NATIONAL CAPITAL ASTRONOMERS, INC.

STAR DUST

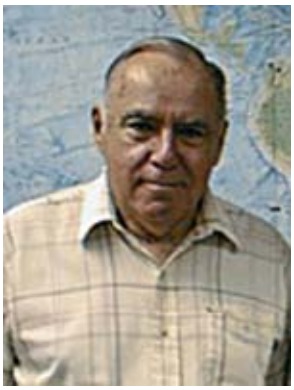
May 2008 Volume 66, Issue 9

MAY 2008: DR. PAUL D. LOWMAN, JR., GSFC
ASTRONOMY FROM THE MOON: WHY, WHERE, AND HOW?"

NEXT MTG: Sat 10 May 2008
TIME: 7:30pm
SPEAKER: Dr. Paul Lowman, Jr
WHERE: UM Observatory

It has long been recognized that Earth-based astronomy would one day be surpassed by astronomy from beyond the atmosphere, and specifically from the Moon - "an astronomer's paradise." However, the spectacular successes of space-borne instruments such as Hubble have led most astronomers to give up on the Moon, favoring programs such as the Lagrangian point James Webb Space Telescope. This talk will argue the older view, that the Moon offers a much better site for astronomy of all sorts - UVOIR, radio, etc.

Dr. Paul D. Lowman, Jr. is a Geophysicist in the Planetary Dynamics Laboratory of the Solar System Exploration Division at NASA's Goddard Space Flight Center in Greenbelt, Maryland. He has been with NASA since 1959, most of that time at Goddard, but with 2 years spent at NASA Headquarters and 1 year on sabbatical at the University of California.



Dr. Lowman earned his BS degree in Geology from Rutgers University in Piscataway, NJ and his PhD in Geology at the University of Colorado in Boulder. His primary interests include lunar geology, comparative planetology, global tectonics, remote sensing, and petrology (the study of rocks). He has been interested in the possibilities of lunar astronomical observatories for some years and has written several articles on the subject.

SPECIAL POINTS OF INTEREST:

- Where's north in space? Good question! p1
- Missed the March meeting? That's all right, read the review p4
- Learn more about NCA's recent acquisition of an antique scope p5.
- So what happened at the Family Day at NASM? p6

Contents:

STELLAR COMPASS FOR SPACE EXPLORERS
BY PATRICK BARRY

In space, there's no up or down, north or south, east or west. So how can robotic spacecraft know which way they're facing when they fire their thrusters, or when they try to beam scientific data back to Earth?

Without the familiar compass points of Earth's magnetic poles, spacecraft use stars and gyros to know their orientation. Thanks to a recently completed test flight, future spacecraft will be able to do so using only an ultra-low-power camera and three silicon wafers as small as your pinky fingernail.

"The wafers are actually very tiny gyros," explains Artur Chmielewski, project manager at JPL for Space Technology 6 (ST6), a part of NASA's New Millennium Program.

Traditional gyros use spinning wheels to detect changes in pitch, yaw, and roll—the three axes of rotation. For ST6's Inertial Stellar Compass, the three gyros instead consist of silicon wafers that resemble microchips. Rotating the wafers distorts microscopic structures on the surfaces of

(Continued on page 3)

2008-2009 NOMINEES

Nominating Committee Report
by Jeff Norman, Chair

The Nominating Committee of NCA (whose members are Jay Miller, Jeff Norman, Wayne Warren and Harold Williams) is pleased to announce the following slate of officers. Elections will be held at the June 14, 2008 meeting; and any member may make additional nominations from the floor.

President	- Elizabeth Warner
Vice-President	- John Hornstein
AsstVP	- John Albers
Sec/Treasurer	- Michael Brabanski
AsstSec/Treas	- Jeffrey Norman
Trustee	- Walter Faust

All NCA members are invited and encouraged to attend this important meeting!

CALENDAR OF EVENTS

NCA Mirror- and Telescope-making Classes: Fridays, May 2, 9, 16, 23 and 30, 6:30 to 9:30pm 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 8:00pm. (Nov.-Apr.) or 9:00pm (May-Oct.). There is telescope viewing afterward if the sky is clear.

