Marcus E. Lower | Curriculum Vitae

✉ marcus.lower@csiro.au • March 18, 2023

Postdoctoral fellow studying pulsars and how we can better understand them through the application of Bayesian inference techniques. Research interests include pulsar timing, polarimetry, studying the interstellar medium, testing general relativity, neutron star magnetospheres and gravitational waves.

Personal information

Present position: Postdoctoral research fellow in pulsar astronomy.
Australia Telescope National Facility, CSIRO, Space and Astronomy,
Epping, 2121 NSW, Australia

Citizenship: Australia, Canada.

Personal webpage: `https://mlower.github.io/`

Academic and research experience

Commonwealth Scientific and Industrial Research Organisation (CSIRO) **Sydney, Australia**
CSIRO Space and Astronomy Postdoctoral Research Fellow *2021-present*

- *Responsibilities*: Principle Investigator, Parkes young pulsar timing programme. National facility support, Parkes expert observer.

Swinburne University of Technology **Melbourne, Australia**
Research Assistant, Centre for Astrophysics and Supercomputing *2018*

- *Responsibilities*: Vetting of 600 pulsars for the UTMOST timing program. Developed diagnostic tools for tracking telescope observation efficiency. Follow up parameter estimation of glitches.
- *Supervisors*: Matthew Bailes, Chris Flynn, Ryan Shannon and Adam Deller.

Education

Swinburne University of Technology & CSIRO Space and Astronomy **Melbourne, Australia**
Ph.D. in Astrophysics *2018-2021*

- *Supervisors*: Matthew Bailes, Ryan Shannon and Simon Johnston.
- *Thesis*: Exploring the magnetospheric and rotational properties of radio pulsars.

Monash University **Melbourne, Australia**
Bachelor of Science with Honours (first class) in Astrophysics *2017*

- *Supervisors*: Eric Thrane, Paul Lasky and Rory Smith.
- *Thesis*: Detecting eccentricity in the orbits of merging binary black holes.

Monash University **Melbourne, Australia**
Bachelor of Science in Applied Mathematics and Astrophysics *2014-2016*

- *Supervisors*: Eric Thrane and Letizia Sammut.
- *Undergraduate thesis*: Can GW150914 reveal anything about dark matter?

Grants, scholarships and awards

Total awarded: $89,500

ASA 2021 best student poster (3rd place), Astronomical Society of Australia, $100 *2021*

CSIRO Space and Astronomy Studentship, CSIRO, $5k *2019-2021*

Faculty of Science Engineering & Technology travel grant, Swinburne University, $3k *2018-2021*

ARC Laureate Fellow PhD Scholarship, Swinburne University, $81k *2018-2021*

OzGrav student travel grant, Swinburne University, $400 *2018*

- Covered travel costs for the ANITA Summer School and Workshop in Perth, Australia

Observing proposals

Principal-investigator:

MeerKAT:

- DDT: Follow-up of magnetar candidate SGR 1555−5402. Granted 1.25 hrs. *2021*
- RB-P11: Timing the invisible B Pulsar of the Double Pulsar system. *2019-2022*
- RB-P12: Probing the magnetosphere of PSR J0737−3039B. *2019-2022*

Parkes Radio Telescope:

- P574: Young pulsar timing: Probing the physics of pulsars and neutron stars. Large science project, 100+ hrs. *2021-2024*
- P1102: A movie of a dynamic magnetar magnetosphere (NAPA). Granted up to 10.5 hrs. *2021-2023*
- P1154: A Southern-Sky Census of Highly Magnetised Pulsars. Granted 30 hrs. *2022*
- P1198: Catching a Galactic fast radio burst analogue (NAPA). Granted up to 31 hrs. *2023-2024*
- PX100: Pulsar bow-shocks at 8GHz. Granted 31.5 hrs. *2023*
- PX079: Target of opportunity observation of SGR 1935+2154. Granted 13 hrs. *2021-2022*
- PX070: Target of opportunity observation of GRB 210119A. Granted 1 hr. *2021*
- PX067: Target of opportunity observation of SGR 1830+0645. Granted 1 hr. *2020*
- PX060: Target of opportunity observation of SGR 1935+2154. Granted 3 hrs. *2020*
- PX057: Target of opportunity observations of Swift J1818.0−1607. Granted 8 hrs. *2020*

