

SKYNEWS



IN THIS ISSUE

Presidents Report
Young RASCal Surveys Solar System
Great Martian Dust Storm of 2018
Another Herschel Concert!

An iPhone Moon
by Nathan Hellner-Mestelman
See more images on pages 4 to 6

NEXT MEETING

Next Meeting AGM
Saturday November 18th
Cedar Hill Golf Course
at 6PM

www.victoria.rasc.ca

President's Report

by *Chris Purse*

Thank you to everyone who was involved in the RASCals Star Party this year. We tried out a new venue in Central Saanich and it looks to have a lot of potential. If only the weather had cooperated! A number of centre members have observed from the site in the past with success. Despite the weather, we did have some great talks and our first attempt at a star party barbecue went well.

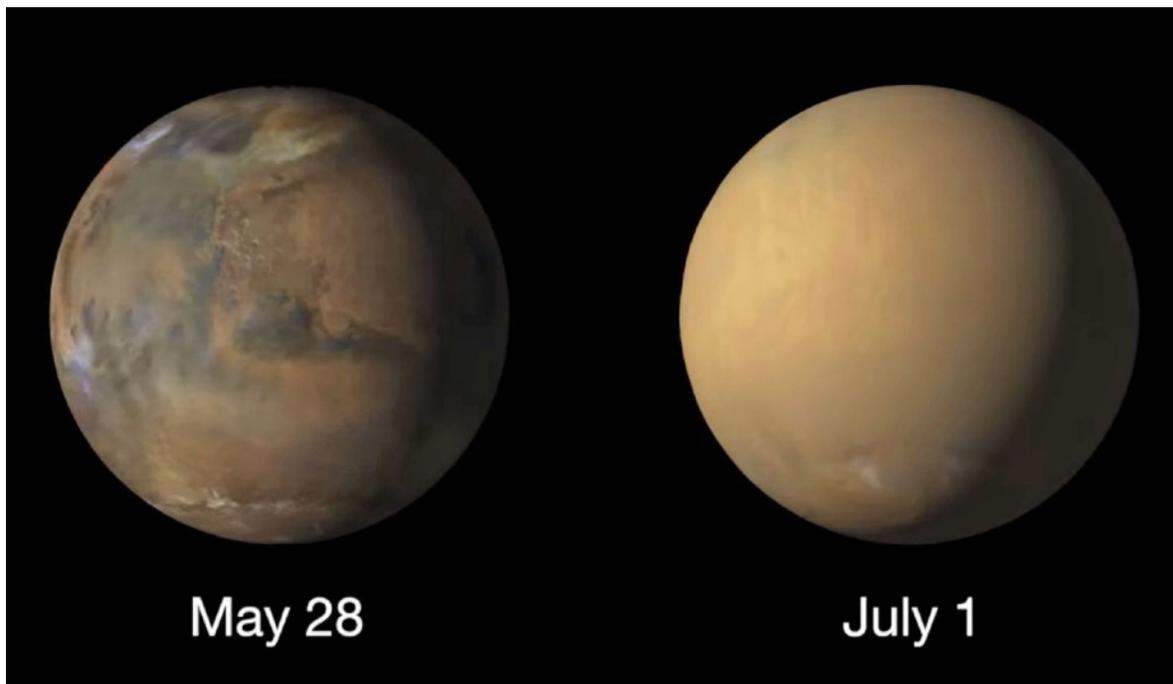
I am pleased to report that our application for special project funding was approved. Jim Hesser, John McDonald, and David Lee will be putting together a visual display for the second concert of William Herschel's music. The application sought funding from the RASC special project fund to cover the costs of some of the equipment needed for the concert. This concert will be part of the fourth season of the explorations in 18th century music. This year's offering is called On the Construction of the Heav'ns and will feature a Baroque chamber orchestra. The venue is Christ Church Cathedral again this year and the concert will take place on Friday, November 16. There will be a preconcert talk at 6:45 p.m. followed by the

concert at 7:30 p.m. More information is available on the [Christ Church Cathedral website](#) and tickets are \$30 each available from [Ticket Rocket](#).

Save the date for our Annual General Meeting on the evening of Saturday, November 17. Evening festivities include a dinner, speaker, annual awards, and election of council. Please let me know if you by email at president@victoria.rasc.ca if wish to attend the dinner. The cost is \$40.

We are now accepting nominations for the annual awards. In particular, we are seeking nominations for the Newton-Ball Award. Please see the [website](#) for details of the award and how to nominate a member to receive the award.

We will be looking for members to join the council this year. It has been a great experience for me to become part of the council and I encourage everyone, even if you've just joined, to consider putting your name forward. Sherry, our past president, will be coordinating the nomination process so please contact her at pastpres@victoria.rasc.ca if you would like more information and to put your name forward.