Dinner with NCA members and speaker: Saturday, April 12 at 5:30 P.M., 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

2nd Saturdays

May 10, 2008,
Dr. Paul Lowman, GSFC/NASA, "*Astronomy from the Moon: Why, Where, and How*"

June 14, 2008,
Dr. Harold Williams, Montgomery College, "*Evolution, of Stars from 0.08 to 100 Solar Masses, what everybody should know*"

OR

Dr. Sean Solomon, CIW-DTM,

July & August,
Summer Hiatus
See You in September!

PLEASE GET *STAR DUST* ELECTRONICALLY

NCA members able to receive *Star Dust,* the newsletter of the NCA via e-mail as a PDF file attachment, instead of hardcopy via U.S. Mail, can save NCA a considerable amount of money on the printing and postage in the production of *Star Dust* (the NCA's single largest expense) and also save some trees.

If you can switch from paper to digital, please contact Michael L. Brabanski, the NCA Sec-Treasurer, at mlbrabanski@verizon.net or 301-649-4328 (h).

Thank you!

MEETING VIDEOS

Those who attend the meetings have probably noticed that Jay Miller records the talks. While the main purpose is to produce a DVD to assist the reviewer of the talk, he also makes several extra copies. While he claims not to be Spielberg, if there is a lecture you've missed or one you want to look at again, members can contact Jay to borrow a copy.

rigel1@starpower.net

Drawing © Jim Hunt

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 e-mail at*** *rigel1@starpower.net.*

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 and University Blvd.

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.

(Continued from page 1)

these wafers in a way that generates electric signals. The compass uses these signals—along with images of star positions taken by the camera—to measure rotation.

Because the Inertial Stellar Compass (ISC) is based on this new, radically different technology, NASA needed to flight-test it before using it in important missions. That test flight reached completion in December 2007 after about a year in orbit aboard the Air Force's TacSat-2 satellite.

"It just performed beautifully," Chmielewski says. "The data checked out really well." The engineers had hoped that ISC would measure the spacecraft's rotation with an accuracy of 0.1 degrees. In the flight tests, ISC surpassed this goal, measuring rotation to within about 0.05 degrees.

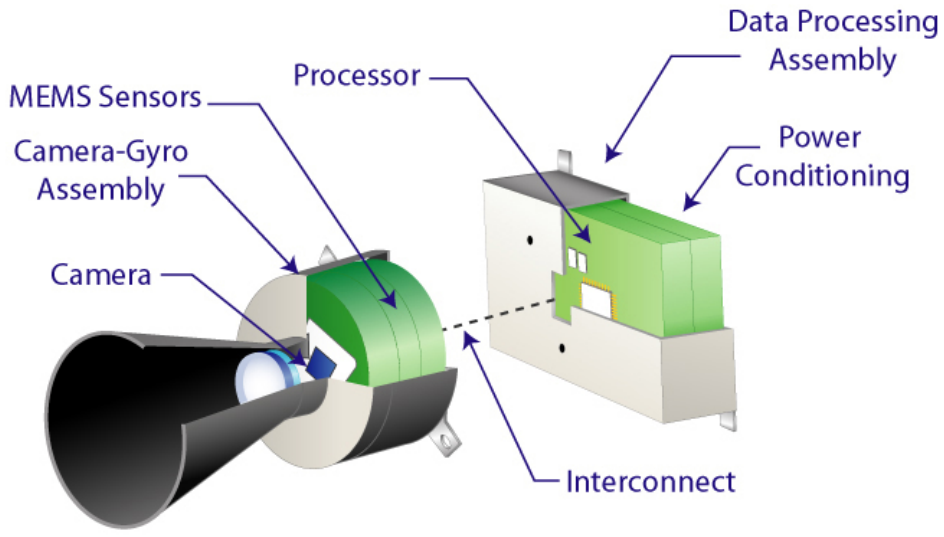
That success paves the way for using ISC to reduce the cost of future science missions. When launching probes into space, weight equals money. "If you're paying a million dollars per kilogram to send your spacecraft to Mars, you care a lot about weight," Chmielewski says. At less than 3 kilograms, ISC weighs about one-fifth as much as traditional stellar compasses. It also uses about one-tenth as much power, so a spacecraft would be able to use smaller, lighter solar panels.

