



CAASTRO NEWSLETTER, Edition #7, May 2013

Update from the CAASTRO Director



CAASTRO is now two years old: a big thanks to the 130+ people who've got us to this point.

While this means we've still got five years to go, the nature of the astronomy job cycle is that our last big round of hiring will take place over the next 12-18 months. To that end, we'll be holding an all-day strategy meeting at CAASTRO HQ in Sydney on 31 May 2013. This meeting will bring together all senior investigators and project leaders across CAASTRO, and we'll be putting everything on the table for discussion: our existing projects, things we'd previously planned, and new projects that are now being discussed. At the end of the day, we hope to emerge with a draft plan for our priorities and projects, which will be the basis for a final decision by July 2013 on our next set of projects and postdoc positions. If you are a CAASTRO member with strong opinions on what you think we need to be doing next, please let me know your thoughts.

Our 2012 Annual Report was submitted to the ARC at the end of March. The consistent theme that shines through this document is the very large amount of extremely solid content across all our activities. Hard copies have been sent to all CAASTRO members and stakeholders, or you can download the PDF version [here](#).

I continue to get very positive feedback on our [mentoring program](#) - thanks to all those who've put time into making this work. Everyone in CAASTRO should now have a mentor or a mentee or both - please let Kate Gunn know if this is not the case, or if you'd like a different pairing. A reminder that mentors and mentees should aim to chat regularly, e.g. a 30-minute phone call every 3-4 months.

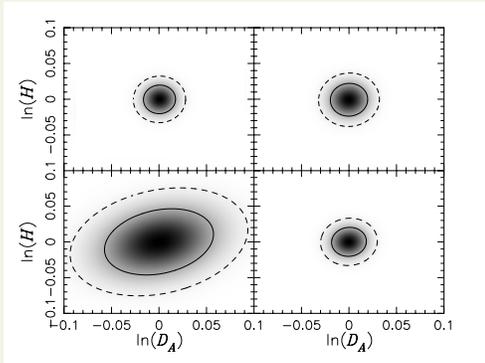
CAASTRO's first annual conference, "[Reionisation in the Red Centre](#)", is now just a couple of months away. There's a very impressive list of invited speakers and every attendance spot is taken - it should be an extremely stimulating meeting. We'll also soon be formally announcing our 2013 annual conference, "Supernovae in the Local Universe", to be held in Coffs Harbour NSW in August 2014.

Finally, a reminder that proposals for CAASTRO computing time are due on 15 May 2013. This time we're keen to start a pilot program on GPU computing - we look forward to receiving some creative ideas for use of this time.

Bryan Gaensler
CAASTRO Director

Research Update

At the time of writing, CAASTRO had [20 published papers in 2013](#), with a further 23 papers under review. Two highlights are below:

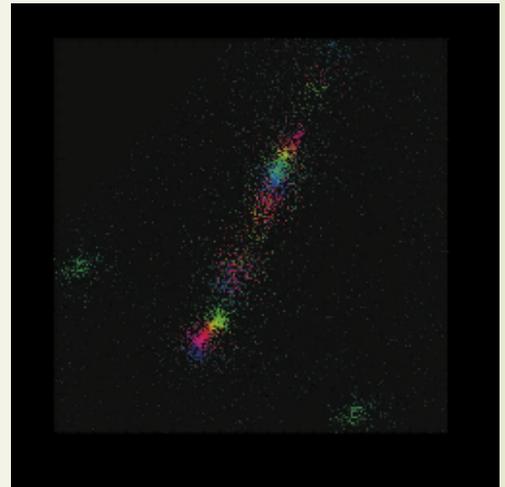


The Hobby-Eberly Telescope Dark Energy Experiment (HETDEX) is an upcoming Lyman-alpha emitting (LAE) galaxy redshift survey that aims to determine cosmological parameters at high redshift. Using a Fisher Matrix analysis, **Bradley Greig** (UMelb), **Eiichiro Komatsu** (Max-Planck-Institut für Astrophysik) and **Stuart Wyithe** (UMelb) have investigated [how the effects of Lyman-alpha radiative transfer through the intergalactic medium](#) affect HETDEX's ability to recover cosmological parameters.

