

Xiaowei Ou

Department of Astronomy, University of Virginia

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Professional

Postdoctoral Fellow, University of Virginia July 2025 – Present
Galaxy Evolution and Cosmology Initiative (GECO) & NSF-Simons AI Institute for Cosmic Origins Fellow

Education

PhD, Physics, Massachusetts Institute of Technology Sep 2020 – Present
Advisors: A. Frebel, L. Necib
Study the Galaxy formation history and structure using stellar kinematics and chemistry

Bachelor of Science, Physics&Astronomy, University of Michigan Sep 2016 – Apr 2020

Honors and Awards

LSST Discovery Alliance Data Science Fellowship, Northwestern University 2023 – 2025
Charlie Changnan Wang Fellowship, Massachusetts Institute of Technology 2020
Jerome and Isabella Karle Physical Sciences Award, University of Michigan 2020
Patrick Dahlin Memorial Award, University of Michigan 2019
James B. Angell Scholar, University of Michigan 2018 – 2019
Granader Family Award for Excellence in Multilingual Writing, University of Michigan 2017

Research Interests

Galaxy dynamics: Milky Way rotation curve, dark matter distribution of the Milky Way and dwarf galaxies, tidal interaction between Milky Way and dwarf galaxies

Galactic archaeology: Metal-poor stars, chemical evolution of the Milky Way and dwarf galaxies, Milky Way formation history, stellar abundances, spectroscopic observations and analyses

Contributed Talks and Posters

Contributed talks:

TeVPA, Chicago, IL, USA 2024
First Stars VII, New York, NY, USA 2024
Kashiwa Dark Matter Symposium, Tokyo, Japan 2024
Galactic Frontiers: Dwarf Galaxies in the Local Volume and Beyond, New York, NY, USA 2024
Phenomenology 2023 Symposium, Pittsburgh, PA, USA 2023
AAS 241, Seattle, WA, USA 2023

Seminar talk:

Yale University Galaxy Lunch, New Haven, CT, USA 2024

Posters:

Dwarf Galaxies, Star Clusters, and Streams in the LSST Era, Chicago, IL, USA 2024
AAS 235, Honolulu, HI, USA 2020

Teaching Experience

Teaching Assistant at MIT May 2021 – May 2025
TA, Experimental Physics I, 8.13, Physics Spring 2022

TA, Introduction to Astronomy, 8.282, Physics	Spring 2023
TA, Introduction to Astronomy, 8.282, Physics	Spring 2024
Teaching Assistant at University of Michigan	May 2018 – May 2020
TA, Physics for the Life Sciences I, PHYSICS 135, Physics	Spring 2018
Writing Fellow, General Physics I, PHYSICS 140, Physics	Fall 2018
Writing Fellow, General Physics I, PHYSICS 140, Physics	Winter 2019
Grader, Intermediate Mechanics, PHYSICS 401, Physics	Fall 2019

Public Engagement

Science communication:

Member/Co-chair, Astrogazer Sidewalk Astronomy, MIT	Sep 2022 – Present
Public Outreach, Society of Physics Students, University of Michigan	Sep 2017 – May 2020

Press coverage:

<i>Study: Stars travel more slowly at Milky Way's edge</i> , MIT News	Jan 2024
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Service and Leadership Experience

LEAPS Fellow , MIT	2020 – Present
Committee Member , Journal Club, MIT	May 2023 – Present
Vice President , Physics Graduate Student Council, MIT	May 2021 – May 2022
Treasurer , Ashdown Graduate House Executive Committee, MIT	May 2021 – May 2023
Mentor , Physics Online Mentoring Program, MIT	Jan 2021 – May 2021
Member/Peer Mentor , Michigan Research Community, University of Michigan	Sep 2016 – Apr 2018
Co-Chair , Mosher Jordan Undergrad House Multicultural Council, University of Michigan	Sep 2016 – Apr 2018
Referee , The Astrophysical Journal	2023 – Present
Referee , Publications of the Astronomical Society of Australia	2024 – Present
Referee , Astronomy & Astrophysics	2025 – Present