Engineers at Draper Laboratory, the Cambridge, Massachusetts, company that built the ISC, are already at work on a next-generation design that will improve the compass's accuracy ten-fold, Chmielewski says. So ISC and its successors could soon help costs—and spacecraft—stay on target.

Find out more about the ISC at nmp.nasa.gov/st6. Kids can do a fun project and get an introduction to navigating by the stars at

spaceplace.nasa.gov/en/kids/st6starfinder/st6starfinder.shtml.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.



Compass is built as two separate assemblies, the camera-gyro assembly and the data processor assembly, connected by a wiring harness. The technology uses an active pixel sensor in a wide-field-of-view miniature star camera and micro-electromechanical system (MEMS) gyros. Together, they provide extremely accurate information for navigation and control.

LOCAL ASTRONOMY EVENTS

3 May, 10am-3pm
Space Day Family Day
National Mall

3 May, 7pm
The Search for Extraterrestrial Intelligence
Montgomery College Planetarium

3 May, 9pm
Exploring the Sky
Rock Creek NP & NCA

5 May, 9pm UM Obs Open House

8-11 May MathCounts National Comp
Denver, CO
(Cheer Guy's team!)

10 May, 7:30pm NCA Mtg
UM Observatory

11May, 7pm NOVAC Mtg
Enterprise Hall, GMU

14 May, 7:30pm
Westminster Astro Soc Mtg
Bear Branch Nature Center

15 May, 7:30pm
Howard Astro League Mtg
Howard County Dept. of Recreation and Parks

20 May, 9pm UM Obs Open House

21 May, 7:30pm TriState Astro Mtg
William Brish Planetarium

29 May, 7:30pm
Astro Soc Greenbelt Mtg
H.B. Owens Science Center

The UM Observatory website maintains a more complete list of links to local astronomy clubs and space places.

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INFRARED LIGHT FROM EXTRASOLAR PLANETS

Presenter: Dr. D. Deming

Reviewer: Dr. W. Warren Jr.

The monthly NCA meeting of March 8, 2008 was highlighted by a lecture on infrared observations of planets orbiting stars other than the Sun, normally called extrasolar planets (or exoplanets). This exciting lecture was given by Dr. Drake Deming, Chief of the Planetary Systems Laboratory, Solar System Exploration Division at NASA's Goddard Space Flight Center. Dr. Deming has focused his research over the last 10 years on detecting and characterizing exoplanets of the "hot Jupiter" class; he is currently the Principal Investigator on the EPOCh (Extra Solar Observation and Characterization) mission, which is using the Deep Impact spacecraft as part of the EPOXI mission, named as a combination of EPOCh and DIXI (Deep Impact eXtended Investigation), which will fly past Comet Hartley 2 in October 2010.

Dr. Deming began his talk by reminding us that extrasolar planets have been known to be orbiting solar-type stars for 13 years, but the first detection of infrared radiation from a "hot" Jupiter was made only 3 years ago. The planet in question is only about 0.05AU from its parent star, meaning that the probability of transit events is higher. The first such detection was actually made with a small telescope set up in a parking lot in Boulder, Colorado. There are now 20 extrasolar planets known to be transiting bright solar-type stars.

The reason that transiting events yield such valuable information can be understood by considering what happens during primary and secondary eclipse. During primary eclipse, a star's light passes through the atmosphere of the planet as it appears in silhouette against the bright background. The detection of faint absorption lines originating in the planet's atmosphere gives us composition information. During secondary eclipse, we see thermal radiation from the planet disappear during ingress and reappear during egress. Thus, we learn about global structure, atmospheres, and eccentricity/obliquity. We can also determine the sizes and masses of transiting planets, thus telling us about a planet's average internal structure. Accurate data for the planet HD 149026 b shows us that the planet is smaller, but more massive, than Jupiter. In fact, it appears that the planet has a heavy element core approximately 70 times the mass of the Earth.

The first IR detection of an eclipse was made with the Spitzer Space Telescope. The thermal emission detected enables direct detection of IR light from the planet. The eclipse depth yields a temperature of 1100 Kelvin (K). Another planet detected around the K3V dwarf star HD 189733 b gives a better result because the planet is about the same size as HD 149026 b while the parent star is fainter and smaller. Thus, the planetary signal is a larger proportion of the total signal, yielding a larger S/N ratio. Since the depth of an eclipse is $(R_p/R_*)^2$ (T_p/T_*), planets around cool dwarf stars (i.e., lower main-sequence) give better results.

