

# The Focal Point

The Atlanta Astronomy Club  
Established 1947  
December 2004

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Editor: Kat Sarbell

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## December Holiday Covered Dish Dinner

by Nancy "Gumby" Cronin

Happy Holidays! Not only are we having the annual Holiday Covered Dish Dinner and Planetarium Program, but this year we have added an Astronomy Art Exhibition and will have a special guest, Jonn Serrie! Have we got a great party planned for you!

When: Friday, Dec. 10th at 6:30 PM

Where: Emory University Observatory Atrium (across from White Hall)

This party is for members and non-members alike. So bring your family and friends out to celebrate. The AAC will provide Turkey, Ham and non-alcoholic drinks, including coffee. Casseroles, salads, and other items to share are provided by attendees as usual.

Rauna Long has been working hard to coordinate the dinner again this year. So please help her out by RSVPing early for this event, and be sure to tell her what you'll be bringing. You can reach her at [raunalong@hotmail.com](mailto:raunalong@hotmail.com) or leave your info and a call-back number for questions: 404-409-1409.

Something new this year is that you may bring beer and wine to this event to share with the adults at your table. Of course, any libations you bring don't count as part of your contribution to the dinner itself, but it's a nice addition if you want.

What's this about an Art Expo? How many times have you been observing with someone taking photos, video, or drawing their observations? This year many people have offered to share their love of astronomy by sharing their creative efforts. Entries include

paintings, photos, sketches, drawings, digital presentations, and more creative outlets.

If you would like to participate, you still have time. Contact me at [programs@atlantaastronomy.org](mailto:programs@atlantaastronomy.org) before Dec. 8th. (We need time to set up the displays.) For each entry, include your name, some identifying name of your art piece ('M31', or 'sketch of the moon', etc.), and age if the participant is under 18. Some art work will be for sale. Also the astronomy calendars and T-shirts will be available for \$10 each.

Last but certainly not least, special thanks to Rick Williamon and the Physics Department of Emory University for sponsoring us again this year! I can't say enough good things about Rick. Not only has he arranged for our celebration facilities, he is putting on the planetarium program again this year. I hope each of you will make a point of thanking him in person.

## Special Guest at Dinner Jonn Serrie

by Rauna Long

We have just booked musician Jonn Serrie to perform at our Holiday Dinner this year! If you are unfamiliar with his work I have included a brief Bio from his website <http://www.vipinfo.com/jonn/>.

Jonn Serrie is the foremost composer of space music.

His name is synonymous with this genre of electronic music. Known for his numerous works commissioned for planetariums around the world, he has reshaped and redefined ambient

space music. In addition to his twelve albums, his body of work includes diverse projects with Lucasfilm Ltd., NASA, the United States Navy, Hayden Planetarium, Expo Seville, and CNN.

Jonn's interest in electronic music began early with piano and church organ studies, eventually leading to a position as resident synthesist at Connecticut-based Electronic Music Laboratories in the 1970's. A fascination with space and aviation became the theme for his unique musical style. He is an FAA licensed pilot and lives in Atlanta.



Photo credit: [starsend.org/jonnserrie](http://starsend.org/jonnserrie)

## December Board Meeting

by Nancy Cronin and Donovan Conrad

The Board is scheduled to meet Monday, December 6th, at 7:00 PM, at Donovan Conrad's office in Buckhead. The address of the meeting place is

ReMax of Buckhead

2911 Piedmont Road

Atlanta GA, 30305

Directions to the office are as follows:

South of Peachtree Road, just past Pharr Road, Cactus Car Wash. Entrance into Montieff Commons Business Park is to the left. There will be a building right in front of you when you enter the place, ReMax (2911) is the first building directly to the left. The front door is facing Piedmont, across from the postal drop boxes. We will be on the second floor conference room. . . just wander upstairs, you can't miss it. If the door accidentally gets locked, just use the doorbell!

## Charlie Elliott Chapter Meeting Minutes November 2004

by Clevis Jones, CEC Recording Secretary

Members and visitors totaling 17 individuals attended the meeting. Larry Owens, Chapter Director, began the monthly meeting of the Charlie Elliott Chapter (CEC) of the Atlanta Astronomy Club (AAC) at about 3:00 PM, Saturday, November 13, 2004. Officers and other members presented news and updates. Debbie Jones, CEC Observing Supervisor, presented a program on "Cassiopeia's Treasures". Clevis Jones presented a slide and movie update on SpaceShipOne, along with other current events in astronomy and solar system exploration. A surprise program, "2001, A Space Odyssey", was presented by chapter member, Horace Sullivan. The featured program was "The 'Philosophy' of Astronomy" by Larry Owens. After the meeting, skies had cleared over the CEWC, so some folks stopped off at the observing field.

## General Membership Meeting Minutes November 2004

The November Meeting of the AAC took place on Friday, November 19th, at 8:00 PM in White Hall at Emory University. AAC President Chuck Painter called the meeting to order. About 60 people were in attendance. A door prize was awarded to one of our visitors. Officers gave announcements about upcoming events. Our speaker that evening was Dr. Richard Schmude Jr., Executive Director of the Association of Lunar & Planetary Observers (ALPO). His presentation was entitled "Recent Observations of the Planet Uranus".