Co-investigator:

MeerKAT:

- MKT-22151: A continuum-imaging search for pulsar candidates in Omega Centauri. Granted 15 hrs. *2022*

Parkes Radio Telescope:

- P574: Young pulsar timing: Probing the physics of pulsars and neutron stars. Large science project, 370+ hrs. *2020-2021*
- P595: PULSE@Parkes (Pulsar Student Exploration online at Parkes) *2022-2024*
- P885: Understanding the remarkable behaviour of radio magnetars. Granted 107 hrs. *2019-2023*
- P1032: Mass measurements of southern binary pulsar systems. Granted 428 hrs. *2019-2023*
- P1154: Chasing up the orphans from previous Parkes pulsar surveys. Granted 101 hrs. *2022-2023*
- P1158: Probing the enigmatic environment of FRB20201124A with broadband observations (NAPA). Granted 20 hrs. *2022-2023*
- P1172: Ongoing observations of the PSR J1713+0747 event recovery. Granted 18 hrs. *2022-2023*

Very Long Baseline Array:

- 18B-390: Improved VLBA astrometry of the recently reactivated magnetar XTE J1810−197. Granted 10 hrs. *2018-2019*
- 20A-428: VLBA astrometry of XTE J1810−197: towards the first parallax for a magnetar. Granted 3 hrs. *2020*
- 20A-433: VLBA astrometry of Swift 1818.0−1607, the new radio-emitting magnetar. Granted 10.5 hrs. *2020*
- 20B-300: Measuring the Mass of an Isolated Pulsar via Gravitational Lensing. Granted 3 hrs. *2020*
- 20B-462: VLBA astrometry of Swift J1818.0−1607, the fastest-spinning magnetar. Granted 10.5 hrs. *2021*
- 22B-087: Pinpointing the 3D Galactic position of the magnetar Swift J1818.0−1607. Granted 9 hrs. *2022*

Teaching and mentoring

CSIRO Space and Astronomy:

Undergraduate student mentoring

- Aksita Deo (summer vacation student from Macquarie University) *2022-2023*
- Sarah Bradbury (summer vacation student from QUT) *2021-2022*

Monash University (teaching assistant):

- ASP1010: Earth to cosmos (1st-year astronomy). *2018*
- ASP1022: Life in the Universe (1st-year astronomy). *2017*

Leadership and service

Referee

- Monthly Notices of the Royal Astronomical Society
- The Astrophysical Journal Letters
- The Astrophysical Journal

Reviewer

- Giant Meterwave Radio Telescope, India
- Australia Telescope National Facility, Australia

Australia Telescope National Facility

- Parkes radio telescope expert observer. *2023-present*
- Vetting updates to the ATNF Pulsar Catalogue (psrcat). *2021-present*
- Chair of weekly ATNF pulsar group meetings (AKA 'Pulsar Chat'). *2021-present*
- Australia Telescope Compact Array Duty Astronomer. *2021-2022*

Organised conferences

- *2022 Australasian (Orange) Pulsar Workshop*, Parkes Observatory, Australia & hybrid online. *2022*
- *2022 ATNF Science Retreat*, Barossa Valley, Australia & hybrid online. *2022*

Professional organisation memberships

- Astronomical Society of Australia
- MeerTime Collaboration
- Parkes Pulsar Timing Array
- International Pulsar Timing Array
- CRAFT: The Commensal Real-time ASKAP Fast Transient Survey (affiliate)
- UTMOST Project (affiliate)
- OzGrav: The ARC Centre of Excellence for Gravitational-Wave Discovery (affiliate)

