

SKYNEWS

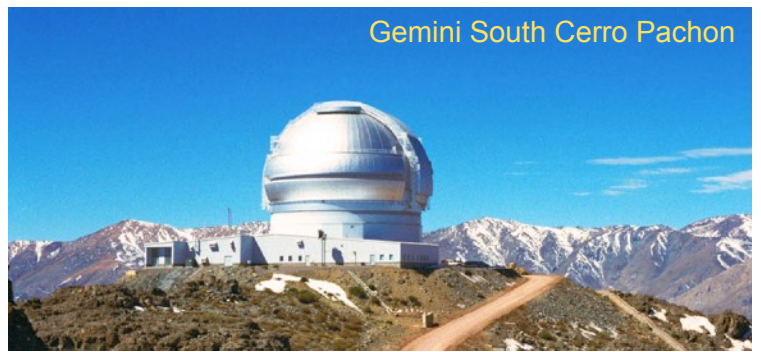
Very Large Telescope Paranal



Magellan Telescopes Las Campanas



Gemini South Cerro Pachon



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Bob Wright Centre
UVic Campus

www.victoria.rasc.ca

On the Cover

Epic Chilean Observatories

The magnificent structures on the cover are just some of the epic scopes that are located in Chile. Have you ever wondered where these observatories are actually located? Check out the article on Page 4 to find out. The following links provide the cover page image sources.

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President's Report

by Chris Purse

I find it fascinating that we have developed a sensationalized vocabulary about naturally occurring events. Perhaps it is the result of reality television becoming so prevalent that everything must be a challenge, a contest, the best, the brightest, the most shocking, etc. Having the recent lunar eclipse labelled with 3 different descriptors, super moon, blue moon, and blood moon, made for some interesting headlines. Are these events really deserving of these labels?

The distance between the moon and the earth does change throughout the month due to the moon's elliptical orbit. For a viewer on earth, the apparent change in the moon's diameter between apogee and perigee is about 13%. That does make a full moon around the perigee appear larger thus potentially brighter. But do most of us really notice without being told? Probably not. As the earth has a greatly varying atmosphere, which has a significant influence on light transmission, the amount of light from a full moon is not a reliable indicator. How many of us can recognize that a full moon is larger, or smaller, than the previous time we saw it? Photographs will show a difference but most of us do not have that sort of visual memory. Is a moon that appears to be 13% larger than at its smallest apparent diameter a difference worthy of being called a super

moon? I lean toward describing it as a full moon near the perigee.

According to sources I have found, the term blue moon, when used to count full moons in a certain time period, was originally used for seasons. Most seasons have three full moons but every tenth season or so has a fourth full moon. The blue moon was the label given to the third full moon of a season with four full moons. Along the way, blue moon has become an accepted expression for the second full moon in a single calendar month. Is having an extra full moon in a month or a season, both of which are arbitrary, human-designated periods of time, significant? Why not just refer to it as the second full moon of January? By the way, March 2018 also has 2 full moons so we will have a second blue moon this year.

The term blood moon is used to describe the red-coloured moon that we see during a lunar eclipse. During the eclipse, the sun's light is blocked from reaching the moon's surface directly. The earth's atmosphere scatters light, particularly in the blue-violet end of the spectrum. This means that light that has passed through the earth's atmosphere and travels on toward the moon is primarily at the red end of the spectrum. Some of this light will end up reaching the moon's surface and the result is a moon illuminated by light that is strongly in the red wavelengths. I'm not sure why we just don't call it a red moon. So, although we did not see much of the eclipse here, I hope those who did enjoyed seeing the large, red moon caused by the lunar eclipse during the second full moon of January 2018 when the moon was close to perigee. Ok, maybe saying the super blue blood moon sounds better!



February Meeting Presentation The Mystery of Dark Matter.

by **Dr. Guillaume Thomas**

Wednesday February 14th 2017 at 7:30 PM
Room A104, Bob Wright Centre.

During the past two decades, the standard model of the cosmology Λ CDM has commonly been accepted by the astrophysical community and successfully reproduced and even predicted many observational effects. I will discuss about one of the principal components of this model: **dark matter** and I will describe why we need it and what are the current hypotheses of its nature.

Bio: Guillaume Thomas is a new postdoctoral NRC fellow who joined Herzberg Astronomy and Astrophysics in October. He was born in Epinal France and obtained his Master and PhD at the Strasbourg Observatory. Thomas is interested in the formation and the dynamical evolution of spiral galaxies. He is also interested in exploring alternative theories to the model Λ CDM. You can follow him on Twitter at @Thomas_gft.

Upcoming Speakers

Wednesday March 14th 2018

Vincent Henault-Brunet. Globular Clusters as Astrophysical Laboratories

Wednesday April 11th 2018

Dr. Henry Ngo. Exoplanet Overview

Wednesday May 9th, 2018

Karun Thanjavur, Gravitational Lensing

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 Dunkley for further details: vp@victoria.rasc.ca

Every Monday at 7:30 PM Beginning

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: Every Saturday Evening

Open to those on the Active Observers list only

Weather permitting. Note that the road may be slippery in winter driving conditions. Exercise caution.



