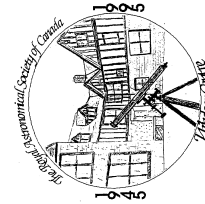


Annular Solar Eclipse - June 10, 2021



The media hyped the annular solar eclipse even though the real show occurred in Northern Canada where the moon which was close to apogee did not quite cover the entire disk of the Sun leaving a “ring of fire” or annulus of sunlight visible. Locally we were ready for a spectacular partially eclipsed Sun to rise on the morning of June 10, 2021. *Above Top:* Mike Mastronardi captured the dozen or so members of the club who gathered at Lakewood Park in Tecumseh and were ultimately fogged out. *Bottom Photo:* Paul Pratt captured the event from Wheatley where the Sun was able to burn through the fog.



AURORA



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The Royal Astronomical Society of Canada - Windsor Centre

June 2021

Flyer

Next Meeting

Tuesday, September 21, 2021

via

Online Zoom Meeting
begins at 7:30 p.m.

Speaker: TBA

Topic: TBA

Upcoming Events

Summer Solstice: The Sun will be at its furthest point North of the Celestial Equator on **Sunday June 20th at 11:32 p.m. EDT** marking the start of Summer for the Northern Hemisphere.

Double Shadow Transit: At 1:05 a.m. on **Saturday June 26th** the shadow of Io will join Callisto crossing the disk of Jupiter. Jupiter will only be 8 degrees above the horizon at this time but the event lasts until 3:20 a.m. when Jupiter will be 28 degrees altitude.

Saturn and Jupiter Oppositions: Saturn reaches opposition on **Monday August 2nd** followed by Jupiter on **Thursday August 19th**.

Perseid Meteor Shower: Peaks on the night of **Wednesday August 11/12**. The moon is new just a few days earlier so the crescent moon will set early providing dark skies for this year's event. Look for Perseids a couple of days before and after the peak. Associated with comet 109P/Swift-Tuttle look for about 60 meteors per hour from a dark location.

Monthly Meeting Minutes May 18, 2021

The monthly meeting of the **Royal Astronomical Society of Canada - Windsor Centre** was held via Zoom Online Meeting.

Windsor Centre **President, Mahayarrahh-Starr Livingstone** chaired the meeting. Starr called **the meeting to order at 7:35 p.m.** and welcomed the members and our guest speaker Doug Johnstone, Senior Research Officer, NRD-Herzberg to the online meeting.

Starr invited members to review the **minutes of the April 20, 2021 general meeting** which were printed in the Aurora newsletter. A **motion to accept the minutes** was made by Susan Sawyer-Beaulieu and seconded by Art Rae. **MOTION CARRIED.**

Director of Observing Report, Susan Sawyer-Beaulieu: Susan began her report by sharing images that were taken by over 16 members which she titled **Celestial Splendors**. Limited space dictates the sharing of only a few photographs. The very early 34.5 hour old moon which paired up with Venus on May 12th at sunset was a popular target. **Randy Groundwater, Art Rae, and Nancy Ng** shared their perspectives on this difficult to catch conjunction. The next evening **Michael Mastronardi and Randy Groundwater** were able to photograph the slightly larger moon shortly after the sun set in the western horizon. Viewing from Hallam, **Starr Livingstone** successfully captured the red and blue colours of M57, the Ring Nebula and also a bright image of M13, the Great Globular Cluster in Hercules. From 31 million light years away the Whirlpool Galaxy, M51A, was presented in beautiful detail by **Randy Drumm**. On the same evening Randy waited patiently for the much closer Lagoon nebula to rise high enough above the horizon to enable him to capture the bright centre of this nebula along with the subtle shades of red surrounding it. **Brian Simpson** shared a glowing image of M64, the Black Eye Galaxy which he captured from his backyard in LaSalle. **Dan Kahraman**, one of our new members submitted two planetary nebulae from the Abell catalogue which he imaged from his backyard in Wheatley. Abell 39 and 50 revealed delicate boundaries and luminous blue colours. Dan also shared a view of NGC 6888, the Crescent Nebula found along the neck of the Swan in Cygnus constellation

