SEAN M. O'BRIEN

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EMPLOYMENT HISTORY

Research Assistant - Queen's University Belfast, UK   *Jun 2025 - present*
Developing the `adler` package for the analysis of solar system bodies in LSST data.
(Contract end: February 2026)

EDUCATION

PhD, Astrophysics - Queen's University Belfast, UK   *Oct 2021 - present*
Thesis title: *Planet Hunters NGTS: No Planet Left Behind in the Next Generation Transit Survey*
Supervisors: Dr Megan E. Schwamb & Prof. Christopher A. Watson
Passed viva with minor corrections: July 2025

MSc by Research, Physics - University of Warwick, UK   *Oct 2020 - Sep 2021*
Thesis title: *Investigating atmospheric scintillation using NGTS photometry of bright stars*
Supervisor: Dr Daniel Bayliss

BSc, Mathematics - University of Warwick, UK   *Oct 2017 - Jul 2020*
First Class Honours

TECHNICAL SKILLS

I have extensive experience in using Python (`pandas`, `astropy`, `allesfitter`, `emcee`, `dynesty`, `ellc`, `multiprocessing`, etc.) for data reduction, analysis and visualisation of a range of datasets including both photometric and spectroscopic datasets. I developed a pipeline to parse and analyse large datasets of citizen science classifications. This pipeline also interfaced with MySQL databases used for the handling of these large datasets. I also developed a pipeline to search for periodic signals in sparse time-series data. I attended the Code/Astro workshop in 2023 where I learned the key skills for building publishable, open-source software packages. These skills include: using Git for collaborative coding; debugging code; developing unit tests; clearly documenting code; and releasing pip-installable software packages. I also have experience with shell scripting and cluster computing.

OBSERVING EXPERIENCE

Telescopio Nazionale Galileo / HARPS-N + GIANO-B (**7 nights**); Setting up Phase 2 for Gemini/Zorro, Gemini/GHOST and ESO-3.6m/NIRPS+HARPS observations.

OBSERVING PROPOSALS

Probing the limits of giant planet formation around low-mass stars - *PI*
0.5 nights on ESO-3.6m/NIRPS, ESO P111 (2023). Radial velocity follow-up of a planet candidate orbiting a low-mass host star. Oversubscription rate 7:1.

GHOST Characterization of a Low-Mass Exoplanet Host Star - *Co-PI*
0.95 hours on Gemini/GHOST, Gemini 2024A. Spectroscopic follow-up to determine the spectral type and stellar parameters of a low-mass star hosting a planet candidate.

Zorro Follow-up of an Exoplanet Candidate Transiting an Evolved Star - *Co-PI*
0.6 hours on Gemini/Zorro, Gemini 2023A. Speckle imaging to search for stellar companions to an evolved star hosting a planet candidate.

Zorro Follow-up of Transiting Exoplanet Candidates - *Co-PI*
1.9 hours on Gemini/Zorro, Gemini 2022A. Speckle imaging to search for stellar companions to three stars hosting planet candidates.

MENTORING AND TEACHING EXPERIENCE

Oct-Dec 2023 - Small group teaching and marking for first year undergraduate Physics course.

Jun-Aug 2023 - Supervision of summer student searching for correlations between Gaia parameters for the NGTS sample compared with the full exoplanet population.

Oct-Dec 2022 - Programming (Python) demonstrator for third year undergraduate Physics course.

SELECTED TALKS

ESO Stellar Coffee and Planetary Tea Talk, Munich, Germany   *Nov 2024*
Planet Hunters NGTS: No Planet Left Behind in the Next Generation Transit Survey

NOIRLab FLASH Talk, (Virtual), Tuscon, US   *Oct 2024*
Planet Hunters NGTS: No Planet Left Behind in the Next Generation Transit Survey

QUB Seminar 2022/2023, Belfast, UK   *Nov 2022/Oct 2023*
Planet Hunters NGTS: No Planet Left Behind in the Next Generation Transit Survey