Public outreach

Outreach activities

- 2023 National Youth Science Forum Year 12 Program (PULSE@Parkes) *2023*
- PULSE@Parkes high school outreach and educational programme. *2022-present*
- Guinness World Record for the Most People Stargazing across Multiple Sites (Monash site). *2018*
- Monash University Open Day: science outreach and public engagement activities. *2017*
- Guinness World Record for the Most People Stargazing across Multiple Sites (Monash site). *2015*
- Monash University Open Day: first year physics lab demonstration. *2014*

Media

- **Space Australia** *Parkes radio telescope spots bizarre magnetar in the Milky Way*. *2021*
- **The Age** *Unlocking the secrets of one of the universe's strongest magnets*. *2021*
- **CNET** *Astronomers trace mysterious fast radio burst to extreme, rare star*. *2020*
- **Space Australia** *Ancient distance measuring technique applied to magnetar*. *2020*
- **Space Australia** *The Dish helps study nearby magnetar*. *2020*
- **phys.org** *Mysterious spinning neutron star detected in the Milky Way proves to be an extremely rare discovery*. *2020*
- **Science Alert** *Strangely flaring dead star could be the 'missing link' between magnetars and pulsars*. *2020*
- **phys.org** *Ticking cosmic clocks reveal the evolution of stars over millions of years*. *2020*
- **Science Alert** *Astronomers have caught this pulsar glitching for the very first time*. *2019*
- **Space Australia** *Pulsar glitches after 30 years*. *2019*

Skills

Programming languages: (proficient) Python, Bash, C shell, (familiar) Mathematica, MATLAB, Fortran90, (basic) C/C++, CUDA.

Software: PSRCHIVE, DSPSR, Tempo2, TempoNest, LIGO-LALSuite, LaTeX, GIT, SLURM, HTCondor.

Accumulated observing time: Parkes 400+ hrs.

Publications

Refereed publications: 58; **First author**: 7; **Citations**: 8200+ (217 first author); **h-index**: 34 (ADS)

Listed below are my first author publications in addition to publications where I made a *substantial* contribution as a co-author. I am also a co-author on 26 LIGO Scientific Collaboration papers that are not listed here, including the first LIGO-Virgo gravitational-wave transient catalogue (GWTC-1) and the GW190425 detection paper (2nd detected binary neutron-star merger).

First Author (refereed)

7. *A birefringent pair plasma within the near-field environment of a radio-loud magnetar*
   M. E. Lower, S. Johnston, M. Lyutikov, et al. Nature Astronomy, submitted (2022).
6. *The 2022 high-energy outburst and radio disappearing act of the magnetar 1E 1547.0−5408*
   M. E. Lower, G. Younes, P. Scholz, et al., ApJ, in press (2023).
5. *The impact of glitches on the rotational evolution of young pulsars*
   M. E. Lower, S. Johnston, L. Dunn, R. M. Shannon, M. Bailes, S. Dai, M. Kerr, R. N. Manchester, A. Melatos, L. S. Oswald, A. Parthasarathy, C. Sobey & P. Weltevrede, MNRAS 508 3251 (2021).
4. *The dynamic magnetosphere of Swift J1818.0−1607*
   M. E. Lower, S. Johnston, R. M. Shannon, M. Bailes & F. Camilo, MNRAS 502 127 (2021).
   - Covered by press release.
3. *Spectropolarimetric properties of Swift J1818.0−1607: a 1.4 s radio magnetar*
   M. E. Lower, R. M. Shannon, S. Johnston & M. Bailes, ApJL 896 L37 (2020).
   - Covered by press release.
2. *The UTMOST pulsar timing programme II: Timing noise across the pulsar population*
   M. E. Lower, M. Bailes, R. M. Shannon, et al. MNRAS 494 228 (2020).
   - Covered by press release.
1. *Measuring eccentricity in binary black hole inspirals with gravitational waves*
   M. E. Lower, E. Thrane, P. D. Lasky & R. Smith, PRD 98, 083028 (2018).

