

# SKYNEWS

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By John McDonald

## NEXT MEETING

**Monthly Meeting**  
Wednesday Jan 11th 2017  
At 7:30 PM  
Rm A104 Bob Wright Centre  
University of Victoria

[www.victoria.rasc.ca](http://www.victoria.rasc.ca)

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## **On the Cover**

### **Supermoon *By John McDonald***

A supermoon occurs when the full Moon coincides with its closest approach to the Earth. The supermoon of November 14, 2016 received considerable media attention because it was the closest supermoon since January 26, 1948. It will not be surpassed until November 25, 2034. The vigilant John McDonald managed to capture this event at 4AM during a rare break in the November cloud shield. He placed the perigee supermoon image adjacent to an apogee (furthest distance) image taken on April 21 to contrast the size difference. Both images were taken using a Canon T3i camera with Canon f/4L 300mm lens. Exposure f/4, ISO 200, 1/1000s. Notice that more of the Moon is visible on the top of the perigee than at the apogee. This effect, called *latitude libration* occurs because the rotational axis of the Moon is tilted 5 degrees from the normal of the Moon's orbital plane about the Earth.

## **Presidents Report**

### ***by Chris Purse***

As this is my inaugural message as the centre president, I want to take this opportunity to thank past and current council members for their efforts to make the RASC Victoria Centre a successful and enjoyable organization. It is the people like you, sharing your love of astronomy, who have kept me involved since becoming a member. Compared to many of you, I am a relative newcomer to astronomy having joined RASC in 2010. I cannot believe how much I have learned and experienced in that time, but I have only scratched the surface of this limitless topic. Astronomy is one of the remaining human endeavours where both professionals and amateurs contribute to ongoing research and discovery due to the vastness of the universe.

Over the past few years, I have been the centre's membership coordinator. It has been great to see the membership numbers growing. As was noted in a session presented at the General Assembly in 2015, a number of people across the country join RASC each year but do not renew their membership when it expires. Why is that? I am sure there are many reasons. I do invite members to let your council know how you think the Victoria Centre is doing. If you have ideas of other activities we might offer, I would welcome hearing from you. Ultimately, my advice to all members is to get involved in the Victoria Centre. Come out to the various activities and meetings as you are able. You will get much more out of your membership through participation.

In reflecting back on the past year, we have had a fascinating series of speakers, learned from each other about our own areas of expertise, spent quite a few evenings at the VCO, camped out for night sky viewing, and shared views of the sun and the night sky with scores of members of the public. We do a lot as a volunteer organization and thank you for making those events successful! We are planning to have a similar number of public events in 2017 so we will be looking for people to help out. Please consider putting your name forward as a volunteer.

In closing, I look forward to working with the new council to further the objectives of the RASC Victoria Centre and continue to make the centre an organization of which you are proud to be a member.

***Chris***

## Upcoming Speakers

**Wednesday Jan 11th 2017 at UVic:**

John Blackeslee; The Massive Galaxy Survey

**Wednesday Feb 8th 2017 at UVic:**

Lisa Locke; Microwave Instrumentation

**Wednesday March 8th 2017 at UVic**

Dr. Julia Foght; "Bugs in Space!? A Microbiologist's View of Astrobiology and the Habitable Zone"

**Wednesday April 12th 2017 at UVic**

Lkyle Oman; TBD

**Wednesday May 10th 2017 at UVic**

Benjamin Gerard; TBD

**ASTRONOMY  
CAFE**



Our weekly **Astronomy Cafe** is an excellent, informal, way to meet us. New comers are especially encouraged. <http://victoria.rasc.ca/events/astro-cafe/>

Fairfield Community Centre - 1330  
Fairfield Rd. Victoria. 7:30pm

Contact: Reg Dunkley for further  
details

[vp@victoria.rasc.ca](mailto:vp@victoria.rasc.ca)

**Every Monday at 7:30 PM but not  
on Boxing Day**

## Email Lists

### Observer / CU Volunteers / Members

Contact Chris Purse to subscribe

[membership@victoria.rasc.ca](mailto:membership@victoria.rasc.ca)



### New Observers Group

Hosted by Sid Sidhu - 1642 Davies  
Road, Highlands. Call 250.391-0540  
for information and directions.