*Editor's Note: After Dr. Schmude's talk at our last meeting, the timing couldn't have been better for the next article. The following is a recent news release from the Keck Observatory concerning the latest discoveries and images of the "Seventh Planet" with the telescope's new adaptive optics system.*

## Keck Pictures of Planet Uranus Show Best View from the Ground

W. M. Keck Observatory News Release

MAUNA KEA, Hawaii (November 10, 2004) Observations of Uranus conducted at the W. M. Keck Observatory in Hawaii are surprising astronomers with the level of detail they can see from the ground. Two separate teams of astronomers, one from Berkeley/SSI and one from Wisconsin, used advances in Keck adaptive optics (AO) to help make major scientific discoveries regarding the planet's atmosphere and ring system. The results are a powerful example of how ground-based telescopes are helping astronomers study planets in the outer solar system that once could only be studied from space. Early results were announced today at the 36th meeting of the American Astronomical Society's Division for Planetary Sciences.

We are stunned by the quality and detail of these images, said Dr. Frederic Chaffee, director of the W. M. Keck Observatory in Hawaii. These are the best pictures of Uranus that have ever been produced by a telescope, and they are opening new windows of understanding for this unique and special world.

The most recent observations of Uranus show the planet as it approaches its southern autumnal equinox, which takes place in 2007 (the length of the year on Uranus is 84 Earth years). The two teams used narrow filters at infrared wavelengths to study features in the atmosphere and ring sets, both of which are enormously enhanced by the Keck adaptive optics system. Ground-based telescopes are helping astronomers track climatic changes in the planet's atmosphere.

People may think that Uranus is relatively inactive, but these images show that Uranus is definitely changing, and perhaps quite dramatically, said Imke de Pater, professor of astronomy at University of California, Berkeley, lead investigator for the team responsible for the Berkeley observations. What is causing it, no one knows for sure. Only time will tell.

The new images are the result of many general improvements to the Keck adaptive optics system. A new calibration technique removes artifacts previously present in the images when measuring the atmospheric distortion with a planet instead of a point source of light. Another major improvement is a new wavefront reconstructor to improve the data processing within the AO system. This dramatically reduces the effect that noise or errors in measuring the atmospheric distortion have on the image quality.

A dramatic visualization of the power of adaptive optics (Figure 1) was made by Dr. Heidi Hammel of the Space Science Institute in Boulder, Colorado and Dr. Imke de Pater of UC Berkeley, California. They took images of Uranus and its rings with the second-generation Near Infrared Camera (NIRC2) behind the AO system on the Keck II telescope, first with the AO system off, and then with the AO system on. In this figure, the ring system is more readily visible through the 2.2-micron filter because methane absorption at this wavelength renders the planet extremely dark except for a few high altitude clouds. In contrast, the 1.6-micron image shows deeper atmospheric cloud structure, including many discrete

features peppering the planet's northern hemisphere. At 1.6 microns, the rings are just barely visible as a faint streak across the planet's northern hemisphere.

The differences are stunning, said Hammel. The detail provided by Keck's AO system for the atmosphere and the rings of Uranus fundamentally changes the science we can achieve.

Later observations conducted by the team at University of Wisconsin-Madison, also with the Keck II AO system, were formed into a composite image in which the highest clouds appear white, the middle level clouds appear bright green, and the lower clouds appear darker blue (Figure 2). The color balance used to reveal the cloud structure in these infrared exposures, which are not normally visible to human eyes, makes the ring system appear red in these images and is an artifact of the process. The higher clouds are most abundant in the planet's northern hemisphere.

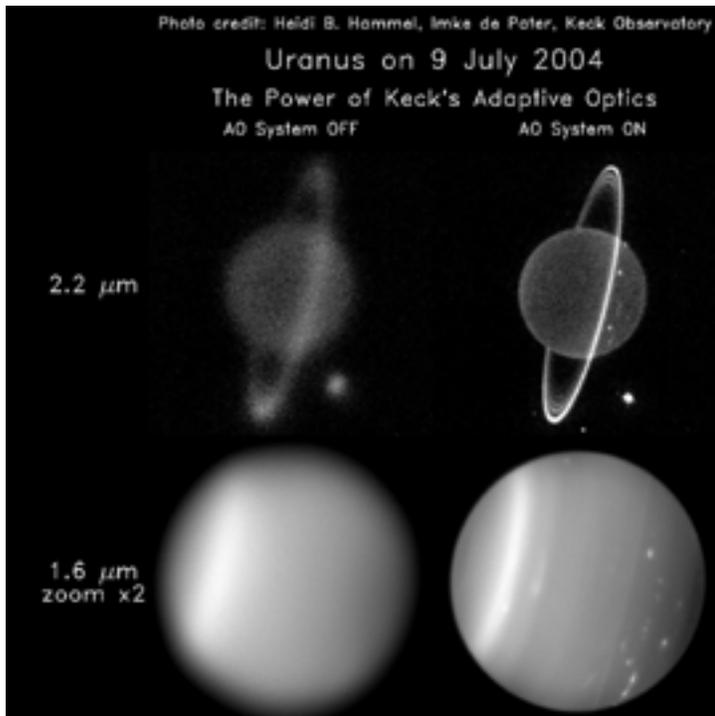


Figure 1: Heidi Hammel, Space Science Institute, Boulder, CO/Imke de Pater, University of California, Berkeley/ W. M. Keck Observatory  
The Power of Keck's Adaptive Optics is demonstrated in two sets of exposures that compare Keck AO system off (left) to Keck AO system on (right). Upper: Uranus, its rings and moon Miranda at near infrared wavelengths of 2.2 microns. Lower: Uranus and its atmospheric details as seen in near infrared wavelengths of 1.6 microns. The image has been doubled in size.

