Star Dust

National Capital Astronomers, Inc.

February 2009

Volume 67, Issue 6

http://capitalastronomers.org

Next Meeting

When: Sat. Feb. 7, 2009

Time: 7:30 pm

Where: UM Observatory

Speaker: Jennifer Wiseman, NASA Goddard

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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 Metzerott 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.

Feb. 2009: Dr. Jennifer Wiseman
NASA Goddard Space Flight Center

New Wavelength Frontiers: Observing Star and Planet Formation with Herschel and ALMA

Abstract: The formation of stars and planets is a dynamic process hidden deep within interstellar gas and dust clouds, mostly invisible to optical telescopes. But two new major telescopes are about to open up this hidden frontier, using relatively unexplored far-infrared, submillimeter, and millimeter-waves to peer deep into these hidden regions. I will discuss the new capabilities we will have and the discoveries we are poised to make with ALMA, a ground-based telescope array under construction in Chile, and with the Herschel Space Observatory, a European space telescope to launch this year, with NASA partnership. These telescopes will reveal the structure, composition, and dynamics of those fertile zones around young stars where planets are likely to form and thrive. Recent exciting discoveries of infant stars and extra-solar planetary systems using current facilities like the Hubble Space Telescope set the framework for breakthroughs with these two new complementary observatories.

Biography: Dr. Jennifer Wiseman is Chief of the Laboratory for Exoplanets and Stellar Astrophysics at the NASA Goddard Space Flight Center in Greenbelt, Maryland. She has studied star-forming regions of our galaxy using radio, optical, and infrared telescopes. She studied physics for her bachelor's degree at MIT, discovering comet Wiseman-Skiff in 1987. After earning her Ph.D. in astronomy from Harvard in 1995, she continued her research as a Jansky Fellow at the National Radio Astronomy Observatory and as a Hubble Fellow at the Johns Hopkins University. Dr. Wiseman also has an interest in national science policy and has served as a Congressional Science Fellow on Capitol Hill. She then served as the Program Scientist for the Hubble Space Telescope at NASA Headquarters. She is also a public speaker and author, and enjoys giving talks to schools, youth and church groups, civic organizations, and space lovers of all kinds.

Observing after the Meeting
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.

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Thank you!

Astronomy Policy in the United States, a Brief Introduction to a Messy Business

Review December 2008: Dr. Kevin B. Marvel, Executive Officer, American Astronomical Society

Reviewed by Jeff Norman

On December 13, 2008, Dr. Kevin B. Marvel spoke to NCA about astronomy policy in the U.S. Interested amateurs as well as professionals need to understand astronomy policy because it determines, among other things, whether we will build a project (like the Spitzer Space Telescope) or cancel one (like the Superconducting Super Collider.)

Dr. Marvel pointed out that the federal government is the main source of funding in the US for astronomical research. There are 2 broad categories of federal expenditures: discretionary (or mandatory) and nondiscretionary. Discretionary spending includes such things as defense, public works, education, administration of justice, as well as research and development (R&D), of which scientific R&D is a part. Nondiscretionary spending is mandatory and includes the major entitlement programs such as Social Security, Medicare and Medicaid. Since R&D is not mandatory like Social Security, it has to compete with all the other discretionary programs, and even within the category of scientific R&D, astronomy has to compete with all the other sciences including medical science.

Most federally funded R&D money for astronomy comes from 2 agencies: NASA (about 80%) and NSF (about 20%). Starting in the 1970s, most categories of nondefense R&D spending have been flat; but the amount going to NIH to fund medical research has increased considerably, largely because of support from one member of Congress. In the last fiscal year, the federal government spent $66.7 billion for all nondefense R&D; the NASA budget was $12.8 billion; and NSF's budget was $5.2 billion.

Policy decisions are often based on politics and not always made for reasons that make good sense or which were arrived at scientifically. A good case in point is the decision to locate the radio telescope in West Virginia. Because of its high humidity, West Virginia is not an ideal place to put a radio telescope. Somewhere in desert Southwest would be better. However, West Virginia has a very powerful Senator, Robert Byrd, who got many federally funded projects for his state. (Reviewer's note: Senator Byrd used to chair the Senate Appropriations Committee, which determines where federally funded projects will go; and in that capacity, he was able to steer many projects to West Virginia. Senator Byrd, who is 91, recently gave up his position as Chair due to his increasingly frail health.)

