

# SIDEREAL TIMES

The Official Publication of the  
Amateur Astronomers Association of Princeton

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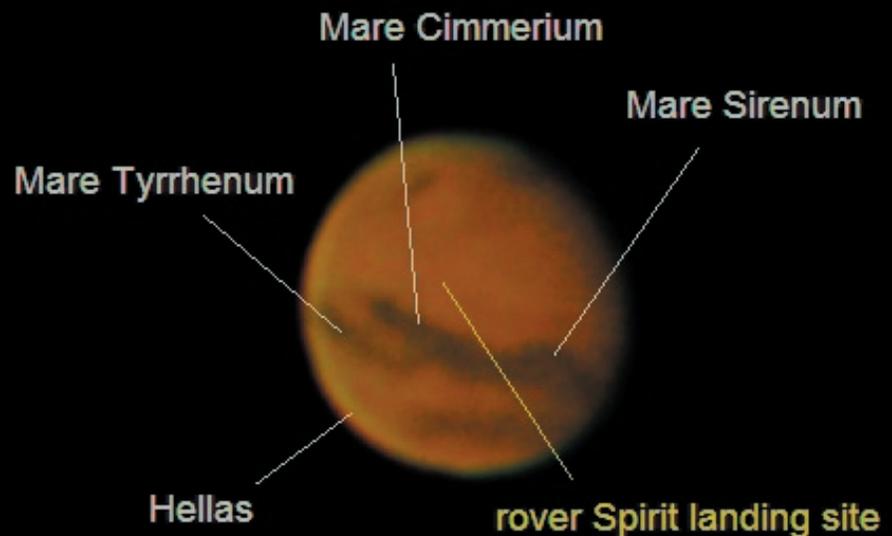
## From the Director

**Nov 8 AAAP Meeting.** Don't miss a remarkable evening coming up at our next AAAP meeting. The guest lecture on Tuesday, Nov 8 (8:00 PM, Peyton Hall) will feature Dr. Mario Livio, Senior Astrophysicist at the Hubble Space Telescope Science Institute. His talk is entitled, "Hubble's Top Ten Scientific Discoveries". Dr. Livio's longstanding research interests range from black holes, neutron stars, white dwarfs, and supernova explosions and their application to cosmology, to the emergence of life in the Universe. Dr. Livio has recently authored the book, "The Equation That Couldn't Be Solved" which explores the theory and language of symmetry in mathematics, science, and nature. This book has received critical acclaim for its literary skill and depiction of the lives of key mathematicians who evolved the ideas of symmetry and structure. There will be a book-signing opportunity assisted by the Princeton Univ. Bookstore at the beginning of our meeting (please come early for book-signing). For more information see Program Chair Ken Kremer's segment elsewhere in this issue, and visit the AAAP website ([princetonastronomy.org](http://princetonastronomy.org), John Miller, AAAP webmaster).

**Mars Opposition Opposed by Earth's Weather.** Despite best-laid plans to hold several Mars observing sessions at our observatory in Washington Crossing Park, the storms of October have shown their power and kept the observatory roof closed for much of this autumn. Same outcome for the AAAP annual fall picnic, which was rained out a couple weeks ago. On Oct 29-30 Mars reaches its closest position with respect to earth, about 69 million miles, and presents its largest angular diameter, just over 20 arc-sec (that's 1/3 of 1/60 of a degree). At magnitude -2.3 and declination +16 degrees, this opposition is better for visual

Mars from NJ

10-03-05 2:30 AM EDT



observation than the 2003 event under most sky conditions.

As it turns out, turbulence and thermal layering in the upper atmosphere are as much of a challenge to observing Mars as are cloudy skies. This phenomenon, common at this time of year on the east coast, leads to blurred images through the telescope. Occasionally and randomly, visibility becomes crisp for short intervals of less than a second, and if the observer is patient a few good views may occur. The same is true for CCD imaging, and only by downloading hundreds or thousands of individual frames can a few clear frames be captured. An example is seen above in the color Mars image (*Tak FS-128 at f/40, 5 meter focal length, ST-10XME camera with LRGB filtering technique*) taken October 3 from my yard (note the time annotation— yes, I had to work the next day!!). Features were matched to the Mars maps provided in *Sky and Telescope* (Sept 2005) to identify several landmarks on the Martian surface. The area just above that labeled Mare

Simpson Observatory (609) 737-2575

(Director, continued on page 3)

Minutes of the General Meeting  
**Amateur Astronomers Association of Princeton**  
October 11, 2005

Tentative AAAP Budget For 2005-06

The meeting started at 8 PM with general announcements.

