

CAS MAG

The official magazine of the Canterbury Astronomical Society

CAS home page: <http://www.cas.org.nz>

Monthly Meeting and Practical Astronomy: Tuesday 17th September
from 7:00 p.m., in room F3 of the School of Forestry, University of Canterbury.

Monthly Speaker: Dr. Loretta Dunne-Seeing the Stolen Starlight with Herschel

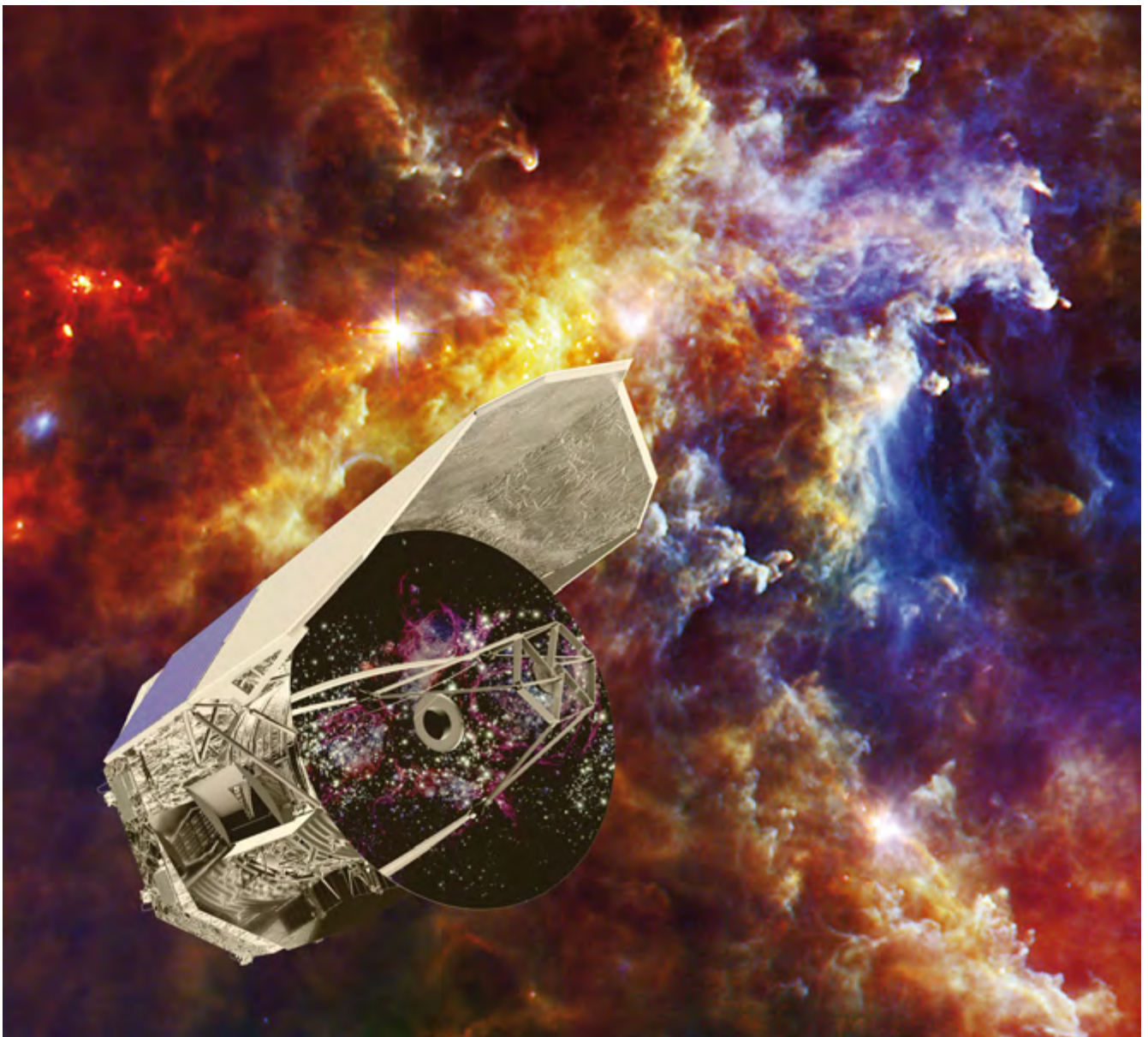


IMAGE CREDIT ESA - C. Carreau

This artist's impression of ESA's Herschel space observatory is set against a background infrared image of the Rosette molecular cloud, the star forming area in the Rosette Nebula. The bright spots contain massive protostars, each one up to ten times the mass of our own Sun. The Herschel Space Observatory completed its amazingly successful four year mission earlier this year, having run out of liquid helium coolant. This month's speaker Dr. Loretta Dunne will highlight some of Herschel's main discoveries and along the way show some of the most beautiful images ever made in astronomy! See page 5 for more

CAS Contact Information

Canterbury Astronomical Society Inc.
PO Box 25-137
Victoria Street Post Office
Christchurch 8144
Web: www.cas.org.nz

West Melton Observatory

43° 29' 55.5" S, 172° 20' 59.0" E

218 Bells Road, West Melton
Observatory phone: 347-9261

Public open nights for 2013 will be held every second Friday evening **Friday 19th April – Friday 20th September**. To make a booking inquiry follow the Open Nights link on the CAS website to find out which nights are available. For all other inquiries and bookings please email bookings@cas.org.nz

CAS Meetings

Monthly meetings are held on the 3rd Tuesday of each month from February to November at 7:45 pm, in room F3 of the School of Forestry building, University of Canterbury. Meetings begin with tea/coffee, followed by a 45 minute talk from an invited speaker as advertised on the front cover of CASMAG. Meetings are preceded by Practical Astronomy, from 7:00-8:00 pm in room F3 of the School of Forestry building. This is a friendly, informal meeting open to all