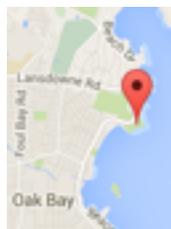


**Cattle Point observing** in Victoria's  
own Urban Dark Sky Park:

[http://victoria.rasc.ca/events/  
rascals-cattle-point/](http://victoria.rasc.ca/events/rascals-cattle-point/)

Next Sessions : *Weather Permitting*

**Friday December 9th at 7PM**



**Victoria Centre Observatory: Every  
Saturday Evening.**

*Open to those on the Active  
Observers list only*

Weather permitting. Dress warmly,  
and see you out there. Take extra  
care during the slippery season.



## Membership Report - December 2016

Total membership is currently **235**. There are 9 members in  
the grace period which means their membership has  
expired in the past 2 months. Please contact Chris Purse  
([membership@victoria.rasc.ca](mailto:membership@victoria.rasc.ca)) if you would like to check  
the status of your membership.



**Jim Stillburn** Captivates Astro Cafe as he explains  
the workings of his Poncet Tracker. The hand  
machined innards are pure "Astronomical Jewelry".



## The Victoria Centre 2016 AGM by Reg Dunkley

On Sunday, November 27th the Victoria Centre assembled in the pleasant upper level of the Cedar Hill Golf Course for the Annual General Meeting. After a delicious buffet meal and a seductive array of desserts the RASCals sat back and enjoyed an entertaining presentation by UVic Phd student Paulo Turri who revealed the "Secrets of Adaptive Optics". Paulo studied at Galileo's alma mater, Padua and in this historical setting he came to appreciate that early telescopes were of great military value. The same was true of adaptive optic technologies which were refined during the Cold War. He illustrated recent astronomical successes with adaptive optics and emphasized the crucial role that they will play in the Thirty Metre Telescope.

Afterwards there was the formal business meeting where Secretary Les Welsh succinctly summarized many of the highlights and accomplishments of the past year. This was followed by the election of next years Council who are listed the final page of SkyNews. The evening concluded with presentation of awards. Hosting 14 Summer Star Parties at the DAO was the premier activity of the Victoria Centre this year. Many of the key players who made this happen were recognized. These included **Sherri Buttnor, Nelson Walker, Laurie Roche and Chris Purse**. *"for their outstanding support and engagement in the role of " Person in Charge " and Volunteer Coordinator.*



**Nelson Walker** received the **Newton/Ball Award** for his *Outstanding Dedication to Serving RASC Members in 2016*. In addition to recognizing his contribution to the RASC Star Party and DAO Public Outreach it also included the Messier Marathon and Astronomy Day at the RBCM, .



**David Lee** received a *Special Award of Excellence For His Dedicated Support of Public Outreach at the Dominion Astrophysical Observatory, 2016*. This not only involved finding, scheduling and introducing over 20 speakers during the Summer but also providing the crucial technical support and ensuring the lecture series ran smoothly. Speaking of lectures, David also made a memorable presentation at the Metchosin Star Party. In the midst of a westerly gale which blew chairs across the outdoor stage and almost ripped the projection screen off the wall, David continued to deliver his talk in his calm, measured, professional manner. He was not even deterred by the wailing of the Metchosin Volunteer Fire Department Siren!



**Jim Stillburn** received the *Ernie Pfannenschmidt Award for Amateur Telescope Making* : For His Outstanding Achievement in Designing and the Building of a Custom Telescope Tracking Platform c/w innovative features. See photos on Page 3



**Matt Watson** received a *Special Certificate of Appreciation* For His Continued Efforts and Successes in Supporting RASC Members in the access of on-line Live-Broadcasting of Monthly General Meetings.

**Out Going President Sherri Buttner** received a Silver Star of Appreciation for her remarkable contribution to RASC Victoria Centre. Among the many challenges she encountered during her two year term was the traffic congestion arising from the wildly popular DAO Star Parties. She headed the implementation of an online reservation system which successfully resolved this problem.

