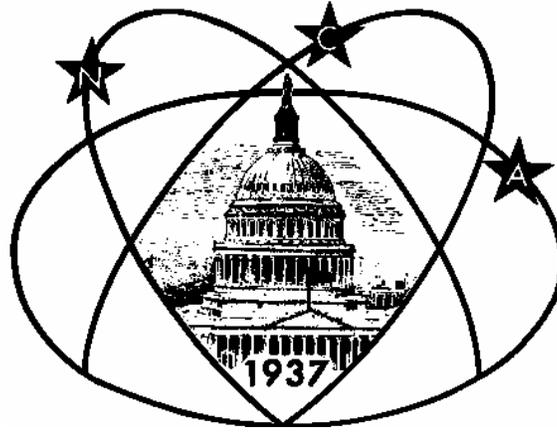


Star



Dust

National Capital Astronomers, Inc.

<http://capitalastronomers.org>

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October Speaker: Dr. Theodore A. Jacobson, “The Expansion of the Universe” *Submitted by Dr. Walter L. Faust*

Theodore A. Jacobson, Professor of Physics at the University of Maryland, College Park, MD will present the talk “The Expansion of the Universe” at the October 1 meeting of the National Capital Astronomers. Dr. Jacobson has provided us with the following abstract of his talk.

Abstract

What does “the expansion of the universe” mean? How do we know that it is expand

ing? Why is it expanding? How did it start? Will it ever stop?

Prof. Jacobson will use spacetime diagrams and the analogy of flat maps of a round world to help explain the basic concepts of relativity that underlie the notion of the expanding universe.

Curriculum Vita

Prof. Jacobson holds an AB degree in

physics and math from Reed College. He earned a Ph.D. in physics at the University of Texas at Austin. He is a fellow of the American Physical Society.

Presently he serves on the Editorial Board of *Physical Review Letters*. In current research, he is probing the validity of relativity theory, black hole thermodynamics, and the microstructure of spacetime.

Exploring the Sky *by Joe Morris*

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

<i>2005 Schedule</i>		
<u>Date</u>	<u>Time</u>	<u>Notes</u>
10/8	7:30 P.M.	Draconid meteor shower peak 10/8
11/5	7:00 P.M.	Pleiades; possible Taurids meteor shower

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!

A presentation of the National Park Service and National Capital Astronomers.

Questions? Call the Nature Center at (202) 895-6070 or check the Internet sites: <http://www.nps.gov/rocr/planetarium>
<http://www.capitalastronomers.org>

In the News *Reported by Dr. Nancy Grace Roman*

My Three Suns

Based on Schilling, Science Magazine, 13 July 2005

Astronomers have found a planet illuminated by three suns. There’s just one problem: It shouldn’t exist.

Over the past decade, dozens of so-called

‘hot Jupiters’ have been found: massive, gaseous planets in very tight orbits around their mother stars. How they get there is a puzzle. The inner parts of the planet-spawning disks of gas and dust surrounding new-born stars are not believed to contain enough mass to form giant planets. Gas giants are probably

born further out, beyond some 400 million kilometers, where ice crystals can develop and accumulate into planetary cores that are massive enough to attract large amounts of gas from the disk.

So how do these far-out giants end up at

(Continued on page 2)

NCA Events This Month

The Public is Welcome!

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

NCA Mirror- and Telescope-making Classes: Fridays, Oct. 7, 14, 21, and 28 9:30 P.M. 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 gbrandenburg@yahoo.com.

Observing with NCA's 14-inch telescope: See schedule and information at right.

Exploring the Sky: Saturday, October 8, with NCA's 14-inch and other telescopes in Rock Creek Park, DC. See Page 1.

Open house talks and observing at the University of Maryland Observatory in College Park on the 5th and 20th of every month at 9 P.M. The talks are non-technical. There is telescope viewing afterward if the sky is clear.

Dinner with NCA members and speaker: Saturday, October 1 at 5:30 P.M., preceding the meeting, at the Garden Restaurant in the University of Maryland University College Inn and Conference Center. See map and directions on Page 6.

If you are planning to come to the dinner before the meeting, please tell Benson J. Simon, telephone: 301-776-6721, e-mail st88@ioip.com, so that we can make reservations for the right number of people.

