light years) away from us. The fraction of HD141569A's luminosity being re-radiated by the disk,  $t = L_{\text{disk}}/L_{\text{star}}$ , is  $8.4 \times 10^{-3}$ .

An infrared photo of the disk, with the central star occulted, shows much structure. It shows dust from 150 to 400 AU from the star with depleted bands within 100 AU and at 250 AU. The observed disk shape is oval; thus, it should be at an angle of about  $50^\circ$  to us. The east facing, brighter side probably is light scattered in the direction facing us. The star's radiation has already driven away most of the gas and dust in the inner part, even at the young age of 5 Myr.

The disk is visible because of scattering, and scattering should be insensitive to temperature. So why the observed structure, asked Dr. Weinberger? She presented several possible explanations: Maybe the dust was cleared out by a planet. Perhaps the brighter dust is relatively bright because it is icy, like the tail of a bright comet, whereas there would be less ice in the warmer, less reflective central areas. She hopes that the ALMA mission from NRAO will help to distinguish between these hypotheses. Using a plot of limiting magnitude of a point source as a function of distance from the central star, she concludes that for a system of 5 Myr age, a Jupiter size planet would still be very hot and thus directly detectable at 250 AU from the central star. We don't see one, she said; so we know there is nothing that big there.

## HR4796A

HR4796A is a star system, sixty-seven parsecs away, eight million years old and 20 times the Sun's luminosity.  $t = L_{\text{disk}}/L_{\text{star}} = 5 \times 10^{-3}$ . Several photos, one taken in emitted light using the Hubble telescope at 1.1  $\mu\text{m}$ , and one taken at Keck at 20.8  $\mu\text{m}$ , show that this system's disk is a very narrow ring, about 10 AU wide and about 70 AU in radius. (This is about the radius of the Kuiper belt). Photos of this disk in both scattered and emitted light appear to show the same grains.

A set of STIS coronagraphic images taken in February 2001, in the visible, with the central star occulted, also shows the narrowness of the disk and shows that it is brighter at the ends of the disk (away from the star). We also note that it is brighter in the NE part of the image than in the SW.

Dr. Weinberger raised the question as to why this should be. While we look through more material at the ends because of the obliquity of our view, this explanation does not explain why the NE end is brighter. One possibility is that there is more material here, for instance, material in stable orbits around a planet, like the Trojan asteroids around Jupiter. Astronomers looked for CO as a signature for total gas in the disk, but did not find any; so it is unlikely that there is still much gas there.

## $\beta$ Pictoris

$\beta$  Pictoris, with an age of about 12 million years, has a luminosity of 6.9 times Solar luminosity,  $t = L_{\text{disk}}/L_{\text{star}} = 2.5 \times 10^{-3}$  and it is only about 19 parsecs distant. The disk extends out about 1000 AU from the central star. Coronagraphic images of  $\beta$  Pictoris in scattered light show that the disk has not only a tilt, but two distinct tilts, the larger one extending out about 100 AU from the star and one significantly smaller. To understand disk composition in these tilted areas, Dr. Weinberger and her colleagues obtained disk spectral images for distances up to about 50 AU from the central star. They found an obvious peak around 10  $\mu\text{m}$ , which corresponds to a blending of amorphous silicate grains (9.5  $\mu\text{m}$ ) and crystalline silicate (e.g., peridot) (11.2  $\mu\text{m}$ ) in each spectrum, for distances up to 24 AU from the central star, but not farther out. Crystalline silicates do not form in the interstellar medium. The most appealing explanation is that there are larger bodies in this system colliding in the inner disk and breaking up and that small silicate dust has been blown to the outer parts of the disk where it mixes with larger grains.