Dr. Lawrence Sromovsky, principal investigator for the Wisconsin observations said, "Twenty years ago we simply couldn't see the types of details in the outer solar system the way we can today with large, ground-based telescopes like Keck. These images actually reveal many more cloud features than the Voyager spacecraft found after traveling all the way to Uranus."

Until recently, little was known about the oddball planet, which gets its name from the Greek word Ouranos, a mythological god who personifies the heavens. Uranus lies tipped on its side, probably

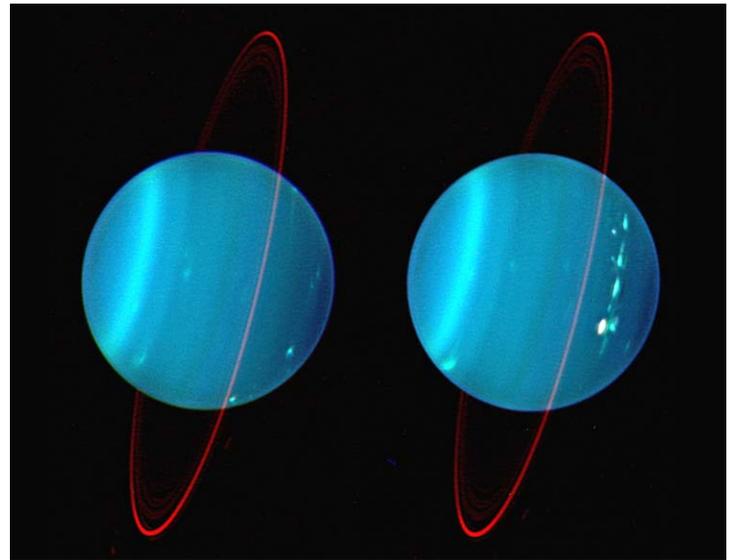


Figure 2: Lawrence Sromovsky, University of Wisconsin-Madison/ W. M. Keck Observatory

An infrared composite image of the two hemispheres of Uranus obtained with Keck adaptive optics. The component colors of blue, green, and red were obtained from images made at near infrared wavelengths of 1.26, 1.62, and 2.1 microns respectively. The images were obtained on July 11 and 12, 2004.

The representative balance of these infrared images which were selected to display the vertical structure of atmospheric features gives a reddish tint to the rings, an artifact of the process.

the result of an ancient cosmic collision, and its magnetic field lays strangely off-set from and tilted with respect to the planet's rotational pole. In 1986, the Voyager 2 spacecraft sent pictures to earth of what appeared to be a non-descript ball suspended in space. At that time, Uranus' South Pole was pointed almost directly at the sun, and the North Pole pointed away. Now, more than 18 years later, the planet is drawing near the point in its orbit where the planet's equator will be pointing toward the Sun, and both poles will get about 17 hours of sunlight a day.

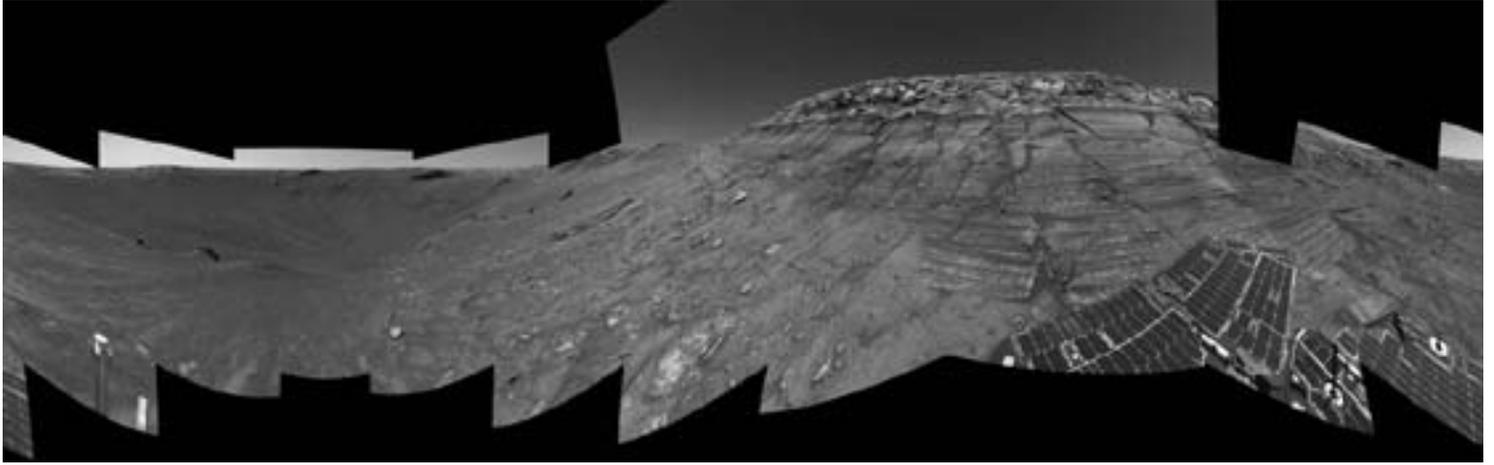
On Earth, the massive storms captured in the new pictures of Uranus would engulf nations as large as the continental United States, about 3 million square miles. But at a distance of more than 1.6 billion miles, even such large storms are barely detectable and require the use of the world's most powerful telescopes.

