Curriculum Vitae: Adam Travis Deller

Personal Details

Date of birth:	01/04/1982
Current Position:	Jansky Fellow, National Radio Astronomy Observatory
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Research Interests

I have a strong interest in pursuing the technical development of radio interferometry, in particular Very Long Baseline Interferometry (VLBI), in order to undertake science that is not possible with existing systems. To date, my focus has been on increasing the flexibility of correlators, in order to make advances in astrometric, wide–field and pulsar VLBI. I have pursued this through the development of a flexible software correlator,which I have used for data taken with the LBA, VLBA, EVN and GMRT instruments. I have also developed improved calibration algorithms for VLBI data. In the future, I plan to continue this theme and expand into efficiently parallel calibration and imaging algorithms for wide–field instruments. In addition to continuing to redefine the accuracy obtainable with pulsar astrometry, this will allow me to explore new challenges in epoch of reionization (EoR) science, where wide–field calibration is of vital importance.

Education

Ph.D. Astrophysics, Swinburne University, 2008

Bachelor of Science – Research & Development/Bachelor of Engineering – Electronic & Computer System *(Hons, 1st class)*, Swinburne University, 2004 (High Distinction average)

Victorian Certificate of Education (VCE), Western Heights College, 1999 (Equivalent National Tertiary Entrance Rank - ENTER - 99.75)

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Research Experience

PhD student
Steven Tingay, Matthew Bailes & John Reynolds   2005–2008
Swinburne University Centre for Astrophysics & Supercomputing/ATNF
Development of software correlator for the Long Baseline Array (LBA) and application of the software correlator capabilities to a Southern Hemisphere pulsar parallax program.

Summer student/undergraduate researcher
Sarah Maddison   2003–2004
Swinburne University Centre for Astrophysics & Supercomputing
Extension of the SWIFT RMVS3 N-body gravitational code to include radiative forces, and investigation of the formation of resonant dust structures in stellar debris disks with embedded planets.

Undergraduate researcher
Tim Hendtlass   2004
Swinburne University, Centre for Complex Systems & Intelligent Processes
Development of a novel method to improve the performance of evolutionary programs.

Research Assistant
Peter Hall   2003
Australia Telescope National Facility (ATNF), Epping
Development of the motion control system for a 90cm prototype Luneburg Lens, including the servo system and software interface, for the Australian SKA development program.

Honors, Awards & Scholarships

Member of successful AISRF bid for AUD$300,000 collaboration between Swinburne, Curtin and NCRA

2006 Swinburne University Vice-Chancellors Research Award (awarded to the SKA group; S. Tingay, R. Bhat, A. Deller, S. Horiuchi & E. Lenc)

Swinburne University Chancellor's Research Scholarship (postgraduate), 2005–2008

CSIRO Postgraduate Scholarship 2005-2008

H.E.R. Steele prize for highest graduate in Swinburne B. Engineering (Electronics & Computer Systems) 2004

Awarded highest graduate in Swinburne B. Science (Research & Development) 2004

Awarded 17 (of a possible 36) highest results in individual undergraduate units

PASA highly commended student poster, ASA Conference 2004

Swinburne University Vice-Chancellor's Scholarship (undergraduate), 2000–2004

Dux (Valedictorian), Western Heights College 1999

Professional Affiliations

Student Member, Astronomical Society of Australia

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Scientific Software Developed

A Distributed FX style software correlator (DiFX)
`http://astronomy.swin.edu.au/~adeller/software/difx/`

Parseltongue calibration scripts for VLBI data
`http://astronomy.swin.edu.au/~adeller/software/scripts/`

VLBI sensitivity calculator
`http://astronomy.swin.edu.au/~adeller/software/lba/`

Stellar debris disk modeling code (N–body gravitational code, extended to include radiative forces)
`http://astronomy.swin.edu.au/~adeller/debrisdisks/`