The figure above shows the expected 1σ & 2σ joint likelihood distributions for the angular diameter distance (DA) and the Hubble rate (H) from Fisher Matrix estimates of the HETDEX survey. The constraints were generated from models for the expected LAE galaxy clustering statistics including Lyman-alpha radiative transfer effects. Top left: A typical galaxy power spectrum (no radiative transfer effects). Top right: The LAE galaxy power spectrum spectrum with radiative transfer effects. Bottom left: The joint distance constraints when higher order clustering statistics (LAE galaxy reduced bispectrum) are considered, which appear worse than from the galaxy power spectrum. Bottom right: When the LAE galaxy power spectrum and reduced bispectrum are combined, the precision of the distance constraints are improved over the power-spectrum only model.

Ue-Li Pen (CITA), **Jean-Pierre Macquart** (ICRAR/Curtin) and collaborators have used [variations in the intervening interstellar medium to measure the physical extent of the emission region of a pulsar](#). The team formed a series of snapshot images of the holographic reconstruction of the scattered pulsar radiation as it propagates through the interstellar medium. Each of these sub-images interferes with every other sub-image, yielding information on the structure of the pulsar on an angular scale inversely proportional to the distance between sub-images.

The figure at right shows a holographic VLBI image of the pulsar B0834+06, formed using the VLBI phase of each holographic cross spectrum residual; each point represents a separate image of the pulsar. The colour is proportionate to time delay, shown using a periodic hue colour scheme. The green locus of points at left centre is a sidelobe of the true locus on the lower right. This scattering image forms a celestial interferometer aperture with which the pulsar is imaged. At a scattering screen distance of approximately 400 parsecs, each milliarcsecond corresponds to a scale of 0.4 astronomical units.



CAASTRO Education & Outreach

Following the CAASTRO Annual Retreat in Nov 2012, we held a professional training workshop for our students and early career researchers. This was delivered by the [UWA Science Communication group](#) and was on the topic "Astrophysics meets YouTube". One direct outcome was our new video chat series "[Pint in the Sky](#)", hosted by Katie Mack and Alan Duffy (UMelb) and edited by Wiebke Ebeling (ICRAR/Curtin). Recent episodes cover [stellar](#), [primordial](#) and [supermassive](#) black holes.



Ben McKinley on YouTube

We continue our series of popular Video Press Releases (ViPRs), the latest being CAASTRO student Ben McKinley (ANU) and his [explanation of his work on detecting FM radio signals that have bounced on the moon](#). Most of Ben's time immediately after the release was spent in radio interviews, explaining whether aliens were eavesdropping.



MWA Exhibit at the Gravity Discovery Centre, WA. Courtesy Anja Cheria

We have found two more homes for our displays of MWA antennas: the [Gravity Discovery Centre](#) (GDC) in Gingin, North of Perth, and Victoria University of Wellington in New Zealand. Visitors of the GDC have the opportunity to experience both the [full-sized MWA tile outdoors and an indoor exhibit](#) about data processing with the precursors to the Square Kilometre Array (SKA).

Having written [short news stories](#) for every CAASTRO paper, we have now compiled the first "CAASTRO Reader's Digest" booklet, containing 16 CAASTRO

news stories from Sep 2012 to Mar 2013. An electronic copy is [available for download](#), and we will also be providing print copies for each CAASTRO node location and for outreach events.

CAASTRO in the Classroom (CitC)



Our [CAASTRO in the Classroom program](#) is off and running again for 2013, now in the capable hands of Shane O'Sullivan (pictured) and Jamie Farnes. CitC speakers so far this year have included Bryan Gaensler on "The Sounds of Space", Ray Norris on "The Astronomy of Aboriginal Australians" and Geraint Lewis on "The Lives of Galaxies". Feedback we have received from these presentations includes:

"Thank you for the presentation; it really was exactly what we required. As I came around the lockers area after the talk, there was a buzz of excitement and discussion – so the talk was a success."

"My students are very keen scientists – but they have only had one lesson on the astronomy unit that we have just started. They left your videoconference buzzing! We had ten minutes left before the next lesson and spent it in the quad discussing many of the concepts that you covered. Thank you so much."

Please email citc@caastro.org if you're interested in giving your own presentation.

