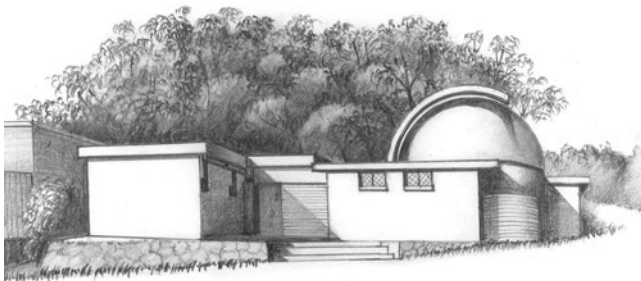
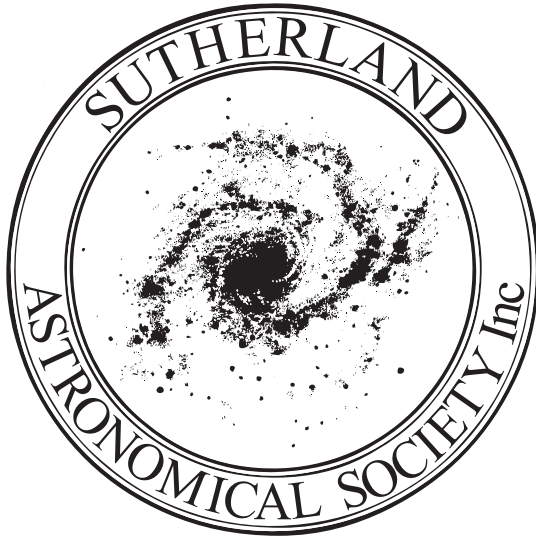


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The Official Journal of The Sutherland Astronomical Society Inc.

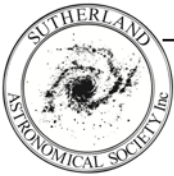
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Brief History

SASI was formed in 1961 when a small group of people constructed an observatory south of the Georges River in the leafy southern suburbs of Sydney. The Society was known, until 1978, as the James Cook Astronomers Club and the James Cook Astronomical Society.

The present Green Point Observatory is located on Council land at the corner of Green Point and Caravan Head Roads, Oyster Bay. The prominent silver dome, with its 41cm (16") Newtonian telescope (now refurbished) and the library were completed in 1970. The meeting hall was completed in 1974 and a roll-off roof observatory was completed in 1996. This now contains a state-of-the-art 35cm (14") Celestron Schmidt Cassegrain telescope. The buildings were joined & meeting hall extended in 2007.

Meetings

The Observatory is open every Thursday evening from 7.00pm. Visitors are welcome, but groups should book first by contacting Brendon Bell (Star Night Booking Officer).

1st Thursday of the month: Guest lecturer (7:30pm).

2nd Thursday: Junior Section (6:30-7:15pm - currently on hold, no meetings)
Committee meeting (7:30pm), social.

3rd Thursday: Miscellaneous meetings & DVDs (7:30pm) social

4th Thursday: Special interest workshops (7:30pm).

5th Thursday: Social

Check the notice board, the back page of this journal and the website for any special programs or events.

Meetings subject to change, which will be advised by email and posted on website.

PDF Journal

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Magazine Submissions

Give your literary masterpieces directly to us, or preferably email them to us as MS Word attachment to journal@sasi.net.au. Please send images in jpeg format separately (approx 400kb or 900x900ppi) or submit on USB thumb drive or bulk upload thru www.wetransfer.com. *Please do not embed photos in emails or MS Word documents unless you also send them separately.*

Deadline for submissions to the November - December 2018 edition is Thursday 20th December.

Important disclaimer

The opinions expressed in this journal are those of the individual authors or the editorial Sub-Committee, and are not necessarily the opinions of the Society or Committee. All articles other than those from acknowledged or public sources are the copyright of the Sutherland Astronomical Society Inc. and, if applicable, the individual authors.

Cover drawing of the Green Point Observatory courtesy of Ian Sansom.

Editorial

Dear Readers,

Welcome to the September - October 2018 edition of "Southern Observer."

The Committee has just announced some dates for 2019 club events. See the back page for details.

We were lucky to have three good talks in September and October. On the 6th of September Rajika Kuruwita from ANU spoke on "Formation of Binary Stars and Planets Around Binary Star Systems" which was a most interesting talk. See Stephen's write-up on pg8.

On 13 September, Snaevarr Gudmundsson from the Astronomical Society of Iceland gave a captivating talk on astronomical observing in Iceland and being a geologist he spoke on the fascinating geography of Iceland. A highlight was a number of magnificent time lapse shots his associates made into a video of auroras. See Rolando's write-up on page 10.

On 4 October Jesse van de Sand from the Sydney Institute for Astronomy at Sydney University. spoke on "What do galaxies and shadow puppets have in common?" and talked about the shape and spectroscopy of galaxies and our future merger with the Andromeda galaxy. See Rolando's write-up on page 14.

On 22 September SASI held its Annual Dinner which was a big hit with members thanks to Lou Pagano. See photos and write-up on page 20.

The Astronomy 2019 Yearbook and guide to the Australian night sky is now available. See Renae Moss for your copy.

The Secretary has just submitted club viewing nights for 2019 in an easy to read table format. See and print page 25 for your observational planning.

Sandy Galos has written a nice invitation and summary of suggested activities for the Summer Sizzler Star Party on his Grattai property to be held 26th thru 31st January. See page 27 for details. Hope you can come!

And finally, we hope you can make it to GPO on Sunday 2nd December for the Christmas BBQ to meet some new members and old friends.

Hope to see you all there!

Happy Reading,

Al, Rolando & Brett ☺

Letters

T'was the night before Christmas
And the word got around
That Grannie's Christmas pudding
Had flopped and was unsound

What sad things befall us
When we expect it not
To see such disasters
As food goes to rot

But stop and think awhile
In sad and hopeful mood
Of those who have it all
And those who have no food

We Aussies have a good deal more
Of folk of other nations
We have serenity and peace
But sometimes conflagration

It is a sunburnt country, yeah
With floods and fire around
So when disaster happens, mate
Our mettle's pretty sound

We pick ourselves up from the floor
To start again to sow
The crops floods destroyed last year
And watch the new lot grow

And when disaster strikes our friends
From any other nation
We put aside our differences
And help, - no hesitation

But what we really do not want
Above all other things
Is bigotry and wars
And all those stinking things

– Rolando De Michiel

In the News

September - October 2018

Aussie Telescope Almost Doubles Known Number of Mysterious ‘Fast Radio Bursts’

By Dr Ryan Shannon et al | October 11, 2018

Using a radio telescope in Western Australia, astronomers have nearly doubled the known number of ‘fast radio bursts’— powerful flashes of radio waves from deep space. The team’s discoveries include the closest and brightest fast radio bursts ever detected and proof that FRBs come from the other side of the Universe, rather than from....

- See more at: <https://www.icrar.org/bursts>

Ancient Merger Wreckage in the Milky Way

By: Camille M. Carlisle | October 31, 2018

Mounting evidence indicates that our galaxy smashed up another smaller galaxy roughly 10 billion years ago....

- See more at: <https://www.skyandtelescope.com/astronomy-news/ancient-merger-wreckage-in-the-milky-way/>

The Kepler Space Telescope Comes to an End

By David Dickinson | October 31, 2018

NASA’s planet-hunting telescope has run out of fuel after a nine-year mission that found more than 2,600 planets orbiting other stars along with thousands of candidate worlds....

- See more at: <https://www.skyandtelescope.com/astronomy-blogs/astronomy-space-david-dickinson/the-kepler-space-telescope-comes-to-an-end/>

Trojan Asteroids Are in a Class of Their Own

By: Christopher Crockett | October 26, 2018

Hordes of debris trapped by Jupiter and Neptune have distinct colors that mark them as possibly the last remnants of the material that built the giant planets....

- See more at: <https://www.skyandtelescope.com/astronomy-news/trojan-asteroids-are-in-a-class-of-their-own/>

Planets Appear More Massive Than Disks Where They Form

By: Julie Freydlin | October 25, 2018

Although disks of gas and dust around young stars are a necessary precursor to planet formation, an expanded survey of stars in our Galaxy confirms earlier doubts that the known matter in such protoplanetary disks might not be sufficient to form planets....

See more at: <https://www.skyandtelescope.com/astronomy-news/planets-appear-more-massive-than-disks-where-they-form>

Dwarf Galaxy Found by Amateur

By: Christopher Crockett | October 24, 2018

Donatiello I is a tiny galaxy about 10 million light-years away, and it was discovered by an Italian hobbyist with a homemade telescope....