Global Dust Storm Sabotages Martian Opposition of 2018: Read all about it on page 7

October Meeting Presentation: *Coronal mass ejection evolution and their effects on galactic cosmic rays and planetary magnetospheres.*

by Dr. Reka Winslow

**Wednesday October 10th, 2018 at 7:30 PM
Room A104 Bob Wright Centre UVic**

Coronal mass ejections (CMEs) are large eruptions of plasma and magnetic field into interplanetary space originating in the Sun's atmosphere. CMEs interact with the environment that they propagate through; for example, they are the most common cause of planetary space weather, and they also modulate the flux of galactic cosmic rays. Because CMEs can be associated with strong southward magnetic fields of long duration, high velocities, enhanced dynamic pressures, and solar energetic particles, they are strong drivers of geomagnetic storm activity at Earth. The effects of CMEs on Earth's magnetosphere have been studied for many decades; on the other hand, studies of CME effects on other planets are only now becoming possible with a number of spacecraft in orbit around inner solar system planets. This new data enables us, for the first time, to directly observe how CMEs cause space weather on other planets, and also how CMEs change during propagation from the Sun to Earth. In this talk, I will present efforts to investigate how CMEs evolve as they propagate outward from the Sun, in order to better predict their effects on planetary magnetospheres. I will also showcase how CMEs affect Mercury's magnetosphere as well as the flux of galactic cosmic rays in the inner solar system.

Dr. Reka Winslow is a research scientist in the Space Science Center at University of New Hampshire, where she also conducted her postdoctoral work. She holds a Ph.D. in geophysics, having specialized in space physics and planetary science at UBC. She has over 10 years of experience conducting research in space physics. Her work bridges the fields of heliophysics and planetary science, by focusing on observational studies of coronal mass ejections, interplanetary shocks, galactic cosmic rays, and solar energetic particle events to better understand their evolution in the inner heliosphere and their interaction with different planetary magnetospheres in the solar system. She is a member of the science team for the CRaTER instrument onboard the Lunar Reconnaissance Orbiter, and was a member of the MESSENGER science team while the spacecraft was orbiting Mercury.

ASTRONOMY CAFE



Our weekly **Astronomy Cafe** is an excellent, informal, way to meet us. New comers are especially encouraged. Click the link for location: <http://victoria.rasc.ca/events/astro-cafe/>
Fairfield Community Centre - 1330
Fairfield Rd. Victoria.
Every Monday at 7:30pm.

Contact Reg for further details:
vp@victoria.rasc.ca



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. Click the link for the date and time of the next scheduled session
<http://victoria.rasc.ca/events/rascals-cattle-point/>



Victoria Centre Observatory: Saturday Evenings
Open to those on the **Active Observers list only**
Weather permitting.



UVic 32 Inch Telescope
RASC Victoria Centre Sessions will resume in **November**.

Membership Report September 2018

Total membership is currently **275**. 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.

A Young RASCaI Surveys Solar System

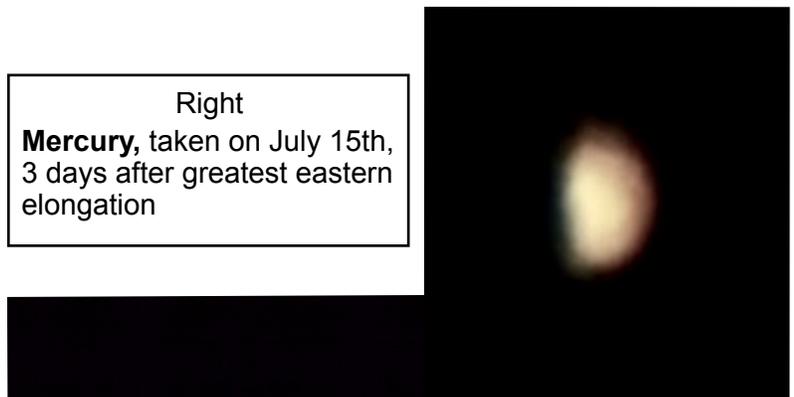
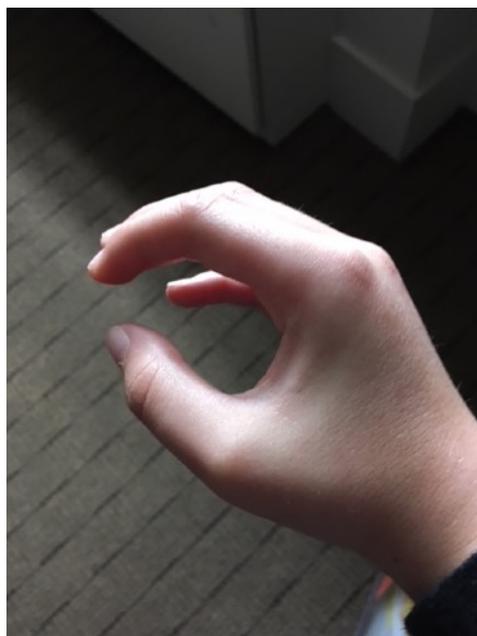
By Reg Dunkley

Show and Tell Sessions at Astro Cafe provide an venue to share your astro adventures with the group. 11 year old Victoria Centre RASCaI, Nathan Hellner-Mestelman, made the most of this opportunity last season. He routinely displayed photos of the solar system that he captured using his 8 inch Dobsonian with his Mom's iPhone. His results continued to improve and have amazed Astro Cafe regulars.

