# Observations

A Monthly Publication Of The
CHESTER COUNTY ASTRONOMICAL SOCIETY

*Vol. 23, No. 1* *Two-Time Winner of the Astronomical League's Mabel Sterns Award ☼ 2006 & 2009* *January 2015*


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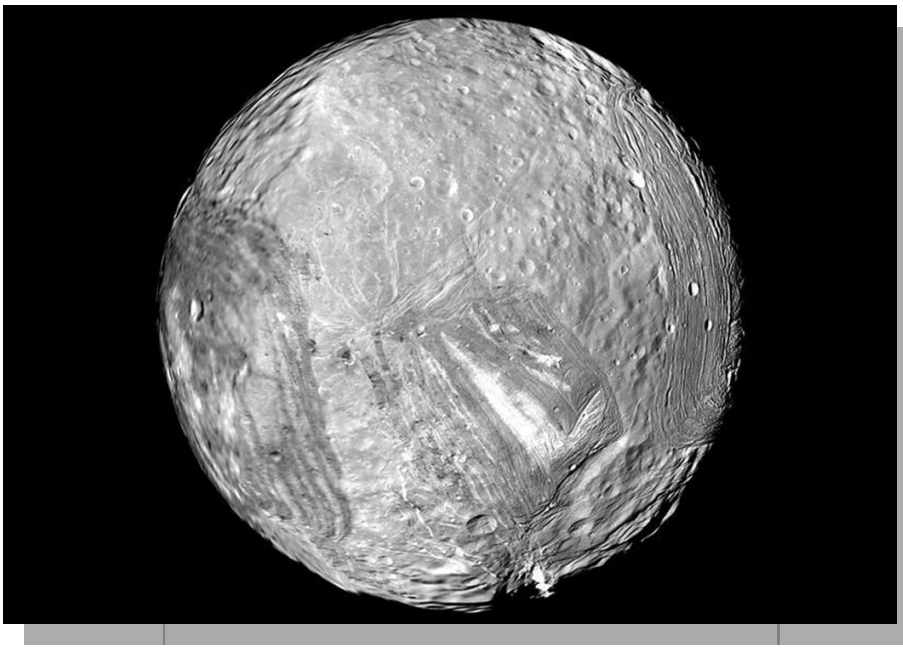
## Membership Renewals Due

| | |
|---|---|
| 01/2015 | Catalano-Johnson & Family<br>Lurcott, Edwin |
| 02/2015 | Rosenblatt & Family<br>Toth<br>Zandler |
| 03/2015 | Angelini<br>End<br>LaFrance<br>Sterrett |

## Extreme Cliff Jumping in an Extreme Place



*Uranus' moon Miranda imaged by the Voyager 2 space probe. See pg. 8 for the article.*

## Important January 2015 Dates

**3rd-4th** • Quadrantid Meteor Shower Peaks.

**4th** • Full Moon, 11:54 p.m.

**13th** • Last Quarter Moon, 7:52 a.m.

**20th** • New Moon, 8:14 a.m.

**23rd-24th** • Jupiter's Moons Transit.

**26th** • First Quarter Moon, 11:49 p.m.

## CCAS Upcoming Nights Out

CCAS has several "nights out" scheduled over the next few months. Members are encouraged to help out during these events any way they can. See below for more information.

☼ **Saturday, March 21, 2015**. Star Party at Bucktoe Creek Preserve, Kennett Square, PA. Preserve members & the general public pay a small fee; CCAS members participate for free. The event is scheduled for 8:00 PM to 9:30 PM.

☼ **Saturday, May 9, 2015**. CCAS special observing session at Hoopes Park, West Chester, PA.

## Winter 2015 Society Events

### January 2015

**3rd-4th • Quadrantids Meteor Shower.** The Quadrantids is an above average shower, with up to 40 meteors per hour at its peak. Meteors will radiate from the constellation Boötes, but can appear anywhere in the sky.

**7th** • PA Outdoor Lighting Council monthly meeting, 1438 Shaner Drive, Pottstown, PA 19465, starting at 7:30 p.m. For more information and directions, visit the PA Outdoor Lighting Council website.

**13th** • CCAS monthly meeting in Room 112, Merion Science Center, WCU. Meet & Greet over coffee and refreshments from 7:10 to 7:30 p.m. The meeting starts at 7:30 p.m. Guest Speaker: Rob Teeter, President of Teeter Telescopes "Imitation to Innovation - how the simple Dobsonian became Premium."

**15th-16th** • The von Kármán Lecture Series: Low Density Supersonic Decelerator, at the Jet Propulsion Laboratory, Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

**20th** • Open call for articles and photographs for the February 2015 edition of Observations.

**23rd-24th** • Over night Galilean satellites Io, Callisto, and Europa cross face of Jupiter .

**26th** • Deadline for newsletter submissions for the February 2015 edition of Observations.

### February 2015

**4th** • PA Outdoor Lighting Council monthly meeting, 1438 Shaner Drive, Pottstown, PA 19465, starting at 7:30 p.m. For more information and directions, visit the PA Outdoor Lighting Council website.

**6th** • West Chester University Planetarium Live Show: "The Expanding, Accelerating Universe," in the Schmucker Science Building. The show starts at 7 p.m. and runs approximately one hour in length.

**10th** • CCAS monthly meeting in Room 112, Merion Science Center, WCU. Meet & Greet over coffee and refreshments from 7:10 to 7:30 p.m. The meeting starts at 7:30 p.m. Guest Speaker: TBA.

**12th-13th** • The von Kármán Lecture Series: No Way Out, Charting Irreversible Climate Change with Jason-3, at the Jet Propulsion Laboratory, Jet Propulsion Laboratory, Pasadena, California. Live stream of free lecture presented by NASA & Caltech.

