

Star Dust

National Capital Astronomers, Inc.

September 2011

Volume 70, Issue 1

<http://capitalastronomers.org>

Next Meeting

When: Sat. Sept. 10, 2011
Time: 7:30 pm
Where: UM Observatory
Speaker: Julie McEnery,
GSFC

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Directions to Dinner/Meeting

Members and guests are invited to join us for dinner at the Garden Restaurant located in the UMUC Inn & Conference Center, 3501 University Blvd E. The meeting is held at the UM Astronomy Observatory on Metzgerott Rd about halfway between Adelphi Rd and University Blvd.

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 e-mail at rigel1@starpower.net.

Observing after the Meeting

Following the meeting, members and guests are welcome to tour through the Observatory. Weather-permitting,

September 2011: Julie McEnery NASA Goddard Space Flight Center Results from the Fermi Gamma Ray Space Telescope

Abstract:

Following its launch in June 2008, high-energy gamma-ray observations by the Fermi Gamma-ray Space Telescope have unveiled over 1000 new sources and opened an important and previously unexplored window on a wide variety of phenomena. These have included the discovery of a population of pulsars pulsing only in gamma rays; the detection of photons up to 10s of GeV from gamma-ray bursts, enhancing our understanding of the astrophysics of these powerful explosions; the detection of hundreds of active galaxies; a measurement of the high energy cosmic-ray electron spectrum which may imply the presence of nearby astrophysical particle accelerators; the determination of the diffuse gamma-ray emission with unprecedented accuracy and the constraints on phenomena such as supersymmetric dark-matter annihilations and exotic relics from the Big Bang. Continuous monitoring of the high-energy gamma-ray sky has uncovered numerous outbursts from active galaxies and the discovery of transient sources in our galaxy. In this talk I will describe the current status of the Fermi observatory and review the science highlights from Fermi.

Biography:

Julie McEnery is the Fermi Project Scientist and an astrophysicist in the Astroparticle Physics Laboratory, Astrophysics Science Division of NASA's Goddard Space Flight Center in Greenbelt, Md. She has also served as the Analysis Coordinator on the Large Area Telescope (LAT), Fermi's primary science instrument. She was named Fermi deputy project scientist in 2005 and was promoted to the position of Fermi Project Scientist in 2009. Since 2009, she is also an Adjunct Professor of Physics at the University of Maryland's College Park campus.

Prior to joining NASA, Julie worked with ground-based gamma-ray telescopes, which detect Cherenkov radiation produced when gamma rays from deep space strike Earth's atmosphere. As a graduate student at University College Dublin, she used the Whipple Observatory to make very-high-energy observations of the active galaxy Markarian 421. She later worked at the University of Utah, the University of Wisconsin and Los Alamos National Laboratory on the Milagro gamma-ray observatory, primarily on gamma-ray burst (GRB) observations.

Active galaxies and GRBs remain her main science interests, but she also explores interesting topics in other areas.

several of the telescopes will also be set up for viewing.

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Thank you!

Reminder

After the meeting, everyone is invited to join us at Plato's Diner in College Park. Plato's is located at 7150 Baltimore Ave. (US Rt. 1 at Calvert Rd.), just south of the university's campus. What if it's clear and you want to stick around and observe? No problem -- just come over when you're through. This is very informal, and we fully expect people to wander in and out.

Upcoming NCA Speakers

- Sep 10 **Julie McEnergy** (GSFC), Results from the Fermi Gamma Ray Space Telescope
- Oct 8 **James Abshire** (GSFC), Topographic Mapping of Planets via Space-based Lidar
- Nov 12 **Dan Wik** (GSFC), Merging Galaxies and Clusters of Galaxies
- Dec 10 **Justin Finke** (NRL), Gamma Rays from Radio Galaxies
- Jan 14 **Guy Brandenburg** (DCPS, retired), Making Your Own Telescope
- Feb 11 **Jacqueline Fischer** (NRL), Gas-Rich Galaxy Mergers: Multi-Wavelength Views
- Mar 10 **Jennifer Wiseman** (GSFC), Protostellar Disks and Jets
- Apr 14 **Stella Kafka** (DTM), Binaries in the Kuiper Belt
- May 12 **Soebur Razzaque** (GMU), Neutrino Astronomy
- June 9 No speaker. Science Fair winners and Election.