He saved up to acquire a SkyWatcher Classic 200P f5.9 Dobsonian telescope with a focal length of 1200 mm. Whenever night skies cleared he seemed to be out there capturing images using an iPhone SE. As I watched the details on Jupiter and Mars become sharper over time I inquired about the image processing software he was using. Nathan's answer surprised me. I suspected that he used Registax or Autostakkert, which breaks down a movie of the planet into thousands of frames and then automatically stacks the best 100 or 200 images. Instead, Nathan displayed innovation by employing the transparency function of Microsoft Word. He manually overlaid some of his best images. He then edited that result. When I asked about the *type of holder he used to clamp the iPhone to the eyepiece* he sent me the **photo below!**



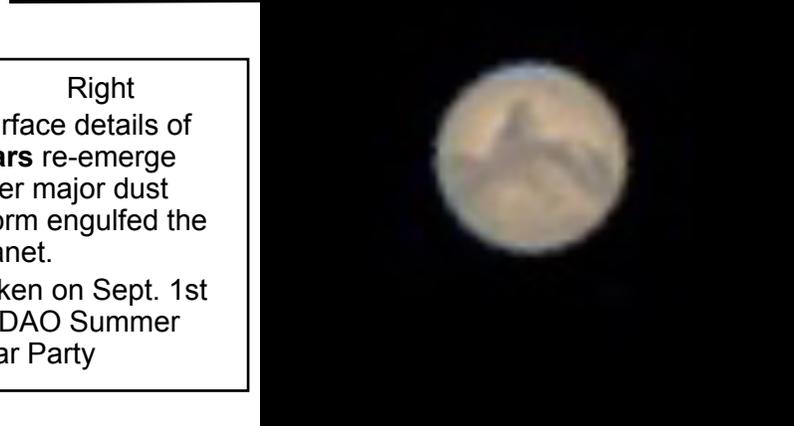
Nathan In Action With His Trusty 8 Inch Dobsonian Scope



Right
Mercury, taken on July 15th,
3 days after greatest eastern
elongation



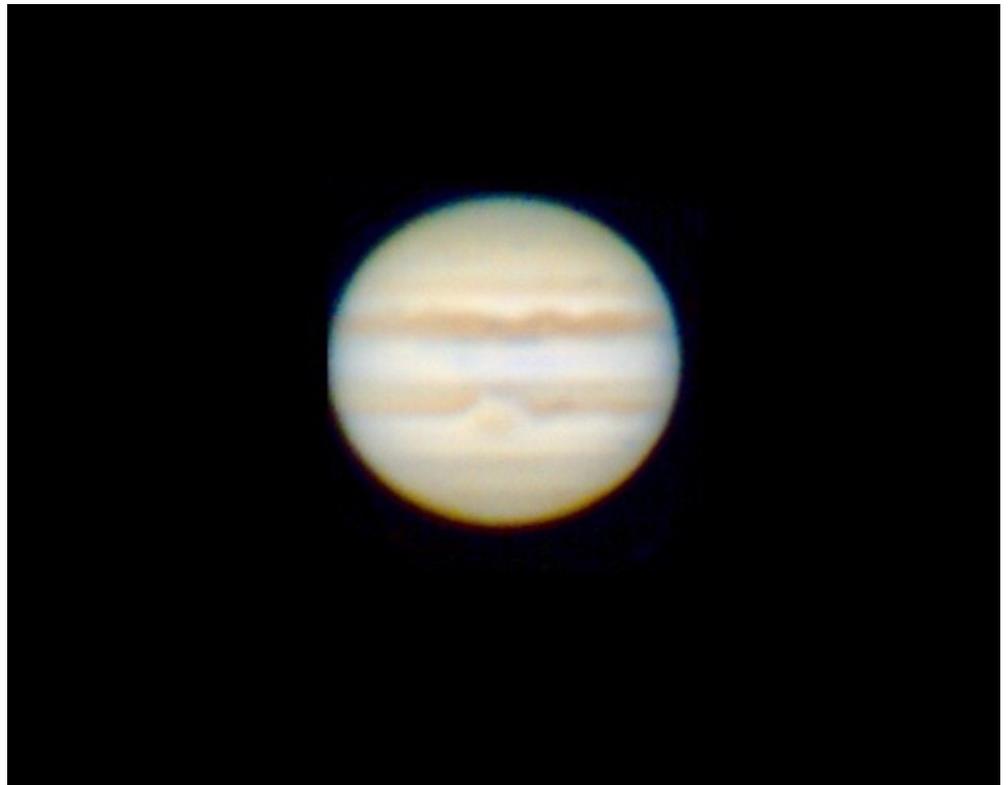
Left
Venus, Taken on
August 24th, one
week after greatest
eastern elongation



