



Dr. Ellen Leitinger

Research fellow in Astrophysics

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Research positions and education

DIFA Unibo & INAF-OAA, Italy

Research Fellowship

Member of the ERC funded 'Asterochronometry' and 'StarDance' projects

Since 2024

Galactic archaeology

Asteroseismology

Binary stars

UQ, Australia & ESO, Germany

Ph.D. in Astrophysics

Graduated 2025

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

Multiple stellar populations

Photometry

Stellar kinematics and dynamics

UQ, Australia

Masters Degree in Astrophysics

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

Spectroscopy

Time series analysis

Research projects

Fellowship

Nitrogen-rich field stars through the lens of asteroseismology

Using a combination of APOGEE abundances and *Gaia* astrometry, I identified a sample of metal-poor Galactic field stars with chemical abundance patterns consistent with formation within globular clusters. Following up with asteroseismology from the *Kepler* mission, I discovered that most of the enriched stars are too young to have originated in globular clusters, challenging previous assumptions of their origins.

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 30 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.

Masters

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' - **E.I. Leitinger**, H. Baumgardt, I. Cabrera-Ziri, M. Hilker, E. Pancino
MNRAS, Volume 520, Issue 1, March 2023, Pages 1456–1480
- 'The kinematics of 30 Milky Way globular clusters and the multiple stellar populations within' - **E.I. Leitinger**, H. Baumgardt, I. Cabrera-Ziri, M. Hilker, J. Carbajo-Hijarrubia, M. Gieles, T.O. Husser, S. Kamman
Astronomy & Astrophysics, Volume 694, A184, 2025
- 'Not all nitrogen-rich field stars originate from globular clusters' - **E.I. Leitinger**, A. Miglio, J. Montalbán, D. Massari, A. Bragaglia, W.E. van Rossem, K. Brogaard, A. Mazzi, J.S. Thomsen, E. Willett
Astronomy & Astrophysics, accepted

Talks and posters

2026	Invited talk APOGEE's Galactic Odyssey	Teruel, Spain
2026	Contributed talk MODEST 26 (MODELing DENSE STellar systems)	Quy Nhon, Vietnam
2026	Contributed talk TASC10/KASC17: A nod to the past with a view to the future	Aarhus, Denmark
2025	Poster Hunting for binaries and exotic stellar populations in star clusters workshop	Florence, Italy
2025	Contributed talk Focusing strong lenses: star clusters & globular cluster progenitors at high-z	Sexten, Italy
2025	Contributed talk & poster European Astronomical Society (EAS)	Cork, Ireland
2025	Contributed talk Stars II - current challenges, upcoming solutions	Bologna, Italy
2024	Poster Resolved stellar populations from photographic plates to large surveys	Florence, Italy
2024	Contributed talk A lens on globular cluster nurseries: how to compare models with observations	Sexten, Italy
2023	Invited talk ESO wine and cheese seminar	ESO, Germany
2023	Poster Two in a Million - The interplay between binaries and star clusters	ESO, Germany
2023	Contributed talk Star @ Lyon	Lyon, France
2023	Contributed talk A multi-wavelength view on GCs near and far: from JWST to the ELT	Sexten, Italy
2022	Contributed talk Star-forming clumps and clustered starbursts across cosmic time	MIAPbP, Germany
2022	Poster ASA Annual Scientific Meeting	ASA, Australia
2021	Contributed talk and poster Mt Stromlo student seminar	Mt Stromlo, Australia
2021	Poster UQ SMP poster day	UQ, Australia
2021	Contributed talk European Astronomical Society (EAS) Annual Meeting	Virtual
2020	Contributed talk 1st Australian BlueMUSE Workshop	Virtual