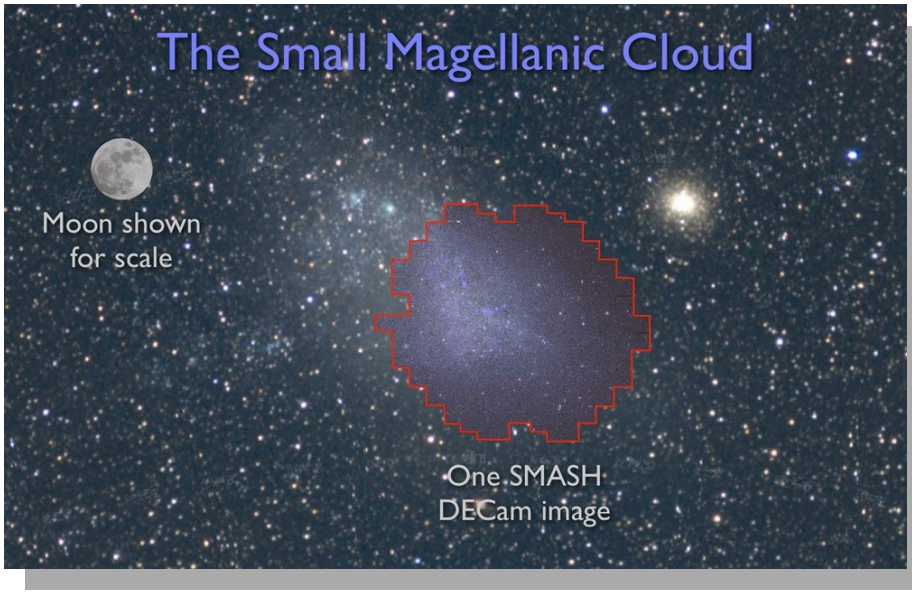
**13th** • West Chester University Planetarium Movie Show: "Black Holes - The Other Side of Infinity," in the Schmucker Science Building. The show starts at 7 p.m. and runs approximately one hour in length.

**20th** • Open call for articles and photographs for the March 2015 edition of Observations.

**26th** • Deadline for newsletter submissions for the March 2015 edition of Observations.

## Smashing Results About Our Nearby Galactic Neighbors

*by NOAO, Astronomy Magazine*




*SMASH DECam image in the Small Magellanic Cloud with the Moon for scale. Courtesy of NOAO/SMASH Team*

The Magellanic Clouds are the two brightest nearby satellite galaxies to our Milky Way Galaxy. From a new study, it appears that not only are they much bigger than astronomers calculated, but also have non-uniform structure at their outer edges, hinting at a rich and complex field of debris left over from their formation and interaction. This is an early result from a survey called SMASH, for "Survey of the MAgellanic Stellar History," carried out by an international team of astronomers using telescopes that include the 4-meter Blanco at Cerro Tololo Inter-American Observatory (CTIO) in Chile.

The Large and Small Magellanic Clouds are dominant features in the Southern Hemisphere sky. Although named after explorer Ferdinand Magellan, who brought them to the attention of Europeans, they were already known to every early culture in the Southern Hemisphere. The Large Magellanic Cloud (LMC), covering about 5° in angular size (10 lunar diameters), appears to the naked eye like a detached piece of the Milky Way. At a distance from us of about 160,000 light-years, even the brightest stars in these galaxies can't be seen without a telescope.

"We have a decent understanding of how large galaxies like the Milky Way form, but most galaxies in the universe are faint, distant dwarf galaxies," said Principal Investigator David Nidever of the University of Michigan. "The Magellanic Clouds are two of the few nearby dwarf galaxies, and SMASH is able to map out and study the structures in them like no other survey has been able to do before."

"We knew from the earlier work of SMASH team members that the LMC was larger than we thought, but those observations probed only 1 percent of

*(Continued on page 3)*

## January 2015 CCAS Meeting Agenda

*by Dave Hockenberry, CCAS Program Chair*

Our next meeting will be held on January 13, 2015, starting at 7:30 p.m. The meeting will be held in Room 112, Merion Science Center (former Boucher Building), West Chester University. Our guest speaker will be Rob Teeter, President of Teeter Telescopes "Imitation to Innovation - How the simple Dobsonian became Premium."

Please note that inclement weather or changes in speakers' schedules may affect the program. In the event there is a change, CCAS members will be notified via e-mail with as much advance notice as possible.

We are looking for presenters for future meetings in our 2015 season. If you are interested in presenting, or know someone who would like to participate, please contact me at programs@ccas.us.

*Rob Teeter*

## Magellanic (Cont'd)

*(Continued from page 2)*

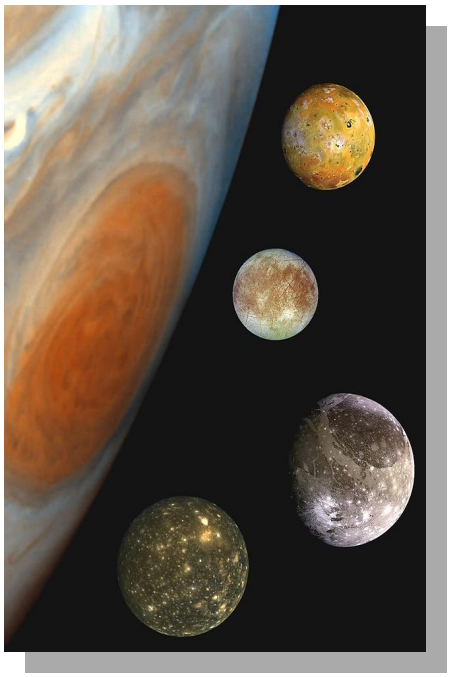
the area that we need to explore," said Knut Olsen of the National Optical Astronomy Observatory and one of the leaders of the SMASH team. "SMASH is probing an area 20 times larger, and is confirming beyond doubt that the LMC is really large while also giving us a chance to map its structure in detail.

The team has identified stars belonging to the LMC at angular distances up to 20° away, corresponding to 55,000 light-years. This was done using a new camera, dubbed DECam, mounted on the CTIO 4-meter Blanco Telescope, which allows the SMASH team to identify faint stars over a much larger area than ever before. With the Blanco Telescope, SMASH can detect exceptionally diffuse stellar structures — up to 400,000 times fainter than the appearance of the faint band of the Milky Way in the night sky. This is possible because DECam can distinguish individual faint Magellanic stars over a huge area. The survey can reach a surface brightness limit of about 35 magnitudes per square arcsecond. That allows the team to detect stellar structures that were previously much too faint to see.