UK Exoplanet Meeting 2023, London, UK   *Aug 2023*
Highlight Talk - Citizen Science Discoveries from Planet Hunters NGTS
Special EDI session talk - Equitea: Creating your own EDI initiative

Equitea Seminar, Belfast, UK   *Jul 2023*
What is Equitea? *(Pitching the concept of a student-run ED&I initiative in our research group)*

National Astronomy Meeting 2022, Warwick, UK   *Jul 2022*
Contributed Talk - Planet Hunters NGTS: No Planet Left Behind in the Next Generation Transit Survey

OUTREACH AND SERVICE

ARC Equitea Founder and Chair/Committee Member   *May 2023-present*
Co-founder of ARC Equitea (initiative providing a forum to discuss ED&I issues in academia and develop possible solutions). Chaired committee until Feb 2024. Gave presentations on topics including gender biases and impostor syndrome.

QUB Astronomy Day 2023/2024 - NI Science Festival   *Feb 2023/2024*
Created materials and ran activities for outreach day and gave short public talks promoting citizen science

NGTS Meeting LOC   *Apr 2023*
Coordinated registration process; wrote information guide on local food & drink options; chaired sessions.

SCHOLARSHIPS AND FUNDING AWARDED

Royal Astronomical Society Travel Grant   *Jul 2023*
£750 to support travel to La Palma, Spain to gain observing experience on TNG/HARPS-N

Emily Sarah Montgomery Travel Scholarship   *Jul 2023*
£400 to support travel to attend Code/Astro workshop 2023 in Chicago, IL, USA

PUBLICATIONS

See all my papers on the NASA Astrophysics Data System

First author:

Sean M. O'Brien, Megan E. Schwamb, Samuel Gill et al. 2024, *Planet Hunters NGTS: New Planet Candidates from a Citizen Science Search of the Next Generation Transit Survey Public Data*, AJ, Vol. 567, Issue 5, Pages 238-260, doi:10.3847/1538-3881/ad32c8

Sean M. O'Brien, Daniel Bayliss, James Osborn et al. 2022, *Scintillation-limited photometry with the 20-cm NGTS telescopes at Paranal Observatory*, MNRAS, Vol. 509, Issue 4, Pages 6111-6118, doi:10.1093/mnras/stab3399

Sean M. O'Brien, Megan E. Schwamb, Christopher A. Watson et al., *NGTS-EB-8: A double-lined eclipsing M+M binary discovered by citizen scientists*, under review

Contributing author:

Daniel Bayliss, **Sean M. O'Brien**, Edward Bryant et al. 2022, *High precision ground-based CCD photometry from the Next Generation Transit Survey*, Proc. Spie 12191, X-Ray, Optical, and Infrared Detectors for Astronomy X, 121911A (29 August 2022), doi:10.1117/12.2628966

Samuel W. Yee, Joshua N. Winn, Joel D. Hartman et al. (including **Sean M. O'Brien**) 2025, *The TESS Grand Unified Hot Jupiter Survey. III. Thirty More Giants Planets*, Accepted to ApJS, doi:10.48550/arXiv.2507.01855

Toby Rodel, Christopher A. Watson, Solène Ulmer-Moll et al. (including **Sean M. O'Brien**) 2025, *NGTS-EB-7, an eccentric, long-period, low-mass eclipsing binary*, MNRAS, Vol. 537, Issue 1, Pages 35-55,
doi:10.1093/mnras/stae2799

Haochuan Yu, Zoltan Garái, Michael Cretignier et al. (including **Sean M. O'Brien**) 2025, *A possible misaligned orbit for the young planet AU Mic c*, MNRAS, Vol. 536, Issue 3, Pages 2046-2063, doi:0.1093/mnras/stae2655

Faith Hawthorn, Daniel Bayliss, Thomas G. Wilson et al. (including **Sean M. O'Brien**) 2023, *TOI-836: A super-Earth and mini-Neptune transiting a nearby K-dwarf*, MNRAS, Vol. 520, Issue 3, Pages 3649-3668, doi:10.1093/mnras/stad306