NCA Returns to Annual Fiscal Year Membership Renewal Cycle

Benson Simon

As most members know by now, NCA is returning to annual membership renewals at the beginning of each NCA fiscal year on September 1. This will save a great deal of work for the NCA Treasurer and Secretary, which was the original intent of the annualized process, as provided in NCA's constitution. Long-time members will largely be unaffected because their renewal date anniversaries will have remained in the August-September time frame. Members who joined or renewed after March 1, 2011 will be considered paid up through August 31, 2012.

NCA Treasurer's Report

1 JULY 2010 - 30 JUNE 2011

Mike Brabanski

INCOME	
Community Foundation for NoVa	5100.00
Dues	1230.00
Gifts	872.00
Sky & Telescope	99.00
Star Dust	80.00
TOTAL INCOME	7381.00
EXPENSES	
Shop Machinery (TMC)	2541.65
60mm SolarMax	2184.00
Astronomical League	670.00
Star Dust	613.73
Liability Insurance	320.00
Speakers' Dinners	295.02
Sky & Telescope	131.80
Admin	112.40
IDA	100.00
TOTAL EXPENSES	6968.60
BALANCE - 1 July 2010	10066.94
NET CHANGE	+ 412.40
BALANCE - 30 June 2011	10479.34

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Recent Activity in Astronomy: August 2011

Nancy Grace Roman

The 8 July issue of *Science* contains a special section on galaxy evolution in addition to two papers on the exceptionally bright outburst from a distant galaxy.

I was interested in the discussion of the Galaxy Zoo. The Sloan Digital Sky Survey (SDSS) had compiled a list of more than one million galaxies. To understand them it is necessary to determine if each is a spiral, a barred spiral, an elliptical, or something else. A computer is unable to make this decision reliably but the task is too large for one person or even several people. By inviting citizen participation, the zealous volunteers finished the classifications for the entire catalog years ahead of schedule. But buoyed by the curiosity and dedication of the volunteers, the Galaxy Zoo team went on to ask more complicated questions that led to studies they had not thought possible. Volunteers have pointed to anomalies that on close inspection have turned out to be genuinely new astronomical objects.

The Galaxy Zoo Web site was launched on 11 July 2007. A simple interface gave volunteers a brief tutorial, asking simply whether each galaxy image was spiral or elliptical and whether it spun clockwise or anticlockwise. A news story on the BBC Web site set the ball rolling. After just three hours, the originator recalls the traffic was so heavy that Galaxy Zoo's site, hosted by Johns Hopkins University, crashed. The university quickly added servers and got it working again in only hours. The hours after its launch, Galaxy Zoo was receiving 20,000 classifications/hour. By the time the Galaxy Zoo team submitted its paper 9 months later, more than 100,000 volunteers had classified the whole SDSS catalog, with each galaxy viewed 38 times on the average. The large number of classifications for each object was valuable. The classifications can be difficult but if most of the classifiers agree, the result can be considered secure. Conversely, if there is much scatter, the object probably merits more careful investigation.

Although 80% of the galaxies surveyed follow the traditional view that spirals are blue (with young stars) and ellipticals, red, (with mainly old stars) sizable minorities show different calibrations. Further investigation showed that barred spirals were more likely to be red. Does the bar inhibit star formation? An astronomer on the Zoo team thinks that something external, such as small neighboring galaxies are stripping the spiral of hydrogen with which to form new stars. The blue ellipticals tend to be small, recently formed ones still undergoing vigorous star formation.

A Dutch schoolteacher discovered several objects that looked like green stars. She started a thread on the Zoo blog to which others contributed more than 100 "green peas". These turned out to be very compact galaxies emitting strongly at a wavelength characteristic of highly ionized oxygen. It is still unclear what these objects are but they most resemble protogalaxies thought to have existed early in the history of the universe. If they are, they will give astronomers the opportunity to study protogalaxies in detail.