Software Skills

Languages: C++, Java, Python, Perl, FORTRAN

Astronomical packages: AIPS, Miriad, Difmap, Parseltongue

Miscellaneous: Latex, Subversion, Linux/Unix, Windows, Office

National Facility Support

Correlator operator, LBA, 2006–2008

ATCA Duty Astronomer $\sim$ 2 weeks per year, 2005–2008

LBA operational support $\sim$ 3 weeks per year, 2005–2008

Organisational/supervisory experienc

Organizing committee member, DiFX workshop, MPIfR, Bonn, September 2008

Swinburne Astronomy Online (SAO) project supervisor, 2005–2007

Organizing committee member, DiFX workshop, MPIfR, Bonn, September 2007

Organizing committee member, ATNF Student Symposium, Epping, June 2006

Postgraduate schools

Lindau meeting of Nobel Laureates, Lindau, Germany 2008

NRAO Synthesis Imaging Summer School, Albuquerque 2006

ATNF Synthesis Imaging Workshop, Narrabri 2003

Collaborative Visits

Max Planck Institute for Radioastronomy, Bonn, GER, September–October 2006, collaborating with W. Alef on the usage of DiFX for geodetic applications

Joint Institute for VLBI in Europe (JIVE), Dwingeloo, NL, June–August 2006, collaborating with R. Oerlemans and H. van Langeveld on distributed software correlator architectures

NRAO Socorro, April–June 2006, collaborating with W. Brisken and J. Romney on the usage of the DiFX software correlator for the VLBA

Publications

Refereed Journal Publications

1. Petrov, L., Phillips, C., Bertarini, A., **Deller, A.**, Pogrebenko, S., & Mujunen, A.
   The use of the Long Baseline Array in Australia for precise geodesy and absolute astrometry
   PASA, submitted *arXiv:0809.0627*

2. **Deller, A. T.**, Verbiest, J. P. W., Tingay, S. J., & Bailes, M.
   Extremely High Precision VLBI Astrometry of PSR J0437–4715 and Implications for Theories of Gravity
   ApJL, 685, L67

3. **Deller, A. T.**, Tingay, S. J., & Brisken, W. 2008,
   Precision Southern Hemisphere pulsar VLBI astrometry: techniques and results for PSR J1559–4438
   2008, ApJ, submitted *arXiv:0808.1598*

4. Johnston, S. et al.,
   Science with the Australian SKA Pathfinder
   2007, PASA, 24,174

5. Phillips, C. J., **Deller, A.**, Amy, S. W., Tingay, S. J., Tzioumis, A. K., Reynolds, J. E., Jauncey, D. L., Stevens, J., Ellingsen, S. P., Dickey, J., Fender, R. P., Tudose, V. & Nicolson, G. D.
   Detection of compact radio emission from Circinus X-1 with the first Southern hemisphere e-VLBI experiment
   2007, MNRAS, 380, L11

6. Norris, R. P., Tingay, S. J., Phillips, C. J., Middelberg, E., **Deller, A. T.** & Appleton, P. N.
   Very long baseline interferometry detection of an Infrared-Faint Radio Source
   2007, MNRAS, 378, 1434

7. **Deller, A. T.**, Tingay, S. J., Bailes, M. & West, C.
   DiFX: A Software Correlator for Very Long Baseline Interferometry Using Multiprocessor Environments
   2007, PASP, 119, 318

8. **Deller, A. T.** & Maddison, S. T.
   Numerical Modeling of Dusty Debris Disks
   2005, ApJ, 625, 398

Conference Proceedings, Memos and Posters

1. Brisken, W. & **Deller, A. T.**
   The Cost of Software Correlation
   2007, VLBA sensitivity memo #15

2. **Deller, A. T.**, Tingay, S. J., Bailes, M. & West, C.
   Distributed FX software correlation for eVLBI
   2006, Proceedings of the 8th European VLBI Network Symposium, p57

3. Tingay, S. J. & **Deller, A. T.**
   A software correlator for VLBI and real-time eVLBI using multi-processor computing environments
   2006, 5th International eVLBI Workshop, MIT Haystack (poster presentation)

4. Gulyaev, S., Natusch, T., Addis, B., Tingay, S. J. & **Deller, A. T.**
   Development of New Zealand radio astronomy and trans-Tasman long-baseline array
   2005, Southern Stars, 44, 12

5. Phillips, C. J, Tzioumis, T., **Deller, A.**, Tingay, S., Harris, C., & Haines, K..
   Electronic Transmission and Computation of Very Long Baseline Interferometry and Its Application to Next Generation Radio Telescopes
   2005, 1st IEEE International Conference on e-Science and Grid Computing (poster presentation)

6. **Deller, A. T**. & Maddison, S. T.
   Searching for planets in dusty debris disks
   2005, Protostars and Planets V, 8124 (poster presentation)

7. **Deller, A. T.** & Hendtlass, T.
   Breeding subroutines for evolutionary programs
   2004, Proceedings of the 7th Asia–Pacific Conference on Complex Systems