



## CAASTRO NEWSLETTER, Edition #6, December 2012

### Update from the CAASTRO Director

The year now ending has been a very strong one for CAASTRO. A lot of 2011 was spent getting things set up, but we knew that 2012 had to be all about doing science. And indeed there are now some excellent research results coming out of all three science themes - you can read some research highlights below.

We launched our CAASTRO-wide mentoring program in August 2012, and by now almost all our mentors and mentees have paired up. The feedback I've been getting is that this has been a positive and useful experience, but note that this is still very much an experimental activity that we are monitoring closely. Participants in the program are encouraged to provide confidential feedback to [coo@caastro.org](mailto:coo@caastro.org) at any time.

The last couple of months have been full of major meetings and events. At the start of November, the CAASTRO Advisory Board met for two days in Sydney, where they carried out an extensive review of our research, outreach and other programs. They also heard several science presentations from our staff and students. Overall the Advisory Board was very pleased with all we have accomplished - they particularly highlighted the quality of our research, plus our efforts in "social engineering" (gender equity, flexibility, mentoring, etc). Thanks to all who gave presentations to the Board, and who took time to chat with them over lunch.

In the middle of November, CAASTRO hosted two workshops: on GPU programming in Perth, and on the global reionisation signature in Sydney. Both were highly successful, with a number of stimulating discussions and new ideas. The reionisation workshop concluded with the official opening of our headquarters in Redfern by NSW Deputy Premier Andrew Stoner.



Opening of the SIFA and CAASTRO headquarters in Redfern. L to R: Prof Peter Tuthill (SIFA Director), Prof Bryan Gaensler (CAASTRO Director), The Hon Andrew Stoner (NSW Deputy Premier). Photo courtesy of Deb Gooley.

A busy November culminated in the CAASTRO Annual Retreat. I enjoyed myself enormously at this event, both in terms of learning so much new science, and getting to meet the many new members of our Centre. There was a strong sense throughout the Retreat that CAASTRO is doing something new and unique in Australian astronomy. I congratulate Kate Gunn, Ruth Jeffries and the rest of the CAASTRO admin team on their superb organisation, which made the event an unquestioned success. Early planning is already underway for the 2013 Annual Retreat, which will take place 20-22 November 2013 in Victoria.

The flagship facilities that CAASTRO aims to exploit for its science are beginning to swing into gear. The ASKAP and MWA projects were both separately launched at the Murchison Radio Observatory site in October/November, and our LIEF proposal to join PanSTARRS was successful. We are also in ongoing negotiations with the German eROSITA collaboration about the possibility of joint research projects between eROSITA and CAASTRO.

I wish a happy holidays and New Year to our CAASTRO team and also to our wider group of collaborators and supporters. We have set ourselves ambitious goals for 2013, which I look forward to working with you to deliver.

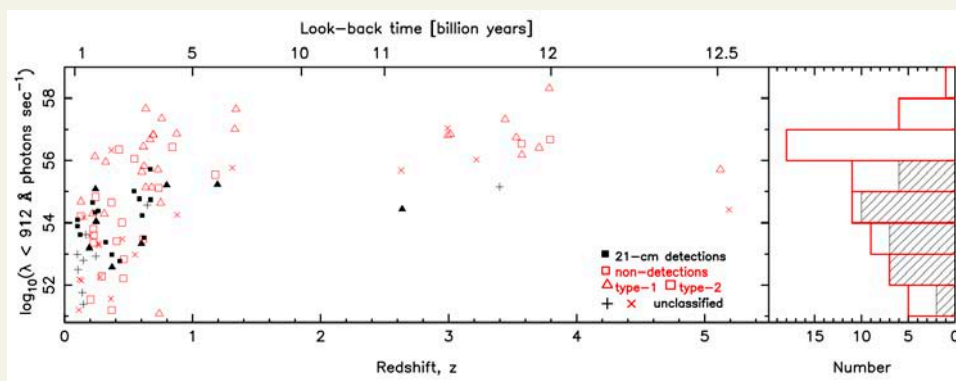
Bryan Gaensler, CAASTRO Director

## Research Update

CAASTRO has published 43 refereed papers in 2012, with a further 12 papers under review. Three highlights are as follows:

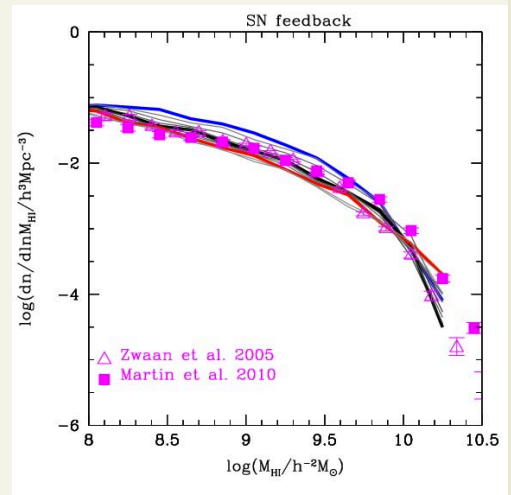
- **Stephen Curran** and **Matthew Whiting** have found that the [non-detection of 21-cm in high redshift radio sources](#) is due to all of the neutral gas (HI) being ionised by the active nucleus, thus rendering these galaxies devoid of star forming material.

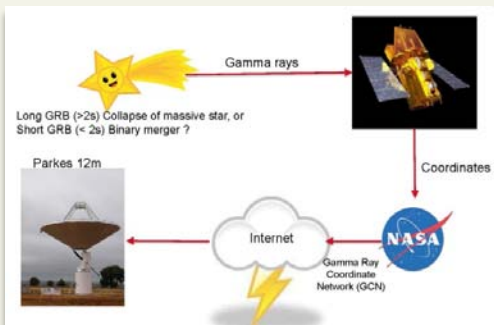
The figure below shows that cool neutral gas, through 21-cm absorption, has never been detected above a critical ultraviolet luminosity (i.e. ionising photon rate). This observed critical value is reproduced when the equation of photoionisation equilibrium is applied to the HI distribution of the Milky Way, indicating that this is the critical value required to ionise all of the gas in a large spiral galaxy.



- **Hansik Kim, Chris Power, Stuart Wythe and collaborators** have used theoretical galaxy formation models to investigate what the [abundance of neutral atomic hydrogen in galaxies](#) can tell us about feedback from supernovae, active galactic nuclei and photo-ionisation heating.

The figure at right explores how the strength of supernova feedback influences the mass function of neutral atomic hydrogen in galaxies using theoretical galaxy formation modelling. The heavy solid black curve shows the 'best-bet' HI mass function assuming the default supernova feedback strength; the red and blue correspond to models in which the supernova feedback strength is roughly factors of two stronger and weaker than this. Filled triangles and squares are observed data from the HIPASS (Zwaan et al. 2005) and ALFALFA (Martin et al. 2010) surveys.





- **Keith Bannister, Tara Murphy Bryan Gaensler and John Reynolds** have detected two single-pulse [radio bursts that might be associated with gamma ray bursts \(GRBs\)](#). These 1.4-GHz detections were performed with a 12-metre dish located at the Parkes radio observatory, and were recorded via an FPGA based architecture. Keith implemented an automated GRB response mode for the telescope, triggered from the Gamma-ray Coordinate Network.

## CAASTRO Annual Retreat

The second CAASTRO Annual Retreat was held in Cervantes, Western Australia over 25-27 November 2012. The Retreat was attended by 67 people, and there were over 30 science presentations. Many attendees commented that they especially enjoyed the Theme and Project break-out sessions, and we will do more of this at the next Retreat. Presentations were grouped into our three Research Themes, and this seemed an effective approach that we can adopt again next year.

Thanks to Lister Staveley-Smith, CAASTRO was lucky to have Professor Ken McNamara from the Department of Earth Sciences at the University of Cambridge join us to provide a short lecture about the stromatolites at Lake Thesis, and also about the history of the Pinnacles. Most delegates got up early in the morning on either Monday or Tuesday morning to tour the Pinnacles with Ken, and were rewarded with its beauty.



The Pinnacles (photo by Sean Farrell)

Enthusiastic scientists were also keen to explore the outdoors, with 14 people playing beach volleyball and frisbee (with rules) on Tuesday morning. Lawn bowls was also popular as a pre-dinner activity on Monday evening. It was good to see that networking continues beyond science collaboration.