**John McDonald** received the *Award of Excellence in Astrophotography* For His Excellent ongoing work in Solar Imaging and the Mercury Transit on 6 May 2016, 6:14 AM, Canon T3i, f/4 300 mm.



## The Universe in 3D! Cosmic Redshift Surveys by *Reg Dunkley*

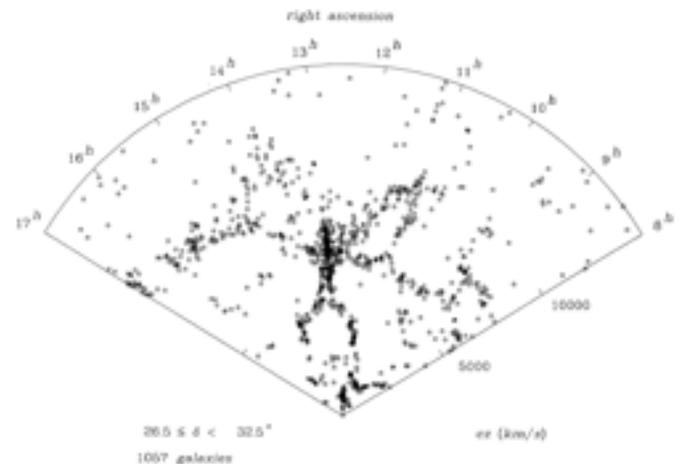
The amazing GAIA mission was described in the November issue of SkyNews. It is currently obtaining ultra precise parallax measurements of over 2 million stars. The associated distance values will greatly improve our 3D model of the nearby portion of the Milky Way. In a similar manner a number of surveys have been conducted which measure the cosmic redshift of **galaxies**. By employing Hubble's law these redshifts can be converted to distance estimates and a **3D model of the observable Universe** can be rendered.

To begin let's revisit the term *redshift*. The redshift of a galaxy occurs by shifting its spectrum towards longer (redder) wavelengths. This is primarily due to the combination of Doppler motions and the general expansion of the Universe. The term *radial velocity* is usually associated with the *Doppler effect* which generally results from motions due to gravitational interactions. The term *redshift* is usually reserved to the stretching of the wavelength due to the *cosmological expansion* of the Universe.

In order to measure the redshift of a galaxy one must obtain a spectrum of the object. In the photographic era it was only feasible to obtain a spectrum of the brightest of galaxies. In the late 1970's, however, a convergence of advances in night vision image intensifiers, light recording diodes and minicomputers greatly improved the feasibility and ease of recording galactic spectra and extracting quality redshifts.

In 1982 Marc Davis and Dave Huchra of the Harvard Smithsonian Centre for Astrophysics published the **CfA** catalogue of 2400 redshifts of *galaxies* brighter than magnitude 14.5. In 1984, Dave Huchra and Margaret Geller began a second extended survey which included galaxies of brighter than magnitude of 15.5. In this catalogue, referred to as the **CfA2**, the number of galaxies swelled to 18000. The spacial analysis of these galaxies revealed surprises. Rather than confirming that the galaxies were randomly distributed the study showed that galaxies were organized along arcs called **walls** or clustered in **nodes**. There were

also great **voids** where there did not appear to be any galaxies at all. This configuration reminded Margaret Geller of interconnected soap bubbles in a kitchen sink. This conceptual model suggested that galaxies were actually concentrated on the cellular walls of bubble like voids. The node at the intersection of two bubbles was associated with a galactic "supercluster".



