Arpit Arora – Curriculum Vitae

Postdoctoral Scholar | Department of Astronomy, University of Washington
arpitarora.space arora125@uw.edu appy2806

Galactic Dynamics · Zoom-in Simulations · Stellar Streams · Dark Matter

Appointments

Moore Foundation Postdoctoral Fellow, DiRAC/University of Washington — Sep 2024 – present
UW Data Science Postdoctoral Fellow, eScience Institute, University of Washington — March 2025 – present

Education

Ph.D. in Physics and Astronomy, University of Pennsylvania — 2019 – 2024
Advisor: *Prof. Robyn Sanderson*
Thesis: Dark matter and disequilibrium at galactic scales
B.S. in Physics with highest distinction, University of Minnesota — 2015–2019
B.S. in Astrophysics with highest distinction, University of Minnesota — 2015–2019
Advisor: *Prof. Liliya L. R. Williams*
Thesis: Power-law pseudo-phase-space density profiles of dark matter halos: A Fluke of Physics?

Grants & Funding

· NSF ACCESS Allocation, PHY250239, PI — 2025
Simulating disrupted dwarf galaxies in a Milky Way-Mass host. 400K core-hours ($1,782.80 estimated value).

Scholarships & Awards

· Spec-S5 Dark Matter Meeting (*$500 travel award.*) — Oct 2025
· Heising-Simons Scholars for IAU conference in Cape Town (*$2,000 travel award.*) — 2024
· Laverne & Ted Jones Scholarship for Academic Excellence, University of Minnesota — 2017, 2018
· Swanson Scholarship for promising student in Astrophysics, University of Minnesota — 2016
· UROP Research scholarship for first year undergraduates, University of Minnesota — 2015 – 2016
· International Buddy Program, International student leader, University of Minnesota — 2017 – 2019
Awarded position with scholarship funds under ISSS. Tasked with building peer-to-peer/globally minded community programs involving 500+ students yearly.
· Culture Corps, Student leadership Scholarship offered by ISSS, University of Minnesota — 2015 – 2019
Developed/organized leadership programs focused on international students developing projects and initiatives that bring global perspectives to the campus.

Talks & Presentations

38 presentations total (**24** invited), across 25 in North America, 5 in Europe, 1 in Africa, and 6 virtual.

Invited Seminars

· University of Minnesota, Astrophysics colloquium, MN, USA — Apr 2027
· Carnegie Observatories, Astronomy seminar, CA, USA — Dec 2026
· University of California San Diego, Astrophysics seminar, CA, USA — Dec 2026

- University of Virginia, GECO seminar, VA, USA Oct 2026
- LSST SMWLV near-field cosmology, virtual keynote speaker Sep 2026
- DESC DKM collaboration, telecon, virtual seminar Jun 2026
- DESI-MWS collaboration, telecon, virtual seminar Jun 2026
- Yale University, Galaxies seminar, CT, USA Apr 2026
- University of Michigan, Galaxies seminar, MI, USA Nov 2025
- Institute of Cosmos Science, University of Barcelona, seminar talk, Barcelona, Spain Jun 2025
- LIRA, Observatoire de Paris, PSL Seminar talk, Paris, France Jun 2025
- University of Washington, Seattle, Astronomy colloquium, WA, USA Mar 2025
- University of Alabama, Huntsville, Astronomy colloquium, AL, USA Feb 2025
- Center of Computational Astrophysics, PACMAN seminar, NY, USA Oct 2023
- MIT Kavli Institute Lunch talk, Boston, MA, USA Oct 2023
- University of Michigan, Astronomy seminar, MI, USA Oct 2023
- DESC stellar stream meeting, virtual talk Jun 2023
- FIRE Collaboration Seminar Series, virtual talk May 2023
- FIRE Collaboration Seminar Series, virtual talk Nov 2021

