

NOVA

NEWSLETTER OF THE VANCOUVER CENTRE RASC
VOLUME 2016 ISSUE 3 MAY JUNE ASTRONOMY DAY 2016



Hubble's 25-Year Space Odyssey

Ray Villard, Space Telescope Science Institute. Room SHW 10081, May 7 at 2pm and 7:30pm

Over the past quarter-century, images and discoveries from NASA's Hubble Space Telescope have re-invigorated and reshaped the public's view of our universe. The space telescope's evocative and colourful celestial imagery unveils properties of the cosmos that for most of human history has only been probed in the imagination. It has unveiled a hidden, discordant, and vibrant universe set against the overwhelming interplay of matter and energy. After launch in 1990, Hubble easily accomplished its primary scientific goals and then proved to be flexible and powerful enough to tackle unexpected frontiers such as extrasolar planets and dark energy. Hubble has gazed farther back into time and space than ever imagined—even by its builders.

Hubble's success has paved the way for a powerful next generation of space observatories: The 6.5 meter aperture Webb Space telescope, a "wide-field" Hubble clone sur-

vey telescope, and ultimately, the 10-meter aperture High-Definition Space Telescope. Collectively, these observatories will answer two time-



less and profound questions about the universe: what are the physical underpinnings of space and time that allowed for cosmic evolution from the Big Bang, and does life exist on planets around other stars?

Answering these questions will bring about a profound and irreversible change in our cultural evolution.

Ray Villard is the news director for the Space Telescope Science Institute at the Johns Hopkins University in Baltimore, Maryland, where he translates Hubble's discoveries into stories for the media and public. He has received several NASA service awards for his contribution to publicizing all the newsworthy Hubble science results. Villard has written a variety of freelance articles for magazines, internet blogs, and scripts for several syndicated science programs on public radio and planetariums. In 2004, he published an illustrated astronomy book on the discovery of extrasolar planets entitled *Infinite Worlds*. Villard co-wrote a video adaptation of the book for the National Geographic Channel. That program, "Alien Earths," was nominated for the 2010 Prime Time Emmy Awards. ✨

MAY 7

NO REGULAR MEETING IN MAY. Instead, join us for Astronomy Day at SFU on Saturday, May 7. See Meetup for details.

SFU

JUNE 9

Moritz Heimpel of the University of Alberta: Dynamics of Jupiter and Saturn: Bands, Spots, and Dynamos. Room SWH10081 (see Meetup)

SFU

JULY 14

Members Night. Watch Meetup for details.

SFU

Astronomy Day Lectures at SFU

Room SWH 10061, Saywell Hall

- | | | |
|--------------|--------------------|--|
| 11:30 | Stanley Greenspoon | What's New in the Search for Exoplanets and Extraterrestrial Life |
| 12:30 | Kenneth Lui | What's up in the Global Space Community |
| 1:30 | Ted Stroman | The Creation and Formation of the Moon |
| 2:30 | Scott McGillivray | It's 2016 – Astronomy is More than Telescopes |

Astronomy Day Activities

Saywell Hall Concourse

11:00am to 3:00pm

- Apollo Rockets and Mission display
- Jim Bernath and his hands-on science activities
- Solar system and Our Planets display
- Planetary Society display
- Solar telescopes (outside the Trottier Observatory, weather-permitting)
- 3 craft tables for the children including alien figures, alien masks, and phases of the Moon with Oreo cookies.
- Astronomy Trivia Bingo
- Solar System Walk and bag toss
- Planetary Society display

The new Trottier Observatory will also be open for tours throughout the afternoon!