The above 6 degree thick wedge from the **CfA2** catalogue spans the northern sky from a right ascension of 8 to 17 hours. The radial axis extends to a redshift velocity of 15,000 km/s which corresponds to ~630 million light years. There is a "stick man" quality to the pattern near the centre. The "torso" sometimes referred to as the "finger of God" is actually the Coma supercluster. [Source](#)

CfA2 survey generated many more questions than answers and this led to [a number of other redshift surveys](#) including the **2dF** survey conducted by the Anglo Australian Observatory. An ingenious technique was developed to speed up the acquisition of galactic redshift measurements. Numerous galaxies are often visible in modern wide field telescopes. Simultaneous spectra from many galaxies can be obtained in a single exposure by positioning optical fibres over individual galaxies. The light from each galaxy is directed through the fibre to a spectrograph and hundreds of galactic spectra can be obtained in an hour. This technique is employed at both the 2.5 m Apache Point Observatory in New Mexico and the 4.0m and 1.2 m Anglo Australian Telescopes at Siding Spring. The volume of galactic redshift data has exploded using this *industrial scale approach*.

By 2014, the number of galactic redshifts exceeded 1.2 million in the BOSS (Baryon Oscillation Sky Survey) a galactic component the [freely accessible Sloan Digital Sky Survey](#).

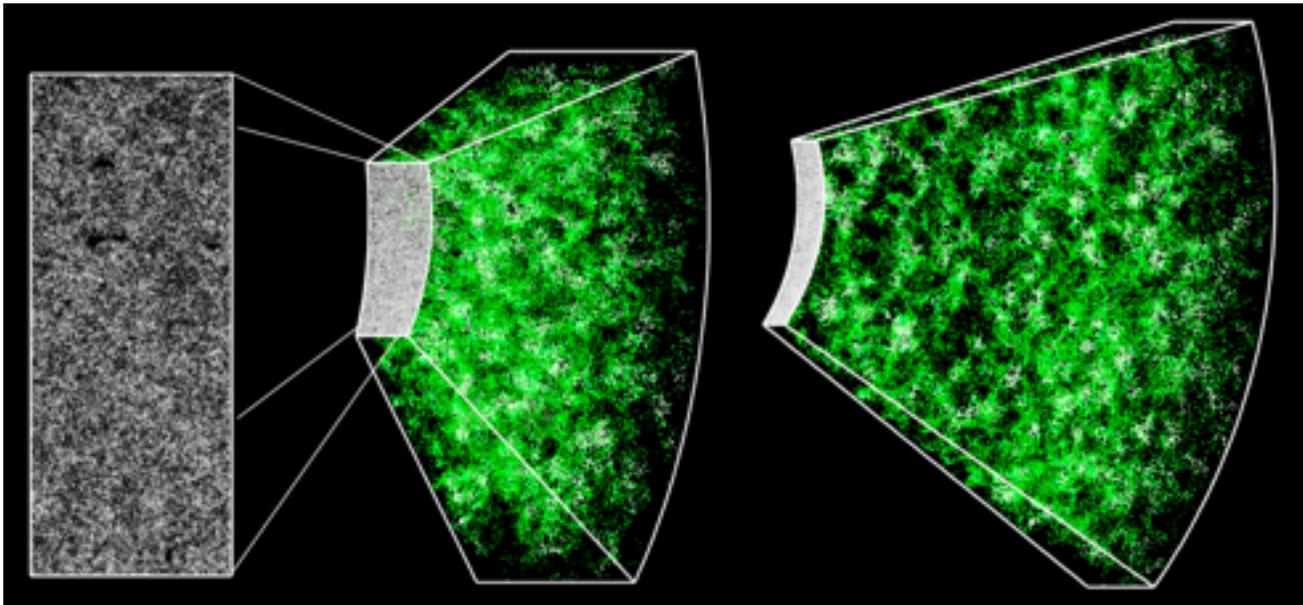
Graphical 3D products of the BOSS survey made [headlines](#) in July 2016. A [video fly through](#) of the dataset is compelling and reminiscent of a Star Wars movie but with displaying real data. The maps even captured the imagination of the fashion industry and you can now buy a [Dark Matter “BOSS” dress](#). Wouldn't that make a great Christmas present!

Galactic redshift surveys are not just “eye candy”.and it will take time to explore and digest these datasets. Features like the BOSS Wall which extends over a billion light years are among the largest structures in the Universe. The forces which formed the voids, walls and nodes are a mystery and a field of active research. which may improve our understanding of dark

**Our One Billion Light Year Local Neighbourhood [Source](#)**



matter and dark energy. **But that story is to be continued** ... in the January Issue of SkyNews. Don't miss it!