Organising committees and scientific outreach

2025	LOC 'Hunting for binaries and exotic stellar populations in star clusters' workshop	Florence, Italy
2025	LOC Haydn mission 1st scientific meeting	Bologna, Italy
2025	LOC 'Stars II - current challenges, upcoming solutions' conference	Bologna, Italy
2023	LOC 'Two in a Million - The interplay between binaries and star clusters' conference	ESO, Germany
2023	LOC 'Coordinated Surveys of the Southern Sky (CSSS)' conference	ESO, Germany
2023	Organiser Weekly 'Resolved stellar populations' meeting	ESO, Germany
2023	Organiser Weekly 'Galaxy evolution coffee' meeting	ESO, Germany
2023	Organiser Weekly 'Informal discussion' meeting	ESO, Germany
2023	Organiser Weekly science department social gathering	ESO, Germany
2022	Organiser/Supervisor UQ Junior Physics Odyssey (JPhO)	UQ, Australia
2020	Organiser Weekly 'Star clusters and galaxies' Meeting	UQ, Australia
2019	Communications Officer UQ Physics Club 'PAIN'	UQ, Australia
2019	Supervisor Work experience program	UQ, Australia
2018-2019	Live Science Show Demonstrator 'Demo Troupe'	UQ, Australia

Observing proposals

PLATO AO-1 Proposal	(PI) 'Mapping the accretion history of the Galactic halo with precision stellar ages' <i>[Accepted]</i>	2026
LBT 2025B Proposal	(PI) 'Ejected or paired? Unveiling the origin of young Nitrogen-rich stars in the Galactic field' <i>[Accepted]</i> (Program ID IT-2025B-021)	2025
PLATO AO-1 Proposal	(Co-I) 'From detection to inference: a PLATO testbed for globular cluster seismology' <i>[Accepted]</i>	2026
TNG AOT53 Proposal	(Co-I) 'Helium enrichment from asteroseismology of binary stars' <i>[Accepted]</i> (Program ID A53TAC_66)	2025
CAT 2023B Proposal	(Co-I) 'Kinematics of multiple populations in NGC5024' <i>[Accepted]</i> (Program ID 50-GTC46/23B)	2023
ESO P109 Proposal	(Co-I) 'Reticulum - a crucial system to probe the universality of the IMF' <i>[Accepted]</i> (Program ID 109.23EQ)	2022

Scholarships and awards

2022-2023	European Southern Observatory 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

Participation to large projects

Since 2023	The Wide-field Spectroscopic Telescope (WST) Science team member	
Since 2024	Asterochronometry ERC Lead by Andrea Miglio, Grant Agreement 772293 Post-doctoral researcher: asteroseismology and galactic archaeology	DIFA, Bologna
Since 2025	PLAnetary Transits and Oscillations of stars (PLATO) Contributor to the MStSci2 pipeline - Module E: age-kinematics relations	
Since 2025	StarDance ERC Lead by Elena Pancino, Grant Agreement 101093572 Post-doctoral researcher: globular clusters and binaries	INAF, Florence
Since 2026	Legacy Survey of Space and Time (LSST) Junior Associate in the 'Stars, Milky Way, and Local Volume' working group	

Press releases and research highlights

March 2026	'The StarXiv' Podcast hosted by Michelle Collins, Payel Das and Nicole Buckley Episode 32 – Ancient star clusters and growing black holes	
May 2026	<i>Nature Astronomy</i> research highlight 'Nitrogen-rich field stars tricking the clock' by Bokyoung Kim DOI: 10.1038/s41550-026-02878-7	
June 2026	SpaCe – Aarhus Space Centre Press release 1 st June 2026: 'Nitrogen-rich field stars look younger than expected' by Ole J. Knudsen	

Invited institute and group seminar talks

2023	Max Planck Institute for Astronomy seminar	MPA, Garching
2023	European Southern Observatory seminar	ESO, Garching
2025	University of California San Diego seminar	UCSD, California
2026	Leibniz Institute for Astrophysics Potsdam 'Milky Way and Local Volume' research group	AIP, Potsdam

Teaching

Undergraduate courses

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