A third phase of the project will extend the classifications to Hubble images of more than 2 million galaxies covering 75% of the age of the Universe.

One professional team member says "It's like having research assistants around the world working 24 hours a day." Are any NCA members involved? If so, I should like to acknowledge them in a future column.

Researchers Detail How A Distant Black Hole Devoured A Star

Francis Reddy, NASA/Goddard Space Flight Center

WASHINGTON -- Two studies appearing in the Aug. 25 issue of the journal *Nature* provide new insights into a cosmic accident that has been streaming X-rays toward Earth since late March. NASA's Swift satellite first alerted astronomers to intense and unusual high-energy flares from the new source in the constellation Draco.

"Incredibly, this source is still producing X-rays and may remain bright enough for Swift to observe into next year," said David Burrows, professor of astronomy at Penn State University and lead scientist for the mission's X-Ray Telescope instrument. "It behaves unlike anything we've seen before."

Astronomers soon realized the source, known as Swift J1644+57, was the result of a truly extraordinary event -- the awakening of a distant galaxy's dormant black hole as it shredded and consumed a star. The galaxy is so far away, it took the light from the event approximately 3.9 billion years to reach Earth.

Burrows' study included NASA scientists. It highlights the X- and gamma-ray observations from Swift and other detectors, including the Japan-led Monitor of All-sky X-ray Image (MAXI) instrument aboard the International Space Station.

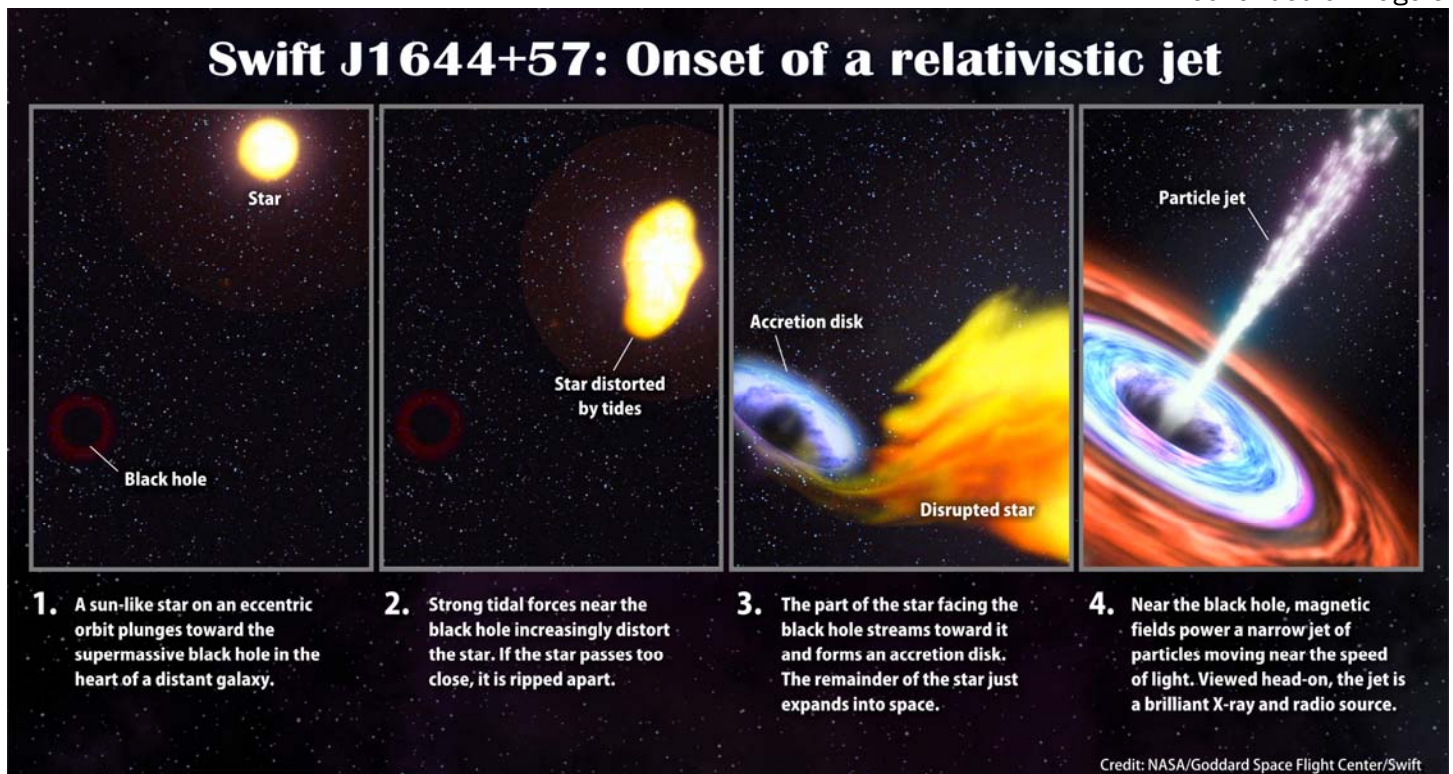
The second study was led by Ashley Zauderer, a post-doctoral fellow at the Harvard-Smithsonian Center for Astrophysics in Cambridge, Mass. It examines the unprecedented outburst through observations from numerous ground-based radio observatories, including the National Radio Astronomy Observatory's Expanded Very Large Array (EVLA) near Socorro, N.M.

