



## **Astronomy Club News**

**April, 2006**

**John Kocijanski.... Editor**

**Jim McKeegan..... President**

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**Lisa Brody..... Treasurer**

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The latest of our “dinner and a movie” meetings was held on March 11<sup>th</sup> at Morgan Outdoors in Livingston Manor. The meeting was well attended. The Discovery Channel documentary “If We Had No Moon” was shown and was well received. The film presented many facts about the moon and gave ideas about what the earth would be like if there was no moon. Two questions and answer segments were moderated by Jim McKeegan. Alan Chao provided his laptop computer and projector to show the DVD. After the movie the skies cleared enough so a brief observation session was held at the Covered Bridge Park near Livingston Manor. Two telescopes were set up and the participants were treated to great views of the gibbous moon, Saturn, a few double stars, and deep sky objects like Orion Nebula and the open star cluster called the Beehive in Cancer. The images below show the indoor event. The first shows Alan Chao setting up and the second shows everyone enjoying the pizza.





The Northeast Astronomy Forum will be held at Rockland County Community College on May 6<sup>th</sup> and 7<sup>th</sup>. Our club has been offered a free space for a table on the balcony for the show. Right now it looks like we will be there on Saturday the 6<sup>th</sup>. Anyone wishing to volunteer to man the table can contact John at [kocis@verizon.net](mailto:kocis@verizon.net). The table worked out well for us last year and gave the club some exposure. We handed out observing schedules, newsletters, as well as NASA literature.

A second Macintosh computer with astronomy software is now available for club members to borrow. Daniel Miller of Sugarloaf, NY donated it to the club. One of the programs on the computer called "Distant Suns" comes with a complete user guide. Another called Voyager II comes with a book of projects and simulations that can be done with the program.

A Cub Scout pack and Boy Scout Troop have contacted us to setup a time where they can join us at separate observation sessions. No definite dates have been set yet.

A dark sky observation session at a site near Roscoe is in the works. No details are worked out yet. A summer session is possible.

An updated list of our library has been compiled. The club now has a library of 82 books. Anyone who needs the list please contact John at 791-5240 or [kocis@verizon.net](mailto:kocis@verizon.net).

The club now has some NASA computer CDs to borrow. The titles available are "Space Weather", "The Dynamic Sun", "Imagine The Universe", "Starchild", "Astronomy Picture of the Day", and "Astro Capella". There are also two planetarium CDs. One is "The Sky: Student Edition" for Macintosh or PC. The other is "Distant Suns" for Macintosh. There is a NASA DVD called "Ring World" about the Cassini mission to Saturn that is available as well.

The March 4<sup>th</sup> and 25<sup>th</sup> observation session was canceled due to poor weather. The April observation sessions are scheduled for the 1st and the 29<sup>th</sup>.

Anyone interested in borrowing our astronomy books, Stardate audio CDs, NASA Computer CDs, planetarium software, two Macintosh computers with astronomy software, or a Meade eight inch reflector telescope please contact John at 791-5240 or kocis@verizon.net.

### ***Astronomy News:***

Here are some articles from various NASA sources that might be of interest.

News Release: 2006-033  
2006

March 9,

#### **NASA's Cassini Discovers Potential Liquid Water on Enceladus**

NASA's Cassini spacecraft may have found evidence of liquid water reservoirs that erupt in Yellowstone-like geysers on Saturn's moon Enceladus. The rare occurrence of liquid water so near the surface raises many new questions about the mysterious moon.

"We realize that this is a radical conclusion -- that we may have evidence for liquid water within a body so small and so cold," said Dr. Carolyn Porco, Cassini imaging team leader at Space Science Institute, Boulder, Colo. "However, if we are right, we have significantly broadened the diversity of solar system environments where we might possibly have conditions suitable for living organisms."

