SIDEREAL TIMES

The Official Publication of the
Amateur Astronomers Association of Princeton

Director *John Miller*

Treasurer *Michael Mitrano*

Program Chairman *Ludy D'Angelo*

Assistant Director *John Church*

Secretary *Ron Mittelsteadt*

Editors *Bryan Hubbard and Ira Polans*

Volume 36 June 2007 Number 6

From the Director

After six productive terms (four consecutive) as Director of the AAAP, Rex Parker has decided to spend more time under the night sky, imaging, observing, and concentrating on reducing intrusive light pollution. Perhaps this is how Harry Truman felt assuming the role held by Franklin Roosevelt. Thanks, Rex, for your leadership and professionalism delivered during your tenure!

I've been very proud to be part of the AAAP, as a teenager, and again as a middle-ager. I well remember John Church kindly welcoming me in 1971, as this junior high-school student made his first visit to the club. Rejoining in 1999, Church again extended a welcoming "hello."

Having visited more than a dozen astronomy clubs around the country, it's clear the AAAP is one of the finest, anywhere. And with the help of the general membership, the upcoming meeting season will offer great Peyton Hall presentations, more field astronomy gatherings, new special interest groups (SIGS), and more public outreach. But we need to hear from *you* to make this happen!

Please welcome the new club officers when you see them at the June meeting. They are: John Church, Assistant Director; Ludy D'Angelo, Program Chair; Ron Mittelstaedt, Secretary and Mike Mitrano, Treasurer. And a round of applause and tip of the hat to the aforementioned Rex, Ken Kremer who did a great job lining up intriguing guest speakers, Brian Van Liew for keeping the books balanced and Ludy D'Angelo for those accurate club records and minutes reports. And please remember to express your appreciation to your Membership Chair, Linda Papetti for those great refreshment table setups at the monthly meetings.

Our June guest speaker is Tony Del Genio, from the NASA Goddard Institute for Space Studies. Dr. Del Genio's presentation is titled "The Cassini Mission to Saturn." As the NASA orbiter celebrates its third anniversary at the ringed planet, he will discuss the latest results from Saturn and its intriguing moons Titan and Enceledus. In May, he published research finding that giant rotating storms are the "engine" powering Saturn's jet streams. Dr. Del Genio is a research scientist at NASA GISS, an Adjunct Professor in Columbia University's Department of Earth and Environmental Science, and a fellow of the American Meteorological Society. His research interests in global climate change and the terrestrial atmosphere have led him to study storms on other planets such as Jupiter, Saturn and Titan to gain a more fundamental understanding of how their meteorology differs from that of Earth. Don't miss what should prove to be an exciting talk.

Cheers—*John Miller*,
Director

The deadline for the July/August issue is:

Friday, July 13, 2007

Send your submissions to:

editors@princetonastronomy.org

New Location for June12 Meeting

Friend Center, Room 101
Meeting time 8PM
Plenty of **FREE** parking is available
on William Street (behind Thomas Sweet)
and Olden Street
Look for road signs with the AAAP logo
Complete details on back page

From the Past Director

AAAP May 21, 2007

What an honor it's been for me to serve as your Director for the past four years! I greatly appreciate the support, contributions, energy, and enthusiasm of members – all of you - over the years. I want to

acknowledge the roles of each of you – especially those of you who have been with me on the Board and as committed core members in the activities of our club. Many memories stand out since that day, 4 years ago in June, when director Kirk Alexander announced he was moving to California, and I said okay, yes, I'd fill in for a little while. Here are some good memories over that span.

