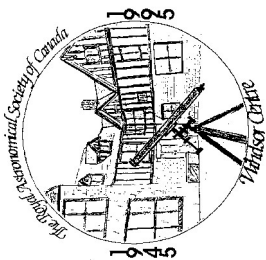




# AURORA



May 2017

The Royal Astronomical Society of Canada - Windsor Centre

Volume 42, No. 8

## Science Rendezvous 2017 (continued on back page)



### *In This Issue*

Science Rendezvous 2017	Cover and Back Page
Events / Housekeeping Items	Page 2
April Meeting Minutes	Page 3
At the Eyepiece	Page 4 and 5



## Calendar of Events

### *Our next meeting...*

Tuesday June 20, 2017  
7:30 p.m.

at  
Ojibway Park Nature Centre  
5200 Matchette Road

### *Main Speaker...*

Dr. Bill Baylis

### *Topic...*

*"Astronomy, Science Literacy and Public  
Engagement"*

### *Activities...*

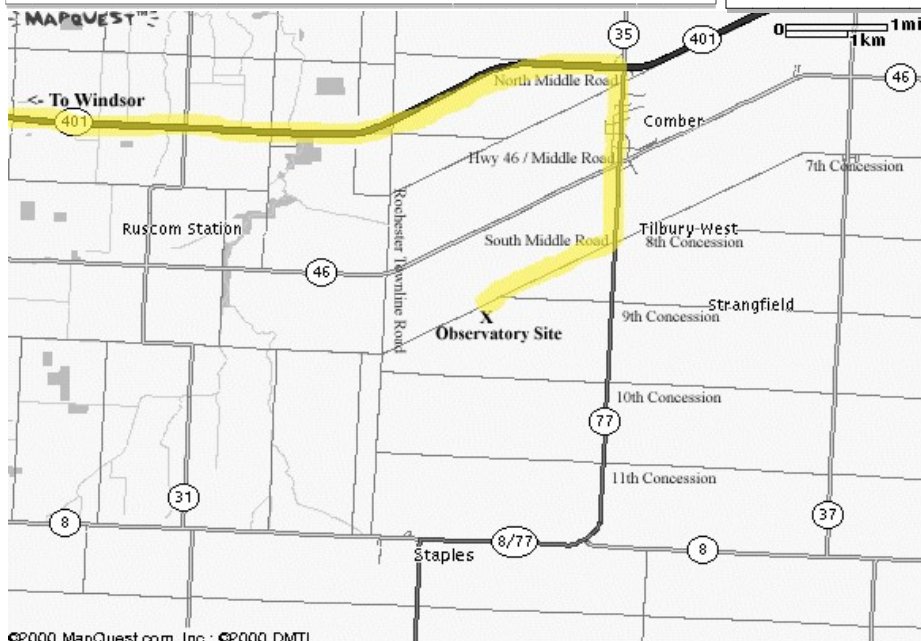
**Moon and Venus:** Form a nice pair in the morning sky on May 22 and again on June 20.

**Saturn:** The Saturnian northern summer solstice occurs on May 24 and the rings are at their maximum tilt 26.7 degrees.

**Double Shadow Transits:** Just before midnight on May 18/19 the shadows of Io and Europa cross Jupiter's disk and then they do it again on May 26 starting at 1:47 a.m.. Also look for the shadows of Ganymede and Io on June 3 starting at 10:21 p.m..

**Venus:** Is at greatest elongation West of the Sun low in the morning sky on June 3.

**Saturn:** Reaches opposition on June 15 and will be visible from dusk until dawn.



### Hallam Observatory Site

**Directions:** The map at left shows the Comber area and it includes the major highways (401, 77, 8 and 46) that are in the area of the observatory.

The most direct route from Windsor is "highlighted" on the map which is to take Highway 401 East to Highway 77 South to South Middle Road. Turn right onto South Middle Road and go about 1 kilometer and just after the point where Concession 9 joins it (it is hard to see this intersection) you will find the observatory site on the South side (left) of the road. 3989 South Middle Road.

If you hit the Rochester Townline Road (you come to a stop sign) you have gone too far.

## Submissions

Aurora is published monthly except for July, August and December. The September, October, January, March and May issues are full newsletters (usually 6 pages) with a number of member submitted articles. The November, February, April and June issues are short flyers (2 pages).

Submitted articles can be of any length from a paragraph to multiple pages. I can scan pictures and/or diagrams (both prints and film) to support your article and the originals will be returned to you.

