

# *Sky* WAA *tch*



## ***Supermoon***

John Paladini shot this image of the March Supermoon with a 4-inch f12 refractor. This was the largest full Moon in 18 years as the Moon was in its full phase just 50 minutes past perigee – the point of its orbit that brings it closest to Earth. As a result the Moon appeared about 14 percent larger and 30 percent brighter than a Full Moon near apogee, its furthest point in the elliptical lunar orbit.

# Events for April 2011

## WAA Lectures

### "50 Years of Astronomy"

Friday April 1<sup>st</sup>, 7:30pm

Miller Lecture Hall, Pace University  
Pleasantville, NY

On April 1<sup>st</sup>, Dr. Michael Inglis, professor of astrophysics at Suffolk County Community College, and author of *Astrophysics is Easy* and *Astronomy of the Milk Way*, will speak on 50 Years of Astronomy, highlighting such topics as the origin of black holes, the search and discovery of other solar systems, and the ultimate fate of the universe. Free and open to the public. [Directions](#) and [Map](#).

## Upcoming Lectures

Miller Lecture Hall, Pace University  
Pleasantville, NY

On May 6<sup>th</sup>, the speaker will be renowned telescope maker Rob Teeter; his talk will be entitled "Teeter and his Telescopes: 9 Years, 72 Scopes and a Thousand Stories." Listen as Rob recounts his most interesting telescope making adventures, capped off by the infamous story of "Mr. Know-it-all and his 0.71 Ratio." Free and open to the public.

## Northeast Astronomy Forum (NEAF)

NEAF will be held this year on Saturday and Sunday April 16<sup>th</sup> and 17<sup>th</sup> at Rockland Community College in Suffern, NY. This nationally known event includes some 140 vendors, world-renowned speakers and informative workshops. For details and directions visit: [NEAF](#).

**Call: 1-877-456-5778** (toll free) for announcements, weather cancellations, or questions. Also, don't forget to periodically visit the WAA website at:

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

## Starway to Heaven

Saturday April 9<sup>th</sup>, 8:00pm

Meadow Picnic Area, Ward Pound  
Ridge Reservation, Cross River

This is our scheduled Starway to Heaven observing date for April, weather permitting. Free and open to the public. The scheduled rain/cloud date is April 23<sup>rd</sup>. Participants and guests should read our [General Observing Guidelines](#).

## New Members. . .

Joseph DePietro - Mamaroneck  
Walter Castro - Wappingers Falls

## Renewing Members. . .

George Thomas - Irvington  
Arumugam Manoharan - Yonkers  
Lori Wood - Yonkers  
Theodore Keltz - New Rochelle  
Doreen Fitzpatrick - Ossining  
David Klaus - Valhalla

**WANTED Co-editor:** Individual to help edit the WAA newsletter. Initial responsibilities to be proof-reading, but eventually seeking someone to co-edit newsletter. Knowledge of Apple Pages would be helpful. Contact: [Newsletter](#).



Westchester Amateur Astronomers, Inc., a 501(c)(3) organization, is open to people of all ages with the desire to learn more about astronomy. The Mailing address is: P.O. Box 44, Valhalla, New York 10595. Phone: 1-877-456-5778. Observing at Ward Pound Ridge Reservation, Routes 35 and 121 South, Cross River. Annual membership is \$25 per family, and includes discounts on *Sky & Telescope* and *Astronomy* magazine subscriptions. Officers: President: Doug Baum; Senior Vice President: Larry Faltz; Vice President Public Relations: David Parmet; Vice President Educational Programs: Pat Mahon; Treasurer: Rob Baker; Secretary/Vice President Membership: Paul Alimena; Vice President Field Events: Bob Kelly; Newsletter: Tom Boustead.

# Articles and Photos

## View Saturn this Spring by Larry Faltz

Almost everyone who looks through a telescope to see Saturn for the first time gasps with wonder and delight. It's just so improbable. Even being raised on high-resolution Hubble and Cassini photographs is not enough to dispel the marvel of actually seeing those rings with your own eyes. And we in the gear-head wing of WAA really feel good about our scopes and eyepieces when the image is detailed and the Cassini division is black and sharp.