Funding for the telescopes and the Keck II adaptive optics system is provided by the W.M. Keck Foundation. Optimization for the Keck adaptive optics system is provided by the National Science Foundation and the Technology Center for Adaptive Optics, managed by UCSC under cooperative agreement No. AST 9876783 (de Pater). Additional funding was provided by NASA grants NAG5-11961, NAG5-10451 (Hammel) and NAG5 12206 (Sromovsky).

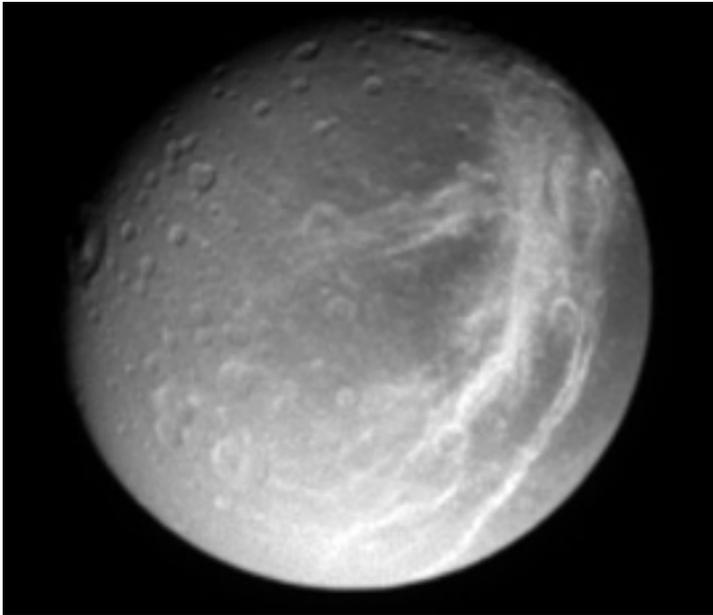
The W. M. Keck Observatory is operated by the California Association for Research in Astronomy (CARA), a non-profit 501 (c) (3) corporation whose board of directors includes representatives from the California Institute of Technology, the University of California, and the National Aeronautics and Space Administration. For more information, please visit [www.keckobservatory.org](http://www.keckobservatory.org).

## Solar System Exploration Gallery

Enjoy some of the latest images from the Mars Exploration Rovers and the Cassini spacecraft. All Images & Captions: NASA/JPL



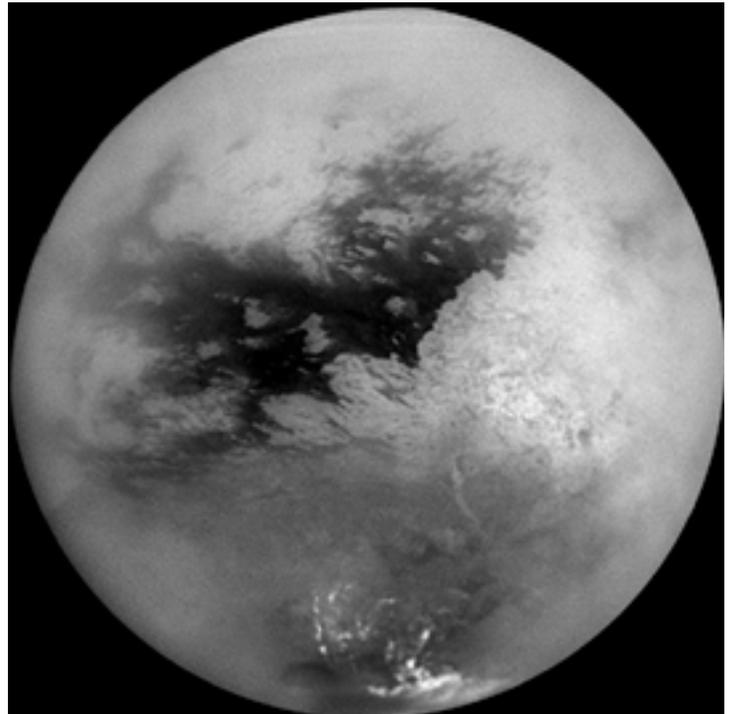
Above: The navigation camera on NASA's Mars Exploration Rover Opportunity took images during the rover's 285th martian day (Nov. 11, 2004) that are combined into this 360-degree panorama. Opportunity had reached the base of "Burns Cliff," a portion of the inner wall of "Endurance Crater." This view is the left-eye member of a stereo pair. It shows rock layers in the wall, with a portion of Opportunity's solar array visible at the bottom right. The rover's position when taking the images was labeled Opportunity site 37, position 550. This view is presented in a cylindrical-perspective projection with geometric seam correction.



A gorgeous Dione poses for Cassini, with shadowed craters and bright, wispy streaks first observed by the Voyager spacecraft 24 years ago. The wispy areas will be imaged at higher resolution in mid-December 2004. Subtle variations in brightness across the surface of this moon are visible here as well. Dione's diameter is 1,118 kilometers.