interested people, with particular emphasis on new and beginning astronomers. Check the CAS website for details of the topic to be covered each month. Attendees are welcome and encouraged to stay for both meetings. N.B. Meetings were previously held in the Law Building but remediation of that building has required our change of venue for 2013.

CAS Committee and Officers 2013/2014

President	Euan Mason	president@cas.org.nz
Vice President	Adrian Kelly	vice.president@cas.org.nz
Treasurer	David Brian	treasurer@cas.org.nz
Secretary	Jan Fortune	secretary@cas.org.nz
Observatory Director	Blair Wilson	observatory.director@cas.org.nz
Editor	Sharlene Mullen	editor@cas.org.nz
Membership Secretary	Ryan Ridden-Harper	membership@cas.org.nz
Librarian	Colin Fortune	librarian@cas.org.nz
Web Master	Blair Wilson	webmaster@cas.org.nz
Committee Members	Malcolm Carr	malcolmcarr@clear.net.nz
	Gary Steel	borealis@clear.net.nz
	Andrei Cotiga	acotiga@yahoo.com
	Brenna Gamperle	bgamperle@gmail.com

Public Nights and Group Bookings Sharlene Mullen bookings.liaison@cas.org.nz

For more specialized information see the contact information page on www.cas.org.nz

CAS Membership

Subscriptions (as listed below) are due 1 April. Fees for current members who renew before 31 May, and new members joining in 2013/14, will be discounted to the amount shown in brackets, i.e., there is a \$10 discount for Adult members etc. Financial year: April to March
Adult (full) membership \$70 (\$60)
Family membership \$105 (\$90)
All other classes (Junior, Senior citizen, Student, Community Services \$35 (\$30))

Contributions to CASMAG

Member contributions to CASMAG (e.g., letters, observing notes, articles, news) are most welcome. Please submit articles to The Editor, CASMAG, PO Box 25-137, Christchurch 8144, or email to editor@cas.org.nz. The deadline for the next issue is the 1st of that month. Small personal advertisements (less than 8 lines in a column) are free to financial members. Charges for larger items range from \$5 to \$40; email the editor for full details.