In a democratic society, citizens can lobby for those discretionary expenditures they want; but they need to understand the budget process to do so effectively. In the US budget cycle, planning needs to start at least a year in advance. First, ideas (including their price tags) are submitted to the OMB, which makes recommendations to the Congress, which go to the appropriate Congressional committees; and then the Congress decides which projects to fund. Letters from citizens can be very helpful. As few as 5 citizen letters about one project will usually cause a Congressional committee to put it on its agenda.

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Dr. Marvel concluded by mentioning two important events that are coming up soon: (1) every decade, astronomers and astrophysicists do a decadal survey to determine what they believe are the most important needs of their respective sciences; and then they make recommendations to the government based on the survey results; and (2) 2009 is the International Year of Astronomy (in honor of the 400th anniversary of the first time Galileo looked through a telescope). He said that this would be a great time for amateurs to play a role in influencing Congress about which programs it should fund. Dr. Marvel is a fine speaker and has a nice sense of humor. I wish to thank him for his interesting and informative lecture.

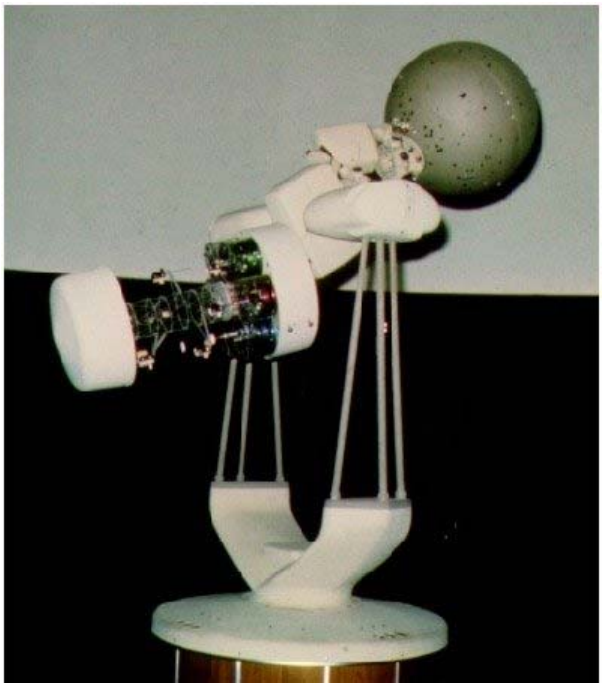
Rock Creek Park Planetarium

Andrew Seacord

Rock Creek Park - the only unit of the National Park Service to have a planetarium - will be upgrading its planetarium in February. Its 38-year-old Spitz A4 projector will be replaced by a Spitz SciDome, a completely digital system.

Rock Creek Park will be introducing its SciDome projector to the public on Saturday, February 28. Several activities are planned for the day, including planetarium programs at each hour during the afternoon. The planetarium will be open for viewing between programs. There will be a Mars exploration activity for children. Lectures by outside speakers and a telescope display are also planned and, weather permitting, some telescopes will be used to observe the Sun.

For further information, including a schedule of events, call the Nature Center at (202) 895-6070 or visit its website at www.nps.gov/rocr/.



"George" the Spitz A4 projector.
Photo courtesy NPS at: http://www.nps.gov/rocr/planyourvisit/planetarium.htm
See George' page: http://www.nps.gov/archive/rocr/planetarium/george.htm

Obituary for Long-Time NCA Member Tom Van Flandern

Dr. David Dunham

Former long time NCA member Tom Van Flandern died on Friday, January 9, 2009. From the mid-1960's into the 1970's, Tom and I worked closely together to establish the first comprehensive computer software system for predicting and analyzing lunar occultations, especially the then new field of grazing occultations. In those days, the work was more difficult than now, done with punched cards and mainframe computers, mainly at the U.S. Naval Observatory (USNO) where Tom worked at the time. Tom preferred to do the analysis while letting me organize the observer network that became IOTA, but he and his work were vital to IOTA's beginnings. He greatly expanded the small "Evans" program (named for Carroll Evans in California) to generate comprehensive modern-style total lunar occultation predictions, which inspired the similar predictions now produced by WinOccult and Lunar Occultation Workbench.