Co-Author (refereed)

22. *Pulsar polarization: a broad-band population view with the Parkes Ultra-Wideband receiver*
    L. S. Oswald, S. Johnston, A. Karastergiou, S. Dai, M. Kerr, **M. E. Lower**, R. N. Manchester, R. M. Shannon, C. Sobey & P. Weltevrede, MNRAS, in press (2023).
21. *Mass measurements and 3D orbital geometry of PSR J1933−6211*
    M. Geyer, V. Venkatraman Krishnan, P. C. C. Freire et al. inc. **M. E. Lower**, A&A, in press. (2023).
20. *The ultra narrow FRB 20191107B, and the origins of FRB scattering*
    V. Gupta, C. Flynn, W. Farah, M. Bailes, A. T. Deller, C. K. Day, **M. E. Lower**, MNRAS 514 5866 (2022).
19. *Propagation of a fast radio burst through a birefringent relativistic plasma*
    P. Kumar, R. M. Shannon, **M. E. Lower**, A. T. Deller & J. X. Prochaska, PRD, submitted, arXiv:2204.10816 (2022).
18. *Circularly polarized radio emission from the repeating fast radio burst source FRB 20201124A*
    P. Kumar, R. M. Shannon, **M. E. Lower**, S. Bhandari, A. T. Deller, C. Flynn & E. F. Keane, MNRAS 512 3400 (2022).
17. *Systematic upper limits on the size of missing pulsar glitches in the first UTMOST open data release*
    L. Dunn, A. Melatos, S. Suvorova, W. Moran, R. J. Evans, S. Osłowski, **M. E. Lower**, M. Bailes, C. Flynn, V. Gupta, MNRAS 512 1469 (2022).
16. *The eccentric millisecond pulsar PSR J0955−6150 I: Pulse profile analysis, mass measurements and constraints on binary evolution*
    M. Serylak, V. Venkatraman Krishnan , P. C. C. Freire et al. inc. **M. E. Lower**, A&A, 665 A53 (2022).
15. *A supernova remnant association for the fast-moving pulsar PSR J0908−4913*
    S. Johnston & **M. E. Lower**, MNRASL 507 L41 (2021).

14. *On the evidence for a common-spectrum process in the search for the nanohertz gravitational wave background with the Parkes Pulsar Timing Array*
B. Goncharov, R. M. Shannon, D. J. Reardon, et al., inc. **M. E. Lower**, ApJL, 917 L19 (2021).
• Covered by press release.
13. *Effects of periodicity in observation scheduling on parameter estimation of pulsar glitches*
L. Dunn, **M. E. Lower** & A. Melatos, MNRAS 504 3399 (2021).
12. *The Relativistic Binary Programme on MeerKAT: Science objectives and first results*
M. Kramer, I. H. Stairs, V. Venkatraman Krishnan, et al., inc. **M. E. Lower**, MNRAS 504 2094 (2021).
11. *Multi-frequency observations of SGR J1935+2154*
M. Bailes, C. G. Bassa, G. Bernardi, et al., inc. **M. E. Lower**, MNRAS 503 5367 (2021).
10. *Gravitational-wave Constraints on the Equatorial Ellipticity of Millisecond Pulsars*
R. Abbott, T. D. Abbott, S. Abraham et al., inc. **M. E. Lower**, ApJL 902 L21 (2020).
9. *Bayesian inference for compact binary coalescences with Bilby: Validation and application to the first LIGO−Virgo gravitational-wave transient catalogue*
I. Romero-Shaw, C. Talbot, S. Biscoveanu, et al., inc. **M. E. Lower**, MNRAS 499 3295 (2020).
8. *A magnetar parallax*
H. Ding, A. T. Deller, **M. E. Lower**, C. Flynn, S. Chatterjee, W. Brisken, N. Hurley-Walker, F. Camilo, J. Sarkissian, V. Gupta, MNRAS 498 3736 (2020).
• Covered by press release.
7. *The MeerKAT Telescope as a Pulsar Facility: System verification and early science results from MeerTime*
M. Bailes, A. Jameson, F. Abbate, et al., inc. **M. E. Lower**, PASA 37 e028 (2020).
6. *The Parkes Pulsar Timing Array Project: Second data release*
M. Kerr, D. J. Reardon, G. Hobbs, et al., inc. **M. E. Lower**, PASA 37 e020 (2020).
5. *The UTMOST Survey for Magnetars, Intermittent pulsars, RRATs and FRBs I: System description and overview*
V. Venkatraman Krishnan, C. Flynn, W. Farah, et al., inc. **M. E. Lower**, MNRAS 492 4752 (2020).
4. *Five new real-time detections of Fast Radio Bursts with UTMOST*
W. Farah, C. Flynn, M. Bailes, et al., inc. **M. E. Lower**, MNRAS 488 2989 (2019).
• Covered by press release.
3. *The 2018 X-ray and Radio Outburst of Magnetar XTE J1810−197*
E. V. Gotthelf, J. P. Halpern, J. A. J. Alford, T. Mihara, H. Negoro, N. Kawai, S. Dai, **M. E. Lower**, S. Johnston, M. Bailes, S. Osłowski, F. Camilo, H. Miyasaka & K. K. Madsen,
ApJL 874 L25 (2019).
2. *Wideband polarized radio emission from the newly revived radio magnetar XTE J1810−197*
S. Dai, **M. E. Lower**, M. Bailes, F. Camilo, J. P. Halpern, S. Johnston, M. Kerr, J. Reynolds, J. Sarkissian & P. Scholz, ApJL 874 L14 (2019).
1. *Bilby: A user-friendly Bayesian inference library for gravitational-wave astronomy*
G. Ashton, M. Hübner, P. D. Lasky, et al., inc. **M. E. Lower**, ApJS 241 27 (2019).

