

# Centre for Research in Mathematics Newsletter

## University of Western Sydney

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TIMS  $\rightarrow$  RiMS  $\rightarrow$  CRM.

*The University of Western Sydney now has a Research Centre in the mathematical sciences, called, simply, the **Centre for Research in Mathematics**. The Centre sits within the School of Computing, Engineering and Mathematics. This is the latest stage in an evolution of organized mathematics and statistics research at UWS that began with the group Theoretical Investigations in Mathematics and Statistics (TIMS) in 2008, renamed to Research in Mathematical Sciences (RiMS) in 2012, and now has become an official Centre. At its establishment, the Centre has six permanent core members, in addition to several associated researchers, postdoctoral researchers and PhD students. It has staff on two of UWS's campuses: Kingswood and Parramatta. Its members conduct research across a broad spectrum of the mathematical sciences, including algebra, control theory, mathematical biology and computational statistics. Members of the Centre currently hold five Australian Research Council grants including four Discovery Projects and one Future Fellowship.*

*This Newsletter will serve to share information about recent and upcoming events, including Visitors, Seminars, Grants and Research Papers.*

### Local Upcoming Events

- The inaugural AMSI/AustMS access grid National Seminar will be held at UWS on Friday 8th February, given by Prof Gene Abrams on "Leavitt path algebras - Something for everyone: algebra, analysis, graph theory, number theory".
- The Centre is hosting an AMSI Workshop on "Graph C\*-algebras, Leavitt path algebras and symbolic dynamics" to be held at UWS Parramatta Campus, 11-14 Feb 2013. For information please contact Roozbeh Hazrat.

### Seminars & Colloquia

Our inaugural CRM Colloquium was held on Monday, 21 January, and given by Peter Jarvis, University of Tasmania, on the topic "Adventures with group theory: counting and constructing polynomial invariants for applications in quantum entanglement and molecular phylogenetics. [or: the Power of Plethysm]"

### Visitors to the Centre

There have been several visitors to the CRM over the 2012-2013 summer, some ongoing. The following lists recent past, current and future visitors:

- Prof Peter Jarvis, University of Tasmania, visited Andrew Francis, January 21-24, 2013.
- Prof Gonzalo Aranda Pino, University of Malaga, is visiting Roozbeh Hazrat, November 2012 – March 2013.
- Prof Gene Abrams, University of Colorado, is visiting Roozbeh Hazrat, 5-15 January 2013.
- Prof Guoping Tang (Chinese Academy of Science), is visiting Roozbeh Hazrat, 22 January – 22 February 2013.
- Prof Brent Everitt, University of York, will visit James East, February 12-13.

### Recent activities of members

**Sangeeta Bhatia** attended the AMSI Summer School in Melbourne in January 2013, and is giving a talk at the ANZIAM annual meeting in Newcastle, 3-7 February

2013, entitled “Group theoretic formalization of double-cut-and-join model of chromosomal rearrangement”.

**James East** visited Des FitzGerald at the University of Tasmania, and attended a workshop on semigroups, giving a talk entitled “Small generating sets for ideals in partition monoids”, in December 2012. He also attended the Victorian Algebra Conference, and spoke on “Generating rank  $N$  semigroups with fewer than  $N$  elements” in December 2012.

**Andrew Francis** visited Prof Henry Wynn at London School of Economics in December 2012, as well as Dr Dorothy Buck at Imperial College and Prof Chrystopher Nehaniv at the University of Hertfordshire.

**Roozbeh Hazrat** visited the Tata Institute for Fundamental Research (TIFR) in Mumbai (Visiting Ravi Rao), and the Indian Statistical Institute (ISI), Bangalore, (Visiting B. Sury) in January 2013, giving two talks in TIFR, Mumbai and two talks in ISI, Bangalore. He also gave a talk at International Center for Theoretical Physics, Trieste, Italy.

**Leanne Rylands** was on the organising committee for the conference *Game On: Our Biology and Biomedical Graduates*, University of Sydney, 11 December 2012, and gave a talk entitled “Scientists and Mathematicians: Understanding each other”.

Looking further ahead

An incomplete list of events and activities coming up later in the year:

**Roozbeh Hazrat** is on the Scientific committee of the Conference in Algebraic K-theory, September 2013, Beijing, China. He will also be an Invited speaker in Banff, Canada (Graph Algebras), in April 2013; an Invited research fellow (Max Planck, Bonn, December 2013); and an Invited research fellow (IHES, Paris, January 2014).

**James East** is on the organising committee for “General Algebra and Its Applications: GAIA 2013”, In celebration of Brian Davey’s 65th birthday and retirement. An AMSI/AustMS workshop at La Trobe University, Melbourne, 15-19 July 2013.

**Andrew Francis** is the local organizer for the AustMS Early Career Workshop, hosted by UWS in Leura, Blue Mountains, in September 2013.

**Wei Xing Zheng** is on the Technical Program Committee of the 2003 Australian Control Conference, Perth, Australia, November 2013.

Recent papers accepted

- **Rehez Ahlip** and Marek Rutkowski, “Pricing of foreign exchange options under the Heston stochastic volatility model and the CIR interest rates”, to appear in *Quantitative Finance*.
- **James East**, “Defining relations for idempotent generators in finite partial transformation semigroups” - to appear in special edition of *Semigroup Forum*, dedicated to the memory of John Howie.

- A J Berrick, **Volker Gebhardt**, L Paris, “Finite index subgroups of mapping class groups”, to appear in *Proceedings of the London Mathematical Society*.
- **Roozbeh Hazrat**, “Dynamics of Leavitt path algebra”, to appear in *Journal of Algebra*.
- **Leanne Rylands**, “A note on antimagic labelings of trees”, to appear in *Bulletin of the Institute of Combinatorics and its Applications*.
- Y. Chen and **Wei Xing Zheng**, “Stability analysis of time-delay neural networks subject to stochastic perturbations”, to appear in *IEEE Transactions on Cybernetics*.
- B. Zhang, **Wei Xing Zheng** and S. Xu, “Filtering of Markovian jump delay systems based on a new performance index”, to appear in *IEEE Transactions on Circuits and Systems-I: Regular Papers*.



The total solar eclipse 14/11/12, taken by Volker Gebhardt at Maitland Downs, QLD.

## CRM Researchers

### Core members:

- Dr James East
- Prof Andrew Francis
- Dr Volker Gebhardt
- Dr Roozbeh Hazrat
- A/Prof Glenn Stone
- Prof Wei Xing Zheng.

### Associated researchers:

- Dr Rehez Ahlip
- Sangeeta Bhatia
- Dr Attila Egri-Nagy
- A/Prof Leanne Rylands
- Stuart Serdoz
- Dr Stephen Tawn