Tom also became interested in asteroidal occultations, especially after observing the occultation of a 9th-mag. star by (18) Melpomene photoelectrically at USNO on 1978 Dec. 11 [that was also my first asteroidal occultation, 30 years to the day before Scotty Degenhardt's remarkable 14-station success with (135) Hertha last month]. I used Tom's software to analyze asteroidal occultation observations until a few years ago, when that function is now performed with WinOccult. Tom listened when, in 1977 and 1978, Paul Maley and others described secondary occultations indicating that asteroids probably had satellites, many years before those objects were accepted as real by most astronomers, and published some pioneering papers discussing the dynamics of binary asteroids.

On 1970 March 7th, Tom observed a total solar eclipse from near the northern limit of totality, while I observed the same eclipse near the southern limit; this was the genesis of modern efforts to observe eclipses this way for solar radius measurements. Tom advocated making these observations, and has organized the only sizeable public successful "Eclipse Edge" expeditions, starting in 1991 July in Mexico (I was with him there) and continuing through the 2002 December eclipse in Australia.

Besides our close astronomical collaboration, I am also indebted to Tom personally; he was a great friend who helped secure my employment with Computer Sciences Corporation in 1976 in spite of poor recommendations from my previous two "old school" bosses who did not appreciate my work. That led to my collaboration with Dr. Robert Farquhar ever since that year, on the design of orbits for numerous space missions, including the ISEE-3/ International Cometary Explorer (first space mission to a comet in Sept. 1985, along with many other "firsts") and the NEAR Shoemaker mission to (433) Eros in 2000 - 2001. Tom also introduced me to his employee, Joan Bixby, whom I married in 1970.

An asteroid will be named for Tom with the next batch of Minor Planet Circulars at the next full moon on February 9.

Occultation Notes

D following the time denotes a disappearance, while R indicates that the event is a reappearance.

When a power (x; actually, zoom factor) is given in the notes, the event can probably be recorded directly with a camcorder of that power with no telescope needed.

The times are for Greenbelt, MD, and will be good to within +/-1 min. for other locations in the Washington-Baltimore metropolitan areas unless the cusp angle (CA) is less than 30 deg., in which case, it might be as much as 5 minutes different for other locations across the region.

Some stars in Flamsteed's catalog are in the wrong constellation, according to the official IAU constellation boundaries that were established well after Flamsteed's catalog was published. In these cases, Flamsteed's constellation is in parentheses and the actual constellation is given in the notes following a /.

Mag is the star's magnitude.

% is the percent of the Moon's visible disk that is sunlit, followed by a + indicating that the Moon is waxing and - showing that it is waning. So 0 is new moon, 50+ is first quarter, 100+ or - is full moon, and 50- is last quarter. The Moon is crescent if % is less than 50 and is gibbous if it is more than 50.

Cusp Angle is described more fully at the main IOTA Web site.

Sp. is the star's spectral type (color), O,B,blue; A,F,white; G,yellow; K,orange; M,N,S,C red.

Also in the notes, information about double stars is often given. "Close double" with no other information usually means nearly equal components with a separation less than 0.2". "mg2" or "m2" means the magnitude of the secondary component, followed by its separation in arc seconds ("), and sometimes its PA from the primary. If there is a 3rd component (for a triple star), it might be indicated with "mg3" or "m3". Double is sometime abbreviated "dbl".

Sometimes the Watts angle (WA) is given; it is aligned with the Moon's rotation axis and can be used to estimate where a star will reappear relative to lunar features. The selenographic latitude is WA -270. For example, WA 305 - 310 is near Mare Crisium.

Mid-Atlantic Occultations and Expeditions

Dr. David Dunham

Asteroidal Occultations

Date	Day	EST/ EDT	Star	mag.	Asteroid	dmag	dur. s	"	Ap. Location
Feb 20	Fri	1:24	SAO 81682	9.4	Strobbe	5.2	2	3	se-nwVA,nWV,Ohio
Feb 27	Fri	22:14	SAO 118351	9.1	Nekrasov	6.9	1	3	sNJ,nMD?,PA,neOH
Mar 1	Sun	2:27	SAO 159571	7.2	Palatia	8.1	10	2	TN,nNC,sVA;seMD?
Mar 6	Fri	23:53	TYC24650967	11.5	Philippa	3.4	27	7	seMD,sVA,wNC,nGA
Mar 7	Sat	2:54	SAO 156138	9.6	Arethusa	3.1	9	4	VA,DE,MD,PA,OH