Non-peer reviewed publications

23. *No significant change in the radio flux density of PSR B1259−63/LS 2883 near the 2022 apastron*
M. E. Lower & S. Johnston, ATel #15923 (2023).
22. *FRB20221128A found by UTMOST-NS*
A. Mandlik, M. Bailes, A. Deller, inc. **M. E. Lower**, ATel #15783 (2022).
21. *Parkes ultra-wideband observations of SGR 1935+2154 during recent epochs of high activity*
M. E. Lower, P. Kumar & R. M. Shannon, ATel #15172 (2022).
20. *Confirmation of glitch event observed in the Vela pulsar (PSR J0835−4510)*
L. Dunn, D. Campbell-Wilson, C. Flynn, et al., inc. **M. E. Lower**, ATel #14807 (2021).
19. *FRB20210630A found by UTMOST*
A. Mandlik, M. Bailes, A. Deller, et al., inc. **M. E. Lower**, ATel #14745 (2021).
18. *FRB20210303A found by UTMOST*
A. Mandlik, V. Gupta, M. Bailes, et al., inc. **M. E. Lower**, ATel #14434 (2021).
17. *Non-detection of radio pulses from GRB 210119A/Swift J1851.2−6148 with Parkes*
M. E. Lower, R. Sengar, P. Kumar & R. M. Shannon, ATel #14347 (2021).
16. *VLBA detection of Swift J1818.0−1607*
D. Hao, A. T. Deller, **M. E. Lower** & R. M. Shannon, ATel #14005 (2020).