- See more at: <https://www.skyandtelescope.com/astronomy-news/dwarf-galaxy-found-by-amateur/>

Source for Europa Geysers Missing

By: Camille M. Carlisle | October 23, 2018

A new look at old data suggests there’s something missing from suspected plumes on Europa: a heat source....

- See more at: <https://www.skyandtelescope.com/astronomy-news/source-for-europa-geysers-missing/>

Two Explosions with Similar Quirks

By: AAS Nova | October 22, 2018

When two neutron stars collided last August, forming a distinctive gravitational-wave signal and a burst of radiation detected by telescopes around the world....

- See more at: <https://www.skyandtelescope.com/astronomy-news/stellar-science/two-explosions-with-similar-quirks/>

Mission to Mercury Launches

By: Emily Lakdawalla | October 20, 2018

The BepiColombo spacecraft, a joint European-Japanese mission to Mercury, rocketed away from Earth to begin its seven-year trek to the innermost planet....

- See more at: <https://www.skyandtelescope.com/astronomy-news/mission-to-mercury-launches/>

Low-key Supernova Marks Possible Birth of Neutron Star Duo

By: Christopher Crockett | October 17, 2018

Last year, a tsunami of gravitational waves washed over Earth, heralding the collision of two neutron stars in a far-off galaxy. Such collisions appear to be the birthplace of many of the heaviest elements such as gold, platinum, and uranium....

See more at: <https://www.skyandtelescope.com/astronomy-news/low-key-supernova-marks-possible-birth-of-neutron-star-duo/>

How to Turn Off a Galaxy’s Star Formation

By: AAS Nova | October 16, 2018

New observations by the Atacama Large Millimeter/submillimeter Array (ALMA) provide a close look at a galaxy that may be in the process of shutting down its star formation... we could assume that star formation stops only when the cold gas supply is depleted, but....

- See more at: <https://www.skyandtelescope.com/astronomy-news/galaxies/how-to-turn-off-a-galaxys-star-formation/>

In the News

September - October 2018

Some Stars Around Galaxy May Be From Elsewhere

By: Summer Ash | October 12, 2018

Data from the Gaia satellite reveal 20 new high-speed stars, 13 of which appear to have originated outside of the Milky Way....

- See more at: <https://www.skyandtelescope.com/astrometry-news/some-stars-around-galaxy-may-be-from-elsewhere/>

Blast from the Past in Today's Sky

By: Rutuparna Das | October 11, 2018

A faint supernova remnant designated G7.7-3.7 may be the remains of SN 386, a supernova recorded by Chinese stargazers over 1,600 years ago....

- See more at: <https://www.skyandtelescope.com/astrometry-news/blast-from-the-past-in-todays-sky/>

Voyager 2 Approaches Interstellar Space

By: Christopher Crockett | October 10, 2018

An increase in the rate of cosmic rays detected by Voyager 2 indicates that the spacecraft is approaching the heliopause, where the solar wind gives way to the interstellar medium....

- See more at: <https://www.skyandtelescope.com/astrometry-news/voyager-2-approaches-interstellar-space/>

MASCOT Deploys from Hayabusa-2, Lands on Ryugu

By: David Dickinson | October 8, 2018

Using "Big The joint DLR-CNES asteroid lander MASCOT dispatched by JAXA's Hayabusa-2 completes its mission....

- See more at: <https://www.skyandtelescope.com/astrometry-blogs/astrometry-space-david-dickinson/mascot-deploys-from-hayabusa-2-lands-on-ryugu/>

Four Things We Now Know About Saturn

By: Javier Barbuzano | October 5, 2018

Cassini gave an epic final show with a series of high-risk maneuvers to go where no space probe had gone before. Here are a few interesting things we learned from that finale...

- See more at: <https://www.skyandtelescope.com/astrometry-news/four-things-we-now-know-about-saturn/>

Hubble Boosts Case for Exomoon

By: Christopher Crockett | October 3, 2018

Exoplanet Kepler-1625b might harbor a moon the size of Neptune—potentially the first confirmed exomoon—but researchers urge caution in interpreting the results....

- See more at: <https://www.skyandtelescope.com/astrometry-news/hubble-boosts-case-first-known-exomoon/>

New Object Found in Far Outer Solar System

By: Christopher Crockett | October 2, 2018

Astronomers have discovered an object — 2015 TG387 — that could help in the hunt for a hypothesized Planet Nine in the distant reaches of the solar system....

- See more at: <https://www.skyandtelescope.com/astrometry-news/new-object-found-in-far-outer-solar-system/>

A New Look at the Solar Corona

By: AAS Nova | October 1, 2018

The hot, tenuous solar corona is visible during a total solar eclipse, and astronomers have long studied the structure & dynamics of the coronal streamers. Now, a special observing campaign has allowed us to see the corona in unprecedented detail....

- See more at: <https://www.skyandtelescope.com/astrometry-news/stellar-science/a-new-look-at-the-solar-corona/>

'Oumuamua's Story Keeps Spinning

By: Javier Barbuzano | September 27, 2018

Two new studies leave most options open for the origin and composition of 'Oumuamua, the solar system's first interstellar visitor....

- See more at: <https://www.skyandtelescope.com/astrometry-news/oumuamua-story-keeps-spinning/>

Surprise Discovery of a 14-Year-Old Supernova

By: AAS Nova | September 25, 2018

Much of today's astronomy happens via methodical searches, but sometimes serendipitous discoveries still surprise us. Such is the case with the transient CGS2004A, a possible supernova recently detected in a galaxy nearly 50M light-years away....

- See more at: <https://www.skyandtelescope.com/astrometry-news/stellar-science/surprise-discovery-of-a-14-year-old-supernova/>

The Magellanic Clouds Might Once Have Been a Trio

By: Christopher Crockett | September 21, 2018

The Magellanic Clouds are a familiar sight to anyone in the Southern Hemisphere. Now, astronomers from Australia suggest that this famous duo might have once been a threesome....

- See more at: <https://www.skyandtelescope.com/astrometry-news/magellanic-clouds-might-have-been-trio/>

Pattern in Milky Way's Stars Suggests Recent Galactic Whack

By: John Bochanski | September 19, 2018

An unexpected pattern in the motions of the stars in the Milky Way's disk points to a recent whack from another galaxy....

- See more at: <https://www.skyandtelescope.com/astrometry-news/pattern-in-milky-ways-stars-suggests-recent-galactic-whack/>

In the News

September - October 2018

Dawn Probes Role of Cryovolcanism on Ceres

By: David Dickinson | September 17, 2018

A recent study explores the history and extent of cryovolcanism in the past — and likely present — on the giant asteroid Ceres...

- See more at: <https://www.skyandtelescope.com/astromy-news/dawn-probes-cryovolcanism-on-ceres/>

Super-Earth Discovered in (Fictional) Vulcan System

By: Monica Young | September 17, 2018

Thirty years ago, three astronomers and Gene Roddenberry, of Star Trek fame, made the case to Sky & Telescope readers that the orange-hued star 40 Eridani A ought to host Vulcan, Spock's home. Now, a robotic survey has discovered...

- See more at: <https://www.skyandtelescope.com/astromy-news/super-earth-vulcan>

Seen at Last: A Superfast Jet Streams Away from Neutron-star Smashup

By: Shannon Hall | September 12, 2018

The finding suggests that LIGO's neutron-star merger was a typical gamma-ray burst after all. Millions of years ago two neutron stars, smashed together at a significant fraction of the speed of light. The event was so violent that it shook the universe — producing perturbations in the fabric of space-time known as gravitational waves. The merger also shot off fireworks, emanating electromagnetic radiation across the cosmos.

Those two signals finally washed across Earth in August 2017. That's when LIGO in the United States and Virgo in Italy detected gravitational waves, and some 70 observatories spotted light streaming from the same region in space...

- See more at: <https://www.skyandtelescope.com/astromy-news/superfast-jet-neutron-star-smashup/>

What Makes Supernovae Superluminous?

By: Monica Young | September 12, 2018

A new technique gives astronomers a closer look at what makes some stellar carnage so incredibly luminous...

- See more at: <https://www.skyandtelescope.com/astromy-news/what-makes-supernovae-superluminous/>

NASA's Cassini Sees Saturn's Towering Polar Hexagon

By: David Dickinson | September 10, 2018

Cassini's legacy sheds more light on the strange mystery of Saturn's northern polar hexagon...

- See more at: <https://www.skyandtelescope.com/astromy-news/saturn-polar-hexagon-stratosphere/>

Middleweight Black Holes Provide Window to Early Universe

By: Monica Young | September 4, 2018

How did supermassive black holes form? Two studies discovered dozens of middling-mass black holes in dwarf galaxies to fuel an ongoing debate.

Heavyweight black holes are a surprisingly common feature of the universe, lurking or blazing in galaxies near and far. But a question has long troubled astronomers: Where did these so-called supermassive black holes — typically ranging in mass from millions to billions of Suns — come from?....