Disclaimer

This newsletter is for general information purposes only. The views expressed herein are not necessarily those of the Canterbury Astronomical Society Inc. (CAS). CAS has taken all reasonable measures to ensure that the material contained herein is correct, but gives no warranty for, and accepts no responsibility for, its accuracy or completeness. Readers are advised not to rely solely on this information, and should seek independent advice before making any decision. CAS reserves the right to make changes at any time, as deemed necessary.

CAS Calendar, September- November 2013

September						
Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

October						
Su	Mo	Tu	We	Th	Fr	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

November						
Su	Mo	Tu	We	Th	Fr	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

 Special event	 Monthly meeting
 Public holiday	 Members open night
	 Public open night

September Events

Friday 6th September - Monday 9th September

Herbert Star Party

Children aged between 5 and 12 years=\$10 per night, aged between 13 and 18=\$13 per night. Adults= \$15 per night(or \$33 per adult for the 3 nights)

Keep an eye out for updates on www.treesandstars.com/herbert/ (updates will be made for this year's event shortly) , [Facebook](#) or contact Ross Dickie (radickie@xtra.co.nz).

Tuesday 17th September CAS General Monthly Meeting and Practical Astronomy

Monthly Speaker-Dr. Loretta Dunne-Seeing the Stolen Starlight with Herschel

Until Friday 20th September: Public Open Nights

Our 2013 Open Nights began on Friday 19 April, and will run every second Friday night until the 20th September. Volunteers wanted! If you think you may be able to assist or would like to know more about what is involved, please let us know by emailing the open night organisers at bookings@cas.org.nz. Even if you are only able to assist on one night, your help is greatly appreciated.

Looking forward

Friday 11th October - Sunday 13th October 2013, Starlight Festival

The Festival will comprise a mix of scientific, educational and cultural events over three days, designed to attract school students, family groups and members of the public who are interested in learning more about the stars, the night sky, the problems of light pollution and the appreciation of the environment and outer space.

See website for more details www.starlightfestival.org.nz



Tuesday 15th October CAS General Monthly Meeting and Practical Astronomy

Monthly Speaker-Prof. Robert Lambourne-Faster than Light Galaxies

Saturday 7th December -CAS Summer Star Party at the West Melton Observatory, Saturday 7th December, 2013, 4:00pm. Our annual Mid Summer Star Party, wet or fine. This is a great opportunity to catch up with other members of the society.

All members and their families welcome. See you there.

Friday 28th February 2014-Monday 3rd March 2014-Stardate SI-Staveley .

Mark it in your calendar and stay tuned for more details closer to the time.

Notices

New Observatory Phone Number

Recognizing that the annual cost of our fixed land-line is a significant expense for what is a little-utilized asset, the committee has elected to replace the observatory telephone with a pre-pay cell-phone. The new cell-phone is permanently installed in the 5m dome entrance area, where there is power available and good reception. The cell-phone is for incoming calls and emergency use only, with only a minimal pre-pay balance being maintained. The observatory's new phone number is 021 143 6589.

For Sale:

An 8" LX90 Schmidt-Cassegrain Telescope with Autostar Hand Controller
please contact Jill 03 3388073 for further details.

Don't miss out on getting your CASMAG. To check if you are fully paid for 2013 please contact the Membership Secretary, Ryan Ridden-Harper, membership@cas.org.nz.

BE IN TO
WIN

one of these each month until the end of 2013.

SEPTEMBER'S PRIZE IS ...

Hubble - ESA's anniversary DVD film "Hubble - 15 years of discovery" covers all aspects of the Hubble Space Telescope project - a journey through the history, the troubled early life and the ultimate scientific successes of Hubble.

TO ENTER THE DRAW email the answer to the competition question that follows, along with your full name to editor@cas.org.nz by 5pm Tuesday 17th September. Winner will be drawn from correct entries at the CAS main meeting. You must be at the September CAS main meeting to claim the prize if your entry is drawn. There will be an immediate redraw if the entrant is not present.

The Herschel Space Observatory completed its amazingly successful four year mission earlier this year, after running out of what?



