

Madeline Lucey

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RESEARCH INTERESTS

Near-field cosmology, Population III stars, dark matter, galactic bulges and bars, carbon-enhanced metal-poor stars, stellar spectroscopy, big data, data mining and machine learning

EDUCATION

The University of Texas at Austin *August 2023*

Ph.D. Astronomy

Thesis: Ancient Stars and the Inner Galaxy as tracers of the Milky Way's Early Evolution

Advisor: Keith Hawkins

The University of Texas at Austin *August 2020*

M.A. Astronomy

Colorado College *May 2018*

B.A. Physics: Astrophysics Emphasis, Magna Cum Laude

APPOINTMENTS

NSF Astronomy and Astrophysics Postdoctoral Fellow *September 2023-Present*

University of Pennsylvania

FIRST AUTHOR PUBLICATIONS – Total First Author Citations: 183

8. **M. Lucey**, C. Mateu, A.M. Price-Whelan, D. Hogg, H.-W. Rix, R.E. Sanderson, *Inferring Stellar Densities with Flexible Models I: The Distribution of RR Lyrae in the Milky Way with Gaia DR3*, 2025, submitted to AJ, arXiv:2510.03221
7. **M. Lucey**, R.E. Sanderson, D. Horta, A. Kundu, P.F. Hopkins, A. Arora, J. Singh, N. Panithanpaisal, *Cosmological predictions for minor axis stellar density profiles in the inner regions of Milky Way-mass galaxies*, 2025, ApJ, 982, 87
6. **M. Lucey**, N. Al Kharusi, K. Hawkins, Y.-S. Ting, N. Ramachandra, A.M. Price-Whelan, T. Beers, Y.S. Lee, J. Yoon, *Carbon-enhanced metal-poor star candidates from BP/RP spectra in Gaia DR3*, 2023, MNRAS, 523, 4049
5. **M. Lucey**, S. Pearson, J.A.S. Hunt, K. Hawkins, M. Ness, M.S. Petersen, A.M. Price-Whelan, M.D. Weinberg, *Dynamically constraining the length of the Milky way bar*, 2023, MNRAS, 520, 4779
4. **M. Lucey**, K. Hawkins, M. Ness, T. Nelson, V.P. Debattista, A. Luna, T. Bensby, K.C. Freeman, C. Kobayashi, *The COMBS Survey - III. The Chemodynamical Origins of Metal-Poor Bulge Stars*, 2022, MNRAS, 509, 122
3. **M. Lucey**, K. Hawkins, M. Ness, V.P. Debattista, A. Luna, M. Asplund, T. Bensby, L. Casagrande, S. Feltzing, K.C. Freeman, C. Kobayashi, A.F. Marino, *The COMBS Survey - II. Distinguishing the Metal-Poor Bulge from the Halo Interlopers*, 2021, MNRAS, 501, 5981
2. **M. Lucey**, Y.-S. Ting, N. Ramachandra, K. Hawkins, *From the Inner to Outer Milky Way: A Photometric Sample of 2.6 Million Red Clump Stars*, 2020, MNRAS, 495, 3087

1. **M. Lucey**, K. Hawkins, M. Ness, M. Asplund, T. Bensby, L. Casagrande, S. Feltzing, K.C. Freeman, C. Kobayashi, A.F. Marino, *The COMBS survey - I. The Chemical Origins of Metal-Poor Stars in the Galactic Bulge*, 2019, MNRAS, 488, 2283

CO-AUTHOR PUBLICATIONS

7. V. Chandra, ..., **M. Lucey**, et al., *Mapping the Distant and Metal-Poor Milky Way with SDSS-V*, 2025, ApJ, submitted, arXiv: 2508.00978
6. C. Fillion, M. S. Petersen, D. Horta, K. J. Daniel, **M. Lucey**, A. M. Price-Whelan, *Counterculture Stars: Slow and Retrograde Stars with Low-alpha Disk Abundances*, 2025, ApJ, 989, 70
5. SDSS Collaboration, ..., **M. Lucey**, et al., *The Nineteenth Data Release of the Sloan Digital Sky Survey*, 2025, ApJ, submitted, arXiv: 2507.07093
4. A. Carrillo, K. Hawkins, P. Jofré, D. de Brito Silva, P. Das, **M. Lucey**, *The detailed chemical abundance patterns of accreted halo stars from the optical to infrared*, 2022, MNRAS, 513, 1557
3. K. Hawkins, **M. Lucey**, J. Curtis, *The Chemical Nature of the Young 120-Myr-old Nearby Pisces-Eridanus Stellar Stream Flowing through the Galactic Disk*, 2020, MNRAS, 496, 2422
2. K. Hawkins, **M. Lucey**, Y.-S. Ting, A. Ji, D. Katzberg, M. Thompson, K. El-Badry, J. Teske, T. Nelson, A. Carrillo, *Identical or fraternal twins? : The chemical homogeneity of wide binaries from Gaia DR2*, 2020, MNRAS, 492, 1164
1. B. Pope, G. Davies, K. Hawkins, T. White, A. Stokholm, A. Bieryla, D. Latham, **M. Lucey**, C. Aerts, S. Aigrain, V. Antoci, T. Bedding, D. Bowman, A. Chontos, G. Esquerdo, D. Huber, P. Jofré, S. Murphy, T. van Reeth, V. Aguirre, J. Yu, *The Kepler Smear Campaign I: An Asteroseismic Catalogue of Bright Red Giants*, 2019, ApJ, 244, 18

