



NEWSLETTER

RITTENHOUSE ASTRONOMICAL SOCIETY

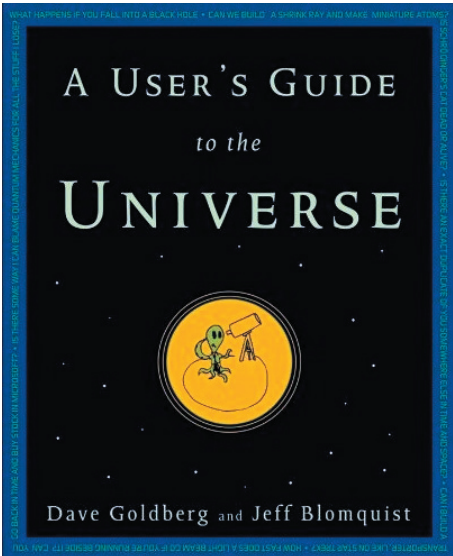
Founded 1888 WWW.RITTENHOUSEASTRONOMICALSOCIETY.ORG

December 2010

OPEN TO PUBLIC AND STUDENTS
Upcoming Meeting on December 8th at
7:15 PM
The Franklin
20th Street and Benjamin Franklin Parkway

December's Meeting Dr. David Goldberg

If the stereotype for an astrophysics professor is an elderly, bumbling, somewhat eccentric man with wild gray hair, Dr. David Goldberg certainly doesn't fit it. He's young, energetic, and articulate about a subject that has acquired the unfair stigma of being tedious and dull. Dr. Goldberg laments the development of the "eat your vegetables" type of physics instruction, in which students are taught cut-and-dry formulas instead of striving to answer conceptual, interesting metaphysical questions. And really, that's the concept behind his soon-to-be-released book, *A User's Guide to the Universe: Surviving the Perils of Black Holes, Time Paradoxes, and Quantum Uncertainty*. The work, which came out in March, aims to dismantle the stigma by suggesting that physics should be studied because it's fun, not because it's necessary. Furthermore, it delivers answers to serious scientific inquiries through comedy and conversation. Co-authored by Drexel graduate Jeff Blomquist, *A User's Guide* is intended to be an easy and enjoyable read for a wide audience.



Dr. Goldberg's most recent work is concentrated in the area of gravitational lensing, examining light refractions to "map" the composition of the universe, specifically, dark matter that is otherwise undetectable.

November's Meeting



Our November's meeting was quite a treat. Joyce Towne, currently of Spitz, Inc., was once employed at The Franklin Institute working in the Fels planetarium. She shared with us a bit of the history of planetaria in the United States and the migration from large museum instrumentation to smaller dome projection systems more affordable for educational venues.

She had on hand one of the first planetariums developed by Armand Spitz utilizing an old can with holes punched in its sides and lid. He then put a light inside the can to project the stars onto the ceiling and walls. It was fascinating to examine the rudimentary planetarium.

Armand Spitz was determined to bring the wonder of the large museum planetarium experience to a lower price point so that more would be able to enjoy the wonders in our sky. She showed us many more versions of the early Spitz planetariums. A discussion soon started about the future of planetarium and the argument of optical mechanical verses an All-Dome video system. Good points were presented for both types.