Saturn will be well-placed for viewing in the evenings in the second quarter of 2011. Amateurs willing to stay up late have already been observing and photographing the planet, which is spending this year in the constellation Virgo. This puts it relatively south and low in the sky from our spring vantage point, and so its altitude for this observing season will not be as high as we would like for the clearest views. Of course, our friends in the southern hemisphere will find it practically overhead, and the best photographs this year will come from Australia, New Zealand, South America and South Africa, where many amateurs have fine astrophotography set-ups. It will be retrograding (reversing course and temporarily moving west) from January 26<sup>th</sup> to June 12<sup>th</sup> as the Earth passes it relative to the stars. You can find a neat display of planetary motion, including an illustrative animation, at <http://www.nakedeyepianets.com/movements.htm>.

You will be able to view Saturn at a comfortable angle during the evening hours in April, May and June. It will be in the south (due south is 180 degrees) but because it is low (only about half-way between the horizon and the zenith at best) you will need a fairly unobstructed view.

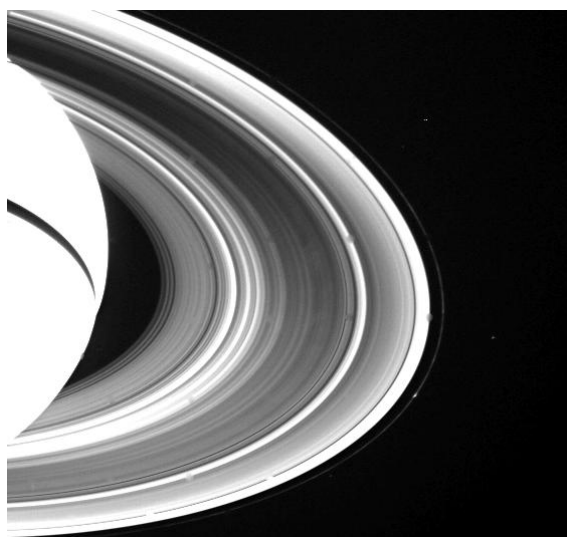
Saturn at 10 PM local time (Westchester, NY)				
Date	Mag.	Diam (sec)	Az	Alt
4/1/2011	0.4	19.3	136°	+36°
4/15/2011	0.4	19.3	154°	+43°
5/1/2011	0.5	19.1	177°	+46°
5/15/2011	0.6	18.8	198°	+45°
6/1/2011	0.8	18.4	220°	+39°
6/15/2011	0.8	17.9	234°	+31°
7/1/2011	0.9	17.4	247°	+21°
7/15/2011	0.9	17.0	256°	+11°

The rings are made up of nearly pure water-ice crystals ranging in size from 1 cm to several meters. The entire ring system is estimated to be only 10 meters (32 feet) thick, yet we have no trouble seeing it from 800 million miles away. It is so bright because the albedo (reflectivity) of the ice crystals is very high. The rings were glimpsed by Galileo in early 1610, but his primitive 14-power telescope couldn't resolve them and he thought at first there were 3 connected bodies. He later called them "ears" on the planet's disc. It wasn't until 1655 that Christiaan Huygens, using a much better 50-power telescope, was able to resolve them as separate from the planet. In 1675, Giovanni Domenico Cassini noted the dark "ring" (actually a relative absence of matter) that now bears his name and is the most obvious ring structure for small telescopes. The rings were thought to be solid objects, essentially gigantic cosmic bagels, until James Clerk Maxwell (he of the famous equations) proved that they would break apart if solid, and so they had to be composed of many smaller bodies.

Advances in optical equipment made for ever-greater ring detail, but it was not until the Voyager missions that the true glory and complexity of the rings was appreciated. Images from the spacecraft showed all sorts of internal structure, including hundreds of ringlets, spokes and waves, and astronomers were able to determine the importance of small "shepherd" moons to the stability of the ringlet configuration. You can learn much more about the remarkable science from these probes at [NASA's Voyager web site](http://www.nasa.gov).