The team is also exploring the Magellanic Stream, a gaseous structure that connects the two clouds and extends in front and behind them. The existence of the Magellanic Stream, first de-

*(Continued on page 9)*

## Anniversary of Discovery of Galilean Satellites



*Montage of Jupiter's four Galilean moons, in a composite image comparing their sizes and the size of Jupiter. From top to bottom: Io, Europa, Ganymede, Callisto.*

This week marks the anniversary of the discovery of Jupiter's Galilean satellites, a discovery that would have important implications in both the field of astronomy and on Western society itself.

On 7 January 1610, Galileo observed with his telescope what he described at the time as "three fixed stars, totally invisible by their smallness", all close to Jupiter, and lying on a straight line through it. Observations on subsequent nights showed that the positions of these "stars" relative to Jupiter were changing in a way that would have been inexplicable if they had really been fixed stars.

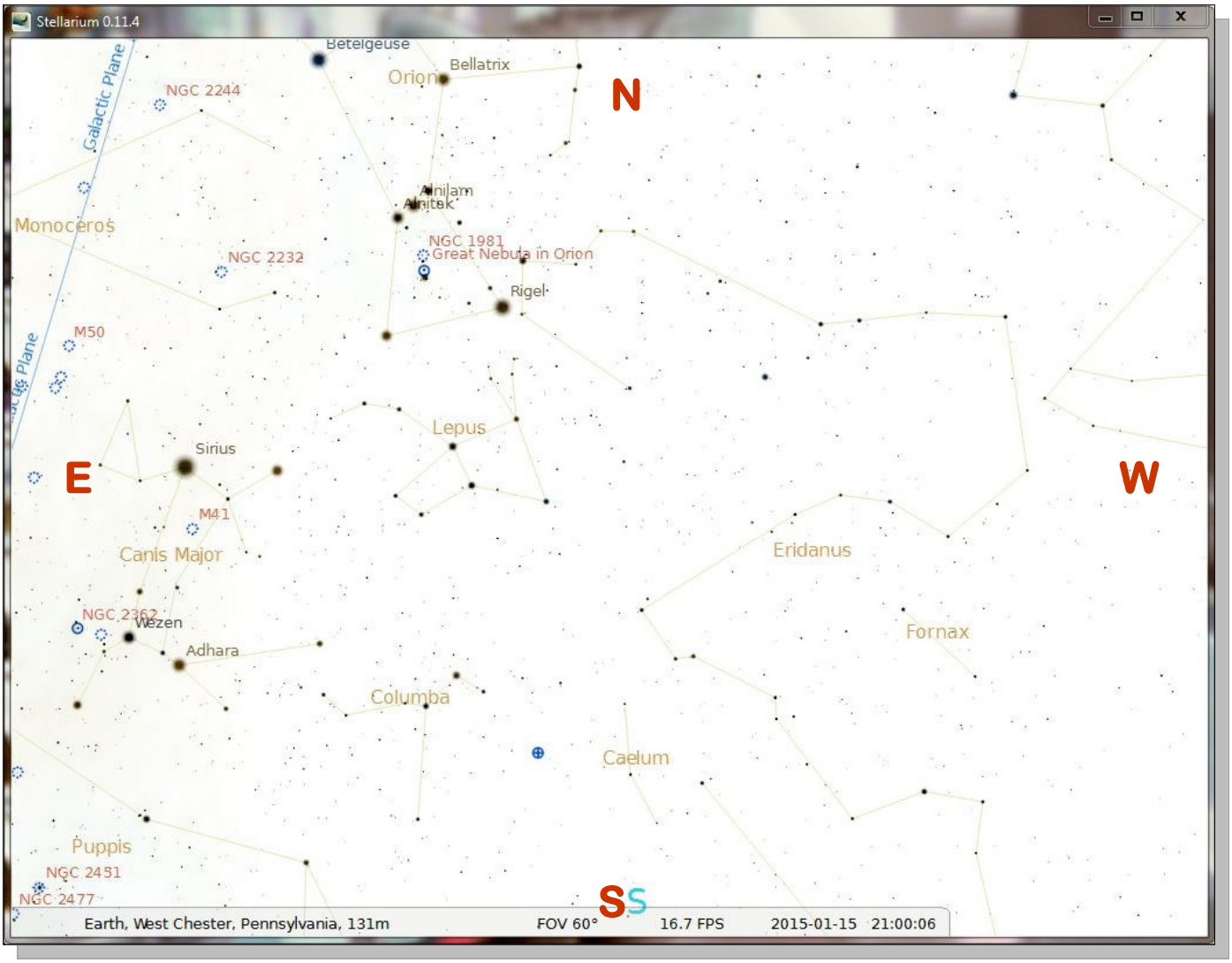
On 10 January, Galileo noted that one of them had disappeared, an observation which he attributed to its being hidden behind Jupiter. Within a few days, he concluded

*(Continued on page 7)*

# The Sky Over Chester County

January 15, 2015 at 9:00 p.m. ET

Note: This screen capture is taken from Stellarium, the free planetarium software available for download at www.stellarium.org.




| Date | Civil Twilight Begins | Sunrise | Sunset | Civil Twilight Ends | Length of Day |
|---|---|---|---|---|---|
| 1/01/2015 | 6:52 a.m. EST | 7:22 a.m. EST | 4:46 p.m. EST | 5:17 p.m. EST | 9h 23m 44s |
| 1/15/2015 | 6:51 a.m. EST | 7:21 a.m. EST | 5:00 p.m. EST | 5:29 p.m. EST | 9h 39m 09s |
| 1/31/2015 | 6:41 a.m. EST | 7:10 a.m. EST | 5:18 p.m. EST | 5:47 p.m. EST | 9h 23m 04s |

| Moon Phases | | | | | |
|---|---|---|---|---|---|
| Full Moon | 1/04/2015 | 11:54 p.m. EST | Last Quarter | 1/13/2015 | 7:52 a.m. EST |
| New Moon | 1/20/2015 | 8:14 a.m. EST | First Quarter | 1/26/2015 | 11:49 p.m. EST |