Submission deadline is the 1st of the month.

Editor: Steve Mastellotto Email: [mmastellotto@cogeco.ca](mailto:mmastellotto@cogeco.ca)

## Membership

The Windsor Centre of The Royal Astronomical Society of Canada meets on the 3rd Tuesday of every month (except July and August) at the Ojibway Park Nature Centre. In addition to regular meetings the centre hosts a number of observing nights, a picnic and a December social. Members receive a copy of the Observer's Handbook, a subscription to SkyNews magazine and access to the Centre's library and telescopes. Optionally the RASC Journal is available in print form—online version free.

Annual Membership Fees: Please see the RASC website at [www.rasc.ca](http://www.rasc.ca) for current rates.

Contact Greg Mockler at (519) 326-7255 or visit our website at: <http://www.rascwindsor.com> for more information.

## April 2017 Meeting Minutes by Nancy Ng

The monthly meeting of the Royal Astronomical Society of Canada - Windsor Center was held at the Ojibway Park Nature Centre on Tuesday April 18, 2017.

Windsor Centre **President, Randy Groundwater**, chaired the meeting and called the meeting to order at 7:32 p.m. and welcomed members and guests to the Ojibway Nature Centre.

Randy invited the members to review the minutes of the March 21, 2017 meeting which were printed in the April newsletter. A motion to accept the minutes was made and the **MOTION CARRIED**.

Randy Groundwater welcomed everyone to the meeting and introduced the Susan Sawyer-Beaulieu.

### Main Presentation

Susan began her presentation "Getting into Solar Imaging" by discussing solar imaging with a telescope using **white light** or broad spectrum filters and **H-alpha** filters. Image capture would be accomplished using various digital cameras. The following is an overview of the topics Susan discussed:

1. Imaging System Basics:
  - Prime Focus
  - Afocal
  - Lens projection: Positive lens & Negative lens
2. Imaging Equipment:
  - Single-shot cameras
  - Video cameras
3. Image Size on Camera Sensor
4. Solar Imaging Work Flow
5. Tools for Image Acquisition & Image Processing
6. Image Processing Examples

Susan showed various lens projection systems including **smart phone adaptors** for eyepieces and **DSLR adaptors** to eyepieces. Paul Pratt also showed an adaptor he uses for his smartphone. Susan also showed video options including using your **DSLR liveview** and dedicated low light astronomy video cameras like the **Mallincam**.

The focus was on **prime focus imaging** as Susan explained what that meant and she demonstrated the different camera sensor sizes and how that affects your final image - will the solar disk fit on the frame? There was some math involved in this part of the presentation but the formulas were not too complicated.

Susan discussed the **workflow** of setting up the scope and camera -> align on sun -> focus -> take images -> process images. Susan included examples of her own solar images and compared the difference between a **single image frame** and **stacking** a number of image frames.

Susan provided a number of **software suggestions** for controlling the camera, focusing, stacking images and processing and demonstrated how the tools she uses work.

You can find a copy of Susan's presentation along with links to all the software tools here: <http://www.rascwindsor.com/media/pdf/Getting%20Into%20Solar%20Imaging.pdf>

**Break and 50/50 draw.**

Following the break Elizabeth Ismail discussed the upcoming "**Science Rendezvous**" at University of Windsor on Saturday May 13, 2017 including pamphlets she had on hand for anyone interested.

Nancy Ng spoke about a recent trip that she took along with Steve Pellarin and Mahayarrahh-Starr to Wayne State University on Tuesday April 11th where they heard a lecture given by **Dr. Adam Riess**. Dr. Riess won the Nobel Prize in Physics in 2011 for his work on discovering that the universe was **ACCELERATING** in the already discovered expanding universe. It was an exciting and informative lecture.

### Director of Observing

**Randy introduced Steve Mastellotto** who gave the Director of Observing report. Steve mentioned that although the stars are moving 4 arcmins to the West every day the winter constellations disappear faster than the summer constellations due to the additional impact of the change in sunset times and the later evening darkness at this time of year.