The image shows primarily the trailing hemisphere of Dione, which is the side opposite the moon's direction of motion in its orbit. The image has been rotated so that north is up.

The image was taken in visible light with the Cassini spacecraft narrow angle camera on Oct. 27, 2004, at a distance of about 1.2 million kilometers from Dione and at a Sun-Dione-spacecraft, or phase, angle of 28 degrees. The image scale is 3.5 kilometers (2.2 miles) per pixel.

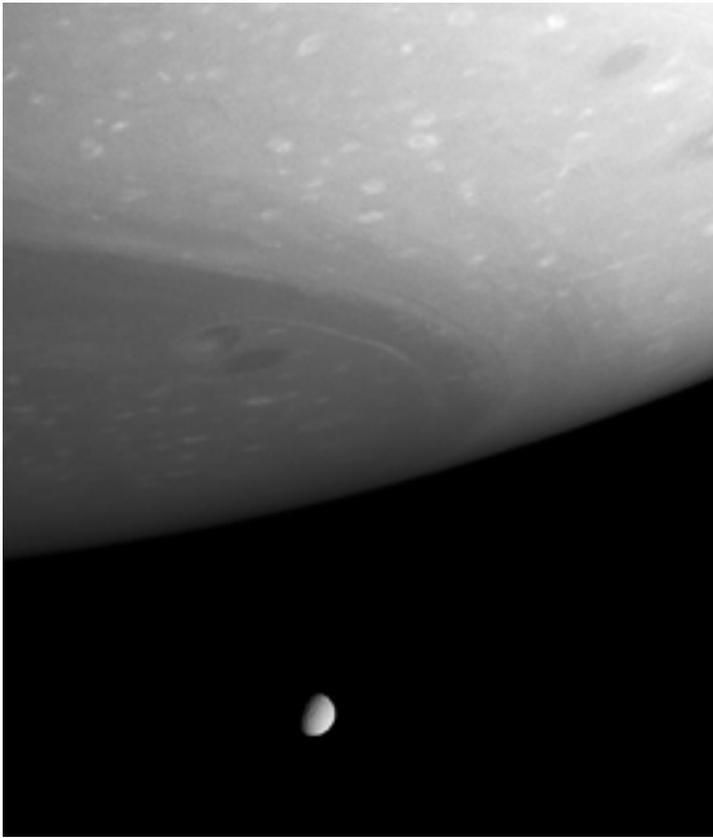


A mosaic of nine processed images recently acquired during Cassini's first very close flyby of Saturn's moon Titan on Oct. 26, 2004, constitutes the most detailed full-disc view of the mysterious moon.

The images that comprise the mosaic have been processed to reduce the effects of the atmosphere and to sharpen surface features. The mosaic has been trimmed to show only the illuminated surface and not the atmosphere above the edge of the moon. The Sun was behind Cassini so nearly the full disc is illuminated. Pixels scales of the composite images vary from 2 to 4 kilometers per pixel.

Surface features are best seen near the center of the disc, where the spacecraft is looking directly downwards; the contrast becomes progressively lower and surface features become fuzzier towards the outside, where the spacecraft is peering through haze.

The brighter region on the right side and equatorial region is named Xanadu Regio. Scientists are actively debating what processes may have created the surface brightness patterns seen here. The images hint at a young surface with, no obvious craters. However, the exact nature of that activity, whether tectonic, wind-blown, fluvial, marine, or volcanic is still to be determined.

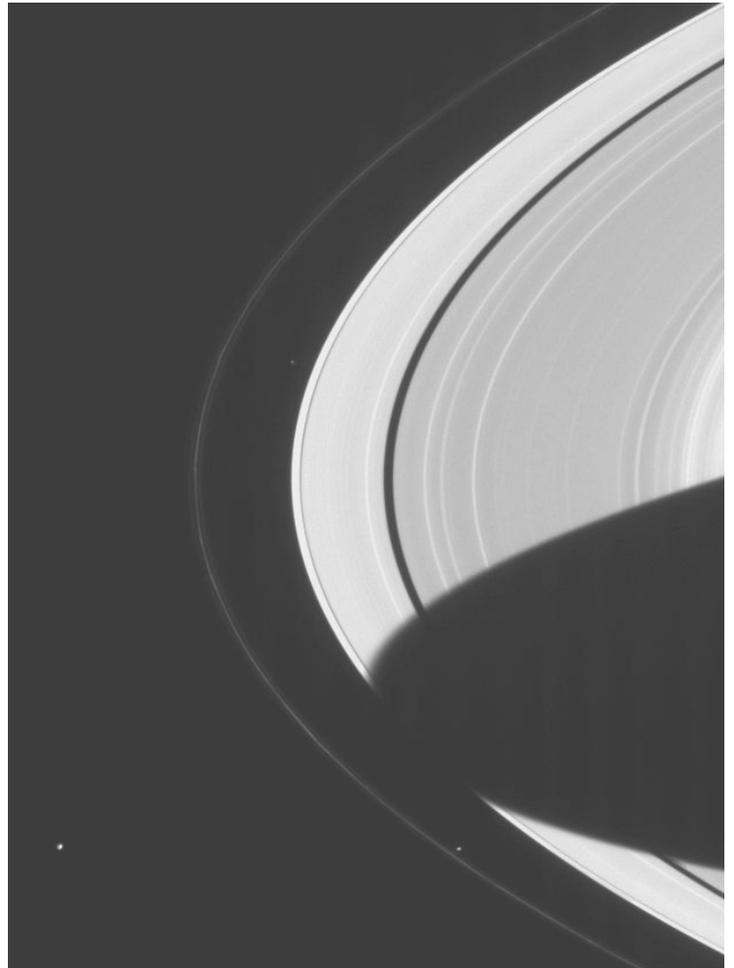


*This dazzling view looks beyond gigantic storms near Saturn's south pole to the small but clear disc of Tethys (1,060 kilometers, or 659 miles, across). Clouds and ribbons of gas swirl about in the planet's atmosphere in the foreground, while a tremendous chasm is visible on the icy moon.*