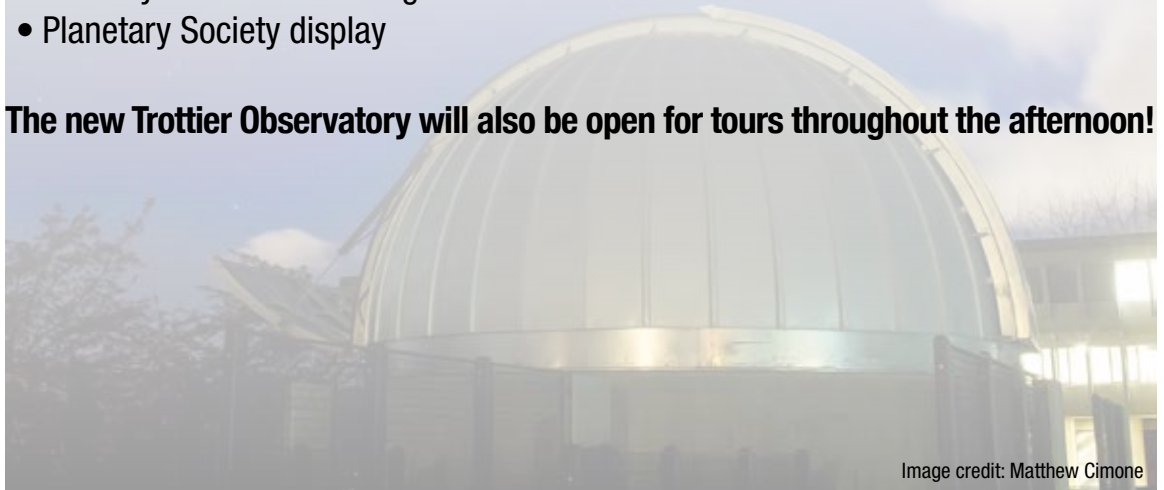


Image credit: Matthew Cimone

President's Message

Welcome to 2016 International Astronomy Day. This is the third year that we have celebrated this event in conjunction with Simon Fraser University's Science Rendezvous. If the last two years were any indication, today will be another fantastic day. I would like to take this opportunity to thank Simon Fraser University and specifically the Faculty of Science for their ongoing sup-

port of the Royal Astronomical Society of Canada (RASC). The partnership created over the past three years with SFU has been extraordinary and beneficial to us and I'm sure the same goes for SFU's appreciation of RASC's efforts in the education of astronomy and its allied sciences.

If there was ever a time to be interested in Astronomy, I think now is it. The

amazing advances in recent technology are making new discoveries a weekly occurrence.

Whether your interest lies in comets, asteroids, planets, exo-planets, galaxies, the search of extra-terrestrial life, or the more brainy topics of gravitational waves, every few days there is a media bulletin on something new and exciting,

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by Suzanna Nagy

About RASC

The RASC Vancouver Centre meets at 7:30 PM on the second Thursday of every month at SFU's Burnaby campus (see map on page 4). Guests are always welcome. In addition, the Centre has an observing site where star parties are regularly scheduled.

Membership is currently \$78.00 per year (\$45.00 for persons under 21 years of age; family memberships also available) and can be obtained online, at a meeting, or by writing

to the Treasurer at the address below. Annual membership includes the invaluable Observer's Handbook, six issues of the RASC Journal, and, of course, access to all of the club events and projects.

For more information regarding the Centre and its activities, please contact our P.R. Director.

NOVA, the newsletter of the Vancouver Centre, RASC, is published on odd-numbered months. Opinions expressed herein are not nec-

essarily those of the Vancouver Centre.

Material on any aspect of astronomy should be e-mailed to the editor or mailed to the address below.

Remember, you are always welcome to attend meetings of Council, held on the first Thursday of every month at 7:30pm in the Trotter Studio in the Chemistry wing of the Shrum Science Centre at SFU. Please contact a council member for directions.

2015 Vancouver Centre Officers

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Past President Mark Eburne
At Large Howard Trotter
Trustees Pomponia Martinez
J. Karl Miller

Library

The centre has a large library of books, magazines and old NOVAs for your enjoyment. Please take advantage of this club service and visit often to check out the new purchases. Suggestions for future library acquisitions are appreciated.