Upcoming NCA Meetings

October 1: Ted Jacobson, Professor, University of Maryland, Department of Physics, "The Expansion of the Universe"

November 12: Lucy McFadden, University of Maryland, Astronomy Department. Planetary Group "Deep Impact: The Initial Observations"

December 10: Robert W. Farquhar, The Johns Hopkins University Space Department, "The Lagrange Points"

More NCA meetings: January 14; February 11; March 11; April 8; May. 13; June 10.

In the News, continued

(Continued from page 1)

the star's doorstep? The answer, according to theorists, is planetary migration: dramatic orbital changes due to the gravitational interaction of the young giant planet with the remains of the disk, or mutual interactions between planets. A planet of a Sun-like star known as HD 188753 was discovered by planetary scientist Maciej Konacki of the California Institute of Technology in Pasadena with the 10-meter Keck telescope at Mauna Kea, Hawaii. The planet is a classic hot Jupiter, but its mother star is part of a close triple system. This should never have been able to give rise to giant planets in the first place because the combined gravity of the second and third stars would have kept the gas and dust disk of the primary star at a maximum radius of 200 million kilometers — too close for the formation of giant planets.

"This discovery will make us look very hard at exoplanet formation scenarios,"

says planetary scientist David Trilling of the University of Arizona. Until now, exoplanet hunters have focused on single, Sun-like stars. Says Trilling: "They have so far ignored at least half of all the stars."

NASA'S HUBBLE WEIGHS IN ON THE HEAVIEST STARS IN THE GALAXY

Using NASA's Hubble Space Telescope, astronomers have made the first direct measurement within our Milky Way Galaxy, and concluded that stars cannot get any larger than about 150 times the mass of our sun.

The astronomers probed the Arches cluster, the densest cluster in our galaxy.

"This is an incredible cluster that contains a rich collection of some of the most massive stars in the galaxy, yet it appears to be missing stars more massive than 150 times the mass of our sun," said astronomer Donald Figer of the Space Telescope

(Continued on page 3)

Observing with the NCA C-14

Mike McNeal

Day, Date and Time	Prime Objects
Sat., Oct. 8, 7:30 P.M.	Rock Creek Park: <i>Exploring the Sky</i>
Open — call to set up a time.	Mars

In Mike McNeal's backyard, 5410 Grove St, Chevy Chase, MD, (Friendship Heights Metro).

Please make reservations by 10 p.m. the Friday before.

Call Mike at 301-907-9449 or email him at mcealmi@verizon.net.

The deadline for the November Star Dust is October 26. Please send your material to Elliott Fein by that date to ensure inclusion. Send submissions to Elliott Fein at [elliott.fein@erols.com](mailto:fein@erols.com).

Articles submitted may be edited to fit the space available.

Do You Want to Get Star Dust 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).

In the News, continued

(Continued from page 2)

Science Institute, Baltimore. "Theories predict the more massive the cluster, the more massive the stars within it. We looked at one of the most massive clusters in our galaxy and found there is a sharp cutoff to how large a star can form," he added.

A star's weight ranges from less than one-tenth to more than 100 times the mass of our sun. Although astronomers know stars come in a variety of masses, they have been uncertain about how large a star can get before it cannot hold itself together and blows apart. Knowing how large a star can form may offer important clues to how the universe makes them. Consequently, theories have predicted stars can be anywhere between 100 and 1,000 times more massive than the sun.

Figer's finding is consistent with statistical studies of smaller-mass star clusters in our galaxy and with observations of a massive star cluster known as R136 in our galactic neighbor, the Large Magellanic Cloud.

Although Figer did not find any stars larger than 130 solar masses, he conservatively set the upper limit at 150 solar masses. R136 resides 25,000 light-years away from Earth in our galaxy's hub, a hotbed of massive star formation. In this region huge clouds of gas collide to form behemoth stars.

Hubble's infrared camera is well suited to analyze the cluster, because it penetrates the dusty core of our galaxy. It produces sharp images, allowing the telescope to see individual stars in a tightly packed cluster.

Figer estimated the stars' masses by measuring the ages of the cluster and the brightness of the individual stars. Francisco Najarro of the Instituto de Estructura de la Materia in Madrid, Spain produced detailed models to confirm the masses, chemical abundances, and ages of the Arches cluster stars. "Standard theories predict 20 to 30 stars with masses between 130 and 1,000 solar masses," Figer explained. "But we found none. If they had formed, we would have seen them," he added. Figer cautions the upper limit does not rule out the existence of stars larger than 150 solar masses. His next step is to pinpoint more clusters to test his weight limit.

