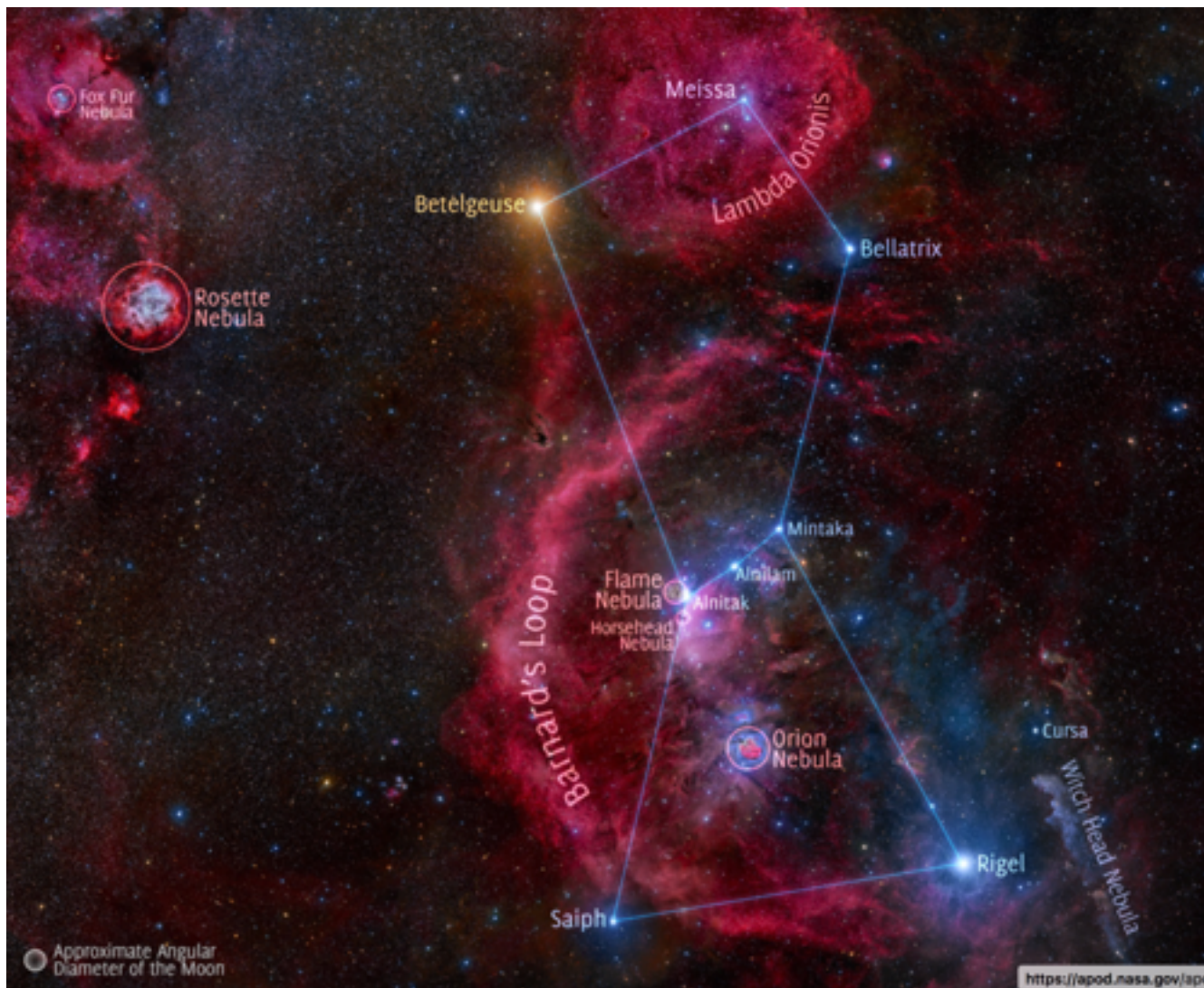


SKYNEWS



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Of Orion**
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Next Monthly Meeting
Wed May 10th 2017
7:30 PM - Room A104
Bob Wright Centre
UVic Campus

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On the Cover

Nebulae in Orion's Neighbourhood

By Stanislav Volskiy

What have they done to that majestic stick man, Orion the Hunter? No, it has not been vandalized by a galactic graffiti artist. Instead this stunning image is an example of extreme astrophotography. Stanislav Volskiy spent two years and over 212 hours of camera time capturing the data. It took over a year to process and knit the mosaic of 1400 images together. It was featured as the November 23, 2015 "[Astronomy Picture of the Day](#)". The rollover annotation by Judy Schmidt is included on the cover page. If you download the primary image you can zoom in on your favourite features such as the Horsehead Nebula. The colour and the texture of the nebulae are breathe taking. The processes that shaped this spectacle are also a subject of wonder. Go to page 4 to learn more.