Monthly Speakers -CAS Member Meetings 2013

The CAS main meeting is held at 8:00pm on the 3rd Tuesday of the month (except December & January), in room F3 of the University of Canterbury School of Forestry. The main meeting at 8:00pm is preceded by the Practical Astronomy for All Ages meeting from 7:00pm to 7:45pm, in room F3 of the University of Canterbury School of Forestry. All members are welcome to attend either or both meetings.

February	Euan Mason	In the footsteps of Tycho Brahe: A pilgrimage to Hven
March	Graeme Kershaw	TOWNSEND TELESCOPE How bad is the damage?
April	Ryan Ridden-Harper	Miss, Are there other planets?
May	Prof. John Hearnshaw	Aoraki Mackenzie Starlight Festival and Dark Sky Reserve.
June	Doug Walker	Work on variable stars and eclipsing binaries with GNAT (The Global Network of Astronomical Telescopes)
July	Andrei Cotiga	Astrophotography
August	Martin Unwin	The Unique Astronomer: Occultations, Eclipses and the Transit of Venus
September	Dr. Loretta Dunne	Seeing the Stolen Starlight with Herschel
October	Prof. Robert Lambourne	Faster than Light Galaxies



Seeing the Stolen Starlight with Herschel -Dr. Loretta Dunne (September's invited Speaker)

The Herschel Space Observatory completed its amazingly successful four year mission earlier this year, having run out of liquid helium coolant.

It was the first telescope to show us the 'sub-millimetre' universe - opening up a new part of the spectrum where we are able to look at the really cold stuff in space. Herschel was able to peer into the hearts of the darkest coldest molecular clouds and see the first stages of star formation, it also discovered hundreds of thousands of galaxies which are full of cosmic dust - allowing us to recapture the stolen starlight and piece together the real action of galaxy formation over the history of the universe.

I'll highlight some of Herschel's main discoveries and along the way show some of the most beautiful images ever made in astronomy!



A new view from ESA's Herschel space observatory of the iconic Horsehead Nebula (right) and two other prominent sites where massive stars are forming, NGC 2068 and NGC 2071

Image credit: ESA/Herschel/PACS, SPIRE/N.

Observatory Directors Report - Blair Wilson

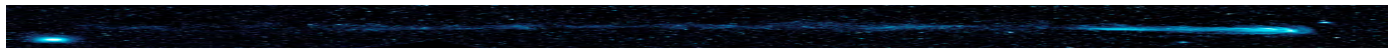
The August mini working-bee saw an excellent turnout of helpers, many of those present being newer members to the society showing great enthusiasm to get involved. With so many on hand the relatively short jobs list was completed in record time, with yours truly being the sole straggler, finally completing work on levelling-off the concrete mound on the upper terrace. A big thankyou to all those who gave up their Saturday afternoon to help keep our site looking great.

With so many members on hand and little else to do, an impromptu early training session on the 16" observatory was ably run by trainee Malcolm Locke, supervised by Gary, before everyone broke for dinner. Dinner ran a little later than planned, but the advertised training session on the 16" observatory went ahead, with more trainees demonstrating to the assembled members the ins-and-outs of operating the observatory and telescope.



There will be more of these members' night training sessions held over the coming months, the next being this coming members' night September 21st, from 7pm to 9pm.

Now is a good time to also mention the re-formation of the accreditation subcommittee, this year consisting of Euan Mason, Adrian Kelly, David Brian, Gary Steel and myself, and to remind everyone of the new observatory phone number: 021 143 6589. 📞



From the Librarian- Colin Fortune

Library Notes

Attended the second Australian Astrophotography Conference on Queensland's Gold Coast last weekend and met, amongst many others Ron Wodaski who is the author of *The New CCD Astronomy*, the book that helped start the revolution in CCD imaging. Ron has been holding Astro Imaging Camps in New Mexico for several years, and the book "*NewAstro Zone System*" is based on Ron's classes at the camps. We now have a copy of this book to include in the Library.

"The NewAstro Zone System gives astro imagers the tools they need to master Photoshop for image processing. These techniques apply to astro CCD cameras, digital cameras, and even film scans.

