Dougal Dobie

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I am an OzGrav Postdoctoral Research Fellow at the University of Sydney working in gravitational wave follow-up, with an interest in radio transients and high-energy astrophysics. I'm also interested in multi-wavelength transients science, data science and machine learning.

Employment

OzGrav Postdoctoral Research Fellow — **University of Sydney**
Radio Follow-up of Gravitational Wave Events — *2024–present*

OzGrav Postdoctoral Research Fellow — **Swinburne**
Multi-wavelength Follow-up of Gravitational Wave Events — *2020–2024*

Education

Doctor of Philosophy (Science) — **University of Sydney**
Thesis title: Radio follow-up of gravitational wave events. — *2017–2021*
Supervisors: Prof. Tara Murphy, Prof. Richard Hunstead, Dr. Keith Bannister.

Bachelor of Science (Advanced) (Honours Class I) — **University of Sydney**
Physics (major), Applied Mathematics and Computational Science — *2013–2016*

Refereed Publications

I am first author of 8 refereed publications, and my paper on the radio follow-up of GW170817 was awarded the University of Sydney Faculty of Science Postgraduate Research Prize for Outstanding Academic Achievement. I am also a co-author of 32 other papers published in a range of journals including *Nature* and *Science*. My h-index is 22, with over 6,000 total citations (>250 citations for first author papers).

Awards and Commendations

Swinburne Academic Promotion (Level A to Level B) — *2022*
University of Sydney Postgraduate Research Prize for Outstanding PhD Thesis (Science) — *2022*
University of Sydney School of Physics Prize for The Best PhD Thesis — *2021*
Australian Institute of Physics (NSW Branch) Award for Postgraduate Excellence in Physics — *2019*
USyd Faculty of Science Postgraduate Research Prize for Outstanding Academic Achievement — *2019*

Successful Telescope Proposals

I have been awarded over 1000 hours of ATCA time as Principle Investigator, including 750 hours for follow-up of gravitational wave events. I am co-Investigator on multiple other standard and target-of-opportunity ATCA proposals, totalling several hundred hours of observing time.

I have been awarded time as Principal Investigator with the Australian Square Kilometre Array Pathfinder (42 h), Parkes (66 h), the Long Baseline Array (40 h), the Karl G. Jansky Very Large Array (11 h), the Giant Metrewave Radio Telescope (20 h), MeerKAT (14.5 h), Keck (1 night), Gemini (11 h) and Swift (5.5 ks).

I am also a co-I of several proposals on the Australian Square Kilometre Array Pathfinder (130 h), the Karl G. Jansky Very Large Array (280 h), the Dark Energy Camera (11 nights), and the Murchison Widefield Array (3 h),

I am Project Scientist of the Variables And Slow Transients Survey which has been allocated over 2000 hours on the Australian Square Kilometre Array Pathfinder.

Professional Activities

Steering Committee member
Astronomical Society of Australia - Time Domain Astronomy Chapter *2023–present*

Co-Chair: Multi-Messenger Observations Program
ARC Centre of Excellence for Gravitational Wave Astrophysics *2022–present*

Project Scientist
ASKAP Variables And Slow Transients Survey *2022–present*

Early Career Researcher Committee
ARC Centre of Excellence for Gravitational Wave Astrophysics *2021–present*

Colloquium Organiser
Swinburne Centre for Astrophysics and Supercomputing *2021–2023*

Reviewer
Giant Metrewave Radio Telescope Time Allocation Committee *2024–present*

Reviewer
Monthly Notices of the Royal Astronomical Society, The Astrophysical Journal *2020–present*

ATCA Duty Astronomer
Assist observers using the Australia Telescope Compact Array *2017–2020*

Australia Telescope User Committee Representative
Liase between the telescope user community and ATNF Director *2018–2019*

Local Organising Committee
Science At Low Frequencies IV *2017*

Invited Talks

Exploring the Dynamic Radio Sky with ASKAP **University of Melbourne**
Physics Seminar *October 2023*

Radio Follow-up of Gravitational Wave Events **Oxford University**
SPI-MAX Seminar *June 2021*

Radio Follow-up of Gravitational Wave Events **CSIRO**
Australia Telescope National Facility Colloquium *March 2021*

Radio Follow-up of Gravitational Wave Events **ICRAR-Curtin**
International Centre for Radio Astronomy Research Colloquium *August 2020*

Exploring the Universe with Gravity & Light **Shanghai Astronomical Observatory**
The 5th Chinese SKA Summer School 2019 *August 2019*

Scholarships and Funding

University of Sydney Postgraduate Research Support Scheme *2019*

University of Sydney Merit Award *2017-2020*

Research Training Program (RTP) Stipend Scholarship *2017-2020*

Teaching Experience

PhD Co-supervisor — **Swinburne**
James Freeburn – "Deeper, Wider, Faster" — *2022–Present*