Presidents Report

by Chris Purse

April will see the start of the centre's outreach season. A major event in our calendar is Astronomy Day that will be held on Saturday 29 April at the Royal BC Museum from 10 a.m. to 4 p.m. This will be followed by the first of the Summer Star Parties at the DAO. Please contact Ken Mallory outreach@victoria.rasc.ca to volunteer to help out with the outreach events that will be occurring this year. We would like to have solar telescopes and people at the table to answer questions. One of the first of these events is Esquimalt Buccaneer Days on 13 and 14 May.

We are looking forward to another set of Summer Star Parties on Observatory Hill. One change this year will be that the Friends of the DAO (FDAO) will lead these evenings. There will be a longer season this year including the Saturdays closest to the solstice. Due to the high demand in past years, we have decided to try opening to visitors even on the evenings when it will not be astronomically dark by closing time. Assuming clear skies, we should have some good solar viewing on those evenings so that could make up for the lack of a night sky!

With the FDAO leading, this will allow evenings to continue on the Saturdays when RASC members are involved with other events. One example of this is Saturday 29 July that coincides with the RASCals Star Party in Metchosin. As you may recall, RASC has designated that Saturday as the national star party day in honour of the sesquicentennial. This means there will be 2 star parties in Greater Victoria that day giving members of the public the option to go to the observatory or the Metchosin municipal grounds.

The Summer Star Parties will occur on Saturday evenings from Saturday 29 April to Saturday 23 September with a few exceptions. There will not be a star party on Saturday 1 July so that everyone can enjoy Canada Day and the 150th anniversary of confederation. We are going to skip the Labour Day weekend and there is also an evening in September when there is a concert in the dome instead.

A reminder that due to April exams being scheduled in our regular meeting room, our monthly meeting on Wednesday 12 April will be in the Elliott Building Lecture Wing Room 167.

Don't Have A Telescope? Learn About the Victoria Centre Loaner Scope Program.

One of the benefits the Centre's membership: The free use of the equipment at the VCO site or borrowing any of the portable telescopes that vary in size from an 8 inch Dob to a Celestron Next Star 114 GT. Solar scopes are also available. Please talk to Sid Sidhu at the regular meetings or by phone at 250-391-0540

Do You Enjoy Building Things? Need to Upgrade Your Scope? We Have A Deal For You!

The Victoria Centre has a **20 inch, f/5 freshly aluminized mirror** for sale. It is being offered first to the Centre's members at an unbelievable price of only \$2000.00. Call Sid Sidhu at 250-391-0540

April 12th Meeting Presentation

Dark matter: Small scales, big problems by Kyle Oman (UVic)

There are several lines of evidence pointing to the existence of an as yet elusive dark matter which is more abundant in the Universe on average than the ordinary stuff of gas, stars and planets. Despite the lack of a plausible particle candidate, the LCDM cosmological theory has been remarkably successful in describing the large scale structure of the Universe. The biggest current challenges to this theory are manifest on the scale of dwarf galaxies. How can we measure a substance we cannot see? What can a handful of puny nearby galaxies tell us about the Universe as a whole? These are the questions I'm tackling with the help of the cutting-edge APOSTLE cosmological simulation suite and observations taken on the Very Large Array in New Mexico.

Bio: Kyle Oman is a PhD candidate at the University of Victoria. He has worked on topics in theoretical extragalactic astronomy ranging from the smallest dwarf galaxies to the largest galaxy clusters. He completed his BSc and MSc at the University of Waterloo.

Upcoming Speakers at UVic

Wednesday May 10th 2017

Benjamin Gerard; Imaging Other Worlds

Wednesday June 14th 2017

Dr. Lisa Loche. Radio and Microwave Astronomy – History, Canadian Involvement, and Interesting Tidbits

Wednesday September 13th 2017

Ted Stroman. Formation and Geology of the Moon.