Amy Gallagher, program Astro Nova, was introduced and talked for 15 minutes on the benefits of the Astro Nova program, she encouraged anyone in the audience to sign up to volunteer their time in the schools to promote and teach astronomy through the Astro Nova program.

The featured speaker, Craig Couvalt (Aviation Week and Space Technology magazine) gave his presentation which was well received. There was a question and answer period afterward

At 9:50 the business meeting was called to order.

Brian VanLiew presented his astro images from the fall member starparty held at Montclair Conservation School on October 1-3. There was some discussion afterwards about the starparty and if it should be done again next year.

The AAAP picnic was discussed, planned for October 22, 2005. Contact Larry Smith to RSVP and he was also looking for people to bring salads, deserts, etc. (note: The picnic was later cancelled due to rain on the 22<sup>nd</sup> and will be rescheduled)

The work party scheduled for October 15<sup>th</sup> to replace the small roof on the back of the Simpson Observatory was cancelled since Gene Ramsey and John Church felt it necessary to consult an engineer before replacing the roof.

Brian VanLiew announced the keyholder training schedule. Anyone who wants to be trained as a keyholder should contact Brian.

John Church presented an initial analysis for a proposed budget (shown at right) for the club. A discussion followed as to how and when a budget should be implemented, if at all.

Vic Belanger reported that his intro to astronomy course was a success and he had very good attendance at his classes. The classes were held at the nature center in the Washington Crossing Park next to the observatory. Students would come to the observatory after their class if it were a clear night.

John Miller reported that there was a good effort in getting publicity emailed to the local newspapers and other media. He will continue with notifying the media about club events.

Ron Mittelstaedt reported that the treasury balance is at \$XXXX>X.

Another discussion about the Schmidt Camera that the club owns came about. It will be moved from Jenny Jump to a safer, stable environment for evaluation and accessibility for its use. Ludy D'Angelo offered his basement for temporary storage. There will be further discussion at another time if it should be sold or not.

Jane Lanahan resigned as Membership Chairperson. For the time being, she will continue to send out greeting packages to the new members. There will be some decision in the near future for replacement or elimination of the position.

Meeting adjourned at 10:45 PM

Submitted by  
Ludovico D'Angelo, Secretary

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**A Money Saving Find; or  
How I saved \$6,500.00 by using  
two hours of retirement time.**

A few years ago I saw posted on Astromart an original copy of Edward Emerson Barnard's "Photographic Atlas of Selected Regions of The Milky Way" and I certainly could not afford that. I was lucky to find two copies at the library at Payton Hall, how exciting to see and touch the actual prints made by Bernard himself and pasted onto each of the 50 pages of photos.

Today Oct 26th I spent the afternoon downloading all the photos from a free webpage at WWW.Library.Gatech.edu. I had my choice of all 50 plates in high resolution along with finder charts and text by Bernard himself. If I wanted, I could download large scale printable PDF files and each webpage had an enlarge function. It is fun to look at the photos while I read my copy of Bernard's biography "The Immortal Fire Within" by William Sheehan.

Ralph Marantino

## Eclipse Over Western Europe

AAAP member Ken Levy was on vacation in Spain last month and had the opportunity to observe an annular eclipse whose narrow track crossed his locale in the southern part of the country.

Despite scattered clouds the stage was set for a spectacular display. By 10am, skyward looking crowds gathered on the street as the first hint of the eclipse became apparent. By 11am the day darkened dramatically as the moon covered all but a slim outer ring of the sun. A most memorable part of the trip! The photo below was taken with a Digital Rebel through a welder's glass.



*(Director, continued from page 1)*

Cimmerium is the landing site where the rover Spirit still roams the Gusev Crater area! While it obviously is not visible to us here, it is thrilling to realize it's there doing unprecedented research on the Red Planet, as described at recent AAAP meetings with the superb videos and science updates provide by Program Chair Ken Kremer.

Dark Skies! -- Rex

### From the Program Chair

On October 11, award winning journalist **Craig Covault** from Aviation Week & Space Technology Magazine, gave a very well received talk and described some of his humorous and poignant adventures related to manned and robotic missions and also global national security issues. We were fortunate to hear many never before revealed "war" stories. Just prior to his Princeton talk, he visited with the Mars Rover team and Steve Squyres up at Cornell to prepare a new feature article following up on his "Real Martians" from November 2004. So he also updated us on the latest adventures of Spirit at the Summit and the "wheel wiggling" required to reach the "Hillary" rock target. There were numerous questions, and at the conclusion Craig handed out a big stack of complementary copies of Aviation Week for the appreciative crowd.