Winter Vacation Scholarship supervisor — **Swinburne CAS**
Callan Gately: Multiwavelength transients with ASKAP and ZTF — *2022*

Summer Vacation Scholarship supervisor — **Swinburne CAS**
Lachlan Graham & Archie Fox: Radio transients with ASKAP — *2021-22*

Undergraduate Tutor — **University of Sydney**
Lab tutor (2nd & 3rd Year Physics), Night Viewing guide (First Year Astronomy) — *2016–2020*

Teaching Assistant — **University of Sydney**
OLET1618 – Data Driven Astronomy: Algorithms — *2018–2020*

Online Tutor — **Coursera**
Coursera – Data Driven Astronomy — *2017–2020*

Lecturer — **Shanghai Astronomical Observatory**
The 5th Chinese SKA Summer School 2019 — *August 2019*

Undergraduate Research Advisor — **University of Sydney**
Pablo Bonilla Ataides - "Prospects for radio follow-up of BNS mergers" — *2019*

Workshop development — **GROWTH Astronomy School**
Undegraduate workshop on radio data analysis — *December 2018, August 2019*

Course Development — **University of Sydney**
Material for Data Driven Astronomy online course — *2016/17*

Selected Public Outreach

Astronomy Educator — **Sydney Observatory**
Educating school groups and the general public — *2016–2020*

Workshop Facilitator & Science Advisor — **Galaxy Convention**
Promoting female innovation and entreupenership in STEM — *5 December 2017*

Science in a Lunchtime — **Mosman High School**
Q&A: Exploring the Hidden Universe & Careers in Astronomy — *17 November 2017*

CAASTRO Astronomer in Residence — **Ayers Rock Resort**
Educating the general public & promoting Australian astronomy — *August 2017*

Sydney Astrofest — **University of Sydney**
Interacting with the public and general logistics — *2016, 2017*

Refereed Publications

First Author

Dobie, D., Sluse, D., Murphy, T., et al. 2023a, Gaia GraL: Gaia DR2 Gravitational Lens Systems. VIII. A radio census of lensed systems, MNRAS (submitted), arXiv:2311.07836

Dobie, D., Pritchard, J., Wang, Y., et al. 2023b, Radio transients and variables in the tenth Deeper, Wider, Faster observing run, MNRAS, 519, 4684

Dobie, D., Stewart, A., Hotokezaka, K., et al. 2022, A comprehensive search for the radio counterpart of GW190814 with the Australian Square Kilometre Array Pathfinder, MNRAS, 510, 3794

Dobie, D., Murphy, T., Kaplan, D. L., et al. 2021, Radio afterglows from compact binary coalescences: prospects for next-generation telescopes, MNRAS, 505, 2647

Dobie, D., Kaplan, D. L., Hotokezaka, K., et al. 2020, Constraining properties of neutron star merger outflows with radio observations, MNRAS, 494, 2449

Dobie, D., Stewart, A., Murphy, T., et al. 2019b, An ASKAP Search for a Radio Counterpart to the First High-significance Neutron Star-Black Hole Merger LIGO/Virgo S190814bv, ApJ, 887, L13

Dobie, D., Murphy, T., Kaplan, D. L., et al. 2019a, An optimised gravitational wave follow-up strategy with the Australian Square Kilometre Array Pathfinder, PASA, 36, e019

Dobie, D., Kaplan, D. L., Murphy, T., et al. 2018, A Turnover in the Radio Light Curve of GW170817, ApJ, 858, L15

Co-authored

Anumarlapudi, A., Ehlke, A., Jones, M. L., et al. 2023, Characterizing Pulsars Detected in the Rapid ASKAP Continuum Survey, ApJ, 956, 28

Rose, K., Pritchard, J., Murphy, T., et al. 2023, Periodic Radio Emission from the T8 Dwarf WISE J062309.94-045624.6, ApJ, 951, L43

Ho, A. Y. Q., Perley, D. A., Gal-Yam, A., et al. 2023, A Search for Extragalactic Fast Blue Optical Transients in ZTF and the Rate of AT2018cow-like Transients, ApJ, 949, 120

Andreoni, I., Coughlin, M. W., Perley, D. A., et al. 2022, A very luminous jet from the disruption of a star by a massive black hole, ***Nature***, 612, 430

Ho, A. Y. Q., Margalit, B., Bremer, M., et al. 2022, Luminous Millimeter, Radio, and X-Ray Emission from ZTF 20acigmel (AT 2020xnd), ApJ, 932, 116

Wang, Y., Murphy, T., Kaplan, D. L., et al. 2022, Discovery of PSR J0523-7125 as a Circularly Polarized Variable Radio Source in the Large Magellanic Cloud, ApJ, 930, 38