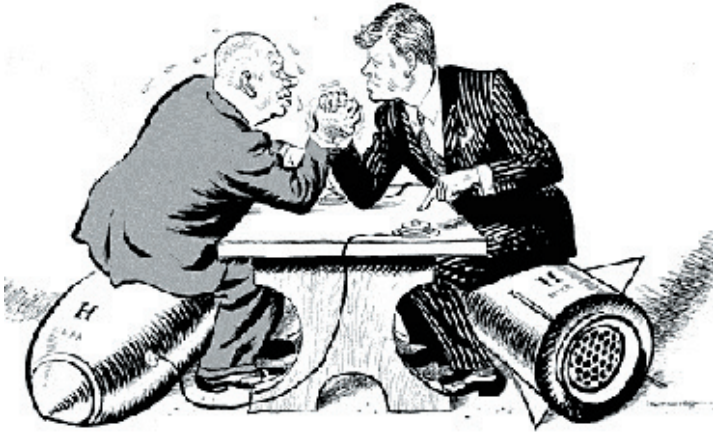
Visible Planets 12/08/2010

	Rises	Transit	Sets
Mercury	08:43 am	01:16 pm	05:48 pm
Venus	03:36 am	09:01 am	02:27 pm
Mars	08:19 am	12:53 pm	05:27 pm
Jupiter	12:40 pm	06:30 pm	12:21 am
Saturn	01:58 am	07:47 am	01:36 pm

President's Message

Dr. Milton Friedman

The Irving Berlin song for the 1946 Broadway show "Annie Get Your Gun" has a famous line that might refer to the U.S.- Soviet/Russia space race: "Anything you can do; I can do better..."



The space race began in 1957 with the launch of Sputnik. Between 1957 and 1999, between 4,378 and 6,854 spacecraft have been launched, the exact number depending on who is counting and what is secret. Russia has had more launches than all other countries combined. In fact, Russian launches total nearly double that of the United States. All the other countries total 808 with 57 percent of all launches by Russia. Meanwhile, the United States has had 12 astronauts walk on the moon and a fleet of spacecraft visiting Mars.

Of satellite launches, 55 percent have been for military purposes and 45 percent for civilian purposes. A launch is successful if the satellite is successfully placed in Earth orbit or beyond. The spacecraft may carry people or just instruments. So far, only nine countries have developed the ability to launch spacecraft into orbit using their own launch vehicles.



Explorer 1 - United States

The Soviet Union was the first into space which started the space age with the launching of Sputnik 1 on Oct. 4, 1957. The U.S. was second with Explorer 1, Feb. 1, 1958. France was the third in space with Asterix on Nov. 26, 1965. Japan launched Osumi, Feb. 11, 1970. (Australia had been the fourth nation to place a satellite into Earth orbit from its own territory).

China launched a satellite on April 24, 1970 and sent up its first astronaut, the third nation to launch a satellite with a person on board, on Oct. 15, 2003. The United Kingdom launched a satellite from Australia on Oct. 28, 1971. India launched a satellite on July 18, 1980 and Israel launched on Sept. 19, 1988. The Ukraine launched on Sept., 28 1991 as did Iran on Feb. 2, 2009.

France had launched its first satellite by its own rocket from Algeria and provides a base for launches by the European Space Agency (ESA) from French Guyana. As of May 14, 2010, NASA has had 132 shuttle launches. The estimated total cost of all shuttle launches is \$174 billion.

The future looks cloudy. The United States is spending its dollars on programs here on Earth bypassing a NASA trip to the moon or Mars. Meanwhile, other nations will be looking to the heavens as will the private sector. Eventually, our astronauts will be sitting behind consoles here at home rather than stepping off this planet to visit a distant world.



What will the future be?



Philadelphia Science Festival

At our last meeting we announced our intent to get involved with the Philadelphia Science Festival. It is being organized by the Franklin Institute. Their goal is to get as many science oriented museums, schools, colleges and universities involved as possible to bring science to Philadelphia.

The festival will be conducted over two-weeks (April 15 through April 28,) and will be a community-wide celebration of science that will take place annually in April.

The Festival will open with an outdoor carnival on the Benjamin Franklin Parkway on April 16, 2011. This celebration of sciences will be highlighted by hands-on exhibits, science-themed performances and demonstrations, and family-oriented science entertainment. The Free Library of Philadelphia—a Science Festival partner organization—will host its annual Book Festival on the same day, making the Benjamin Franklin Parkway an unrivaled destination for family-friendly informal learning opportunities

Programs and exhibitions will take place throughout the city's many neighborhoods, fueled by the best scientific and educational resources the region has to offer--all geared towards making science interesting, relevant, and fun.