ERA OF GALAXY AND BLACK HOLE GROWTH SPURT DISCOVERED

Distant galaxies undergoing intense bursts of star formation have been shown by NASA's Chandra X-ray Observatory to be fertile growing grounds for the largest black holes in the Universe. Collisions between galaxies in the early Universe may be the ultimate cause for both the accelerated star formation and black hole growth.

By combining the deepest X-ray image ever obtained with sub-millimeter and optical observations, an international team of scientists has found evidence that some extremely luminous adolescent galaxies and their central black holes underwent a phenomenal spurt of growth more than 10 billion years ago. This concurrent black hole and galaxy growth spurt is only seen in these galaxies and may have set the stage for the birth of quasars - distant galaxies that contain the largest and most active black holes in the Universe.

The sub-millimeter observations along with optical data from the Keck observatory indicate these galaxies had an unusually large amount of gas that was forming into stars at a rate of about one per day, or 100 times the present rate in the Milky Way galaxy. The Chandra X-ray data show that the super-massive black holes in the galaxies were also growing at the same time. The X-ray observations also showed that the black holes are surrounded by a dense shroud of gas and dust. This is probably the material that will be consumed by the growing black holes. Hubble Space Telescope observations indicate that most of the sub-millimeter galaxies are actually two galaxies that are colliding and merging. Theory predicts that such mergers drive gas toward the central regions of galaxies, triggering a burst of star formation and providing fuel for the growth of a central black hole.

NASA'S SPITZER CAPTURES ECHO OF DEAD STAR'S RUMBLINGS

An enormous light echo etched in the sky by a fitful dead star was spotted by the infrared eyes of NASA's Spitzer Space Telescope. The surprising finding indicates Cassiopeia A, the remnant of a star that died in a supernova explosion 325 years ago, is not resting peacefully. Instead, this dead star likely shot out at least one burst of energy as recently as 50 years ago. "We had thought the stellar remains inside Cassiopeia A were just fading away," said Dr. Oliver Krause, University of Arizona, Tuc-

son. "Spitzer came along and showed us this exploded star, one of the most intensively studied objects in the sky, is still undergoing death throes before heading to its final grave," he added.

Infrared echoes trace the dusty journeys of light waves blasted away from supernovae or erupting stars. As the light waves move outward, they heat up clumps of surrounding dust causing them to glow in infrared light. The echo from Cassiopeia A is the first witnessed around a long-dead star and the largest ever seen. It was discovered by accident during a Spitzer instrument test. "We had no idea that Spitzer would ever see light echoes," said Dr. George Rieke of the University of Arizona. "Sometimes you just trip over the biggest discoveries."

A supernova remnant like Cassiopeia A typically consists of an outer, shimmering shell of expelled material and a core skeleton of a once-massive star, called a neutron star. Neutron stars come in several varieties ranging from intensely active to silent. Typically, a star that has recently died will continue to act up. Consequently, astronomers were puzzled that the star responsible for Cassiopeia A appeared to be silent so soon after its death.

The new infrared echo indicates the Cassiopeia A neutron star is active and suggests it may be an exotic, spastic type of object called a magnetar. Magnetars are like screaming dead stars, with eruptive surfaces that rupture and quake, pouring out tremendous amounts of high-energy gamma rays. "Magnetars are very rare and hard to study, especially if they are no longer associated with their place of origin. If we have indeed uncovered one, then it will be just about the only one for which we know what kind of star it came from and when," Rieke said.

Astronomers first saw hints of the infrared echo in strange, tangled dust features that showed up in the Spitzer test image. When they looked at the same dust features again a few months later, using ground-based telescopes, the dust appeared to be moving outward at the speed of light. Follow-up Spitzer observations taken one year later revealed the dust was not moving, but it was lit up by passing light. A close inspection of the Spitzer pictures revealed a blend of at least two light echoes around Cassiopeia A, one from its supernova explosion, and one from a hiccup of activity that occurred around 1953.

Other National Capital Area Meetings, etc.

Montgomery College's Planetarium

Fenton St. in Takoma Park/Silver Spring Campus, Maryland, United States of America, Planet Earth around a star named Sol, in the Milky Way Galaxy, an out lying member of the Virgo Super Cluster around 13.7 billion years after creation.

