

Dr Madeline Leslie Howell

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I am a postdoctoral scholar in the Department of Astronomy at The Ohio State University and affiliate of the Centre 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 NASA's *Kepler*, *TESS*, and the upcoming *Roman* mission. I also have experience in using large spectroscopic surveys and smaller boutique spectroscopic samples from my own successful telescope proposals.

Research Interests

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

Career History

Postdoctoral Scholar

*The Ohio State University,
Columbus OH, USA*

Postdoctoral 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 - present

Doctor of Philosophy in Astrophysics

*Monash University,
Melbourne, Australia*

Graduated November 2024. Supervisors: Dr Simon Campbell, Prof Dennis Stello & Associate 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, with a minor in mathematics. Graduated with Honours First Class in astronomy.

2017-2020

Publication History

H-index: 5 // **Total number of citations:** 181

First Author

Howell, M., et al., "*TESS Asteroseismology of Red Giants in the Old Metal-Rich Open Clusters NGC 188 & NGC 6791*", submitted, 2026, DOI: [arxiv:2604.27828](https://arxiv.org/abs/2604.27828)

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://doi.org/10.1093/mnras/stae2686)

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://doi.org/10.26180/27683697.v1)

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://doi.org/10.1093/mnras/stad3565)

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://doi.org/10.1093/mnras/stac1918)

Co-Author

Lu, Y., ... **Howell, M.**, et al., “[*C/N*] Ages and Extra-Mixing for [*Fe/H*] <- 0.5: Insights from the LMC and SMC”, accepted, 2026, DOI: [arxiv:2602.14925](https://arxiv.org/abs/2602.14925)

Roberts, J. D., ... **Howell, M.**, et al., “*Checking It Twice: Using [C/N]-Masses and Asteroseismic Masses as a Diagnostic of Mass Loss and Transfer on the RGB*”, accepted, 2026, DOI: [arxiv:2601.10800](https://arxiv.org/abs/2601.10800)

Ji, A., ... **Howell, M.**, et al., “*A nearly pristine star from the Large Magellanic Cloud*”, Nature Astronomy, 2026, DOI: [10.1038/s41550-026-02816-7](https://doi.org/10.1038/s41550-026-02816-7)

Maben, S., ... **Howell, M.**, et al., “*Asteroseismology of Carbon-Deficient Red Giants: Merger Products of Hierarchical Triple Systems?*”, ApJ, 2025, DOI: [10.3847/1538-4357/ae071c](https://doi.org/10.3847/1538-4357/ae071c)

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*”, ApJ, 2025, DOI: [10.1051/0004-6361/202452118](https://doi.org/10.1051/0004-6361/202452118)

Kos, J., ... **Howell, M.**, et al., “*The GALAH survey: Improving chemical abundances using star clusters*”, A&A, 2025, DOI: [10.1051/0004-6361/202554112](https://doi.org/10.1051/0004-6361/202554112)

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://doi.org/10.1017/pasa.2025.26)

Scholarships & Awards

Research Training Program Stipend (\$105,000 AUD) Australian government PhD scholarship to support students undertaking a Research Doctorate.	<i>Monash University</i> 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.	<i>Monash University</i> 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.	<i>Astronomical Society of Australia</i> 2023
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.	<i>Monash University</i> 2020
J. L. Williams Honours Scholarship (\$5,000 AUD) Awarded to woman commencing a Physics/Astronomy Honours course.	<i>Monash University</i> 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.	<i>Monash University</i> 2020

Teaching & Student Supervision

Student Supervision

Current Students:

- Jack Roberts (Grad Student, OSU) - Academic mentor on the project titled “*Checking It Twice: Using [C/N]-Masses and Asteroseismic Masses as a Diagnostic of Mass Loss and Transfer on the RGB*” (Roberts et al., submitted)
- Noah Downing (Grad Student, Yale University) - Academic mentor on the project titled “*Asteroseismology of High Mass Stars with TESS*” (Downing et al. in prep)

Past Students:

- Sabrina Fortunak (Undergraduate, OSU) - Co-supervising on the project titled “*Development of a Roman Asteroseismic Target List: Identifying Likely Red Clump Stars in the GBTDS*”

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 as a PI for 17 hours to observe with 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)

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 AAT’s HERMES spectrograph (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).