Thanks to the hard working "A-Team" for working so hard during the Retreat – Kim, Sue, Michelle, Angela & Rose.



Beach volleyball and Frisbee; photos courtesy of Sean Farrell

## Membership Update

[CAASTRO now has 125 members.](#) We welcome our latest team members:

- **Alan Duffy**, University of Melbourne
- **Jamie Farnes**, University of Sydney
- **Andrew Johnson**, Swinburne University
- **Katie Mack**, University of Melbourne
- **Rose Metcalfe**, Australian National University
- **Samuel Oronsaye**, Curtin University
- **Stephen Ord**, Curtin University
- **Shane O'Sullivan**, University of Sydney
- **Emily Petroff**, Swinburne University
- **Nicholas Scott**, Swinburne University
- **Michelle Sullivan**, University of Sydney
- **Syed Uddin**, Swinburne University

## CAASTRO Member Profiles



**Dr Fang Yuan, CAASTRO Postdoctoral Researcher, Australian National University**

Fang is currently working with SkyMapper and is hoping to find many supernovae, both normal and peculiar ones, to study their origin and explosion physics. Her other research interest is gamma-ray bursts and their connection to supernova. Fang's PhD thesis, "Chasing the Brightest Cosmic Explosions with ROTSE-III", won the Kent M. Terwilliger Memorial Prize for best doctoral thesis in the Physics Department at the University of Michigan. Outside of Physics, Fang enjoys art, and was involved in amateur theatre in Beijing and at the Brisbane Art Theatre when she moved to Australia from China. She is keen to resume dancing lessons again soon.

**Ms Katie Lau, Administrative Officer, University of Western Australia**

Katie works with the CAASTRO Deputy Director at University of Western Australia to provide finance and administrative support. Katie has an MBA from the University of Hawaii and graduate degrees in Corporate Finance and Corporate Administration. She has extensive professional experience in the banking industry and in university administration both in Hong Kong and on the east coast of Australia.



**Mr Bradley Greig, PhD student, University of Melbourne**

Bradley is a graduate of University of Melbourne Physics and is undertaking a PhD on the cosmology of the intergalactic medium. As part of this work, he is investigating baryonic acoustic oscillations (BAOs) in the Lyman-alpha forest. Bradley is also studying the influence of radiative transfer effects on the recovery of cosmological parameters from the clustering of Lyman-alpha emitting galaxies. Bradley is part of the Telescopes in Schools program, promoting astronomy to high school students in the western suburbs of Melbourne. When he's not working, he's on the sporting field playing cricket or soccer. He sported a moustache for Movember to raise funds and awareness of men's health

## CAASTRO Members Recognised

**Tall Poppy of the Year:** Associate Investigator **Tara Murphy** was one of nine recipients of the annual New South Wales Young Tall Poppy Science awards, and was further named as overall [NSW Young Tall Poppy of the Year](#) for 2012.



**Western Australian Science Awards:** Chief Investigator, **Steven Tingay** was named [WA Science Ambassador of the Year](#) at the Western Australian Science Awards in October.

**Women of Influence:** Chief Operating Officer, **Kate Gunn** has been recognised as one of [Australia's Top 100 Women of Influence](#). The Australian Financial Review and Westpac have recognised outstanding women who are using their influence to improve business and society.



## Upcoming Visitors to CAASTRO

- Ue-Li Pen, University of Toronto, 13 Jan – 31 Jan 2013. Ue-Li will visit UWA to work with Lister Staveley-Smith on 21cm intensity mapping.
- Gianni Bernardi, Harvard-Smithsonian Center for Astrophysics, 1 Feb – 21 Feb 2013. Gianni will visit Rachel Webster and Daniel Mitchell at the University of Melbourne to work on wide-field imaging with the MWA.
- Jakob Walcher, Leibniz Institute for Astrophysics, 1 Feb – 28 Mar 2013. Jakob will visit the University of Sydney, Swinburne University and ANU, and will be working with Scott Croom, Julia Bryant, Warrick Couch and Matthew Colless on SAMI/CALIFA science and on galaxy velocity fields.
- Aaron Ludlow, University of Bonn, 5 Feb – 10 Feb 2013. Aaron will visit the University of Melbourne to work with Stuart Wyithe and his team on high-redshift galaxy formation and its impact on the intergalactic medium.
- Marc Davis, University of California Berkeley, 30 Sep – 30 Dec 2013. Marc will visit multiple nodes of CAASTRO, and will be jointly hosted by AAO. He plans to work on galaxy distributions and galaxy velocity fields.