On the Internet

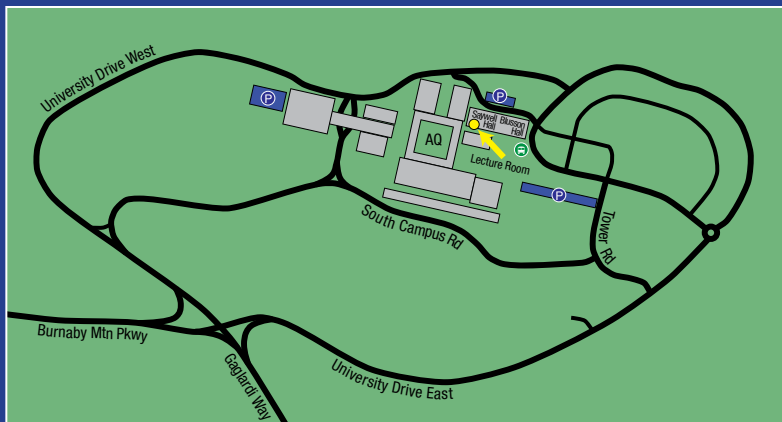
<http://rasc-vancouver.com> or
<http://www.rasc.ca/vancouver>
<http://astronomy.meetup.com/131/>
<http://www.facebook.com/RASC.Van>

 @RASC Vancouver

Mailing Address

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Map to Meeting Site



SFU

Our June and July meetings are in room SWH 10081 of Saywell Hall, indicated by the arrow on the map.

Pay parking is available at several locations around campus (indicated as “P” on the map).

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The recent successes of SpaceX and its reusable launch system make ongoing space exploration a certainty.

The RASC does its best to bring these exciting topics to you in various publications including the NOVA newsletter, the scientific *Journal*, the *Observer's Handbook*, and the recent acquisition of SkyNews Magazine with which we will ensure that Canadian content continues.

Membership in the RASC brings these four publications directly to you.

In addition, your local centre (in this case Vancouver) offers telescope observing parties, monthly lectures, and the chance to meet scientists doing the research you read about. For example, today you have the opportunity to meet Mr. Ray Villard of NASA's Hubble Space Telescope Program and hear his lecture on the 25 Years of Hubble. In June, Dr. Moritz Heimpel of the Department of Physics, University of Alberta, is speaking to the RASC on the atmospheres of gas giants. His research was recently published in *Nature Geosci-*

ence. All of our lectures are always open to the public and free to attend.

I hope you and your family will thoroughly enjoy the fun and educational activities we have prepared for you today. If you do, please consider joining the RASC. Membership has many benefits, as well as the appreciation that your yearly fees support educational outreach.

Clear skies,
Suzanna Nagy
President ★



Moonsset behind an old ferry terminal near Porteau Cove (photo by Elena Popovici)

Education Outreach Events in April

We continue to be kept busy with our education outreach activities.

On Friday, April 8th, we attended “Space Night” at Royal Heights Elementary School in west Surrey. We had been invited by Charlotte Brenner (learner support teacher) and Lisa Jamieson (principal). They extended a very warm welcome when we arrived.

The “we” this time was Terry McComas, Karl Miller, Jeremy van den Driesen (our events coordinator) and myself. I arrived a close first and made contact with Charlotte and Lisa to find out where we could set up telescopes and generally get the lay of the land at the school. The best location turned out to be the east playground just beside the school parking lot. I set up my mount and put the solar scope on it. Terry, Karl and Jeremy soon arrived and Karl and

Terry started setting up telescopes in the playground while Jeremy and

I went to the school gymnasium so I could start setting up the projector for my presentation while Jeremy set up and organized his table with a stack of star wheels and handout material.

Before starting my presentation, I went back outside and switched telescopes, as the sun was dipping behind the school. The sky was streaked with light clouds so we kept our fingers crossed. We also got a feed of hotdogs and drinks before we went any further. That was a very nice treat.

By this time, a crowd of students and parents had formed in the gym, so I jumped right into my presentation. I was able to log onto Wi-Fi which enabled me to show a YouTube video of Blue Origin’s 3rd historic launch and landing of the same booster rocket. I hadn’t realized

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Karl Miller and students at Royal Heights Elementary School

Membership has its Privileges!