We were wondering how we might participate. One idea suggested would be setting up an information table on the Parkway during the opening celebration on April 16, 2011. Another idea might be to take it to the streets! Consider setting up a telescope at a location within Philadelphia for an evening to get people to look up. Bright planets or the moon might be featured since they can easily be seen through city lights. This might be an easy way to get

involved since it would only require 1 or two members to set up a location in town for night viewing.

Your ideas are welcome at this time to help us prepare. Either contact us through our website, members' network site, or directly at our upcoming December 8 meeting. We will need members to get involved to make this a success, so please consider helping out!

Society Business

It is December when we clear out our database of members that have not renewed by submitting their annual dues. If you have not received an Abrams Sky Calendar with this mailing and you have a yellow highlight on your envelope on your expiration date, you are no longer a member. This newsletter mailing is a courtesy copy in case you have merely overlooked submitting your dues.

As of January 1, dues will be increased to \$25.00 to cover the mailing and production costs of our newsletter, public website server fee, members networking site hosting fee, and still includes a yearly subscription to our Abrams Sky Calendars (subscriptions run from October through September of the following academic year.) Student memberships will remain at \$15.00.

Membership certificates are available upon request. We do not print them for all members, but save cost by printing only those that are requested. Many members display them in their home office, while some of our teachers display them in their classrooms. Membership cards are also available upon request. You may request multiple cards during the year since members are encouraged to give their membership card out as a contact to perspective guest speakers they feel other members may have an interest in. Ruth List is the contact for membership cards, Ted Williams is the contact for Membership Certificates.

Upcoming Speakers	
December	Dr. Dave Goldberg Associate Professor Drexel University Department of Physics
January	Robert Nemiroff Astronomy Picture of the Day: Creator, Lead Writer, Editor Best Space Pictures of 2010 Major review of Astronomy developments in 2010
February	Laura Misajet Zeiss Planetaria / Optics

Robots Arrive at Kennedy Space Center

Dr. Ken Kremer

Two of the world's most advanced robots have invaded the Kennedy Space Center (KSC) as NASA prepares to launch Space Shuttle Discovery on the STS-133 mission to the International Space Station (ISS). These robots are friendly to earthlings – at least for now.

The twin brother of Robonaut 2 - known as R2A - was standing guard at the KSC press site adjacent to the Vehicle Assembly Building (VAB) where I had the unique pleasure to meet him for an outdoors encounter. R2A was gazing intently at launch Pad 39 A and shuttle Discovery where his sibling – Robonaut 2 - is set to meet his destiny and become the first humanoid robot in space. R2A is virtually identical to Robonaut 2.



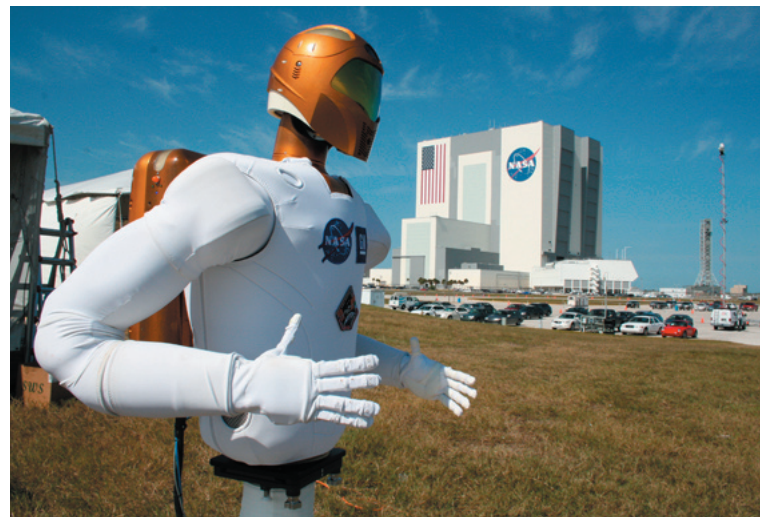
Robonaut 2A gazes at Launch Pad 39 A (right of head) where his twin brother – dubbed R2 – will blast off to space inside Space Shuttle Discovery at the Kennedy Space Center. Note Shuttle Launch Pad 39 B, US flag and world famous countdown clock at left.