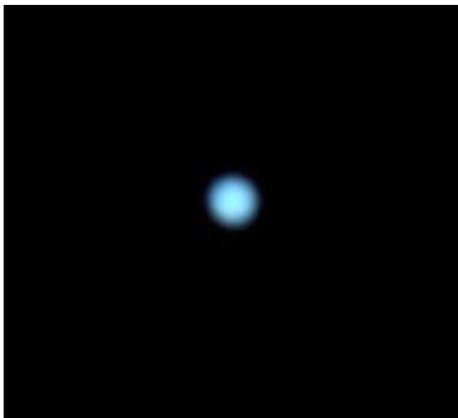
Right
Surface details of
Mars re-emerge
after major dust
storm engulfed the
planet.
Taken on Sept. 1st
at DAO Summer
Star Party

Using what many astrophotographers would consider the most basic of tools Nathan has achieved remarkable results. This is a testament to his enthusiasm and perseverance.

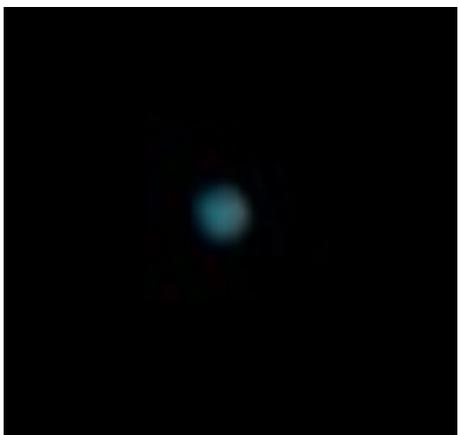
It has been a joy for the Astro Cafe community to witness him have so much fun as he developed his skills. We encourage him to continue to refine his techniques and look forward to his next appearance at an Astro Cafe show and tell session. Be sure to check out Nathan's sequence of lunar images on page six.



Jupiter, taken August 5th, 2018
Great Red Spot in the Lower Centre



Uranus, taken Dec. 21st, 2017



Neptune, taken Sept. 1st, 2018



Saturn, taken August 6th, 2018

Nathan' New Moon to Full Moon Sequence



The 2018 Martian Dust Storm By Reg Dunkley

What can go wrong will go wrong. That is Murphy's Law in a nutshell and it was certainly validated on the Red Planet this Summer. Just when Mars made its closest approach in 15 years it was suddenly obscured in a major dust storm which encircled the planet. This frustrated a multitude of amateurs who were eagerly anticipating the heavily hyped Mars Opposition of 2018. Many had just upgraded their scopes to better observe details of the Martian surface.

The Mars Reconnaissance Orbiter detected a small dust storm on May 29th which rapidly progressed to engulf most of Mars by June 12th. The planet remained shrouded in dust throughout the summer and surface details have gradually re-emerged. By the end of September things were nearly back to normal. NASA's radioisotope powered Curiosity Rover continued to function throughout the episode but batteries on the solar powered Opportunity Rover were depleted and that robot went silent on June 12th. With 6 space craft orbiting Mars, planetary scientists have never been better equipped to monitor a dust storm of global proportions.

Most of the news focused on the fate of the Opportunity Rover. This remarkably successful robot landed in Meridiani Planum in January 2004. It has operated over 5500 Martian days (sols); exceeding it's designed lifespan of 90 sols by a factor of 55! It has travelled over 45 km in this 14 year period.

Less attention has been devoted to the explanation of Martian dust storms, in part



[Martian Dust Devil](#) Casts Shadow. It is 30m wide and extends 800m above surface. A recent [study](#) suggests millions occur on Mars every day.

because they are not well understood. Martian dust storms have been observed from the Earth since the 1870's. Isolated storms have been detected in every season but features that encircle the entire planet tend to occur about once every 3 Martian years. 1 Martian year = 687 Earth days. Until this recent event the most intense dust storm occurred in 1971, just as Mariner 9 arrived on the scene and became the first space craft to orbit another planet. Murphy's law strikes again! The last major event occurred in 2007.