In the telescopic era, Saturn was thought to have 9 moons, but observations by Voyager 1 and 2 and the Cassini probe (launched in 1997, reaching Saturn in





2004 and still sending back a trove of data--see the [Cassini web site](#)), have raised that number to at least 63. Many of their surfaces have unique and still-unexplained features. The largest moons, shown in the table, are visible with a good 6-8" telescope (although you'll need a big scope for Mimas and Hyperion). I've seen 5 of them in one field from my driveway in light-polluted Larchmont with an 8" SCT. Any good planetarium program will plot them so you can identify them accurately. I use [Cartes du Ciel](#), a very capable application that can be downloaded at no cost. The moons' positions relative to the planet are shown in the chart below for May 17<sup>th</sup> at 10 pm, but the smaller moons move fairly quickly, so you'll have to make your own charts if you want to know which is which.

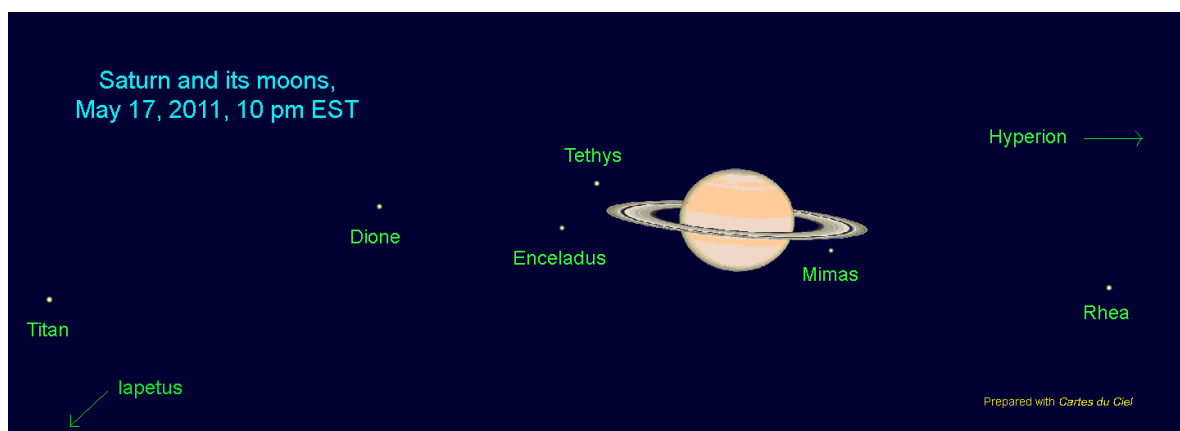
**Saturn's Largest Moons**

Moon	Actual Diam (km)	Angular Diameter (arc-sec)	Mag. on 5/15/11
Titan	5,150	0.798	8.6
Rhea	1,530	0.237	10.0
Tethys	1,070	0.164	10.5
Dione	1,120	0.174	10.7
Iapetus	1,470	0.223	11.4
Enceladus	500	0.077	12.0

What I said about optics for Jupiter in the [November 2010 SkyWAatch](#) naturally applies to Saturn: anything works, refractors preferred, Newtonians and SCT's need to be collimated and cooled, and be patient for those moments of good, steady seeing. Even a small image of the planet through a decent but modest scope will show the rings and perhaps the Cassini Division.

The surface of Saturn is relatively bland, especially compared to Jupiter, and only vague bands can be appreciated. With excellent seeing and a large scope, storms on the surface can be visualized, although they usually require imaging, multi-frame stacking and contrast enhancement. Amateurs have even made movies showing the planet's rotation, bringing out structure in the rings. You can find many of these images by going to the Solar System Imaging and Processing forum on the [Cloudy Nights](#) amateur astronomy web site.

So take your scope out on the sidewalk this spring and enjoy the view. Make sure any passers-by stop and take a look. You'll get a big kick from their shouts of amazement.



## **GOES-R, Zombie Fighter**

**by Dr. Tony Phillips**

On April 5, 2010, something eerie happened to the Galaxy 15 telecommunications satellite: It turned into a zombie.

The day began as usual, with industry-owned Galaxy 15 relaying TV signals to millions of viewers in North America, when suddenly the geosynchronous satellite stopped taking commands from Earth. It was brain dead! Like any good zombie, however, its body continued to function. Within days, Galaxy 15 began to meander among other satellites in geosynchronous orbit, transmitting its own signal on top of the others'. Satellite operators scrambled to deal with the interference, all the while wondering what happened?