Astronomy is the oldest science and one of the few sciences that welcomes amateurs. Everyone who looks up at the stars with wonder is an astronomer. The planetarium is open from the last week in August until the Friday before Memorial day in May. This is an academic institution so there are a few holidays like Thanksgiving and around Christmas and New Year's Day when the entire institution is closed. All evening planetarium programs include a star party after the show, if it is clear. Star party means we look at the sky with telescopes. We have a 10 inch (2540 mm) Meade LX200-GPS-SMT, a 3 1/2 inch (88.9 mm) Questar, and a 4 1/8 inch (105 mm) Edmund Astroscan telescopes that we bring outside the planetarium when clear. Bring your telescope to the star party, and we can have even more fun sharing, the more the merrier.

Saturday, 15 October at 7 P.M. Polarization Sundials which will work when a cloud covers the sun or an hour before sunrise and an hour after sunset.

Saturday, 29 October at 7 P.M. The Real Occult: Lunar & solar eclipses and asteroid & stellar disappearances, sometimes involving the Moon. Mars will be brightest on this night so we will observe it after the show if the sky is clear.

Monday, 7 November at 8 P.M. Mars is in opposition on November 7, the Sun, the Earth, and Mars line up; and Mars will be close and good to view. We will observe Mars on the roof of the King Street Parking Garage if it is clear.

The planetarium shows 1,834 naked-eye stars, the Milky Way (the diffuse band of light caused by the disk of our own galaxy), and the five naked eye planets (Mercury, Venus, Mars, Jupiter, and Saturn) under a twenty-four-foot dome with forty-two comfortable chairs. The planetarium is located on Fenton Street on the Takoma Park/Silver Spring campus of Montgomery

College. It is attached to the Science South building on the ground level and has a conspicuous silver colored domed roof. The stars are the province of all of mankind. An astrophysicist will answer questions about the universe. There is no admission charge for these public planetarium programs.

How to get to Montgomery College's Planetarium on the Takoma Park/Silver Spring Campus. From I-495, the capital beltway, go south on Georgia Avenue (Route 97). Turn left on Sligo Avenue. Continue to Fenton Street; turn right. The parking garage is on the right and the campus is on the left. The campus is easily accessible from the Silver Spring and Takoma Park Metro stations and local Ride-On buses as well. We are at one end of Fenton Street, the southern end. City Place is at the other end of Fenton Street, the northern end.

Parking while visiting the planetarium.

If you are coming for a Saturday evening public planetarium program you may park in the faculty/staff only lot. Please do not park in the faculty/staff lot at any other time unless you have a Montgomery College faculty/staff parking sticker; you maybe ticketed — sorry about that. If you are coming to the planetarium for a public program not on a Saturday, please park in the Montgomery College parking garage on King Street. If you are coming to the planetarium for a special program by appointment, please pull your car adjacent to the planetarium in the faculty/staff lot and let everyone off, then come into the planetarium and get a temporary parking sticker from me, Dr. Harold Williams.

URL: <http://montgomerycollege.edu/Departments/planet/>

Northern Virginia Astronomy Club

Saturday, October 1 3 P.M. to 11 P.M. NOVAC's Annual Star Gaze T C.M. Crockett Park in Fauquier County, Virginia. NOVAC invites you to the largest public star gaze in the Washington, D.C. area. Learn about astronomy while enjoying the night sky with hundreds of telescopes, binoculars and homemade projects. Many experienced astronomers will be on hand to answer

questions and share their knowledge. You do not need to be a member of the club or own any astronomical equipment to attend. All you need is an interest in the wonders of the cosmos. Easy access, lots of equipment and a dark sky make for a good night under the stars. Please join us! Solar observing begins at 3 P.M. Speakers: John Dobson and Richard Berry.

John Dobson is the co-founder of the Sidewalk Astronomers and the inventor of one of the most popular and affordable telescope mounts; he will speak on and be available to discuss observational astronomy. Dobson is an icon to telescope makers of all ages, having pioneered the construction of affordable, portable, large aperture optics. Yet, as he turns 90, he spends much of his time and missionary zeal talking about the nature of the universe and challenging everyone to look up.

Richard Berry, another very well-known astronomer, author, and publisher, will talk about our place in the Milky Way galaxy, and how visual observation reveals some of its major structures.