New members, did you know? The Vancouver Centre has several telescopes available for loan free of charge! We have telescopes ranging from 60mm to 10” in diameter. For more information see the Director of Telescopes after the members meeting. The loaner period is for one month, to be returned after the next meeting. Telescopes are not allowed to circulate outside of these meetings. You

can now reserve two different telescopes per year and use what is left at the end of the meeting anytime.

Your greatest opportunity as a member of the RASC is to take advantage of the company of other enthusiasts to increase your knowledge, enjoyment and skill in astronomy.

The best thing you can do to gain the most from your membership is to get ac-

tive! Take in the club meetings; engage other members with questions; come out to observing sessions (also known as “star parties”), and, by all means, volunteer to take part in our many public events.

For the usual observing sites and times, visit our website at <http://rasc-vancouver.com> or contact the Observing Chair at observing@rasc-vancouver.com.

Upcoming Events

May

7 – Astronomy Day at SFU

9 – Transit of Mercury

19-22 – RASC General Assembly in London

July

30 - Aug 7 – Mt. Kobau Star Party

August

13 – Perseid meteor shower at Alder-grove Regional Park

20 – Starry Night at Deas Island Regional Park

27 – Sep 4 – Merritt Star Quest

December

8 – AGM

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that SpaceX had successfully landed their rocket on the robotic barge on the same day, or I would have shown that as well. I wanted the students and parents to think about how that day might be marked down as one of those pivotal days in history sometime in their future.

My presentation seemed well received with lots of questions from the kids and some from parents as well. Thanks to our merchandise chair, Kyle Dally, I had some prizes to give away during a fun quiz after my talk. Jeremy was continually busy at his table demonstrating star wheels and giving them away. He was also very busy informing people of our upcoming activities which included Astronomy Day and Science Rendezvous at SFU. While Jeremy and I were busy indoors, Terry and Karl were outside at their telescopes with a group of students and parents, all of them looking for Jupiter in a not-

yet-dark sky.

After finishing my talk, I put my presentation equipment away, Jeremy cleared his table, and then we both headed outside. The sky had cleared considerably during the time



Terry McComas and the Chimo Group Girl Guides

we had been in the school, however it was still just a little too light out. While standing next to Karl, I challenged the kids and parents to be the first to see a bright object in the sky. One of the mothers spotted Jupiter well before my poor old eyes could see it. She excitedly pointed it out to her daughter who said, “Is that what we are looking for? I would have shown you if I had known.” Oh, to have young eyes again!

I put my telescope onto Jupiter for much of the rest of the evening as I knew that most of the kids would be going home before it got truly dark enough to see much else. Karl and Terry shifted their scopes

to the crescent Moon for a short while. That got a few “ahs” from the crowd.

A great time was had by all, especially us. I extend my thanks to Charlotte, Lisa and all the students at Royal Heights Elementary School. I also want to give a shout-out to the school custodian, John Bergeron,

who was so kind and helpful to us whenever we needed him.

Two weeks later, April 22nd proved to be an even busier day for our volunteers with two separate events taking place, one in Maple Ridge and the other in Vancouver. While Kyle, Terry and I were busy at Camp Kanaka in Maple Ridge teaching the Chimo group of Girl Guides about the night sky, Jeremy

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SWEET at Science World

by Jeremy van den Driesen

Once again SWEET (Science World Extravagant Evening for Teens) proved to be an event that evinced much interest in astronomy from the younger generation. Elena Popovici, Adrian Mitescu, Pascal Pillot and I engaged the teens distributing star finders, other promotional material and explaining the intricacies of the different types of telescopes we had on display. Elena and Adrian's 4" refractor with solar filter,

Pascal's 8" Meade reflector and my (the club's, really) Coronado rounded out our static display of telescopes. Why static display? Well, as is predictable for most stargazing events in Van-

cover, it rained.

In keeping with the Earth Day theme of SWEET, Scott McGillivray's



Scott McGillivray speaking to students at Science World

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van den Driesen, Elena Popovici, Adrian Mitescu, Pascal Pillot and Scott McGillivray took on the task of educating and entertaining a Science World full of teenagers. This was made even more challenging for us all because the capricious weather of the west coast insisted on raining on both our parades.

