Wellington Astronomical Society May 2016 Volume 46 Issue 4
WWW.WAS.ORG.NZ, ISSN 01147706 - PRINT, ISSN 2230-5912 ONLINE

The next WAS meeting will be held at 7:30 pm, Wednesday 18th of May at Carter Observatory, Upland Rd, Kelburn, Wellington

"Is the Solar System stable?" – Dr Warwick Kissling

The question of whether the Solar System is stable (or not) was first hinted at by Isaac Newton, and since his time this problem has been tackled, to no avail, by some of the world's most famous mathematicians. In the last few years, our ability to simulate motions of the planets in the solar system has reached a point where 5 billion year simulations are routinely possible. These have shown that in some cases the Solar System can indeed be unstable, but the exact details remain elusive. In this talk, Warwick will explain why people thought the Solar System might not be stable and describe the efforts over the years to show whether or not this is true.

Inside this issue:

2015 — 2016 SUBSCRIPTIONS DUE

The new subscription year began in September, so WAS looks forward to receiving your subscription renewal.

Renewal forms can be found on the website, but a summary follows:

Subscription for Newsletter by Email 2015-2016

Adult/Waged:	$ 50.00
Student/Unwaged:	$ 30.00
Family:	$ 70.00

Payment methods:

Cheque - make out to Wellington Astronomical Society Inc, and mail to PO Box 3181, Wellington 6140

Direct Deposit or Internet Banking - use Acc No: 03-0502-0508656-00, please include reference so WAS knows who is making the payment

Cash - please bring exact amount to meeting

WAS COUNCIL MEMBERS AND CONTACTS

Council Members

The following members were elected to Council at the Nov 2015 AGM

President: Antony Gomez

Vice President: Duncan Hall

Secretary/Telescope custodian: Chris Monigatti

Treasurer: John Homes

Website (joint): John Homes & John Talbot

Councilors

Frank Andrews

Janine Bidmead

Peter Graham

Aline Homes

Murray Forbes

James Smith

Peter Woods

Newsletter Editor: editor@was.org.nz

Postal Address: Wellington Astronomical Society, PO Box 3181, Wellington 6140, New Zealand

From the President

Firstly, a warm welcome to all our new members who have recently joined the Society. It is great seeing new people coming along to meetings and events we have held. Please introduce yourself to other Society members and especially to the Council so we can get to know you and if you have any questions or need help, let us know. And to all members, if anyone has any suggestions or concerns, make it known to a Council and we will happily address them.

April, Global Astronomy Month, began with a bang. I was asked to give a presentation for the monthly Tuesday Talks at Space Place, the topic being "The Universe Next Door", which looked at our own universe, hidden dimensions, parallel universes, many-world interpretation and the multiverse. It was a packed audience with over 70 people attending and many more turned away at the front desk. The following night Josh Gross gave a fantastic talk at our Society meeting on "Where are all the Aliens? An Introduction to the Fermi Paradox". Again we had a full turnout to the meeting followed by many questions and discussions.

For those of you who are unaware, we have changed the format of our meeting to bring a little more variety. As usual we have our Researcher's meeting starting at a slightly later time of 6:45pm to give the Council more time for their meeting. The main meeting begins at 7:30pm where we look at the current Night Sky and highlight some of the wonderful objects to keep a look out for during the month. This is followed by any recent astronomy news and other Society news. The main presentation is around 8pm followed by a supper, a time to catch up with others.

We had a good turn out at our regular monthly Observing Evening at Tawa College where we had a chance to observe Jupiter, Mars and Saturn as well as many other spectacular objects. If you haven't seen the Jewel Box Cluster, Tarantula Nebula or Sombrero galaxy then come along and take a look. There are many different telescopes to observe with and it is also a great opportunity to learn how to use the telescopes and to find these objects for yourself with your own telescope or binos.

The next Friday we had a joint event with the Lower Hutt Library where Mark Gee, who was the 2013 International Astronomy Photographer of the Year, gave a very entertaining presentation on his "Stories behind the Art of Night". Mark talked about the amazing stories behind some of his images including those that didn't go to plan. There were well than over a hundred people attending and we had crowds lining up to look through the four telescopes we had set up for the evening.

The following evening was our Global Star Party which we held near Anderson Park in the Botanical Gardens. We captured a lot of foot traffic as many were heading down or back from the city. A good number saw our advertisements and came especially to join in the party. Hard to estimate but again well over a hundred people came along. It was hard not to contain the excitement that many had as they saw the Moon, Jupiter, Mars and Saturn through a telescope for the first time. There were many overseas visitors and international students, some who rang up friends and invited them to come along. For those of us that helped run the event, it was such a rewarding evening to see so many excited and amazed at our night sky.

On Tuesday, in conjunction with four other organisations, we hosted the start of the Engineering and Science Festival 2016 Lecture Series at the National Library where David MacLennan gave an entertaining presentation on "Where to next? Human Spaceflight at the Crossroads". David talked about the latest endeavours for human spaceflight, setting a base on the Moon before taking the journey to Mars. Again another good turnout.