## Conclusion

Dr. Weinberger addressed the question as to why they do not use the methods used by Paul Butler on middle aged Solar-type stars. Dr. Paul Butler (*Star Dust*, September 2002) and his team use the Doppler shifting of spectral lines in F, G, and K type stars to determine the wobble of a star produced by the mass of a planet rotating about the star. The answer is that the young stars studied by Dr. Weinberger are twice as massive as the Sun. An A type star does not show the many lines in its spectra that Paul Butler uses to determine Doppler

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## Review of Talk by Alycia Weinberger

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shift. Moreover, young stars are very active, with higher rotation rates and spots, making analysis more difficult. Currently there is a disconnect between the stars looked at by Paul Butler and the ones our speaker can work with. However, the upcoming SIM mission promises to change this by detecting wobble in a way other

than Doppler and the upcoming SIRTf mission promises to detect zodiacal light in Solar-like stars.

Dr. Weinberger concluded by noting that they have managed to find evidence of planets in star systems with very young disks and to put bounds on when planet formation could occur.

## 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](mailto:nancy.roman6@verizon.net) or 301-656-6092 (home).

## Invitation to Participate in "Journey through the Universe" Week

forwarded by Jay Miller

Contact Information: John Hamel at 703-683-9740 or [jhamel@challenger.org](mailto:jhamel@challenger.org)

Dear Colleague:

Challenger Center for Space Science Education, in partnership with the District of Columbia Public Schools, invites you to participate in the 4th annual Journey through the Universe Week in D.C., October 20-24, 2003. We're assembling a cadre of 50-60 scientists and engineers to visit over 7,000 students in DC.

In 1999, Challenger Center for Space Science Education launched Journey through the Universe — an initiative to establish a national network of under-served communities committed to sustainable community-wide science, mathematics and technology education.

Currently funded by grants from NASA's Minority University Research and Education Programs, and Offices of Space Flight, Space Science, and Earth Science, Journey through the Universe uses research disciplines across all five NASA Enterprises to engage entire communities.

Programming provided to each community includes a week-long celebration of learning conducted by a National Team of researchers and engineers - the Visiting Researchers - reflecting organizations from across the NASA R&D communities. During the week, training is provided for up to 350 K-12 educators, 4,000-8,000 K-12 students are visited in classrooms, and 2-4 Family Science Nights are held, each for 300-1,000 parents and their children. You can learn more about the national program at [www.challenger.org/journey](http://www.challenger.org/journey).

Last year's Journey through the Universe Week in Washington, DC included visits to

over 7,000 students (in 280 classrooms, 103 schools) by 42 Earth and space scientists and engineers from a dozen research organizations. 100 6th grade DCPS teachers were trained on the use of Earth science educational materials that bring the universe into the classroom.

This year's program in D.C.: Journey through the Universe in D.C. in 2003 will be celebrated October 20-24. The grade-level focus is still 6th grade, though other grade levels may participate. We are looking for 50-60 Visiting Researchers to visit 300 or more classrooms.

Each morning the researchers will arrive at Trinity College where they'll park their cars, have a big hot breakfast, and meet their DCPS Ambassadors that will take them to the designated schools. At the end of the day, we'll all meet at Trinity for a cup of coffee and a "how did it go".

The disciplinary focus this year is broad, covering all topics in the Earth and space sciences. As long as you can place your research in the context of the Earth and space sciences, we'd like to invite you to participate. If you aren't sure how your research may be made relevant to these disciplines, please call us, and we likely can help.

We hope you and/or your colleagues will join us for another exciting year of Journey through the Universe in D.C. If you are interested in participating in this program, and just as importantly, know others who might be, please call John Hamel at 703-683-9740, or send him an e-mail at [jhamel@challenger.org](mailto:jhamel@challenger.org). We are trying to assemble the team by September 1, 2003.

Finally, you might want to consider joining

# Support the IDA

Join the International Dark-Sky Association

3225 N. First Avenue Tucson, AZ  
85719-2103

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

program teams traveling around the nation. In the past Visiting Researchers in the DC program last year enjoyed it so much that they joined the National Team on the road to Tuskegee, Alabama; Nogales, Arizona; Labette County, Kansas and Marquette, Michigan.