High-resolution Cassini images show icy jets and towering plumes ejecting large quantities of particles at high speed. Scientists examined several models to explain the process. They ruled out the idea that the particles are produced by or blown off the moon's surface by vapor created when warm water ice converts to a gas. Instead, scientists have found evidence for a much more exciting possibility -- the jets might be erupting from near-surface pockets of liquid water above 0 degrees Celsius (32 degrees Fahrenheit), like cold versions of the Old Faithful geyser in Yellowstone.

Mission scientists report these and other Enceladus findings in this week's issue of Science.

"We previously knew of at most three places where active volcanism exists: Jupiter's moon Io, Earth, and possibly Neptune's moon Triton. Cassini changed all that, making Enceladus the latest member of this very exclusive club, and one of the most exciting places in the solar system," said Dr. John Spencer, Cassini scientist, Southwest Research Institute, Boulder, Colo.

"Other moons in the solar system have liquid-water oceans covered by kilometers of icy crust,"

said Dr. Andrew Ingersoll, imaging team member and atmospheric scientist at the California Institute of Technology, Pasadena, Calif. "What's different here is that pockets of liquid water may be no more than tens of meters below the surface."

Other unexplained oddities now make sense. "As Cassini approached Saturn, we discovered that the Saturnian system is filled with oxygen atoms. At the time we had no idea where the oxygen was coming from," said Dr. Candy Hansen, Cassini scientist at NASA's Jet Propulsion Laboratory in Pasadena. "Now we know that Enceladus is spewing out water molecules, which break down into oxygen and hydrogen."

Scientists are also seeing variability at Enceladus. "Even when Cassini is not flying close to Enceladus, we can detect that the plume's activity has been changing through its varying effects on the soup of electrically-charged particles that flow past the moon," said Dr. Geraint H. Jones, Cassini scientist, magnetospheric imaging instrument, Max Planck Institute for Solar System Research, Katlenburg-Lindau, Germany.

Scientists still have many questions. Why is Enceladus currently so active? Are other sites on Enceladus active? Might this activity have been continuous enough over the moon's history for life to have had a chance to take hold in the moon's interior?

"Our search for liquid water has taken a new turn. The type of evidence for liquid water on Enceladus is very different from what we've seen at Jupiter's moon Europa. On Europa the evidence from surface geological features points to an internal ocean. On Enceladus the evidence is direct observation of water vapor venting from sources close to the surface," said Dr. Peter Thomas, Cassini imaging scientist, Cornell University, Ithaca, N.Y.

In the spring of 2008, scientists will get another chance to look at Enceladus when Cassini flies within 350 kilometers (approximately 220 miles), but much work remains after Cassini's four-year prime mission is over.

"There's no question that, along with the moon Titan, Enceladus should be a very high priority for us. Saturn has given us two exciting worlds to explore," said Dr. Jonathan Lunine, Cassini interdisciplinary scientist, University of Arizona, Tucson, Ariz.

The Cassini-Huygens mission is a cooperative project of NASA, the European Space Agency and the Italian Space Agency. JPL, a division of the Caltech, manages the mission for NASA's Science Mission Directorate. The Cassini orbiter was designed, developed and assembled at JPL.

For images and more information, visit: <http://www.nasa.gov/cassini> and <http://saturn.jpl.nasa.gov>.

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News Release: 2006-034

March 10, 2006

### **Robotic NASA Craft Begins Orbiting Mars for Most-Detailed Exam**

With a crucially timed firing of its main engines today, NASA's new mission to Mars successfully put itself into orbit around the red planet.

The spacecraft, Mars Reconnaissance Orbiter, will provide more science data than all previous Mars missions combined.

Signals received from the spacecraft at 2:16 p.m. Pacific Time after it emerged from its first pass behind Mars set off cheers and applause in control rooms at NASA's Jet Propulsion Laboratory, Pasadena, Calif., and at Lockheed Martin Space Systems, Denver.