- See more at: <https://www.skyandtelescope.com/astromy-news/middleweight-black-holes-early-universe/>

After Brief Shutdown, Hubble Goes Back to Work

By: Christopher Crockett | October 29, 2018

Following three weeks of downtime, engineers have cleared out a mechanical blockage in one of Hubble's gyroscopes and returned the observatory to full science operations. The 28-year-old space telescope completed its first science observation on October 27th at 2:10 a.m. EDT...

- See more at: <https://www.skyandtelescope.com/astromy-news/after-brief-shutdown-hubble-goes-back-to-work/>

60-Second Astro News: Infant Superclusters and Wavering Gamma Rays

By: Christopher Crockett | October 19, 2018

In astronomy news this week: A gargantuan supercluster of galaxies lurks in the early universe, while data from the Fermi telescope hint at two supermassive black holes locked in a gravitational dance....

- See more at: <https://www.skyandtelescope.com/astromy-news/60-second-astro-news-infant-superclusters-and-wavering-gamma-rays/>

Some Moons Could Have Moons of Their Own

By: Christopher Crockett | October 19, 2018

Four solar system satellites — and one putative exomoon — might be big enough and far enough from their home worlds to hold onto tiny moons for billions of years...

- See more at: <https://www.skyandtelescope.com/astromy-news/some-moons-could-have-moons-of-their-own/>

Saturn's Moon Dione Has Some Weird Stripes

By: Christopher Crockett | October 29, 2018

Long straight parallel lines on the satellite's surface could be droppings from Saturn's rings, one of the moons, or a passing comet, researchers suggest....

- See more at: <https://www.skyandtelescope.com/astromy-news/saturns-moon-dione-has-some-weird-stripes/>

Speaker Notes

by Stephen White

6th September – Rajika Kuruwita – Australian National University

"Formation of Binary Stars and Planets Around Binary Star Systems"



Rajika's main interest is in exoplanets orbiting in a binary star system. There are currently 731 known exoplanets (www.exoplanets.org).

These planets can orbit:

One star in the binary system;

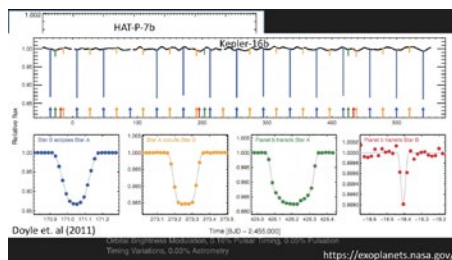
Both stars in a circumbinary configuration. There are currently 20 known planets in this configuration.

There are several known techniques to detect exoplanets in binary systems:

The transit method. This looks for the dip in light when a planet passes in front of a star. This technique works better in single star systems. This is responsible for discovering $\frac{3}{4}$ of the known exoplanets – mainly because of the Kepler satellite until a fault made it difficult to stay fixed on one part of the sky.

Tess (Transiting exoplanets survey satellite) launched this year, will continue the work of Kepler.

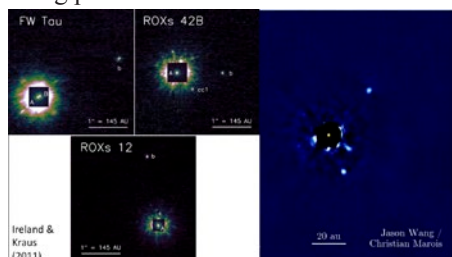
Eclipsing binaries complicate the transit method.



The radial velocity method. This looks for the wobble in a star as a planet orbits around it. The spectrum of the star shifts as the planet moves around it. This technique only works in single star systems. There have been no planets detected around binary star systems using this method.

Gravitational microlensing. When a star or a planet passes in front of a background star, it can amplify the light of the background star. The problem with this method is that you must have a crowded field to have these chance alignments of one star in front of the other.

After the alignment fault, Kepler has been used to look at stars in the galactic plane. The data from this mission is still being processed.



Imaging method. Imaging tries to take pictures of the planets. The simplest way to directly image a planet is to use a coronagraph. The coronagraph blocks out the light from the star so that you can see what is around it.

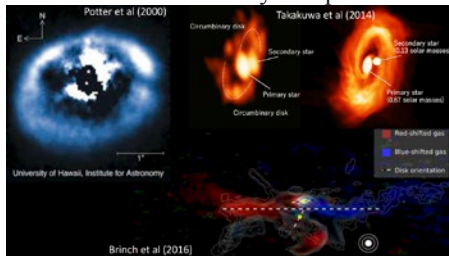
Rajika then moved on to talk about how planets are made.

Stars are formed in giant molecular clouds of gas. These clouds can compress

under the influence of a large group of stars (the Orion nebula) or a supernova as a star explodes. If a clump can get dense enough, then it can start collapsing and rotating and forming a disk and creating jets (from magnetic fields).

A famous image of a protoplanetary disk is HR Tau from the early 2000s. There is a baby star in the middle and gas is falling into the disk from the molecular cloud. As gas comes into the disk, most falls into the star and the star grows bigger. While it is not exactly clear how, planets may also be forming in the disk.

The existence of binary systems complicates this picture of how planets form. There are many binary systems with stars greater than the size of our sun and the disks in binaries are very complicated.



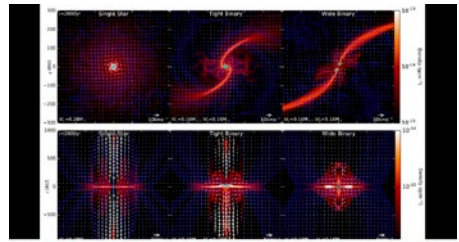
Rajika is interested in how planets are formed in binary systems.

It may be more difficult for planets to form in binary star systems as there are two stars competing for the gas and dust, so the disk may not last long enough for planets to form.

Old binary star disks, however, have been observed as old as 10 billion years.

Most of Rajika's work is running simulations of disks of single star and binary star systems on super computers using a program called flash, started by a group in Chicago. She is interested to see how 2 stars influences how gas and dust moves in the disk and the likelihood of planets forming.

Two competing things she found was the binary star simulations are eating up

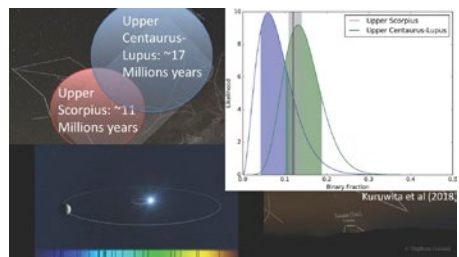


Videos available @ http://www.mso.anu.edu.au/~rajika/html_pages/movie_pages/2016_1.html

a lot more gas than the single star simulations. However, there are more outflows in single star simulations, so there is potentially more gas in binary simulations to make planets. Another complication is between narrow binaries and wide binaries and the degree of turbulence, which can also impact on the size of the disk.

Is it easier or harder to make planets in binary systems? Rajika cannot yet answer this question.

Rajika also does some observational work trying to figure out how long disks live for around binaries. She was looking for disks around stars which glow in the infrared in the regions Upper Scorpius and Upper Centaurus. If there is any major difference between the typical lifetime of a disk around a binary compared to a single star, it will be amplified at these late ages. She found that there isn't a big difference between disk lifetimes of binaries and single stars but she emphasized that there is a lot more work to be done.



For more information see:

Rajika Kuruwita's web page:

<http://www.mso.anu.edu.au/~rajikak/index.html>

Speaker Notes

by Rolando De Michiel

13th September
- Snævarr Guðmundsson -
Astronomical Society of
Iceland
"Icelandic Geography
and Astronomy"



This month we were fortunate to have two guests, Sidy and Snævarr Guðmundsson from Iceland. We were given a superb presentation on both Iceland as a country in addition to personal interests in astronomy. Snævarr is a Physical Geographer/Geologist who has an observatory in his back yard in Iceland. In his spare time, he likes to measure eclipsing binary stars and the transits of exoplanets, increasing knowledge in these areas of study.

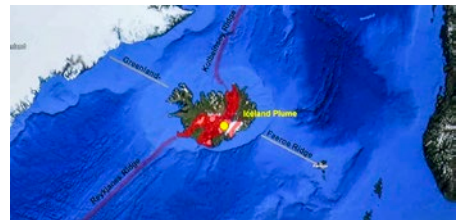
The talk began by presenting some statistics which were compared with Australia. Iceland is a relatively small island of 103,000km² spanning between +63° to



+66° latitude and is the third coldest place after the poles. Its population in 2018 is estimated at 350710. It was first settled approximately 1,200 years ago. It is a very active volcanic land with frequent eruptions, some of which have caused severe damage and deaths. During the little ice age, many mountains of ice froze and since then there has been a melting of ice and retreat of glaciers.



