SEAN M. O'BRIEN

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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
Expected completion: Mar 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 am proficient in using Python (`pandas`, `astropy`, `allesfitter`, `multiprocessing`, etc.) for a variety of applications including: data analysis and visualisation; global modelling of time-series data; and parsing/analysis of large datasets of citizen science classifications. I also have experience using MySQL to create, manage and query large databases. I attended the Code/Astro workshop in 2023 where I learned the key skills for building publishable, open-source software packages (e.g. Git, debugging, unit testing, documentation).

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.

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)*

UK Exoplanet Meeting 2022, Edinburgh, UK *Sep 2022*
Contributed Talk - Planet Hunters NGTS: No Planet Left Behind in the Next Generation Transit Survey

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

NGTS Consortium Meeting 2021, Virtual *Mar 2021*
Measuring atmospheric scintillation using NGTS photometric data

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.

Irish Astronomical Association *Nov 2022*
Outreach Lecture: Hunting for Exoplanets using Citizen Science

Planet Hunters activities
Contributor to Planet Hunters blog. Media appearances on local Northern Irish radio (U105) and UTV

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., *Planet Hunters NGTS: Analysis of TIC-165227846*, in preparation (title TBD)

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

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, accepted, 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

REFERENCES

Dr. Megan Schwamb - Queen's University Belfast - PhD supervisor *m.schwamb@qub.ac.uk*
Prof. Christopher Watson - Queen's University Belfast - PhD supervisor *c.a.watson@qub.ac.uk*
Dr. Daniel Bayliss - University of Warwick - MSc by Research supervisor *d.bayliss@warwick.ac.uk*