The Zone System shows you how to handle colour, use Curves and Levels, and the book is filled with tutorials and Photoshop tips. Practice files are included on a free DVD. The DVD also contains many additional tutorials in video format so that you can learn at your own pace."

Review – Amazon.Com

The Conference was a great success and brought together many well-known names in Astro Imaging, I shall try to put together a full article next month when I have sorted the hours of video I shot over 3 days.



Transit of Venus experience- Blair Wilson

What a wonderful recount of Martin's Transit of Venus experience. Perhaps not as successful as Martin's, we had rather an eventful transit too...

We were greatly looking forward to observing the Transit of Venus, with a much-anticipated long-weekend in Tekapo planned for the event. The society had published few plans for the day, other than the possibility of an informal meeting and barbecue at the observatory and no advertised public outreach. Two weeks out from the date, with excitement growing for our long-weekend getaway, Sharlene was approached by the Director of Mt John Observatory who wanted to know what CAS had planned and could CAS assist with their event on the University campus? At the time, the correct answer seemed to be "Sorry, no, CAS can't help", but to tell the University of Canterbury that, and to fend-off an opportunity to be involved in such a well organized and highly publicized event just did not seem right, so Sharlene instead said she'd find out and get back.

With little time available to respond, and no response from committee, Sharlene and I agonized over the problem and eventually decided we would sacrifice our long-weekend in Tekapo to represent CAS at the University, committing to be there for the whole morning and allowing us the option to leave at lunch time if viewing from campus was not possible. We hoped other CAS members would help but felt that even if it was only the two of us, at least CAS would be represented and would not be letting the University or the Society down. Sharlene sought advice from Steve, the CAS President, explaining the situation and what we were prepared to do, Steve was very supportive and agreed we should email members to ask for support, which we did. Happily we received support from two other members, one who had been planning a visit to a local school, but whose school had canceled to be involved in the University activities instead.

So our weekend plans changed; instead of staying in Tekapo for the Wednesday, we would return to Christchurch on Tuesday to fly the CAS flag on campus. I printed up CAS business cards to have available for visitors, batteries were charged, telescopes and solar filters were checked and readied. We had already left solar-viewers with family in Townsville (Northern Queensland) the previous Christmas, and we were able to get a few more pairs from the Physics and Astronomy department to take with us.

We left for Tekapo early Saturday afternoon, a late start but we'd been looking forward to this for months.

We'd barely left Christchurch when the phone rang. One of those moments nobody wishes for, Sharlene's father had suffered a heart attack and had been admitted to hospital in Invercargill. That was tough news for both of us, with my father passing away from a heart attack only a few months earlier. Waiting on the side of the road where we'd found good cell reception, we found out Sharlene's father was stable and likely to be transferred to Dunedin on Monday, Sharlene was even able to talk to him for a while, but jokes and laughter didn't really ease the fear in the backs of our minds.

Tekapo was magic, brilliant weather, visits to Mt John, hot-pools, fun around the lake, photo opportunities everywhere in the crisp winter sun. We were able to keep in contact with Sharlene's Dad who seemed to be doing okay and was confirmed to be transferring to Dunedin on the Monday. Tuesday dawned, we were up early to check out of our cabin, and the decision was made we'd take the long route home via Dunedin so we could visit Sharlene's father in hospital. Tuesday afternoon in Dunedin turned out wet, very, very wet, but Mr Mullen was doing great and after an operation was going to be kept in for another couple of days. We were so happy to have been able to visit, and were able to hand out solar viewers to the whole family for the following day. Under the circumstances we didn't want to leave Dunedin, but we had a commitment in Christchurch and felt we couldn't let the society down. It was a long drive home, knowing what we were leaving behind.



Wednesday. What's the worst weather you could ask for if you had a big solar event to view? Snow storm? Yep. University was closed, event canceled. Sharlene's father was still in Dunedin hospital where we'd left only half a day earlier. The 4WD was still loaded up from the weekend, so we jumped in and headed South, chasing patches in the cloud. Oamaru was our turnaround point, almost an hour spent in the cold at the lookout on the hill, hoping the little patches of thin cloud amongst the murk might scoot across the sun, but not to be.

