Dr Gregory Ashton

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Academic Experience

2020-2021 **Teaching Fellow (Science):** Royal Holloway, University of London

- Teaching Fellow in the Centre for the Development of Academic Skills.
- Responsible for foundation-year Mathematics with over 140 students taught in a blended learning environment.

2020-2021 **Adjunct Research Associate:** School of Physics and Astronomy, Monash University

- Held concurrently with the Teaching Fellowship at Royal Holloway to enable ongoing research, collaborations and student supervision.

2018-2020 **Assistant Lecturer:** School of Physics and Astronomy, Monash University

- Researcher in gravitational-wave astronomy and neutron-star astrophysics.
- Mentored research students in science and software development.
- Assistant lecturer for first-year physics PHS1011 (Classical Physics and Relativity) and PHS1022 (Fields and Quantum Physics) with over 250 students enrolled per year.

2016-2018 **Research Scientist:** Albert Einstein Institute, Hannover

- Researcher in continuous gravitational-wave searchers and neutron-star astrophysics.
- Co-authored 8 publications in gravitational-wave astronomy and neutron-star astrophysics.

Education

2012-2016 PhD in Mathematics. Thesis title: *"Timing variations in neutron stars: models, inference, and their implications for gravitational waves"*, University of Southampton (GB) and Albert Einstein Institute (Hannover, DE).

2008-2012 MPhys, 1st class (Hons), University of Southampton (GB).

2006-2008 General Certificate of Education Advanced Level, in Physics, Mathematics, and Music (AAC), Ferndown Upper School Sixth Form (GB).

Leadership and Community Roles

2020- **Co-chair**: LIGO Parameter Estimation group comprising ~ 100 members responsible for the physical characterisation of every observed gravitational-wave signal.

2020- **Scientific Advisor**: GWCloud, a cloud-based platform to access gravitational wave astronomy data with an intuitive, fully managed job system.

2019-2020 **Co-chair**: LIGO Bilby development group comprising 30 members who are responsible for the development and deployment of the Bilby software.

2019-2020 **Member**: Australian gravitational-wave (OzGrav) Equity & Diversity Committee. I delivered training materials and helped support the committee's efforts across the Centre for Excellence.

2018-2020 **Co-chair**: OzGrav Inference program. This is one of seven research themes in the Australian Research Council's Centre of Excellence for Gravitational Wave Discovery. I coordinated cross-node interactions and developed workshops and seminars to facilitate collaboration.

2018-2019 **Chair**: OzGrav Computing Task Force. I was responsible for coordinating communication between OzGrav members and the OzStar super-computing team.

Research Supervision

2018-2021	Nikhil Sarin, PhD candidate, Monash University, *The observational consequences of neutron star post-merger remnants*. Together, we have published eight articles, with Nikhil first-author on four of these.
2020	Rowina Nathan, PHS2360 Physics and Astronomy Introductory Research Project, Monash University, *Analysing radio pulsar pulses using machine learning*. (Co-authored two papers together)
2019	Kshipraa Athar, 2019 Vacation Scholarship, Monash University, *Optimising tools for gravitational wave astronomy*. (Co-authored one paper together)
2019	Tushar Nagar, PHS2360 Physics and Astronomy Introductory Research Project, Monash University, *Glitches in the Vela Pulsar: A Bayesian approach*.
2018	Chandana Anand, PHS2360 Physics and Astronomy Introductory Research Project, Monash University, *Magnetospheric switching in PSR B1828-11*.

Grants and Awards

- Awarded the 2020 USERN (Universal Scientific Education and Research Network) prize for Physical and Chemical Sciences.
- Awarded two support grants (total 40,000 AUD) to develop GWCloud: a bilby-backed cloud-based gravitational-wave analysis tool, one of three projects in the AUD 2.8M Australian Gravitational-Wave Data Center.
- Runner-up: Monash Universitys Faculty of Science 2020 Research Excellence by an Early Career Researcher.
- Special Breakthrough Prize in Fundamental Physics (2016) for "the detection of gravitational waves" (shared with the LIGO founders and 1012 other LIGO-Virgo collaborators).
- Best student talk prize at the 2016 NewCompStar Annual Meeting (Istanbul, TR).
- Runner-up student talk prize at the 2014 BritGrav annual meeting (Cambridge, GB).