"This is a great milestone to have accomplished, but it's just one of many milestones before we can open the champagne," said Colleen Hartman, deputy associate administrator for NASA's Science Mission Directorate. "Once we are in the prime science orbit, the spacecraft will perform observations of the atmosphere, surface, and subsurface of Mars in unprecedented detail."

The spacecraft traveled about 500 million kilometers (310 million miles) to reach Mars after its launch from Florida on Aug. 12, 2005. It needed to use its main thrusters as it neared the planet in order to slow itself enough for Mars' gravity to capture it. The thruster firing began while the spacecraft was still in radio contact with Earth, but needed to end during a tense half hour of radio silence while the spacecraft flew behind Mars.

"Our spacecraft has finally become an orbiter," said JPL's Jim Graf, project manager for the mission. "The celebration feels great, but it will be very brief because before we start our main science phase, we still have six months of challenging work to adjust the orbit to the right size and shape."

For the next half-year, the mission will use hundreds of carefully calculated dips into Mars' atmosphere in a process called "aerobraking." This will shrink its orbit from the elongated ellipse it is now flying, to a nearly circular two-hour orbit. For the mission's principal science phase, scheduled to begin in November, the desired orbit is a nearly circular loop ranging from 320 kilometers (199 miles) to 255 kilometers (158 miles) in altitude, lower than any previous Mars orbiter. To go directly into such an orbit instead of using aerobraking, the mission would have needed to carry about 70 percent more fuel when it launched.

The instruments on Mars Reconnaissance Orbiter will examine the planet from this low-altitude orbit. A spectrometer will map water-related minerals in patches as small as a baseball infield. A radar instrument will probe for underground layers of rock and water. One telescopic camera will resolve features as small as a card table. Another will put the highest-resolution images into broader context. A color camera will monitor the entire planet daily for changes in weather. A radiometer will check each layer of the atmosphere for variations in temperature, water vapor and dust.

"The missions currently at Mars have each advanced what we know about the presence and history of water on Mars, and one of the main goals for Mars Reconnaissance Orbiter is to decipher when water was on the surface and where it is now," said JPL's Dr. Richard Zurek, project scientist for the mission. "Water is essential for life, so that will help focus future studies of whether Mars has ever supported life."

The orbiter can radio data to Earth at up to 10 times the rate of any previous Mars mission. Besides sending home the pictures and other information from its own investigations, it will relay data from surface missions, including NASA's Phoenix Mars Scout scheduled for launch in 2007 and Mars Science Laboratory in development for 2009.

Additional information about Mars Reconnaissance Orbiter is available online at:

<http://www.nasa.gov/mro>

The mission is managed by JPL, a division of the California Institute of Technology, Pasadena, for the NASA Science Mission Directorate, Washington. Lockheed Martin Space Systems, Denver, is the prime contractor for the project and built the spacecraft.

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IMAGE ADVISORY: 2006-035

March 13, 2006

### **Years of Observing Combined Into Best-Yet Look at Mars Canyon**

A new view of the biggest canyon in the solar system, merging hundreds of photos from NASA's Mars Odyssey orbiter, offers scientists and the public an online resource for exploring the entire canyon in detail.

This canyon system on Mars, named Valles Marineris, stretches as far as the distance from California to New York. Steep walls nearly as high as Mount Everest give way to numerous side canyons, possibly carved by water. In places, walls have shed massive landslides spilling far out onto the canyon floor.

A simulated fly-through using the newly assembled imagery is available online at [http://www.nasa.gov/mission\\_pages/mars/missions/odyssey/20060313.html](http://www.nasa.gov/mission_pages/mars/missions/odyssey/20060313.html) . The fly-through plus tools for wandering across and zooming into the large image are at <http://themis.asu.edu> .

"We picked Valles Marineris to make this first mosaic because it's probably the most complex, interesting feature on the entire planet," said Dr. Phil Christensen of Arizona State University, Tempe. He is the principal investigator for Mars Odyssey's versatile camera, the Thermal Emission Imaging System. "To understand many of the processes on Mars -- erosion, landsliding and the effects of water -- you really need to have a big-picture view but still be able to see the details."