**3D View of Sloan Digital Sky Survey BOSS** measurements. The rectangle on the far left shows a cutout of 1000 sq. degrees in the sky containing nearly 120,000 galaxies, or roughly 10% of the total survey. The spectroscopic measurements of each galaxy — every dot in that cutout — transform the two-dimensional picture into a three-dimensional map, extending our view out to 7 billion years in the past. [Source](#)

## RASC Victoria Centre Council 2016 / 2017

POSITION	NAME	E-Mail
Past President:	Sherry Buttnor	<a href="mailto:pastpres@victoria.rasc.ca">pastpres@victoria.rasc.ca</a>
President	Chris Purse	<a href="mailto:president@victoria.rasc.ca">president@victoria.rasc.ca</a>
First Vice President	Reg Dunkley	<a href="mailto:vp@victoria.rasc.ca">vp@victoria.rasc.ca</a>
Second Vice President	Deb Crawford	<a href="mailto:vp2@victoria.rasc.ca">vp2@victoria.rasc.ca</a>
Treasurer	Bruce Lane	<a href="mailto:treasurer@victoria.rasc.ca">treasurer@victoria.rasc.ca</a>
Secretary	Leslie Welsh	<a href="mailto:secretary@victoria.rasc.ca">secretary@victoria.rasc.ca</a>
Librarian	Michel Michaud (Diane Bell)	<a href="mailto:librarian@victoria.rasc.ca">librarian@victoria.rasc.ca</a>
Technical Comm Chair / E-Mail	Matt Watson	<a href="mailto:admin@victoria.rasc.ca">admin@victoria.rasc.ca</a>
Skynews Editor	Reg Dunkley	<a href="mailto:editor@victoria.rasc.ca">editor@victoria.rasc.ca</a>
Public Outreach	Ken Mallory	<a href="mailto:outreach@victoria.rasc.ca">outreach@victoria.rasc.ca</a>
School Outreach	Laurie Roche / Sid Sidhu	
Telescopes	Sid Sidhu	<a href="mailto:telescopes@victoria.rasc.ca">telescopes@victoria.rasc.ca</a>
National Representative	Nelson Walker	<a href="mailto:nationalrep@victoria.rasc.ca">nationalrep@victoria.rasc.ca</a>
Light Pollution Abatement	Dave Robinson	<a href="mailto:lighting@victoria.rasc.ca">lighting@victoria.rasc.ca</a>
Membership Coordinator	Chris Purse	<a href="mailto:membership@victoria.rasc.ca">membership@victoria.rasc.ca</a>
Observing Chairperson	Michel Michaud / Jim Stillburn	<a href="mailto:obschair@victoria.rasc.ca">obschair@victoria.rasc.ca</a>
Website Content	Joe Carr	<a href="mailto:web@victoria.rasc.ca">web@victoria.rasc.ca</a>
<b>Members at Large</b>		
National Officer	Chris Gainor	
Astro Cafe	John McDonald	
NRC Liaison	James di Francesco	
Nat RASC Anniversary Wrkg Group	Dr. James Hesser	<a href="mailto:james.Hesser@nrc-cnrc.gc.ca">james.Hesser@nrc-cnrc.gc.ca</a>
Nat RASC Anniversary Wrkg Group	Laurie Roche	
UVic Liaison	Alex Schmid	
Observing	David Lee	
Historian	Bill Almond	

### Astronomy Books Wanted!

Our new enthusiastic **Public Outreach Officer, Ken Mallory** would like to acquire a number astronomy books to display at Public Outreach events. This might be the perfect time for you to thin out your bulging bookcases and make room for anticipated arrivals on Christmas Morn. If you have a donation, please contact Ken at [outreach@victoria.casc.ca](mailto:outreach@victoria.casc.ca)



### Borrowing Telescopes

The centre has telescopes for new and seasoned observers that members can use. Contact Sid Sidhu

from the email list above.