Almost all global encircling storms occur during the summer of the Martian southern hemisphere. **Why is that?** The answer involves factors which drive the meteorology of Mars. For starters the length of the Martian day (24 hrs 37 min) and the tilt of the Martian rotational axis (25 deg) is very close to that of Earth (23.4 deg). This tilt causes the seasons and the

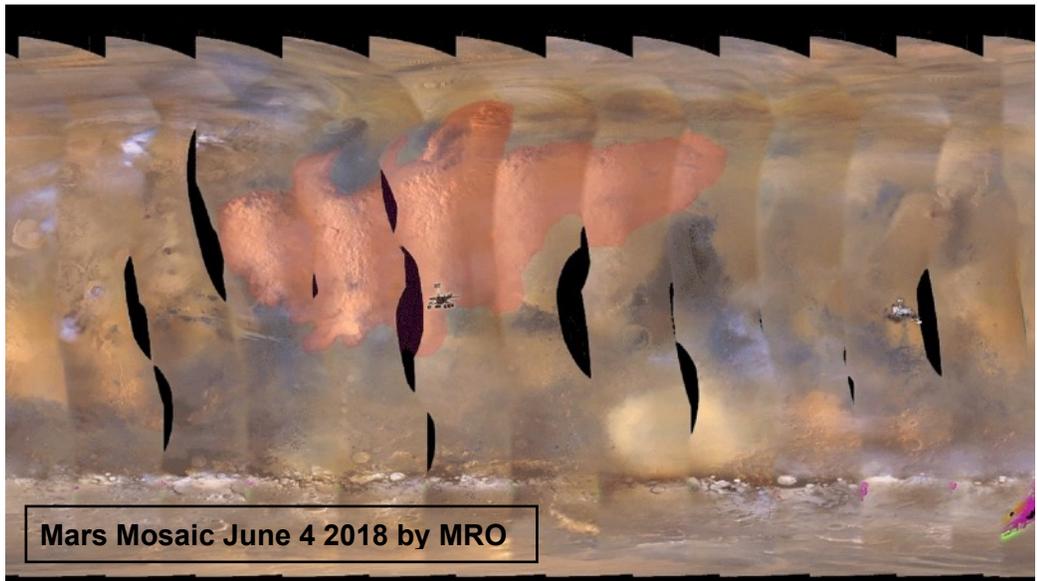
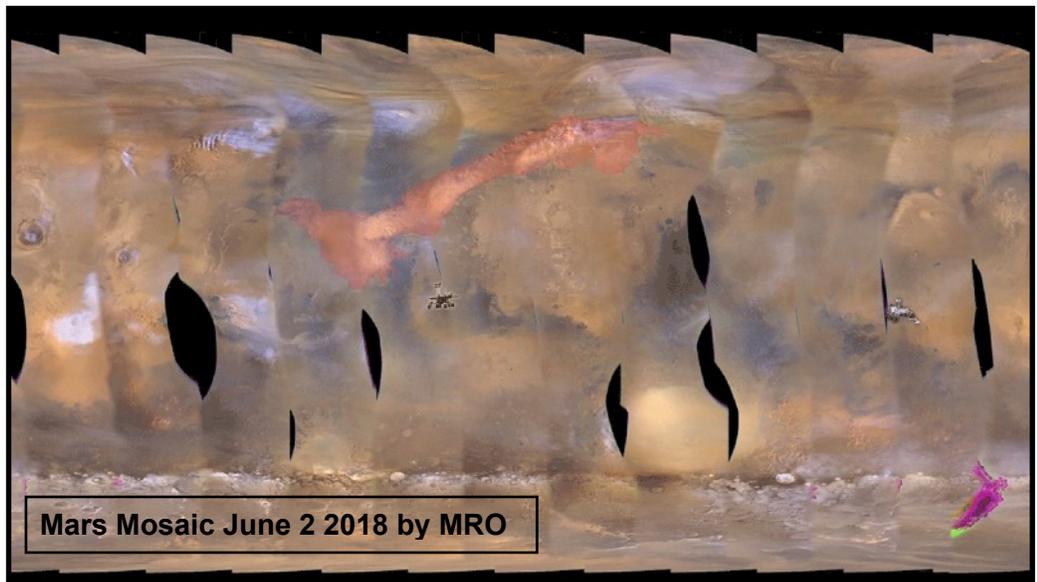