High-resolution observations of HD 189733 b show a beautifully clean light curve containing clear primary and secondary eclipses. In fact, the data are so good that the planet's rotation can be seen via a thermal phase variation. Observations of HD 189733 b at other wavelengths have now been made and they show an energy distribution of a "normal" hot Jupiter. The energy distribution even indicates that water vapor is present in the planet's atmosphere. [Note: more recent models contradict the water vapor ones...WHW.] Spectra also show that there is silicate dust present in the atmosphere of HD 209458 b.

A reconstruction of the atmosphere of HD 209458 b seems to show a reversed temperature profile (higher temperature at greater altitude), unlike that of HD 189733 b. Models of HD 149026 b show a hot stratosphere in the most extreme model. Observations during eclipse appear to agree with the extreme model and give an equivalent thermal temperature of 2300 K, no doubt due to the proximity of the planet to its large luminous parent star.

Dr. Deming next discussed a transiting planet that is equivalent in size to a hot Neptune. This planet was discovered about a year ago orbiting an M dwarf star designated GJ 436. [This is a designation from the Gliese-Jahreiss *Catalogue of Nearby Stars*, a successor to the Gliese catalog of the same name that compiles information for stars closer than 22.5 parsecs to the Sun...WHW]

The transit eclipse is only 0.6% deep and corresponds to an equivalent thermal temperature of 712 ± 36 K (actually a brightness temperature at 8 μm), but no secondary eclipse had been seen at the time. The Goddard group found the secondary eclipse in the infrared at phase 0.58 and it was determined to have a depth of only 5.7 parts in 10^4, corresponding to a temperature of 712 K. This planet has an eccentric orbit of period 2.644 days and is in pseudo-synchronous rotation with a period of about 2.3 days. The eccentricity of the orbit leads to an 83% variation in the amount of light received from the parent star over a 1.3-day timescale, thus leading to complex flow patterns over the planetary surface.

Dr. Deming concluded his talk by discussing "The M-dwarf opportunity" as defined by himself and David Charbonneau of Harvard University. M dwarfs offer exciting opportunities for finding habitable planets for several reasons. They are much more numerous in the Galaxy than are any other types of stars and there are many of them in

(Continued on page 7)

Mid-Atlantic Occultations and Expeditions

by Dr. David Dunham

Asteroidal Occultations

Date	Day	EDT	Star	Mag	Asteroid	dmag	dur. s	Ap. in.	Location
May 12	Mon	23:07	2UC37387291	12.9	Varsavia	2.9	4	10	NJ,PA,OH;nMD?
May 15	Thu	1:47	PPM 732830	10.2	Nei Monggo	1.5	2	4	PA,OH;MD,nVA?
May 19	Mon	22:09	TYC61230585	11.3	Libya	3.8	8	8	e&nNC,swVA
May 27	Tue	3:03	2UC22726370	11.8	Rosa	2.7	6	8	NC, Tenn.
Jun 7	Sat	3:20	TYC74271593	11.2	Johanna	1.8	13	7	eVA,seMD,DE
Jun 18	Wed	3:17	SAO 186418	8.8	Fortuna	1.9	19	3	Fla,sTex,nMex

Grazing Occultations

DATE	Day	EDT	Star	Mag	% alt	CA	Location
May 8	Thu	22:32	SAO 78579	9.3	18+ 17	14N	Chantilly&DaleC,VA;LaPlata,MD
May 10	Sat	23:12	ZC 1297	6.8	38+ 28	14N	Natural Bridge,VA, Witaker,NC
May 12	Mon	21:05	SAO 118218	7.8	59+ 56	18N	Columbia & Odenton,MD; Sun-10
May 14	Wed	20:46	ZC 1711	7.9	78+ 47	20N	Sykesville, Annapolis, MD
May 29	Thu	4:57	SAO 146779	8.8	37- 31	13N	Grnsb,NC;Richmnd,VA;LexPrk,MD
Jun 5	Thu	21:35	ZC 1097	6.9	7+ 13	15N	Remington & Fredericksburg,VA