**CAASTRO members interested in meeting these visitors should email [coo@caastro.org](mailto:coo@caastro.org).**

## CAASTRO Public Outreach & School Engagement

**Video Press Release:** Our recent press release [“WiggleZ confirms the Big Picture of the Universe”](#), reporting the result of UWA-based CAASTRO PhD student Morag Scrimgeour and her colleagues, received substantial national and international media attention. Instrumental to this success was the CAASTRO-produced [video press release](#) that has been viewed over 3500 times, and which has even inspired an [Italian spin-off version](#).

**CAASTRO Website:** There has been a significant change to the [News section](#) of the CAASTRO website. Every CAASTRO paper that has been accepted for publication will also now be converted into a news story to broaden public understanding of our research activities. Check out our recent news items on [“SAMI finds windy galaxy using spatially resolved optical spectra”](#) and [“Milky Way or nearby Galaxy home to unusual variable X-ray source”](#).

**MWA Tile Display:** We are very pleased to see a continuing and growing interest in our display tiles of the [Murchison Widefield Array](#), such as our exhibitions at the [Western Australian Museum – Geraldton](#) and at [Scitech in Perth](#). The CAASTRO outreach team is currently working towards expanding this program.

**CAASTRO in the Classroom:** Our school engagement program, [CAASTRO in the Classroom](#) had a very busy [November schedule](#) with eight sessions that will be part of the NSW Government Education & Training’s [“Clickfest Virtual Excursions”](#). On 8 Nov 2012, the students even had the opportunity to talk to our [Dark Universe](#) theme leader and Nobel Laureate [Brian Schmidt!](#)

## Workshops and Events

### Recent Workshops & Events

- [GPU Training Workshop](#), Perth, 8-9 Oct 2012.
- [Women in Astronomy](#), Melbourne, 10-11 Oct 2012.
- Public Lecture, [“When Galaxies Collide”](#) Professor Richard de Grijs, Sydney, 29 Oct 2012.
- [EoR Global Signal Workshop](#), Sydney, 19-21 Nov 2012.
- Opening of CAASTRO HQ in Redfern, 21 Nov 2012
- [Prospects for TAIPAN](#), Macquarie U, 10-12 Dec, 2012

### Upcoming Events

- [Joint CoEPP-CAASTRO workshop](#) on Dark Matter, neutrino astrophysics, Dark Energy and gravity, Melbourne, 28 Feb 2013
- [Synthetic Universes for Future Surveys](#), Perth, 21-22 Mar 2013
- [Reionisation in the Red Centre: New windows on the high redshift Universe](#), Uluru, 15-19 Jul 2013.

### Employment Opportunities

CAASTRO is [currently advertising two postdoctoral positions](#) to work on low-frequency radio astronomy:

- CAASTRO postdoctoral scientist to work on development and execution of the MWA Sky Survey. University of Western Australia, closes 11 Jan 2013.
- CAASTRO postdoctoral fellow / research fellow to work on radio detection of the Epoch of Reionisation. Australian National University, closes 31 Jan 2013.

**CAASTRO supports a flexible working environment: for Australian citizens or permanent residents, these opportunities are available as either full-time or part-time positions.**



Emil Lenc, EoR Workshop, Nov 2012. Photo courtesy of Bryan Gaensler

# Seasons Greetings

Wishing all CAASTRO members  
happiness these holidays and  
during the year ahead.



*Contributions from CAASTRO members are welcomed for future editions;  
please contact [Ruth Jeffries](#) if you have stories or suggestions.  
Past editions of the CAASTRO newsletter are available at [www.caaastro.org/newsletters](http://www.caaastro.org/newsletters)*