Invited Conference & Workshop Talks

- Small-Scale Structure of the Universe and SIDM, Valencia, Spain Jun 2025
- DREAMS collaboration workshop, CCA, NY, USA May 2025
- Simulating Beyond CDM workshop, CCA, NY, USA Aug 2023
- Self Interacting Dark Matter: Models, Simulations and Signals, Pollica, Italy Jun 2023
- Stream across simulations workshop, CCA, NY, USA Apr 2023

Contributed Talks & Posters

- Probe Combination for Dark Matter Physics in the Era of Large Surveys, IL, USA Sep 2026
- Near Field Cosmology in the Era of Big Data, University of Toronto, ON, Canada Jul 2026
- Spec-S5 Dark Matter Meeting 2025, IL, USA Oct 2025
- Gravity in the local Group, Carnegie Mellon University, PA, USA Jun 2025
- IAU General Assembly 2024, research talk, Cape Town, South Africa Aug 2024
- XMC Workshop, NY, USA Feb 2024
- 243^{rd} American Astronomical Society meeting, dissertation talk, Louisiana, USA Jan 2024
- Surveying the Milky Way, California, USA Oct 2023
- 54^{th} Division for Dynamical Astronomy, MI, USA May 2023
- Towards Real-Time Galactic Dynamics, Leiden, Netherlands Jul 2022
- 53^{rd} Division for Dynamical Astronomy, NY, USA May 2022
- 52^{nd} Division for Dynamical Astronomy, Virtual (USA) May 2021
- Undergraduate Research Symposium, University of Minnesota, MN, USA Aug 2018
- Undergraduate Research Symposium, University of Minnesota, MN, USA Aug 2016

Mentoring

15 students advised or co-advised, including **5** Ph.D., **2** postbac, **5** undergraduate, and **3** high school.

- Lucas Mandacaru Guerra (Graduate student at Princeton University) Jun 2026 – present
  Advising on one specific Ph.D. project.
- Jack Kohm (Graduate student at UW) Oct 2025 – present
  Overall mentoring on Jack's Ph.D. thesis work.
- Gray Thoron (Graduate student at UW) Oct 2024 – present
  Overall mentoring on Gray's Ph.D. thesis work.
- Shriya Prasanna (Undergraduate research at UW) Sep 2025 – present
  Currently drafting a paper on stellar streams in evolving Milky Way.
- Videep Reddy (Undergraduate research at UW) Dec 2024 – present
  Currently drafting a paper on dwarf galaxy disruption in realistic host galaxies.
- Maya Silverman (Graduate student at UC Irvine) 2022 – 2025
  First-authored a Ph.D. project on gravothermal collapse in SIDM dwarf halos.
- Abdelaziz Hussein (Graduate student at MIT) 2022 – 2024
  Second-authored a Ph.D. project on gravothermal collapse in SIDM dwarf halos.
- Mia Mansfield (Undergraduate thesis at UPenn) 2023 – 2025
  Thesis & published first author paper on MW-LMC reflex motion response.
- Jasjeev Singh (Undergraduate thesis at UPenn) 2023 – 2025
- Emily Bregou (Undergraduate research & Postbaccalaureate at UPenn) 2022 – 2023
  Thesis project contributing to a paper on time-evolving potential models, published 2024.
- Lily Joseph (Postbaccalaureate at UPenn) 2020 – 2023
  Thesis & postbac project on surface of sections in MW.
- Christopher Regan (Undergraduate at UPenn) 2020 – 2021
  Lead contributor to a thesis project on time-evolving potential models, published 2024.
- Penn Laboratory Experiences in Natural Sciences (grade 11-12 students) Summer 2022, 2023
  3 student mentees from 2 different local schools with different academic/cultural background

Teaching

Guest Lectures

- **University of Washington**
  ASTR 102: Introduction to Astronomy Fall 2025
  ASTR 511: Galactic Structure and Dynamics Winter 2025
- **University of Pennsylvania**
  PHYS 522: Intro to Particle Physics Spring 2024, 2022
  PHYS 533: Topics in Cosmology: Galactic Dynamics with Gaia Spring 2023
  PHYS 150: Principles of Physics I: Mechanics and Wave Motion Fall 2020, 2021
- **University of Minnesota**
  AST 2001: Intro to Modern Astrophysics Spring 2018, 2019
  PHY 1301: Physics I for Science & Engineering Fall 2018

