Next Meeting
When: Sat. Dec. 14th, 2013
Time: 7:30 pm
Where: UMD Observatory
Speaker: Douglas Hamilton

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Directions to Dinner/Meeting
Our time and location for dinner with the speaker before each meeting is 5:30 pm at Mulligan’s Grill and Pub on the UM Golf Course. Mulligan’s is one intersection closer to the observatory on Route 193 than UMUC. One turns on to “Golf Course Road” and drives a few hundred feet to the golf course building, where “Mulligan’s Grill and Pub” is located.

The dinner menu can be downloaded from http://mulligans.umd.edu/

The meeting is held at the UMD 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.

The Origin of Titan & Hyperion
Douglas P. Hamilton
University of Maryland

Abstract: Titan is arguably the Solar System’s most unusual satellite. It is fifty times more massive than Saturn’s other moons and is the only satellite with a substantial atmosphere. Titan shares a unique resonance with nearby Hyperion; but, otherwise, it sits in a particularly large gap between Rhea and Iapetus. Titan has the largest eccentricity of all Saturn’s regular satellites and has a reasonably large orbital tilt; its distant neighbor, Iapetus, has an even more impressive 8º inclination. Hyperion itself is a mystery, with its extremely low density and its unique surface covered with bizarre craters. None of these peculiarities was even partially understood…until now!

Biographical Sketch:
Douglas Hamilton is a Professor in the Department of Astronomy at the University of Maryland. He is known for his insights into how the individual planets and moons and asteroids in the Solar System formed, and how they eventually became as we see them today. He discovered Saturn’s largest ring, and has solved several long-standing puzzles. Some of these puzzles include how it is possible for a pulsar to have planets (some do!), why Saturn is tilted, how Neptune captured Triton, the effects of intermediate-mass black holes in globular clusters, and, very likely, other intriguing puzzles that he will discuss in his talk. He is renowned for his clear and vivid explanations. He is also the lead author of the Astronomy Workshop (http://janus.astro.umd.edu/), a collection of interactive tools for use by Astronomy students and the general public.
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.

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.
Sky Watchers

December

Winter Schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Event</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>5:30 pm</td>
<td>Planets, SW Sky, Northern Hemisphere.</td>
<td>Features: Venus ((\text{maximum mag: } -4.9)) &amp; Phases of Venus (during December)</td>
</tr>
<tr>
<td>13-14</td>
<td>9-10:00 pm</td>
<td>Geminid Meteor Shower, Global.</td>
<td>solarsystem.nasa.gov/planets/geminids.cfm</td>
</tr>
<tr>
<td></td>
<td>(peak)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>4:28 am</td>
<td>Full Moon, Global.</td>
<td>Other Moon Names: Cold Moon, Long Night Moon, Moon before Yule</td>
</tr>
<tr>
<td>21</td>
<td>12:11 pm</td>
<td>Winter Solstice, Northern Hemisphere.</td>
<td></td>
</tr>
<tr>
<td>25-28</td>
<td>10:08 pm</td>
<td>Moon &amp; Planets, SE Sky, Northern Hemisphere.</td>
<td>Features: Moon, Mars &amp; Saturn</td>
</tr>
</tbody>
</table>

All times EST

Got Books?

Sally Bosken

Looking for an astronomy book? The US Naval Observatory (USNO) Library is happy to have visitors come to do research and use our collection. You can't "check books out," but you can use them on site and read past astronomy journals. We have them all in hard copy and online. Just email a week in advance to set up a date and we will be happy to help you.

Library Hours: 8 am – 4 pm, Monday – Friday
Location: 3450 Massachusetts Ave NW, Washington DC 20392-5420
(free parking on the grounds)
Appointment set-up: email Sally Bosken, USNO Library (sally.bosken@navy.mil)

ISON: The other side...

Courtesy NASA/SOHO
http://youtu.be/kcROVqmF9SY

Plate 9: Ophiuchus, the serpent-bearer, from A. Jamieson’s Celestial Atlas (1822 CE) – USNO Rare Book Collection

Exploring the Sky

will resume in April 2014!

“Exploring the Sky” is an informal program that, for over 60 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. Presented by the National Park Service and National Capital Astronomers, sessions are held in Rock Creek Park once each month on a Saturday night from April through November. Beginners (including children) and experienced stargazers are all welcome—and it’s free!

Circadian Rhythms, LEDs & the Stars...