One of the real threats in times of eruption and lava flows are Tsunamis, as ice rapidly changes to flowing water. Iceland itself was actually formed by a plume of magma. We are all familiar with the



eruption of the volcano Eyjafjallajökull in March 2010 that shut down many European flights.

Snævarr showed some stunning photos of this



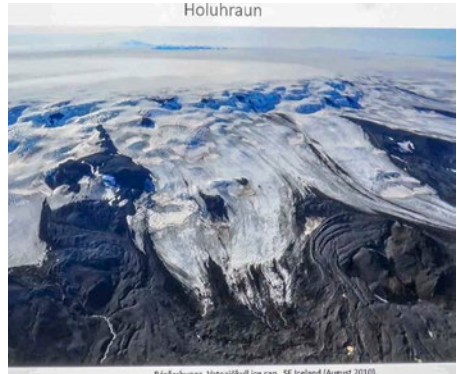
eruption and mentioned that the eruption had started 10 years earlier. Many tourists go to Iceland to see the thermal activity and visit the ice caves.



After it settled down, he was one of the first expeditions to visit the crater and take measurements and map the area.



Another large lava field is that of Holuraun that is formed by a plume rising up from the earth's mantle and brings up huge amounts of sulphur dioxide. This is very evident as a visible cloud that is unhealthy and people are warned to stay in-



doors with heating on to prevent it and the fine silica ash cloud from being breathed in (photos above and at bottom of page).

Snævarr's interest in astronomy had an interesting start. He was interested in mountain climbing. After a difficult climb one day and returning to a mountain hut that evening in which they had hoped to retire, he and fellow climbers were told that the hut was full and unable to cater for any more people that night. This meant that they had to sleep out overnight. Waking and seeing a perfectly clear sky overhead he was immediately gripped by the beauty of the star filled sky and was hooked.



He showed a number of magnificent time lapse shots made into a video of au-





roras that had to be seen to be believed.

Link: www.VISITVATNAJOKULL.IS

In Iceland the cutting down of a single tree is a major sacrifice. Yet he had to make this painful offering to build an observatory in his back yard.



Snævarr's first telescope was a 12" but has now graduated to a 16" Schmidt

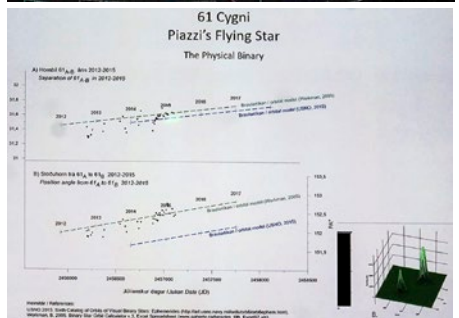
Cassegrain. We were shown some example of his astro photos which were of excellent quality.



Snævarr recounted some of his other exploits that included:



- Trying to photograph and determine the proper motion and magnitude of 61 Cygni. His results were very close to



the accepted results.

- Monitored Ross 248
- Determine the magnitude of the eclips-

ing binary Epsilon Aurigae which has been eclipsed only seven times since its discovery.

- Monitored distances to various star clusters
- Studied the large Exoplanet WASP 1b which is an achievement in being able to do this at an amateur level.

Before finishing the presentation, he showed how in the early part of last century some keen observers were watching a Solar Eclipse by using a door with dark glass as a filter.



Snævarr is truly a multi disciplinarian and skilled and enthusiastic about the type of astronomy that can be achieved with modern amateur equipment.

After answering a number of questions we gratefully thanked him for his presentation and Lou Pagano presented him with the usual SASI bottle of grape fluid and cup.



Speaker Notes (cont.)

by Rolando De Michiel

4th October

- Dr Jesse van de Sande -

**Sydney Institute for
Astronomy (SfA)**

University of Sydney

**"What do galaxies and shadow
puppets have in common?"**



This interesting and informative talk began with an overview of the fact that the Milky Way and Andromeda galaxies will inevitably collide. Jesse showed in two 4-way images how the progression of this collision would appear from Earth's perspective.

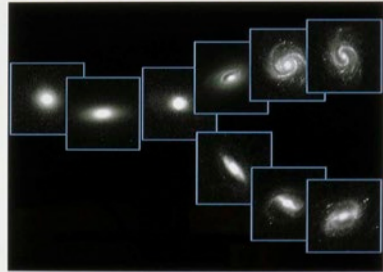


The first tidal effects would be felt around 3.85 billion years. The distortion of the galaxies will continue up to about 7 billion years after which the 'relaxed' mode would be reached. At this stage the galaxy would then seem like a large, rounded, bulbous galaxy.

Hubble's 'Tuning Fork' galaxy classification of galaxies should be taken merely as a classification of galaxy types and not as a progressive road along which galaxies evolve.

Hubble's Tuning Fork:

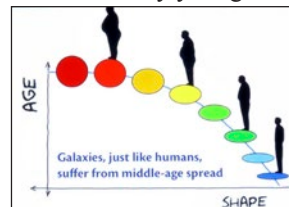
Is the diversity of galaxies in the present day universe the result of 14 billion years of galaxy evolution?



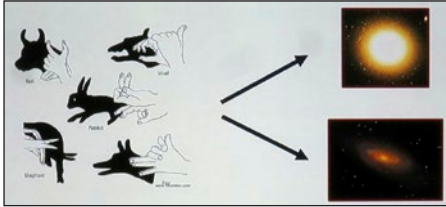
During the collision phase thousands or even millions of new stars may form as can be seen in the Antenna Galaxy.



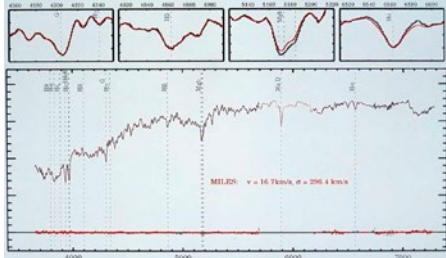
Galaxies in one respect are just like humans, in that as they age, they tend to bulk out. Very young stars reside in these galaxies. Trying to determine the actual shape of a galaxy is a very difficult exercise as



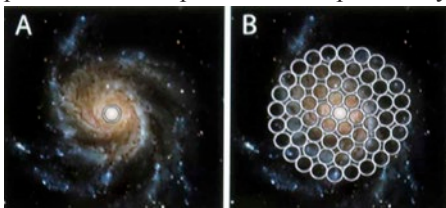
we only see a projection of the galaxy in a similar way we see a projection of the puppeteer's hand in shadow puppets.



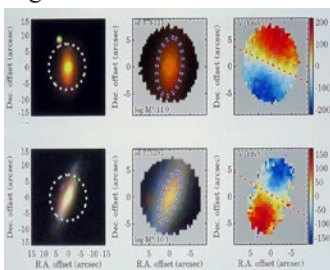
Spectroscopy gives us more information of the galaxy's rotation by examining the absorption lines of a number of elements.



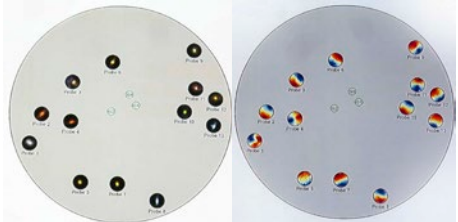
This is done at the AAO by using 'Hexabundles' of optical fibres that are placed in the location of the original film planes where plates were previously



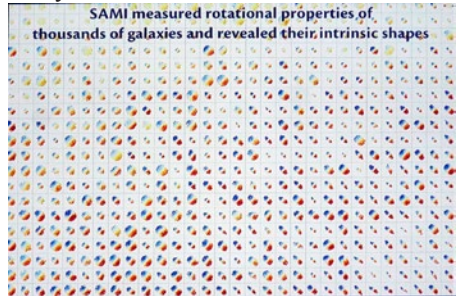
Each of these bundles contains 61 optical fibres and the equipment is capable of doing 12 galaxies at a time over a one degree field. The red-shift of the galaxies'



rotation becomes apparent and hence the shape and nature of the galaxy.

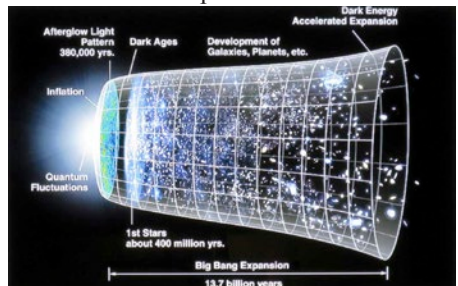


SAMI has used this technique to measure the rotation and shape of many thousands of galaxies. This has been achieved over 200 observing nights over the past five years.



It is apparent that the more massive galaxies have a slower rotation. When we look at the Hertzsprung-Russell diagram, the colour of the stars gives information about both the age and the mass of stars. It is essential to understand all about the formation of stars in order to be able to know how galaxies form and their age. Age reshape is not dependant on the galaxy's size.