GRANTS, AWARDS AND FELLOWSHIPS

NSF Astronomy and Astrophysics Postdoctoral Fellow (\$330,000)	2023
CCAPP Price Prize	2022
Raynor L. Duncombe Student Research Prize	2022
NSF Graduate Research Fellow (\$138,000)	2020
Frank N. Edmonds, Jr. Memorial Fellowship in Astronomy	2019
Kavli Summer Program in Astrophysics Fellow	2019
University of Texas at Austin Graduate School Fellowship	2018
David and Karen Smith Cowperthwaite Award for Excellence in Physics	2018
Keller Venture Grant (\$1,200)	2016

AWARDED TELESCOPE TIME

Co-I: Magellan Clay, MIKE, 2 nights (PI: Paula Jofré) → <i>Chemical Homogeneity of Metal-Poor Wide Binaries</i>	2025
PI: McDonald Obs. 2.7m, 4 nights → <i>Characterizing Candidate Carbon-Enhanced Metal-Poor Stars</i>	2023
PI: Gemini South, IGRINS, 15 hours → <i>Carbon-Enhanced Metal-Poor Stars in the Inner Galaxy</i>	2022
Co-I: McDonald Obs 2.7m, 7 nights (PI: Andreia Carrillo) → <i>Chemical abundances of distant red clump stars</i>	2022
PI: McDonald Obs. 2.7m, 5 nights → <i>Chemically Characterizing Blue Lurkers in M67</i>	2021
PI: McDonald Obs. 2.7m, 6 nights → <i>Chemically Characterizing a Newly Discovered Stellar Stream</i>	2019

Co-I: McDonald Obs. 2.7m, 6 nights (PI:Andreia Carrillo)	2019
→ <i>Detailed chemical abundances of Gaia-Enceladus stars</i>	
Co-I: McDonald Obs. 2.7m, 5 nights (PI:Keith Hawkins)	2018
→ <i>The Chemical Homogeneity of Wide Binaries in Gaia DR2</i>	
Co-I: WIYN 3.5m, 4 nights (PI:Natalie Gosnell)	2018
→ <i>Clusters with K2: systematics from membership and binarity</i>	

NOTABLE PRESENTATIONS

Invited Talks

Vera Rubin Celebration Town Hall, American Astronomical Society Meeting, 246, *Next Generation Dark Matter Research*, 2025

CTC Seminar, University of Maryland, *The Galactic Halo's Contribution to Inner Galaxy Stellar Populations*, 2024

Invited Review, Astrophysical Origins of Carbon Workshop, *Carbon-Enhanced Metal-Poor Stars in Big Data All-Sky Surveys*, 2024

CCAPP Price Prize Seminar, Ohio State University, *Ancient Stars and the Inner Galaxy as tracers of the Milky Way's Early Evolution*, 2022

Board of Visitors Meeting, University of Texas at Austin, *Uncovering Galactic Fossils from the Early Universe*, 2020

Colorado College Across the Country: Change-makers Who are Defining the CC Experience, *Astronomy in Thailand: Inspiring Young Scientists*, 2018

Colorado College Venture Grant Forum, *Astronomy in Thailand: Inspiring Young Scientists*, 2017

Colloquia

University of Florida, *The Milky Way's Big Data Revolution: Ancient Stars and Dark Matter Mapping*, 2025

Lafayette College, *The Milky Way's Big Data Revolution*, 2025

Yale University, *The Milky Way's Big Data Revolution*, 2023

Contributed Talks

IAUS 403: The Hidden Beauty of the Galactic Outskirts, *The Search for CEMP in Satellite Galaxies*, 2025

American Astronomical Society Meeting, 246, *A Multi-Component Gaussian Model of the Milky Way*, 2025

XMC II: Clouds over Yellowstone, *Searching for Carbon-Enhanced Metal-Poor Stars in the XMCs*, 2025