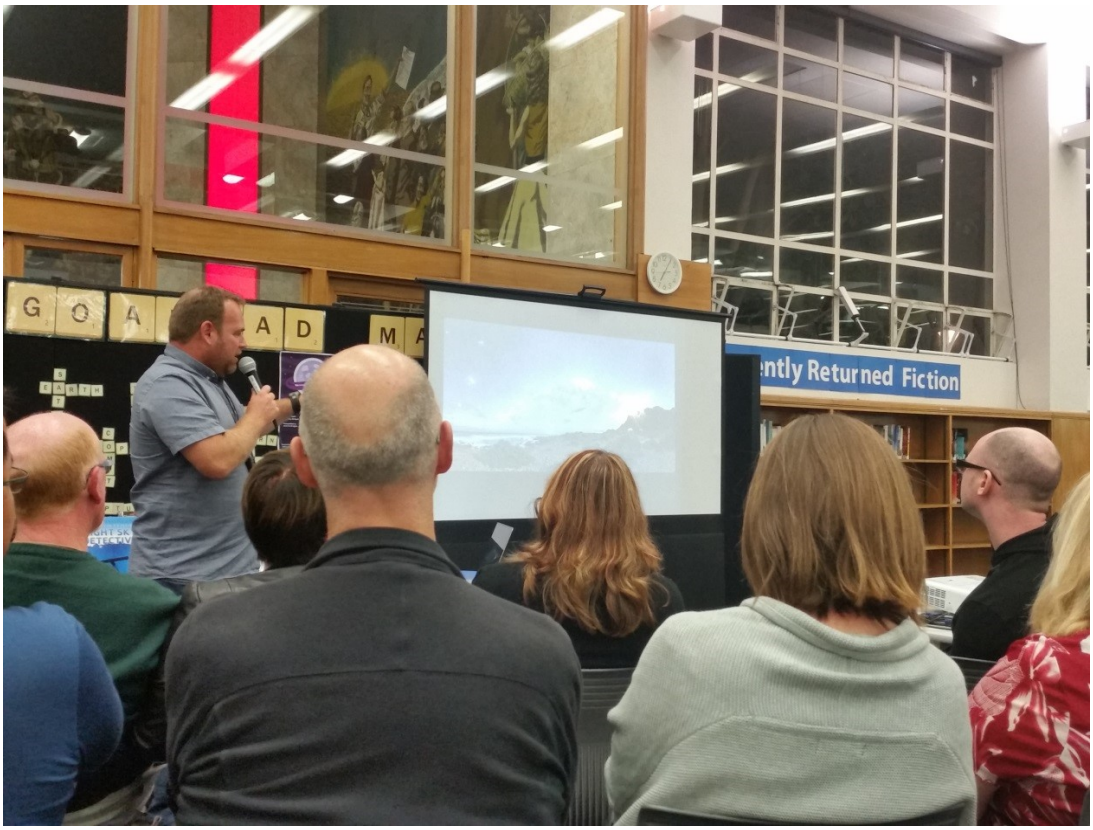
And finally for Global Astronomy Month, we celebrated Sun Day on the 24th April again down at Anderson Park. It was a beautiful warm sunny day and you couldn't ask for a better day to celebrate. We had three telescopes operating which gave us good views of the surface of the Sun. A rather quiet Sun, there were a few sunspots to look at and a couple of small prominences barely visible on the limb. Many families came along with young children to join in the fun activities Janine had set up. There was a Solar System obstacle course with times recorded for each age group, including some parents tried it out. We had over 70 entrants for our "Guess the distance of the Earth" competition where one places a flag on the Park to guess the relative distance of the Earth from a half meter diameter Sun. If you want to know the answer and the winners then check out our Facebook Page Wellington Astronomical Society. There are many other images and Society events listed on the page.

A fitting end to Global Astronomy Month is that through the efforts of Gordon, Chris and some students at Tawa College, the dome for the WAS observatory is now in place at Tawa College. There are a few more jobs to be done like installing a telescope on the pier but it won't be long before members will be able to use the observatory for observing.

We are also making progress in negotiating with the Gifford Trust the use of the observatory at Wellington College for the testing of a proof of concept fully remote controlled observatory. If all goes well we will be building a remote controlled observatory with a state of the art telescope at a dark sky site with the Syd Cretney bequest for Society members to use.

Thanks to everyone that have helped out and attended the events over the past month. If you didn't partake in some of the events then you certainly missed out! It has been a lot of effort but well worth. Not only has it been a great promotion for the Society but we had fun doing it. Having said that, we do need to have more involvement from the members at all our events. On the 14th May we are part of the Space & Science Festival at Onslow College, Johnsonville, where we will be operating telescopes from 12-10pm looking at the Sun during the day and the planets at night. It is a full 10 hours so we can't expect the same people to be there the whole time. I am making a plea for more volunteers to spend a couple of hours each operating one of the telescopes. They are easy and simple to use so don't let it deter you. You will also have free entry to the festival so make use of the opportunity. Apparently 3000 are expected to attend on the day. Please contact Chris or I if you can help. If you can't make the day we will still need volunteers for many of the events we are booked to be at in June during the Matariki season.