Location: C.M. Crockett Park. Crockett Park is about 20 miles south of Manassas at 10066 Rogues Road (Rt. 602) Midland, Va. 22728. From Washington D.C./Northern Virginia, go west on I-66 to exit 44 (234 South bypass around Manassas). Take 234 bypass approximately 3 miles to Rt. 28 West. Stay on Route 28 for about 13.7 miles through Nokesville, Catlett, and Calverton. Turn right on Rt. 643 (Meetze Rd.) towards Warrenton (Mayhugh's country store is on the corner) Go about a mile up Rt. 643 to the park entrance road (Rogues Rd.) on the left. Look for a small sign directing you to C.M. Crockett Park. Once on the park entrance road, go one-half mile to the park gate. After arriving at the main gate, continue past the gravel parking lot on the left to the paved parking lot at the end of the road. There will be telescopes setup in the nearby field. Dim your headlights when arriving and departing. Please do not drive onto the field.

For more information: <http://www.novac.com/gaze/>

Mid-Atlantic Occultations and Expeditions

by David Dunham

Asteroidal Occultations

Date	Day	EDT	Star	Mag	Asteroid	dmag	s	in.	Location
Oct 6	Thu	5:00	2UC46904980	11.8	Danae	1.0	9	8	cPA,cMD,DC,eVA
Oct 7	Fri	3:09	TYC13112375	10.5	Pirola	5.3	7	5	s.S.Car.,c.GA
Oct 8	Sat	3:29	TYC06690086	11.1	Toni	2.7	20	6	cPA,cMD,DC,eVA
Oct 23	Sun	6:20	TYC13641341	11.1	Thia	2.5	9	6	wNY,nePA, NYC
Oct 25	Tue	0:33	TYC19010470	11.1	Lydina	3.6	10	6	cTN,KY,OH,eON
Oct 25	Tue	5:20	SAO 60082	8.3	Alma	6.5	2	2	OH,WV,MD,DC,DE

Grazing Occultations

DATE	Day	EDT	Star	Mag	% alt	CA	Location
Oct 7	Fri	20:15	ZC 2354	7.5	20+	6	7S W.Virginia s. of Morgantown
Oct 10	Mon	19:11	ZC 2855	7.6	52+	22	7S Cumberland, MD; Sunbury, PA
Oct 12	Wed	20:02	37 Cap	5.7	74+	29	9S *NCanton,OH;Erie,PA;BuffaloNY
Oct 13	Thu	1:44	kappa Cap	4.7	76+	9	10S Pittsburgh,PA; Binghampton,NY
Oct 24	Mon	2:50	SAO 79642	8.6	58-	41	6N Myersville,MD; New Freedom,PA
Oct 24	Mon	4:04	SAO 79684	8.8	57-	65	1S Damascus&Balto.,MD;Milford,DE
Oct 24	Mon	5:12	SAO 79685	8.5	57-	67	2S Fincastle,Richmond,OnancockVA
Oct 27	Thu	6:43	SAO 98973	8.5	29-	8	3N Oakville&Denton,MD;CapeMay,NJ

Total Lunar Occultations

DATE	Day	EDT	Ph Star	Mag	% alt	CA	Sp.	Notes
Oct 8	Sat	20:57	D SAO 185410	7.8	30+	6	38N A0	Azimuth 225 deg.
Oct 8	Sat	21:23	D ZC 2519	7.3	31+	2	71S M0	Azimuth 229 deg.
Oct 9	Sun	20:13	D ZC 2677	6.9	41+	17	66N F5	
Oct 9	Sun	20:20	D SAO 186874	8.0	41+	16	80N A5	
Oct 9	Sun	21:44	D ZC 2688	7.0	41+	8	79N G6	Azimuth 222 deg.
Oct 10	Mon	20:07	D SAO 188257	7.1	52+	22	67S K0	
Oct 11	Tue	18:44	D SAO 189406	7.3	63+	23	87N K4	Sun alt. -3 deg.
Oct 11	Tue	19:02	D ZC 2998	6.4	63+	24	69S A0	Sun alt. -6 deg.
Oct 11	Tue	21:05	D SAO 189469	7.7	64+	26	55N K0	
Oct 11	Tue	22:15	D ZC 3012	6.9	64+	22	79N A7	
Oct 11	Tue	23:27	D SAO 189555	7.2	65+	14	67S G1	Azimuth 222 deg.
Oct 11	Tue	23:44	D ZC 3018	6.4	65+	12	40N G8	Azimuth 226 deg.
Oct 12	Wed	22:18	D epsilonCap	4.5	75+	30	83S B3	ZC 3164
Oct 12	Wed	22:49	D SAO 164528	7.5	75+	28	71N B8	
Oct 13	Thu	0:26	D SAO 164567	7.3	76+	18	85S K5	
Oct 15	Sat	22:43	D ZC 3449	7.3	92+	44	82N K2	
Oct 16	Sun	3:47	D 44 Piscium	5.8	98+	25	61N G5	ZC 50 /term.dist. 19"
Oct 18	Tue	6:50	R 19 Arietis	5.7	99-	18	85S M0	ZC 326;Spec.bin.; Sun-6
Oct 18	Tue	20:02	R 40 Arietis	5.8	97-	11	84N K1	ZC415;Az75;close dbl.?
Oct 19	Wed	22:17	R ZC 556	5.4	92-	29	55N B8	spectroscopic binary
Oct 20	Thu	3:35	R SAO 76358	7.2	91-	74	17S B9	term. dist. 19"
Oct 20	Thu	3:41	R ZC 587	6.2	91-	74	50N K0	
Oct 21	Fri	4:13	R SAO 76841	7.3	83-	78	69N K1	2nd mg.10.1,.08",PA82d
Oct 21	Fri	6:54	R ZC 746	7.0	83-	53	70N B7	
Oct 21	Fri	23:10	R ZC 868	7.5	76-	21	48S A0	
Oct 22	Sat	2:08	R ZC 885	5.6	76-	54	10S G7	
Oct 26	Wed	3:50	R ZC 1393	6.5	37-	31	47N G7	
Oct 27	Thu	2:25	R ZC 1485	7.1	29-	4	69S G0	Azimuth 74 deg.