Courtesy NASA Earth Obs/NOAA NGDC
Bob Parks, Director of the International Dark Sky Association, discusses light pollution on CBS. http://bit.ly/1eIhxmq

ISON: The other side...

Courtesy NASA/SOHO
http://youtu.be/kcROVqmF9SY
Ceres

David Dunham

On October 25th (only four nights after the Patroclus occultation), another occultation occurred across most of the east coast of the US, from southern Maine to Georgia. The occultation was important since it was the last chance to record an occultation of a star bright enough (11th magnitude or brighter) to be observed by 8th-magnitude Ceres before NASA’s Dawn spacecraft will reach it in February 2015. It was clear in the Mid-Atlantic & New England regions; but, it was cloudy in the Carolinas and southernmost Virginia. The occultation of the 10.0-mag. star in Virgo occurred at 5:40am EDT and, due to Ceres’ fast motion, lasted about 22 seconds for observers in the Washington, DC area (which was near the center of this very wide path). Since Ceres was brighter, there was only a 0.3-magnitude drop when the occultation occurred, difficult to notice with visual observations but obvious in analysis of video recordings of the event. The event occurred at an altitude of 15 degrees above the eastern horizon, posing challenges for finding a location with an unobstructed view. The view from my backyard in Greenbelt was blocked in that direction by a neighbor’s house, but there was a view of such a low altitude between trees outside of a room on the top floor of our house. The figure to the right shows the 120mm refractor (with video equipment attached) set up in that room. I pre-pointed the telescope early in the evening before the event (I used a convenient pre-point opportunity of the 4th-mag. star, omicron Tauri). My wife Joan then took the picture and closed the window. Then, half an hour before the event, Joan got up, turned off the heat, and opened the window. By the time of the event, the air in the room stabilized to obtain a good recording of the occultation. In the meantime, I had driven south, to successfully record the occultation with two more 120mm refractors at locations north and south of Richmond, VA (at Varina and at Hanover High Schools). The occultation was also recorded from 4 other stations, in Maryland, northern Virginia, and New England; so, after we analyze the observations, we can contribute to characterization of Ceres before Dawn’s arrival. The only other occultation by Ceres that has been observed from multiple stations was observed in November 1984. Ceres image credit: NASA/ESA/J. Parker (Southwest Research Institute), P. Thomas (Cornell University), L. McFadden (University of Maryland, College Park), and M. Mutchler and Z. Levay (STScI).
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

Asteroidal and Planetary Occultations

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>EST</th>
<th>Star</th>
<th>Mag.</th>
<th>Asteroid</th>
<th>dmag</th>
<th>s</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dec 15</td>
<td>Sun</td>
<td>2:08</td>
<td>2UC41323806</td>
<td>13.6</td>
<td>Latona</td>
<td>0.3</td>
<td>6 10 NJ, sPA, MD, DC?</td>
<td></td>
</tr>
<tr>
<td>Dec 19</td>
<td>Thu</td>
<td>3:28</td>
<td>2UC39846820</td>
<td>13.2</td>
<td>Lumen</td>
<td>0.5</td>
<td>10 26 sDE, sMD, VA, DC?</td>
<td></td>
</tr>
<tr>
<td>Dec 22</td>
<td>Sun</td>
<td>1:44</td>
<td>2UC34836511</td>
<td>12.2</td>
<td>Honoria</td>
<td>1.2</td>
<td>9 8 SNJ, MD, nVA, DC?</td>
<td></td>
</tr>
<tr>
<td>Dec 29</td>
<td>Sun</td>
<td>1:29</td>
<td>2UC40637532</td>
<td>12.1</td>
<td>Ate</td>
<td>0.6</td>
<td>31 8 MD, sPA, DC, nVA?</td>
<td></td>
</tr>
<tr>
<td>Dec 29</td>
<td>Sun</td>
<td>18:15</td>
<td>SAO 128055</td>
<td>9.2</td>
<td>Valborg</td>
<td>5.9</td>
<td>1 4 sEN, nVA, DC, MD, nSJ</td>
<td></td>
</tr>
</tbody>
</table>

2014
Jan 3 Fri | 19:34| TYC24040617 | 9.7  | Zvezdara | 5.5  | 3 4 sEA, nWD, nVA?        |
Jan 9 Thu | 22:19| TYC06621464 | 10.5 | Branham  | 5.6  | 8 6 sEN, nVA, DC, PA      |
Jan 11 Sat| 2:04 | TYC49550550 | 12.2 | Meriones | 4.9  | 8 8 sPA, MD, DE, NJ, DC?  |