It is an exciting time to be involved in astronomy! As the saying goes for Global Astronomy Month – "One people, one sky"



Mark Gee's presentation at the Hutt City Library

Crowds lining up at the Hutt City Library

Josh Gross presenting at April's Society meeting

Edward Wilcock's image of the Sun on Sun Day. Note the sunspot

A timelapse from our Global Star Party courtesy of Edward Wilcock) https://drive.google.com/open?id=0B1riKFAeX-8JV2xSRTF6QUF4alk

A timelapse from our Sun Day (courtesy of Edward Wilcock) https://drive.google.com/open?id=0B1riKFAeX-8JeDFLRU9rYnhKMzA

Wellington Astronomical Society May 2016 Events

Tuesday Talks: Was That the Big Bang?

Is the Big Bang Theory as simple as it seems?

Over 13 billion years ago, a massive explosion erupted, starting the path that leads to us.

The Big Bang model has succeeded to become widely accepted and the ideal cosmological mode of how the Universe started. It offers the best explanation for a broad range of wonders in the cosmos – from galaxies steadily drifting apart to cosmic background radiation.

Even so, there are some loose ends: such as the mystery of primordial imprints of gravitational waves and Hawking radiation, Dark Matter and Dark Energy don't have all of the observed properties of matter explained by the Big Bang. So just how sure are we that everything derives from that Big Bang?

Victoria University research fellow Dr Ed Budding joins us for a Tuesday Talk to discuss the Big Bang Theory, and why it isn't as simple as it seems.

Date: Tuesday, 3 May

Time: 7:00 PM

Venue: Space Place, Carter Observatory

Details: http://www.museumswellington.org.nz/tuesday-talks-big-bang/

WAS Observing Evening

Come along and see the many wonderful objects, star clusters, galaxies, dying stars and nebulae around and near the Southern Cross, the Magellanic Clouds, Jupiter and its moons, and the Orion nebula. Anyone is welcome.

Date: Saturday, 7 May

Time: 7:00 PM

Venue: Tawa College

Details: Call or text Chris Monigatti on 021890222 to check.

Transit of Mercury - Monday 9th May

The transit starts at 11:12 pm on 9 May (NZST) and ends at 6:42 am on 10 May (NZST).

The end is about half an hour before sunrise at Wellington. However for those keen to observe this rare event there are a number of sites providing live streaming. One available site is http://www.cosmos.esa.int/web/bepicolombo-mercurytransit/home

Astronomy Club Night

A short presentation and observing the night sky.

Date: Thursday, 12 May

Time: 7:00 PM

Venue: Hutt International Boys School

Space & Science Festival

The Space & Science Festival is an event run by the Space & Science Festival Society, a not-for-profit organisation formed entirely by volunteers who are passionate about inspiring the next generation of amazing people growing up in New Zealand.

The aim is to give children of all ages and their families amazing experiences to inspire them to follow their interests in space, astronomy, astrophotography, science, technology, engineering and maths at a festival we run each year.

WAS will be providing telescopes for observing the Sun during the day and the planets at night.

Tickets are required for this event.

Date: Saturday, 14 May

Time: 12:00 to 10:00 PM

Venue: Onslow College, Johnsonville

Tickets: http://spacesciencefestival.org/

WAS May Meeting

As detailed on our front page, the WAS May meeting talk will be given by Dr Warwick Kissling on whether the Solar System is stable.

Date: Wednesday, 14 May

Time: 7:30 PM

Venue: Space Place, Carter Observatory

Chancing Upon a Meteor

Briana de Kwant takes her friends out star-gazing when an unexpected guest appears in the night sky…

"On Tuesday the fifth of April at 8pm, a group of very eager stargazers set out from the centre of Lower Hutt to watch the skies. Several were going to be looking closely at our universe for the first time and as their guide I was keen to point out the highlights; The Milky Way, the Large and Small Magellanic Clouds, Jupiter, the Southern Cross and many other familiar sights.

About an hour into our mini adventure we ended up seeing something entirely unexpected: a large, bright meteor streaked across the northern sky towards Gemini. Green, white and red, and visible for several seconds it certainly left an impression on some of my friends who exclaimed:

"My mind is blown at the beauty of it"

"It is incredible to think that debris is falling through our atmosphere every night and that it looks so incredibly beautiful"

"Gee whiz!"

The meteor was an extraordinary sight to witness and opened up some great conversations about our planet, sparking the atmosphere and interest alike. It's safe to say that their expectations are quite high now so here's hoping the universe can display something similar on our next star-gazing evening!"

Astronomy - Seeing Stars

This six week Adult Community Education course is being presented at Wellington High School by Vicky Irons.

Find out where to look for planets, the main constellations of each season, the workings of optical devices and more. Learn to look at the night sky's planets and constellations and understand their movements and positioning through the year.