Teaching Assistantships

- **University of Pennsylvania**
  PHYS 522: Intro to Particle Physics Spring 2021, 2022, 2024
  PHYS 533: Galactic Dynamics with Gaia Spring 2023
  PHYS 526: Astrophysical Radiation Fall 2022
  PHYS 016: Energy, Oil, & Global Warming Fall 2023

PHYS 150: Principles of Physics I: Mechanics and Wave Motion — Fall 2020, 2021
PHYS 101-102 Laboratory — Summer 2020B, 2021A, 2021B

- **University of Minnesota**
  PHY 1301: Physics I for Science & Engineering — Fall 2018, Spring 2019
  AST 2001: Intro to Modern Astrophysics — Spring 2017, Spring 2018, Spring 2019

Grading and Tutoring

- **University of Pennsylvania**
  ASTR 212: Intro to Astrophysics II — Spring 2020
  ASTR 007: The Big Bang and Beyond — Fall 2019
- **University of Minnesota**
  PHY 1302: Physics II for Science & Engineering — Fall 2017
  Certified Tutor, PLC Smart Learning Commons — 2017–2018

Service, Outreach & Media

Service

· Division of Dynamical Astronomy, AAS, Committee Member — June 2025 – June 2028
· DiRAC, University of Washington, Seminar committee — Oct 2024 – present
· Referee for APJ, MNRAS, OJA, A&A — 2023 – present
· DDA 53^{rd} volunteer LOC — May 2022
Ranked/sorted and selected abstract submissions in Galaxy dynamics.

Public Engagement

· Fox 13, and KING 5 News Desk Interview — Oct 2026
· Speaker on NPR *Short Wave*: Could the Milky Way be headed for a collision? — June 2025
· Classroom astronomer — 2022 – present
Led lectures/Q&A sessions for multiple high school astronomy classes.

Media Coverage

· *Ciel & Espace No. 609* (France), Another story of galaxies told by globular clusters, — Oct 2026
· UW News press release: *No Stream Left Unscathed*, picked up by 10 outlets internationally, including Universe Today, The Independent, Discover Magazine, Interesting Engineering, and Phys.org — Aug 2026

Publications

ADS/SciX, ORCID, Google Scholar
29 Total, **7** First author, **637** citations (as of October 16, 2026)

Primary Author

** indicates work led by a student I advised or co-advised.*

11. Silverman M.*, Hussein, A.*, **Arora, A.**, Kaplinghat, M., Lisanti, M., Necib, L., et. al. 2026. Mergers Matter: Gravothermal Collapse in Dwarf Halos with Self-Interacting Dark Matter. *The Astrophysical Journal revisions*, arXiv:2606.02566.

10. **Arora, A.**, Ferguson, P. S., Nibauer, J., Shipp, N., Reddy, V., et. al. 2026. No Stream Left Unscathed: The imprint of a host galaxy. *The Astrophysical Journal*, 1008(1), p.91.

9. Mansfield, M. W.*, Sanderson, R. E., Hey, D., Huber, D., **Arora, A.**, Cunningham E. C., and Panithanpaisal, N., 2026. Kinematic Signatures in the Stellar Halo from Cosmological Encounters between the Milky Way and its Clouds. *The Astrophysical Journal revisions*, arxiv:2602.03528.

8. Darragh-Ford, E.*, Garavito-Camargo, N., **Arora, A.**, Wechsler, R. H., Mansfield, P., Besla, G., et. al. 2025. Shaping the Milky Way. II. The dark matter halo's response to the LMC's passage in a cosmological context. *The Astrophysical Journal accepted*, arXiv:2511.02031.

7. **Arora, A.**, Garavito-Camargo, N., Sanderson, R. E., Weinberg, M. D., Petersen, M. S., et. al., 2025. Shaping the Milky Way: The interplay of mergers and cosmic filaments. *The Astrophysical Journal*, 988(1), p.190.