Most galaxies, including our own, possess a central supersized black hole weighing millions of times the Sun's mass. According to the new studies, the black hole in the galaxy hosting Swift J1644+57 may be twice the mass of the four-million-solar-mass black hole in the center of the Milky Way galaxy. As a star falls toward a black hole, it is ripped apart by intense tides. The gas is corralled into a disk that swirls around the black hole and becomes rapidly heated to temperatures of millions of degrees.

The innermost gas in the disk spirals toward the black hole, where rapid motion and magnetism create dual, oppositely directed "funnels" through which some particles may escape. Jets driving matter at velocities greater than 90 percent the speed of light form along the black hole's spin axis. In the case of Swift J1644+57, one of these jets happened to point straight at Earth.

"The radio emission occurs when the outgoing jet slams into the interstellar environment," Zauderer explained. "By contrast, the X-rays arise much closer to the black hole, likely near the base of the jet."

Continued on Page 5



Continued from Page 4

Theoretical studies of tidally disrupted stars suggested they would appear as flares at optical and ultraviolet energies. The brightness and energy of a black hole's jet is greatly enhanced when viewed head-on. The phenomenon, called relativistic beaming, explains why Swift J1644+57 was seen at X-ray energies and appeared so strikingly luminous.

When first detected March 28, the flares were initially assumed to signal a gamma-ray burst, one of the nearly daily short blasts of high-energy radiation often associated with the death of a massive star and the birth of a black hole in the distant universe. But as the emission continued to brighten and flare, astronomers realized that the most plausible explanation was the tidal disruption of a sun-like star seen as beamed emission.

By March 30, EVLA observations by Zauderer's team showed a brightening radio source centered on a faint galaxy near Swift's position for the X-ray flares. These data provided the first conclusive evidence that the galaxy, the radio source and the Swift event were linked.

"Our observations show that the radio-emitting region is still expanding at more than half the speed of light," said Edo Berger, an associate professor of astrophysics at Harvard and a coauthor of the radio paper. "By tracking this expansion backward in time, we can confirm that the outflow formed at the same time as the Swift X-ray source."

Swift, launched in November 2004, is managed by NASA's Goddard Space Flight Center in Greenbelt, Md. It is operated in collaboration with Penn State, the Los Alamos National Laboratory in N.M. and Orbital Sciences Corp., in Dulles, Va., with international collaborators in the U.K., Italy, Germany and Japan. MAXI is operated by the Japan Aerospace Exploration Agency as an external experiment attached to the Kibo module of the space station.

