

# Dr Madeline Leslie Howell

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I am a postdoctoral scholar in the Department of Astronomy at The Ohio State University. I am also an affiliate with the Center for Cosmology and AstroParticle Physics (CCAPP). My research focuses on measuring asteroseismic oscillations in red giant stars to investigate stellar evolution and Galactic archaeology. I have a specific interest in the asteroseismology of stars in stellar clusters using photometry from *Kepler*, *TESS*, and the upcoming *Roman* mission. I also have experience in using large spectroscopic surveys and smaller boutique spectroscopic samples from my own telescope proposals.

## Research Interests

Asteroseismology of Red Giants, Stellar Evolution, Stellar Clusters, Stellar Abundances, Galactic Archaeology

## Career History

### Post Doctoral Scholar

*The Ohio State University,  
Columbus OH, USA*

Post Doctoral Scholar Position in the Department of Astronomy. This position is funded from a NASA grant titled ‘A Sound Grasp: Solving Hard Problems in Chemical Evolution with TESS Asteroseismology’.

2025 - current

### Doctor of Philosophy in Astrophysics

*Monash University, Melbourne,  
Australia*

Graduated November 2024. Supervisors: Dr. Simon Campbell, Prof. Dennis Stello & A/Prof. Gayandhi De Silva. Thesis title: *Asteroseismology of Red Giants in Globular Clusters to Study Stellar Evolution and Multiple Populations*

2021 - 2024

### Bachelor of Science Advanced Research (Honours)

*Monash University, Melbourne,  
Australia*

Majoring in Physics and Astrophysics - Graduated with Honours First Class in Astronomy.

2017-2020

## Publication History

Ji, A., ... **Howell, M.**, et al., “*A nearly pristine star from the Large Magellanic Cloud*”, submitted, 2025, DOI: [arxiv:2509.21643](https://arxiv.org/abs/2509.21643)

Maben, S., ... **Howell, M.**, et al., “*Asteroseismology of Carbon-Deficient Red Giants: Merger Products of Hierarchical Triple Systems?*”, accepted by ApJ, 2025, DOI: [arxiv:2508.19509](https://arxiv.org/abs/2508.19509)

Molnár, L., Netzel, H., **Howell, M.**, Kalup, C., and Joyce, M. “*Matching seismic masses for RR Lyrae-type and oscillating red horizontal-branch stars in M4*”, accepted by ApJ, 2025, DOI: [arxiv:2409.05391](https://arxiv.org/abs/2409.05391)

Kos, J., ... **Howell, M.**, et al., “*The GALAH survey: Improving chemical abundances using star clusters*”, accepted by A&A, 2025, DOI: [arxiv:2501.06140](https://arxiv.org/abs/2501.06140)

Buder, S., Kos, J., Wang, E. X., McKenzie, M., **Howell, M.**, et al., “*The GALAH Survey: Data Release 4*”, PASA, 2025, DOI: [10.1017/pasa.2025.26](https://arxiv.org/abs/2501.06140)

**Howell, M.**, Campbell, S. W., Kalup, C., Stello, D., and De Silva, G. M., “*Asteroseismic Masses of Red Giants in the Galactic Globular Clusters M9 & M19*”, MNRAS, 2025, DOI: [10.1093/mnras/stae2686](https://arxiv.org/abs/2501.06140)

**Howell, M.**, “*Investigating Stellar Mass Loss and Multiple Populations using Asteroseismology of Red Giants in Globular Clusters*”, Monash University, PhD Thesis, 2024, DOI: [10.26180/27683697.v1](https://arxiv.org/abs/2501.06140)

**Howell, M.**, Campbell, S. W., Stello, D., and De Silva, G. M., “*First Asteroseismic Analysis of the Globular Cluster M80: Multiple Populations and Stellar Mass Loss*”, MNRAS, 2024, DOI: [10.1093/mnras/stad3565](https://arxiv.org/abs/2501.06140)

**Howell, M.**, Campbell, S. W., Stello, D., and De Silva, G. M., “*Integrated mass-loss of evolved stars in M4 using asteroseismology*”, MNRAS, 2022, DOI: [10.1093/mnras/stac1918](https://arxiv.org/abs/2501.06140)

## Scholarships & Awards

### Research Training Program Stipend (\$105,000 AUD)

Australian government PhD scholarship to support students undertaking a Research Doctorate.