At Camp Kanaka, Kyle, Terry and I put on an indoor presentation with the aim of the girls earning their Astronomy Badge. I hope we succeeded on that account. All the young ladies were very attentive and

interesting presentation on NEOS (Near Earth Objects) drew in a sizeable crowd of teens who then proceeded to quiz him on the cosmos and his star power as a TV presenter on things

asked some very good questions. When I finished my presentation, I handed it over to Terry and Kyle to hand out star wheels and demonstrate how they work. While I started to pack up my presentation equipment, Terry had all the girls line up to have a look through his telescope at some posters that Kyle had put on the wall earlier. It was the best we could do while the rainforest went pitter-patter.

My thanks to Guide Leader Linda Knight for inviting us to participate at their group's weekend camp. At the end of our evening, the girls

astronomical on Global TV.

Samaria (Sam) Marriott, the event organizer at Science World, as always, made us feel most welcome and provided us with everything that was necessary to make the event a success. These events at Science World certainly promote an interest in astronomy and, what is most encouraging, a burgeoning awareness of the effects of light pollution on the night sky.

Our next encounter with Science World, on May 14th or 15th, is a daytime affair and so light pollution will not be a problem, but clouds may be. Let's keep our fingers crossed. ✨

thanked us so kindly and presented us with two boxes of Girl Guide cookies. By the time you have read this, the cookies will have disappeared at our council meeting. The perks of volunteering!

As usual, I think it is fair to say that our volunteers get back as much as they give when we bring our passion for the night sky to our fellow citizens of all ages. Council will continue to encourage our members to volunteer in whichever way they can. I hope we can continue to spark interest in what lies beyond our own little world. ✨

Cool Astronomy Facts

by Gordon Farrell

Nearly every atom in your body that isn't hydrogen was created inside a star (with the possible exception of the trace amounts of lithium, beryllium and boron, each of which formed in the first 20 minutes after the Big Bang, but there's so little of them in your body they're hardly worth mentioning).



As you sit there reading this, your body is being gently pummeled by cosmic rays several times per second.

Cosmic rays are mainly alpha and beta particles (essentially hydrogen and helium nuclei) produced both inside and outside our galaxy and can travel at speeds approaching that of light. They are thought to be produced by supernova explosions and can damage electronics outside the protection of Earth's atmosphere (the more atmosphere the better—air travellers are more exposed than beachside sunbathers).



100 years ago, scientists believed the Milky Way was all that there was to the universe. Yes, they could see these funny little "spiral nebulae" but though they were features within our own galaxy, perhaps solar systems in the early stages of formation. It wasn't until the mid 1920s that Edwin Hubble conclusively proved they were entire galaxies all their own, well outside the Milky Way. The universe suddenly got a lot bigger.



If the Sun were to suddenly wink out, we wouldn't know about it for

8 minutes and 17 seconds.



Not every star is as stable as the Sun. Some stars fluctuate in brightness, size, and colour, sometimes changing their brightness by up to 500% or their radius by 25% in periods that can range from years to mere hours.

One particular class of variable stars, known as Cepheid variables, have very predictable variations. Their changes in brightness are so reliable they have been used as a sort of "standard candle" for estimating the distances to other galaxies.

And, technically, the Sun is also a variable star, it's just a very subtle one, varying in brightness by about 0.1% over an 11-year cycle.



Saturn's rings are more than 250,000 km in diameter, but average only 20 m thick.



The Moon is slowly moving away from the Earth, with the average distance increasing by 3.8 cm every year.

As the Moon slowly recedes, it appears smaller from our point of view and will eventually be too far away to completely block the Sun. This means that if you want to see a total solar eclipse, you'd better hurry. The last one will happen about 620 million years from now.



Though a day is 24 hours long, it only takes the Earth 23 hours, 56 minutes and 4 seconds to turn 360°. So why the difference?