- **Upgrades at WC Observatory**: new Paramount for the C14, and new Losmandy G11 along with several fine renovations on the 6 1/4" Hastings, along with significant improvements of the grounds and facility. Thanks to the core members and especially the Observatory Committee.
- **Excellent observing events** the Venus Transit of June 2004 at WC Park. The oppositions of Mars in fall of 2003 and again in 2005 were unforgettable (sleep deprivation stands out). Bill Murray's Deep Sky Challenges at StarQuest, (almost) all of which were won by Ron. The continued success of StarQuest and the leadership and commitment of members (especially Don, Larry, and Bill) who have made this annual event a wonderful AAAP tradition. Even though I'm a little nervous about the switch to October this year...
- **Telescopes and CCD imaging came alive for club members**. I know that many of you, like me, wouldn't have gotten this far in observing and astro-imaging without AAAP as a motivation and context.
- **Keyholders and Enhanced Public Observing efforts** culminating in our current each-Friday-night open house schedule. We give back and make a positive impact on the lives of others. For this effort the AAAP honors and thanks the Keyholders and our core members who give their evenings to public outreach. We've received significant acknowledgement of this effort by schools and other groups for whom we have provided education and star watches. We're even getting checks in the mail!
- **Outstanding lectures and presentations** put together the last two years by Ken, and in prior years by Michele and Mark. Remarkable depth and breadth of presentations, the envy of the amateur astronomy community in the northeast! And the wonderful pre-meeting dinners, where we got to know each other as well as our speakers.
- **Development of the club library** and its expansion by Larry Kane, who personally took on this challenge.
- **The emergence of the Website** with outstanding content and utility, with great credit to John Miller. Kudos to the creative vision here!
- **The excellent tradition of Sidereal Times** with many years of leadership by Vic, and now a successful handoff to our new editors/publishers, Bryan and Ira.

I greatly appreciate the contributions of the Board, and especially want to acknowledge the efforts of **John, Ludy, Ken, Brian, and Ron** for enabling me to carry out my role as Director. We have developed a viable Succession Plan for the Board and the committee chairs for key roles in club. Membership is strong at 100+. There are good reasons to be optimistic about the future of our club.

So as we turn forward, I would emphasize the role each of you, our members, have in the future of AAAP. It is with your energy and commitment that this club will flourish. It is with your support that the new Director and the Board will be empowered to continue to create the future of the AAAP.

Rex Parker, PhD

Minutes of the General Meeting

Amateur Astronomers Association of Princeton
May 8, 2007

Refreshments were served from 7:30PM to 8PM. The meeting started at 8 PM.

Rex Parker (Director) gave a welcome and thank you to all for coming.

Ken Kremer (Program Chair) introduced Guy Consolmagno from the Vatican Observatory. He gave a talk on "God, Astronomy, and the Search for Elegance". The lecture hall was filled to capacity and there was a book signing during the break.

After the break, Rex Parker reviewed the achievements of the club over the last few years under his directorship, and thanked all the hardworking members that make the club what it is. He acknowledged all that promote the public outreach and public open houses at the observatory. Rex then turned over the meeting to John Church.

John Church (Nominations Chair) presented the slate of nominees for the Board of Directors for the 2007-2008 season as follows:

Director: *John Miller*
Assistant Director: *John Church*
Treasurer: *Michael Mitrano*
Secretary: *Ron Mittelsteadt*
Program Chair: *Ludy D'Angelo*

A quorum of the membership was present for this purpose.

John opened the floor to any additional nominations. There were none. There was a motion to pass the slate as is, the motion was seconded. The vote was unanimous from the members present.

Ludy D'Angelo (Secretary) reported that the membership is at 105.

Brian VanLiew (Treasurer) reported that the club has $12,332.13 in the treasury.

Outreach: Super Science Weekend will be the weekend of May 19 and 20th. Volunteers are needed. Jeff Bernardis reports that there will be several groups out at the observatory in the next few Friday open houses.

The new email for submitting articles for the Sidereal Times is editors@princetonastronomy.org. Submissions for the June issue should be made by May 18th.

The meeting ended around 10 PM

Ludovico D'Angelo, Secretary

Treasurer's Report

At the time of this report the current AAAP balance stands at $12,136.03.

Brian Van Liew, Treasurer

Science Outreach and Exploration Update

The Explorers Club: NY, NY, Mon Apr 23, 7 PM. *"Exploring Mars, the Search for Life and a Journey in 3-D"*.

