

## October Meeting Minutes (continued)

prevalent. **Neptune** is in Aquarius. **Uranus** is in Aries.

Meteor showers: **Orionid** meteor shower peaks on October 21 – 22.

The morning of October 22 the **moon will be in the M44** cluster at 1 a.m..

**Mercury Transit** November 11 between 7:36 a.m. to 1:04 p.m.. There will be viewing at the riverfront during this time.

**Venus and Mercury** are in the western horizon.

**Reminder:** Astro Luncheon at **Skippy's Restaurant** every second Wednesday of the month, at noon Located at 954 University Ave West, Windsor.

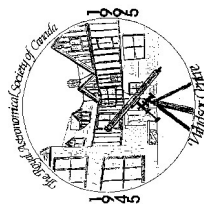
**Mike** thanked everyone for coming out to the meeting and reminded everyone that the **next regular membership meeting** would take place on **November 19, 2019**.

**Meeting adjourned at 9:25 p.m.** October 15, 2019.

Recorded by Sandy van Gaalen, RASC Windsor Centre



*The Bubble Nebula (NGC 7635) captured by Brian Simpson over 4 nights in September and October. Subframes of 3 minutes and 8 minutes through Ha and OIII filters were combined for a total exposure time of 4 hours and 45 minutes.*



# AURORA



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The Royal Astronomical Society of Canada - Windsor Centre

November 2019

## Flyer

### Next Meeting

Tuesday, January 21, 2020  
7:30 p.m.

at

[Ojibway Park Nature Centre](#)  
5200 Matchette Road

Speaker: **It's a Movie Night!**

Movie: ***"To Be Determined"***

### Upcoming Events

**Possible Meteor Storm?** On Thursday November 21 there is a chance that the obscure Alpha Monocerotid shower could produce upwards of 400 meteors per hour from a radiant near the star Procyon. Peak activity is expected at 11:50 p.m..

**December Social:** Our annual Holiday Party for members and their families will be held on Friday December 6th at the Ojibway Park Nature Centre. Doors open at 5:30 p.m. and a "potluck" style dinner will be served around 6:30 p.m.. Please contact Mike Mastronardi at ([michael.mastronardi@stantec.com](mailto:michael.mastronardi@stantec.com) or 519-965-1705) to coordinate what you will be bringing and confirm the number of people in your party. Details are still being finalized but we typically have a raffle and a small gift exchange.

**Winter Solstice:** Winter officially begins for the northern hemisphere at 11:19 p.m. EST on Saturday December 21st.

**Point Pelee Dark Sky Night:** Saturday December 28th.

## Monthly Meeting Minutes

### October 15, 2019

The monthly meeting of the **Royal Astronomical Society of Canada - Windsor Centre** was held at the Ojibway Park Nature Centre.

Windsor Centre **President, Mike Mastronardi** chaired the meeting. Mike called the meeting to order at 7:30 p.m. and welcomed members and guests to the Ojibway Park Nature Centre.

Mike invited members to review the **minutes of the September 17, 2019** meeting which were printed in the Aurora newsletter. A **motion to accept the minutes** of the September 17, 2019 meeting was made by Susan Sawyer-Beaulieu and seconded by Steve Pellarin. **MOTION CARRIED.**

**Mike** provided an overview of the meeting and introduced the main speaker for the evening.

### Main Presentation

Mike welcomed **Dr. Chitra Rangan** from the University of Windsor to the floor for her talk on ***Cosmic Microwave Background.***

Dr. James Peeble was awarded one half the noble prize for his theoretical discoveries in cosmology. Two years in a row Canada has been awarded the Nobel Prize. James Peeble is the third Canadian citizen to win in five years.

The Universe started with a **Big Bang** approximately 13.8 billion years ago and proceeded through inflation. Particles were forming structures as light and matter were moving away (expanding through inflation).

The **first stars and galaxies formed approximately two hundred million years** after the Big Bang. Dr Rangan presented the **standard model** of cosmology and explained the process involved in this formation, the initial conditions, what the different parts are and how they attract each other. From this they do calculations, predict what to expect and compare observations.

The Universe today consists of **68% Dark Energy, 27% Dark Matter, 4.9% Normal Matter, 0.1% Mass-Energy** and a tiny bit of radiation.

The **cosmological principle** states the Universe is homogeneous and isotropic in space and time. Meaning the Universe looks the same everywhere, the same as it always has and always will.

The first observations that showed the **Universe is expanding** was in 1929. We have expansion of the Universe, composition of the Universe and Dark Energy which all are connected to each other and can be shown with equations.

Three main components used in the observation of cosmology:

- 1) Cosmic Microwave Background
- 2) Large Scale Structure of the Universe
- 3) Supernovae

Each is a very thick topic and Dr. Rangan focused on the **Cosmic Microwave Background**. Dr. Rangan explained Hubble's work from the 1920's along with the affect of redshift through hydrogen alpha in the expanding Universe. This does not happen in the local regions only in the larger scales.

**Gravitational clumping** holds local clusters together but on a large scale you see the structures falling apart. As space expands it carries galaxies apart. **Hubble's Law** in a homogeneous Universe - every point sees every other point moving away.

A prediction of this - If you go back in time far enough, everything was a gas. The temperature was about 3000K at which ionization of Hydrogen occurs. **Ionized gas consists of proton and electrons** which are opaque. Light does not travel through opaque gas. We should see the gas in all directions which is called the cosmic background radiation. Plank measured the **polarization** of the light. This tells you where electrons were in the early Universe.

The Cosmic Microwave Background has shown that the Big Bang's origin and evolution of the Universe can be traced to a large percentage of the weight, based on observational evidence.

**Mike thanked Dr. Rangan for her presentation.**

Mike reminded members of the **ArtSpeak Gallery** November 3 – 10. He also mentioned the **commemorative stamps donated by Art Rae** as a fund raiser to be issued to the first 12 members who donate \$40. Mike also made aware the **financial statement on the back of the Aurora** for the past fiscal year.

Mike called **Randy Groundwater** to discuss the **proposed 2020 council** of the RASC – Windsor Centre. Randy explained the positions currently held as well as those open to the members which have not been filled.

After the **coffee break a 50/50 draw** was held. **Jeremy Hansen** won and donated it back to the centre.

### Director of Observing Report

**Susan Sawyer-Beaulieu** was welcomed to the floor and opened the Director of Observing report with pictures submitted by members, **Nancy Ng, Brian Simpson and Pete Barbaro.**

There has been **no change to the activity on the sun.**

October 21 the **last quarter moon**, October 27 **new moon**, November 4 the **first quarter**, and November 11 **full moon.**

The **summer triangle** has moved in the west, slowly losing it. Hercules is vanishing. Late summer, early fall constellations are front and centre. Winter constellations are starting to make their presents.

**Saturn** is low in the western sky, sets at 9 p.m.. **Neptune and Uranus** will be