With best wishes,

Dr. Jeff Goldstein

Project Director, Journey Through the Universe  
VP for Space Science Research  
Challenger Center for Space Science Education

# Mid-Atlantic Occultations and Expeditions

by David Dunham

## Asteroidal Occultations

Date	Day	EDT	Star	Mag	Asteroid	dmag	s	in.	Location
Sep 5	Fri	2:55	TYC51810581	11.1	Nevanlinna	3.7	5	7	wVA,MD,sePA,NJ
Sep 13	Sat	5:00	TYC52720448	11.7	Dejanira	3.4	2	8	sePA,wMD,WV
Sep 14	Sun	21:15	TAC+3d 197	11.7	Marlene	2.5	5	8	s. Florida
Sep 18	Thu	3:53	TYC18700556	11.9	Metcalfia	3.4	3	8	NJ,MD,DC,nVA
Sep 22	Mon	21:40	TYC52220381	10.3	Klio	1.3	25	5	n&se VA; n WV
Sep 25	Thu	1:24	chi Gem	5.1	Aurora	8.0	7	1	cenQue,Labrad.
Oct 1	Wed	0:45	TAC +6d 337	11.3	Vala	2.6	4	8	se VA, w NC
Oct 4	Sat	4:44	TYC48201278	10.8	Nestor	5.1	5	6	nWV, Virginia

## Lunar Grazing Occultations

DATE	Day	EDT	Star	Mag	% alt	CA	Location
Sep 1	Mon	19:09	Dschubba	2.3?	43+	23-10S	Falmouth&Nantucket,MA sunset
Sep 5	Fri	19:16	tau Sgr	3.3	76+	18-11S	Arlington, VA; Clinton, MD
Sep 5	Fri	20:53	ZC 2796	6.8	76+	25 6N	ColonialHgts&Williamsburg,VA
Sep 15	Mon	3:19	SAO 093108	7.5	81-	63 19N	Woodmore & n. Bowie, MD
Sep 15	Mon	5:49	SAO 093138	8.9	80-	60 14N	Temple Hills & s. Bowie, MD
Sep 19	Fri	2:38	SAO 078009	9.0	45-	30 14N	Gaithersburg & Dayton, MD
Sep 19	Fri	4:31	SAO 078084	8.6	45-	51 14N	Sterling, VA & Baltimore, MD
Sep 20	Sat	5:24	SAO 079105	8.9	35-	51 12N	Barnesville & Towson, MD
Sep 22	Mon	4:55	X13667	10.0	17-	23 12N	Frederick, MD & York, PA
Sep 30	Tue	20:18	25 Scorpii	6.7	29+	13 -1S	Massaponax,VA & Oakville, MD

## Total Lunar Occultations

DATE	Day	EDT	Ph Star	Mag	% alt	CA	Sp.	Notes
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 4	Thu	21:07	D SAO 186339	7.8	67+	23 46S	K0	
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
Sep 7	Sun	23:55	D ZC 3102	7.0	93+	28 41S	A0	maybe close double
Sep 12	Fri	5:16	R 14 Ceti	5.9	97-	33 39S	F5	ZC 0076
Sep 13	Sat	21:51	R ZC 0283	6.6	89-	9 80S	M0	Azimuth 86 deg.
Sep 15	Mon	0:50	R ZC 0406	7.8	81-	38 16S	F5	
Sep 17	Wed	5:15	R upsilonTau	4.3	63-	72 67S	A8	maybe close double; ZC660
Sep 17	Wed	6:07	R 72 Tauri	5.5	63-	74 86S	B7	maybe close double; ZC664
Sep 17	Wed	23:31	R 103 Tauri	5.5	56-	5 30S	B2	very close double; ZC767
Sep 19	Fri	2:52	R SAO 077999	8.0	45-	33 64N	A0	
Sep 20	Sat	1:06	R 39 Gem	6.2	36-	5 61S	F8	ZC 1061; Azimuth 60 deg.
Sep 21	Sun	3:39	R SAO 079855	8.0	25-	21 71N	A0	
Sep 21	Sun	4:08	R 4 Cancri	6.3	25-	26 53N	A1	ZC 1211
Sep 22	Mon	4:04	R ZC 1334	7.0	17-	14 11S	G5	
Sep 30	Tue	20:10	D 25 Scorpii	6.7	30+	14 11S	K0	Graze, n.VA, s.MD
Oct 1	Wed	21:31	D ZC 2575	6.9	41+	10 67N	A3	Az. 222; maybe double
Oct 1	Wed	21:43	D SAO 185892	7.7	41+	8 23S	A2	Azimuth 224 deg.
Oct 2	Thu	19:30	D ZC 2743	7.4	52+	23 86N	A5	Sun-9;2nd* m8.9, ".5, PA330d
Oct 3	Fri	19:23	D SAO 188688	7.7	63+	23 38S	G8	
Oct 3	Fri	20:19	D SAO 188724	7.7	63+	25 57S	F5	possible close double
Oct 3	Fri	20:23	D omega Sgr	4.7	63+	25 68N	G3	ZC 2910; maybe double
Oct 3	Fri	22:10	D 60 Sgr	4.8	64+	20 89S	G8	ZC 2914; close double