After the Big Bang, the CMB shows that there are small energy level discrepancies where photons vary in energy and from this cosmic web galaxies start. This cosmic web is replicated in models that



match what we see in reality.

Red-shift (velocity) is measured by spectroscopy and then using Hubble's

How do we measure a velocity to get a distance

- Cosmological Redshift due to expansion of the Universe:

$$1 + z = \frac{\lambda_{obs}}{\lambda_{rest}}$$

- Further away = higher redshift = further back in time

wavelength in nm

Law (that was originally formulated by Georges Lemaître in 1927, 2 years prior to Hubble), we then calculate distances. At greater distances, the galaxies become much fainter in a manner that is inversely related to the fourth power of red-shift.

By studying galaxies at different redshift we can directly witness galaxy evolution:

- At $z=10$ the universe was ~ 0.5 Gyr old
- At $z=3$ the universe was ~ 2.1 Gyr old
- At $z=2$ the universe was ~ 3.3 Gyr old
- At $z=1$ the universe was ~ 5.9 Gyr old
- At $z=0$ the universe was ~ 13.7 Gyr old

- Galaxies become rapidly fainter with increasing redshift:
 $S \sim (1+z)^4$
- Galaxies are smaller (in angular size)
- Harder to detect as the light moves into the NIR

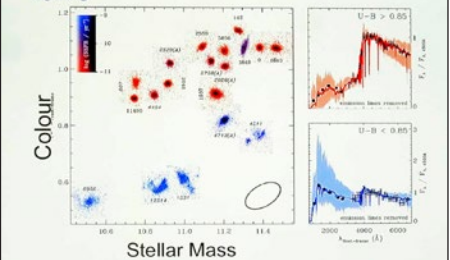
The Hubble Deep Field Photo that took over 2000 hours of observations to compile, had shown that in going back



13.7 billion years galaxies are seen everywhere. Studies have shown that within 3 billion years after the Big Bang, galaxies had formed and stars switched off. These Red and Dead galaxies are termed "Zom-

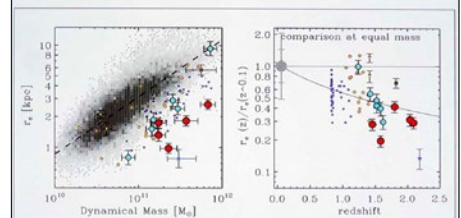
Dawn of the Red and Dead

- The first Red and Dead galaxies existed 3 billions years after the big bang.



bie Galaxies". Most of the changes appear to have occurred at about 1.5 billion years. Generally these "Zombies" are much smaller than expected. The Milky Way galaxy in on the road to becoming one of these "Zombies".

Red and Dead Galaxies in the early Universe are much more compact than expected!



Just like humans, galaxies suffer from middle age spread. They grow through a process of collision and mergers. Late-type galaxies have many younger stars in the disc, an old bulge and star formation. The Early-types however, are massive, filled with older stars that are red and dead. Large galaxies have few mergers whereas smaller ones have more collisions and mergers.

Jesse mentioned that his observations at the large telescopes are a process of sitting at a computer screen and only the technicians are permitted to control the telescopes. One night of observations may cost \$125k. He fielded many questions from a very interested audience and was then thanked in the usual way by Craig Goulden and members.

Observations

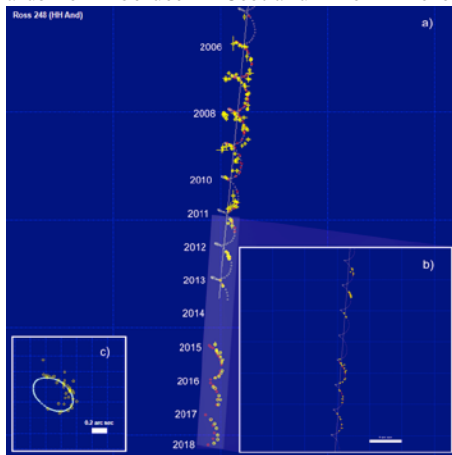
by Snævarr Guðmundsson

The distance of a nearby star measured by an amateur astronomer

Ross 248 (HH And, Gliese 905) is a BY Draconis variable, or a flare star, positioned in the constellation Andromeda (coordinates: [J 2000.0] 23 41 55 +44 10 40,8). In the early 20th century it was catalogued by Ross¹; as star no. 248 in the second list of 1000 high proper motion stars. It has an annual proper motion of 1.58" and a parallax of 0.317". It is a nearby star with an accepted distance of 3.157 parsec, or 10.3 light years².

It is a red dwarf with color index of M6e according to MILES³, with a surface temperature of 2800 K° and light flux is 0.0018 compared to the Sun⁴. The apparent magnitude ranges from 12.23 to 12.34 but it has a tendency of becoming brighter than that. Kron⁵ pointed out that its flux drops by 0.06 magnitude over a period of 120 days.

Astrometrical observations, obtained over a period of seven years, were used to estimate the distance of Ross 248 and its visual magnitude, to eventually determine its absolute magnitude. The telescope used for this project was a 12" Schmidt-Cassegrain reflector, equipped with a CCD camera. A dataset containing 37 values of the star's coordinates, 10 obtained by the Scottish amateur astronomer David Richards from Aberdeen in Scotland in 2011—2013



and the remainder by the author in 2015—2018.

The software used to calculate the results was designed by Richard Berry⁶. Averaged result for the star's distance was 3.33 ± 0.06 parsecs with a standard deviation of 0.0235 (table 1), about 0,174 pc further away than the generally accepted value. From this and the average measured apparent mag(v) of 12.25, the absolute magnitude of the star was found to be 14.7, about 0.1 mag brighter than the accepted value.

Table 1. Comparison of accepted values vs measured values (grálituð).

Ross 248	
Accepted apparent magnitude*	B 14,19
	V 12,28
Measured apparent magnitude	b 14,19
	v 12,25
Distance (parsec), accepted value	3,157
Distance (parsec), measured value	3,331
Absolute magnitude accepted value	14,79
Absolute magnitude, measured by author	14,70

* SIMBAD, 2018.

These results indicate that the distance of nearby stars can be estimated with good accuracy, using moderately sized telescopes, CCD cameras and sophisticated software.

References:

1. Ross, F. E. 1926. New Proper Motion Stars Second list). *Astronomical Journal*, Vol. 36, iss. 856, p. 124-128 1926). Link: http://adsabs.harvard.edu/cgi-bin/bib_query?1926AJ.36.124R
2. SIMBAD 2018. SIMBAD Astronomical Database – CDS (Strasbourg). Link: <http://simbad.u-strasbg.fr/simbad/>
3. MILES. 2015. The Catalogue. Vefslóð: <http://www.iac.es/proyecto/miles/>
4. Jenkins, J. S., L. W. Ramsey, H. R. A. Jones, Y. Pavlenko, J. Gallardo, J. R. Barnes & D. J. Pinfield 2009. Rotation Velocities for M-dwarfs. arXiv:0908.4092. Link: <https://arxiv.org/abs/0908.4092>
5. Kron, G. E. 1950. Special characteristics of a few late-type dwarf stars. *Astronomical Journal*, Vol. 55, p. 69. Link: <http://adsabs.harvard.edu/abs/1950AJ.55.69K>
6. Berry, R. 2011. The Proper Motion and Parallax of Barnard's Star: Errors and Precision in Small-Telescope Astrometry. The Society for Astronomical Sciences 30th Annual Symposium on Telescope Science. Held May 24-26, 2011 at Big Bear Lake, CA. Published by the Society for Astronomical Sciences, bls. 79—86. Link: <http://adsabs.harvard.edu/>

Text of Figure

a) The trajectory of Ross 248, over the period 2005—2018, its proper motion (diagonal line) and parallax. Measured coordinates (yellow points) and a model. The fine dots (one every ten days) represent a predicted model. b) The period of 2011—2018 was used to estimate the star's distance. c) The lightblue ellipse represents the annual parallax with the proper motion subtracted, indicating the accuracy of the collected data.

Observations

by Peter Williams

At the end of a star party or group observing session, or when the weather closes in and a slow migration to the warmer indoors occurs, the talk often turns to what has just been observed in the different constellations. Casting your mind back to the last time out under the stars most of us will think of the rich hunting grounds of Carina/Crux/Centaurus and towards the centre of our galaxy in Scorpius/Sagittarius, or even the extra galactic fields of Sculptor and Eridanus/ Fornax. It is also hard to overlook the Magellanic Clouds.