Best part of the weekend?

- All the feedback we got from family in Townsville who'd been showing the transit to everybody they could with the solar viewers we'd left them.
- Mr Mullen's reports from his hospital bed, brilliant sunshine, full view of the transit with the solar viewers we'd left.
- The two minutes of clear sky we got at the Waimate turnoff, our only glimpse of the transit (but we DID get to see it!)


Worst part of the weekend?

- Leaving family in Dunedin hospital to meet a CAS commitment.
- Sacrificing our relaxed weekend away to fly the CAS flag only to have it kick up a storm within the committee and seemingly come back to bite us.

It's experiences like this that sometimes make us question how much time we put into the society, but we're learning to moderate it, we have to remember that we love this hobby, we have hope for the society, and it's where we met.



Heather's obs... BINO POWER.

Hello again everyone... To the north is a constellation that looks like it's name, - Sagitta The Arrow. It has two stars to the left, one under the other, then tapers down to two stars in a line widely spaced. In other words, it is the shape of an arrow.. Between the middle and last star and 'just' above, is a faint glob of M71.. Well, woo hoo, you may say, 'how exciting', but wait, there's more;--- Go back to the two stars the 'head' of the arrow, [I expect the blunt end of an arrow is not really called, The Head of it,-- Is it? but then, what do I know about arrows!] Anyway, from those two stars, go a little left and a little down,-- [you are now in Vulpecula the Fox] and tell me what you see; -- A straight line of six stars, and, a hook at the top,-- yes, it is a Coathanger !!!! This cluster is called Brocchi's cluster, Collinder 399, AND, The Coathanger.-- Now, go to the tip of the arrow [back to Sagitta] and you will find a nice orange star. Go down from that, [back in Vulpecula] sometimes very slightly left of the orange star depending on the orientation of the arrow, and you will find a slightly elongated misty patch, which is M27 aka the Dumbbell Nebula, which is a planetary nebula in the shape of a dumbbell,-- good to see through larger binos, or scope... Lots of stuff going on in these two constellations.. Enjoy... happy hunting from Heather... 

Venus is the brilliant 'evening star' appearing in the west soon after sunset. Saturn is above it at the beginning of the month but much fainter. On the morning of the 9th the moon will be close to Venus, allowing the planet to be found by naked eye in the daylight. By that evening the moon will be midway between Venus and Saturn. Venus stays about the same altitude each evening through the month while Saturn slides lower. Around the 17th the two planets will be level. On the 25th Mercury will make a close pairing with fainter Spica, below Saturn and Venus.

At the end of September Venus, Saturn and Mercury will make a long triangle low in the west. Through the month Venus will be setting after 10 pm., so will be brilliant against the dark night sky. It casts shadows in dark places.

The apparent grouping of the planets is just a line-of-sight effect. At the end of the month Venus is 137 million km from us; Mercury is 172 million km; Saturn is 1600 million km.

The Milky Way spans the sky from north to south. Many of the brightest stars are scattered along it or near it. Two exceptions are Canopus, near the south skyline, and Arcturus, setting early in the north-west. Both stars are shining through a lot of air which makes them twinkle colourfully. Canopus, being white, shows all colours like a diamond. Orange Arcturus twinkles red and green.

Midway down the southwest sky are 'The Pointers', Beta and Alpha Centauri. They point down to Crux the Southern Cross. Alpha Centauri is the third brightest star. It is also the closest of the naked eye stars, 4.3 light years* away. And it is a binary star: two sun-like stars orbiting each other in 80 years. A telescope magnifying 50x will split the pair. Beta Centauri, along with most of the stars in Crux, is a blue-giant star hundreds of light years away.

Canopus is the brightest star in the evening sky. It is near the south skyline at dusk then swings upward into the southeast sky through the morning hours. Canopus is a truly bright star: 13 000 times the sun's brightness and 300 light years away. On the opposite horizon is Vega, one of the brightest northern stars. It is due north at dusk and sets in the late evening.

