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## EMPLOYMENT / EDUCATION

- 2025-. STFC Ernest Rutherford Research Fellow  
 2025 Postdoctoral Researcher  
 2022-25 Herchel Smith Research Fellow  
 2018-22 Ph.D.: *Eccentricity in Gravitational-Wave Transients.*  
 2013-18 B.A. and M.Sc. Physics with Honours, Class I

Cardiff University  
 University of Bristol  
 University of Cambridge  
 Monash University  
 University of Birmingham

## SELECTED INVITED TALKS

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|------|--|--|
| 2025 | University of Oxford   | SPIMAX Colloquium  |
| -    | University of Bristol  | Astrophysics Seminar   |
| -    | University of Nottingham                                     | Particle Cosmology and Gravity Seminar                       |
| -    | IIT Madras   | Eccentricity Workshop  |
| 2024 | University of Sussex   | Astronomy Colloquium   |
| -    | Southampton University                                       | Gravity Seminar  |
| -    | University of Birmingham                                     | Seminar  |
| -    | University of Cambridge                                      | Kavli Institute for Cosmology Seminar                        |
| 2023 | Madrid Instituto de Física Teórica                           | COSMO'23, Plenary Seminar                                    |
| -    | Albert Einstein Institute, Max Planck Institute, Potsdam     | CIERA Seminar  |
| -    | Northwestern University                                      | Seminar  |
| -    | Queen Mary University of London                              | Seminar  |
| -    | University of Cambridge                                      | (Data Intensive Science, Cosmology, KICC Frontiers) Seminars |
| -    | University of Amsterdam                                      | Anton Pannekoek Institute Colloquium                         |
| 2021 | Niels Bohr Institute   | Conference on Dynamical Binary Black Hole Formation          |
| -    | CSIRO Australia Telescope National Facility                  | Seminar  |
| -    | OzGrav Centre of Excellence for Gravitational-Wave Discovery | Seminar  |
| -    | Massachusetts Institute of Technology                        | Seminar  |
| -    | California Institute of Technology                           | TAPIR Seminar  |
| -    | University of Queensland                                     | Seminar  |
| 2020 | OzGrav Centre of Excellence for Gravitational-Wave Discovery | Seminar  |
| -    | University of Santiago de Compostela                         | Colloquium   |
| -    | Monash University School of Physics and Astronomy            | Colloquium   |

## PRIZES, AWARDS &amp; SCHOLARSHIPS

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|------|--|--|
| 2025 | Ernest Rutherford Fellowship (accepted)  | Science and Technology Facilities Council                    |
| 2023 | Honourable Mention: Charlene Heisler Prize   | Astronomical Society of Australia                            |
| -    | Rising Star Award  | OzGrav Centre of Excellence for Gravitational Wave Discovery |
| 2022 | Honourable Mention: GWIC-Braccini Prize  | Gravitational Wave International Committee                   |
| -    | Robert Street Prize  | Monash University, School of Physics & Astronomy             |
|      | For "the best PhD thesis awarded through the School of Physics and Astronomy"                      |  |
| 2021 | Norris Family Award  | Monash University, Faculty of Science.                       |
|      | For "outstanding author contribution by a graduate student to published scholarly research output" |  |
| -    | Herchel Smith Research Fellowship (accepted)   | University of Cambridge                                      |
| -    | Burke Fellowship (declined)  | Caltech  |
| -    | Flatiron Research Fellowship (declined)  | Flatiron Centre for Computational Astrophysics               |
| -    | Niels Bohr Fellowship (declined)   | Niels Bohr International Academy                             |
| 2020 | Homeward Bound Membership  | STEMM Leadership Initiative                                  |
| -    | Outreach Award   | OzGrav Centre of Excellence for Gravitational Wave Discovery |
| -    | ECR Poster Prize   | Royal Astronomical Society                                   |
| 2019 | Student Poster Award   | OzGrav Centre of Excellence for Gravitational Wave Discovery |
| -    | Student Talk Award   | Astronomical Society of Australia                            |
| 2018 | J.L. William International Scholarship   | Monash University, School of Physics and Astronomy           |
| -    | Dean's International Postgraduate Scholarship  | Monash University, Faculty of Science                        |
| -    | International Postgraduate Research Scholarship  | Monash University  |
| -    | Nolan Merril Prize   | University of Birmingham                                     |
|      | For "the highest-scoring M.Sc. project in the School of Physics & Astronomy"                       |  |
| -    | M.Sc. Poster Prize, School of Physics & Astronomy  | University of Birmingham                                     |

## SUPERVISION &amp; TEACHING

## ▷ Graduate Supervision:

- Elizabeth Morgan (Cardiff). PhD project: *X-ray and Gravitational-Wave Joint Observations of Compact Objects using Machine Learning*
- Teagan Clarke (Monash). Honours (Masters) project: *Gravitational Waves from Eccentric Binary Black Holes*