Small parts of the canyon have been seen at higher resolution, but at 100 meters (328 feet) per pixel, the new view has sharper resolution than any previous imaging of the entire canyon.

In addition to the completed mosaic of Valles Marineris images, the camera team has also prepared an online data set of nearly the entire planet of Mars at 232 meters (760 feet) per pixel, the most detailed global view of the red planet. The team plans to post 100-meter-resolution mosaics of other regions of Mars in coming months.

Odyssey reached Mars in 2001. The Thermal Emission Imaging System began observing the planet systematically in February 2002 both in visible wavelengths and in infrared wavelengths, which are better for seeing surface details through Mars' atmospheric dust. As the spacecraft passes over an area, the camera records images of swaths 32 kilometers wide (20 miles wide). More than three years of observations made at infrared wavelengths during Martian daytime are combined into the assembled view of Valles Marineris and the global image data set.

Mars Odyssey is managed by NASA's Jet Propulsion Laboratory, a division of the California

Institute of Technology, Pasadena, for NASA's Science Mission Directorate, Washington. Lockheed Martin Space Systems, Denver, is the prime contractor for the project and built the spacecraft. The orbiter began an extended mission in August 2004 after successfully completing its primary mission.

Video of the simulated Valles Marineris fly-through, interview excerpts and related B-roll are available during NASA Television video file downlinks beginning March 13, 2006. NASA TV's video file news feed is broadcast on the agency's Media Channel (Program 103) at 12 p.m. (Eastern), with replays at 1, 5, 6, 10 and 11 p.m. and 6 and 7 a.m. The NASA TV Media Channel is available on an MPEG-2 digital C-band signal accessed via satellite AMC-6, at 72 degrees west longitude, transponder 17C, 4040 MHz, vertical polarization. In Alaska and Hawaii, it's available on AMC-7 at 137 degrees west longitude, transponder 18C, at 4060 MHz, horizontal polarization. A Digital Video Broadcast compliant Integrated Receiver Decoder is required for reception.

For digital downlink information for NASA TV's Media Channel (Program 103) on the Web, visit <http://www.nasa.gov/ntv> . For media unable to receive the NASA TV Media Channel, a modified version of Video-File airs on the NASA TV Public Channel at 9 a.m., 5 p.m., 7 p.m. and 10 p.m. (Eastern). The Public Channel is accessible on the Web, at <http://www.nasa.gov/ntv>