Wednesday October 11th 2017

Wendell Shuster. Historical Supernovae



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

Every Monday at 7:30 PM

Email Lists

Observer / CU Volunteers / Members

Contact Chris Purse to subscribe
membership@victoria.rasc.ca

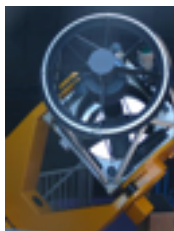
New Observers Group

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/>

Next Sessions : *Weather Permitting*
Friday October 6th at 7:00 PM



Victoria Centre Observatory: Every Saturday Evening.

*Open to those on the **Active Observers list only***

Weather permitting. Dress warmly, and see you out there..

UVic 32 Inch Telescope

RASC Victoria Centre Session
2nd Friday of April and May.

Meet by the Elevator in the Bob Wright Centre at 7PM

Membership Report - March 2017

Total membership is currently **239**. There are 18 members in the grace period which means their membership has expired in the past 2 months. Please contact Chris Purse (membership@victoria.rasc.ca) if you would like to check the status of your membership.

Orion's Aura

by Reg Dunkley

Aura: *a field of luminous multicolored radiation around a person or object.*

Well that pretty much sums up this month's cover photo by Stanislav Volskiy. Like a sunset, you can simply enjoy the beautiful nebulae surrounding Orion for the colours and textures alone. It does, however, contains numerous fascinating features and begs the question "Just what is going on around Orion?"

In fact this question has attracted the attention of many astronomers and active research is being performed in this region. What makes it so special? Well, it is relatively nearby and lies to the south of the Galactic plane which reduces the number of features lying in the foreground. It also contains a group of young, very hot, luminous stars called the *Orion OB1 Association*. Much of the light from these stars is released in ultra violet wavelengths and has sufficient energy to ionized clouds of hydrogen. When the ionized hydrogen nucleus recombines with electrons it emits light in the beautiful "hydrogen alpha" red colour which illuminates most of the nebulae that dominate the cover photo. Many of the Orion OB1 group are massive enough to produce Supernovae which can eject clouds of debris. Associated shock waves and stellar winds from OB stars are sufficient to sweep up the interstellar media and form cavities. There are also large areas of gas and dust such as the *Orion Molecular Cloud*. A particularly dense area of cloud near the Orion Nebula is a star forming region. So this area seems to have it all and it is a great nearby laboratory for *stellar astrophysicists*.

Deciphering the processes at work in such a complex and rich area is very challenging. It is in some ways similar to the task faced by an *accident Investigation team*. They must unravel numerous overlapping skid marks left in the aftermath of a major pile up. Fortunately astronomers have many tools at their disposal. These include a number of *all sky surveys*. Instead of making observations from scratch astronomers can "mine" existing databases and extract and integrate relevant measurements.