Lunar Grazing Occultations

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>EST</th>
<th>Star</th>
<th>Mag</th>
<th>%</th>
<th>alt</th>
<th>CA Location &amp; Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dec 26</td>
<td>Thu</td>
<td>2:14</td>
<td>ZC 1834</td>
<td>7.7</td>
<td>42-</td>
<td>14</td>
<td>2S *Cntrvil&amp;Burke, VA, Brndywin, MD</td>
</tr>
<tr>
<td>Dec 27</td>
<td>Fri</td>
<td>6:09</td>
<td>Spica</td>
<td>1.0</td>
<td>34-</td>
<td>16</td>
<td>2S Rostov &amp;Kovrov, RU-Moscow time</td>
</tr>
</tbody>
</table>

2014
Jan 9 Thu | 20:10| SAO 93030 | 8.0  | 69+ 65  | 0S *Williamsburg &sPetersburg, VA

Total Lunar Occultations

<table>
<thead>
<tr>
<th>Date</th>
<th>Day</th>
<th>EST</th>
<th>Ph Star</th>
<th>Mag</th>
<th>%</th>
<th>alt</th>
<th>CA Sp. Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dec 13</td>
<td>Fri</td>
<td>20:03</td>
<td>D sigma Ari</td>
<td>5.5</td>
<td>90+</td>
<td>60</td>
<td>51S B7 ZC 422</td>
</tr>
<tr>
<td>Dec 14</td>
<td>Sat</td>
<td>19:50</td>
<td>D ZC 532</td>
<td>7.1</td>
<td>95+</td>
<td>52</td>
<td>58S G0 Maybe close double</td>
</tr>
</tbody>
</table>
| Dec 16    | Mon | 3:55| D ZC 718  | 6.0 | 99+| 27  | 30S K4 Terminator Dist. 5"
| Dec 17    | Tue | 19:13| R ZC 943  | 6.6 | 99-| 19  | 60S B8 AA 273, TermDist 8" |
| Dec 20    | Fri | 1:41 | R ZC 1212 | 7.3 | 92-| 65  | 84S A5 close double? |
| Dec 20    | Fri | 20:48| R 45 Cancri | 5.6 | 88-| 7   | 63N A3 Az 79, ZC1309, close dbl? |
| Dec 22    | Fri | 22:50| R 50 Cancri | 5.9 | 87-| 30  | 13S A1 Az 1318, TermDist. 17" |
| Dec 21    | Sat | 0:56 | SAO 98146  | 7.7 | 87-| 52  | 85S F5 close double?  |
| Dec 21    | Sat | 5:46 | R 60 Cancri | 5.4 | 86-| 45  | 65N K5 ZC1332, close double?? |
| Dec 22    | Sun | 4:03 | SAO 117836 | 7.2 | 79-| 59  | 66S G5:nah             |
| Dec 25    | Wed | 2:51 | R ZC 1731  | 7.5 | 52-| 31  | 49N M*                  |
| Dec 26    | Thu | 2:21 | R ZC 1831  | 7.7 | 42-| 15  | 13S G5 Az.113, close double |
| Dec 26    | Thu | 3:56 | R ZC 1843  | 7.0 | 41-| 30  | 25N F5                  |
| Dec 27    | Fri | 5:15 | R SAO 158105 | 7.5 | 31-| 31  | 61S F5 close double??   |
| Dec 27    | Fri | 7:34 | R 86 Vir   | 5.5  | 30-| 79  | 70S GB Sun +1, ZC 1971 |