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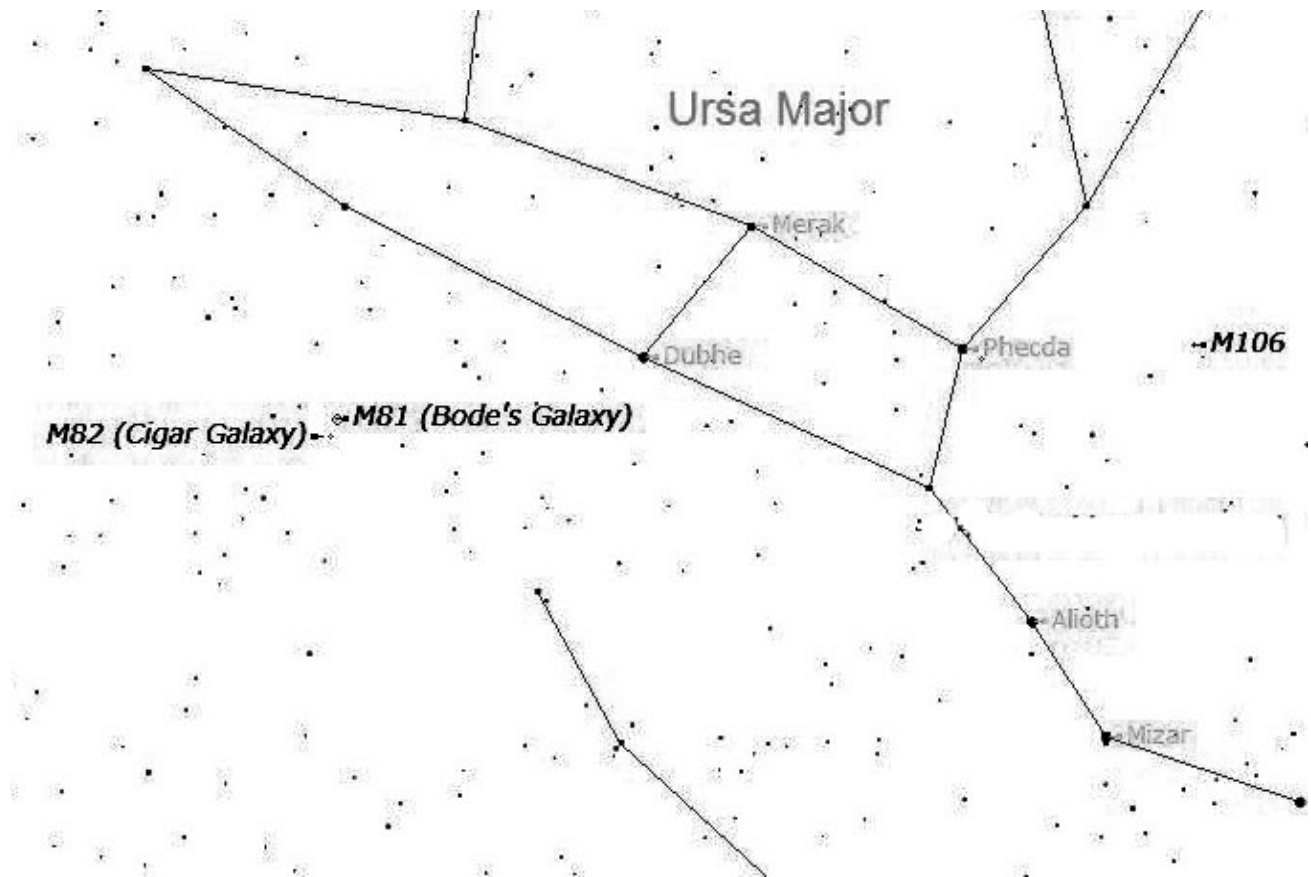
For more information about NASA and agency programs on the Web, visit <http://www.nasa.gov>

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### ***Mid Evening Observing Highlights for April***

Jupiter is low in the eastern sky. Saturn is high in the western sky near the open cluster M44 otherwise known as the Beehive Cluster in Cancer. Orion is setting in the west. The bright star Arcturus is rising in the eastern sky. The bright star Spica is rising in the southeast. The constellations Virgo, Coma Berenices, Ursa Major, and Leo have many observable galaxies within their boundaries. New moon will occur on April 27<sup>th</sup> and full moon will occur on April 13<sup>th</sup>. The image below shows the location of the galaxies M81 and M82 near the Big Dipper in Ursa Major as well as M106 in Canes Venatici.



*NASA Space Place*

## Planets in Strange Places

By Trudy E. Bell

Red star, blue star, big star, small star—planets may form around virtually any type or size of star throughout the universe, not just around mid-sized middle-aged yellow stars like the Sun. That’s the surprising implication of two recent discoveries from the 0.85-meter-diameter Spitzer Space Telescope, which is exploring the universe from orbit at infrared (heat) wavelengths blocked by the Earth’s atmosphere.

At one extreme are two blazing, blue “hypergiant” stars 180,000 light-years away in the Large Magellanic Cloud, one of the two companion galaxies to our Milky Way. The stars, called R 66 and R 126, are respectively 30 and 70 times the mass of the Sun, “about as massive as stars can get,” said Joel Kastner, professor of imaging science at the Rochester Institute of Technology in New York. R 126 is so luminous that if it were placed 10 parsecs (32.6 light-years) away—a distance at which the Sun would be one of the dimmest stars visible in the sky—the hypergiant would be as bright as the full moon, “definitely a daytime object,” Kastner remarked.