By the end of the course, you'll be able to:

- Identify the major constellations of the year and their companions
- Read a planisphere accurately to identify objects
- Know where to look for planets and see the difference from stars
- Identify the brightness and colour of stars and what that means
- Tell the time using the Southern Cross

Dates: Every Tuesday, 10 May to 14 June (six week course)

Time: 7:30 PM – 9:30 PM

Venue: Wellington High School

Cost: $135.00 incl. GST

Registration: Contact Vicky Irons vickineverirons@yahoo.co.nz

WAS on Facebook

Our Facebook page Wellington Astronomical Society is now operational. You can search for it on Facebook or click on this link https://www.facebook.com/WellingtonAstronomicalSociety/. If you are a Facebook user please use the page to receive up to date notifications of our Society's events and news. This is the easiest way to be informed as to what is going on in the Society as well as keeping up with astronomical news. You will need to interact occasionally with the page by liking / commenting on postings or indicate whether you are coming to an event. Otherwise Facebook will, after a time, no longer send you the new postings. So keep visiting the page as there are a number of Society events coming up in the next few months.

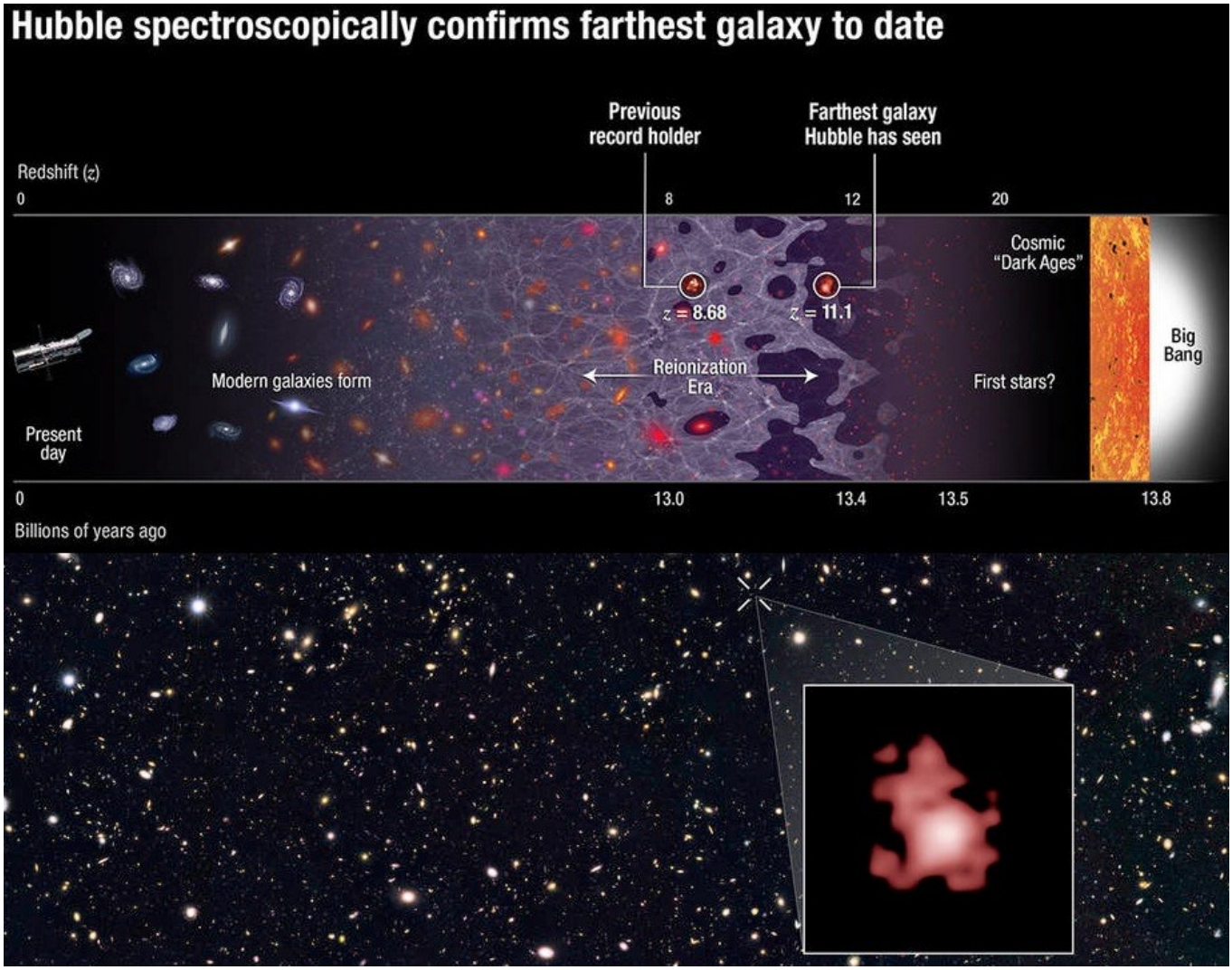
We also have Facebook group WAS – Wellington Astronomical Society (https://www.facebook.com/groups/96304353012/) which is open for anyone to join by request. The public group is open for discussion or postings on astronomical news.

Hubble Shatters The Cosmic Record For Most Distant Galaxy

This article is provided by NASA Space Place.

With articles, activities, crafts, games, and lesson plans, NASA Space Place encourages everyone to get excited about science and technology.

Visit **spaceplace.nasa.gov** to explore space and Earth science!



Images credit: (top); NASA, ESA, P. Oesch (Yale University), G. Brammer (STScI), P. van Dokkum (Yale University), and G. Illingworth (University of California, Santa Cruz) (bottom), of the galaxy GN-z11, the most distant and highest-redshifted galaxy ever discovered and spectroscopically confirmed thus far.