In horror movies, zombies are usually produced by viruses. "In this case, the culprit was probably the sun," says Bill Denig of the National Geophysical Data Center in Boulder, Colorado. He and colleague Janet Green of NOAA's Space Weather Prediction Center recently led a study of the Galaxy 15 anomaly, and here are their conclusions:

On April 3rd, a relatively minor solar flare launched a cloud of plasma toward Earth. Galaxy 15 had experienced many such events before, but this time there was a difference.

"Galaxy 15 was just emerging from the shadow of Earth when the cloud arrived and triggered a geomagnetic storm," explains Denig. Suddenly exposed to sunlight and the ongoing storm, "the spacecraft began to heat up and charge [up]."

Electrons swirling around Galaxy 15 stuck to and penetrated the spacecraft's surface. As more and more charged particles accumulated, voltages began

to rise, and—zap!—an electrostatic discharge occurred. A zombie was born.

"At least, this is what we suspect happened based on data collected by GOES satellites in the vicinity," he says. "We'll be able to diagnose events like this much better, however, after GOES-R is launched by NASA in 2015."

GOES-R is NOAA's next-generation Geostationary Operational Environmental Satellite. One of the instruments it will carry, a low-energy electron counter, is crucial to "zombie fighting." Low energy-electrons are the ones most likely to stick to a spacecraft's surface and cause brain-frying discharges. By monitoring these particles in Earth orbit, GOES-R will provide better post-mortems for future zombie outbreaks. This could help satellite designers figure out how to build spacecraft less susceptible to discharges. Also, GOES-R will be able to issue alerts when dangerous electrons appear. Satellite operators could then take protective action—for example, putting their birds in "safe mode"—to keep the zombie population at bay.

Meanwhile, Galaxy 15 is a zombie no more. In late December 2010, after 9 months of terrorizing nearby spacecraft, the comsat was re-booted, and began responding to commands from Earth again.

All's well that ends well? True zombie fighters know better than to relax. Says Denig, "we're looking forward to GOES-R."

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with NASA.

## **Classified**

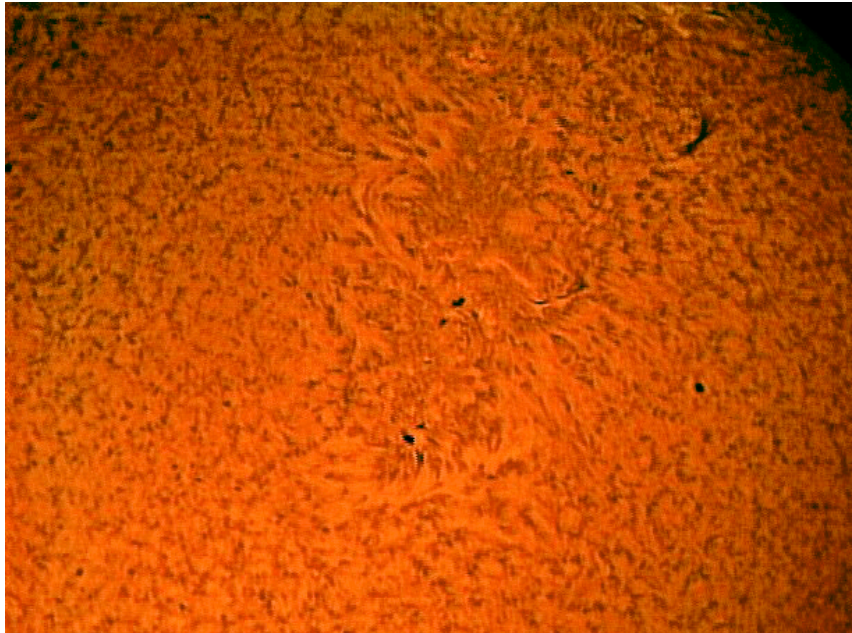
**For Sale:** Star Master Deluxe Oak 42" StarStep Observing Chair. Like new, excellent condition and finish. Free personal delivery at a mutually agreeable site within Westchester. Contact: Tom Crayns by email at [articulated@msn.com](mailto:articulated@msn.com) for further details.

