Max Foxley-Marrable

Institute of Cosmology and Gravitation, University of Portsmouth
Dennis Sciama Building, Burnaby Road, Portsmouth, PO1 3FX, UK
Tel: +447806770181 Email: max.foxley-marrable@port.ac.uk
UK Citizen

Personal Profile

I am a PhD student currently studying at the Institute of Cosmology and Gravitation in Portsmouth, UK. My research involves the strong gravitational lensing of supernovae and their applications in cosmology and astrophysics. My research is intensely data-driven and I wish to develop a career that combines scientific research with my coding knowledge and the principles of data science.

Research Interests

1. Tensions between early/late universe measurements of H_0, and using time delays from strongly lensed supernovae to measure H_0 independently of the cosmological distance ladder.
2. The impact of microlensing has on constraining the mass-sheet degeneracy and therefore our ability to standardise strongly lensed Type Ia supernovae.
3. Exploiting the effects of strong lens time delays to observe the earliest moments of supernovae.
4. Time domain and transient astrophysics.

Education

University of Portsmouth (2016-Present)

PhD (In progress - funded by the University of Portsmouth)
Thesis title: *Strongly Lensed Supernovae: A Powerful Probe of Cosmology and Astrophysics*
Supervisors: Dr. Thomas Collett, Prof. Bob Nichol, Prof. David Bacon

University of Nottingham (2011-2015)

MSci Hons - Physics with Astronomy (First Class Honours)
Dissertation: *Cosmological Constraints from Golden Gravitational Lenses*
Supervisor: Dr. Simon Dye
Relevant Modules: *Computing for Physical Science* (89%), *Scientific Computing* (71%), *Imaging and Image Processing* (74%)

Publications

- *The Impact of Microlensing on the Standardization of Strongly Lensed Type Ia Supernovae.* Max Foxley-Marrable, Thomas E Collett, Georgios Vernardos, Daniel A Goldstein and David Bacon. In: Monthly Notices of the Royal Astronomical Society, Volume 478, Issue 4, August 2018, Pages 5081–5090. https://doi.org/10.1093/mnras/sty1346.
- *Observing the earliest moments of supernovae using strong gravitational lenses.* Max Foxley-Marrable, Thomas E. Collett, Chris Frohmaier, Daniel A. Goldstein, Daniel Kasen, Elizabeth Swann and David Bacon. Accepted for publication by Monthly Notices of the Royal Astronomical Society. https://doi.org/10.1093/mnras/staa1289.

Conferences and presentations

- *Strongly Lensed Supernovae: A Unique Probe of Cosmology and Astrophysics* (December 2019). Presented at the 30th Texas Symposium on Relativistic Astrophysics, University of Portsmouth.
- *Strongly Lensed Supernovae: A Unique Probe of Cosmology and Astrophysics* (October 2019). Invited for a seminar at the CITA-PI Day, University of Toronto.

- *Using Strongly Lensed Type Ia Supernovae to Probe H_0 with Suppressed Systematics* (April 2019). Presented at the South Coast Cosmology meeting, University of Portsmouth.
- *The Impact of Microlensing on the Standardisation of Strongly Lensed Type Ia Supernovae* (September 2018). Presented at 'The Universe as a telescope' strong lensing conference, University of Milan.
- *The Viability of the Lensed Type Ia Supernova as a Cosmological Probe* (December 2017). Presented at the Euclid UK Meeting, University of Portsmouth.

Community Roles

SEPnet Student Led Conference - Organising Committee (2018-2019)

Assisted in the organisation and subsequent running of a student led conference titled '*From Infinity to Zero: The History of the Universe in Redshift*'.

Astronomy on Tap - Organising Committee (2017-2018)

Tri-monthly public engagement events where ICG researchers present their research to the public using a pub as a venue. Helped organise and run four events and was the compere for two events.

Tactile Universe Volunteer (2019)

Assisted with the building of tactile models of galaxies for use by visually impaired students.

Teaching Experience

Workshop Demonstrator (2017)

Assisted University of Portsmouth lecturers in their MATLAB computing workshops, helping undergraduates learn and understand the fundamental skills and principles of programming.

Coursework Marker (2016-2018)

Assisted teaching staff at the University of Portsmouth with marking undergraduate coursework and providing feedback to students.

Assistant Music Teacher (2010-2011)

Assisted in secondary school (Year 8) music lessons fortnightly, helping the younger students with their musical theory and performance skills.

Public Engagement & Outreach Experience

Stargazing at Portsmouth Historic Dockyard (2016-Present)

Yearly outreach/public engagement event hosted by the ICG at the Portsmouth Historic Dockyard. Engaged with the public on various astrophysical topics using activities such as: 'Galaxy Sorting', 'Galaxy Zoo/Zooniverse', 'Thermal Camera', 'Michelson Interferometer' & 'Guess the Gas'.

Stargazing for Schools (2017)

Engaged with young students (age 7-11) and taught them the basic principles of telescope physics.

Additional Information

Proficient with Python (including popular packages such as NumPy, SciPy, AstroPy, Pandas & Matplotlib), Git, SQL, Bash, LaTeX & MATLAB.

References

Available on request.