*Monash University*

2021 - 2024

### Monash Graduate Excellence Scholarship (\$35,000 AUD)

Granted to the top-ranked domestic students commencing a Research Doctorate at Monash University in addition to the RTP stipend.

*Monash University*

2021 - 2024

### Student Travel Grant (\$1,500 AUD)

Travel grant awarded by the Astronomical Society of Australia to a student who is presenting at an international conference.

*Astronomical Society of Australia*

2023

### J. L. Williams Honours Scholarship (\$5,000 AUD)

Awarded to females commencing a Physics/Astronomy Honours course.

*Monash University*

2020

### Prize for Top Honours Student in Astrophysics (\$350 AUD)

The award granted to the top Honours student in Astronomy in 2020 at Monash University. This was judged based on my research thesis and internal coursework marks throughout my Honours year.

*Monash University*

2020

### Dean's List Fellow

This prestigious award is granted to students enrolled in a Science program who have attained a minimum of a distinction grade (70 percent and above) as well as a weighted average of at least 85 per cent across all science units completed in the previous year.

*Monash University*

2020

## Teaching & Student Supervision

### Student Supervision

Current Students:

- Jack Roberts (Grad Student, OSU) - Co-supervising on the project titled "*Using [C/N] as a diagnostic to investigate the mass loss-metallicity trend*" (Roberts et al. in prep)
- Noah Downing (Grad Student, Yale University) - Co-supervising on the project titled "*Asteroseismology of High Mass Stars in TESS*" (Downing et al. in prep)

Past Students:

- Sabrina Fortunak (Undergraduate, OSU) - Co-supervising on the project titled "*Creation of a Roman Asteroseismic Target List*"

### Teaching Associate

Assisting the lecturer with workshops and labs in undergraduate Astronomy and Physics units. This involved helping answer student questions, marking and facilitating the running of classes.

*Monash University*

2020 - 2024

## Successful Telescope Proposals

### Large Binocular Telescope (LBT)

Proposal accepted for 17hrs to use the PEPSI spectrograph on the LBT to study chromospheric activity in red giants in the open cluster NGC 2420 .

*Arizona, USA*

2025

### European Space Observatory (ESO) - Very large Telescope (VLT)

My proposal (112.25CQ; PI: Howell) was accepted for 9.8 hours on the FLAMES instrument to measure spectroscopic stellar parameters and abundances in the globular cluster M80.

*Paranal, Chile*

2024

### Anglo Australia telescope (AAT)

Success in several proposals on the AAT (A/2021B/11, R/2022B/02, and A/2022A/04, PI: Howell) to measure spectroscopic stellar parameters and abundances in the globular cluster M4 (this data was included in the GALAH DR4 release). Additionally, I was observer for the GALAH survey.