Credit: Ken Kremer

The launch of Discovery on her very final mission has now been reset to no earlier than Dec. 17 after a hydrogen fuel leak delayed the planned Nov. 5 blastoff. Robonaut 2, also known as R2 or R2B, is stowed inside the “Leonardo” Permanent Multipurpose Module (PMM) which is the primary cargo loaded inside the shuttle’s payload bay.

R2 will eventually take up permanent residence inside the US built Destiny science research laboratory as a robotic assistant. The goal is for R2 and the ISS crew to work together shoulder to shoulder in space.

R2 will make history by becoming an official member of the ISS crew and the first non-human member to boot. The goal is to demonstrate just how well dexterous robots can



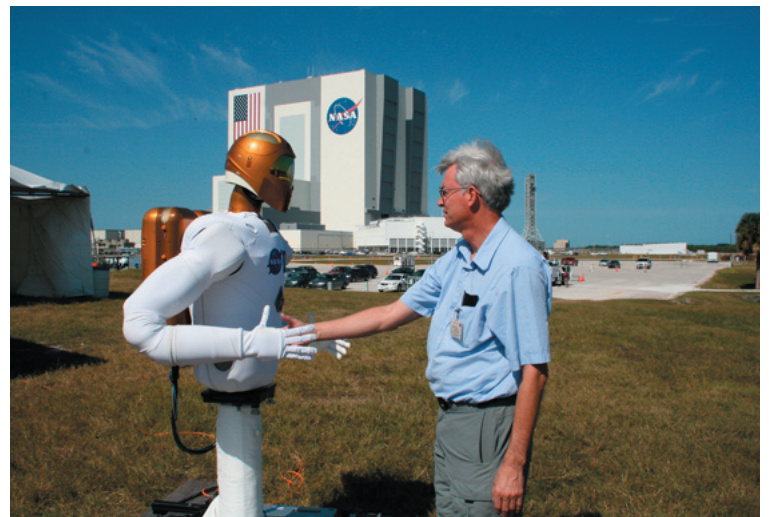
Robonaut 2A with the Vehicle Assembly Building and Ares 1 Mobile Launcher in the background at the Kennedy Space Center.

Credit: Ken Kremer

operate in the zero g environment of space and how they can work to contribute to the maintenance and scientific output of the orbiting outpost.

R2 is the most dexterously advanced robot on Earth. When R2 boards the station, the ISS will become the most advanced robotics lab in human history and serve as an ideal test bed for humans and robots working together to build a future of exploration and discovery.

“The chance to fly our robot to the ISS was a dream come true,” Ron Diftler told me in an interview at KSC. Diftler is NASA’s R2 project manager at the Johnson Space Center in Houston, Tx. “The human form is intentional and we hope it should help to motivate kids to study science.”



Robonaut 2A and Ken Kremer shake hands at the Kennedy Space Center. R2 has over 350 sensors. Each finger has a grasping force of 5 pounds. What a cool experience to meet and greet the most advanced humanoid robot in the world.

Credit: Ken Kremer

“We hope that one day, after further upgrades and the addition of a lower body and legs that R2 will even be able to venture outside – without a spacesuit - and conduct EVA activities to assist spacewalking astronauts,” Diftler added.