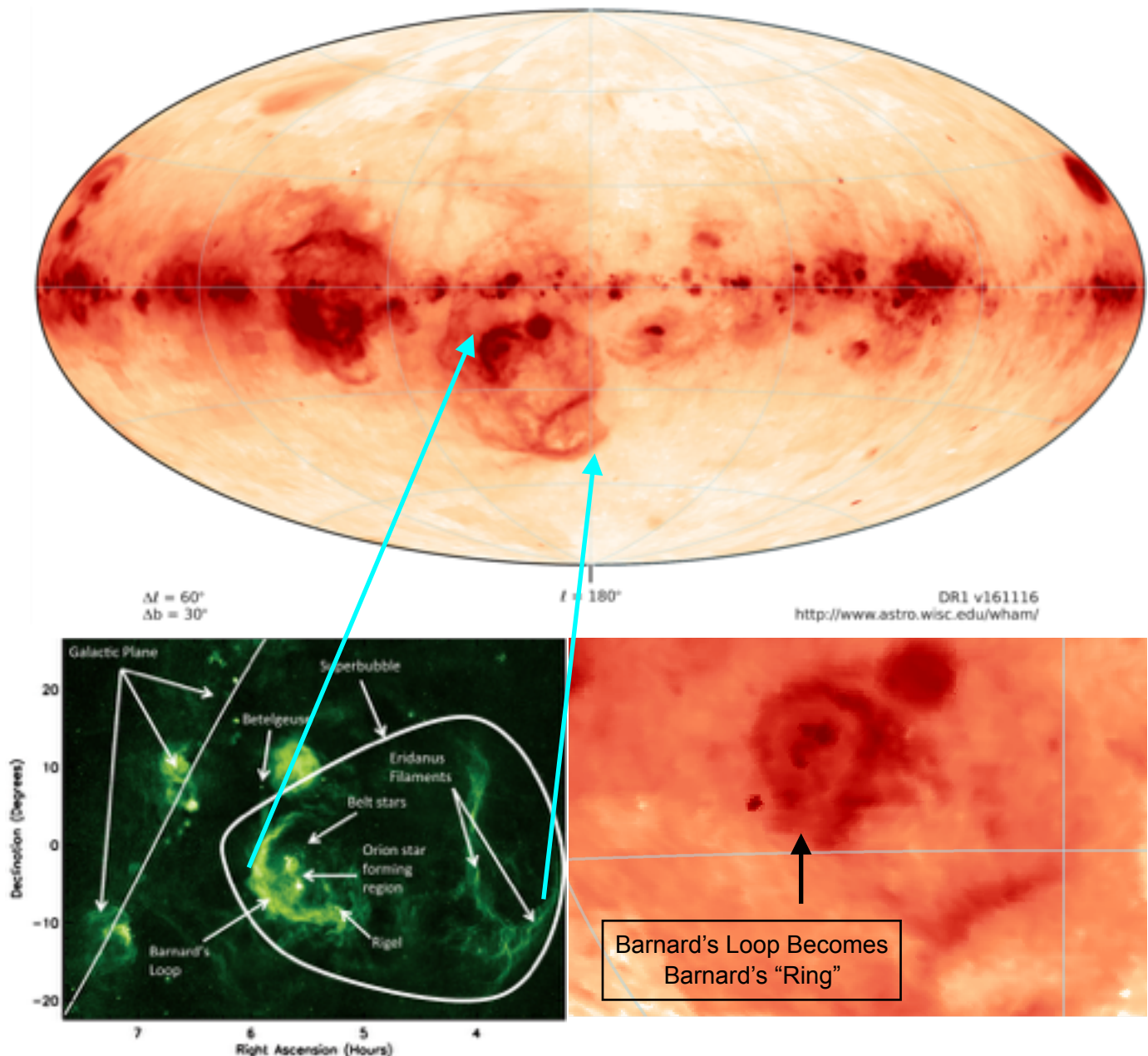
Some of these surveys are useful for measuring aspects of interstellar media (ISM), the low density gas and dust found between stars. One valuable survey is the Wisconsin Hydrogen Alpha Mapper (WHAM). It employed a very sensitive Fabry Perot spectrograph to map the radial velocity and intensity fields of the very faint ionized hydrogen signal. Another useful survey is [LAB](#) which used radio telescopes to map the radial velocity and intensity of neutral hydrogen obtained from the 21 cm band. Dust particles can be detected in the infrared/ microwave portion of the spectrum. Data from infrared satellites such as Spitzer, WISE and IRAS are available from the [Infrared Science Archive](#). Very hot gases found within expanding bubbles can emit X-Rays and [archives](#) of X-Ray satellite surveys such as ROSAT and Chandra also provide clues to the mystery. Together these surveys enable astronomers to map the temperatures, densities and motions of the Orion interstellar medium and help identify boundaries and cavities.

Analysis of this data reveals that a number of [nested shells](#) of expanding gas are present in the Orion area. These shells appear to be centred near that OB group located close to the Orion Nebula. The outer envelope of this feature is called the *Orion Eridanis Superbubble* and is a very large elongated volume covering a 20 degree by 45 degree swath of the sky. Attendees of the 2014 RASC General Assembly in Victoria may recall the Northcott Lecture delivered by Dr. Andy Pon. on the Orion Eridanis Superbubble. He received his Phd from UVic and received the 2014 Plaskett award for his thesis. In order to explain the elongated nature of the super bubble he employed the Kompaneets model. If Kompaneets does not ring a bell do not feel too bad. It was originally developed to model clouds formed by atomic bombs! Pon has written an interesting and readable article about his research in the February 2015 RASC Journal which is available [online](#) for RASC members.