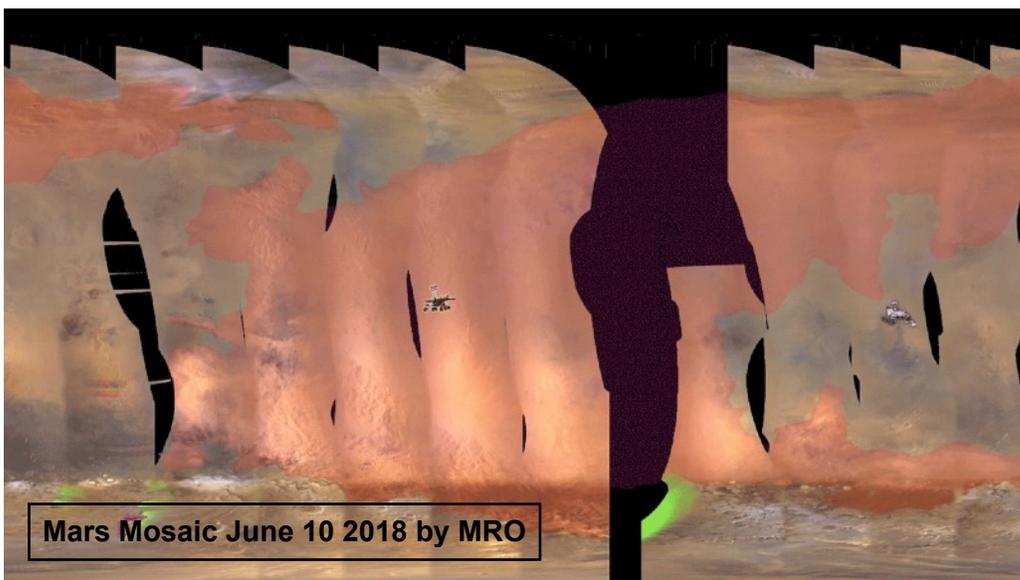
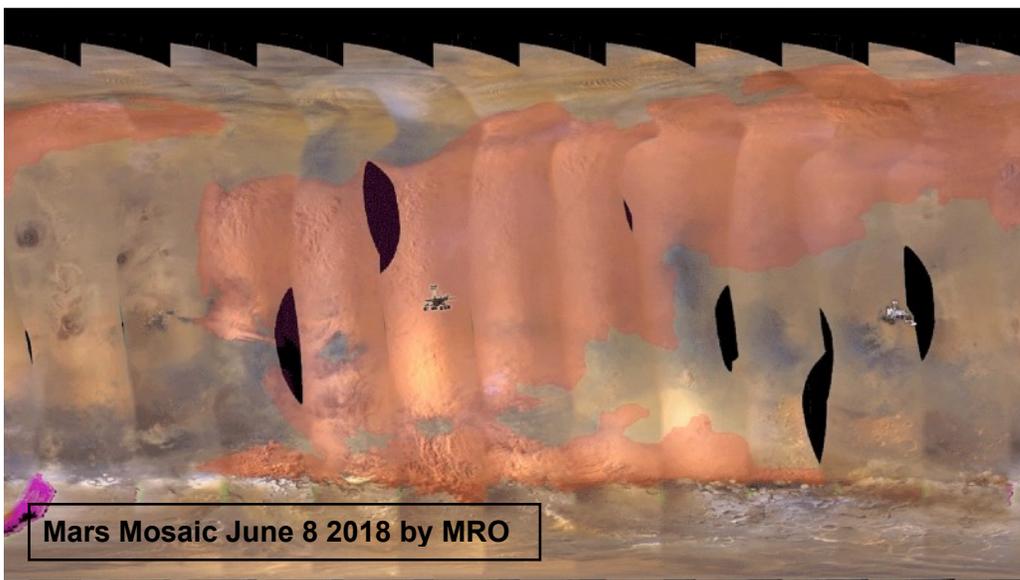
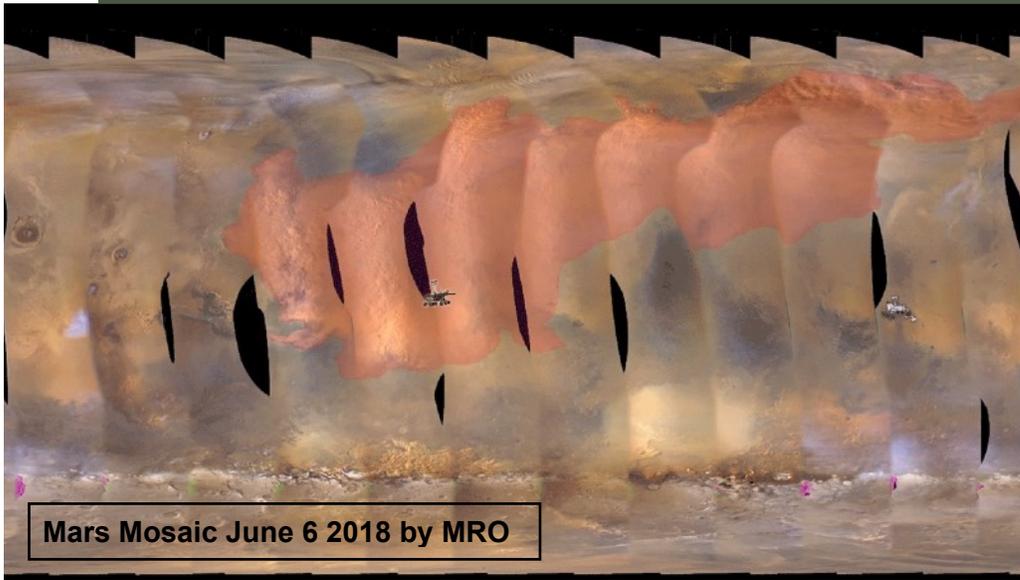
Isolated Martian Dust Storm Near North Polar Cap captured April 2018 by [ESA Mars Express](#)