Such hot stars have fierce solar winds, so Kastner and his team are mystified why any dust in the neighborhood hasn’t long since been blown away. But there it is: an unmistakable spectral signature that both hypergiants are surrounded by mammoth disks of what might be planet-forming dust and even sand.

At the other extreme is a tiny brown dwarf star called Cha 110913-773444, relatively nearby (500 light-years) in the Milky Way. One of the smallest brown dwarfs known, it has less

than 1 percent the mass of the Sun. It's not even massive enough to kindle thermonuclear reactions for fusing hydrogen into helium. Yet this miniature "failed star," as brown dwarfs are often called, is also surrounded by a flat disk of dust that may eventually clump into planets. (Note: This brown dwarf discovery was made by a group led by Kevin Luhman of Pennsylvania State University.)

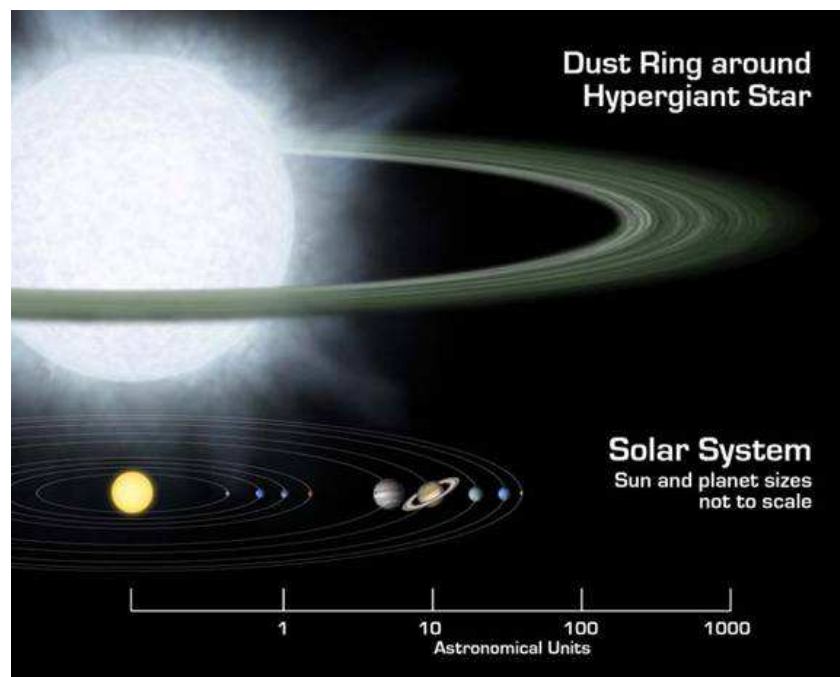
Although actual planets have not been detected (in part because of the stars' great distances), the spectra of the hypergiants show that their dust is composed of forsterite, olivine, aromatic hydrocarbons, and other geological substances found on Earth.

These newfound disks represent "extremes of the environments in which planets might form," Kastner said. "Not what you'd expect if you think our solar system is the rule."

Hypergiants and dwarfs? The Milky Way could be crowded with worlds circling every kind of star imaginable—very strange, indeed.

Keep up with the latest findings from the Spitzer at [www.spitzer.caltech.edu/](http://www.spitzer.caltech.edu/) . For kids, the Infrared Photo Album at The Space Place ([spaceplace.nasa.gov/en/kids/sirtf1/sirtf\\_action.shtml](http://spaceplace.nasa.gov/en/kids/sirtf1/sirtf_action.shtml)) introduces the electromagnetic spectrum and compares the appearance of common scenes in visible versus infrared light.

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



*Caption:*

Artist's rendering compares size of a hypothetical hypergiant star and its surrounding dusty disk to that of our solar system.