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](mailto:dunham@erols.com), phone 301-474-4722

# Getting to the NCA Monthly Meeting

## Saturday, September 6

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

Dr. David E. Smith will present the featured talk: "Update on Mars Research: What's been Discovered and Future Missions".

**Following the meeting, dinner** with the speaker and NCA members at a restaurant in Bethesda.

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

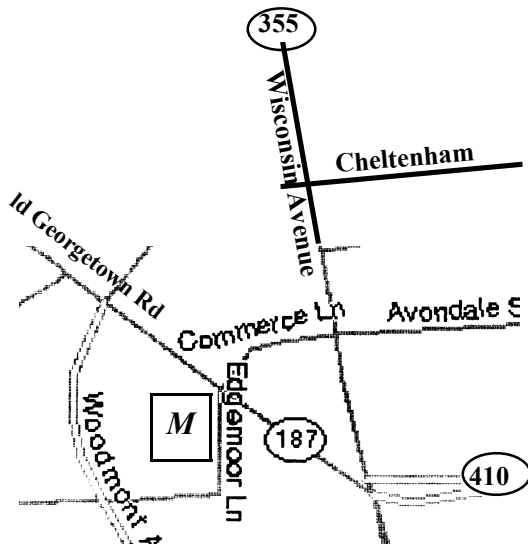
### From North of Bethesda

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.



## Meteor Showers

### September Radiants

Full Moon: September 10

Major Activity – None

Minor Activity		
Radiant	Duration	Maximum
Gamma Aquarids	September 1-14	September 7/8
Alpha Triangulids	September 5?-15?	September 11/12
Alpha Aurigids (AUR)	August 25-September 6	September 1/2
Eta Draconids	August 28-September 23	September 12/13
Gamma Piscids	August 26-October 22	September 23/24
Southern Piscids (SPI)	August 12-October 7	September 11-20

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

*The deadline for the October Star Dust is September 15.*

*Please send your material to Elliott Fein by that date to ensure inclusion.*

*Send submissions to Elliott Fein at [elliott.fein@erols.com](mailto: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.*



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Observing - Robert N. Bolster; Telescope Making - Guy Brandenburg; Travel Director - Sue Bassett; *Star Dust* Editor - Elliott Fein

### 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](mailto: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](mailto: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:

\_\_\_ \$60 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*) (\$40 tax-deductible).

\_\_\_ \$150 Sustaining member (with *Sky & Telescope*) (\$90 tax-deductible).

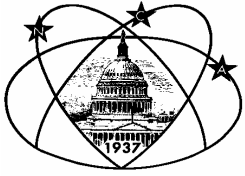
Junior members only: Date of Birth: \_\_\_\_\_ Only members under the age of 18 may join as juniors.

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  
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4620 N. Park Ave., #306W  
Chevy Chase, MD 20815-4551

**FIRST CLASS  
DATED MATERIAL**

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