The farther away you look in the distant universe, the harder it is to see what's out there. This isn't simply because more distant objects appear fainter, although that's true. It isn't because the universe is expanding, and so the light has farther to go before it reaches you, although that's true, too. The reality is that if you built the largest optical telescope you could imagine -- even one that was the size of an entire planet -- you still wouldn't see the new cosmic record-holder that Hubble just discovered: galaxy GN-z11, whose light traveled for 13.4 billion years, or 97% the age of the universe, before finally reaching our eyes.

There were two special coincidences that had to line up for Hubble to find this: one was a remarkable technical achievement, while the other was pure luck. By extending Hubble's vision away from the ultraviolet and optical and into the infrared, past 800 nanometers all the way out to 1.6 microns, Hubble became sensitive to light that was

severely stretched and redshifted by the expansion of the universe. The most energetic light that hot, young, newly forming stars produce is the Lyman-α line, which is produced at an ultraviolet wavelength of just 121.567 nanometers. But at high redshifts, that line passed not just into the visible but all the way through to the infrared, and for the newly discovered galaxy, GN-z11, its whopping redshift of 11.1 pushed that line all the way out to 1471 nanometers, more than double the limit of visible light!

Hubble itself did the follow-up spectroscopic observations to confirm the existence of this galaxy, but it also got lucky: the only reason this light was visible is because the region of space between this galaxy and our eyes is mostly ionized, which isn't true of most locations in the universe at this early time! A redshift of 11.1 corresponds to just 400 million years after the Big Bang, and the hot radiation from young stars doesn't ionize the majority of the universe until 550 million years have passed. In most directions, this galaxy would be invisible, as the neutral gas would block this light, the same way the light from the center of our galaxy is blocked by the dust lanes in the galactic plane. To see farther back, to the universe's first true galaxies, it will take the James Webb Space Telescope. Webb's infrared eyes are much less sensitive to the light-extinction caused by neutral gas than instruments like Hubble. Webb may reach back to a redshift of 15 or even 20 or more, and discover the true answer to one of the universe's greatest mysteries: when the first galaxies came into existence!

Ethan Siegel

NACAA 2016 Symposium Report

The National Australian Convention of Amateur Astronomers (NACAA) is held once every two years, over Easter. This year it was held in Sydney, at the University of Sydney Camperdown Campus, and included the fourth Variable Stars South symposium (VSS4) and the tenth Trans-Tasman Symposium on Occultations (TTSO10). The next Convention will be in 2018, in Ballarat.

Five WAS members (Ed Budding, Murray Forbes, Warwick Kissling, and us, John and Aline Homes), and four others from New Zealand, attended the Convention. There was a significant New Zealand contribution to proceedings, with New Zealanders, including WAS members, making three presentations to the main Conference, three to VSS4, and one to TTSO10. WAS member Murray Forbes contributed presentations to all of these sessions.

In addition, three presentations were given by New Zealanders not present. WAS member John Talbot and Rangitikei observer Carl Knight gave presentations by proxy, and Brian Loader from Darfield, in Canterbury, made a presentation to TTSO10 remotely using the MeetCheap virtual meeting system. There were some glitches with that, but overall it should count as a success.

For us, the Convention started on Thursday evening, with a VSS dinner at the Duck Inn, Chippendale, not far from the Convention site. It was an enjoyable time, although we should note that the Aylesbury Duck For Two could more accurately be described as Aylesbury Duck For Four.

Most of Friday was given over to VSS4, which was largely concerned with Eclipsing Binaries, followed in the evening by the official opening of the main NACAA Convention.

The main Convention on Saturday and Sunday was split into two streams, so we could not attend everything. For the most part the choice for us was obvious, but I would have liked to be able to attend the Dark Skies presentation by Mike Chapman, and compare progress in Australia to that in New Zealand.

There was a wide range of presentations. For serious science, special mention should be made of Roy Axelsen's presentation on some Delta Scuti type variable stars. At less rarefied levels, I note that the Star of Bethlehem remains a perennial topic, and that Hristo Pavlov, well known for his work on using video cameras for occultations, is now interested in using them for variable stars.

The Convention Dinner on Saturday night was Place Service rather than buffet, and there was no free wine on the tables, but otherwise much like the RASNZ Conference dinner, including awards, and an after-dinner speech by Fred Watson. Some will remember Fred from when he performed the same role at the 2011 RASNZ Conference in Napier. Another entertaining speech from Fred.

TTSO10 started late on Sunday afternoon, overlapping with the last few presentations of the main Convention. Thus it was that I missed the presentation awarded "best in Convention" at the Sunday evening barbecue (this is Australia; there has to be a charbecue).

TTSO10 continued over Monday, including Brian Loader's MeetCheap presentation. I, perhaps foolishly, volunteered to do some html bashing for the Occultations Section reports. The applause may have been magnified somewhat by feedback in the PA system.

After TTSO10, we found a German restaurant on Broadway for dinner, and authentic German beer, and on Tuesday it was off on the morning train to Melbourne.