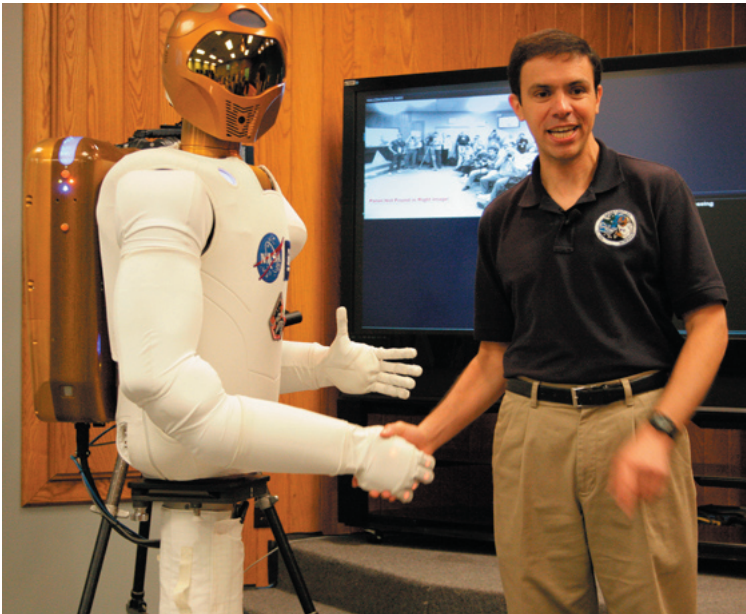
R2 weighs some 300 pounds and was manufactured from nickel-plated carbon fiber and aluminum. It is equipped with human like arms and hands as well as four visible light cameras that provide stereo vision.

The robot was developed in collaboration with GM which had also been working to develop dexterous robots. “NASA and GM pooled their resources and R2 was unveiled in February 2010,” according to Susan Smyth, GM Director of Research and Development. “With R2 we will demonstrate ground breaking technology that will also have real world applications as GM works to build better and safer cars.”

A key point is that R2 can accomplish real work with incredibly dexterous hands and an opposable thumb as I witnessed with my own eyes in a live action demonstration at KSC.

R2A will be watching his twin brother’s blast off to space live from the Kennedy Space Center. Look here for more details about Robonaut:

<http://www.spaceref.com/news/viewnews.html?id=1473>



Robonaut 2A and Ron Diftler, NASA's R2 project manager at the Johnson Space Center greet the media at a KSC press briefing for the STS-133 mission. The cameras provide eyesight for R2A and are projected live on the TV monitor at rear. Credit: Ken Kremer



Discovery unveiled in darkness at pad 39 A at KSC. Credit: Ken Kremer

Astronomy Outreach:

Dr. Ken Kremer

Please contact me for more info or science outreach presentations by email. My upcoming Astronomy talks include:

- **Gloucester County College Astronomy Club:** Sewell, NJ, Dec 7, 7:30 PM. “6 Years of Mars Rovers and the Search for Life (in 3-D)” Website: http://www.gccnj.edu/news_and_alerts/rotating_ads/ken_kremer.cfm

- **Rittenhouse Astronomical Society (RAS) at the Franklin Institute:** Philadelphia, PA, Dec 8, Wed, 8 PM. “6 Years of Mars Rovers: Update.”

Website: <http://www.rittenhouseastronomicalsociety.org>

- **Hayden Planetarium:** NY, NY, Dec 20, Mon, 6:30 PM. “Lunar Eclipse Night at the Hayden Planetarium”

- **Amateur Astronomers Association of Princeton:** Princeton, NJ, Jan 11, Tue, 8 PM “Whats Beyond for NASA with Orion, Falcon 9 & Heavy Lift”. Website: <http://www.princetonastronomy.org/>

Dr. Ken Kremer Email: kremerken@yahoo.com
NASA JPL Solar System Ambassador & The Planetary Society Web site:

<http://www.rittenhouseastronomicalsociety.org/Dr.Kremer/K.htm>

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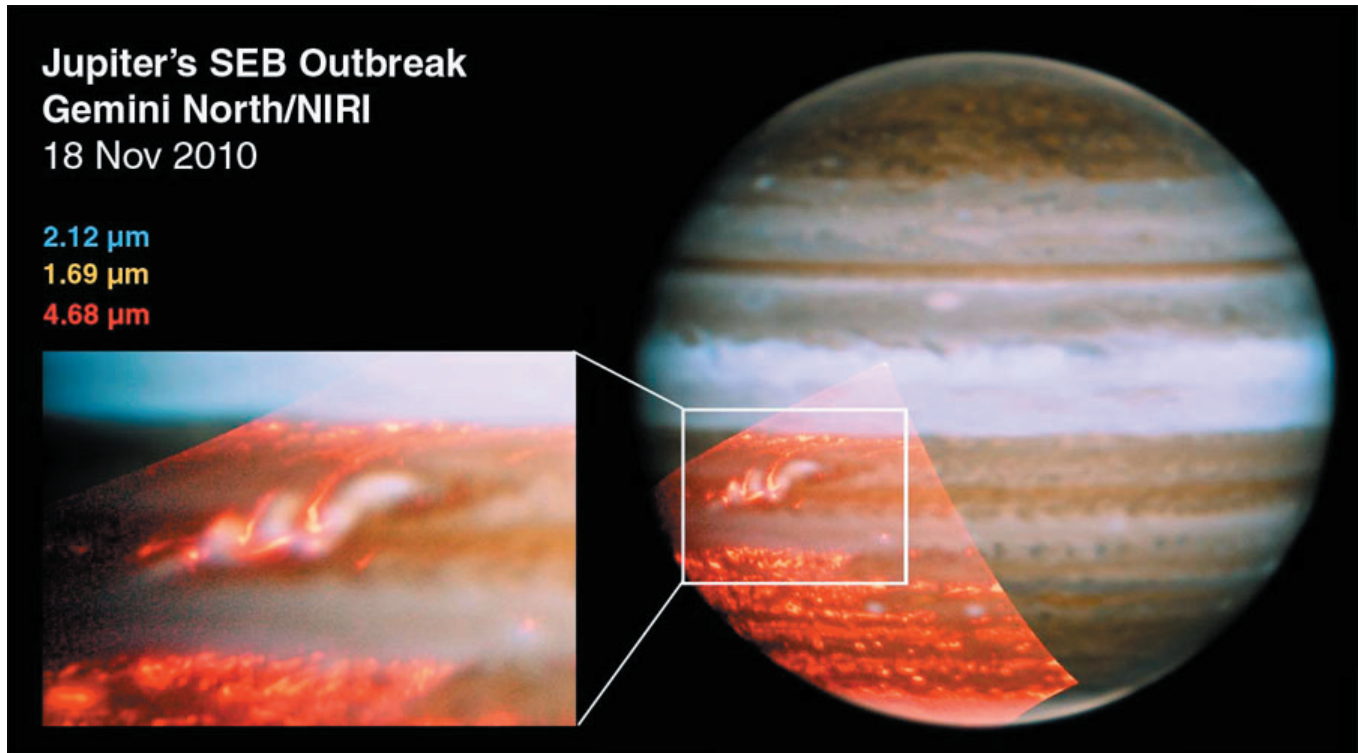
January's Meeting

Robert Nemiroff

Astronomy Picture of the Day

Sample from November 29, 2010

Note: Meeting Date is Jan 5, 2011



Dark Belt Reappearing on Jupiter

Credit: NASA's JPL, U. Oxford, UC Berkeley, Gemini Obs. (North), USC Philippines

Explanation: Why are planet-circling clouds disappearing and reappearing on Jupiter? Although the ultimate cause remains unknown, planetary meteorologists are beginning to better understand what is happening. Earlier this year, unexpectedly, Jupiter's dark Southern Equatorial Belt (SEB) disappeared. The changes were first noted by amateurs dedicated to watching Jupiter full time. The South Equatorial Band has been seen to change colors before, although the change has never been recorded in such detail. Detailed professional observations revealed that high-flying light-colored ammonia-based clouds formed over the planet-circling dark belt. Now those light clouds are dissipating, again unveiling the lower dark clouds. Pictured above two weeks ago, far infrared images -- depicted in false-color red -- show a powerful storm system active above the returning dark belt. Continued observations of Jupiter's current cloud opera, and our understanding of it, is sure to continue.

Come Join Us!