Membership Update

[CAASTRO now has 123 members.](#) We welcome our latest team members:

- **Ewan Barr**, Swinburne University
- **Joss Bland-Hawthorn**, University of Sydney
- **Jessica Bloom**, University of Sydney
- **Eli Bressert**, CSIRO
- **Hannah Feldman**, Curtin University
- **Lisa Fogarty**, University of Sydney
- **Cody Gough**, Curtin University
- **Luke Horsley**, Curtin University
- **Scott Meyer**, University of Western Australia
- **Robert Sharp**, Australian National University
- **Kimberley Steele**, Curtin University

CAASTRO Member Profiles



[Chris Blake](#), Swinburne, CAASTRO Chief Investigator

Chris has worked at Swinburne University since 2006. He received his PhD from the University of Oxford, and then was a postdoc at the University of British Columbia and UNSW. Chris is a cosmologist, with expertise in constructing large maps of the distribution of galaxies throughout space, and determining what this tells us about the physics of the Universe. His current focus is to constrain the nature of Dark Energy.

[Michelle Sullivan](#), University of Sydney, Executive Assistant

Michelle joined CAASTRO in October 2012 as Executive Assistant to the Director. Michelle has over 20 years of administrative and executive support experience, having worked for 10 years at Charles Sturt University in her home town of Wagga Wagga and 10 years in various executive support positions with the City of Sydney.



[Hanna Feldman](#), Curtin University, Honours Student



Hanna is currently completing an Honours thesis at Curtin University, in Science Communication and Outreach. In her study, she hopes to investigate and develop an outreach program specifically suited to the MWA project. This program will provide learning centres around Australia with hands on and applet-style games to educate their visitors on Radio Astronomy. When she isn't working on her thesis, Hanna enjoys playing a range of musical instruments, particularly the cello. Upon finishing her Honours degree, she hopes to indulge in her love for travel, continuing to communicate science around the world.

CAASTRO Members Recognised

CAASTRO Director **Bryan Gaensler** has been elected as a [Fellow of the Australian Academy of Science](#). The Australian Academy of Science annually honours a small number of Australian scientists for their outstanding contributions to science by electing them as Fellows of the Academy. Bryan was made a Fellow in recognition of his fundamental contributions to our understanding of the universe through his outstanding research on high-energy astrophysics, cosmic magnetic fields and the structure of our galaxy.

The Australian Academy of Science has announced that CAASTRO Chief Investigator **Chris Blake** will receive the [2013 Pawsey Medal](#) for research in physics. The Pawsey Medal recognises outstanding research in physics by a scientist aged under 40.

Upcoming Visitors to CAASTRO

- Ariel Sanchez, MPE, Germany. Visiting Swinburne, Sep 2013, to work on BOSS and WiggleZ.
- Karen Masters, University of Portsmouth, UK. Visiting UWA, Sep 2013, to work on 2MTF.
- Greg Hallinan, CalTech, USA. Visiting Curtin/Swinburne/USyd, Sep 2013 to work on transients.
- Jason Hessels, ASTRON, Netherlands. Visiting Curtin, Nov 2013, to work on transients.
- Claudia Lagos, ESO, Germany. Visiting UWA/UMelb, Jan-Mar 2014, to work on galaxy evolution

CAASTRO members interested in meeting these visitors should email coo@caastro.org

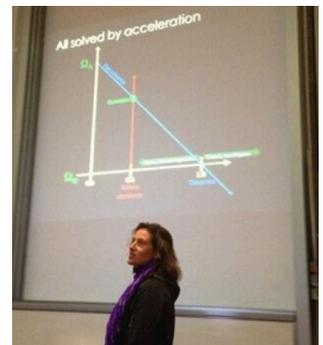
Events and Workshops

Recent Workshops

- [Synthetic Universes for Future Surveys](#), Perth, 21-22 Mar 2013.
- [Joint CoEPP-CAASTRO Workshop](#), Melbourne, 28 Feb 2013.

Upcoming Events

- [6th International PHISCC Workshop](#), Sydney, 19-21 Jun 2013
- [Reionization in the Red Centre](#), Uluru, 15-19 Jul 2013
- [Women in Astronomy Workshop 2013](#), Perth, 11-12 Sep 2013.
- [Studying Galaxy Evolution](#), Sydney, 23-26 Sep 2013
- The Ephemeral Universe with Widefield Low-Frequency Arrays, Perth, 12-14 Nov 2013
- [Astroinformatics 2013](#), Sydney, 9-13 Dec 2013
- Supernovae in the Local Universe, Coffs Harbour, 11-15 Aug 2014



Tamara Davis, CoEPP-CAASTRO Workshop.
Photo: Brian Schmidt

Contributions from CAASTRO members are welcomed for future editions; please contact [Kate Gunn](#) if you have stories or suggestions. Past editions of the CAASTRO newsletter are available at www.caastro.org/newsletters