Organisation of International Workshops and Meetings

Aug 2020	*Parameter Estimation for Gravitational waves*: lead organizer, invited by the LIGOIndia community to train 60+ astrophysicists (virtual).
May 2020	*LIGO-Virgo Collaboration GW Open Data Workshop #3*: co-organizer, invited to write and coordinate the Parameter Estimation tutorials for 100 students (virtual).
Feb 2019	*LIGO-Virgo Collaboration Parameter Estimation Meeting*: Local organizer
Nov 2018	*Towards O3*: lead organizer, 20 national participants, software development sprint.
Aug 2018	*Introduction to Inference*: lead organizer, 33 international participants trained in software development and Bayesian inference.

Invited Presentations

Nov 2020	*Turning wiggles into science*, Royal Holloway High-Energy Physics (London, UK).
Jul 2020	*Transient Gravitational-Wave and Multi-messenger Astronomy*, UCL Astrophysics (London, UK).
Jun 2020	*Maximising the science of gravitational-wave observatories* Stockholm University Astrophysics (Stockholm, SE).
Dec 2019	*Bystander Awareness Training*, OzGrav Annual Retreat (Melbourne, AUS).
Sep 2019	*GW190425: A Binary Neutron-Star Coalescence observed by LIGO and Virgo*, plenary talk on behalf of the paper writing team, LIGO/Virgo meeting, invited (Warsaw, PO).
Jul 2019	*Introduction to Bayesian Data Analysis*, Masterclass in Relativistic Fluid Dynamics, University of Southampton, invited (Southampton, GB).
Oct 2018	*Astrophysical inference and transient gravitational wave astronomy*, Astrophysics Colloquium, University of Melbourne (Melbourne, AU).
Apr 2018	*Continuous wave parameter estimation and non-standard signal follow up*, INT-18-71W, Institute for Nuclear theory (Seattle, US).
Dec 2017	*Neutron stars as continuous gravitational wave emitters*, 11th Neutron Star workshop (Bonn, DE).
Jun 2017	*Continuous gravitational waves*, Aspen Center for Physics (Aspen, US).
Mar 2017	*Statistical characterization of pulsar glitches and their potential impact on searches for continuous gravitational waves*, invited seminar, Glasgow University Physics Colloquium (Glasgow, GB).

Selected Public Engagement

Oct 2020	Work highlighted in the Australian Research Council's 2020 research highlights.
Jan 2020	Adelaide Five aa radio station interview: the second binary neutron merger ever observed
Aug 2019	Featured in the national Australian newspaper The Age: Patient astronomers crack the code of super-dense spinning stars along with follow-up online articles in PhysicsWorld CNET, The Register, and other sites.
Aug 2019	Behind the paper article, *Understanding the rotational evolution of the Vela pulsar during the 2016 glitch* written for Nature Astronomy Community blog.
2015-2020	Delivered several outreach talks on gravitational-wave astronomy at 'Pint of Science' and 'Skeptics Society' meetings.
2015-2019	Regular contributor to open days and public outreach at Monash University, Leibniz University, and the University of Southampton.
Feb 2015	Invited article in the Institute of Physics Gravitational Physics Group 2015 Newsletter: *The effect of timing noise on continuous gravitational wave searches.* [5pt]

Teaching Experience

- **Teaching Fellow (Science)** at Royal Holloway, University of London. I develop and deliver the foundation-year Mathematics course with over 140 students enrolled. I create flipped-classroom teaching materials, co-ordinate support, and deliver the content in a blended learning environment.
- **Assistant Lecturer** for Monash University's first-year physics units PHS1011 and PHS1022. These units implement the *studio physics* model of teaching; an evidence-based student-centric pedagogy. Responsible for coordinating and delivering workshops, laboratories, and assessments.
- While teaching at Monash, I achieved Student Evaluation of Teaching Units (SETU) scores for all subjects average 4.6 out of 5.0
- While teaching at Royal Holloway and Monash I developed teaching materials, including traditional lectures along with YouTube videos introducing and reviewing concepts and examples aimed at first-year students.
- Developed several online programming and Bayesian statistics courses aimed at PhD-level students.
- Graduate Research Supervisor Accreditation at Level 1 with Monash Graduate Research Office.
- **Contributor** to the Monash ADS1002 (Applied Data Science) module. I developed and mentored a student project using Google Maps geolocation data.
- **Teaching Assistant** for Math, Physics, and Programming at the University of Southampton (2012-2016)
- **Student Associate**: University of Southampton scheme placing undergraduate physicists in secondary-school maths and science classrooms (2011)