West of overhead the orange star Antares marks the heart of the Scorpion. The Scorpion's tail hooks toward the zenith like a back-to-front question mark, the 'fish-hook of Maui' in Maori star lore. Antares is a red giant star: 600 light years away and 19 000 times brighter than the sun. Red giants are stars wringing the last of the thermonuclear energy out of their cores. Antares is expected to explode as a supernova in a few million years. Above Scorpius is 'the teapot' made by the brightest stars of Sagittarius. It is upside down in our southern hemisphere view.

The Milky Way is brightest and broadest overhead in Scorpius and Sagittarius. In a dark sky it can be traced down past the Pointers and Crux into the south. To the north it crosses Altair, meeting the skyline right of Vega. 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 actual centre is hidden by dust clouds in space. The nearer clouds appear as gaps and slots in the Milky Way. A scan along the Milky Way with binoculars shows many clusters of stars and some glowing gas clouds, particularly in the Carina region below Crux, and in Scorpius and Sagittarius.

The Large and Small Clouds of Magellan, LMC and SMC, look like two misty patches of light in the south sky. They are easily seen by eye on a dark moonless night. They are galaxies like our Milky Way but much smaller. The LMC is about 160 000 light years away; the SMC about 200 000 light years away. Jupiter (not shown) rises in the northeast around 4 a.m. NZST, mid month. It is the brightest 'star' in the morning sky and shines with a steady golden light. At dawn it is low in the northeast sky. A small telescope easily shows its four big moons. Jupiter is 820 million km from us mid month.

*A light year (l.y.) is the distance that light travels in one year: nearly 10 million million km or 10¹³ km. Sunlight takes eight minutes to get here; moonlight about one second. Sunlight reaches Neptune, the outermost major planet, in four hours. It takes four years to reach the nearest star, Alpha Centauri.

Aoraki Mackenzie Starlight Festival. Friday 11th until Sunday 13th of October



The Starlight Festival will take place in Tekapo next month from the 11-13th October to celebrate the creation of the southern hemisphere's first International Dark Sky Reserve, in the Mackenzie Basin and at Aoraki/Mt Cook National Park. The Festival will comprise a mix of scientific, educational and cultural events over three days, designed to attract school students, family groups and members of the public who are interested in learning more about the stars, the night sky, the problems of light pollution and the appreciation of the environment and outer space. The events will include stargazing, lectures, a concert, an essay and poetry competition, documentaries on the night sky, a photographic exhibition, and more.

Weekend passes are available.

See www.starlightfestival.org.nz for full programme details.

Starlight BBQ
(barbecue food available)
with Earth and Sky and Canterbury Astronomical Society and Fraser Gunn Astrophotography Cowan's Hill Observatory Tekapo.

Earth and Sky Treasure Hunt at Mt John University Observatory, including astronomy booklet and activities

Public talk by UK astronomer Dr Karen Masters on 'A Zoo of Galaxies' Lake Tekapo Community Hall

Presentation of winners of Margaret Mahy essay/poetry competition Lake Tekapo Community Hall

Documentary 'The City Dark': Acclaimed US documentary on light pollution and stargazing Lake Tekapo Community Hall

Opening ceremony:
Includes powhiri, talk by Dr Pauline Harris, opening of photographic and art exhibition, wine and refreshments, documentary 'Venus-A quest' Godley Hotel, Tekapo

CSM Christchurch Youth Orchestra concert: 'Symphony under the Stars' with conductor Luke di Somma. Tekapo Springs ice rink

A day with astronomers:
Visit Mt John Observatory, look at telescopes, discuss research programmes, chat to astronomers Mt John University Observatory

Photographic Exhibition Godley Hotel, Tekapo free

The Solar System Challenge Project with Freidl Hale Lake Tekapo foreshore



'Human Spaceflight, past, present and indefinite future',
with NASA astronaut Marsha Ivins
Lake Tekapo Community Hall

Building your Galileoscope and learning how to use it then Sky viewing with your Galileoscopes Lake Tekapo Community Hall

Observing the Sun using solar telescopes, with Drs Steve Maddox and Loretta Dunne Lake Tekapo Community Hall

Earth and Sky night tour to Mt John University Observatory.