The upcoming lecture season currently features:

The November 8 keynote speaker will be prize winning author **Dr. Mario Livio**, Senior Astronomer and former Head of the Science Division at the Space Telescope Science Institute (STScI). His talk, titled "Hubble's Top 10 Scientific Discoveries" will detail the key scientific breakthroughs resulting from the first 15 years of operation of Hubble in low-Earth orbit. He is also an adjunct professor at John Hopkins University. and has published more than 400 papers. He has received numerous awards for research

and for excellence in teaching. He is the author of The Golden Ratio, a highly acclaimed book about mathematics and art for which he received the International Pythagoras Prize and the Peano Prize

Dr. Livio will be signing copies of his acclaimed new book, The Equation that Couldn't Be Solved: How Mathematical Genius Discovered the Language of Symmetry. The book will be autographed and on sale at the lecture theatre in Peyton Hal

On December 13, the speaker will be **Dr. Kimberly Weaver**: X-Ray astronomer at NASA Goddard Spaceflight Center and author of a newly published book, "The Violent Universe". She is also the Program Scientist for the Spitzer Space Telescope and currently based at NASA HQ.

**Field Trip to Honeybee Robotics in Manhattan:** Projected for Dec/Jan. Limited to 17 participants, 9 so far. Those interested should please email me or Bryan Hubbard:

Please send me your suggestions for speakers, with contact/topic information.

Email:

Ken Kremer

Deadline for the  
December Issue of the  
Sidereal Times  
Friday, December 2, 2005

# Science Outreach and Exploration Update

## Science Outreach

**“World Space Week” at The Franklin Institute Science Museum:** Philadelphia, Pa, Oct 1, 2005, 10 AM to 3 PM. This annual UN sponsored event celebrates the achievements of astronomy and space exploration on behalf of humankind. My “mission booth” set up included displays on 3D viewing, Deep Impact at Comet Temple 1, Space Shuttle Return to Flight, Cassini at Saturn and the ongoing trek of the Mars Rovers which featured the scale model of the science drill from Honeybee Robotics. I gave several presentations of “*Exploring Mars and the Search for Life*” and slide shows on “*A Tour of the Solar System*” and “*NASA Returns to the Moon*”.



Ludy D’Angelo and Larry Kane manned the AAAP exhibit table with an informative display of telescopes and astronomy info for inquisitive minds. See the picture on the AAAP homepage of Larry, Ludy and myself with Derrick Pitts, chief astronomer at the Franklin Institute. He and his staff thanked us for our active public outreach participation, exhibits and presentations on Mars and beyond.

**New Jersey Science Teachers Convention:** Somerset, NJ, Oct 5, 2005. Despite my being a literally last second addition to the convention schedule, the presentation room was packed with an enthusiastic crowd of about 50 for my lecture on “*Exploring Mars and The Search for Life*”. The audience of attentive science teachers responded with a wide variety of excellent questions. They also enjoyed handling the Mars Rover “RAT” science drill on loan from Honeybee Robotics. Overall it was quite an enjoyable experience. Numerous AAAP lecture flyers were snapped up at the lecture and at the convention exhibition booths. Lots of enthusiasm resulted in future invites for science outreach lectures.

**29<sup>th</sup> International Electric Propulsion Conference: Mars at Opposition Star Party:** Princeton, NJ, Mon, Oct 31 at 7:30 PM. AAAP volunteers will provide telescope viewing for distinguished scientists from around the world at a nighttime conference social event. We were invited to participate by the conference organizer, Princeton Professor Edgar Choueiri, of the Department

of Mechanical and Aerospace Engineering (MAE). Future collaborations are being planned.

**New Jersey Astronomical Group (NJAG):** Montclair, NJ, Wed, Nov 9, 2005 at 8 PM. Our sister club has invited me to give a Mars Rover presentation, which is open to all. Please check this website for directions and info: <http://www.njastro.org/>

**JASON Expedition Conference: “Mysteries of Mars and Earth”:** BOCES Educational Center, Garden City, LI, NY, Thur, Nov 10, 2005 from 9 AM to 3 PM. I will present an invited lecture on the Mars Rovers at this upcoming conference for teachers.

**Rockland Astronomy Club (RAC):** Blauvelt, NY, Sat, Feb 11, 2006 at 6 PM. The Rockland club has kindly invited me to present a wide ranging space exploration lecture at their annual dinner meeting at the Casa Mia Restaurant. For information visit the RAC Website: <http://www.rocklandastronomy.com/>

A Mars info packet was sent to our good friend and colleague Barlow Bob for the benefit of the Mohawk Valley Astronomical Society (MVAS).