*** Dates and times above EST, those below EDT ***

Mar 10	Tue	23:48	TYC19590215	11.5	Roma	1.5	6	7	DE,neMD,se-nwPA
Mar 13	Fri	0:44	TYC07910838	10.3	Eudora	5.6	10	4	SC,wNC,wVA,cenOH
Mar 13	Fri	23:02	TYC08120062	12.1	Miriam	2.4	9	8	e&nVA,nWV,e&nOH

Lunar Grazing Occultations

DATE	Day	EST/ EDT	Star	Mag	% alt	CA	Location, Notes
Mar 1	Sun	22:16	SAO 75439	8.1	26+	10	10N Palmyra,Downington,&Media,PA
Mar 4	Wed	20:25	ZC 833	7.1	58+	66	9N Westminster, MD; Milford, DE
Mar 5	Thu	23:12	SAO 78653	7.4	70+	47	14N Haymrkt&Woodbrdg,VA;BelAltnMD

Total Lunar Occultations

DATE	Day	EST/ EDT	Ph	Star	Mag	% alt	CA	Sp.	Notes
Feb 15	Sun	1:43	R	MW Vir	7.0	65-	18 68S	A5	ZC 2046
Feb 15	Sun	5:24	R	ZC 2058	6.8	64-	30 47S	K0	
Feb 16	Mon	4:52	R	ZC 2174	6.5	54-	26 84N	B8	May be close double
Feb 17	Tue	5:40	R	ZC 2312	5.4	45-	24 8N	M2	
Feb 18	Wed	4:01	R	ZC 2437	7.9	36-	10 84S	A0	AZ138;mg2 9 sep11",PA30
Feb 18	Wed	6:27	R	SAO 184936	7.3	35-	22 41S	A3	Sun alt. -6 deg.
Feb 19	Thu	5:08	R	SAO 185892	7.9	27-	12 87S	A2	Azimuth 141 deg.
Feb 26	Thu	18:41	D	SAO 128469	7.7	4+	13 22S	G5	Az. 264; Sun alt. -9
Mar 1	Sun	20:26	D	26 Arietis	6.1	25+	30 37S	A9	ZC 370; close dbl.?
Mar 1	Sun	22:06	D	SAO 75439	8.1	26+	12 32N	G5	Az. 287; PA graze
Mar 1	Sun	22:18	D	SAO 93005	7.9	26+	9 15S	K0	Az. 288 deg.
Mar 2	Mon	22:05	D	ZC 512	8.1	36+	24 39S	F5	Maybe close double
Mar 2	Mon	22:14	D	ZC 513	7.3	36+	22 37S	K0	Maybe close double
Mar 2	Mon	22:54	D	SAO 75990	7.5	36+	15 73S	K0	Maybe close double
Mar 3	Tue	18:15	D	ZC 655	7.9	46+	76 19S	F5	Sun alt. -3; VA graze
Mar 4	Wed	0:11	D	ZC 698	7.5	48+	13 9S	K2	Azimuth 293 deg.
Mar 4	Wed	20:16	D	ZC 833	7.1	58+	68 23N	B5	MD & DE graze
Mar 4	Wed	23:08	D	ZC 849	6.5	59+	36 69N	G9	Maybe close double
Mar 5	Thu	1:30	D	ZC 869	7.4	60+	11 73N	B9	Az. 295; close double
Mar 5	Thu	23:38	D	epsilonGem	3.1	70+	42 85N	A3	mg2 9 sep 111", PA 94
Mar 6	Fri	0:36	R	epsilonGem	3.1	70+	30 -58N	A3	ZC 1030 = Mebsuta
Mar 6	Fri	0:44	D	SAO 78706	7.0	71+	29 15S	K2	mg2 10 sep 18",PA 262
Mar 6	Fri	21:55	D	SAO 79628	7.1	80+	68 56S	F5	
Mar 6	Fri	22:06	D	ZC 1167	6.3	80+	67 77N	K0	

*** Dates and times above EST, those below EDT ***

Mar 8	Sun	20:56	D	ZC 1413	6.8	95+	46 33S	B9	
Mar 12	Thu	23:27	R	ZC 1872	7.3	95-	21 52N	K0	WA 318 deg.
Mar 13	Fri	6:33	R	ZC 1893	6.9	93-	17 54S	K0	WA 244 deg.; Sun -10
Mar 14	Sat	4:31	R	ZC 2004	7.1	88-	31 46S	K0	

Explanations & more information are at http://iota.jhuapl.edu/exped.htm.
David Dunham, dunham@starpower.net, phone 301-474-4722

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 in their schedule, 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.