The Explorers Club is an international multidisciplinary professional society dedicated to the advancement of field research and education in the physical, natural and biological sciences for explorers and scientists worldwide. They invited me to present a comprehensive review of the NASA Mars Rover mission at their Headquarters in Manhattan. The elegant room was filled to capacity with about 130 people, including Aviation Week and Space Technology Magazine senior editor Craig Covault (AAAP speaker October 2005). Check out the link to Craig's Space Blog for more details and his comments on "Big Bang" Diplomacy and Stephen Hawking.

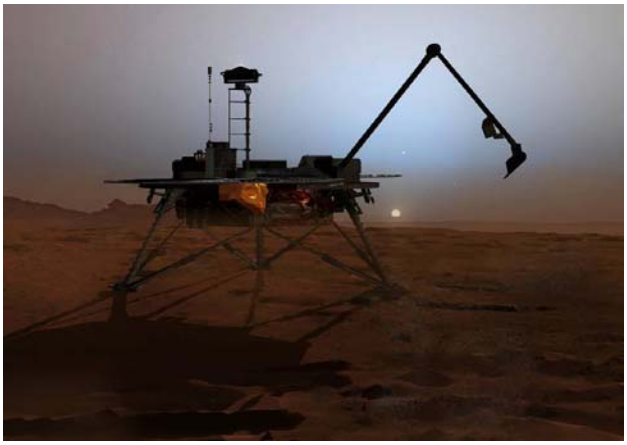
Websites: http://aviationweek.typepad.com/space/2007/05/big_bang_diplom.html, http://www.explorers.org/index.php, and http://www.explorers.org/calendar/view_entry.php?id=9317&date=20070423H

On Mars in 3-D at The Explorers Club by AAAP Program Chair Ken Kremer

NorthEast Astronomy Forum (NEAF): Suffern, NY, Apr 28-29. This annual extravaganza was attended by thousands of astronomy enthusiasts and featured a keynote lecture by Brother Guy Consolmagno describing how he was inspired by astronomy and to write his book "Turn Left at Orion". Pictures from his May 8 talk to the AAAP are below. My presentations included the Mars Rovers and the Solar System in 3-D. Website: http://www.rocklandastronomy.com/neaf.htm

The Solar System in 3-D at NEAF

Phoenix Mars Lander: NASA's second planetary mission this summer is set to launch on August 3. The spacecraft has been delivered to the Kennedy Space Center for final payload processing. Phoenix will use retro rockets to land near the north pole of Mars in May 2008 where abundant sheets of water ice are located. She will dig several feet into the soil to retrieve samples for chemical analysis and determine the potential for biologic activity. The robotic arm is equipped with a scoop built by Honeybee Robotics. Honeybee Chairman Steve Gorevan was the keynote speaker at the AAAP September 2005 monthly meeting.

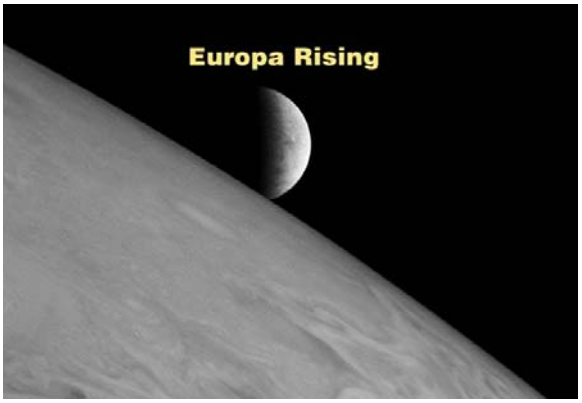


Artists Concept of Phoenix with Robot Arm and Scoop on Mars

DAWN Asteroid Orbiter: This highly ambitious NASA mission is scheduled to blast off from Cape Canaveral this summer on June 30. The spacecraft will be mankind's first to orbit 2 bodies; Ceres the "dwarf planet" and Vesta, which are the 2 most massive objects in the Asteroid Belt. Dr. Marc Rayman, Chief Engineer on DAWN from NASA's Jet Propulsion Laboratory in Pasadena, California described how this mission scenario is only made possible using ion propulsion at the March 2006 monthly meeting of the AAAP. Prof Edgar Chouieiri of Princeton University discussed ion propulsion technology in detail at the March 2007 AAAP monthly meeting. I had the good fortune to observe the spacecraft under construction at the Orbital Sciences facility in Virginia.