Mid-Atlantic Occultations and Expeditions

David Dunham

Asteroidal Occultations

Date	Day	EDT	Star	Mag.	Asteroid	dmag	s "	dur.	Ap. Location
Sep 12	Mon	3:34	TYC12311106	9.8C	Amphitrite	0.1	43	8	NC, VA, wMD, PA
Sep 13	Tue	2:06	ZC 3506	6.1	2001 QT22	12.	0.7	2	NJ, DE, MD, DC?, VA
Sep 15	Thu	4:42	2UC31964284	11.8C	Budrosa	0.8	6	9	sOH, sPA, NJ; MD?
Sep 16	Fri	20:21	2UC29570829	12.1	1999 RE215	11.	6	8	TNO; Americas?
Sep 17	Sat	22:13	TYC57040136	11.3	Oshima	5.6	4	6	OH, PA?, MD, DE, NJ
Sep 20	Tue	5:41	2UC38590085	13.7	Sapientia	1.1	5	10	WV, VA, DC, sMD
Sep 23	Fri	4:23	2UC38591019	13.1	Sapientia	1.5	6	9	WV, VA, DC, MD, DE
Sep 28	Wed	2:07	TYC19290995	11.3	Carolina	3.4	2	7	cNC, eVA, seMD, DE
Sep 30	Fri	0:41	2UC41479575	13.6	Tone	1.4	5	10	NJ, DE, MD, DC, nVA
Oct 1	Sat	3:40	TYC07740138	10.8	Carlova	2.8	5	6	TN, w&nNC, seVA
Oct 5	Wed	20:18	2UC20464703	12.6	Vindobona	1.9	3	9	WV, PA; MD, nVA?
Oct 11	Tue	3:57	SAO 97705	7.7	Saimaa	8.9	1	2	cenOH, sPA, cenNJ

Lunar Grazing Occultations (*, Dunham plans no expedition)

Date	Day	EDT	Star	Mag.	% alt	CA	Location
Sep 21	Wed	6:26	ZC 1010	7.9	41- 66	5S	Dahlgren, VA; Shiloh, MD Sun -6

Total Lunar Occultations

DATE	Day	EDT	Ph	Star	Mag.	% alt	CA	Sp.	Notes
Sep 7	Wed	0:02	D xi2	Sgr	3.5	75+ 17	9N	G8	ZC 2759
Sep 7	Wed	20:56	D	SAO 162982	7.6	82+ 31	26N	G6	
Sep 15	Thu	4:02	R	ZC 197	7.0	92- 60	81S	K0	maybe close double?
Sep 16	Fri	22:04	R	40 Arietis	5.8	81- 10	84S	K1	Az 74, ZC 415, double?
Sep 18	Sun	1:08	R	ZC 534	6.1	72- 37	79S	A0	spectroscopic binary
Sep 18	Sun	1:42	R	SAO 76150	7.8	72- 43	42N	A3	
Sep 18	Sun	3:34	R	SAO 76212	8.0	71- 63	72N	A5	
Sep 19	Mon	0:34	R	SAO 76665	8.2	63- 21	67S	K0	
Sep 20	Tue	1:16	R	ZC 828	6.3	53- 20	49N	K0	
Sep 21	Wed	2:18	R	ZC 987	8.0	42- 21	80N	G5	maybe close double?
Sep 21	Wed	2:42	R	SAO 78406	7.6	42- 25	70S	A0	
Sep 21	Wed	4:58	R	SAO 78481	8.4	41- 51	32N	A0	
Sep 21	Wed	5:44	R	SAO 78514	8.0	41- 59	15N	K2	mag.2 9.4, sep. 0.04"
Sep 21	Wed	5:48	R	SAO 78500	8.2	41- 60	61S	A5	
Sep 21	Wed	6:39	R	ZC 1010	7.9	41- 67	22S	F2	Sun -4; VA, sMD graze
Sep 22	Thu	3:17	R	SAO 96864	8.0	32- 21	87S	K5	
Sep 22	Thu	3:34	R	SAO 96872	7.5	32- 24	67N	K0	
Sep 22	Thu	4:40	R	ZC 1130	7.2	31- 36	30N	G5	
Sep 23	Fri	2:41	R	ZC 1246	6.4	22- 3	59N	K0	
Sep 23	Fri	5:09	R	SAO 97782	8.1	21- 30	89N	A2	maybe close double?
Sep 24	Sat	5:10	R	SAO 98491	8.0	13- 17	30N	A2	mg2 11.4, sep 1.2", PA 5d
Sep 24	Sat	5:28	R	SAO 98487	8.4	13- 21	86N	K0	
Oct 2	Sun	19:33	D	X 42639	8.3	37+ 24	76N	F3	Sun-10; mg2 10, 3", PA 108
Oct 2	Sun	22:04	D	SAO 185634	7.6	38+ 6	67S	G8	Azimuth 233 deg.
Oct 3	Mon	21:27	D	SAO 187096	7.9	49+ 20	75S	B8	
Oct 4	Tue	19:51	D	ZC 2854	7.2	59+ 32	29N	K4	
Oct 4	Tue	23:17	D	ZC 2863	6.1	60+ 15	4N	F0	Azimuth 230 deg.
Oct 5	Wed	21:40	D	SAO 163579	8.2	69+ 33	83N	G8	maybe close double?
Oct 5	Wed	22:55	D	ZC 2986	6.4	70+ 27	84S	G8	