Science Fair Judging

Jay Miller

Science fair time is March, as usual. NCA gives a year's membership in NCA plus a year's subscription to Sky and Telescope magazine in both junior and senior divisions. It isn't difficult and you don't have to be a PhD astronomer. We can help train you or you can go along with someone who has done it before. Nancy Grace and I (and maybe one other person) will judge the Montgomery County fair. If you are interested in judging contact me at 240-401-8693 or rigel1@starpower.net. These are all Saturdays and judging normally begins between 8 AM and noon.

- Northern Virginia (Arlington, Alexandria, Falls Church)
  7 March
- District of Columbia
  14 March
- Montgomery County
  21 March
- Prince George's County
  28 March
- Fairfax County
  28 March

Science News

Thank you Nancy Grace Roman for finding these black hole articles.

Eclipsing Black Hole

Based on report by Jerome A. Orosz, Jeffrey E. McClintock & Ramesh Narayan in NOAO/NSO Newsletter

The first observed eclipsing black hole was found in the galaxy, M33. Knowing the distance to the galaxy and measuring the radial velocity curve and detailed spectrum as well as the period and, of course, the inclination, the authors were able to characterize the system completely. The black hole has a mass of 15.65 solar masses. The optically visible star has a mass of 70.0 solar masses and a spectral type of O7-8 III. Its metal content is about 10% of that of the Sun. Incredibly, only 42 solar radii separate the stars, less than the distance of Mercury from the Sun.

Monster Tag Team

From /Science/NOW Daily News
By Phil Berardelli

Astronomers taking a second look at a distant galaxy have found it is actually a pair of colliding galaxies, each harboring a supermassive black hole at its center. The existence of the black holes, which were fully formed less than 2 billion years after the big bang, suggests that these giant objects could have been common in the early universe. If so, they must have had a bigger impact on the evolution of galaxies than previously thought, and they might have influenced the origin of life on distant planets.

The researchers were stunned when they pointed the Submillimeter radio telescope array on Mauna Kea to 4C60.07, located about 12 billion light-years away. 4C60.07 is actually a pair of galaxies in the process of merging.

"The long-standing question is whether galaxy and black-hole formation started at about the same time in the universe," says astronomer Chris Willott of the National Research Council Canada. "These observations tell us that they did. Additionally, astronomer David Sanders of the University of Hawaii, Manoa, says the discovery shows that given the right environment--with enough surrounding dust and gas--galaxies can evolve very quickly, in this case in less than 2 billion years.

Star Dust Submissions

Do you have an article, photograph, or other item which you want to appear in an upcoming issue of Star Dust? If you would like to share with NCA your experiences at a star party or public outreach event, please consider writing an article about it for Star Dust. If you recently read a good book about astronomy, you can let your fellow NCA members know about it by writing a book review. Your pictures are appreciated too, whether they are astrophotographs, or taken during an eclipse trip or a visit to an observatory. To ensure that your item is included in the next issue of Star Dust, please send it by the second Monday after the next NCA meeting to m.chesnes@verizon.net.

Calendar of Events

NCA Mirror- and Telescope-making Classes: Fridays, Feb. 6, 13, 20, and 27, 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 gfbrandenburg@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, Feb. 7 at 5:30 pm, preceding the meeting, at the *Garden Restaurant* in the University of Maryland University College Inn and Conference Center.

Upcoming NCA Meetings at the University of Maryland Observatory

Feb. 7, 2009
Dr. Jennifer Wiseman, NASA Goddard Space Flight Center
Star and Planet Formation with Herschel and ALMA

Mar. 14, 2009
Dr. Robert MacDowall, NASA Goddard Space Flight Center
SIRA (Solar Imaging Radio Array) or Results from Ulysses and WIND

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All members receive Star Dust, the monthly newsletter announcing NCA activities. The basic dues cover an electronic copy of Star Dust; paper copies are $10 extra. You may also choose to get Sky & Telescope magazine at the discounted rate of $33.

Student Membership	$ 5
Paper copy of Star Dust	$10
Sky & Telescope	$33
Total	_____

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Paper copy of Star Dust	$10
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@ UM Obs

Dr. Jennifer Wiseman

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