Publications

15. **Ou, Xiaowei**; Necib, Lina; Wetzel, Andrew; Frebel, Anna; Bailin, Jeremy; and Oeur, Micah (2025). *Decoding the Galactic Twirl: The Downfall of Milky Way-mass Galaxies Rotation Curves in the FIRE Simulations*. arXiv e-prints. 10.48550/arXiv.2503.05877
14. **Ou, Xiaowei**; Yelland, Alexander; Chiti, Anirudh; Frebel, Anna; Limberg, Guilherme; and Mardini, Mohammad K. (2025). *Early r-process Enrichment and Hierarchical Assembly Across the Sagittarius Dwarf Galaxy*. AJ, 169, 279. 10.3847/1538-3881/adc126
13. **Ou, Xiaowei**; Ji, Alexander P.; Frebel, Anna; Naidu, Rohan P.; and Limberg, Guilherme (2024). *The Rise of the R-Process in the Gaia-Sausage/Enceladus Dwarf Galaxy*. ApJ, 974, 232. 10.3847/1538-4357/ad6f9b.
12. Nguyen, Tri; **Ou, Xiaowei**¹; Panithanpaisal, Nondh; Shipp, Nora; Necib, Lina; Sanderson, Robyn; and Wetzel, Andrew (2024). *Synthetic Gaia DR3 Surveys from the FIRE Cosmological Simulations of Milky Way-mass Galaxies*. ApJ, 966, 108. 10.3847/1538-4357/ad35ba.
11. **Ou, Xiaowei**; Chiti, Anirudh; Shipp, Nora; Simon, Joshua D.; Geha, Marla; Frebel, Anna; Mardini, Mohammad K.; Erkal, Denis; and Necib, Lina (2024). *Signatures of Tidal Disruption of the Hercules Ultrafaint Dwarf Galaxy*. ApJ, 966, 33. 10.3847/1538-4357/ad2f27.
10. **Ou, Xiaowei**; Eilers, Anna-Christina; Necib, Lina; and Frebel, Anna (2024). *The dark matter profile of the Milky Way inferred from its circular velocity curve*. MNRAS, 528, 693-710. 10.1093/mnras/stae034.

¹Co-first author.

9. **Ou, Xiaowei**; Necib, Lina; and Frebel, Anna (2023). *Robust clustering of the local Milky Way stellar kinematic substructures with Gaia eDR3*. MNRAS, 521, 2623-2648. 10.1093/mnras/stad706.
8. **Ou, Xiaowei**; Roederer, Ian U.; Sneden, Christopher; Cowan, John J.; Lawler, James E.; Shectman, Stephen A.; and Thompson, Ian B. (2020). *Vanadium Abundance Derivations in 255 Metal-poor Stars*. ApJ, 900, 106. 10.3847/1538-4357/abaa50.
7. Sands, Isabel S.; Hopkins, Philip F.; Shen, Xuejian; Boylan-Kolchin, Michael; Bullock, James; Faucher-Giguere, Claude-Andre; Mercado, Francisco J.; Moreno, Jorge; Necib, Lina; **Ou, Xiaowei**; Wellons, Sarah; and Wetzel, Andrew (2024). *Confronting the Diversity Problem: The Limits of Galaxy Rotation Curves as a tool to Understand Dark Matter Profiles*. arXiv e-prints. 10.48550/arXiv.2404.16247
6. Staudt, Patrick G.; Bullock, James S.; Boylan-Kolchin, Michael; Wetzel, Andrew; and **Ou, Xiaowei** (2024). *Sliding into DM: Determining the local dark matter density and speed distribution using only the local circular speed of the Galaxy*. JCAP, 08, 022. 10.1088/1475-7516/2024/08/022
5. Roche, Cian; Necib, Lina; Lin, Tongyan; **Ou, Xiaowei**; and Nguyen, Tri (2024). *The Escape Velocity Profile of the Milky Way from Gaia DR3*. ApJ, 972, 70. 10.3847/1538-4357/ad58d7
4. Wang, Shuyu; Necib, Lina; Ji, Alexander P.; **Ou, Xiaowei**; Lisanti, Mariangela; de los Reyes, Mithi A. C.; Strom, Allison L.; and Truong, Mimi (2023). *High-resolution Chemical Abundances of the Nyx Stream*. ApJ, 955, 129. 10.3847/1538-4357/acec4d.
3. Chiti, Anirudh; Frebel, Anna; Ji, Alexander P.; Mardini, Mohammad K.; **Ou, Xiaowei**; Simon, Joshua D.; Jerjen, Helmut; Kim, Dongwon; and Norris, John E (2023). *Detailed Chemical Abundances of Stars in the Outskirts of the Tucana II Ultrafaint Dwarf Galaxy*. AJ, 165, 55. 10.3847/1538-3881/aca416.
2. Mardini, Mohammad K.; Frebel, Anna; Chiti, Anirudh; Meiron, Yohai; Brauer, Kaley V.; and **Ou, Xiaowei** (2022). *The Atari Disk, a Metal-poor Stellar Population in the Disk System of the Milky Way*. ApJ, 936, 78. 10.3847/1538-4357/ac8102.
1. Chiti, Anirudh; Frebel, Anna; Mardini, Mohammad K.; Daniel, Tatsuya W.; **Ou, Xiaowei**; and Uvarova, Anastasiia V. (2021). *Stellar Metallicities from SkyMapper Photometry. II. Precise Photometric Metallicities of $\sim 280,000$ Giant Stars with $[Fe/H] < -0.75$ in the Milky Way*. ApJS, 254, 31. 10.3847/1538-4365/abf73d.