Total Lunar Occultations

DATE	Day	EDT	Ph	Star	Mag	% alt	CA	Sp.	Notes
May 10	Sat	20:13	D	35 Cancri	6.6	37+ 60	54S	G0	ZC 1282; Sun -2 deg.
May 10	Sat	21:40	D	ZC 1287	6.7	38+ 44	59S	A5	rest Praesepe stars
May 10	Sat	22:35	D	SAO 98009	7.6	38+ 34	67N	A7	during NCA meeting &
May 10	Sat	23:07	D	SAO 98027	7.8	38+ 28	47N	A8	Astronomy Day
May 10	Sat	23:47	D	BY Cancri	7.9	39+ 20	74N	A7	SAO 98054
May 12	Mon	21:00	D	SAO 118218	7.8	59+ 58	26N	F5	cen. MD graze
May 12	Mon	21:10	R	SAO 118218	7.8	59+ 57	11N	F5	
May 13	Tue	23:54	D	SAO 118693	7.7	70+ 34	71N	G5	
May 14	Wed	20:41	D	ZC 1711	7.9	78+ 47	29N	G0	cen. MD graze
May 14	Wed	20:52	R	ZC 1711	7.9	78+ 48	12N	G0	Sun alt. -8 deg.
May 21	Wed	1:08	R	ZC 2397	6.5	99- 23	50S	K1	WA 253; term. 15" away
May 27	Tue	5:15	R	SAO 164779	7.2	58- 34	82S	G5	Sun alt. -6 deg.
May 28	Wed	3:19	R	SAO 146272	7.7	48- 17	67N	G5	
May 29	Thu	3:47	R	13 Piscium	6.4	37- 18	83S	K1	
May 31	Sat	3:47	R	SAO 92318	7.9	17- 8	61N	G0	Azimuth 81 deg.
Jun 1	Sun	3:50	R	ZC 317	6.4	9- 2	71S	F5	Azimuth 70 deg.
Jun 6	Fri	20:51	D	ZC 1242	6.9	14+ 30	46S	F2	Sun alt. -4 deg.
Jun 6	Fri	21:16	D	SAO 80051	8.2	14+ 25	84S	K0	Sun alt. -8 deg.
Jun 9	Mon	0:21	D	SAO 118138	7.1	35+ 3	63N	M3	Azimuth 280 deg.
Jun 10	Tue	21:22	D	SAO 138313	7.6	54+ 42	80S	F9	Sun alt. -9 deg.
Jun 11	Wed	21:30	D	ZC 1778	7.0	64+ 40	78N	K0	Sun alt. -10 deg.
Jun 15	Sun	1:24	D	SAO 182861	7.3	89+ 15	41S	F2	Azimuth 224 deg.

On Mon. morning, June 30, the 11% sunlit waning Moon will pass through the Pleiades, with the reappearance of a few of the bright stars visible on the dark side, but the Moon will be only a few deg. above the east-northeastern horizon then. Data for the brighter events will be in the next Stardust.

More information is at iota.jhuapl.edu/exped.htm.
David Dunham, dunham@starpower.net, phone 301-474-4722

ANTIQUE 6-INCH F/15 "KIESS" REFRACTOR

BY BRON GERVAIS

Edward Keiss, son of the late Dr. Carl C. Keiss, recently donated his father's antique telescope to the NCA. I had responded to Ed's e-mail, offering to give the scope to "someone interested in astronomy, perhaps your astronomy organization," and picked it up on behalf of the NCA. The telescope had been in the basement of a house in NW Washington, DC for almost 50 years, where it hung on the wall, and includes the original equatorial mount. When I asked Ed if this might be an Alvan Clark, he recognized the name. Ed recalled the peculiar spelling of "Alvan" from a letter that Georgetown University's Fr Heyden had written to Mrs. Carl C. Keiss around 1960. Dr. Keiss got his PhD from University of California in 1913, and was an astronomer/physicist working in spectroscopy at the National Bureau of Standards. Dr. Keiss had gone on to do research at Georgetown University after he retired from the National Bureau of Standards in 1957, until he passed away in 1967.