And did I hear you mention Octans? What? Yes, you know – that's it, the bit of sky down there somewhere near the celestial pole in a barren bit of near starless sky. Kinda jumps right out at you, doesn't it? And it's a real mongrel of a place to observe if you have an equatorial mount and there are precious few things for the deep sky observer. Hartung's *Astronomical Objects* devotes not quite 1 page to Octans while Burnham's *Celestial Handbook* has just 2 pages wedged between Norma and Ophiuchus. A check of my observing notes shows just 9 deep sky objects described in Octans and these are all double or multiple stars. But we are not here to talk deep sky.

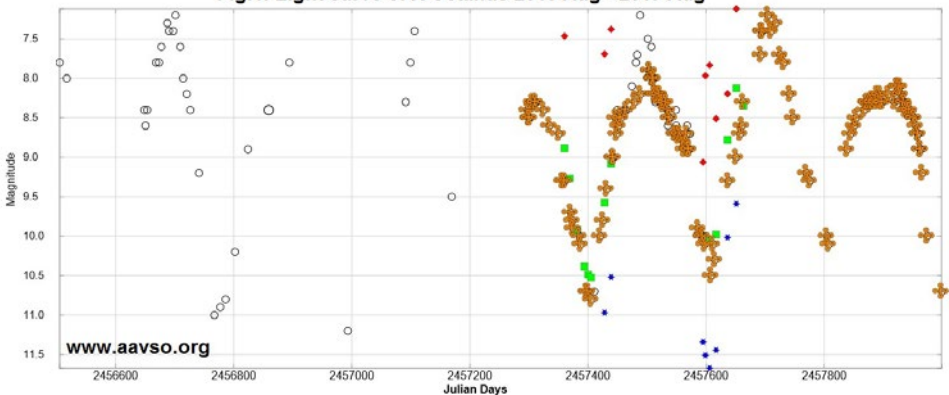
Some years ago when looking to increase the number of variable stars within reach of the binoculars I noticed X Octantis was being poorly observed. A far southern Mira type star, X Oct lies at -84S degrees declination and is

therefore circumpolar from Sydney for those with a reasonable southerly aspect. In my case it is necessary to move the binoculars to various locations along the driveway, depending upon the time of year and, subject to the neighbour's trees growing further, it can receive good all year coverage to produce a near complete light curve.

X Oct was discovered in 1916 on Harvard patrol plates taken during the early part of the 20th century in Milton Field 54, so called because the Milton Fund was financing the southern survey telescopes at Arequipa (19S degrees) and Bloemfontein (29S degrees) at that time. It received the preliminary designation 1916.0027 and later HV3382. Those plates were the responsibility of Miss Paris Pishmish of the Harvard College Observatory and the survey results were first published in the *Harvard Annals* of 1951, Volume 115 No.1 as Variable Stars in Milton Field 54, by Cecilia Payne-Gaposchkin.

Based on the Harvard survey data X Oct was classified as a likely Mira type star but with peculiar behaviour, showing a period averaging 205 days and a photographic magnitude range of 8.7 to 12.8 but with a strongly variable depth of minima. The last print version of the *General Catalogue of Variable Stars* (GCVS4, 1985) lists X Oct as a SRA type variable, a semi regular variable whose broad characteristics are of late (red) spectral type where the amplitude is typically less than 2.5 magnitudes and both amplitude & period are subject to some variation.

Fig.1. Light curve of X Octantis 2013 Aug - 2017 Aug



In the case of X Oct, the period has been show to oscillate between 200 and 208 days over a number of years and an amplitude ranging between 1 and 4 magnitudes. The Variable Star Index (VSX) maintained by the AAVSO and available on their web site, lists X Oct as a Mira star of mean cycle 200 days and brightness range 6.8 – 10.9V but also includes the above GCVS notations on period and amplitude. This just goes to show how difficult (or academic) it is to slot each and every star into rigidly defined groups.

The light curve shown here as Figure 1 covers the 1500 days from 2013 August through 2017 August, from the AAVSO Light Curve Generator. The left half of the light curve shows one well observed cycle then just scattered observations but the light curve is much more complete since 2015 October when I began monitoring X Oct with the 20x80mm binoculars and where my observations are highlighted. The cycle to cycle variations are an interesting feature and make X Oct well worth observing.

X Oct is just one of perhaps too many poorly studied southern stars and one which has proven to be a profitable target for regular and frequent observations with the 20x80mm binoculars with some interesting features of its light curve now being revealed.

Observations

by ABC News

'Dust moons' spotted orbiting Earth, confirming decades of speculation

Earth has two so-called "dust moons", researchers say, after their study confirmed the presence of astronomical clouds orbiting our planet. The clouds, however, are practically invisible.

They were found about 400,000 kilometres from Earth by Hungarian researchers, and are extremely faint, which previously gave rise to scepticism about their existence.

The clouds were first reported by Polish astronomer Kazimierz Kordylewski in 1961, who made the discovery while investigating two points in the Earth-Moon system where two gravitational forces interact in a way that stabilises the position of objects, known as a

Lagrange point.

It was near one of these points, called L5, where Dr Kordylewski noted two "bright patches", now known as the Kordylewski dust cloud.

This collection of space dust was thought to move around Earth as the Moon moves along its orbit, according to the Royal Astronomical Society.

However, as the clouds were difficult to observe, their existence was doubted by some scientists.

But now researchers say they have captured images of the clouds using a polarising filter system attached to a camera lens. Polarised light reflected from the dust was picked up by the camera, thus confirming the elusive clouds.

"The Kordylewski clouds are two of the toughest objects to find, and though they are as close to Earth as the Moon, they are largely overlooked by researchers in astronomy," study co-author Judit Sliz-Balogh said in a Royal Astronomical Society statement.

"It is intriguing to confirm that our planet has dusty pseudo-satellites in orbit alongside our lunar neighbour." Ms Sliz-Balogh, along with Andras Barta and Gabor Horvath, described the clouds in a research paper published in the Royal Astronomical Society's November issue.

The location of these dust clouds could be potential sites for orbiting space probes, the Royal Astronomical Society proposed.

Future research will look into the Kordylewski clouds to determine whether the dust could threaten equipment parked there.



ANNUAL DINNER

by Rolando De Michiel

Another very pleasant social gathering was the SASI Annual Dinner held at Mike's Grill within the Royal Hotel on the corner of East Parade and Adelong Streets at Sutherland. The gathering officially started at 7.30pm and went through to past 10pm, well after most other patrons had left. Does this say anything about the staying power of astronomers?

The evening was just a bit short of the Vernal Equinox that was at 11:54am on the following day, Sunday 23 September Eastern Australian Time. By the time we departed, the light cloud cover had dissipated and a clear sky gave a good view of

the Moon overhead.

Ron and Jeanette Le Marsney were the lucky winners of a substantial meat hamper raffle held by the hotel and went home smiling. Many other members too were lucky winners of "Star" wine bottle stoppers that Lou Pagano had organised.

But the evening belonged to Ken McEwen who celebrated his 81st that day. Congratulations and best wishes to Ken! Luckily no one squeezed 81 candles on his birthday cake or else this would have set off the smoke alarms.

Overall, the 40 members and guests seemed happy with the evening and enjoyed themselves. The venue was a good one and the food variety and quality were excellent. A thank you to Lou for organising this event and the lucky door prizes.



Daytime Astronomer's Picnic

by Rolando De Michiel

And so it came to pass and as prophesied, that on the five plus twentieth day of the moonth of the Sept there was a gathering of those fortunates who wisely dreamed of days in splendid fields beside calming waters of the Park of the Royals within the bounds of the Shire of the South Land. Such was to be the day amidst friends of long standing. However, the gods of the damp attended the gathering in spite of worshipful beseeching that such damp should be most propitiously directed to the parched fields at the interior of this great land of the antipodes.



The fortunates having gathered together and having donned more cloth against the cooling breeze, considered their position and wisely retired to the greater shelter of Park. In so doing they noted the manner in which a mini-chariot had been placed in a very unwise and unthinking manner taking up five lots in which other chariots for less able persons are prescribed.

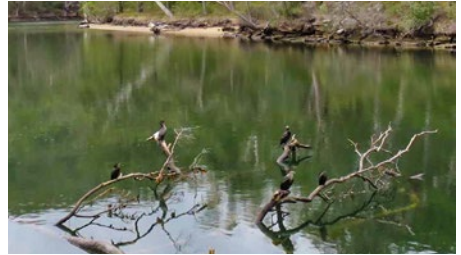


Having arrived under the great shelter, partaking of sustenance took place in

greater comfort and in a more congenial manner. But in truth, the aforementioned



damp was only mild and of limited duration. Thus the passing of the shadow of the gnomon upon the dial exposed a Sol that pleased both the attending fortunates as well as the family of cormorants resting upon the wood of the fallen tree above the placid waters.



Thus were the gods of the damp banished by the fires of the Sol!