Explanations & more information are at <http://iota.jhuapl.edu/exped.htm>.

David Dunham, dunham@starpower.net

Phones: home 301-220-0415; cell 301-526-5590

Timing equipment and even telescopes can be loaned for most expeditions that we actually undertake; we are always shortest of observers who can fit these events into their schedules, so we hope that you might be able to.

Information on timing occultations is at: <http://iota.jhuapl.edu/timng920.htm>.

Good luck with your observations.

Film Review: *The City Dark*

Michael Chesnes

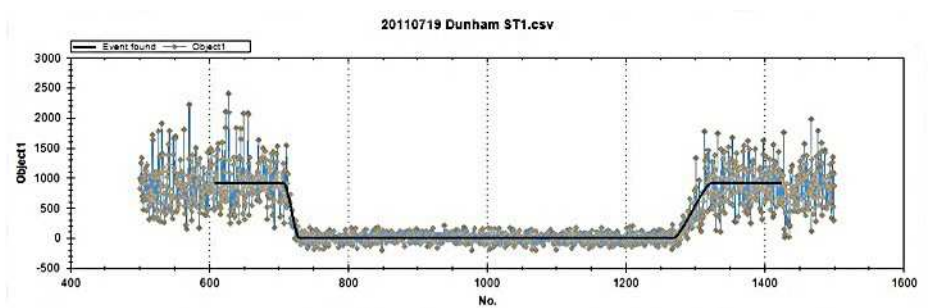
On the evening of Thursday, August 25, I saw a one-time showing of *The City Dark*, a documentary about light pollution, at the E Street Cinema as part of the 19th annual Environmental Film Festival in the Nation's Capital. Director Ian Cheney was on hand to answer questions about the film and meet with audience members, which included NCA member Victor Slabinski, and former NCA member Dan Costanzo (see bottom right photo).

The film was narrated by Cheney, and began with a contrast between the night skies during his childhood as an amateur astronomer in small-town Maine, and during his adult life in New York City. The film continued with a number of vignettes, which were grouped into self-contained segments which Cheney used to explore how much darkness city dwellers are missing from their lives, where some of the darkest places in the U.S. are located, the negative effects of intense exposure to artificial lighting, why society enjoys artificial lighting, and what can be done to improve the night sky while maintaining well-lit cities.

Some of the vignettes featured Neil de Grasse Tyson and Ann Druyan, while others feature professional and amateur astronomers observing from dark (and not-so-dark) sites, a Boy Scout troop, the proprietor of a family-owned lighting store, rescuers of hatchling turtles in Florida and injured birds in Chicago, a breast cancer survivor, and residents of a high-crime Newark, NJ neighborhood.