variation of Martian polar caps. The orbit of Mars is much more eccentric than the orbit of Earth. The greatest distance from Mars to the Sun (aphelion) 1.6660 astronomical units (AU) is 20% further than its closest approach (perihelion) of 1.3814 AU. In contrast Earth's aphelion is only 3% further than it's perihelion. As a consequence Mars receives 31% less solar radiation at aphelion than at perihelion. The solar radiation variation between aphelion and perihelion on Earth is only 6%.

The summer solstice of the Martian southern hemisphere occurs shortly after *closest* approach to the Sun. The summer solstice of the northern hemisphere occurs shortly after Mars is *furthest* away from the Sun. As a result Mars receives up to 30% more solar daytime heating during the southern hemisphere summer than during the northern hemisphere summer. This leads to a stronger temperature difference between the northern polar region and equatorial regions when it is summer in the southern hemisphere. This thermal contrast increases the potential for active cyclones, frontal systems and stronger winds in the in the northern hemisphere.

The mosaics taken by the Mars Reconnaissance Orbiter (MRO) during the onset of the 2018 storm show that the dust (pinkish-orange) progresses from west to east; similar to the motion and development of a mid-latitude low pressure system on Earth. Speaking of pressure, (the weight of air above the surface) it is less than 1% of that on Earth. The Martian atmosphere is comprised of 96% carbon dioxide (CO₂). The pressure is 30% lower in the southern hemisphere winter than in southern summer because much of the CO₂ is deposited on the south





polar cap during colder conditions.

The elevation of northern third of the Martian surface is 3-6 km lower than the remaining two thirds of the planet. Atmospheric pressure increases as one descends to lower elevations. Pressures therefore are higher in northern regions, particularly when it is summer time in the southern hemisphere. The air is also denser in areas of high pressure and more capable of kicking up dust during windy conditions.

This combination favours both stronger winds and higher pressures in the northern hemisphere when it is summer time in the southern hemisphere. This helps explain why global encircling dust storms mainly occur during the southern hemisphere summer. It should be noted however that because the pressure on Mars is much less than that on Earth winds need to exceed 65 kmh before raising dust.

Dust can remain suspended in the Martian atmosphere for months after the wind storm. There are at least two reasons for this. The gravity of Mars is only 38% of that on Earth. While rainfall scavenges much of the dust out of Earth's atmosphere there are only traces of water in the Martian atmosphere and it is in the form of ice crystals.

Dust absorbs solar radiation and warms the middle atmosphere during storm events but can lower surface temperatures by 20C. It is therefore imperative to include dust concentration in Martian atmospheric circulation models.

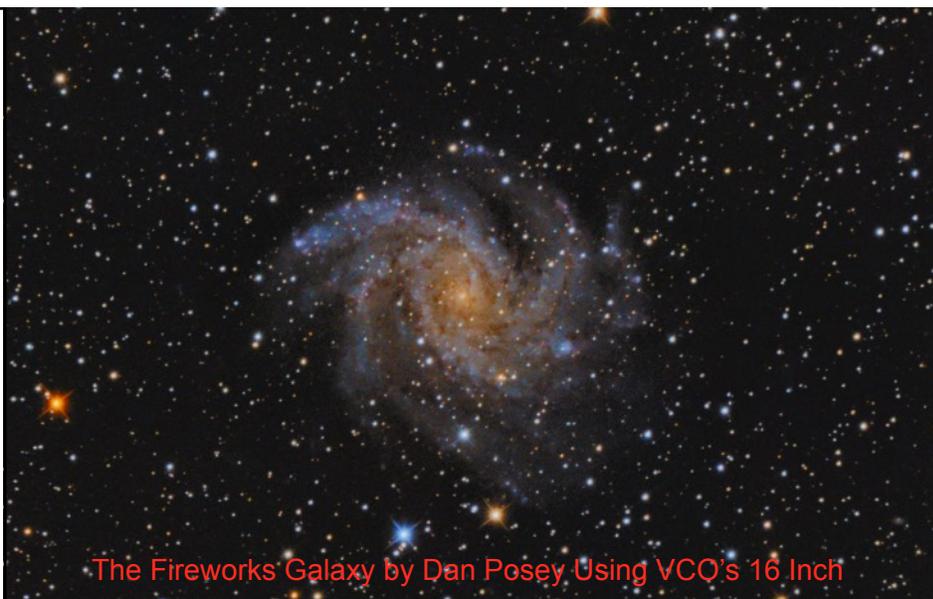
The Great Dust Storm of 2018 has been intensely monitored and will add to our understanding of these remarkable events.