## January 2015 Observing Highlights

*by Don Knabb, CCAS Treasurer & Observing Chair*

| | |
|---|---|
| 3/4 | Quadrantid meteors peak |
| 4 | Full Moon |
| 7 | Jupiter is near the Moon |
| 8-12 | Mercury and Venus are close in evening twilight |
| 13 | Last Quarter Moon |
| 20 | New Moon |
| 21 | The Crescent Moon, Mars, Venus and Mercury are visible in evening twilight |
| 23/24 | Three of Jupiter's moons and their shadows transit the planet's disk |
| 26 | First Quarter Moon |
| 28 | Lunar Straight Wall visible |

**The best sights this month:** January is a great month for planet hunting! Venus and Mercury are close together in the fading glow of the setting Sun and dim Mars is to their upper left. Then big, bright Jupiter rises in the east and is reasonably high by midnight.

**Mercury:** Mercury is visible most of January in the fading glow of the setting Sun. On January 10th Mercury and Venus are less than 1 degree apart, then on January 21st they are joined by a thin crescent Moon.

**Venus:** Bright Venus will slowly get higher in the sky as January progresses. On January 10th Venus and Mercury are at their closest observable separation since 2005.

**Mars:** The red planet is now quite dim, but can be found to the upper left of Venus during January.

**Jupiter:** The king of the planets rises around 8 p.m. at the beginning of January and just after sunset at the end of the month. On January 23/24 a rare triple shadow transit occurs when three of the Galilean satellites cast their tiny black shadows onto the disk of Jupiter. All three shadows are visible at the same time beginning at 1:27 a.m. on the 24th and they can be seen until nearly 2:00 a.m. This event will not reoccur until the year 2032, so don't miss it! And it's a Friday night/Saturday morning, so you don't need to get up for work the next day.

**Saturn:** Saturn rises during the early morning hours during January.

**Uranus and Neptune:** Both gas giants continue to be visible during the evening hours throughout January. Neptune is very near Mars on January 19th. Finder charts can be found at the website of Sky and Telescope magazine.

**The Moon:** The Moon is full on January 4th. According to Native Americans, this is the Full Wolf Moon. Amid the cold and deep snows of midwinter, the wolf packs howled hungrily outside Indian villages, so it was named the Full Wolf Moon. Sometimes it was also referred to as the Old Moon or the Moon after Yule. Some called it the Full Snow Moon, but most tribes applied that name to the next full Moon.

**Constellations:** Auriga, Taurus, Orion and Gemini are the highlights of the January skies. But the nights are so long that you can see many "summer" constellations setting early in the evening and many "spring" constellations rising if you stay up late. Dress warmly and sit in your lounge chair and see how many constellations you can record toward the Astronomical League Constellation Hunter club. It is a fun project to pursue, you get a nice pin and you learn the constellations!

**Messier/deep sky:** During the winter months we are looking away from the center of the Milky Way, so the sky is not as full of deep sky wonders as during the summer. But, the sky is clear and there are still many beautiful objects for us to enjoy. Don't miss the trio of clusters in Auriga, and not far away is another nice cluster, M35, at the feet of the twins of Gemini. And below and behind Orion is Canis Major with the cluster M41, the Little Beehive, not far from the brightest star in the night sky, Sirius.

**Comets:** There are no bright comets in the January skies, but at a dark sky site with a telescope you can seek out Comet Lovejoy, which was discovered in August of 2014 by Terry Lovejoy from Brisbane, Australia. This fast moving comet can be found near Orion and the Pleiades. A sky chart is in the January issue of Astronomy magazine. Comets can be diffi-

*(Continued on page 10)*

## Through the Eyepiece: Collinder 70, Orion's Belt

*by Don Knabb, CCAS Treasurer & Observing Chair*


*Image credit: screenshot from Stellarium*

At star parties it is always fun to share star clusters that have distinctive shapes, such as the Coat Hanger Cluster (Collinder 399 or Brocchi's Cluster), Kathy's Triangle (ask Kathy Buczynski about that one), NGC 457 (which looks like ET), or Kemble's Cascade, a long string of 20 colorful stars that are in a nearly straight line (see the December 2013 issue of Observations for an article about Kemble's Cascade). Another of these clusters is Collinder 70, the group of stars that form Orion's belt. Undoubtedly you have seen this cluster, but you might not have known that it is Collinder 70.

For those new to stargazing, here is a star diagram of the constellation Orion the Hunter that I generated from Stellarium, the free download planetarium software. The center three stars in a tight group form Orion's belt, and they are part of Collinder 70.

The stars of Orion's belt are collectively called Collinder 70. It was cataloged by Swedish astronomer Per Collinder, who published a catalog of open clusters in 1931. This star cluster is best viewed with binoculars because it is huge. If you use a telescope it will need to be one that is of short focal length so that it provides a wide field of view, and use the lowest power eyepiece you have.

With a simple pair of binoculars under good viewing conditions you should be able to see at least 100 stars. My favorite part of this cluster is the S shaped curve that wends its way between the center and right side star of the

*(Continued on page 7)*

## Collinder 70 (Cont'd)


*Image credit: screenshot from Stellarium*

*(Continued from page 6)*
belt. This is a beautiful curve of stars, like jewels decorating Orion on the Hunter's belt. Here is a screen shot also from Stellarium for which I zoomed in on Collinder 70:

At a winter star party this cluster is guaranteed to give a high "Wow" factor. This cluster is about 1500 light years away and the three brightest stars are 20,000 to 40,000 times as bright as our Sun. With the naked eye we only see the brightest nearby stars in our galaxy, the searchlights among the 100 watt bulbs.

Dress warmly and if possible mount your binoculars on a tripod. Take your time and follow the beautiful chain of stars that form the S shaped curve. If you study the stars closely you will see subtle color variations between the stars. To train your eyes to see the most detail and to improve your observing skills, try sketching the cluster. But beware of frostbite on these cold January nights!