The overall tone of the film was concerned, but calm and hopeful. Towards the end of the film Cheney profiled a lighting ordinance in Bar Harbor, ME and a new park in New York City with cutting-edge lighting design. If you get a chance to see *The City Dark*, I recommend it.

Photos: Top – David Dunham setting up Mighty Mini occultation observing station in Newman, CA. Middle – Light curve of asteroid Antiope from Tracy, CA on July 19, 2011. Bottom – Victor Slabinski, Ian Cheney, Michael Chesnes, Dan Costanzo at screening of The City Dark.



Star Dust Speaker Reviews

Michael Chesnes

I warmly encourage NCA members to write reviews for the talks at our meetings, so that they can be published in Star Dust. We have an excellent lineup of speakers every year, and our reviews are both a valuable historical record of our activities and a way to recognize our speakers.

Sunwatchers of the Southwest:

Sept. 9 at Owens Science Center. On this evening, view the Sun through the eyes of the Ancient Sunwatchers of the Southwest. Immerse yourself in its wonders as our planetarium staff leads you through the experience of sunwatching as evidenced by ancient petroglyphs/ pictographs and solar observatories. *Cost is \$5.00 for adults; \$3.00 for students/teachers/seniors. Children 3 and under are free. Program starts at 7:30 p.m.; doors open by 7:15 p.m.*

Calendar of Events

NCA Mirror- and Telescope-making Classes: Tuesdays Sept. 6, 13, 20, 27 and Fridays, Sept. 9, 16, 23, 30, 6:30 to 9:30 pm 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 gfbrendenburg@yahoo.com. In case there is snow, call 202-282-2204 to see if the CCCC is open.

Open house talks and observing at the University of Maryland Observatory in College Park on the 5th and 20th of every month at 8:00 pm (Nov-Apr) or 9:00 pm (May-Oct). There is telescope viewing afterward if the sky is clear.

Dinner: Saturday, Sept. 10 at 5:30 pm, preceding the meeting, at the [Garden Restaurant](#) in the University of Maryland University College Inn and Conference Center.

Planetarium show: Friday, Sept. 9 at 7:30 pm at The Howard B. Owens Science Center in Lanham, MD. "Sunwatchers of the Southwest"

Upcoming NCA Meetings at the University of Maryland Observatory

Sept. 10, 2011 **Julie McEnery** (GSFC) - Results from the Fermi Gamma Ray Space Telescope

Oct. 8, 2011 **James Abshire** (GSFC) - *Topographic Mapping of Planets via Space-based Lidar*

Nov. 12, 2011 **Dan Wik** (GSFC) - *Merging Galaxies and Clusters of Galaxies*

National Capital Astronomers Membership Form

Name: _____ **Date:** ___/___/___

Address: _____ **ZIP Code:** _____

Home Phone: ___-___-___ **E-mail:** _____ **Age:** _____

Present or Former Occupation (Or, If Student, Field of Study): _____

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

Employer or Educational Institution: _____

Student Membership: \$ 5

Standard Individual or Family Membership: \$10

Optional additional contribution to NCA: \$__

Total Payment (circle applicable membership category above): \$__

Members receive Stardust, the monthly newsletter announcing NCA activities, by e-mail. If you would like to receive a paper copy of Stardust via regular mail, please check here: _____

Please mail this form with check payable to National Capital Astronomers to:
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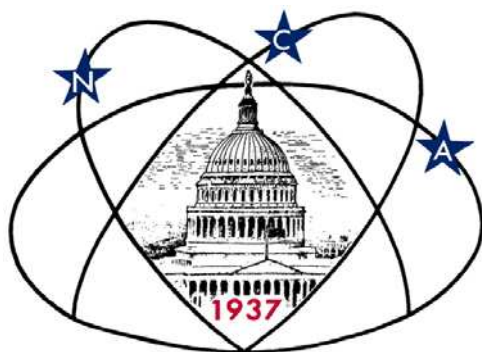
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First Class

Dated Material



Next NCA Mtg:

Sept. 10

7:30 pm

@ UM Obs

Dr. Julie McEnery

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