Connor, T., Stern, D., Krone-Martins, A., et al. 2022, Gaia GraL: Gaia DR2 Gravitational Lens Systems. VII. XMM-Newton Observations of Lensed Quasars, ApJ, 927, 45

Makhathini, S., Mooley, K. P., Brightman, M., et al. 2021, The Panchromatic Afterglow of GW170817: The Full Uniform Data Set, Modeling, Comparison with Previous Results, and Implications, ApJ, 922, 154

Stern, D., Djorgovski, S. G., Krone-Martins, A., et al. 2021, Gaia GraL: Gaia DR2 Gravitational Lens Systems. VI. Spectroscopic Confirmation and Modeling of Quadruply Imaged Lensed Quasars, ApJ, 921, 42

Murphy, T., Kaplan, D. L., Stewart, A. J., et al. 2021, The ASKAP Variables and Slow Transients (VAST) Pilot Survey, PASA, 38, e054

Wang, Z., Kaplan, D. L., Murphy, T., et al. 2021, Discovery of ASKAP J173608.2-321635 as a Highly Polarized Transient Point Source with the Australian SKA Pathfinder, ApJ, 920, 45

Leung, J. K., Murphy, T., Ghirlanda, G., et al. 2021, A search for radio afterglows from gamma-ray bursts with the Australian Square Kilometre Array Pathfinder, MNRAS, 503, 1847

Bhakta, D., Mooley, K. P., Corsi, A., et al. 2021, The JAGWAR Prowls LIGO/Virgo O3 Paper I: Radio Search of a Possible Multimessenger Counterpart of the Binary Black Hole Merger Candidate S191216ap, ApJ, 911, 77

Kasliwal, M. M., Anand, S., Ahumada, T., et al. 2020, Kilonova Luminosity Function Constraints Based on Zwicky Transient Facility Searches for 13 Neutron Star Merger Triggers during O3, ApJ, 905, 145

Wang, Z., Murphy, T., Kaplan, D. L., Bannister, K. W., & Dobie, D. 2020, The capability of the Australian Square Kilometre Array Pathfinder to detect prompt radio bursts from neutron star mergers, PASA, 37, e051

Horesh, A., Sfaradi, I., Ergon, M., et al. 2020, A Non-equipartition Shock Wave Traveling in a Dense Circumstellar Environment around SN 2020oi, ApJ, 903, 132

Ackley, K., Adya, V. B., Agrawal, P., et al. 2020, Neutron Star Extreme Matter Observatory: A kilohertz-band gravitational-wave detector in the global network, PASA, 37, e047

Andreoni, I., Goldstein, D. A., Kasliwal, M. M., et al. 2020, GROWTH on S190814bv: Deep Synoptic Limits on the Optical/Near-infrared Counterpart to a Neutron Star-Black Hole Merger, ApJ, 890, 131

Kaplan, D. L., Dai, S., Lenc, E., et al. 2019, Serendipitous Discovery of PSR J1431-6328 as a Highly Polarized Point Source with the Australian SKA Pathfinder, ApJ, 884, 96

Chatys, F. W., Bedding, T. R., Murphy, S. J., et al. 2019, The period-luminosity relation of red supergiants with Gaia DR2, MNRAS, 487, 4832

Ho, A. Y. Q., Phinney, E. S., Ravi, V., et al. 2019, AT2018cow: A Luminous Millimeter Transient, ApJ, 871, 73

Mooley, K. P., Frail, D. A., Dobie, D., et al. 2018b, A Strong Jet Signature in the Late-time Light Curve of GW170817, ApJ, 868, L11

Mooley, K. P., Nakar, E., Hotokezaka, K., et al. 2018a, A mildly relativistic wide-angle outflow in the neutron-star merger event GW170817, ***Nature***, 554, 207

Andreoni, I., Ackley, K., Cooke, J., et al. 2017, Follow Up of GW170817 and Its Electromagnetic Counterpart by Australian-Led Observing Programmes, PASA, 34, e069

Kasliwal, M. M., Nakar, E., Singer, L. P., et al. 2017, Illuminating gravitational waves: A concordant picture of photons from a neutron star merger, ***Science***, 358, 1559

Hallinan, G., Corsi, A., Mooley, K. P., et al. 2017, A radio counterpart to a neutron star merger, ***Science***, 358, 1579

Abbott, B. P., Abbott, R., Abbott, T. D., et al. 2017, Multi-messenger Observations of a Binary Neutron Star Merger, ApJ, 848, L12

Murphy, T., Kaplan, D. L., Bell, M. E., et al. 2017, Low-Frequency Spectral Energy Distributions of Radio Pulsars Detected with the Murchison Widefield Array, PASA, 34, e020

Bell, M. E., Murphy, T., Johnston, S., et al. 2016, Time-domain and spectral properties of pulsars at 154 MHz, MNRAS, 461, 908