*The image was taken with the Cassini spacecraft narrow angle camera on Oct. 18, 2004, at a distance of 3.9 million kilometers (2.4 million miles) from Saturn and at a Sun-Saturn-spacecraft, or phase, angle of 61 degrees. The view is in wavelengths of visible red light centered at 619 nanometers. The image scale is 23 kilometers (14 miles) per pixel.*



*Having now passed closer to Tethys than the Voyager 2 spacecraft, Cassini has returned the best-ever natural color view of this icy Saturnian moon.*



*Saturn hosts its own miniature solar system, with an entourage of more than 30 moons. This image shows Saturn's A and F rings, along with three of the moons that orbit close to them.*

*From innermost to outermost, tiny Atlas orbits just outside of the bright A ring and is seen above center in this view. Prometheus is visible near lower right. Prometheus and its smaller cohort, Pandora, shepherd the thin, knotted F ring. Finally Janus can be seen near lower left. Janus shares its orbit with the moon Epimetheus.*

*Density waves due to Janus cause some of the bright bands seen in the A ring in this image. Prometheus and Atlas also produce waves in the rings, but their wave regions are too narrow to be seen here. The interactions of the moons with each other and the rings are a major target of study for the Cassini mission.*

*The planet's shadow stretches all the way across the main rings in this view. The shadow has an oval shape at present, but over the next few years will become more rectangular as the planet orbits the Sun and the angle at which sunlight strikes the rings decreases.*

*(Continued from bottom left) As seen here, the battered surface of Tethys has a neutral hue. The image here is a mosaic of two footprints. Three images taken in the red, green and blue filters were taken to form a natural color composite. The result reveals a world nearly saturated with craters - many small craters lie on top of older, larger ones, suggesting an ancient surface. At the top and along the boundary between day and night, the moon's terrain has a grooved appearance.*

*This moon is known to have a density very close to that of water, indicating it is likely composed mainly of water ice. Its frozen mysteries await Cassini's planned close flyby in September 2005.*

## NASA Successfully Launches Swift Gamma-Ray Satellite

NASA's Swift satellite was successfully launched November 20th from the Cape Canaveral Air Force Station, Fla. The satellite will pinpoint the location of distant yet fleeting explosions that appear to signal the births of black holes.

"It's a thrill that Swift is in orbit. We expect to detect and analyze more than 100 gamma-ray bursts a year. These are the most powerful explosions in the universe, and I can't wait to learn more about them," said Swift Principal Investigator Dr. Neil Gehrels, at NASA's Goddard Space Flight Center, Greenbelt, Md.

Each gamma-ray burst is a short-lived event, lasting only a few milliseconds to a few minutes, never to appear again. They occur several times daily somewhere in the universe, and Swift should detect several weekly.

Swift, a mission with international participation, was designed to solve the 35-year-old mystery of the origin of gamma-ray bursts. Scientists believe the bursts are related to the formation of black holes throughout the universe - the birth cries of black holes.

To track these mysterious bursts, Swift carries a suite of three main instruments. The Burst Alert Telescope (BAT) instrument, built by Goddard, will detect and locate about two gamma-ray bursts weekly, relaying a rough position to the ground within 20 seconds. The satellite will swiftly re-point itself to bring the burst area into the narrower fields of view of the on-board X-ray Telescope (XRT) and the UltraViolet/Optical Telescope (UVOT). These telescopes study the afterglow of the burst produced by the cooling ashes that remain from the original explosion.

The XRT and UVOT instruments will determine a precise arc-second position of the burst and measure the spectrum of its afterglow from visible to X-ray wavelengths. For most of the bursts detected, Swift data, combined with complementary observations conducted with ground-based telescopes, will enable measurements of the distances to the burst sources.

The afterglow phenomenon can linger in X-ray light, optical light, and radio waves for hours to weeks, providing detailed information about the burst. Swift will check in on bursts regularly to study the fading afterglow, as will ground-based optical and radio telescopes. The crucial link is having a precise location to direct other telescopes. Swift will provide extremely precise positions for bursts in a matter of minutes.

Swift notifies the astronomical community via the Goddard-maintained Gamma-ray Burst Coordinates Network. The Swift Mission Operations Center, operated from Penn State's University Park, Pa., campus, controls the Swift observatory and provides continuous burst information.

"Swift can respond almost instantly to any astrophysical phenomenon, and I suspect that we're going to be making many discoveries which are currently unpredicted," said Swift Mission Director John Nousek, Penn State professor of astronomy and astrophysics.

Goddard manages Swift. Swift is a NASA mission with the participation of the Italian Space Agency (ASI) and the Particle Physics and Astronomy Research Council in the United Kingdom.