It is prophesies that further gatherings of such fortunates will be at the prescribed places of merriment upon the arrival of the fourth and last day of Tiu of the passing of each moonth except for the last moonth that has been called the moonth of Decem by persons who are progressives.

The prescribed places for each gathering will be made known not upon the web of the spider, but upon the web of the wide world upon which we rely. The board of notice at the place of gathering of members shall also show the prescribed places of merriment and all members who have such motives, inclinations and abilities will be most welcome to gather and make a greater throng.

Assorted Clubstuff

Editorial Sub-Committee

OBSERVER OF THE MONTH

The following Observer of the Month awards were approved:

September 2018: No award

October 2018: No award

Please don't forget about this important award and if you or a mate have made some great observations, please let the Committee know through the Secretary.

YOUR JOURNAL

Readers of this journal will have noticed that the majority of the articles are written by a relatively few number of persons. This is YOUR journal and YOUR articles are welcome. They need not be long or highly technical. If there is an article you wish to submit please forward it to the Editor together with any photos in high res format for inclusion.

*** In recent months, the Committee has taken further steps to reduce the number of printed and posted journals as these are both inefficient and costly with more modern electronic methods available to most people.

*** Effective immediately, all new members joining the Society will only have the option of receiving the journal by emailed PDF, as will other non member recipients such as other societies, commercial organisations and professional observatories. Existing members who still require a printed journal will still receive one, but once these members lapse or convert to PDF then they will no longer be able to switch back to a printed journal. There will still be a limited supply of printed journals at the observatory for visitors and members who may wish to pick one up. The \$10 surcharge on membership will still apply to those existing members who elect to receive a printed and posted journal.

ANDY VAN DAM AND THE WASP

Unfortunately due to circumstances beyond the control of the Society, the previously advertised visit and social function in honour of pioneer member Andy Van Dam and the Wootton Astronomical Star Party both had to be cancelled.

We hope Andy will be able to organize a visit in 2019 and should that occur we will advise members by email. Hopefully WASP will be able to be held in 2019.

PUBLIC OPEN NIGHTS

The Annual Public Open Nights were held on Friday 17th & Saturday 18th August 2018 and were extremely successful. Weather was good both nights and following good publicity (including from the world record stargazing attempt), the visibility of all 4 major bright planets and a favourable opposition of Mars, crowds of nearly 800 people on both nights were in attendance. This kept all our volunteers, including those manning telescopes and those helping with the gate, food, merchandise, lectures and crowd control very busy and the funds received have significantly added to the Society's coffers.

A big THANK YOU to all members who attended and worked hard at these nights. Your contributions are appreciated by the Committee and the Society.

ANNUAL DINNER

The Annual Dinner was held on Saturday 22nd September 2018 at Mikes Grill, Sutherland, and about 40 members and families attended and a great night was had by all. Thank you to those who attended and thank you to Lou Pagano who organized the night and Michael Links who took the bookings. See the write-up with photos on page 20.

SUMMER SIZZLER STAR PARTY

Members Sandy Galos and Maree Emett will be hosting the Summer Sizzler Star Party 26th thru 31st January at Sandy's property in Grattai just outside Mudgee. Please see page 27 for details. As is the case with all of our star parties:

All SASI members and their families are welcome to attend.

All children to be controlled, no pets unless cleared with the host.

All attendees to make their own arrangements for food, cooking and accommodation.

Plenty of space for telescopes, caravans and camping on site.

Advise the host (in this case Sandy Galos sandygalos@ymail.com) of your intentions and estimated arrival time.

White light etiquette to be observed on site when observing is taking place.

If you have not attended previously, contact hosts for address and directions.

WATERFALL AND MADDENS PLAINS

Members who regularly attend dark sky nights at Waterfall would have been aware that there were some issues with gaining access from the National Parks and Wildlife Service (NPWS) following problems with some of our keys.

With that ongoing, several members of the Committee attempted to find alternative sites should Waterfall no longer be available to us. A site at Maddens Plains (operated by the Engadine Soaring League, a gliding club) has been trialled and is still under consideration. The Maddens Plains site has some advantages, including a clear Western horizon, but some disadvantages, including lack of vehicle access and high winds.

Subsequent to that, Craig Goulden was able to renegotiate suitable arrangements with NPWS and Waterfall Oval is now available for us to use, but only 2 keys are available. There is also a requirement that all users need to be members of SASI, so we need to amend by-laws to include SASPAC registrants as temporary members.

It is planned to trial Maddens Plains again in December, weather permitting, and then survey regular attendees as to the preferred dark sky site for future use.

The Green Point Observatory also remains an option for these nights, and al-

though the sky is not dark, offers observatory facilities (ie toilet and kitchen) and the use of the CCD camera for accredited users.

VISITING AMERICAN ASTRONOMER REQUIRES BILLETING

A visiting American astronomer, Mr Gordon Pegue, is visiting Australia next year (around April-May) to complete his tour of Messier and Caldwell objects, and needs accommodation while transiting Sydney en-route to Coonabarabran.

If any member is able to billet Mr Pegue for a few days both side of his tour please contact Committee Member Colin Draper.

2019 QUASAR YEARBOOKS

The Society is again stocking the 2019 edition of the Quasar Publishing yearbook. These are available from Merchandise Officer Renae Moss for \$25 each. If you need one posted to you please contact Renae to find out additional postage costs.

CHRISTMAS BBQ

The Annual Christmas BBQ will be held at the Green Point Observatory on Sunday 2nd December 2018 commencing at 4pm.

All members and their families are welcome to attend. BBQ hotplate and tools are supplied, please bring your own food and hard drinks. Soft drinks may be purchased from the fridge and tea and coffee available in the kitchen.

This is a great opportunity to celebrate the year in a social environment with fellow members and their families.

DAYTIME ASTRONOMERS' ANNUAL CHRISTMAS LUNCH

Advance notice is hereby given for this popular event to be held at 'Sporties' -formerly known as the Kareela Golf Club. The date is Wednesday 12th December at noon. Write this in your diary the old way or get the electrons organised in your electronic calendar so you don't double book the day. We look forward to seeing you there.

SASI MERCHANDISE

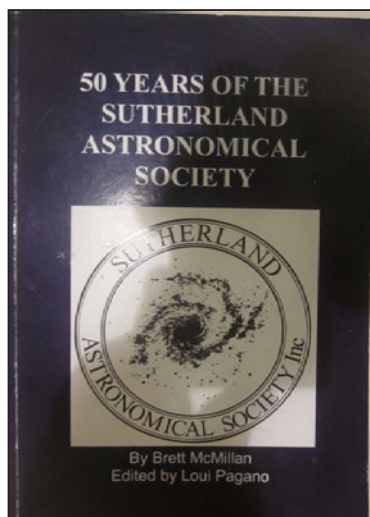
Please see Renae Moss if you wish to purchase any of the below merchandise. Posting of non breakable merchandise available for extra postage & packaging fee (confirm with Renae before ordering).



Astronomy 2019
Price \$25



Coffee Mug:
Green Point Observatory
\$12 each.



50th Anniversary book
Special Price \$10



New SASI sloppy joes, hoodies and polo shirts now available. Also available: Hepworth freezer suits and thermal accessories; Pens; Planispheres (Quasar); SASI 150 workbooks; Junior workbooks, Blow-up aliens; metal and cloth (sew-on) badges; posters, postcards and placemats. See Renae for further details and pricing.

OBSERVING NIGHTS FOR 2019

All times in EST **not** corrected for daylight savings
(add 1 hour when daylight savings in force)

3RD QUARTER MOON

MONTH	DAY	MOON		END A.T	Hrs of darkness
FEBRUARY	2nd	rise	3:32	20:34	20:34e-03:32r
MARCH	2nd	rise	3:50	19:57	19:57e-3:50r
MARCH	30th	rise	1:06	19:17	19:17e-01:06r
APRIL	27th	rise	23:51	18:43	18:43e-23:51r
MAY	25th	rise	21:40	18:24	18:24e-21:40r
JULY	6th	set	20:49	18:23	20:49s-05:32m
JULY	27th	rise	2:43	18:38	18:38e-2:43r
AUGUST	24th	rise	1:30	18:55	18:55e-1:30r
SEPTEMBER	21st	rise	0:22	19:13	19:13e-00:22r
OCTOBER	19th	rise	23:16	19:39	19:39e-23:16r
NOVEMBER	16th	rise	22:09	20:13	20:13e-22:09r
DECEMBER	21st	rise	1:40	20:50	20:50e-1:40r

NEW MOON

MONTH	DAY	MOON		END A.T	Hrs of darkness
JANUARY	5th	rise	4:46	20:53	20:53s-3:07m
FEBRUARY	9th	set	20:56	20:26	20:56s-3:52m
MARCH	9th	set	19:58	19:47	19:58s-4:24m
APRIL	6th	set	18:31	19:07	19:07e-4:47m
MAY	4th	rise	6:24	18:37	18:37e-5:06m
JUNE	1st	rise	5:12	18:23	18:23e-5:12r
JUNE	29th	rise	3:57	18:25	18:25e-3:57r
AUGUST	3rd	set	19:41	18:42	19:41s-5:21m
SEPTEMBER	28th	rise	6:03	19:19	19:19e-4:13m
OCTOBER	26th	rise	4:33	19:47	19:47e-3:32m
NOVEMBER	23rd	rise	3:05	20:22	20:22s-3:01m
DECEMBER	28th	set	20:53	20:52	20:53s-3:00m

Moonrise times after midnight refer to following day.