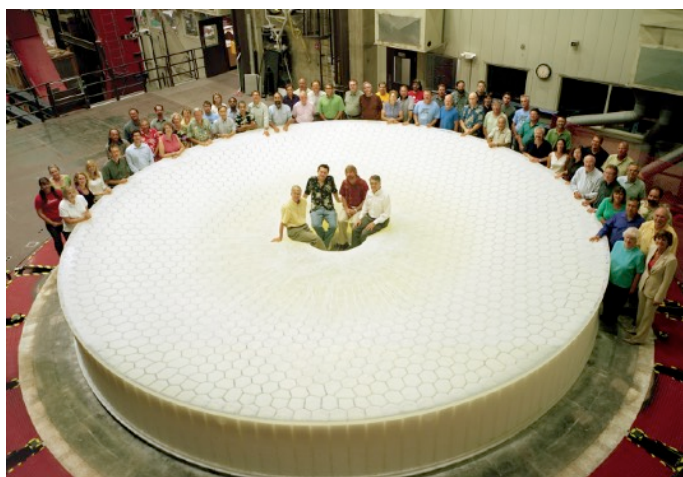
UVic 32 Inch Telescope

RASC Victoria Centre Session
2nd Friday of Month. Meet by the Elevator in the Bob Wright Centre at 7PM



Membership Report February 2018

Total membership is currently **258**. There are 10 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.



Large Synoptic Survey Mirror Successfully Cast

The Whereabouts of Chilean Observatories

By Reg Dunkley

It seems that every week there is an astronomical story in the headlines that involves a major Chilean Observatory. I did not have a clue where these epic scopes were actually located ... and I might not be the only one. So it was time to flash up Google Earth and set off on a Chilean reconnaissance mission. It was an enjoyable journey and I hope that this brief summary will serve as a "cheat sheet" to help you quickly locate and find out more about these great observatories.

Why So Many Scopes in Chile?

Before we get started, let's examine the geography of this "string bean" shaped nation. With latitudes that range from 17.5 deg S to 56 deg S, Chile is over 4000 km long ... that is the distance from Victoria to New Brunswick. Its slender width varies from 150 km to 400 km. There is a fairly low mountain range along the Pacific Coast while its eastern boundary follows the crest of the mighty Andes with some summits exceeding 22,000 feet. That is over 8000 feet higher than the Rockies! The climate undergoes great variations from desert in the north to glaciers and fjords in the south. The capital Santiago is located at 33.5 deg S less than half way down from the northern border. The desert regions lie to the north of Santiago and the telescopes are situated between 23 deg S and 30.25 deg S.

The deserts are the result of three features.

- 1) The subtropical ridge of high pressure, located off the north coast of Chile is associated with a broad area of sinking air which warms and dries the atmosphere as it subsides. This results in skies that are clear over 300 days a year.
- 2) An alongshore northward moving Humbolt ocean current is nudged offshore due to the Coriolis force and this results in an upwelling of colder water from below along the Chilean Coast. This forms a shallow layer of cold air which caps moisture from the Pacific. The Coastal Mountains usually prevent this moisture from moving inland.
- 3) The Andes block any moisture sources from the Atlantic.



As a consequence the Atacama desert in the Chilean interior is the driest place on Earth and there are some valleys that have not experienced streamflow for 120,000 years! So it is not a surprise that astronomers are attracted to this region.

It is expensive to develop observing sites in remote locations. To make the most of this investment, telescopes tend to cluster along adjacent ridge tops. There are six major groups of observatories in Chile.

Atacama Large Millimetre Array Chajnantor Plateau



The Northern Congregation

The Atacama Large Millimetre Array ALMA is the northern most collection, located 295 km inland at 23 deg S. It is situated on the Chajnantor Plateau at an elevation of 16000 ft. This is above much of the water vapour that attenuates signals at the millimetre wavelength. It is an interferometer composed of 54 12m dishes and 12 7m dishes. The antennae can be placed in a number of configurations with spacings ranging from 150 m to 16 km. Partners include the European Southern Observatory (ESO), the US National Science Foundation, Canada's NRC and well as Japan, Taiwan and Chile. It became fully operational in 2013. The nearest centre is Calama. It can peer through the veil of interstellar dust and it's astonishing resolution will be further enhanced when it participates in the Event Horizon Telescope project.



Very Large Telescope Paranal

The **Very Large Telescope (VLT)** is an ESO facility comprised of four 8.2 m "unit" Ritchey Chretien scopes plus four 1.8 m moveable "auxiliary" scopes. They usually operate individually but can work in concert with an

interferometer. Located 12 km inland at 24.6 deg S at 8,645 ft on **Cerro Paranal** the VLT was commissioned in 2001. Antofagastas is the closest centre. In addition to the interferometer there about 20 other exotic instruments connected to the scopes.