## ▷ Undergraduate Supervision:

- Salman Khan (Cambridge). Data Intensive Science MPhil project: *Reproducing Third Gravitational Wave Transient Catalogue Population Inference*
- Daniel Gibson (Cambridge). Part III Mathematics MPhil project: *Understanding Neutron Stars with Future Gravitational-Wave Detector Networks*
- Joshua Sharkey (Cambridge). Summer project: *Wrong Model, Right Answer: Recovering traces of dynamical binary black hole formation from gravitational-wave data*
- Samir Goorachurn (McGill). Summer project: *Eccentricities of Binary Black Holes with Circumbinary Disks*
- Ajinkya Naik (Pune). Summer project: *Spins of Binary Black Holes from High Mass X-Ray Binaries*

## ▷ PhD School Lectures:

- [Kavli-Villum School on Gravitational Waves](#): Introduction to Gravitational Wave Astrophysics
- [ESO-Gruber Summer School](#): From Nearby Worlds to Distant Galaxies: Gravitational Waves

## ▷ Problem Classes / Labs / Workshops:

- Statistical Uncertainty Quantification (Cambridge), Introductory Astronomy, Introduction to Astrophysics, Computational Astrophysics & the Extreme Universe (Monash)

## ACADEMIC SERVICE

2025	Subject-matter expert reviewer	<i>NASA peer review</i>
2019-	Referee	<i>Nature Astronomy, PRD, MNRAS, ApJ, ApJ Letters</i>
2018-	Eccentricity Task Force, internal paper reviews, paper writing	<i>LVK Collaboration</i>
2023	Gravitational Waves Session Co-convener	<i>National Astronomy Meeting (UK)</i>
2023	LOC, Conferences: Rubin/LSST, Astrostats/ML	<i>Kavli Institute Cambridge</i>
2022-2023	Organiser: GR Seminar, GR Journal Club, Theory Colloquia	<i>University of Cambridge</i>
2020-22	Steering Committee	<i>Australian National Institute for Theoretical Astrophysics</i>
2019	Women in Physics & Astronomy Student Co-Chair	<i>Monash University</i>
2018	Board of Misconduct Student Rep.	<i>University of Birmingham</i>
2013-18	Student Rep.	<i>University of Birmingham</i>

## OUTREACH

**Publications & Articles**

- 2021 [Women in Physics](#), Colouring book; co-author, editor, and illustrator
- 2020 [Planetymology: Why Uranus is not called George and other facts about space and words](#), Children's non-fiction book; author, editor, and illustrator
- [The CO<sub>2</sub> Elephant in the Room: Curbing the Carbon Footprint of Astronomy](#), Astrobites article

**Media Interviews**

- |          |  |
|----------|--|
| PODCASTS | <a href="#">The Science Pawdcast</a>                 |
| -        | <a href="#">Astrophiz</a>                            |
| -        | <a href="#">Storytellers of STEMM</a>                |
| -        | <a href="#">Listening to the Cosmos (LIGO India)</a> |
| RADIO    | <a href="#">Einstein A Go-Go, Triple R</a>           |
| -        | <a href="#">The Space Show, Southern FM</a>          |
| ARTICLES | <a href="#">Space Australia</a>                      |
| -        | <a href="#">Monash University Science</a>            |

**Public Talks**

- 2025 Taunton Astronomy Society
- Astronomy on Tap Cardiff
- 2024 Taunton Astronomy Society
- Bath Royal Literary & Scientific Institution
- 2023 Astronomy on Tap Chicago
- 2022 U3A Deepdene
- 2021 GWTC-3 Webinar
- Astronomical Society of Victoria
- Denver Astronomical Society
- 2020 Mount Burnett Observatory
- OzGrav Public Lecture Series
- 2019 Mount Burnett Observatory

**Kid's Talks & Outreach Visits**

- 2024 City Academy Bristol with We The Curious
- 2022 Casey Tech School with OzGrav
- Haileybury Middle School for Women's Day Australia
- 2021 Girlguiding UK
- Cambridge Festival

**Other**

- 2025 Scientific Consultant for We The Curious Planetarium Nights show: *The Space Between*