Technicians install microchip with names of over 360,000 space enthusiasts worldwide onto DAWN at Kennedy Space Center

New Horizons: The Pluto bound planetary spacecraft rocketed past Jupiter on Feb 28 and has been slowly transmitting the results of over 700 scientific observations back to Earth.



Europa rising above the cloud tops of Jupiter

For science outreach presentations please contact me at Email**:**

Ken Kremer
AAAP Program/Lecture Chairman 2005–2007

From the Program Chair

2007 AAAP Lecture Season

June 12: Dr. Tony Del Genio, a science team member of the Cassini Saturn Orbiter from the NASA Goddard Institute for Space Studies (GISS) in New York City, will present "Cassini's Excellent Adventure Through the Saturn System" as the NASA orbiter celebrates its 3rd anniversary at the spectacular ringed planet. Severe thunderstorms ten times deeper than those in the Midwest. Howling winds everywhere, all the time. Lakes of paint thinner. Geysers spewing possible clues about pre-biotic chemistry. Shepherds sculpting rings, and creators forming rings. And a yin-yang satellite with a midriff bulge (but alas, no known monolith - yet). There is no place in the solar system with greater variety and scientific intrigue than Saturn, its system of rings, and its collection of icy satellites. For the past three years the Cassini spacecraft has toured this fascinating planetary outpost, its cameras accumulating evidence that solves old mysteries and raises new questions. He will show some of the most breathtaking images that nature has to offer, discuss some of the major science questions that the Saturn system presents to us, and talk about what's yet to come, because the journey is barely half over. Dr. Del Genio is a climate change and planetary scientist, an Adjunct Professor at Columbia University, Fellow of the American Meteorological Society and published a major new research finding that giant rotating storms are the engine powering Saturn's jet streams.

Learn more about Dr. Del Genio's research and the Cassini Mission at these links.

http://www.spaceflightnow.com/cassini/070508saturnjets.html
http://www.space.com/scienceastronomy/070508_saturn_jetstreams.html
http://saturn.jpl.nasa.gov/home/index.cfm

On May 8**, Brother Guy J. Consolmagno**, Chair of the Division for Planetary Sciences of the American Astronomical Society and Curator of the Vatican meteorite collection at the Vatican Observatory in Castel Gandolfo, Italy gave a fantastic talk to over 160 people gathered at Peyton Hall. This was the second Standing Room Only crowd of the season with the hall filled beyond capacity and eager listeners sitting on the steps. "God has given us roadmaps and the ability to know what we do not know" he concluded.

Giant crowd greets Brother Guy at 8 May AAAP Monthly meeting

Q&A with Dr. Guy Consolmagno from the Vatican Observatory

Brother Guy presents "God, Astronomy and the Search for Elegance"

Long line for autographs of Brother Guy's books "Turn Left at Orion" *and* "Brother Astronomer, Adventures of a Vatican Scientist". *Book sale courtesy of* "Astronomy to Go".

Email:

Ken Kremer
AAAP Program/Lecture Chairman 2005–2007

Preventing “Sick” Spaceships

Article courtesy of NASA News

May 11, 2007: Picture this: You're one of several astronauts homeward bound after a three-year mission to Mars. Halfway back from the Red Planet, your spacecraft starts suffering intermittent electrical outages. So you remove a little-used service panel to check some wiring.