Steve noted the following items since the last meeting and **highlighted many with images by our members**:

- Mercury was in the evening sky
- Venus passed through inferior conjunction and could be seen in both the evening and morning sky
- Prime observing season for Jupiter
- Saturn is in the morning sky
- Comet 41P/Tuttle-Giacobini-Kresak is visible
- It is galaxy season

Steve went on to discuss **upcoming viewing opportunities** including:

- Overview of the night sky for the evening viewing hours as well as the early morning hours
- The phases of the Moon
- Mercury is low on the horizon in the morning sky for most of May
- Venus prominent "Morning Star" in the East prior to sunrise
- Mars, Uranus and Neptune are all close to the Sun
- Jupiter observing season is here and double shadow transits return on Thursday May 11th
- Saturn rises around midnight and is low in the southern sky
- Asteroid 2014 JO25 is 650 meters across and will be within 4 moon distances on April 19th
- Bright(ish) comets - 41P, C2017 E4 (Lovejoy) and C/2015 ER61 (PanSTARRS)
- Lyrid (April 21/22) and Eta Aquarid (May 5/6) meteor showers peak

Steve closed his talk with a **quiz question** regarding the definitions of civil, nautical and astronomical twilight.

Randy thanked Steve and reminded everyone that our next regular membership meeting would be **May 16th, 2017** at 7:30 p.m.. He also mentioned that we are hosting a **Dark Sky Night** at Pt. Pelee this Saturday, April 22nd.

**Randy adjourned the meeting at 9:45 p.m..**

## At The Eyepiece: The Poetry of Galaxies by Mike Ethier

Imagine you are standing in a fog so dense that you cannot see any objects around you. There is fog, and nothing else. You know there is a landscape surrounding you - trees, buildings, a lake, perhaps. But none of it can be seen. You take a few hesitant steps, hoping to glimpse a familiar landmark. Then, suddenly the outline of something appears before you. It is very indistinct. Nothing definite can be perceived, just the hint of *something*. For an instant it becomes slightly less mysterious, but then the fog enshrouds it again and it is gone. This little game continues for a few moments, until you are almost sure that what you are seeing is a building or a village, but you cannot be 100 % certain....

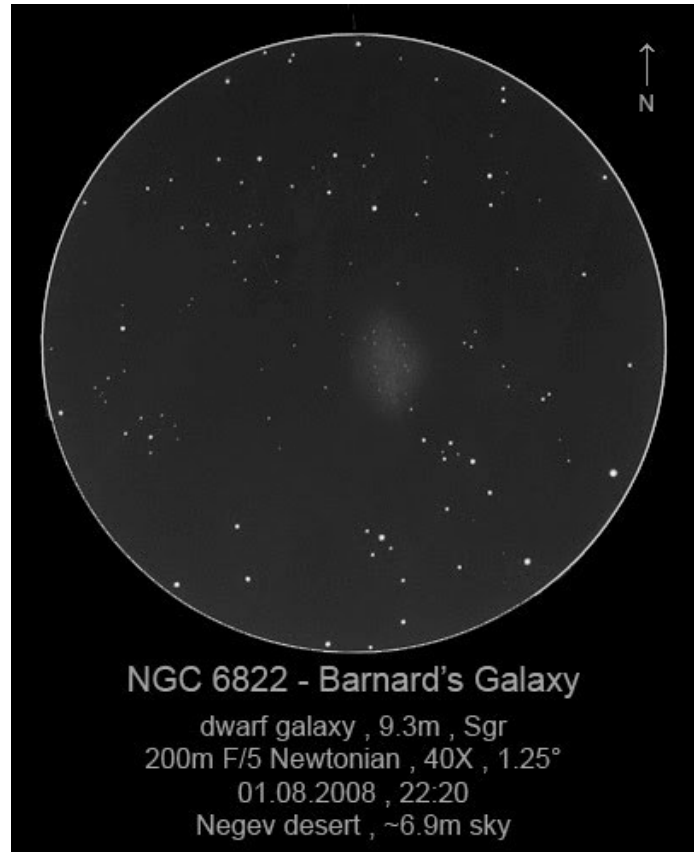


Old Amersham, Buckinghamshire, England - Author's photo

And now imagine it is a dark and very clear night. The humidity is low, there are no lights nearby, and you are away from any cities and towns. In the eyepiece of your 12" reflecting telescope you are seeking a galaxy of magnitude 14, at the very limit of what you are able to see on the best of nights. The sky background in your eyepiece view is black, though a few very faint stars are sprinkled across it. You have been searching for several minutes, with no luck. Suddenly, out of the corner of your eye, there is a slight flaring. Is it a faint star, near the limit of visibility? No, it's larger than a star. A moment later and it is seen again, this time as a nearly undetectable oval haze that increases in brightness when you do not stare right at it. It is probably the galaxy, but you cannot be 100% certain. You try a different eyepiece, likely a higher magnification. If it is the galaxy, it should appear again...