*Enjoy
A Wonderful Evening
Of Music and the Stars*

*The Compositions of
Astronomer
William Herschel
Will Foster
Contemplation*

*As You Savour
Beautiful Images
of the Night Sky*

*As Captured by
Victoria Centre
RASCals*



The Fireworks Galaxy by Dan Posey Using VCO's 16 Inch

“ON THE CONSTRUCTION OF THE HEAV’NS”

A multi-media concert event, featuring

- Music by composer and astronomer William Herschel (1738 – 1822) played by a Baroque chamber orchestra
- Astrophotographic projections by members of the Victoria Centre of the Royal Astronomical Society of Canada
- Readings from the writings of William & Caroline Herschel

William Herschel was an 18th Century polymath: a prolific composer, organist and director of the orchestra at the fashionable English spa of Bath, he was also a gifted astronomer who discovered the planet Uranus and introduced many other scientific and technical innovations. This program brings the two sides of Herschel together in a unique multi-media experience.

An earlier, smaller version of this program was a sold-out hit that those lucky enough to be there were talking about for months afterward. Now, we are enlarging the canvas. The stunning and beautiful images of stars, planets, constellations and nebulae captured by talented local astronomical photographers will be projected on a giant video wall beneath the great vaulted ceiling at the front of the cathedral. The music, played by an orchestra of some of the West Coast's finest Baroque instrumentalists, will be led from the keyboard by Michael Jarvis. The program includes several of Herschel's symphonies (some heard for the first time in the modern era), part of a violin concerto and a long-lost, recently rediscovered organ concerto.

Herschel's sister Caroline was a talented musician and astronomer in her own right, and something of a proto-feminist: the first woman ever to receive a salary from the British government. Through the evening, we will hear entertaining short readings from the writings of both William and Caroline: memoirs and letters, and excerpts from scientific papers delivered to the Royal Society, read by Carolyn Sinclair and Alan Batten.

- **WHEN:** Friday, November 16th, 7:30 pm (pre-concert talk at 6:45 pm)
- **WHERE:** Christ Church Cathedral, Quadra at Rockland

TICKETS: \$30.00

- On-line at Ticketrocket.co, 1-855-842-7575, #101-804 Broughton St.
- Cathedral office, 930 Burdett Ave., 250-383-2714 (*cash, cheque, credit, debit*)
 - Ivy's Book Shop or Munro's Books (*cash or cheque only*)*Students: \$5.00 rush seats at the door.*

This event is part of the fourth season of *Intimate Encounters* concerts, organized by Michael Jarvis and Paul Luchkow, with the Music Committee of Christ Church Cathedral.



Thanks to the Royal Canadian Astronomical Society for their invaluable assistance.

More information:
cccmusicvictoria@gmail.com
250-658-6014

Upcoming Speakers

-Saturday November 17th 2018
AGM Speaker Dr. Doug
Johnstone

-Wednesday December 12th
2018
James Edgar Editor RASC
Handbook

-Wednesday January 9th 2019
Dr. Ruobing Dong

-Wednesday February 13th
2019

To be determined

-Wednesday March 13th 2019
Dr. JJ Kavelaars New Horizon's
Rendezvous with MU69

-Wednesday April 13th 2019
Dr Karun Thanjuvar Machine
Learning and the Big Data
Tsunami

RASC Victoria Centre Council 2017 / 2018

POSITION	NAME	E-Mail
Past President:	Sherry Buttnor	pastpres@victoria.rasc.ca
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	Joe Carr	secretary@victoria.rasc.ca
Librarian	Michel Michaud (Diane Bell)	librarian@victoria.rasc.ca
Technical Comm Chair/Sys Admin	Matt Watson	admin@victoria.rasc.ca
Skynews Editor	Reg Dunkley	editor@victoria.rasc.ca
Public Outreach	Ken Mallory	outreach@victoria.rasc.ca
School Outreach	Laurie Roche / Sid Sidhu	
Telescopes	Sid Sidhu	telescopes@victoria.rasc.ca
National Representative	Nelson Walker	nationalrep@victoria.rasc.ca
Light Pollution Abatement	Dave Robinson	lighting@victoria.rasc.ca
Membership Coordinator	Chris Purse	membership@victoria.rasc.ca
Observing Chairperson	Jim Stillburn	obschair@victoria.rasc.ca
Website Content	Joe Carr	web@victoria.rasc.ca
Members at Large		
National Officer	Chris Gainor	
Astro Cafe	John McDonald	
NRC Liaison	James di Francesco	
Nat RASC Anniversary Wrkg Group	Dr. James Hesser	james.Hesser@nrc-cnrc.gc.ca
FDAO Liaison	Laurie Roche	
UVic Liaison	Alex Schmid	
Observing	David Lee	
	Li-Anne Skibo	
	Dan Posey	

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 above.