Please contact me for schools, museums or community groups interested in science outreach presentations.

Email:

Ken Kremer

## Robotic Mission Exploration Update

**Ulysses (ESA/NASA): Celebrates 15<sup>th</sup> Anniversary.**

The European-built Ulysses spacecraft was launched into space on October 6, 1990 by the Space Shuttle Discovery as the first spacecraft to be placed in a polar orbit around the Sun. It achieved this ‘out-of-the-ecliptic’ path via a slingshot around Jupiter and can study the sun and the heliosphere over all solar latitudes. During its 6 year long orbital period, it has traveled over 7 billion miles and provided new and exciting insights into solar and interstellar phenomena. A mission extension to March 2008 will allow Ulysses to observe the heliosphere in three dimensions over a large fraction of the Sun’s 22-year magnetic cycle [http://www.esa.int/esaSC/SEMTC5Y3EE\\_index\\_0.html](http://www.esa.int/esaSC/SEMTC5Y3EE_index_0.html)

**Spirit and Opportunity on Mars: Celebrate a Martian Year on Mars; “Spirit” on November 21 and “Opportunity” on December 11.** Our twin rovers continue their scientific assault on opposite sides of the surface of Mars. Due to the continuing good health of the rovers, NASA has enlarged the science team to include 8 new members to maximize the science output.

Spirit has now begun its descent from the Summit, having spent about 5 weeks of exploration at the top and completing several extensive panoramic imaging campaigns. Delicate maneuvering, nicknamed “*wheel wiggling*”, was required to reach the “*Hillary*” rock target. Extensive engineering testing was done before allowing Spirit to pitch upward at a record breaking angle of about 27 degrees. This was required to reach the target and enable deployment of the IDD and its spectrometers. Since power output on Spirit remains high (>700 watt hours), she is conducting a

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nighttime astrophotography campaign and has imaged Orion and the Orion nebula with the panoramic camera. Star trails can clearly be seen in the 60 second exposures.

<http://photojournal.jpl.nasa.gov/catalog/PIA03070>

Meanwhile Opportunity is making good progress around Erebus crater and studying the bedrock. Caution is the watchword however due to the numerous dunes. The rover nearly got trapped again, but safety checks avoided that. There have been surprisingly few "blueberries" and IDD work is planned soon for the "tasty" looking geology.

**Cassini/Huygens (NASA/ESA):** The next Titan Flyby (T8) is taking place on October 28 as this is being written. This flyby is extra significant because the cloud peering radar is being pointed directly at the Huygen's landing site. The goal is to provide further clues into the nature and composition of the area where the probe safely landed in January of this year.

View these truly incredible "*Prometheus Effect*" images, as this tiny shepherd moon (63 miles wide) creates a gore and then gravity induced ripples in Saturn's F ring, at the links below. Such phenomena have not previously been detected in planetary ring systems.

<http://photojournal.jpl.nasa.gov/jpeg/PIA07601.jpg>

<http://photojournal.jpl.nasa.gov/catalog/PIA07750>

A stunning ringside view of the icy moon Dione (700 mi wide), with Saturn as the backdrop, is at the link below. The only close flyby of the mission occurred on October 11, at a distance of just 310 miles from the heavily cratered and fractured surface. Also check out the Dione icemoon rendezvous movie, with a beautiful backdrop of Saturn and its rings.

<http://photojournal.jpl.nasa.gov/jpeg/PIA07744.jpg>

[http://ciclops.org/view\\_event.php?id=39](http://ciclops.org/view_event.php?id=39)

Like Enceledus, Dione may also be a source of material for the tenuous E ring. See a way cool "*many worlds*" picture of Rings, Titan, Dione and Prometheus at this link:

[http://planetary.org/blog/images/20051017/N00041980\\_rotated\\_levels.jpg](http://planetary.org/blog/images/20051017/N00041980_rotated_levels.jpg)

The close flyby of tiny Hyperion on September 26, revealed it to have a stunning and truly unique spongelike appearance as it tumbles through space.

<http://photojournal.jpl.nasa.gov/jpeg/PIA07740.jpg>

**Deep Impact:** I am pleased to announce that Prof Mike A'Hearn, the science Principal Investigator (PI), will be our AAAP keynote speaker on May 9, 2006. Mike told me by telephone that water and some simple organics (HCN, CH<sub>3</sub>CN, H<sub>2</sub>S) have so far been detected in the spectra. Further analysis has also revealed the presence of ethane, methanol, acetylene, methane, formaldehyde and carbon monoxide. His initial results were published in a special Deep Impact cover issue of SCIENCE on 15 Oct, comprising of 8 research papers. A temperature map of the comets surface was acquired with the IR spectrometer and gave a range from 260 K to 329 K.