Both cases, the foggy scene and the very faint galaxy, are extreme. Seldom is it so foggy that nothing can be seen nearby, but it does happen. And out of all the galaxies that I hunt in the darkest skies, only a very small percentage of them are at the limit of what I can expect to see. Yet just as the foggiest day seems to have more poetry in it than most average days, sometimes recognizing these really faint, difficult galaxies can be the biggest thrill of a whole night's observing.

Galaxies, being what they are, are often the most studied and most photographed objects in the deep sky (deep sky being beyond the moon and the planets in our solar system). There is no such thing as a typical galaxy, though they all have things in common. Plenty of stars, for one. However, from the largest earth-based telescopes used for observing with the human eye, even the brightest and closest northern hemisphere galaxies all



<http://www.asod.info/?p=1920>

look like haze. Without photography we would still not know what these island universes are, nor have seen their immense beauty. In fact, it wasn't until 1925 that the debate was settled, when Edwin Hubble, using photographs taken with the 100" Hook Telescope, was able to distinguish variable stars in another galaxy and compute their distance from earth. Since the stars were hundreds of thousands of light years beyond our galaxy, then other galaxies like ours had to exist. All of that *haze* astronomers had been seeing were stars; billions of stars. We now know that there are more galaxies *out there* than there are stars in our Milky Way galaxy! If that isn't mathematical poetry, then I don't know what is.

Galaxies are grouped into classes, depending on their shape and their light output. The many different types need not overly concern us in this discussion, but they are important when observing. Some galaxies that do not fit neatly into any class are referred to as *peculiar*. More poetry! For me, the galaxies that provide the most poetry when observed are called "edge-on." That is, we are seeing them along their equatorial line. They appear long and thin, with a central bulge. Though only haze to the eye, to the imaginative mind we are seeing billions of stars shining together to produce a grayish haze coming from hundreds of millions of miles away. The bulge is the center of the galaxy, always its busiest, most populated and most active place. As an extra bonus, some of these edge on galaxies have dust lanes, material within the galaxy that has not yet been converted into stars. Our own galaxy is filled with such dust, as are many other galaxies.

(Continued on page 5)



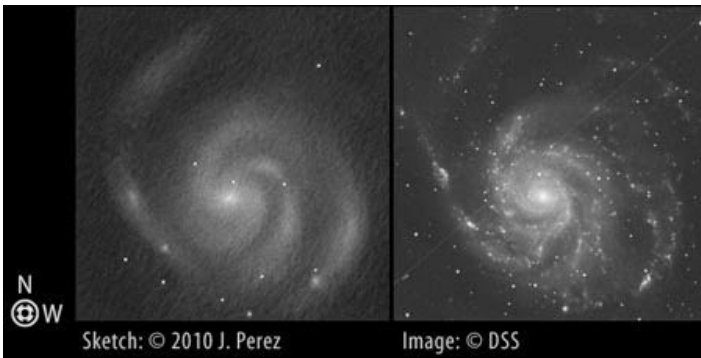
## At The Eyepiece: The Poetry of Galaxies (continued from page 4)



*An edge-on galaxy, photographed through a large telescope. Note the central bulge and the very distinct dust lane running the length of the galaxy. Our own galaxy is similar to this one. <http://mgio.arizona.edu/older-mgio-journal-entries>*