To your unbelieving eyes, floating in midair in the microgravity near the wiring is a shivering, shimmering globule of dirty water larger than a grapefruit. And on the wiring connectors are unmistakable flecks of mold.

That actually happened on the Russian space station Mir. When Mir was launched in 1986, "it was as clean as the International Space Station when it was launched," recounted C. Mark Ott, health scientist at Johnson Space Center in Houston, Texas. And the cosmonauts aboard Mir (just like the astronauts from the U.S. and other nations aboard ISS) followed a regular schedule of cleaning all the space station's surfaces to prevent the growth of bacteria and molds that could jeopardize human health.

Yet, wherever humans venture, microorganisms follow—and make themselves right to home, thank you, if conditions are right.

In the late 1990s, NASA joined the Russian space program in its evaluation of the microbial activity aboard Mir. For planning long-duration missions, they wanted to learn about the kinds of organisms that can grow in spacecraft occupied for long periods of time and where air and water are recycled. They were especially interested because several times during its 15 years in low Earth orbit, Mir had had the misfortune to suffer several power outages, so the temperature and humidity rose well above normal levels and air circulation was inadequate until the electricity was restored.

In 1998, U.S. astronauts participating in the NASA 6 and NASA 7 visits to Mir collected environmental samples from air and surfaces in Mir's control center, dining area, sleeping quarters, hygiene facilities, exercise equipment, and scientific equipment. Imagine their surprise when they opened a rarely-accessed service panel in Mir's Kvant-2 Module and discovered a large free-floating mass of water. "According to the astronauts' eyewitness reports, the globule was nearly the size of a basketball," Ott said.

Moreover, the mass of water was only one of several hiding behind different panels. Scientists later concluded that the water had condensed from humidity that accumulated over time as water droplets coalesced in microgravity. The pattern of air currents in Mir carried air moisture preferentially behind the panel, where it could not readily escape or evaporate.

Nor was the water clean: two samples were brownish and a third was cloudy white. Behind the panels the temperature was toasty warm—82ºF (28ºC)—just right for growing all kinds of microbeasties. Indeed, samples extracted from the globules by syringes and returned to Earth for analysis contained several dozen species of bacteria and fungi, plus some protozoa, dust mites, and possibly spirochetes.

But wait, there's more. Aboard Mir, colonies of organisms were also found growing on "the rubber gaskets around windows, on the components of space suits, cable insulations and tubing, on the insulation of copper wires, and on communications devices," said Andrew Steele, senior staff scientist at the Carnegie Institution of Washington working with other investigators at Marshall Space Flight Center.

Aside from being unattractive or an issue for human health, microorganisms can attack the structure of a spacecraft itself. "Microorganisms can degrade carbon steel and even stainless steel,” Steele continued. "In corners where two different materials meet, they can set up a galvanic [electrical] circuit and cause corrosion. They can produce acids that pit metal, etch glass, and make rubber brittle. They can also foul air and water filters."

In short, germs can be as bad for a spacecraft's health as for crew health.

That's one reason that Marshall is developing the Lab-On-a-Chip Application Development–Portable Test System, or LOCAD-PTS for short. LOCAD-PTS is a handheld device that can diagnose the presence of bacteria or fungi on the surfaces of a spacecraft within minutes, far more rapidly than standard methods of culturing, which may take several days and may require return to Earth for further analysis.

"LOCAD-PTS is an excellent example of the kind of hardware astronauts will need to be autonomous in a lunar habitat or a long-duration mission to Mars," Steele explained. "Crews must be able to make assessments on their own. They may not be able to get samples back to Earth." Although no electrical or mechanical failure on Mir was specifically traced to biodegradation, "it's not a chance you would want to take en route to Mars."

An early version of LOCAD-PTS, which can test for one major category of bacteria (called Gram-negative bacteria, accounting for about half of all bacterial species) is being tested aboard ISS right now. New cartridges for the unit, due to be sent up to ISS in early 2008, will be able to test for almost all major categories of bacteria (Gram positive as well as Gram negative) and also for fungi. Meantime, this fall (2007), an even more advanced version—which can sense 130 specific microorganisms, not just broad categories—Steele will test in the Arctic.