John Homes

VOLUME 46 ISSUE 4

Finders for Solar Scopes

The recent SunDay was held in clear skies – a nice bright, large Sun that should be easy to locate in a telescope. Well, it can actually be tricky. Finders must be removed or covered, and with the solar filter on all that is usually visible in an eyepiece is blackness. Scopes are aligned by aiming at the Sun, then adjusting to generate the smallest, round image shadow of the scope – when the shadow is round it must be pointing at the Sun.

Some H-alpha telescopes have special finders, but these tend be expensive – so a job for Google!

An early hit was:

http://www.dd1us.de/Downloads/a%20collection%20of%20solar%20finder%20designs%200v6.pdf

which is an up-to-date compilation of all the various commercial and custom-made solar finders known to the author, 'Matthias', and down-loadable as a PDF.

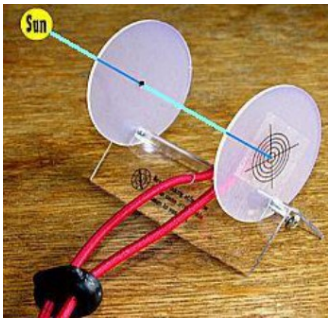
I was intrigued by the 'Helio pod', especially as this is fitted by elastic which would be quick to set up.

It could also be placed on the underside of the scope, and thus be usable even if a hood is used to shield direct sunlight from the observer. When tightened it should align itself with the scope and be pointing at the Sun. These cost US$20 inc p&p from the states - http://www.dynapod.com/dyna-hp1.html .

Thinking back to Murray's talk on 3-D printing, it could be possible to print a similar but more robust type of gadget for even less cost. Time to experiment – any other ideas?

Chris Monigatti

Example of how to align telescope using round image shadow



"Helio pod"

Professional Astronomy Research Experience: Magnetic Fields in Space

WAS has received the following from Dr. Lisa Harvey-Smith:

"*Dear Colleague,*

I am delighted to announce the launch of my Professional Astronomy Research Experience: Magnetic Fields in Space. In this course, students will embark on a voyage of astrophysical discovery using real data from major astronomical observatories.

The course provides an exciting insight into the world of astrophysics research, designed for the non-specialist to enjoy. It is suitable for amateur astronomers, science teachers, communicators, students, engineers, hobbyists - anyone with a solid knowledge of high-school physics and a passion to learn. In the theory section, you will learn about:

- *The Earth's magnetic field*
- *Electromagnetic waves*
- *Polarised radio emission from galaxies*
- *Ionised regions of the Milky Way*
- *Faraday rotation*
- *Electromagnetic radiation from atoms*
- *Astronomical coordinate systems*
- *Accessing astronomy research papers.*

In the research project, you will

Install astronomical imaging and data visualisation software (free of charge)

- *Download data from world-class optical and radio telescopes*
- *Find important physical quantities in the research literature*
- *Solve equations to calculate electron density and magnetic field strength*
- *Apply your techniques to different regions of the Milky Way*
- *Write up your results in a research report*

An online discussion board provides you with the opportunity to share and discuss your ideas with fellow students.

For a limited time I am pleased to offer you and your members a 10% discount using the drop-down box with the code ASTRO10.

For more details and to sign up, please visit my website.

With very best wishes,

Lisa"

www.lisaharveysmith.com

VOLUME 46 ISSUE 4

Global Star Party – Saturday 16 April 2016

Wellington Astronomical Society is celebrating Global Astronomy Month with Astronomers Without Borders and its Global Star party was on the 16th April. Communities all over the world had arranged to stargaze on the eve of the 16th to truly make it a global event.

We'd advertised in local newspapers and on the internet but we weren't sure what the turnout would be. We moved our position slightly away from Anderson Park to in between the cricket club room and the graveyard. This enabled us to greet passers by with a chance to look through our telescopes.

There were some minor issues with the clouds, but they were moving so quickly and there were enough big objects to look at that night that it didn't deter people. We were able to get a good look at the Moon, Jupiter, Saturn, Mars, the Jewel Box, Alpha Centauri, Acrux, and Omega Centauri. Not a bad selection!

We were impressed with how many people came to the event, and stuck around for hours waiting to see Saturn and Mars come out later in the evening. One passer-by even happened to have a blue filter in his bag so we were able to see great definition between the different colours of Jupiter, and towards the end of the evening the Great Spot.

It was great to see such a variety of people too – university students, young children, their parents and older chatting away about what they were looking at and what exciting space stories had been in the news recently. Some people worked in science and others had never looked through a telescope before. Proof once again that astronomy can bring the whole community together and can appeal to anyone!

WAS Global Star Party

2016 RASNZ Conference

This year's RASNZ Conference will be hosted in Napier by the Hawke's Bay Astronomical Society.

You don't need to be a RASNZ member to attend, anyone is welcome. However, RASNZ members qualify for a discount, so joining up may be worthwhile.

Usually 80 – 100 participants attend these conferences, so it pays to book accommodation early.

The guest speaker this year is Dr Michelle Bannister. Dr Bannister works on the Outer Solar System Origins Survey, which tries to understand the formation and evolution of the Solar System. Her main talk will be "Pluto: Once a Point of Light, Now a World", and she will also be giving a public lecture on Sunday afternoon.

