James Paynter

PERSONAL STATEMENT

I am a second year PhD student at the University of Melbourne, studying under Professor Rachel Webster. I am particularly interested in gravitational lensing, and the effects of cosmological inhomogeneity on our understanding of modern physics. I have studied gravitational lensing of gamma-ray bursts using analytic methods, with nested sampling for data analysis. I am the lead author of a paper accepted for publication by Nature Astronomy in which we infer a cosmological density of intermediate mass black holes from a gravitationally lensed gamma-ray burst. I also study gravitational microlensing, whereby extreme magnification events of quasar accretion disks will allow us to probe their inner structure. I intend to carve out a dual role in astrophysics and applied data science during my career. I want to apply my skills to tangible problems and effect real change. My particular interests are in technology driven agriculture and understanding the natural environment.

EDUCATION HISTORY

The University of Melbourne, Parkville **2019 – Ongoing**
Doctor of Philosophy (Ph.D), Astrophysics (Applied Data Science).

Australian National University, Canberra (online) **2019 – 2020**
Sanskrit Language.

The University of Melbourne, Parkville **2017 – 2018**
Master of Science (M.Sc), Astrophysics (research) & Theoretical Physics (coursework).

The University of Melbourne, Parkville **2013 – 2016**
Bachelor of Science (B.Sc), Physics and Mathematics.
Diploma of Languages (D-Lang), Arabic.

John Monash Science School, Clayton **2010 – 2012**

AWARDS

- ⋆ Melbourne Centre for Data Science 2021 Doctoral Academy Fellow, 2021 ($5,000).
- ⋆ Dr Alan Kenneth Head Travelling Scholarship, 2020 ($5,000) for research into quasar microlensing.
- ⋆ Ramm Prize in Experimental Physics, 2019 ($2,340) for research into the gravitational lensing of gamma ray bursts.
- ⋆ Selected as a Laby Scholar to travel to Nepal to attend the second Kathmandu Astrophysics School funded by The School of Physics.
- ⋆ Laby Scholar, 2017 ($2,000) and Global Mobility U21 Scholar, 2017 ($1,000) to travel to The University of Edinburgh as part of a one semester masters exchange.
- ⋆ Dr Jean E. Laby Bursary, 2018 ($1,000).
- ⋆ Summer Research Scholarship, 2015 ($1,200).

TALKS, CONFERENCES, & WORKSHOPS

ADACS astrocomp hack week, Macquarie University, NSW 10–14/2/2020
Hack day – working on PyGRB software package (documentation, unit testing & continuous integration).

ANITA Summer School & Workshop, Canberra, ACT 3–7/2/2020

Gravitational Lensing of Fast Transients, Manly Astrophysics. **18/12/2019**
Invited talk – *Gravitational Lensing of Gamma-Ray Bursts*.

X-Sensing Conference, Coffs Harbour, NSW 25–29/11/2019
Hack day – integrated an off the shelf LiDAR unit with a drone to create a portable surface and scrub mapping device.

CASS Radio Astronomy School, Narrabri, NSW 29/9–4/10/2019

Astronomical Society Australia General Meeting, University of Queensland, QLD **8–12/7/2019**
Talk – *Gravitational Lensing of Gamma-Ray Bursts.*

Summer School in Statistics for Astronomers XV, Penn State University, USA **14–16/2/2019**

Manhattan Microlensing, New York, USA **14–16/2/2019**

Kathmandu Astrophysics School, Pokhara, Nepal **10–17/6/2018**

PUBLICATIONS & RESEARCH

⋆ PyGRB – A GRB light-curve analysis package.
`https://github.com/JamesPaynter/PyGRB`

TECHNICAL SKILLS

Programming: Python, Object-Oriented Programming, Latex.
Mathematics: Tensor Calculus, Representation Theory, Complex Analysis.
Theoretical Physics: Quantum Field Theory, General Relativity, Cosmology, Astrophysics, Gravitational Lensing.
Statistics: Bayesian Inference (computational and theoretical), Nested Sampling.
Languages: Italian (6 years), Arabic (3 years), Sanskrit (1 year), Russian (1 year).

REFEREES

Available upon request.