Information credits:

http://www.cloudynights.com/item.php?item_id=438
http://en.wikipedia.org/wiki/Orion_(constellation)
http://www.backyard-astro.com/deepsky/bino/02_b.html

## Satellites (cont'd)

*(Continued from page 3)*
that they were orbiting Jupiter: he had discovered three of Jupiter's four largest satellites (moons). He discovered the fourth on 13 January. Galileo continued to observe the satellites over the next eighteen months, and by mid-1611, he had obtained remarkably accurate estimates for their periods.

His observations of the satellites of Jupiter caused a revolution in astronomy: a planet with smaller planets orbiting it did not conform to the principles of Aristotelian cosmology promoted by the Church in Rome. This discovery was proof that the geocentric model of cosmology was not correct.

## Jumping the Tallest Cliff in the Solar System

*by NASA Space Place*

Let's talk extreme sports. What's more extreme than jumping off a cliff with a parachute? Jumping off the highest cliff known to humankind, that's what!

Here's the thing: This super-high cliff is not here on Earth. It's a whole lot taller than what we've got on our planet.

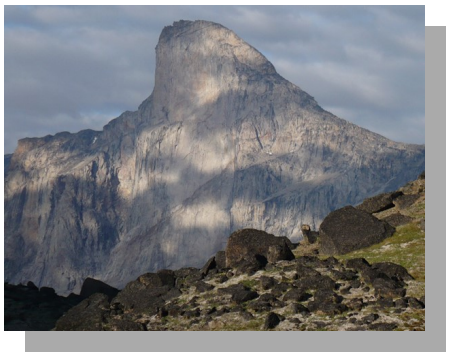
To get a good comparison, we would first have to take a trip to the remote and rugged mountains of northern Canada to see the tallest cliff on Earth.

There, we would find ourselves at the base of Mount Thor. We'd also be in front of a massive cliff. The cliff is 4,100 feet tall—without any breaks.

If we were to drop a bowling ball from the top (something you should never ever do), it would take almost 20 seconds for it to hit the ground. Count that out in your head: 1… 2… 3… 4…. That's a lot of falling! By the time it reaches the ground, the ball would be traveling over 150 miles per hour! That would be a pretty extreme fall for a professional cliff jumper.

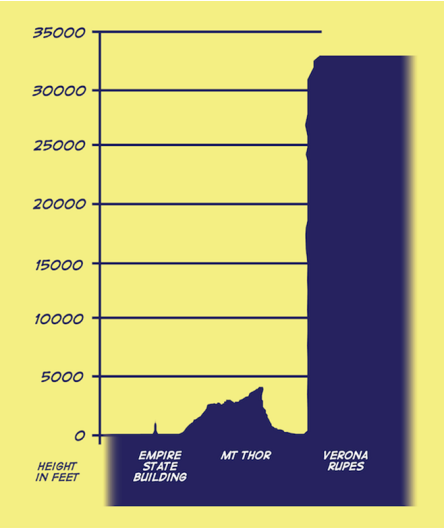
Not impressed? Fine. But the tallest cliff known to us is in a place even more remote than northern Canada. We would have to take a long journey to find it.

It's on a moon named Miranda in orbit around Uranus. That's right near the far edge of our solar system. It's estimated that this cliff—named Verona Rupes—is over six miles high. It's nearly 33,000 feet tall. That's five times the depth of the Grand Canyon and taller than Mount Everest!



*Mount Thor (in Nunavut, Canada) has the tallest cliff face on Earth.*

The first and only close-up images of Miranda didn't come around until 1986. That's when NASA's Voyager 2 space probe flew by it. These pictures revealed a super-weird surface full of jagged cliffs, rugged terrain, and craters. The pictures showed massive cracks and lines traveling through its surface that seemed to separate it into different plates.




*This figure is to scale.*

But Miranda is so small that it really shouldn't have any sort of moving plates on it at all. So what's the deal with the crazy surface?

We don't really know the answer to this question. Some think it could be the result of it being put back together after being struck by a massive impact. Others think that, for some unknown reason, it might have tectonic plates (link), like those found on Earth. Whatever it is, it sure looks cool.

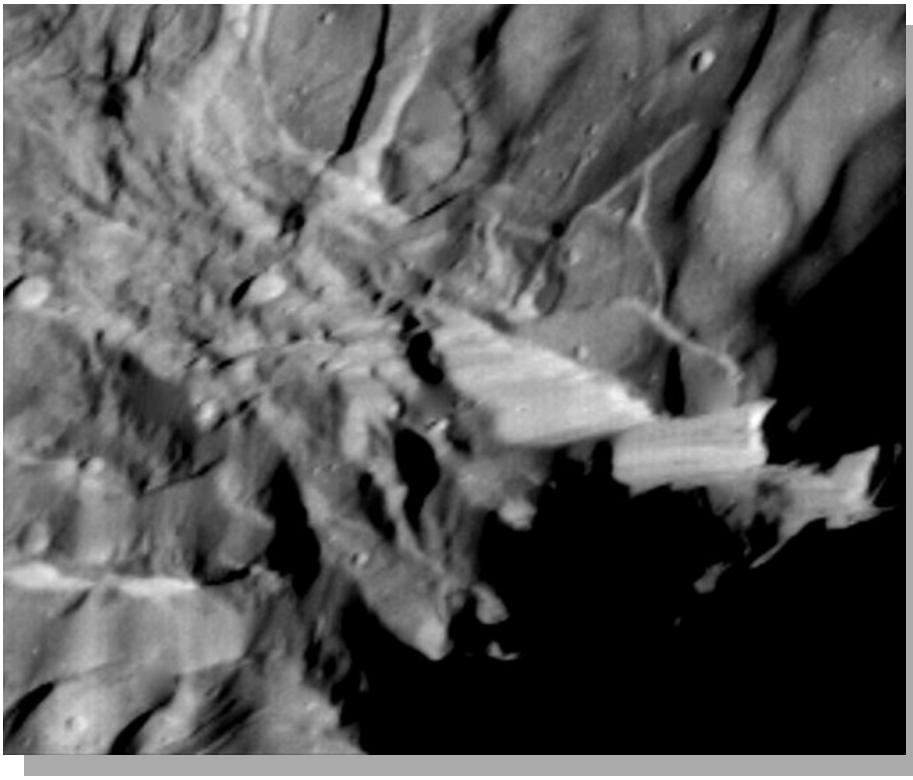
So what would happen if our trained professional/extreme astronaut jumped from something that high? You probably wouldn't be too surprised to hear that it would take a long time to fall.