**Stardust (Comet Sample Return):** This NASA spacecraft collected cometary dust particles from comet Wild 2 in January

2004 and is on target to return them in a science canister of aerogel collector plates on January 15, 2006. NASA has just issued an Announcement of Opportunity to use the spacecraft following completion of the sample return.

**Mars Express (ESA):** View a dramatic video flyover of the Martian North Polar Ice Cap at the link below, using images from the High Resolution Stereo Camera (HRSC):[http://www.esa.int/SPECIALS/Mars\\_Express/SEM8T86Y3EE\\_0.html](http://www.esa.int/SPECIALS/Mars_Express/SEM8T86Y3EE_0.html)

**Mars Global Surveyor:** A new global high resolution map of Mars magnetic field has been created with the onboard magnetometer for the first time. The data reveal that Mars experienced significant plate tectonics in the past.

**New Horizons (Pluto Flyby):** Checkout and testing of the science payload of 7 instruments has been completed. Altogether they draw only 28 watts. The spacecraft will be moved to the launch pad in December after being sheltered from Hurricane Wilma. The launch window for the first mission to the last planet opens on 11 January 2006.

**Venus Express Orbiter (ESA):** Just days before the scheduled October 26 liftoff, the launch was delayed when contamination was found on the spacecraft. ESA officials are optimistic that the spacecraft can be cleaned quickly and liftoff can be attempted before the launch window closes on November 24. *The Planetary Society* has teamed with ESA to sponsor a "*Postcards from Venus*" art contest. Details at this website:

[http://www.planetary.org/postcards\\_from\\_venus/](http://www.planetary.org/postcards_from_venus/)

**Hayabusa (Japan):** Despite a few glitches, the spacecraft continues to perform amazing feats and has now moved to within 7 km of the surface. A rotation animation can be viewed at this link:

[http://www.hayabusa.isas.jaxa.jp/e/index\\_24.html](http://www.hayabusa.isas.jaxa.jp/e/index_24.html)

### More News

**Shenzou 6:** The 2<sup>nd</sup> manned Chinese space mission was successfully completed on October 17. Two new astronauts (or taikonauts) spent 5 days in space and the launch and landing were broadcast live. The next mission is planned for 2007.

**ISS:** Princeton area scientist and spaceflight participant Greg Olsen returned safely to Earth on October 15 in a Soyuz capsule as part of a 3 man Russian/American crew. He spent 10 days in space and conducted science experiments for ESA while aboard the International Space Station for a week. The ISS celebrates the 5<sup>th</sup> year of continuous manned operations on November 5.

**Last Titan 4 Launched:** A distinguished career ended when the last of the Titan family of rockets blasted off on October 19, 2005 from Vandenberg Air Force Base in California carrying a top secret spy satellite. Earlier versions launched the Gemini manned capsules into Earth orbit, Viking space probes to Mars, Voyagers to the outer planets and Cassini/Huygens to Saturn.

**Space Shuttle:** The next launch has tentatively been targeted for May 2006.

**Hubble Space Telescope:** In August, the telescope was pointed to the moon and recorded the first ever high resolution ultraviolet images of areas that may be rich in oxygen-bearing minerals. These would be a valuable source of breathable air or could serve

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as rocket fuel for future human visitors.

**National Solar Observatory:** After a recent upgrade to adaptive optics, the Dunn Solar Telescope has produced ultrasharp images of sunspots and revealed features that hold the key to understanding their magnetic structure. Magnetism in solar activity is the "dark energy problem" being tackled in solar physics today. <http://www.nso.edu/press/DALSA/>

Websites for daily updates/perspectives:

<http://marsrovers.jpl.nasa.gov/home/index.html>

[http://www.esa.int/export/SPECIALS/Mars\\_Express/index.html](http://www.esa.int/export/SPECIALS/Mars_Express/index.html)

<http://saturn.jpl.nasa.gov/home/index.cfm>

<http://www.esa.int/SPECIALS/Cassini-Huygens/>

<http://deepimpact.jpl.nasa.gov/>

<http://pluto.jhuapl.edu/index.php>

[http://www.esa.int/SPECIALS/Venus\\_Express/index.html](http://www.esa.int/SPECIALS/Venus_Express/index.html)

<http://www.planetary.org/>

Email:

*Outreach for AAAP, JPL and The Planetary Society*

Ken Kremer

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please mail your check to our  
Post Office box  
or bring it to the  
October meeting.

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