15. *Resurgence in the radio flux of the magnetar XTE J1810−197*
M. E. Lower, V. Gupta, C. Flynn, et al., ATel #13840 (2020).
14. *FRB200607 found by UTMOST*
V. Gupta, M. Bailes, A. Jameson, et al., inc. **M. E. Lower**, ATel #13788 (2020).
13. *No radio counterpart for IGR J18179−1621 detected during a serendipitous VLBA observation*
H. Ding, A. T. Deller, **M. E. Lower** & R. M. Shannon,
ATel #13737 (2020).
12. *FRB200508 found at UTMOST*
V. Gupta, M. Bailes, A. Jameson, et al., inc. **M. E. Lower**, ATel #13715 (2020).
11. *Multi-band observations of Swift J1818.0−1607 with Parkes*
M. E. Lower & R. M. Shannon, ATel #13587 (2020).
10. *MeerKAT observation of the radio magnetar candidate Swift J1818.0−1607*
M. E. Lower, S. Buchner, S. Johnston, A. Parthasarathy, M. Geyer & M. Bailes on behalf of the MeerTime collaboration, ATel #13562 (2020).
9. *FRB191223 found at UTMOST*
V. Gupta, M. Bailes, A. Jameson, et al., inc. **M. E. Lower**, ATel #13363 (2019).
8. *Detection of a glitch in PSR J0908−4913 by UTMOST*
M. E. Lower, M. Bailes, R. M. Shannon, et al., RNAAS 3 192 (2019).
7. *FRB191107 found at UTMOST*
V. Gupta, M. Bailes, A. Jameson, et al., inc. **M. E. Lower**, ATel #13282 (2019).
6. *FRB190806 found at UTMOST*
V. Gupta, M. Bailes, A. Jameson, et al., inc. **M. E. Lower**, ATel #12995 (2019).
5. *Detection of FRB190322 at the Molonglo Radio Telescope*
V. Gupta, M. Bailes, A. Jameson, et al., inc. **M. E. Lower**, ATel #12610 (2019).
4. *Detection of FRB181228 at the Molonglo Radio Telescope*
W. Farah, M. Bailes, A. Jameson, et al., inc. **M. E. Lower**„ ATel #12335 (2018).
3. *Detection of low-frequency radio emission from the magnetar XTE J1810−197*
M. E. Lower, M. Bailes, A. Jameson, et al., ATel #12288 (2018).
2. *Two new FRBs discovered by UTMOST*
W. Farah, M. Bailes, A. Jameson, et al., inc. **M. E. Lower**, ATel #12124 (2018).
1. *Detection of a glitch in the pulsar J1709−4429*
M. E. Lower, C. Flynn, M. Bailes, et al., RNAAS 2 139 (2018).

Conference proceedings, software papers, etc.

3. *RMNest: Bayesian approach to measuring Faraday rotation and conversion in radio signals*
M. E. Lower, P. Kumar, R. M. Shannon, ascl:2204.008 (2022).
2. *Probing magnetar formation channels with high-precision astrometry: The progress of VLBA astrometry of the fastest-spinning magnetar Swift J1818.0−1607*
H. Ding, A. T. Deller, **M. E. Lower** & R. M. Shannon, Proceedings of the IAUS 363 (2021).
1. *A phenomenological model for measuring generalised Faraday rotation*
M. E. Lower, arXiv:2108.09429 (2021).

Presentations

3 colloquia, **13** conference/workshop talks, **13** department seminars, **3** posters at conferences.

Colloquia

3. *The Parkes magnetar monitoring programme*
MQAAAstro Seminar, Macquarie University, Sydney, Australia, December 2022.
2. *A radio-loud magnetar with an identity crisis*
ATNF Colloquium, CSIRO Marsfield, Sydney, Australia, March 2022.
1. *Massive scale pulsar timing with the Molonglo Observatory Synthesis Telescope*
ATNF Colloquium, CSIRO Marsfield, Sydney, Australia, Feb 2020.