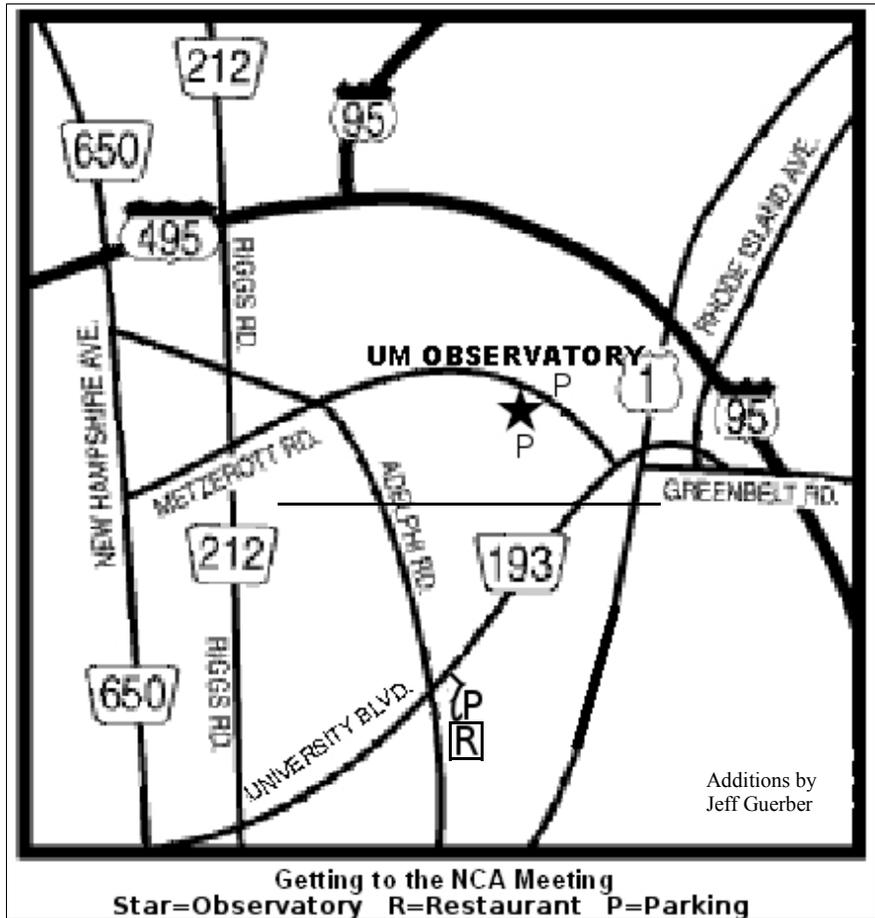
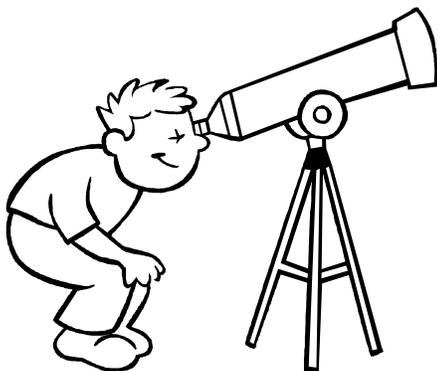
David Dunham, e-mail dunham@starpower.net, more info. <http://iota.jhuapl.edu>
Phone home 301-474-4722; office 240-228-5609; car 301-526-5590