But what might shock you is how long it would take. The fall would last a full eight minutes. You might also be surprised to learn that the jumper would be going much slower by the time he or she reached the ground. The jumper would max out at around only 90 miles per hour and might even be able to land safely with some sort of futuristic airbag!

The fall would take so much more time because Miranda is much smaller than Earth. That means it has less gravity. In fact, the gravity is only 0.008 times as strong there as compared to Earth.

So maybe our super long space jump wouldn't be that extreme after all?

## Space Place (Cont'd)



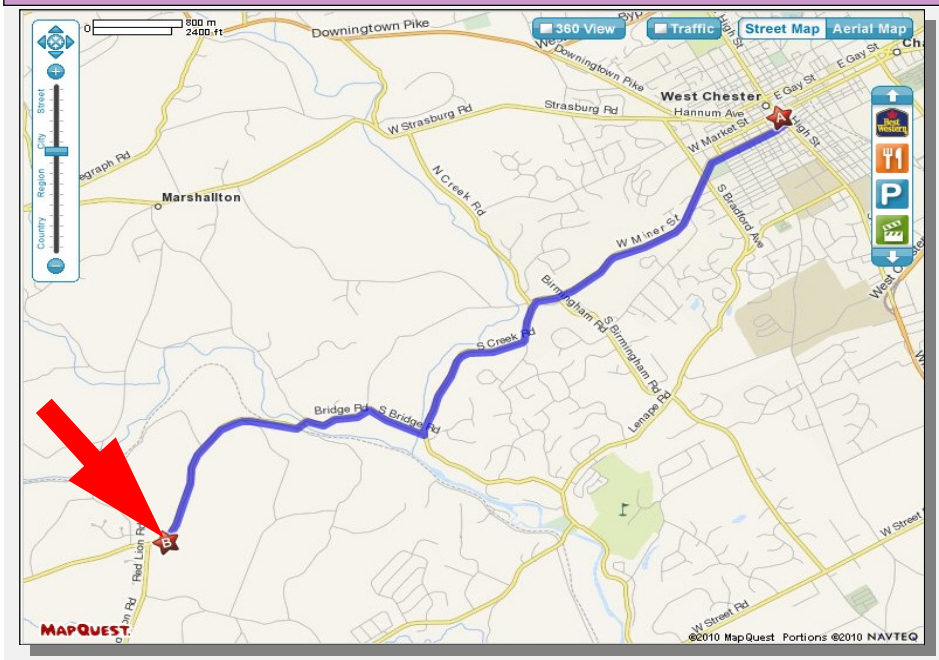
*Close-up view of Verona Rupes on Miranda imaged by the Voyager 2 space probe.*

## Magellanic (Cont'd)

*(Continued from page 3)*

tected with radio telescopes more than 30 years ago, clearly indicates that the two galaxies are interacting with each other and with our Milky Way. Astronomers expect to also find stars in the stream, but so far none have been detected. It's likely this is because the stellar component of the stream is too faint to have been detected until the availability of the new camera. As Nidever said, "SMASH's ability to reveal super-faint stellar structures should not only allow us to finally detect the stellar component of the Magellanic Stream but also map out its structure, which will give us a much better understanding of the Magellanic Clouds' interaction history."

## *CCAS Directions*




**Brandywine Valley Association**
1760 Unionville Wawaset Rd
West Chester, PA 19382
(610) 793-1090
http://brandywinewatershed.org/

BVA was founded in 1945 and is committed to promoting and protecting the natural resources of the Brandywine Valley through educational programs and demonstrations for all ages.

### Brandywine Valley Association

The monthly observing sessions (held February through November) are held at the Myrick Conservation Center of the Brandywine Valley Association.