24 hours measures a "solar day,"

which can be thought of as the average time between "high noon"s. Pulling that off requires more than 360° of rotation because the Earth moves a fair distance in its orbit over the course of a day. To get the Sun directly overhead again, we need to rotate just a hair under 361°, which takes an extra 3 minutes and 56 seconds, so there you go.

And if you're curious, the shorter day also has a name: a sidereal day.



Not only is Jupiter the largest planet in the solar system, but it also has the shortest day at just under 10 hours.



The first person to figure out the Earth revolved around the Sun (and not the other way around) was Nicolaus Copernicus. The idea was so controversial at the time that it wasn't published until he was on his deathbed in 1543.

The book was entitled *On the Revolutions of the Celestial Spheres* and was such a sensation that the word "revolution" took on a whole new meaning as a result.



The Valles Marineris on Mars is one of the largest canyons in the solar system. Stretching over 4000 km in length, 200 km in width and up to 7 km deep, it would almost touch both coasts of the continental US.



How many stars are there in the universe? Current estimates put the number at 70,000,000,000,000,000,000,000 (give or take). *

Members' Gallery



Pleiades by Elena Popovici

(left) Taken at a RASC Sidewalk Astronomy Meetup at Spanish Banks on March 31. SONY ILCE-5000 camera attached to 102mm Sky-Watcher reflector telescope, with wide-angle prime-focus adapter setup. 1/2 sec. exposure and 6400 ISO.

Orion by Elena Popovici

(below) View to the south at Porteau Cove Provincial Park. Anvil Island in the foreground, a cloud over the water and city lights on the horizon. Sirius at left, Orion in the centre and Hyades (The Bull) at right.



Become a Member of the RASC–Vancouver Centre!

Why Join?

RASC–Vancouver Centre is a charitable society whose purpose is to advance education on astronomy and allied sciences by providing presentations, workshops, seminars, and outreach programs.

By becoming a member, you will:

- Give and receive **SUPPORT**:
 - Help the society's education and outreach programs
 - Enjoy observing the wonders of the universe as part of a community of amateur and professional astronomers who learn from one another
- Receive **PUBLICATIONS**:
 - A printed copy of the annual *RASC Observer's Handbook* – the standard North American reference for data on the sky and guide to the year's astronomical events
 - Six printed copies of *SkyNews* – Canada's amateur astronomy magazine
 - Six electronic copies of the *Journal* – publishing research and review papers by professional and amateur astronomers, as well as general interest astronomy articles
 - Or get the printed version at a heavily-discounted price
- Get Access to **RESOURCES**:
 - The Centre's library, containing over 500 astronomical books
 - The Centre's telescope loaner program, so you can try out different telescope types
 - **NEW!** Time on the SFU Trottier Observatory telescope to pursue astronomy projects – by application
 - Grants from the legacy fund to pursue projects enhancing astronomy outreach – by application
- Be able to get involved and have an **IMPACT** by:
 - Voting in election of Council members and in general votes
 - Attending the monthly Vancouver Centre Council meetings, to observe or make a presentation
 - Running for election to join Council
 - Volunteering at our public events
 - Submitting articles or photos for publication in the Centre's bimonthly newsletter, *NOVA*
 - Attending the annual RASC National General Assembly – a five day conference with workshops, speakers, sessions, tours, and the RASC Annual Meeting and Banquet
- Get other **DEALS & DISCOUNTS** as described on the RASC National website