IAUS 395: Stellar populations in the Milky Way and beyond, *The Galactic Halo's Contribution to Inner Galaxy Stellar Populations*, 2024

Local Local-Group Group (L2G2) Meeting, *The history of bulge stars in Milky Way-like galaxies*, 2023

SDSS-V Collaboration Meeting, *The Dynamical Length of the Milky Way's Bar*, 2023

Gaia XPloration: Discovery and measurement with low-resolution spectroscopy, *Detecting Carbon-Enhanced Metal-Poor Stars*, 2023

IAUS 377: Early Disk-Galaxy Formation from JWST to the Milky Way, *Using Metal-Poor Stars in the Inner Galaxy to Uncover the Ancient Milky Way*, 2023

American Astronomical Society Meeting, 241, *Ancient Stars and the Inner Galaxy as tracers of the Milky Way's Early Evolution*, 2023

Division on Dynamical Astronomy Meeting, *Constraining the length and pattern speed of the Milky Way bar from direct orbit integration*, 2022

Inward bound: bulges from high redshifts to the Milky Way, *The chemodynamics of the (metal-poor) Milky Way Bulge stellar populations*, 2022

Seminars

Universidad Diego Portales, *The Galactic Halo's Contribution to Inner Galaxy Stellar Populations*, 2025

Universidad de la República, *The Galactic Halo's Contribution to Inner Galaxy Stellar Populations*, 2025

Durham University, *The Galactic Halo's Contribution to Inner Galaxy Stellar Populations*, 2024

Max Planck Institute for Astronomy, *Constraining the length of the Milky Way's bar from direct orbit integration*, 2023

Big Apple Dynamics School, *The Interplay of Potentials and Orbits in the Milky Way Bar*, 2021

Kavli 2019 Alumni Event, *The COMBS Survey*, 2020

Kavli Summer Program in Astrophysics, *Declumping the Red Clump*, 2019

Poster Presentations

American Astronomical Society Meeting Abstracts, 243, *The Structure of the Inner Milky Way*, 2024

Cool Stars 21, *CEMP Stars in Gaia DR3*, 2022

American Astronomical Society Meeting Abstracts, 237, *The COMBS Survey - II. Distinguishing the Metal-Poor Bulge from the Halo Interlopers*, 2021

Frank N. Bash Symposium, *Selecting a Pristine Sample of 5 Million Red Clump Stars*, 2019

American Astronomical Society Meeting, 231, *Cataloging the Praesepe Cluster: Identifying Interlopers and Binary Systems*, 2018

Public Talks

Astronomy on Tap PHL, *The Origins of Your Elements*, 2024

Astronomy on Tap ATX, *Why Stars are Better than Everything Else*, 2020

Frank N. Bash Visitor's Center at McDonald Observatory, *Uncovering Galactic Fossils from the Early Universe*, 2019

STUDENT MENTORSHIP

Emma Tasso, undergraduate, now MA student at CUNY	2024-Present
Nariman Al Kharusi, undergraduate, UT Austin	2021-2022
Alice Luna, undergraduate, now PhD student at U. Chicago	2020-2021

SERVICE

Co-Chair, SDSS-V Galactic Genesis Working Group	2024-Present
Grant Reviewer: UKRI STFC	2024
TAC: CanTAC Gemini	2024
Referee: ApJ, AJ, MNRAS, A&A	2021-Present
Task Force to Reform the Qualifying Exam, University of Texas at Austin	January-May 2022
Graduate Recruitment, University of Texas at Austin	2021 & 2022
Leader of Equity and Inclusion Book Club, University of Texas at Austin	2021
Task Force to Reform the Graduate Program, University of Texas at Austin	August 2020–May 2021

TEACHING EXPERIENCE

Instructor

Astronomy (Princeton Prison Teaching Initiative, South Woods State Prison) Spring 2024

Guest Lecturer

Introductory Astronomy (University of Pennsylvania) Fall 2023

Teaching Assistant

Introductory Astronomy (University of Texas at Austin) Fall & Spring 2019

Learning Assistant

Introductory Physics I & II (Colorado College)

2015–2018

Tutoring

Math and Physics Department (Colorado College)

2015–2018

PRESS AND COMMUNITY ENGAGEMENT

Forbes, *Our Milky Way Galaxy Likely Formed In Relative Isolation, Says Study*, [Link](#) Jan. 2023WIRED magazine, *The Gaia Mission Keeps Unlocking Secrets of the Galaxy*, [Link](#) June 2022

GUMMY, Graduate Mentor January 2018–2020

Astronomy on Tap ATX, Social Media Coordinator May 2018–Present

Girl Day, Organizer, University of Texas at Austin February 2019–Present

AWARE, University of Texas at Austin September 2018–Present

Women in STEM, Colorado College January 2017–May 2018