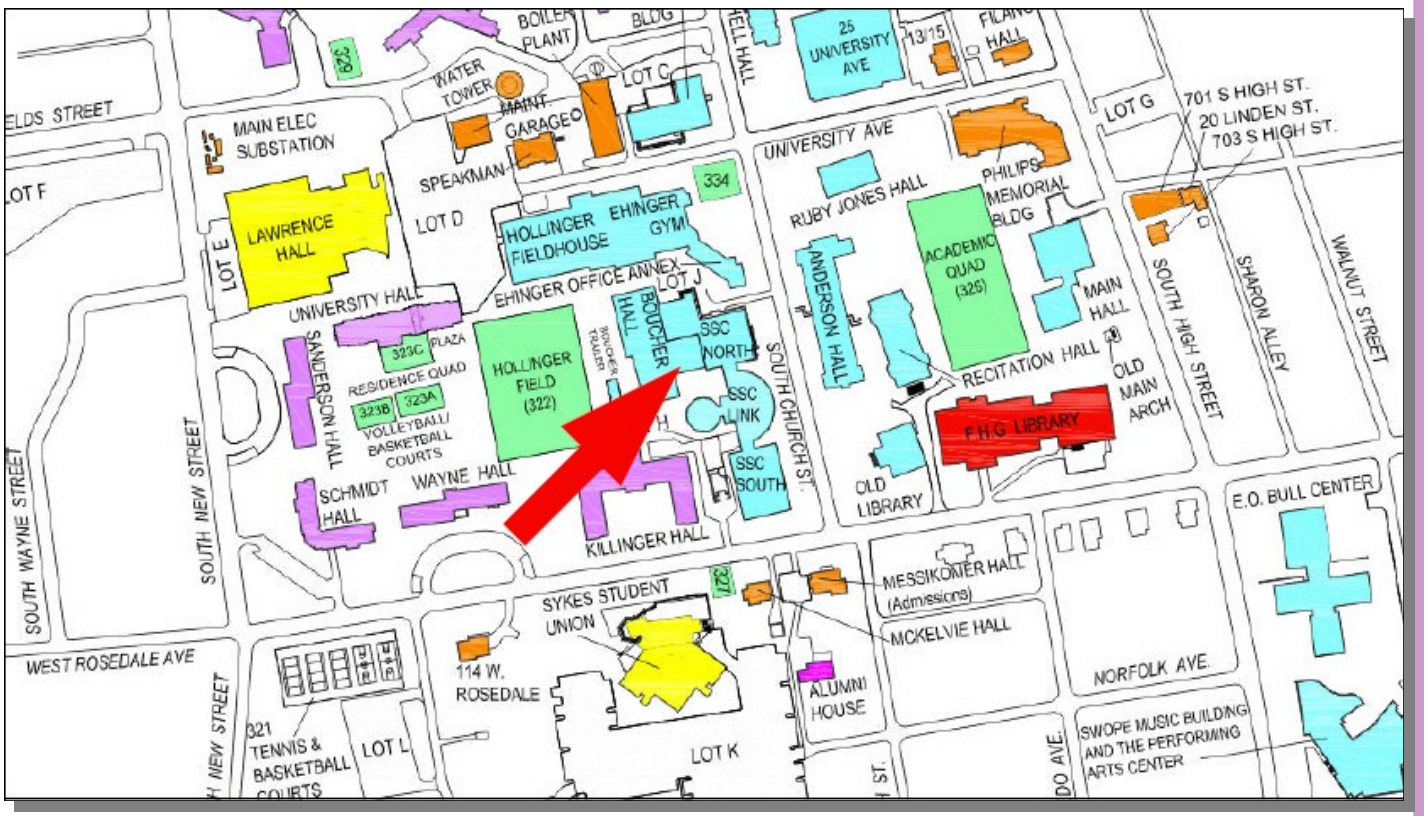
To get to the Myrick Conservation Center from West Chester, go south on High Street in West Chester past the Courthouse. At the next traffic light, turn right on Miner Street, which is also PA Rt. 842. Follow Rt. 842 for about 6 miles. To get to the observing site at the BVA property, turn left off Route 842 into the parking lot by the office: look for the signs to the office along Route 842. From that parking lot, go left through the gate and drive up the farm lane about 800 feet to the top of the hill. The observing area is on the right.

If you arrive after dark, *please turn off your headlights and just use parking lights* as you come up the hill (so you don't ruin other observers' night vision).

# CCAS Directions

## West Chester University Campus

The monthly meetings (September through May) are held in Room 112 in Merion Science Center (formerly the Boucher Building), attached to the Schmucker Science Center. The Schmucker Science Center is located at the corner of S. Church St & W. Rosedale Ave. Parking is generally available across Rosedale in the Sykes Student Union parking lot (Lot K).




## Observing (Cont'd)

*(Continued from page 5)*

cult to locate in the night sky, but when you can list one of these on your life-list you will be filled with the joy of discovery.

**Meteor showers:** The Quadrantid meteor shower peaks on the night of January 3/4 and is active for a day before and after the peak. Several years ago I observed several dozen Quadrantid meteors, many very bright, although I must admit that many of them were viewed through a sliding glass door since it was particularly frigid that night. Unfortunately the Full Moon will interfere with the fireworks this year.

## *CCAS Membership Information and Society Financials*

### Treasurer's Report
*by Don Knabb*

**Nov. 2014 Financial Summary**

| | |
|---|---|
| Beginning Balance | $2,225 |
| Deposits | $120 |
| Disbursements | $200 |
| Ending Balance | $2,145 |

### New Member Welcome!

Welcome new CCAS member Pete Kellerman from Downingtown. We're glad you decided to join us under the stars! Clear skies to you!

### Membership Renewals

You can renew your CCAS membership by writing a check payable to "Chester County Astronomical Society" and sending it to our Treasurer:

**Don Knabb**
**988 Meadowview Lane**
**West Chester PA 19382**

The current dues amounts are listed in the *CCAS Information Directory*. Consult the table of contents for the directory's page number in this month's edition of the newsletter.

# *CCAS Information Directory*

## Join the Fight for Dark Skies!

You can help fight light pollution, conserve energy, and save the night sky for everyone to use and enjoy. Join the nonprofit International Dark-Sky Association (IDA) today. Individual memberships start at $30.00 for one year. Send to:

**International Dark-Sky Association**
**3225 North First Avenue**
**Tucson, AZ 85719**

Phone: **520-293-3198**
Fax: **520-293-3192**
E-mail: **ida@darksky.org**

For more information, including links to helpful information sheets, visit the IDA web site at:

**http://www.darksky.org**

Note that our CCAS Webmaster John Hepler has a link to the IDA home page set up on our Society's home page at **http://www.ccas.us**.

## Dark-Sky Website for PA

The Pennsylvania Outdoor Lighting Council has lots of good information on safe, efficient outdoor security lights at their web site:

**http://www.POLCouncil.org**

## Find out about Lyme Disease!

Anyone who spends much time outdoors, whether you're stargazing, or gardening, or whatever, needs to know about Lyme Disease and how to prevent it. You can learn about it at:

**http://www.LymePA.org**

Take the time to learn about this health threat and how to protect yourself and your family. It is truly "time well spent"!

## CCAS Event Information Phone Number

We've set up a special phone number you can dial to find out if our monthly observing session and other scheduled events will be held or postponed. Call **610-436-0829** after 5 PM ET to hear a recording to find out the latest news.

## Good Outdoor Lighting Websites

One of the biggest problems we face in trying to reduce light pollution from poorly designed light fixtures is easy access to good ones. When you convince someone, a neighbor or even yourself, to replace bad fixtures, where do you go for good lighting fixtures? Check out these sites and pass this information on to others. Help reclaim the stars! And save energy at the same time!

Starry Night Lights

Light pollution from poor quality outdoor lighting wastes billions of dollars and vast quantities of valuable natural resources annually. It also robs us of our heritage of star-filled skies. Starry Night Lights is committed to fighting light pollution. The company offers the widest selection of ordinance compliant, night sky friendly and neighbor friendly outdoor lighting for your home or business. Starry Night Lights is located in Park City, Utah.