The ultimate plan is to develop a handheld device that can identify thousands of individual microorganisms. "The arrays of tests on LOCAD-PTS can be tailored to look at specific questions," Steele said. "For example, one array might look for genes and chemical compounds associated with biodegradation of a spacecraft’s structure, whereas another array might look for human pathogens, or try to detect life on Mars."

By getting the results of the tests in minutes, astronauts would then know which cleaning compound would work best to prevent a spacecraft or habitat from "falling ill.

A Massive Explosion on the Sun

Article courtesy of NASA News

Astronomers are calling the Japanese Hinode spacecraft a "Hubble for the sun." The footage, gathered by Hinode's Solar Optical Telescope (SOT) on Dec. 13, 2006, shows sunspot 930 unleashing a powerful X-class solar flare. It's one of the most detailed movies of a flare solar physicists have ever seen. The SOT has a resolution of 0.2 arcseconds or 0.00006 degrees. Putting those numbers into perspective, the telescope can see features on the sun as small as 90 miles wide from its orbit 93 million miles away.

But resolution is only part of the story. What makes Hinode truly special as a solar telescope "is its unique ability to see the sun's magnetic field," says John Davis, NASA's project scientist for Hinode at the Marshall Space Flight Center. It's an ability Hinode used to reveal the magnetic underpinnings of the Dec. 13th flare.

"Solar flares are essentially magnetic," Davis explains. In the maelstrom above a sunspot, lines of magnetic force are twisted and stretched until the tension reaches a certain point—and then the whole thing explodes.

A rubber band provides a good analogy. Take one from your desk, hold one end in each hand: stretch and twist. If you twist, twist and twist to extremes, the tormented band will eventually snap, painfully releasing all the energy you just put into it.

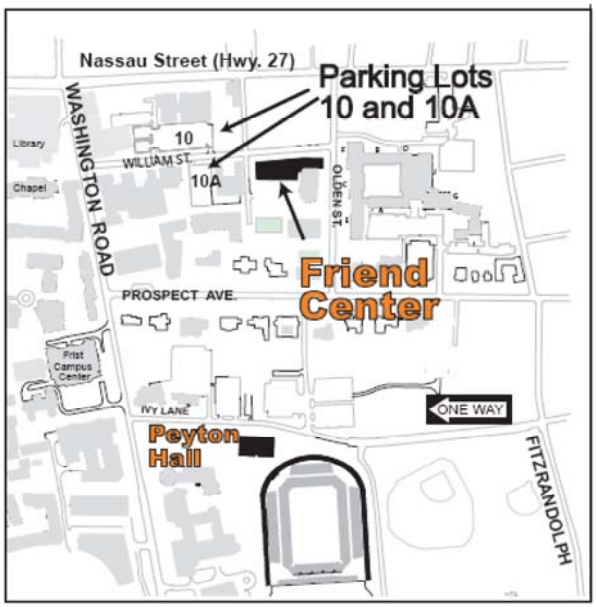
Magnetic fields behave a lot like rubber bands, and "Hinode was able to see the twisting and stretching that preceded the Dec. 13th solar flare," he says.

The full article and a link to the brief movie can be found at:- http://science.nasa.gov/headlines/y2007/24apr_hubble4sun.htm

Updated Information About the June 12 Meeting

Cassini's Excellent Adventure Through The Saturn System

Speaker Dr. Tony Del Genio, *NASA*



New Location
Friend Center, Room 101 on William Street
(Same location as March 2006 AAAP meeting)

Time
8 PM

FREE REFRESHMENTS (*courtesy of Princeton University)*

ROAD SIGNS will be POSTED

Plenty of *Free Parking* on William Street (behind Thomas Sweet) and Olden Street

Map Link: http://www.princeton.edu/%7Epumap/buildings/128.html

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See us on the Web: www.princetonastronomy.org

June 2007

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