Swift was built through collaboration with national laboratories, universities and international partners, including General Dynamics, Gilbert, Arizona; Penn State University; Los Alamos National Laboratory, New Mexico; Sonoma State University, Rohnert Park, Calif.; Mullard Space Science Laboratory in Dorking, Surrey, England; the University of Leicester, England; ASI Malindi ground station in Africa; the ASI Science Data Center in Italy; and the Brera Observatory in Milan, Italy.

For more information about Swift on the Internet, visit:

<http://www.nasa.gov/swift> and <http://swift.gsfc.nasa.gov>



*This image shows the Solid Rocket Boosters separating from the Delta II rocket.  
Photo Credit: [www.spaceflightnow.com](http://www.spaceflightnow.com) / Carleton Bailie / Boeing*



*Photo: NASA-KSC*

## Charles Elliot Chapter December Meeting

MEETING DATES AND PROGRAMS:

NEW FALL/WINTER SCHEDULE – meetings begin at 3:00 PM

DECEMBER Meeting: Saturday, 11 December at 3:00 PM: "An Interesting Astronomical Topic"

-What's Up Tonight: Observing report by Debbie Jones

-Current Events: Jim Honeycutt

-Lecture: Dr. Amy Lovell, Associate Professor of Physics and Astronomy at Agnes Scott College is coming to Charlie Elliott to give us an interesting talk on astronomy. The specific topic will be announced soon.

JANUARY 2005 Meeting: TBD

PLEASE check the CEC website for the most current meeting information!

<http://www.atlantaastronomy.org/CEWMA/>

## GASP (Georgia Astronomy in State Parks) Events

The GASP schedule for 2004 has been completed. GASP events for 2005 will begin around March. For information about these events, contact Joanne Cirincione at [Starrynights@AtlantaAstronomy.org](mailto:Starrynights@AtlantaAstronomy.org).

## Directions to White Hall at Emory

Meeting Location Information:

Turn onto Dowman Drive from North Decatur Road at the five way intersection (across from Everybody's Pizza). White Hall is located on the right across from the new Science & Math building. Parking is available along Dowman Drive on both sides of the road. There is also a gated parking lot on the left behind the Admissions Building. After 6PM there is no fee to park there. For more detailed directions on how to get to Emory University, visit [www.atlantaastronomy.org](http://www.atlantaastronomy.org).

The **Atlanta Astronomy Club Inc.**, the South's largest and oldest astronomical society, meets at **8:00 p.m.** on the third Friday of each month at Emory University's White Hall or occasionally at other locations. Membership is open to all. Membership fees are **\$30** for a family or single person membership. College Students membership fee is **\$15**. These fees are for a one year membership.

Magazine subscriptions to Sky & Telescope or Astronomy can be purchased through the club for a reduced rate. The fees are **\$33** for Sky & Telescope and **\$29** for Astronomy. Renewal forms will be sent to you by the magazines. Send the renewal form along with your check to the Atlanta Astronomy Club treasurer.

**The Club address is:** Atlanta Astronomy Club, PMB 305, 3595 Canton Road A9, Marietta, Georgia 30066.

Atlanta Astronomy Club Hot Line: Timely information on the night sky and astronomy in the Atlanta area. Call **770-621-2661**.

Internet Home Page: <http://www.AtlantaAstronomy.Org>

Send suggestions, comments, or ideas about the website to [webmaster@AtlantaAstronomy.org](mailto:webmaster@AtlantaAstronomy.org). Also send information on upcoming observing events, meetings, and other events to the webmaster.

## AAC Contacts

**President:** Chuck Painter 404-386-3899  
[president@atlantaastronomy.org](mailto:president@atlantaastronomy.org)

**Program Chair / Board Chair:** Nancy Cronin 678-849-3300  
[programs@atlantaastronomy.org](mailto:programs@atlantaastronomy.org)

**Observing Chair:** Jim Holley 678-838-2906  
[observing@atlantaastronomy.org](mailto:observing@atlantaastronomy.org)

**Corresponding Secretary:** Kat Sarbell 404-352-0652  
[focalpoint@atlantaastronomy.org](mailto:focalpoint@atlantaastronomy.org)

**Treasurer:** Kelly Melikian [Treasurer@AtlantaAstronomy.Org](mailto:Treasurer@AtlantaAstronomy.Org)

**Recording Secretary:** Brad Isley 770-497-1599  
[secretary@atlantaastronomy.org](mailto:secretary@atlantaastronomy.org)