Siding Springs Observatory,
Australia

2020 - 2024

Research Talks

Invited Seminars/Colloquia:

California State University Long Beach

Invited colloquium to physics department. Colloquium title: “*A Cluster Carol: Asteroseismology of Red Giants in Clusters*”

Long Beach CA, USA

February 2026

Yale University

Invited seminar to exoplanet and stars group. Seminar title: “*A Cluster Carol: Asteroseismology of Red Giants in Clusters*”

New Haven CT, USA

November 2025

Monash University

Astronomy seminar title: “*A Cluster Carol: Asteroseismology of Red Giants in Clusters*”

Melbourne, Australia

September 2025

Aarhus University

Seminar title: “*Studying Stellar Evolution using Asteroseismology of Red Giants in Globular Clusters*”

Aarhus, Denmark

August 2023

Australian National University

Invited talk at GASP group meeting. Talk title: “*Measuring Asteroseismic Masses in Globular Clusters with K2*”

Canberra, Australia

December 2022

University of Melbourne Colloquium title: “ <i>Measuring Asteroseismic Masses in Globular Clusters with K2</i> ”	<i>Melbourne, Australia</i> September 2022
Contributed Talks:	
TASC9/KASC16 Talk title: “ <i>Red Giants in Open Clusters with TESS</i> ”	<i>Vienna, Austria</i> July 2025
SDSS-V Science Meeting Talk title: “ <i>APO-TESS: Characterising Stars with Spectroscopy and Asteroseismology</i> ”	<i>Heidelberg, Germany</i> June 2025
CCAPP Fellows Symposium Talk title: “ <i>Measuring RGB Mass Loss in Globular Clusters with Asteroseismology</i> ”	<i>Columbus OH, USA</i> September 2024
Advances in Cool Evolved Stars Conference Talk title: “ <i>Measuring RGB Mass Loss in Globular Clusters with Asteroseismology</i> ”	<i>Melbourne, Australia</i> July 2024
TASC7/KASC14 Talk title: “ <i>First Asteroseismic Study of the Globular Cluster M80: Multiple Populations and Stellar Mass Loss</i> ”	<i>Honolulu HI, USA</i> July 2023
Astronomical Society of Australia Science Meeting Talk title: “ <i>First Asteroseismic Study of the Globular Cluster M80: Multiple Populations and Stellar Mass Loss</i> ”	<i>Sydney, Australia</i> July 2023
ASTRO-3D General Science Meeting Talk title: “ <i>First Asteroseismic Study of the Globular Cluster M80: Multiple Populations and Stellar Mass Loss</i> ”	<i>Perth, Australia</i> June 2023
TASC6/KASC13 Talk title: “ <i>Measuring Asteroseismic Masses in M4 with K2</i> ”	<i>Leuven, Belgium</i> July 2022
ASTRO-3D General Science Meeting Talk title: “ <i>Measuring Asteroseismic Masses in M4 with K2</i> ”	<i>Melbourne, Australia</i> May/June 2022
Star Clusters: The Gaia Revolution Talk title: “ <i>Measuring Asteroseismic Masses in M4 with K2</i> ”	<i>Online</i> October 2021

Workshops & Special Training

MESA Summer School 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 computational stellar astrophysics using MESA, and FORTRAN coding.	<i>Budapest, Hungary & Sydney, Australia</i> September 2023 & June 2024
ESO La Silla Observing School Invited to attend the ESO La Silla Observing School. This school provided 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

PostDoc Representative for the ‘Workplace Culture and Department Success’ Committee In this role, I assist 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
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Science Organising Committee: TASCC10/KASC17

I was invited to serve as a member of the science organising committee for the TASCC10/KASC17 conference, which will be held at Aarhus University in July 2026.

Aarhus University

2025 - current

Organiser of APO-TESS Meetings

This position involves facilitating the running of biweekly APO-TESS meetings between collaborators in the USA, Europe, and Australia. These international meetings provide the opportunity to discuss and collaborate on current projects that involve TESS asteroseismology of red giants and APOGEE spectroscopy.

The Ohio State University

2025 - current

Organiser of Local Stellar Spectra Workshop

I organised 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.

The Ohio State University

2025

Outreach at the Melbourne Observatory

I assisted with a telescope demonstration and explaining scientific concepts to a public audience at the Melbourne Observatory.

Melbourne, Australia

2025

Women and Non-Binary People in Physics and Astronomy Post-Graduate Representative

I contributed to the organisation of activities and mentor programs for members of the school who identifies as a woman or a non-binary person in Physics and Astronomy at Monash University.

Monash University

2021 - 2024

Local Organising Committee: MESA Winter School

I was a 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.

Sydney, Australia

2024

Local Organising Committee: Advances in Cool Evolved Stars

I was a member on the local organising committee for the 2024 Advances in Cool Evolved Stars conference, held at Monash University in July. In this role I helped with catering and set up, and also designing the talk program for the duration of the conference.

Melbourne, Australia

2024

Outreach at Monash University Open Days

I demonstrated how to use Dobsonian telescopes to observe Sunspots for Monash University Open Days. This included answering questions about Astronomy degrees and my experience as a student.

Monash University

2022-2024