- The ESO **Extremely Large Telescope (ELT)** is under construction 22 km east of the VLT on **Cerro Armazones** at 9993 ft. With a diameter of 39.3 m it will be the largest optical telescope in the world. First light is planned in 2024.

The ELT was selected after the proposed ESO 100m diameter **Overwhelmingly Large Telescope (OWL)** was cancelled due to complexity and cost.



Las Campanas Observatory

Congregation In the Middle

Las Campanas Observatory is situated at 29 deg S on a generously long ridge at 7810 ft which prevents one from photographing all the domes together. Owned and operated by the Carnegie Institute of Science it is of particular interest to RASCals because this is where Ian Shelton discovered SN1987A. The U of Toronto *Helen Sawyer Hogg* 24 inch telescope was located here from 1971 to 1978. The twin 6.5 m Magellan scopes, the 2.5 m du Pont scope and the 1m Henrietta Swope telescopes will eventually be joined by the **Giant Magellan Telescope** which is comprised of seven 8.2 m mirrors. It is equivalent to a **24.5 m** telescope with first light expected in 2024.



La Silla Observatory



The **La Silla Observatory** (see pg 2) situated on a saddle like ridge at 29.25 deg S at 7900 ft houses 3 ESO scopes (3.6 m, 3.5 m and 2.2m) was well as 7 other telescopes including the Trappist telescope that discovered the Trappist-1 planet system. It is 14 km off the Pan American Highway which connects to La Serena which serves as the administrative hub for several observatories. Tours are conducted every Saturday except July and August.

The Southern Congregation

There are 20 telescopes located on Cerro Tololo (30.17 deg S) at 7810 ft and two newer scopes located 10 km to the southeast on Cerro Pachon at 8930 ft. La Serena is the administrative hub and campus of the Cerro Tololo Inter-American Observatory (CTIO) but the international ownership, management and operations of the various components are very complicated.

Development of Cerro Tololo began in 1963 and the largest scope, the 4.0 m Blanco telescope went into operation in 1976. It is a twin of the Mayall telescope on Kitt Peak. The Gemini South 8m and the SOAR 4.1 m scopes began operation on Cerro Pachon in 1998 and 2003 respectively. There is also four Small Aperture Research Telescopes (SMART)



ranging from 0.9m to 1.5m on Cerro Tololo that are available to rent.

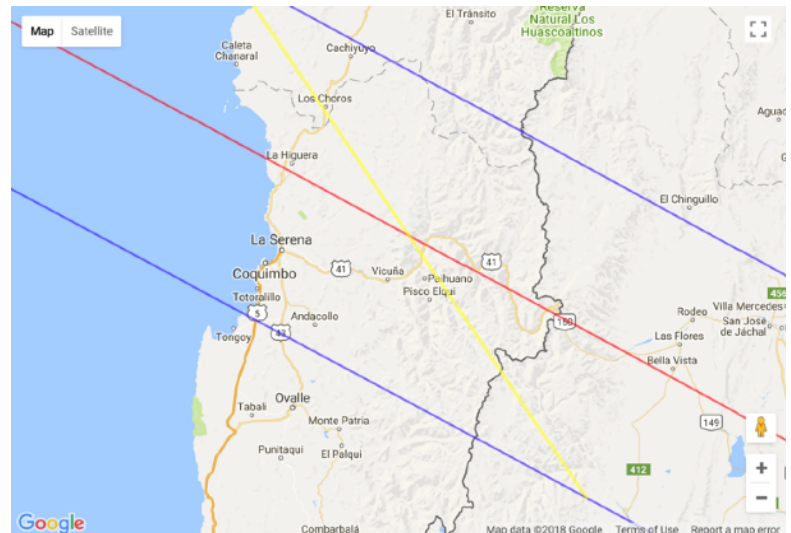
The Large Synoptic Survey Telescope (LSST), a novel 3 mirror design with a primary 8.4 m mirror and very wide 3.5 deg field of view is currently under construction on Cerro Pachon and is planned to go into operation in 2022.



I have always considered observatories to be "Temples of Science" and I have been susceptible to the lure of the beautiful domes. On their own the cluster of Chilean scopes are probably too remote to seduce me southward.

But when well travelled RASCals at Astro Cafe share their images and enthusiasm about the beauty the Southern Sky my willpower begins to waver.

Now I just realized that the path of totality of the July 2nd 2019 Solar Eclipse is just north of La Serena and Jay Anderson's wonderful Eclipsophile web site recommends that La Silla may be the best spot! Three strikes and your out!!! I am beginning to buckle!!!



Path of Totality of July 2nd 2019 Solar Eclipse

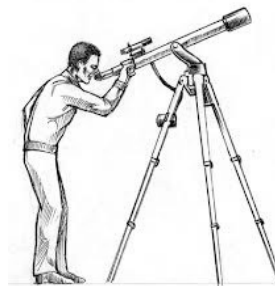
RASC Victoria Centre Council 2017 / 2018

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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.