## RESEARCH PUBLICATIONS: SHORT-AUTHOR

- [35] Astrophysical Implications of Eccentricity in Gravitational Waves from Neutron Star-Black Hole Binaries — **IRS**, J. Stegmann, G. Morras, M. Zevin. Submitted to *MNRAS*, Dec 2025
- [34] Distinguishing the origin of eccentric black-hole mergers with gravitational-wave spin measurements — J. Stegmann, D. Gerosa, **IRS**, G. Fumagalli, H. Tagawa, L. Zwick. Published in *ApJL*, Nov 2025
- [33] Evidence for eccentricity in the population of binary black holes observed by LIGO-Virgo-KAGRA — N. Gupte *et al.* (incl. **IRS**). Published in *PRD*, Nov 2025
- [32] Fast and accurate parameter estimation of high-redshift sources with the Einstein Telescope — F. Santoliquido *et al.* (incl. **IRS**). Published in *PRD*, Nov 2025
- [31] Hierarchical Triples vs. Globular Clusters: Binary black hole merger eccentricity distributions compete and evolve with redshift — A. Dorozsmai, **IRS**, A. Vijaykumar, S. Toonen, F. Antonini, K. Kremer, M. Zevin, E. Grishin. Published in *MNRAS*, Nov 2025
- [30] Gravitational-Wave Signatures of Highly Eccentric Stellar-Mass Binary Black Holes in Galactic Nuclei — E. Grishin, **IRS** A. A. Trani. Submitted to *MNRAS*, Oct 2025
- [29] Biased parameter inference of eccentric, spin-precessing binary black holes — Divyajyoti, **IRS** *et al.* Submitted to *PRD*, Oct 2025
- [28] GW200208\_222617 as an eccentric black-hole binary merger: properties and astrophysical implications — **IRS**, J. Stegmann, H. Tagawa, D. Gerosa, J. Samsing, N. Gupte, S. R. Green. Published in *PRD*, Sep 2025
- [27] Inferring the pair-instability mass gap from gravitational wave data — F. Antonini, T. Callister, F. Dosopoulou, **IRS**, D. Chattopadhyay. Published in *PRD*, Sep 2025
- [26] Rapid stellar and binary population synthesis with COMPAS: methods paper II — I. Mandel *et al.* incl. **IRS**. Published in *ApJS*, Sep 2025
- [25] Gravitational waves reveal the pair-instability mass gap and constrain nuclear burning in massive stars — F. Antonini, **IRS**, T. Callister, F. Dosopoulou, D. Chattopadhyay, M. Gieles, M. Mapelli. Submitted to *Nature Astronomy*, Sep 2025
- [24] A Star Cluster Population of High Mass Black Hole Mergers in Gravitational Wave Data — F. Antonini, **IRS**, T. Callister. Published *PRL*, Jan 2025
- [23] Eccentric Signatures of Stellar-Mass Binary Black Holes with Circumbinary Disks in LISA — **IRS**, S. Goorachurn, M. Siwek, C. J. Moore. Published in *MNRAS Letters*, Oct 2024
- [22] Gravitational-wave data analysis with high-precision numerical relativity simulations of boson star mergers — T. Evstafyeva, U. Sperhake, **IRS**, M. Agathos. Published in *PRL*, Sep 2024
- [21] Residual eccentricity as a systematic uncertainty on the formation channels of binary black holes — G. Fumagalli, **IRS**, D. Gerosa, V. De Renzis, K. Kritos, A. Olejak. Published in *ApJ*, Sep 2024
- [20] Detecting gravitational-wave bursts from black hole binaries in the Galactic Center with LISA — A. Knee, J. McIver, S. Naoz, **IRS**, B-M. Hoang. Published in *ApJL*, Aug 2024
- [19] Blind Spots and Biases: The dangers of ignoring eccentricity in gravitational-wave signals from binary black holes — Divyajyoti, S. Kumar, S. Tibrewal, **IRS**, C. Mishra. Published in *PRD*, Feb 2024
- [18] Double black hole mergers in nuclear star clusters: eccentricities, spins, masses, and the growth of massive seeds — D. Chattopadhyay, J. Stegmann, F. Antonini, J. Barber, **IRS**. Published in *MNRAS*, Dec 2023
- [17] Rapid population synthesis of black-hole high-mass X-ray binaries: implications for binary stellar evolution — **IRS**, R. Hirai, A. Bahramian, R. Willcox, I. Mandel. Published in *MNRAS*, Sep 2023
- [16] Inferring Interference: Identifying a Perturbing Tertiary with Eccentric Gravitational Wave Burst Timing — **IRS**, N. Loutrel, M. Zevin. Published in *PRD*, Jun 2023
- [15] Eccentricity or spin precession? Distinguishing subdominant effects in gravitational-wave data — **IRS**, D. Gerosa, N. Loutrel. Published in *MNRAS*, Jan 2023
- [14] Gravitational-wave inference for eccentric binaries: the argument of periapsis — T. A. Clarke, **IRS**, P. D. Lasky, E. Thrane. Published in *MNRAS*, Dec 2022
- [13] Subtracting glitches from gravitational-wave detector data during the third observing run — D. Davis, T. B. Littenberg, **IRS**, M. Millhouse, J. McIver, F. Di Renzo, G. Ashton. Published in *Class. Quant. Grav.*, Dec 2022
- [12] Four eccentric mergers increase the evidence that LIGO–Virgo–KAGRA’s binary black holes form dynamically — **IRS**, P. D. Lasky, E. Thrane. Published in *ApJ*, Dec 2022
- [11] General-relativistic precession in a black-hole binary — M. Hannam *et al.* (incl. **IRS**). Published in *Nature*, Oct 2022
- [10] A Rosetta Stone for Eccentric Gravitational Waveform Models — A. Knee, **IRS**, P. D. Lasky, J. McIver, E. Thrane. Published in *ApJ*, Sep 2022
- [9] When models fail: an introduction to posterior predictive checks and model misspecification in gravitational-wave astronomy — **IRS**, P. D. Lasky, E. Thrane. Published in *PASA*, Jun 2022
- [8] Implications of Eccentric Observations on Binary Black Hole Formation Channels — M. Zevin, **IRS**, K. Kremer, E. Thrane, P. D. Lasky. Published in *ApJ Letters*, Nov 2021
- [7] Signs of Eccentricity in Two Gravitational-Wave Signals may Indicate a Sub-Population of Dynamically Assembled Binary Black Holes — **IRS**, P. D. Lasky, E. Thrane. Published in *ApJ Letters*, Nov 2021