In the past few weeks that I've had the telescope, I've been in contact with a variety of people and organizations that are knowledgeable about antique telescopes. The book Alvan Clark & Sons, Artists in Optics, by Warner and Ariail, appears to be the seminal work on Alvan Clark & Sons. It was published by Willmann-Bell, who many will recognize for their fine books about astronomy, and is in its second edition which is now out of print. The international Antique Telescope Society and their "Oldscope" Yahoo Group is another good source.

Alvan Clark died in 1887, and the Clark & Sons company passed through many hands, well into the 1930s, and it seems there is still much to learn about the influence of Clark's legacy. On Jan. 31, 1862, his son Alvan Graham Clark, while testing a new 18-inch refracting telescope, discovered Sirius B, the magnitude 8 companion of Sirius and the first known white dwarf. The long period comet named after Dr. Keiss gave us the Aurigid meteor shower on September 1. 2007.

I'm taking care to only do the most basic of cleaning, removing the layer of black dusty grime that has settled on the scope and mount as they rested in the basement for those years. Some initial correspondence I've had suggests that this may not be an Alvan Clark, but offers no clue yet at to who may have made it. Ed believes it was manufactured between

(Continued on page 6)

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Jeffrey Norman
Wayne Warren
Harold Williams

PDF distributor: Jay Miller

(Continued from page 5)

1912 and 1919 or so. Reasons that I've been given for this not being an Alvan Clark are:

a. the use of two wheels on the focuser, instead of one,

b. the use of aluminum for the mirror cell and adapters between the different pieces of tube in the OTA, instead of brass,

c. 1.25-inch eyepiece diameter, instead of 1.15-inch, and

d. the mount doesn't appear to match the Clark style,

e. no identifying plaque or markings on the tailpiece.

These points do start to stack up, but it is clear that the telescope is old and well made. The tight-fitting cap on the primary cell has kept the lenses in pristine condition, and I'm looking for an opportunity to do a star test.

I had told Ed Keiss as I thanked him for his generosity that this was the start of an adventure, and I'm only beginning to appreciate just what that is. I'll be sharing more as I learn more about this piece of history.

Photos by Bron Gervais

RECENT OUTREACH REPORTS!

Wood Acres Space Night

Alan Bromborsky

NCA participated in Space Night (April 17, 2008) at Wood Acres Elementary School in Bethesda MD. Alan Bromborsky supplied his Apogee 88 mm astronomical binoculars (32x) so that students and parents could view the moon. During the viewing hours between 200 and 300 students and parents viewed the moon. Typical comments were "wow" and "I never saw it so big." The only problem was students grabbing onto the eyepieces or knocking the binoculars off the target with their heads. Overall Space Night was a large affair with sixteen venues including a planetarium show and talks by astronaut Neil Woodward.

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Science Fairs

Jay Miller

NCA members were able to attend only two science fairs this year, Prince George's County and Montgomery County. The Price George's County fair was judged by Martha and Wayne Warren. The winning project was "What is a MES: Martian Environmental Simulator II" by Julie Emily Walker from Hollywood, MD and a student at Leonardtown Regional High School. The Montgomery County Science Fair was judged by Alan Bromborski and Jay Miller. The junior project chosen was "Geomagnetic Field Fluctuations" by Miles King of Potomac, MD.

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Family Astronomy Days

Guy Brandenburg
Photos by Joe Morris, Katie Moore

At least half-a-dozen NCA members engaged in outreach activities at the two sites of the National Air and Space Museum on April 12 and 19th. We let scores, and perhaps hundreds, of visitors from around the region and around the world look at and through telescopes, both commercial and homemade. We tried to answer lots of questions about all aspects of science, particularly astronomy.

On April 12, **Joe Morris**, **Jim Roy**, **Jay Miller**, and **Jeff Guerber** were at the NASM's Udvar-Hazy annex in Chantilly, VA for Family Telescope Day. The weather wasn't great, but Jay brought his 6-inch f/8 refractor and let people look at various objects inside the enormous museum hall. Jeff brought along a home-made 4.25" f/4 Newtonian telescope made out of plumbing parts and plywood.

Westminster Astronomy Club also had a display, and some of the museum staff were running one at which kids could color black construction-paper disks to look like the views of astronomical objects through an eyepiece.

