



# Dr. Ellen Leitinger

Research fellow in Astrophysics

- Alma Mater Studiorum  
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## Employment and education

- 2024 **Research Fellowship** University of Bologna, Italy  
Member of the ERC funded Asterochronometry project  
Galactic archaeology Asteroseismology
- Graduated 2024 **Ph.D. in Astrophysics** University of Queensland, Australia & ESO, Germany  
**Title:** 'A Wide-Field View of Multiple Stellar Populations in 30 Galactic Globular Clusters'  
**Supervisors:** A/Prof. Holger Baumgardt, Dr. Michael Hilker and Dr. Ivan Cabrera-Ziri  
Globular clusters Observational photometry Multiple stellar populations Stellar kinematics and dynamics
- Graduated 2019 **Honours Degree in Astrophysics** University of Queensland, Australia  
**Title:** 'Contributions of the MgII Emission Line in Reverberation Mapping of Active Galactic Nuclei'  
**Supervisors:** Dr. Janie Hoorman and Prof. Tamara Davis  
**Thesis Grade:** High Distinction [7/7]  
AGN Reverberation mapping MCMC methods Observational spectroscopy Time series analysis
- Graduated 2018 **Bachelor of Science, extended major in physics** University of Queensland, Australia

## Research projects

- Fellowship **Nitrogen-rich stars through the lens of asteroseismology**  
I identify stars in the Kepler, K2, and TESS fields using APOGEE abundances and Gaia astrometry, searching for field stars with chemical and kinematic properties indicative of the primordial and chemically enriched populations which likely once belonged to globular clusters. I then analyse these stars using asteroseismology, to further investigate their properties and ascertain likely formation scenarios.
- PhD **I. A wide-field view on multiple stellar populations in 30 Milky Way globular clusters**  
Through the homogeneous analysis of HST and Johnsons-Cousins photometry with a large sample of Galactic Globular Clusters, I photometrically classified the multiple stellar populations within each cluster and calculated their spatial distributions. I discovered that dynamically young GCs display a wide range of initial conditions - a result which challenges current formation theories.
- PhD **II. The kinematics of 30 Milky Way globular clusters and the multiple stellar populations within**  
Using the same photometric classifications of multiple populations as in the previous project, I combined proper motions and line-of-sight velocities to investigate the 3D kinematics. I determined the rotation, velocity dispersions and anisotropy of all stars in each cluster, as well as the individual populations.
- Honours **The contribution of the MgII emission line in reverberation mapping of AGN**  
Reverberation mapping is a common method for determining the masses of AGN using multi-epoch data - most commonly with the use of the  $H\beta$  emission line. I determined that the same analysis could be completed for higher redshift AGN  $1 < z < 3$  using the MgII line, despite contamination from the surrounding Fe emission lines.

## First author publications

- 'A Wide-Field View on Multiple Stellar Populations in 28 Milky Way Globular Clusters' - **Leitinger, E.**, Baumgardt, H., Cabrera-Ziri, I., Hilker, M., Pancino, E.  
*MNRAS, Volume 520, Issue 1, March 2023, Pages 1456–1480*
- 'The kinematics of 30 Milky Way globular clusters and the multiple stellar populations within' - **Leitinger, E.**, Baumgardt, H., Cabrera-Ziri, I., Hilker, M., Carbajo-Hijarrubia, J., Gieles, M., Husser, T.O., Kamman, S.  
*A&A, accepted for publication, 2024*
- 'Nitrogen-rich stars through the lens of asteroseismology' - **Leitinger, E.**, Miglio, A., Massari, D., Bragaglia, A.  
*in prep.*

## Scholarships and awards

2022-2023	European Southern Observatory 1 year studentship	ESO, Germany
2022	First place poster presentation at the ASA Annual Scientific Meeting	ASA, Australia
2021	First place at the School of Mathematics and Physics poster day	UQ, Australia
2019-2024	Research training program scholarship	UQ, Australia
2019	Dean's award for academic excellence	UQ, Australia