Dates: Friday, 20th May to Sunday 22nd May

Venue: Napier's Museum Theatre Gallery, 1 Tennyson Street (near Marine Parade)

Details: http://rasnz.org.nz/Downloadable/Conference/2016%20RASNZConference%20Brochure.pdf.

NOTE: WAS will be hosting the 2020 RASNZ conference in Wellington. If you would like to be involved in the local organizing committee, please contact Antony Gomez or Chris Monigatti.

2016 RASNZ Conference Astrophotography Symposium

The 2016 RASNZ Conference (see previous article) will be followed by an Astrophotography Workshop. This 1.5 day event will cover everything from getting the images at the telescope through to processing the images at the computer.

The symposium will have a range of top New Zealand astrophotographers presenting talks and speaking from personal experience. In particular, Rolf Olson, arguably the best astrophotographer in New Zealand, will be sharing from his vast array of image processing skills.

Dates: Monday, 23rd May to lunchtime Tuesday 24th May 2016

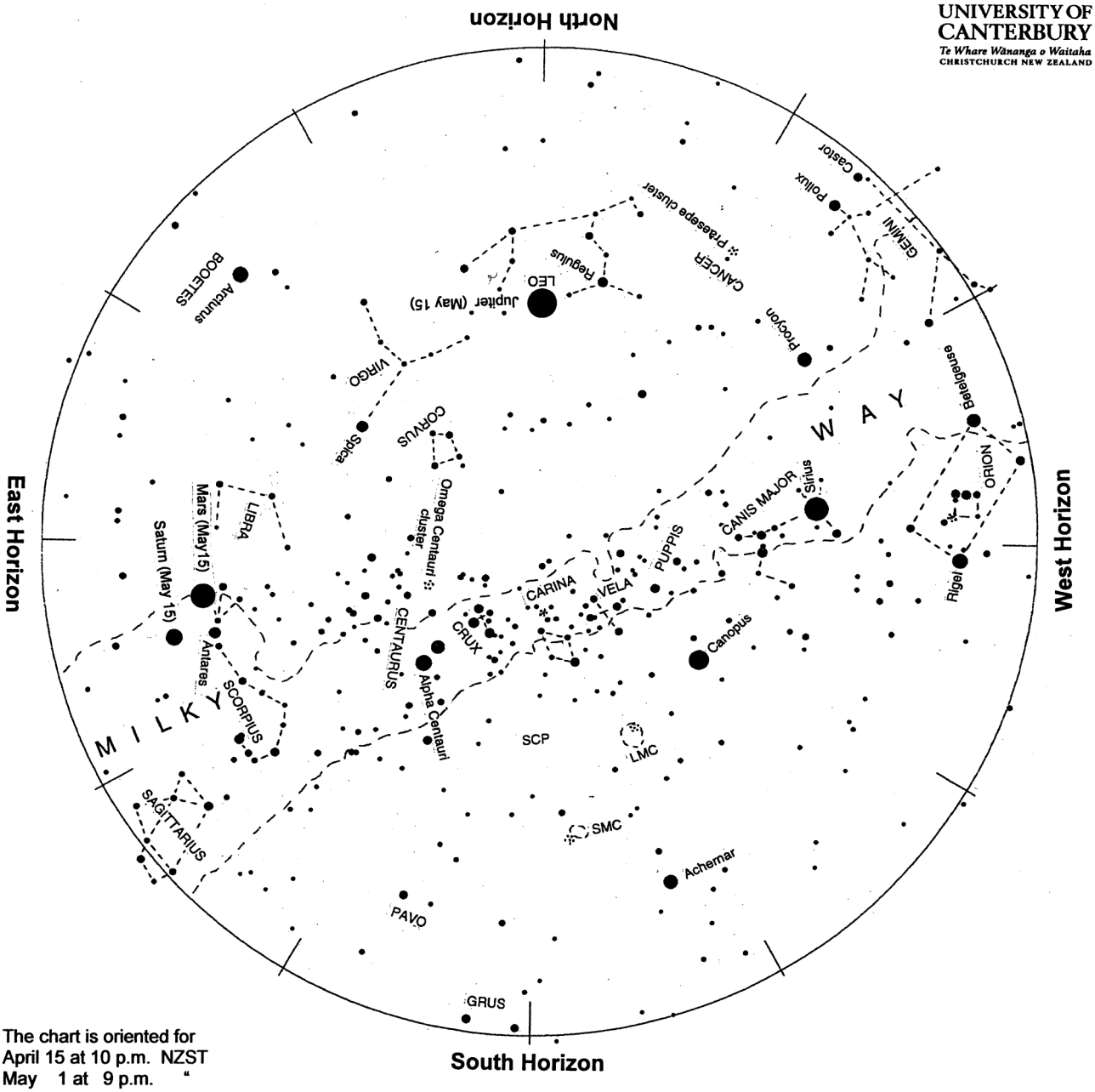
Venue: Hawke's Bay Holts Planetarium (on the grounds of the Napier Boys' High School, Chambers Street, Napier)

Registration: http://www.rasnz.org.nz/groups-news-events/conference-registration

Queries or Offers to give talks: john_drummond@xtra.co.nz

VOLUME 46 ISSUE 4

UC
UNIVERSITY OF CANTERBURY
Te Whare Wananga o Waitaha
CHRISTCHURCH NEW ZEALAND



The chart is oriented for
April 15 at 10 p.m. NZST
May 1 at 9 p.m. "
May 15 at 8 p.m. "
June 1 at 7 p.m. "

Evening sky in May 2016

To use the chart, hold it up to the sky. Turn the chart so the direction you are looking is at the bottom of the chart. If you are looking to the south then have 'South horizon' at the lower edge. As the earth turns the sky appears to rotate clockwise around the south celestial pole (SCP on the chart). Stars rise in the east and set in the west, just like the sun. The sky makes a small extra westward shift each night as we orbit the sun.