The following weekend, **Joe**, **Jay**, and **Jim** were joined at the original NASM building on the Mall in DC by **Nancy Grace Roman**, and **Guy Brandenburg**, who brought an 8-inch f/6 telescope he made and a 5-inch f/7 telescope made by some of his students. He also had a simple Ronchi tester made out of a broken chair, a battery-powered LED, and a 100-line-per-inch grating, but whose incredible sensitivity allowed interested viewers to see heat waves coming off of their friend's hands in front of a very nicely parabolized 6-inch mirror. Jim Roy brought a Meade reflecting scope and a small refractor, as well as a model of an original Galilean refractor, to form a "Telescope Petting Zoo" along with Guy's telescopes, which a lot of youngsters took quite literally. There were no major accidents. Jim also had on display a number of beautiful astrophotographs that he had taken. Jay had his C-11 set up outside with a filter so that people could see the Sun at H-alpha wavelengths. (He said the seeing was only fair, and that solar prominences were a bit hard to see for most visitors.) Joe let interested people take a look through his C-11, which he had set up inside.

Thanks to the contributions of Guy, Elizabeth, Jeff, Gary Joaquin, and others, we National Capital Astronomers finally had a club banner that fit very nicely in front of our tables.

There were also other tables from other groups, including one from NOVAC; a group that allowed youngsters to make their own Keplerian telescope out of two cardboard tubes, some rubber foam, and two plano-convex plastic lenses; and one promoting the search for extra-solar planets, manned by Paul Hueper, among others. There were probably other tables that this writer didn't notice.

The NASM continues to see NCA and other local astronomy clubs as a valuable resource, and made special arrangements for us volunteers to have parking and a decent lunch at no charge. We were set up by 10 AM when the museum opened, and wrapped everything up at 3 PM. According to veterans of these events, the day's crowds were fairly average.

If anybody is interested in trying to spark an interest in science and astronomy in the general public, this is a fun and engaging way to spend part of an April morning and afternoon doing just that.

STARRYTELLING FESTIVAL

Discover the Galileo in You… at **Look Up! The StarryTelling Festival.** Invite your children and grandchildren along for an astronomical day of discovery from 2-10 pm on July 19 at the Kensington Town Hall, Kensington, MD. A full day of stories from ancient astronomers, Galileo and contemporary scientists -- with a little magic thrown in. Northern Stars Planetarium will bring a StarLab for stargazing and stories under an inflatable celestial sphere. Bring your own telescopes and your wisdom to share! We want to hear your story too!

WHAT: StarryTelling Festival

WHEN: Sat 19 Jul 2008, 2-10pm

WHERE: Kensington Town Hall, Kensington, MD

(Continued from page 4)

the solar neighborhood, thus increasing the probability of detection from Earth. Unlike the Solar System, the habitable zone of an M-dwarf planetary system is much closer to the parent star, so the periods of any habitable planets will be short compared to a year. Since transiting probability increases with decreasing planetary distance, we should find more transiting planets around M dwarfs than around solar analogs. Planets are much easier to detect around low-luminosity stars and the higher S/N ratios will result in more accurate observations. For these reasons, Charbonneau has deployed an array of eight 0.4-meter (16″) telescopes on Mt. Hopkins in southern Arizona to monitor some 8,000 nearby M dwarfs for transit events. Following discoveries of other systems, observations with the James Webb Space Telescope (the Spitzer Observatory will probably only last for another year) are planned to learn more about any newly discovered systems.

Dr. Deming summarized his talk with the following remarks:

1. Using the Spitzer Infrared Telescope Facility, secondary eclipse observations have been used to measure thermal emission from hot Jupiters at a spectral resolving power of ~5 (photometry of 10 planets) and of ~100 (two planets).
2. Dramatic differences in temperature structure are seen. They may be related to parent-star differences, planetary composition, and/or photochemistry – we just don't know yet.
3. The dynamics of heat redistribution varies.
4. Spitzer technologies are more favorable for lower main sequence stars:
    a. one hot Neptune in an M-dwarf system has already been detected and studied.
    b. M-dwarf habitable planets will be detectable using future space missions.

The NCA is indebted to Dr. Deming for an interesting and stimulating talk. The subject of possible detection of extrasolar habitable planets always generates a lot of interest and discussion, so Dr. Deming's research area promises a bright future. The writer thanks Drake Deming for reviewing this review and for his suggested changes.

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