It was really Barnard's Loop that inspired this article. It was first photographed in 1890 by Pickering and in 1894 by E. E. Barnard. It is a popular object for amateur astrophotographers. The crescent shape with a large 7 degree radius

is particularly intriguing. The distance to Barnard's Loop cannot be measured directly but by assuming it's centre coincides with the Orion Nebula it's mean distance is ~ 1300 light years. When the WHAM survey is restricted to positive (approaching) radial velocities of 30 km/s to 50 km/s then Barnards Loop becomes a closed circle which suggests a bubble like

structure. Spectral analysis indicates that the bubble is expanding at 100 km/s. It is likely associated with the remnant of a supernova that exploded 30 thousand years ago. So Barnard's Loop is coming 9 million km closer to the Earth every day! Perhaps it is time to take out that supernova insurance policy.



Top: Hydrogen Alpha from WHAM survey projected in Galactic Coordinates centred on Longitude 180 Radial Velocities ranging from -80 km/s to +80 km/s. Barnards Loop stands out even on this vast scale.
Bottom Right: Barnards Loop becomes a **Closed Ring** in this Enlargement of WHAM for Radial Velocities ranging from +30 km/s to +50 km/s. Suggests an expanding bubble of a Supernova Remnant.
Bottom Left: Eridanus Super Bubble from Pon JRASC Feb 2015. It's scale is enormous in the Top map



Dr. Ian Shelton visits Astro Cafe

photo Chris Gainor

On Monday March 6th, a record crowd of 34 enjoyed a most energetic, enthusiastic, and entertaining presentation on supernova SN1987A by it's discoverer Dr. Ian Shelton. It was within days of the 30th anniversary of the sighting of the first supernova visible to the naked eye since the invention of the telescope ... 400 years ago. He presented fascinating scientific findings about the evolution of this supernova as it expanded over the last 30 years. The human interest aspects of his story were also of great interest. Highlights of his adventure include: photos of his home observatory in Manitoba, how he obtained his observing position in Chile, how he acquired rejected photographic plates from an adjacent observatory, how the wind blew his observatory roof shut during the critical exposure. He also explained the challenges following his headline making discovery. Many of these events were captured on an engaging [claymation video](#). If you have not seen it, be sure to check it out.



Assemble Here for Astronomy Day, Saturday April 29th 10 AM to 4PM

Not too sure where that is? Some things have changed since 1859. The big white house of Sir James Douglas has been replaced by the **Royal BC Museum**. Dr. Helmcken's house on the left is still standing. See you there!

Astronomy Day Events 10AM-4PM

**Royal BC Museum
Exhibits in Main Hall**

Lectures

11AM Dr. Jon Willis

Are We Alone?

1PM Michael Webb

Greatest Show on Earth

2PM Dr. Kim Venn

Archaeology with Stars

8PM to 11PM

**Dominion Astrophysical
Observatory**

Lectures

8PM Dr Christian Marois

*Trappist 1 System and
Habitable Planets*

RASC Victoria Centre Council 2016 / 2017

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President	Chris Purse	president@victoria.rasc.ca
First Vice President	Reg Dunkley	vp@victoria.rasc.ca
Second Vice President	Deb Crawford	vp2@victoria.rasc.ca
Treasurer	Bruce Lane	treasurer@victoria.rasc.ca
Secretary	Leslie Welsh	secretary@victoria.rasc.ca
Librarian	Michel Michaud (Diane Bell)	librarian@victoria.rasc.ca
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School Outreach	Laurie Roche / Sid Sidhu	
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Members at Large		
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Astro Cafe	John McDonald	
NRC Liaison	James di Francesco	
Nat RASC Anniversary Wrkg Group	Dr. James Hesser	james.Hesser@nrc-cnrc.gc.ca
Nat RASC Anniversary Wrkg Group	Laurie Roche	
UVic Liaison	Alex Schmid	
Observing	David Lee	
Historian	Bill Almond	

Online Resources

Magazines

[SkyNews](#) Our National RASC Newsletter
[Sky & Telescope](#) Magazine
[Astronomy](#) Magazine
[Astronomy Now](#) Astronomy in the UK
[Amateur Astronomy](#) Magazine
[Astrophotography](#) Magazine



Borrowing Telescopes

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