*Coonabarabran, Australia*

2020 - 2024

## Research Talks

### Yale University

Invited Seminar

*New Haven CT, USA*

November 2025

### Monash University

Invited Seminar

*Melbourne, Australia*

September 2025

<b>TASC9/KASC16</b> Contributed talk	<i>Vienna, Austria</i> July 2025
<b>SDSS-V Science Meeting</b> Contributed talk	<i>Heidelberg, Germany</i> June 2023
<b>CCAPP Fellows Symposium</b> Contributed Talk	<i>Columbus OH, USA</i> September 2024
<b>Advances in Cool Stars Conference</b> Contributed Talk	<i>Melbourne, Australia</i> July 2024
<b>Aarhus University</b> Invited Seminar	<i>Aarhus, Denmark</i> August 2023
<b>TASC7/KASC14</b> Contributed talk	<i>Honolulu HI, USA</i> July 2023
<b>Astronomical Society of Australia Science Meeting</b> Contributed talk	<i>Sydney, Australia</i> July 2023
<b>University of Melbourne</b> Invited Colloquium	<i>Melbourne, Australia</i> September 2022
<b>TASC6/KASC13</b> Contributed talk	<i>Leuven, Belgium</i> July 2022
<b>ASTRO3D General Science Meeting</b> Contributed talk	<i>Melbourne &amp; Perth, Australia</i> May/June 2022 & June 2023
<b>Star Clusters: The Gaia Revolution</b> Contributed talk	<i>Online</i> October 2021

## Workshops & Special Training

<b>MESA Summer School</b>  Attended the MESA summer school as a student in 2023, and as a teaching assistant in 2024. This school provided me the opportunity to develop my skills in computation stellar astrophysics using MESA, and FORTRAN coding.	<i>Budapest, Hungary &amp; Sydney, Australia</i> September 2023 & June 2024
<b>ESO La Silla Observing School</b>  Has been selected for the upcoming ESO La Silla Observing School. This school aims to provide hands-on experience in preparing for and completing the analysis for an ESO observing proposal. I was one of two Australians picked, with a total of 20 worldwide.	<i>Santiago, Chile</i> February 2024

## Outreach, Service & Leadership

<b>PostDoc Representative for the ‘Workplace Culture and Department Success’ Committee</b>  In this role, I aid in initiatives to improve the culture and success of the astronomy department. Also, I act as a liaison for the postdocs to this committee.	<i>The Ohio State University</i> 2025 - current
<b>Science Organising Committee: TASCC10/KASC17</b>  Serving as a member of the science organising committee for the TASCC10/KASC17 conference.	<i>Aarhus University</i> 2025 - current
<b>Organiser of Local Stellar Spectra Workshop</b>  Helped organise a Stellar Spectra workshop for local participants at The Ohio State University. This workshop was in collaboration with CCAPP department. This role involved proposing for funding and local admin organisation.	<i>The Ohio State University</i> 2025
<b>Organiser of Regular APOTESS Meetings</b>  Facilitating the running of the bimonthly APOTESS meetings. These international meetings provide the opportunity to discuss and collaborate on current projects that involve TESS asteroseismology of red giants and APOGEE spectroscopy.	<i>The Ohio State University</i> 2025
<b>Outreach at the Melbourne Observatory</b>  Assisted with a telescope demonstration at the Melbourne Observatory	<i>Melbourne, Australia</i> 2025

<p><b>Women and Non-Binary People in Physics and Astronomy Post-Graduate Representative</b></p> <p>Help organise activities and mentor programs for anyone who identifies as a woman or a non-binary person in Physics and Astronomy at Monash University. This group cultivates an inviting and inclusive culture within the School, and provides an opportunity to give and receive advice in the form of mentoring.</p>	<p><i>Monash University</i></p> <p>2021 - 2024</p>
<p><b>Local Organising Committee: MESA Winter School</b></p> <p>Was an active member of the local organising committee for the 2024 MESA winter school, held at University of Sydney in June. My role included developing a website for the workshop and organising events for the school.</p>	<p><i>Sydney, Australia</i></p> <p>2024</p>
<p><b>Local Organising Committee: Advances in Cool Stars</b></p> <p>Was an active member on the local organising committee for the 2024 Advances in Cool Stars conference, held at Monash University in July. In this role I helped with catering and set up, and also designing the talk schedule for the duration of the conference.</p>	<p><i>Melbourne, Australia</i></p> <p>2024</p>
<p><b>Outreach at Monash University Open Days</b></p> <p>Demonstrated how to use Dobsonian telescopes to observe Sun spots for Monash University Open Days. This included answering questions about Astronomy degrees and knowledge.</p>	<p><i>Monash University</i></p> <p>2022-2024</p>