Susan displayed a view of the **Sun** as it looked that evening. **Sunspot 2822** is rotating out of the field of view in the east as **sunspot 2824** slowly spins into view in the west. The Sun is beginning to rise out of solar minimum and an increasing number of sunspots can be expected over the next 4-5 years. The phases of the moon for May and June were displayed. Susan also presented a display of the night sky for May 18th showing the positions of the **spring constellations**. The location of the large **Coma Cluster** containing over 1,000 galaxies was highlighted. Three upcoming imaging and photo-opportunities were suggested. Thirty minutes after sunset on May 28th you will find the conjunction of **Mercury and Venus** low in the west. One hour before sunrise on May 31st **Jupiter, Saturn and the waning gibbous moon** will gather in Capricornus. After sunset on June 11th **Venus** will follow the 1.5 day old moon into the WNW horizon and then the moon will join **Mars** on the 13th. Here in Windsor we will be able to view a portion of the **annular solar eclipse** on June 10th. As the Sun rises at 5:55 a.m. it will look as though the moon has taking a bite out of the sun. However, very quickly the sun will rise higher and be too bright to view the partial eclipse without a filter.

Up All Night: Life at the Summit of Maunakea
Doug Johnstone, National Research Council Canada:
Herzberg Astronomy and Astrophysics, University of Victoria
Doug began by **acknowledging with respect the peoples whose traditional territory** is now the location of the University of Victoria and NRC Herzberg. He also acknowledged the reverence which the **indigenous Hawaiian community** has always had with

the summit of **Maunakea**. Doug indicated that his presentation was going to outline the process which he uses as a professional astronomer to move from research to discovery. He would begin with theoretical ideas and then move to contemplations on how to test these ideas and finally to assemble the telescopes and equipment required to research them. A theoretical idea emerged while he and his colleagues were contemplating how **stars formed out of giant gas 'puddles'**. They questioned if the formation of stars was a **smooth** process or a **messy** process. This began the search for an answer which would take years of scientific study. The began by looking at **dark molecular clouds** of gas like Barnard 68 which is 400 light-years away. If the temperature changes a little inside these clouds or if the mass increases a little they can begin to collapse. Doug indicated that if there is any rotation in a cloud as it collapses then the angular momentum spins the material up and forms a disc. **A star may be constructed at the centre** and the beginning of planets and a solar system can be seen in the disc. Doug and his team were more interested in the **collapse of the cloud** as gas was pulled to the centre by gravity. Their research would zero in on the anything that might be obstructing the smooth passage of materials that would ultimately begin star formation at the centre. They now begin to contemplate on how they will test their ideas.

The stars they will be viewing are often **deeply embedded in dense clouds** of gas where optical light cannot get through. For this reason they must observe in the far **infrared spectrum** of the electromagnetic radiation. They will need a telescope that is in space because Earth's atmosphere blocks much of far infrared emissions. They turn to the **Herschel Space Observatory** but their proposal was rejected. Doug was then granted use of **SOFIA, the Stratospheric Observatory for Infrared Astronomy**. An actual 747 plane with a telescope that views through an opening on the side while actually flying through the sky. After analyzing the data they had collected they realized **it wasn't what they needed**.

The scientific process led them to the **JCMT, the James Clerk Maxwell Telescope** on the summit of Maunakea in Hawaii where they will observe in microwave wavelengths. Their team was successful in finding an object that was **changing in brightness as a function of time**. They wondered if this was an indication that some of the gas was being obstructed by something as it was falling toward the center which resulted in bursts of light. At this time a former graduate student was observing a **bright flare in Orion** constellation. A detour from their main research may have led to the discovery of one of the **most powerful flares** ever recorded.

Doug noted they now returned to the data they had been collecting for 4 years at the JCMT. This revealed that **many of the protostars were variable stars on a 3-4 year timescale**. They wondered if planets orbiting in the disc was causing this instability or could there be more activity going on in the environment surrounding the protostars. They now needed to observe with higher resolution and this would lead them to **ALMA, the Atacama Large Millimeter and Submillimeter Array** located in Chile. The future of their journey from process to discovery may even lead them to the **James Webb Space Telescope** which will hopefully be launched in October of this year.

In his final thoughts Doug listed requirements for astronomical research. Scientific **debate and patience** were at the top of this list. Noticing that the process continues with more precision and deeper understanding. Also, while observing the deep sky there is always room for a **little luck and serendipity**. In summary Doug believes the data they've collected indicates instability in the formation of stars and shows this to be a **messy process** and not a smooth one. Not unlike the journey to discovery itself.

Meeting adjourned at 9:18 p.m. Recorded by Nancy Ng, Secretary, RASC Windsor Centre