Hours of Darkness is time between the end of evening AT and the start of morning AT when no moon is in the sky.

Codes:

- e = Darkness starts at the end of evening AT
- s = Darkness starts at Moonset
- r = Darkness ends at Moonrise
- m = Darkness ends at the start of morning AT

NOTES:

Forthcoming Speakers

29th November

**- Dr. Christine Finn -
Artist, Archaeologist
and Journalist**

**"Under the Rays of the Aurora
Borealis: The artistic legacy of
Sophus Tromholt"**



Sophus Tromholt (1851 - 1896) a Danish-born, self-taught scientist, and school-teacher, left a unique legacy from his role in the First International Polar Year. He had set up an open-air studio to photograph the Auroras in the remote High Arctic settlement of Kautokeino, on the Norwegian/Finnish border, and there won the admiration of the Sami who posed for portraits. But his scientific hopes were dashed: "Every attempt I made to photograph the Aurora Borealis failed...in spite of using the most sensitive dry plates, and exposing them from four to seven minutes, I did not succeed in obtaining even the very faintest trace of a negative". He admitted in his newspaper columns and subsequent book "Under the Rays of the Aurora Borealis" that the accompanying illustrations were..."the photographic reproductions of my own drawings", made in his hut. These drawings were long overlooked after his early death, although his archive of Sami photographs achieved international and UNESCO acclaim. On her way to the Faroes eclipse in 2015, Christine Finn came across the albumen

prints of the Aurora illustrations, protected together with the glass plates at the University of Bergen. Astonished by these drawings as works of fine art, she was given permission to work with them, and was commissioned by the Scottish gallery, Timespan, to have them remade as large-format photographs. They were exhibited for the first time there. This talk tells the story of Tromholt, drawing on the work of his biographers in Denmark, Dr Peter Stauning and Kira Moss, and Finn's project, which is travelling the course of the Aurora cycle. It acknowledges Tromholt's archive at the University of Bergen, Timespan/Creative Scotland. The evening will include an extract from Tromholt's written descriptions of the Auroras he witnessed, in a recording made for the Timespan show by the British actor, Michael Maloney.

Dr Christine Finn (b Jersey, 1959) is an artist and creative archaeologist, who is also a freelance print and broadcast journalist (BBC radio, Sunday Times UK). She works across three investigative practices - reporting, excavation, and art in various media. She was a Reuter Journalist Fellow and Visiting Fellow at Oxford University, where she also studied Archaeology and Anthropology, and wrote her doctorate on Yeats, Heaney and archaeology (Past Poetic, Duckworth). She is a Fellow of the Society of Antiquaries of London, with a left-field interest in retro technology (Artifacts: an archaeologist's year in Silicon Valley, MIT Press; essays at Edge.org), She has spoken about poetry to astronomers, and travelled to total eclipses in Sumatra, UK and the Faroe Islands. One of her artworks was installed during last year's eclipse in Oregon. Finn is also a Senior Research Associate at Flinders University, but is making her first visit to Australasia as an artist supported by the British Council & Arts Council England, and the Henry Moore Foundation.

Summer Sizzler Star Party Saturday 26th to Thursday 31st January 2019 Inclusive

All members and their family and friends are invited to attend this star party, designed to take advantage of the summer delights and dark nights. Come for as long or as short as you like, just let Sandy know when you will be attending. Contact details below.

Some spectacular objects of interest for viewing during this period are:

- Easily seen with the naked eye:
Capella, Sirius, Procyon, Canopus, alpha and beta Centauri, Achernar, Castor Pollux, Rigel, Betelgeuse, Pleiades, Hyades, Aldebaran.
- Easily seen with Binoculars:
 - Deep sky objects in Orion and Carina against a dark clear contrasty sky.
 - SMC and LMC in inky black skies
 - Auriga, Orion, Taurus, Monoceros, and all the jewels within!
 - Omicron Velorum Cluster
- Telescopic Objects:
 - The Tarantula Nebula
 - A feast of double and multiple stars eg. θ Eridani and β Monocerotis
 - Supernova remnant M1
 - Bright Planetary Nebula NGC3132 in Velorum
 - M42 the great nebula in Orion

Whether it's viewing with your favourite DOB, SCT or binoculars or a serious astro-imager this is not to be missed! Practice your observing skills under dark sky conditions.

Facilities on Site:

Camping ground for tents. Recommend you bring a ground sheet as the nights will be cool. Warm sleeping bags are recommended.

- 240 Volt AC Power available for caravans or campervans if needed.
- Shower with hot water, toilet and laundry sink available. (Hot water is tank fed, the cold water is bore water).
- External tap available with tank water to meet cooking needs.
- Access to external microwave oven, under cover BBQ with side burner available for use by all.
- External fridge available to store perishables and share.
- An onsite caravan with a double bed and two small bunks is available. Need to supply your own sheets and pillows. It has power and heating and an external awning with an eating area and microwave pro-

vided. Suits family or friends prepared to share. Rules are keep it clean and hand it back as you found it! First in best dressed on this accommodation. So please let me know immediately if you want to use it.

- **Please bring your own drinking water**

For Astronomical Use:

- A large viewing field with good horizons in all directions. Visual observers can be clear of any interfering light from imager's screens.
- Part of the field can be provided with 240 VAC power for those who need it.
- Urn for those late night comfort drinks!
- Recommended people bring the warm jackets and beanies.

Non-Astronomical Activities:

- Daily get together at 4pm (happy hour).
- If all people contribute some dips and nibbles then it can be fun to share.
- Weekend markets in Mudgee
- Historic Gulgong nearby, home of Henry Lawson.
- 42 Wineries and numerous eating and coffee outlets in the Mudgee town and nearby district.
- Bush walking in national parks, ideal for twitchers.
- Bring your pan and prospect for gold in nearby Windeyer or Hargreaves.

Contact details:

Please email Sandy Galos at sandygalos@gmail.com by 19th of January to advise your attendance and your site accommodation needs. You can also call Sandy on 0407211910 to discuss any matters re the star party.

Directions on how to get there:

- There are lots of kangaroos and wallabies on the road from Mudgee to our property from dusk onwards so plan to get there in daylight hours.
- Detailed directions will be provided to those indicating their attendance.

Hope to see you there!



The Back Page

2018 – 2019 At A Glance...

CLUB EVENTS 2018

Christmas BBQ 2nd Dec
Trivia Quiz Night 6th Dec

CLUB EVENTS 2019

AGM 2nd May
10yr Member's Party 27th June
Trivia Quiz Night 5th Dec
Christmas BBQ 8th Dec

STAR PARTIES

WASP (Wootton)..... CANCELLED
Summer Sizzler 26th-31st Jan
2019 (Grattai)
Mudgee 26th April - 5th May
2019

WORKING BEES (2019)

(from 9am):

Spring 9th November
Autumn 16th March
Winter: 3rd August

PUBLIC OPEN NIGHTS (2019)

Earth Hour 23rd March
August 9th & 10th August

SASPAC

(TBA).....

see: <http://www.sasi.net.au/index.php/public-events/courses>

Coming Events

- * **Tuesday 27th November**
 - Daytime Astronomers Gathering 10am
 - Location: Como Pleasure Grounds
- * **Thursday 29th November**
 - Special Guest Speaker 7:30pm
 - Christine Finn
- * **Saturday 1st December**
 - Waterfall/GPO Observing 7:00pm
- * **Sunday 2nd December**
 - Christmas BBQ 4:00pm
- * **Thursday 6th December**
 - Trivia Night 7:30pm
- * **Saturday 8th December**
 - Waterfall/GPO Observing 7:00pm
- * **Wednesday 12th December**
 - Daytime Astronomers Annual
Christmas Lunch 12:00pm
- * **Thursday 13th December**
 - Committee Meeting 7:30pm
- * **Saturday 29th December**
 - Waterfall/GPO Observing 7:00pm
- * **Saturday 26th - Thurs 31st January**
 - Summer Sizzler Star Party
 - Location: Sandy Galos Property,
Grattai NSW
- * **Thursday 7th February**
 - Guest Speaker 7:30pm
 - Mamie Ogg