As a service to members, the WAA newsletter will publish advertisements for equipment sales and other astronomy-related purposes. Ads will only be accepted from WAA members and must relate to amateur astronomy. Please keep to 100 words, include contact info and provide by the 20th of the month for inclusion in the next issue. The newsletter is subject to space limits; so ads may be held to subsequent issues. The WAA may refuse an ad at its sole discretion. In particular, price information will not be accepted. Members and parties use this classified service at their own risk. The Westchester Amateur Astronomers (WAA) and its officers accept no responsibility for the contents of any ad or for any related transaction. Send classified ad requests to: [Newsletter](#).



### ***Discovery Launch***

On February 24<sup>th</sup>, Ben Alimena took this photo of the final flight of the the space shuttle Discovery. Ben and family were in Titusville at SpaceView Park, 12 miles away from pad 39A.



### ***Solar Active Region 1176***

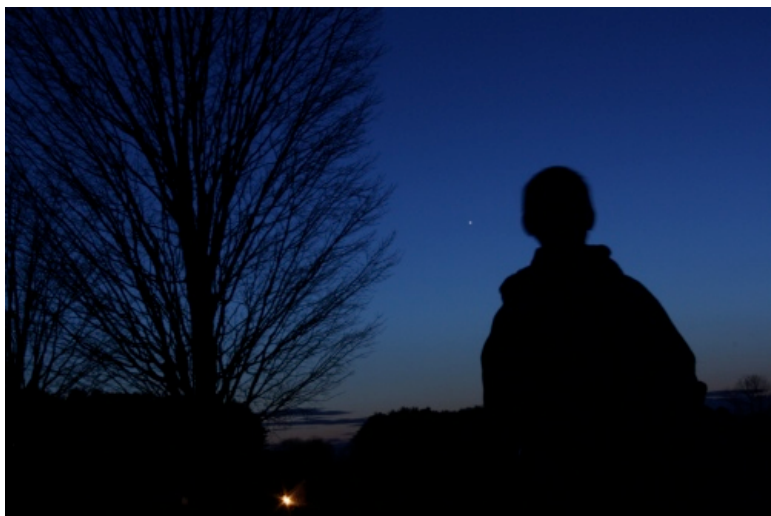
Larry Faltz took this image of the Sun on March 26<sup>th</sup>, Active region 1176, using a Lunt 60mm double-stack H-alpha telescope at f/20 on iOptron Minitower. The camera was a Mallincam Color Hyper Plus (Best 860 frames from a 2500-frame avi processed with Registax 5.0).





### **Crescent Moon**

Rick Bria provided this image of the Moon taken at the Mary Aloysia Hardey Observatory (Convent of the Sacred Heart) on October 14, 2010. Notes Rick: The Moon orbits the Earth about every 29 days. The different phases of the Moon are due to the changing angle of the Moon, Earth, and Sun as the Moon orbits. The dark portion of the Moon is not caused by the shadow of the Earth. The only time the Earth's shadow darkens the Moon is during a Lunar Eclipse. When the Moon is less than 50 percent illuminated it is called a crescent phase. During Crescent phases, the Moon-Earth-Sun angle is less than 90 degrees. When the Moon is more than 50 percent illuminated, it is called a Gibbous phase. At that time the Moon-Earth-Sun angle is greater than 90 degrees. The image, shot through a Televue 76mm, was assembled and processed in Registax5. It is a 407 image stack from an AVI video produced using the freeware program EOS Movie Record. Final adjustments were in PhotoshopCS5.



### **◀ Boy, Tree and Jupiter**

Courtesy of Bob Kelly is a photo from the WAA March Starway to Heaven. Notes Bob: It's a ten second exposure, ISO 400, zoomed to 55mm focal length, Canon XS on a tripod. The bright dot in the evening twilight sky really is Jupiter. The young man was sitting atop a pile of rocks. Someone must have scraped them up into a pile, perhaps while plowing snow from the unpaved parking lot.