Phone: **877-604-7377**
Fax: **877-313-2889**

**http://www.starrynightlights.com**

★ ★ ★ ★ ★

Green Earth Lighting
Formerly
Outdoor Lighting Associates

Green Earth Lighting is a dedicated lifetime corporate member of the International Dark-Sky Association. GEL's products are designed to reduce or eliminate the negative effects outdoor lighting can have while still providing the light you need at night.

Green Earth Lighting LLC
620 Onion Creek Ranch Rd
Driftwood, Texas 78619

Phone: **512-944-7354**

**http://www.greenearthlighting.com**

## Local Astronomy-Related Stores

Listing retail sites in this newsletter does not imply endorsement of any kind by our organization. This information is provided as a service to our members and the public only.

Skies Unlimited

Skies Unlimited is a retailer of telescopes, binoculars, eyepieces and telescope accessories from Meade, Celestron, Televue, Orion, Stellarvue, Takahashi, Vixen, Losmandy and more.

**Skies Unlimited**
**Suburbia Shopping Center**
**52 Glocker Way**
**Pottstown, PA 19465**

Phone: **610-327-3500** or **888-947-2673**
Fax: **610-327-3553**

**http://www.skiesunlimited.net**

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Spectrum Scientifics
Quality Science Products for All Ages

Located in Manayunk, Spectrum Scientifics educates and entertains customers with an array of telescopes, microscopes, binoculars, science toys, magnets, labware, scales, science instruments, chemistry sets, and much more.

**4403 Main Street**
**Philadelphia, PA 19127**

Phone: **215-667-8309**
Fax: **215-965-1524**

**Hours:**
Tuesday thru Saturday: 10AM to 6PM
Sunday and Monday: 11AM to 5PM

**http://www.spectrum-scientifics.com**

# *CCAS Information Directory*

## CCAS Lending Telescopes

Contact Don Knabb to make arrangements to borrow one of the Society's lending telescopes. CCAS members can borrow a lending telescope for a month at a time; longer if no one else wants to borrow it after you. Don's phone number is 610-436-5702.

## CCAS Lending Library

Contact our Librarian, Barb Knabb, to make arrangements to borrow one of the books in the CCAS lending library. Copies of the catalog are available at CCAS meetings, and on the CCAS website. Barb's phone number is 610-436-5702.

## Contributing to *Observations*

Contributions of articles relating to astronomy and space exploration are always welcome. If you have a computer, and an Internet connection, you can attach the file to an e-mail message and send it to: **newsletter@ccas.us**

Or mail the contribution, typed or handwritten, to:

**John Hepler**
**313 S. Queen St.**
**Chestertown, MD 21620**

## CCAS Newsletters via E-mail

You can receive the monthly newsletter (in full color!) via e-mail. All you need is a PC or Mac with an Internet e-mail connection. To get more information about how this works, send an e-mail request to John Hepler, the newsletter editor, at: **newsletter@ccas.us**.

## CCAS Website

John Hepler is the Society's Webmaster. You can check out our Website at:

**http://www.ccas.us**

John welcomes any additions to the site by Society members. The contributions can be of any astronomy subject or object, or can be related to space exploration. The only requirement is that it is your own work; no copyrighted material! Give your contributions to John Hepler at (443) 282-0619 or e-mail to webmaster@ccas.us

## CCAS Purpose

The Chester County Astronomical Society was formed in September 1993, with the cooperation of West Chester University, as a non-profit organization dedicated to the education and enjoyment of astronomy for the general public. The Society holds meetings (with speakers) and observing sessions once a month. Anyone who is interested in astronomy or would like to learn about astronomy is welcome to attend meetings and become a member of the Society. The Society also provides telescopes and expertise for "nights out" for school, scout, and other civic groups.

## CCAS Executive Committee

For further information on membership or society activities you may call:

| | |
|---|---|
| **President**: | Roger Taylor<br>610-430-7768 |
| **Vice President:** | Liz Smith<br>610-842-1719 |
| **ALCor, Observing, and Treasurer:** | Don Knabb<br>610-436-5702 |
| **Secretary:** | Ann Miller<br>610-558-4248 |
| **Librarian:** | Barb Knabb<br>610-436-5702 |
| **Program:** | Dave Hockenberry<br>610-558-4248 |
| **Education:** | Kathy Buczynski<br>610-436-0821 |
| **Webmaster and Newsletter:** | John Hepler<br>443-282-0619 |
| **Public Relations:** | Deb Goldader<br>610-304-5303 |

## CCAS Membership Information

The present membership rates are as follows:

**REGULAR MEMBER**……$25/year
**SENIOR MEMBER**…….$10/year
**STUDENT MEMBER**……..$ 5/year
**JUNIOR MEMBER**……..$ 5/year
**FAMILY MEMBER**…….$35/year

## Membership Renewals

Check the Membership Renewals on the front of each issue of *Observations* to see if it is time to renew. If you need to renew, you can mail your check, made out to "Chester County Astronomical Society," to:

**Don Knabb**
**988 Meadowview Lane**
**West Chester PA 19382-2178**

Phone: **610-436-5702**
e-mail: **treasurer@ccas.us**

## *Sky & Telescope* Magazine Group Rates

Subscriptions to this excellent periodical are available through the CCAS at a reduced price of **$32.95,** much less than the newsstand price of $66.00, and also cheaper than individual subscriptions ($42.95)! Buying a subscription this way also gets you a 10% discount on other Sky Publishing merchandise.

To **start** a **new** subscription, make **sure** you make out the check to the **Chester County Astronomical Society**, note that it's for *Sky & Telescope*, and mail it to Don Knabb.

To **renew** your "club subscription" contact Sky Publishing directly. Their phone number and address are in the magazine and on their renewal reminders. If you have **any** questions call Don first at 610-436-5702.

## *Astronomy* Magazine Group Rates

Subscriptions to this excellent periodical are available through the CCAS at a reduced price of **$34.00** which is much less than the individual subscription price of $42.95 (or $60.00 for two years). If you want to participate in this special Society discount offer, **contact our Treasurer Don Knabb.**