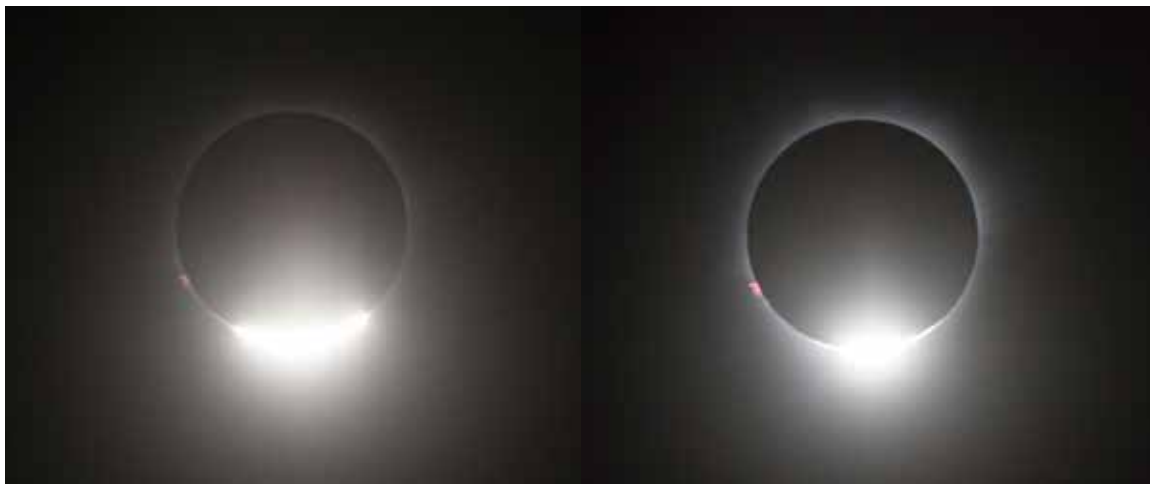
The yearly **membership fees** for the Vancouver Centre of RASC are:

- Individual youth membership (under 21 or full-time students under 25): \$45
- Individual adult membership: \$78
- Family membership: \$73 + \$16/additional adult + \$8/additional youth

Want to learn more about RASC–Vancouver Centre?

Visit us at <http://rasc-vancouver.com/about-us/>

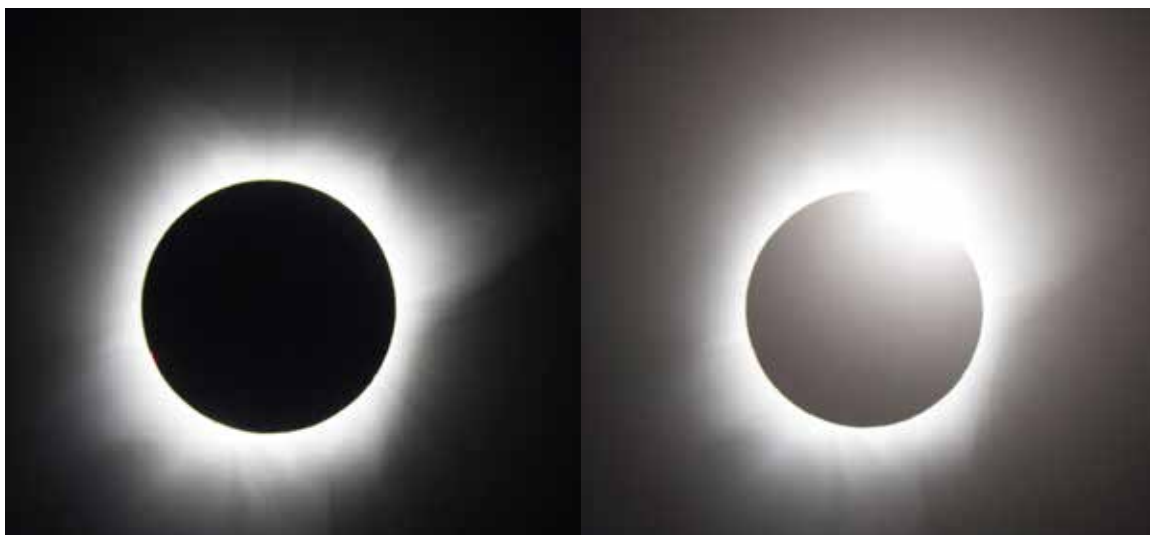
Members' Gallery



Solar Eclipse by Oleg Mazurenko

The total solar eclipse of March 9 as seen from Luwuk, Indonesia.

As totality begins (above), pink prominences are visible at the 8:00 position, along with the “diamond ring” effect as the Moon covers all but the last sliver of the Sun. The Sun’s dim corona becomes visible during totality (below) until the Sun re-emerges a mere 2 minutes 51 seconds later.





VANCOUVER TELESCOPE CENTRE

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