CALLING ALL MEMBERS!!!
We need all members we can possibly get to help CAS co-host the starlight BBQ at Cowan's Hill on the Saturday night alongside Earth and Sky and Fraser Gunn. We especially need members who can bring their telescopes! If any question, especially for help with transport and accommodation please email president@cas.org.nz

CASKids Space

News and information for the little astronomers

Beyond the Horizon

For a long time people believed that the Earth was flat and that if you sailed too far you'd fall over the edge! It seems funny they could have thought that, because now we're lucky enough to have pictures of our entire planet and we can see its shape. But it took some pretty impressive technology to get these pictures, which wasn't available to our ancient ancestors. Did you know you have to travel about 20,000 kilometres from Earth to be able to see the entire planet?

Now imagine how far into space you'd have to travel to fit all the 300 billion stars of the Milky Way (our Galaxy) into one shot! This is way beyond our abilities at the moment, but we can photograph small sections of the Galaxy. This picture from the Chandra X-ray Observatory shows the very centre of the Milky Way. This is the most chaotic and dangerous part of the Galaxy, and home to a supermassive black hole.

Anything that gets too close to a black hole is pulled into it with such a strong force that it has no chance of escape. The boundary that marks the point of no return is called the event horizon. Past this not even light will return: this monster will pull it in forever. The blue haze in this picture includes piping-hot gas floating perilously close to the event horizon of our Galaxy's supermassive black hole. But astronomers have found that just a tiny amount of this gas will be gobbled up by the black hole, and the rest will be "spat out" before it gets too close.



This is a picture of the Earth as a whole planet from space. It was taken by astronauts during the Apollo 8 mission in 1968. This was the first manned spacecraft to reach the Moon, which they orbited around before returning safely to Earth. The crew were the first people to ever see this view of Earth! Photo credit-NASA



This picture from the Chandra X-ray Observatory shows the very centre of the Milky Way, with the supermassive black hole Sagittarius A* (Sgr A*) located in the middle.. This is the most chaotic and dangerous part of the Galaxy, and home to a supermas-

Thankyou to unawe.org for use of this Space Scoop based on a Press Release from [Chandra X-ray Observatory](#).

APPLICATION FOR MEMBERSHIP



To: The Membership Secretary

Canterbury Astronomical Society Inc.
 P.O.Box 25-137
 Victoria Street
 Christchurch 8144

Receipt #:

Date:

Elected:

Member advised:

Editor advised:

Applicant's name in full (block letters): _____

Address: (Note: a P.O. Box is NOT a legal address) _____

Phones: Home: _____ Work: _____ Mobile: _____

eMail: _____ Date of birth (if under 18) _____

Occupation: _____

Membership Category (subscription must accompany application. [Discounted if paid by 31 May](#))

*Please circle your selection

\$70	\$60	Adult (any person 18 years of age or over who is not eligible for any other category)
\$105	\$90	Family (two or more persons living at the same address) §
\$35	\$30	Junior (under 18 years of age on 1 April of the current year)
\$35	\$30	Senior Citizen (over 65 years)
\$35	\$30	Community Services Card holder
\$35	\$30	Student (any person studying full-time at a tertiary institution; must reapply annually)
\$210	\$180	Corporate (members have voting rights of one member but cannot take office)

§ If family membership, please list the other persons involved.

Name	Date of birth (if under 18)	Signature

All CAS members receive CASMAG, a monthly newsletter. Would you prefer to receive this

☐ by email as a .pdf attachment?☐ or by post as a hard copy?

Do you have access to a telescope? What type and size? _____

What are your astronomical interests? _____

I, the undersigned declare that the information given herein is true.

Signature: _____ Date: _____

Proposer: _____ Second: _____

Address: _____ Address: _____