Conference and workshop presentations

13. *Magnetars@Murriyang*
2022 Australasian (Orange) Pulsar Workshop, Parkes Observatory, Australia, November 2022.
12. *Radio-loud magnetars as Galactic fast radio burst analogues*
IAU Symposium 369, IAU General Assembly 2022, Busan, South Korea, August 2022.
11. *Untangling the twisted polarised emission of a radio-loud magnetar*
2022 Astronomical Society of Australia Annual Scientific Meeting, Hobart, Australia, July 2022.
10. *Modelling radio birefringence in neutron star magnetospheres*
ANITA 2022 workshop, Macquarie University, Sydney, Australia, Feb 2022.
9. *Timing an invisible neutron star and testing General Relativity via the eclipses of its pulsar companion*
14th Edoardo Amaldi conference on gravitational waves, held online, July 2021.
8. *A MeerKAT's perspective of the Double Pulsar eclipses*
11th IPTA scientific meeting, held online, June 2021.
7. *The radio magnetar XTE J1810−197: A galactic FRB analogue?*
2020 Astronomical Society of Australia Annual Scientific Meeting, held online, July 2020.
6. *The UTMOST pulsar timing programme*
10th IPTA scientific meeting, Pune, India, June 2019.
5. *Bayesian pulsar timing and noise analysis with TempoNest*
10th IPTA student workshop, NCRA, Pune, India, June 2019 (**Invited**).
4. *Profile domain timing: The future of pulsar timing?*
OzGrav Pulsar Timing Inference Workshop, Swinburne University of Technology, Melbourne, Australia, May 2019 (**Invited**).
3. *Pulsar inference tools*
OzGrav Pulsar Timing Inference Workshop, Swinburne University of Technology, Melbourne, Australia, May 2019 (**Invited**).
2. *Measuring rotational instabilities in pulsars with the Molonglo telescope*
ANITA 2019 workshop, Swinburne University of Technology, Melbourne, Australia, Feb 2019.
1. *Distinguishing eccentricity in binary black hole mergers with aLIGO*
ANITA 2018 workshop, ICRAR Curtin University, Perth, Australia, Feb 2018.

Department and research group seminars

13. *Solving your Bayesian dreams with Bilby, Part II*
Invited tutorial, CSIRO Space & Astronomy Co-learnium, CSIRO Marsfield, Sydney Australia, June 2022.
12. *Solving your Bayesian dreams with Bilby, Part I*
Invited tutorial, CSIRO Space & Astronomy Co-learnium, CSIRO Marsfield, Sydney Australia, Apr 2022.
11. *The impact of glitches on young pulsar rotational evolution*
Invited talk (virtual), LIGO-Virgo-KAGRA Continuous Gravitational Waves Working Group, Nov 2021.
10. *Large braking indices in young pulsars: intrinsic or glitch-induced?*
Invited talk (virtual), Monash University Gravitational-Wave Group weekly meeting, Nov 2021.
9. *How do glitches affect the rotational evolution of young pulsars?*
Invited talk (virtual), Oxford University pulsar journal club, Nov 2021.
8. *Exploring the magnetospheric and rotational properties of radio pulsars*
Pre-thesis-submission talk, Swinburne University of Technology, Melbourne, Australia, July 2021.
7. *The dynamic magnetosphere of Swift J1818.0−1607*
Invited talk (virtual), Max-Planck-Institut für Radioastronomie pulsar journal club, Dec 2020.
6. *Introduction to Bayesian parameter estimation with Bilby*
Astrophysics weekly coding workshop, Swinburne University of Technology, Melbourne, Australia, Nov 2020.
5. *Exploring the spectropolarimetric properties of radio-loud magnetars*
Mid-candidature talk, Swinburne University of Technology, Melbourne, Australia, Aug 2020.
4. *Application of astrophysical inference to next generation pulsar data sets*
Confirmation of candidature talk, Swinburne University of Technology, Melbourne, Australia, Sept 2019.
3. *Detecting eccentric binary black holes with Advanced LIGO*
Honours year final talk, Monash University, Melbourne, Australia, Nov 2017.
2. *Detecting eccentricity in an ensemble of binary black hole mergers*
Honours year introductory talk, Monash University, Melbourne, Australia, Jun 2017.
1. *What can GW150914 tell us about dark matter?*
Undergraduate research talk, Monash University, Melbourne, Australia, Oct 2016.

Posters

3. *How do young pulsars spin down?*
   ASA 2021 Annual Scientific Meeting, Melbourne, Australia, July 2021.
   - Student poster prize, 3rd place.
2. *Characterising rotational irregularities in the radio pulsar population with UTMOST.*
   OzGrav Annual Retreat, Lorne, Australia, Nov 2019.
1. *Measuring eccentricity in binary black hole inspirals with gravitational waves.*
   ASA 2018 Annual Scientific Meeting, Melbourne, Australia, Jul 2018.