Three bright planets are in the evening sky. Golden Jupiter appears in the north soon after sunset. Orange Mars is in the east with creamy-white Saturn below it. Sirius, the brightest true star, is midway down the western sky. Directly below it is Orion with bright stars Rigel and Betelgeuse and 'The Pot' between them. Canopus is southwest of overhead. Low in the northeast is Arcturus, often twinkling red and green. Crux, the Southern Cross, and the Pointers, Alpha and Beta Centauri, are southeast of the zenith. The Milky Way spans the sky from southeast to northwest.

Chart produced by Guide 8 software; www.projectpluto.com. Labels and text added by Alan Gilmore,
Mt John Observatory of the University of Canterbury. www.canterbury.ac.nz

The Night Sky in May

Three bright planets and the brightest stars share the evening sky this May. Soon after sunset golden Jupiter appears in the north and orange Mars in the east. As the sky darkens Saturn appears below Mars and Sirius, the brightest star, appears northwest of the zenith. Canopus, the second brightest star, is southwest of overhead. Midway up the southeast sky are 'The Pointers', Beta and Alpha Centauri. Soon after dusk Arcturus appears in the northeast, often twinkling red and green as the air breaks up its orange light.

Below Sirius are bluish Rigel and reddish Betelgeuse, the brightest stars in Orion. Between them is a line of three stars: Orion's belt. To southern hemisphere star watchers, the line of three makes the bottom of 'The Pot', now tipped on its side. Sirius, 'the Dog Star', marks the head of Canis Major the big dog, now head down tail up in the west.

Crux, the Southern Cross, is southeast of the zenith, to the right of 'The Pointers'. Alpha Centauri, the brighter Pointer, is the closest naked-eye star, 4.3 light years* away. Beta Centauri, like most of the stars in Crux, is a very luminous blue-giant star hundreds of light years away. Canopus is also very luminous and distant: 13 000 times brighter than the sun and 300 light years away.

Orange Antares, right of Mars, marks the body of Scorpius, the Scorpion. Antares means 'rival to Mars' in Greek for the planet and star are often similar in colour and brightness (but not now). Antares is a red-giant like Betelgeuse; 600 light years away and 19 000 times brighter than the sun.

Arcturus, in the northeast, is the brightest red star in the sky but, at 37 light years, is much closer than Antares. It is about 120 times brighter than the sun.

The Milky Way is brightest in the southeast toward Scorpius and Sagittarius. In a dark sky it can be traced up the sky past the Pointers and Crux, fading toward Sirius. The Milky Way is our edgewise view of the galaxy, the pancake of billions of stars of which the sun is just one. The thick hub of the galaxy, 30 000 light years away, is in Sagittarius. The nearby outer edge is by Orion where the Milky Way is faintest. A scan along the Milky Way with binoculars shows many clusters of stars and some glowing gas clouds, particularly in the Carina region and in Scorpius.

The Clouds of Magellan, LMC and SMC, are midway down the southern sky, easily seen by eye on a dark moonless night. They are small galaxies. The Large Magellanic Cloud is 160 000 light years away and is about 5% the mass of our Milky Way galaxy. The Small Cloud is around 200 000 light years away and 3% the mass of our galaxy. That's still many billions of stars in each.

Mars is closest to Earth at the end of May. It will then be 75 million km away. It is a small planet, half the diameter of Earth, so never looks big in a telescope. At this approach one needs to magnify Mars 100 times to make it appear as big as the full Moon does to the naked eye. We catch up on Mars and pass it by every 26 months. At the next pass or 'opposition' in 2018 Mars will be 58 million km away and appear 1/3rd bigger than now.

At the beginning of May Jupiter sets around 2 a.m., reducing to around midnight by month's end. Jupiter is 750 million km away. It is always worth a look in a telescope. Its four big 'Galilean' moons look like faint stars near the planet. One or two can be seen in binoculars. All four are easily seen in any telescope magnifying 20x or more. Sometimes one or more of the moons will be invisible as they pass in front of, or behind, Jupiter. The Moon will be near Jupiter on the 15th.

Saturn is a great sight in any telescope with its rings now near maximum tilt. It is 1360 million km away. Titan, its biggest moon, orbits four ring diameters from the planet. Three or four smaller moons can be seen in larger telescopes closer to Saturn.

Notes by Alan Gilmore, University of Canterbury's Mt John Observatory, P.O. Box 56, Lake Tekapo 7945, New Zealand.

www.canterbury.ac.nz