# Almanac

**For April 2011 by Bob Kelly**

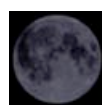
Where have all the planets gone? April starts with Mercury, Mars, Jupiter, Uranus and Neptune hiding in the Sun's glare. Venus plays it cool, low in the pre-sunrise sky, keeping her distance from the rest of the Sun's kids. With the other kids out of the way this month, we have more time to spend on the rest of the universe.

Saturn provides enough entertainment for everyone in April. Saturn reaches opposition, up all night on the 3<sup>rd</sup>, entering the sky from the east at sunset and departing in the west before sunrise. Its main moon Titan is viewable in most telescopes. Saturn's rings are tipped seven degrees toward us, appearing wider and brighter than last year. The brighter rings are making it harder to see the smaller moons that we were able to pick out when the rings were on edge last year.

If you like to use the Moon to find your way around the sky, the crescent Moon makes a pretty picture with the open clusters Hyades and Pleiades on the evening of the 7<sup>th</sup>. The Moon sidles up to Saturn on the 16<sup>th</sup> and sails by Spica on the 17<sup>th</sup>. By the end of the month, Venus and the Moon sink into the morning twilight and lead us to a series of alignments of the other planets visible starting in the last third of April - if you have a very clear eastern horizon and good optical aid.

For the rest of the month, the Big Dipper, high overhead before midnight, is the key to the evening sky. Saturn is bright, but not brilliant like Jupiter was or Venus is. So, folks who want to be new fans of Saturn should follow the handle of the Dipper away from the bowl and "arc to Arcturus" and "speed on to Spica". Of course, if you speed to Spica, Saturn will pull you over, as it is the bright 'star' that patrols the sky between Arcturus and Spica in the southeastern sky before midnight.

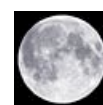
But after you spend some time with Saturn, come back to the Dipper. I like to show people Alcor and Mizar, the pair of stars in the bend of the handle of the Dipper. Many people can see this pair of stars without optical aid. They are not a true binary star system, as they don't revolve around each other, but they are related, about 10 light years apart. Mizar itself is a true double, with a companion so close that our guests get the thrill of discovering the companion when we zoom in with higher power.



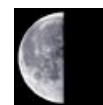
Apr 3



Apr 11



Apr 17



Apr 24

Most of the stars in the Dipper, including Alcor and Mizar, are part of a gang of young stars (less than 1 billion years old) called the Ursa Major Group. These stars appear to have been formed about the same time and place and were spread out due to interactions that ejected them from the cluster where they were formed. Since the stars in this group are moving past our Sun (the old kid in the neighborhood at 4.6 billion years), it's good to show that this group of stars are spread across the sky. I've pointed out brilliant Sirius as a member of this group. Since Sirius is on the other side of the winter/spring sky from the Dipper's stars, people can really see the concept of the stars passing around us as they stream through the galaxy, like how the telephone poles on either side of the road separate as you drive down the road between them. However, star movement data from Hipparcos (according to research by amateur astronomer Ken Croswell) is said to show that Sirius is not streaming with the rest of the gang. (Makes you wonder what he did to get kicked out of the gang!)

But let's go back to the Dipper again. At last month's Starway to Heaven, we were treated to views of several galaxies you can find near the Dipper. First we saw them through 'glass' in Doug's 12-inch scope and then on the wide 'green screen' with the Binocular Photon Machine image intensifier and then in full color with Larry's Mallincam. We don't have that every month, but it was fun until the overcast rolled in!

Other sightings: The launch of the Shuttle Endeavour, no earlier than the 19<sup>th</sup>, just after sunset our time, may allow a view of the last four minutes of powered flight low in the southeast. The Endeavour will bring supplies and the Alpha Magnetic Spectrometer to the International Space Station. ISS sighting times for April are in the morning through the 16<sup>th</sup> and in the evening from the 16<sup>th</sup> through the end of the month.

On the 11<sup>th</sup>, the almost first quarter Moon will occult 4<sup>th</sup> magnitude ζ Gem. It will be a little harder to see than March's occultation. Sunspots are reappearing for those with a good solar filter. Come to NEAF to view the wonders you can see on the Sun with the latest solar telescopes.

Bob has a blog at <http://bkellysky.wordpress.com/>.