2014
Jan 4 Fri | 18:21| SAO 145968 | 7.6 | 17+ 29 | 62S B9
Jan 4 Fri | 18:38| SAO 145963 | 7.5 | 17+ 26 | 46N A2
Jan 5 Sun | 21:58| D ZC 3420  | 6.9 | 28+ | 4   | 295 K0 Azimuth 265 degrees |
Jan 6 Mon | 17:10| SAO 128524 | 7.6 | 37+ | 54  | 59N K2 Sun altitude -3 degrees |
Jan 6 Mon | 19:48| SAO 108995 | 7.9 | 38+ | 39  | 65S K2
Jan 6 Mon | 22:01| D ZC 14    | 8.0  | 38+ | 16  | 89B G5
Jan 7 Tue | 21:06| D ZC 131  | 7.9  | 49+ | 37  | 84N K0 close double?? |
Jan 7 Tue | 23:14| SAO 109603 | 8.1  | 49+ | 14  | 45N G5 Azimuth 269 degrees |
Jan 7 Tue | 23:25| D 70 Piscium | 7.6 | 50+ 12 | 85N G5 Az.271, ZC 142, Spec.Bin.
Jan 7 Tue | 23:46| D epsilon  | 4.3  | 50+ | 8   | 72S K0 Az.274, ZC 146, CloseDbl?
Jan 9 Thu | 19:51| SAO 93030  | 8.0  | 69+ | 65  | 26S F8
Jan 10 Fri | 1:16| D SAO 93094 | 7.9 | 70+ | 13  | 46N AO Azimuth 279 degrees |
Jan 10 Fri | 20:11| D ZC 505  | 7.1  | 78+ | 68  | 64S A0
Jan 11 Sat | 18:10| D ZC 629  | 7.5  | 85+ | 47  | 79S G5 Sun -11, spec. binary |
Jan 11 Sat | 20:30| D ZC 643  | 6.8  | 85+ | 68  | 75S F6

Explanations & more information is at http://iota.jhuapl.edu/exped.htm
David Dunham, dunham@starpower.net, phone 301-526-5590
As I finish the December issue of Star Dust, thinking about chthonian exoplanets, I realize that I finally have space to pay tribute to Ms. Sterns, the creator & first editor of this newsletter. When I accepted that very same role, I looked through the newsletter archives. The first Star Dust edition was October, 1943 (70 years before the first edition that I edited). At the time, there were 40 members, 4 officers, 4 trustees and $229.14 in the treasury: all for the 7th year of an organization called the Amateur Astronomers Association (later to become National Capital Astronomers). In 1948, Ms. Sterns also became the first newsletter editor for the Astronomical League. In fact, in 1988, the league created a newsletter award for member organizations in honor of Ms. Sterns’ service. The last Star Dust that she edited for NCA was in March, 1949 (Jewel Boling, who had been serving as assistant editor, then took over the editing duties). So, as we, fellow sky watchers of the DC area, continually aspire to share our love of the stars, let us take a moment to remember Mabel Sterns for her dedication that words still cannot adequately convey and for her creation that we shall continue to diligently maintain.

Yours in service, ~ CA

Mabel Sterns

CA Brooks

April 1943

MISS STERNS RESIGNS AS EDITOR OF STAR DUST

Since October 1943 Mabel Sterns has been Editor of STAR DUST. Only those who have performed a like service on a month by month basis can appreciate the amount of effort that went into the preparation of this publication. With her it was a labor of love. It was her brain child and she nurtured it faithfully for more than five years.

It is a tribute to Miss Sterns and to NCA, by reflected glory, that time and again STAR DUST has carried scoops of astronomical news. SKY AND TELESCOPES as well as POPULAR ASTRONOMY have frequently carried items printed in STAR DUST first, and credited to STAR DUST in the articles published in those journals.

It is with regret that the trustees have accepted Miss Sterns' resignation as Editor of STAR DUST. Nothing that we can say would adequately express our sincere appreciation for a job well done.
Learn how to use your Telescope

Coming January 2014!

Clear Skies!

Submission deadline for the January issue of Star Dust is December 31st

National Capital Astronomers Membership Form

Name: ___________________________________________ Date: ___/___/___

Address: ___________________________________________________________ ZIP Code: ______

Home Phone: ____-____-____ E-mail: __________________________ Print / E-mail Star Dust (circle one)

Membership (circle one): Student….. $ 5 Individual / Family…..$10 Optional Contribution…..$__

Please indicate which activities interest you:

- Attending monthly scientific lectures on some aspect of astronomy
- Making scientific astronomical observations
- Observing astronomical objects for personal pleasure at relatively dark sites
- Attending large regional star parties
- Doing outreach events to educate the public, such as Exploring the Sky
- Building or modifying telescopes
- Participating in travel/expeditions to view eclipses or occultations
- Combating light pollution

Do you have any special skills, such as videography, graphic arts, science education, electronics, machining, etc.?

Are you interested in volunteering for: Telescope making, Exploring the Sky, Star Dust, NCA Officer, etc.?

Please mail this form with check payable to National Capital Astronomers to:
Henry Bofinger, NCA Treasurer; 727 Massachusetts Ave. NE, Washington, DC 20002-6007

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