Getting to the NCA Monthly Meeting and the Dinner Before the Meeting

Jeff Guerber

NCA meetings are now held at 7:30 p.m. at the University of Maryland Observatory, in College Park on Metzerott Rd. between University Blvd. (MD-193) and Adelphi Rd. To get there from the Capital Beltway (I-495), either take US Rt. 1 south about a mile, turning right onto MD-193 West, then at the first light turn right onto Metzerott; or, take New Hampshire Ave. (MD-650) south, turn left at the second light onto Adelphi Rd., two more lights, turn left onto Metzerott, and proceed about a mile to the observatory. The observatory is on the south side of Metzerott Rd., directly opposite the UM System Administration building; you can park there if the observatory lot is full, but be careful crossing Metzerott Rd.

At 5:30 p.m., before the meeting, please join us for dinner at the Garden Restaurant in the UMD University College Inn and Conference Center, 3501 University Blvd. East at Adelphi Rd. From the Beltway, either take New Hampshire Ave. south, turn left onto Adelphi, and at the third light (passing Metzerott) turn left onto University then immediately right into the garage; or, take US-1 south, turn right onto University Blvd. west, and take it to the intersection with Adelphi Rd. Park either in the garage (costs), or in Lot 1 nearby (free). To get to the Observatory, exit to the right onto University Blvd. (MD-193) east, and at the second light turn left onto Metzerott Rd.



Observing after the Meeting

Elizabeth Warner

Following the meeting, members and guests are welcome to tour through the Observatory. Weather permitting, several of the telescopes will also be set up for viewing.

Are You Coming to Dinner?

If you are planning to come to the dinner before the meeting, please tell Benson J. Simon, telephone: 301-776-6721, e-mail st88@ioip.com, so that we can make reservations for the right number of people.

Do You Need a Ride?

Please contact Jay Miller, 240-401-8693, if you need a ride from the metro to dinner or to the meeting at the observatory. (Please try to let him know in advance by email at rigell@starpower.net.)

Support the IDA

Join the International Dark-Sky Association
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NCA Web Page: <http://capitalastronomers.org/>.

Appointed Officers and Committee Heads: Exploring the Sky - Joseph C. Morris; Meeting Facilities - Jay H. Miller;

Observing - Michael McNeal, mcnealmi@verizon.net; Telescope Making - Guy Brandenburg; *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. NCA is an IRS Section 501(c)(3) tax-deductible organization. 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.

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 semianual 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).

Classes: Some NCA members are available for educational programs for schools and other organizations. The instruction settings include star parties, classroom instruction, and school-teacher 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.

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 NATIONAL CAPITAL ASTRONOMERS!

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Would you prefer to get *Star Dust* by e-mail?

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Academic Degrees: _____ Field(s) of Specialization: _____

Employer or Educational Institution: _____

MEMBERSHIP CATEGORIES AND ANNUAL DUES RATES

All members receive Star Dust, the monthly newsletter announcing NCA activities. As an added optional benefit to extend your knowledge of astronomy you may also choose Sky and Telescope magazine at the discounted rate of \$33.

Student Membership: \$15with *Sky and Telescope*....\$48

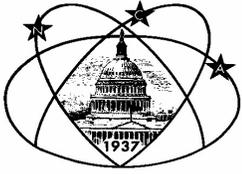
Standard Individual or Family Membership: \$27with *Sky and Telescope*....\$60

You are welcome to make contributions in any amount in addition to the dues shown above.

Contribution amount: _____

Please mail this form with your check payable to National Capital Astronomers, to:

Mr. Jeffrey Norman, NCA Treasurer; 5410 Connecticut Avenue, NW #717; Washington, D.C. 20015



National Capital Astronomers, Inc.

If undeliverable, return to
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4620 N. Park Ave., #306W
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**FIRST CLASS
DATED MATERIAL**

***The October
NCA
Meeting is
on the 1st
Saturday of
October!***

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