## Contributed talks and posters

2024	<b>Poster</b> Resolved stellar populations from photographic plates to large surveys. A celebration of Peter B. Stetson's career in astronomy	Florence, Italy
2024	<b>Contributed talk</b> A lens on globular cluster nurseries: how to compare models with observations	Sexten, Italy
2023	<b>Contributed talk</b> ESO wine and cheese seminar	ESO, Germany
2023	<b>Poster</b> Two in a Million - The interplay between binaries and star clusters	ESO, Germany
2023	<b>Contributed talk</b> Star @ Lyon	Lyon, France
2023	<b>Contributed talk</b> A multi-wavelength view on GCs near and far: from JWST to the ELT	Sexten, Italy
2022	<b>Contributed talk</b> Star-Forming clumps and clustered starbursts across cosmic time	MIAPbP, Germany
2022	<b>Poster</b> ASA Annual Scientific Meeting	ASA, Australia
2021	<b>Contributed talk and poster</b> Mt Stromlo student seminar	Mt Stromlo, Australia
2021	<b>Poster</b> UQ SMP poster day	UQ, Australia
2021	<b>Contributed talk</b> European Astronomical Society Annual Meeting	Virtual
2020	<b>Contributed talk</b> 1st Australian BlueMUSE Workshop	Virtual

## Committees and scientific outreach

2025	<b>LOC</b> 'Stars II - current challenges, upcoming solutions' conference	Bologna, Italy
2024	<b>LOC</b> 'The Milky Way assembly tale' conference	Bologna, Italy
2023	<b>LOC</b> 'Two in a Million - The interplay between binaries and star clusters' conference	ESO, Germany
2023	<b>LOC</b> 'Coordinated Surveys of the Southern Sky (CSSS)' conference	ESO, Germany
2023	<b>Organiser</b> Weekly 'Resolved stellar populations' meeting	ESO, Germany
2023	<b>Organiser</b> Weekly 'Galaxy evolution coffee' meeting	ESO, Germany
2023	<b>Organiser</b> Weekly 'Informal discussion' meeting	ESO, Germany
2023	<b>Organiser</b> Weekly science department social gathering	ESO, Germany
2022	<b>Organiser/Supervisor</b> UQ Junior Physics Odyssey (JPhO)	UQ, Australia
2020	<b>Organiser</b> Weekly 'Star clusters and galaxies' Meeting	UQ, Australia
2019	<b>Communications Officer</b> UQ Physics Club 'PAIN'	UQ, Australia
2019	<b>Supervisor</b> Work experience program	UQ, Australia
2018-2019	<b>Live Science Show Demonstrator</b> 'Demo Troupe'	UQ, Australia

## Teaching assistant

### Undergraduate courses

2018-2022	<b>Numerical Methods in Computational Science (COSC2500/7500)</b> Numerical analysis, linear algebra, solution of equations, and differential equations using Matlab and C++.	UQ, Australia
2019-2022	<b>Electromagnetism and Modern Physics (PHYS1002)</b> Electromagnetism, relativity, quantum physics and laboratory experiments.	UQ, Australia
2019-2022	<b>Physical Basis of Biological Systems (PHYS1171)</b> Forces and motion, elasticity and fluids, thermodynamics, electricity and biomedical imaging.	UQ, Australia
2019-2022	<b>Theory and Practice in Science (SCIE1000)</b> Mathematical and analytical models, introduction to the scientific method, coding in Python and ethics in science.	UQ, Australia
2018-2021	<b>Physics Laboratory Assistant</b> Preparation of all undergraduate physics laboratory apparatus throughout each academic semester.	UQ, Australia

## Proposals

CAT 2023B Proposal	<b>(CoI)</b> 'Kinematics of multiple populations in NGC5024' [Accepted with A priority] (Program ID 50-GTC46/23B)	
ESO P109 Proposal	<b>(CoI)</b> 'Reticulum - a crucial system to probe the universality of the IMF' [Accepted with A priority] (Program ID 109.23EQ)	