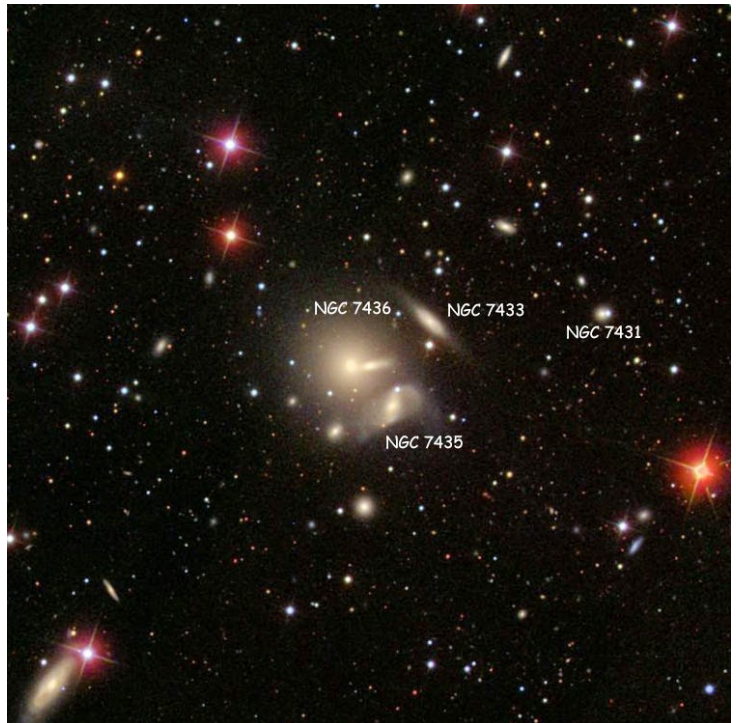
In the eyepiece, sometimes only the central bulge of such galaxies can be seen. However, other galaxies clearly display their full length, and these can send shivers up one's spine when viewed. With fainter galaxies the full length sometimes comes through only like our foggy day analogy--a glimpse now and then of the full extent of the object. Patience, and looking indirectly at them (called averted vision) often show faint objects more readily than staring directly at them. More poetry!

A second type of galaxy that telescope observers love to view is called "face on." Now we are situated *above* the galaxy, looking directly down at it (or it is "above" us--it's all relative in deep space). With some of the brighter and closer galaxies, we can see the haze shaping itself into spirals, called arms. Sometimes, these arms show tiny clumps of brighter areas. These are not commonly seen in smaller amateur scopes, but they are star forming regions, places where stars are either being born or are newly born. Realizing that one is actually looking at star birth in another galaxy can be an overwhelming experience. Galaxies where such regions can be viewed in larger amateur instruments are not hard to track down.



*Nice comparison of a sketch from the eyepiece and a photograph. This is Messier 101, a face-on spiral galaxy, displaying arms and bright knots, which are actual star-forming regions. <http://www.perezmedia.net/beltofvenus/archives/001416.html>*

Galaxies abound in the skies of summer, autumn and winter. However, the best time to see them is spring. At this time of year, we are in the part of our orbit around the Sun when our night sky faces away from our own galaxy. The Milky Way, with all of its stars and dust, can make it difficult to see beyond, into really deep space. But when we look up at the sky in Spring, it can seem a barren field to the naked eye. There are fewer stars, no Milky Way; just plenty of dark space. We are looking directly opposite the center of our galaxy, our view now extending out into deepest intergalactic space. This part of the sky is simply swimming in galaxies; bright ones, faint ones, large ones and small ones, and everything in between. They are often so crowded together that more than one of them can be seen at a time in the eyepiece. Sometimes they are physically close to one another, and even interacting, but just as often they happen to be in a line of sight, from our vantage point. A closer galaxy may thus appear larger and brighter, with a further and fainter one seemingly right beside it.



*Several galaxies can be viewed at once sometimes. <http://cseligman.com/text/atlas/ngc7436wide.jpg>*

It is a wonderful experience to see and contemplate one galaxy on a fine night, but to see two, three, four or more all at once can really test the limits of one's ability to comprehend. Just what are we really seeing? How many stars? How many possible planets? It is beyond mind boggling. These experiences are relatively common for amateur astronomers, though I never find anything common about them. It is always such a thrill and a privilege that sometimes after such an experience I simply stop observing for the night! Such treats are thus best reserved for the end of an observing session, rather than at the beginning.

Just as intensely foggy days can reteach us the essence of *what is*, so can observing faint galaxies through a telescope. By stretching our imagination we can fill in some of the details that the eye cannot fully grasp. By combining what we know and what we can imagine, there is a meeting of science and poetry; between the universe and humankind. It is true that we and our planet are insignificant when compared to objects that are on a cosmic scale, such as galaxies. However, this fact in itself is insignificant. But poetic.



## Science Rendezvous 2017



**2017 Science Rendezvous** - was another great success! Elizabeth Ismail coordinated our efforts by making sure we had plenty of volunteers and materials at our tables as well as a couple of scopes outside for safe solar observing. A special thank you to the volunteers: Elizabeth Ismail, Steve Pellarin, Susan Sawyer-Beaulieu, Randy Groundwater, Nancy Ng and John Marn and anyone I may have left out. The photos on the cover and on this page were provided by Randy Groundwater, Nancy Ng and Elizabeth Ismail.