## RESEARCH PUBLICATIONS: SHORT-AUTHOR (CONT.)

- [6] **Gravitational Waves as a Probe of Globular Cluster Formation and Evolution** — **IRS**, K. Kremer, P. D. Lasky, E. Thrane, J. Samsing. Published in *MNRAS*, Jul 2021
- [5] **An Interactive Gravitational-Wave Detector Model for Museums and Fairs** — S. Cooper *et al.* (incl. **IRS**). Published in *Am. J. Phys.*, Jul 2021
- [4] **Bayesian Inference for Compact Binary Coalescences with BILBY: Validation and Application to the First LIGO-Virgo Gravitational-Wave Transient Catalogue** — **IRS**, C. Talbot, S. Biscoveanu, V. D'Emilio, G. Ashton *et al.* Published in *MNRAS*, Sep 2020
- [3] **GW190521: Orbital Eccentricity and Signatures of Dynamical Formation in a Binary Black Hole Merger Signal** — **IRS**, P. Lasky, E. Thrane, J. Calderón Bustillo. Published in *ApJ Letters*, Oct 2020
- [2] **On the origin of GW190425** — **IRS**, N. Farrow, S. Stevenson, X-J. Zhu, E. Thrane. Published in *MNRAS Letters*, May 2020
- [1] **Searching for Eccentricity: Signatures of Dynamical Formation in the First Gravitational-Wave Transient Catalogue of LIGO and Virgo** — **IRS**, P. Lasky, E. Thrane. Published in *MNRAS*, Oct 2019

## RESEARCH PUBLICATIONS: LARGE COLLABORATION

I list here publications to which I have actively contributed.

To see all papers upon which I am listed as an author, please visit my [ADS bibliography](#).

- [7] **Observation of Gravitational Waves from the Coalescence of a 2.5 – 4.5 Msun Compact Object and a Neutron Star** — *The LVK Collaboration (incl. IRS)*. Published in *ApJ*, Aug 2024. Contribution: Internal review of parameter estimation results and presentation.
- [6] **Population of Merging Compact Binaries Inferred using Gravitational Waves through GWTC-3** — *The LVK Collaboration (incl. IRS)*. Published in *PRX*, Mar 2023. Contribution: Internal review of population spin analysis.
- [5] **GWTC-3: Compact Binary Coalescences Observed by LIGO and Virgo During the Second Part of the Third Observing Run** — *The LVK Collaboration (incl. IRS)*. Published in *PRX*, Dec 2023. Contribution: Member of the paper-writing team. Event analysis, writing, result presentation.
- [4] **Population Properties of Compact Objects from the Second LIGO-Virgo Gravitational-Wave Transient Catalog** — *The LVK Collaboration (incl. IRS)*. Published in *ApJ Letters*, May 2021. Contribution: Internal review of population spin analysis.
- [3] **GWTC-2: Compact Binary Coalescences Observed by LIGO and Virgo During the First Half of the Third Observing Run** — *The LVK Collaboration (incl. IRS)*. Published in *PRX*, Apr 2021. Contribution: Analysis of strain data surrounding one event trigger.
- [2] **Neutron Star Extreme Matter Observatory: A Kilohertz-Band Gravitational-Wave Detector in the Global Network** — OzGrav: K. Ackley *et al.* (incl. **IRS**). Published in *PASA*, Nov 2020. Contribution: Research into efficacy of GW detector network including Australian instrument for observing binary neutron stars.
- [1] **A cryogenic silicon interferometer for gravitational-wave detection** — R. X. Adhikari *et al.* (incl. **IRS**). Published in *CQG*, Aug 2020. Contribution: Created one of the numerical models used to simulate noise at gravitational-wave interferometers.