**Board:** Mike Boni 770-956-7486  
[mikeboni@atlantaastronomy.org](mailto:mikeboni@atlantaastronomy.org)

**Board:** Chris Hetlage 770-242-6584 [chrishet@comcast.net](mailto:chrishet@comcast.net)

**Board:** Donovan Conrad [donovan@donconrad.com](mailto:donovan@donconrad.com)

**Board:** Tom Faber 770-923-6832 [tfaber@america.net](mailto:tfaber@america.net)

**Board:** Brigitte Fessele 404-371-4713  
[brigitte\\_hf@earthlink.net](mailto:brigitte_hf@earthlink.net)

**Elliott Chapter Director:** Larry Owens  
[planetographer@comcast.com](mailto:planetographer@comcast.com)

**Elliott Observing Chair:** Debbie Jones [djemail@aaahawk.com](mailto:djemail@aaahawk.com)

**Elliott Recording Secretary:** Clevis Jones  
[cjones@aaahawk.com](mailto:cjones@aaahawk.com)

**Elliott Coordinator:** Alesia Rast [Alesia\\_Rast@mail.dnr.state.ga.us](mailto:Alesia_Rast@mail.dnr.state.ga.us)

**Webmaster Charlie Elliott:** Larry Owens  
[planetographer@comcast.net](mailto:planetographer@comcast.net)

**The Telescope Workshop:** Dan Llewellyn 678-579-9661  
[zoser@mindspring.com](mailto:zoser@mindspring.com)

**Georgia Astronomy in State Parks:** Joanne Cirincione 404-824-4751  
[starrynights@AtlantaAstronomy.org](mailto:starrynights@AtlantaAstronomy.org)

**Light Trespass:** Tom Buchanan 770-521-2136  
[buchanant@bellsouth.net](mailto:buchanant@bellsouth.net)

**Mentor Program:** Keith Burns 770-427-1475  
[Keith\\_B@bellsouth.net](mailto:Keith_B@bellsouth.net)

**PSSG Chairman:** Peter Macumber [pmacumber@nightssky.org](mailto:pmacumber@nightssky.org) **Co-Chairman:** Joanne Cirincione [starrynights@AtlantaAstronomy.org](mailto:starrynights@AtlantaAstronomy.org)

**Sidewalk Astronomy / Board:** Mark Banks 404-257-2766  
[jmarkbanks@earthlink.net](mailto:jmarkbanks@earthlink.net)

**Woodruff Observ. Coordinator:** John Lentini 770-984-0175  
[johnlentini@yahoo.com](mailto:johnlentini@yahoo.com)

**Webmaster Atlanta Astronomy:** Peter Macumber 770-941-4640  
[pmacumber@nightssky.org](mailto:pmacumber@nightssky.org)

## Atlanta Astronomy Club Website

While this newsletter is the official information source for the Atlanta Astronomy Club, it is only up to date the day it is printed. So if you want more up to date information, go to our club's website. The website contains pictures, directions, membership applications, events updates (when available) and other information. <http://www.atlantaastronomy.org>

## Calendar

December 5th, Sunday: Moon Last Quarter: Conjunction Venus & Mars.  
December 6th, Monday: AAC Board Meeting. 7-9PM, in Buckhead, see page 2 for details.  
December 7th, Tuesday: Moon occults Jupiter. Earliest Sunset (~5:27 PMEST at Atlanta)

December 9th, Thursday: Moon near Venus and Mars.

December 10th, Friday: Mercury at Inferior Conjunction. AAC Christmas Pot Luck Dinner, Atrium of Math and Science Building at Emory University. Time 6:30PM. Bradley Observatory Open House. 8:00PM, Agnes Scott College. "Asteroids and Comets: Things your mother never told you." Speaker: Dr. Amy Lovell, Agnes Scott College.

December 12th, Sunday: Moon New

December 13th, Monday: Geninid Meteor Shower. Pluto at Superior Conjunction.

December 18th, Saturday: Moon First Quarter.

December 21st, Tuesday: Solstice at 7:40 AM EST

December 22nd, Wednesday: Ursid Meteor Shower.

December 23rd, Thursday: Moon near M45.

December 26th, Sunday: Moon Full (Moon Before Yule, Long Night Moon).

December 29th, Wednesday: Mercury at Western Elongation & conjunction with Venus.

December 30th, Thursday: January Focal Point submission deadline. 4PM.

January 1st, Saturday: Earth at Perihelion.

January 3rd, Monday: Quadrantid Meteor Shower.

January 4th, Tuesday: Latest Sunrise (~7:42 AM EST at Atlanta).

January 7th, Friday: Moon, Mars, & Antares grouping in morning sky.

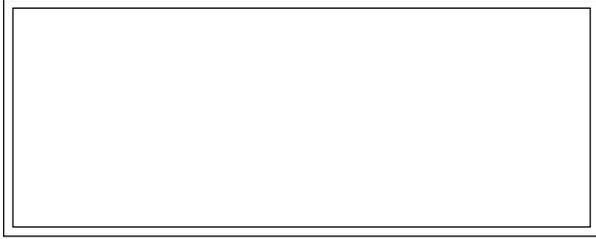
## Atlanta Astronomy Club Listserve

Subscribe to the Atlanta Astronomy Club Mailing List: The name of the list is: AstroAtlanta. The address for messages is: AstroAtlanta@yahoogroups.com . To add a subscription, send a message to: AstroAtlanta-subscribe@yahoogroups.com . This list is owned by Lenny Abbey.

### Focal Point Deadline and Info

Please send articles, pictures, and drawings in electronic format on anything astronomy related to Kat Sarbell at focalpoint@atlantaastronomy.org. You can submit articles anytime up and including the deadline date. The deadline for January is Thursday, December 30th at 4:00 PM .... Submissions will no longer be accepted after the deadline.

FIRST CLASS



*The Focal Point*

Newsletter of The Atlanta Astronomy Club,

Inc.

FROM:

Kat Sarbell

2025 Peachtree Road, Apt.#408

Atlanta, GA 30309

We're here to help! Here's how to reach us:

Atlanta Astronomy Club

PMB 305

3595 Canton Road A9

Marietta, GA 30066