6. **Arora, A.**, Sanderson, R. E., Regan, C., Garavito-Camargo, N., Bregou, E., Panithanpaisal, N., Wetzel, A., Cunningham, E.C., Loebman, S.R., Dropulic, A. and Shipp, N., 2024. Efficient and accurate force replay in cosmological-baryonic simulations. *The Astrophysical Journal*, 977(1), p.23.

5. **Arora, A.**, Sanderson, R. E., Chakrabarti, S., Wetzel, A., Donlon, T., Horta, D., Loebman, S. R., Necib, L., and Oeur, M., 2024. The imprint of dark matter on the Galactic acceleration field. *The Astrophysical Journal*, 974(2), p.223.

4. Ansar, S., Pearson, S., Sanderson, R. E., **Arora, A.**, Hopkins, P. F., Wetzel, A., Cunningham, E. C., Quinn, J. 2024. Bar formation and destruction in the FIRE-2 simulations. *The Astrophysical Journal*, 978(1), p.37.

3. **Arora, A.**, Garavito-Camargo, N., Sanderson, R. E., Cunningham, E. C., Wetzel, A., Panithanpaisal, N., Barry, M. 2023. LMC-driven anisotropic boosts in stream–subhalo interactions. *The Astrophysical Journal*, 974(2), p.286.

2. **Arora, A.**, Sanderson, R.E., Panithanpaisal, N., Cunningham, E. C., Wetzel, A. and Garavito-Camargo, N., 2022. On the stability of tidal streams in action space. *The Astrophysical Journal*, 939(1), p.2.

1. **Arora, A.** and Williams, L.L., 2020. Power-law Pseudo-phase-space Density Profiles of Dark Matter Halos: A Fluke of Physics?. *The Astrophysical Journal*, 893(1), p.53.

Co-Author

18. Pearson, S., Nibauer, J., Cunningham, E. C., Price-Whelan, A. M., Thob, A. C.R., **Arora, A.**, and Sanderson, R. E., 2026. Extragalactic Stellar Streams in Time-Dependent Cosmological Halos. *The Astrophysical Journal submitted*. arxiv:2609.00526.

17. Zhang, X., Thoyas A., Necib, L., Wetzel, A., and **Arora, A.**, 2026. Set the Night on FIRE: Building an Empirical Local Dark Matter Velocity Distribution. *The Astrophysical Journal submitted*, arxiv:2603.25783.

16. Mandacarú Guerra, L. S., O'Neil, S., Lisanti, M., Roy, S., Sanderson, R. E., Kundu, A., **Arora, A.**, Necib, L., Shipp, N., Shen, X. 2026. Probing Atomic Dark Matter with Stellar Streams in Milky Way-Mass Galaxies. *The Astrophysical Journal accepted*, arXiv:2603.20367.

15. Panithanpaisal, N., Sanderson, R. E., Rodriguez, C. L., Starkenburg, T., Pearson, S., Bonaca, A., Hopkins, P. F., Cook, B. T., **Arora, A.**, Weatherford, N. C. 2026. Breaking Down the CosmoGEMS: Toward Modeling and Understanding Globular Cluster Stellar Streams in a Fully Cosmological Context. *The Astrophysical Journal*, ApJ 997(1), p.182.

14. Quinn, J., Loebman, S. R., Daniel, K., Silva, L.B., Wetzel, A., Debattista, V., **Arora, A.**, McCluskey, F., Masoumi, D., Bailin, J. 2026. Spiral Structure Properties, Dynamics, and Evolution in MW-mass Galaxy Simulations. *The Astrophysical Journal*, ApJ 997(2), p. 29.

13. Hunt, J. A. S., Petersen, M. S., Weinberg, M. D., Johnston, K. V., Bernet, M., Daniel, K. J., Hyman, S. Ó., Price-Whelan, A. M., **Arora, A.**, the EXP Collaboration. 2025. The dark matter wake of a galactic bar revealed by multichannel Singular Spectral Analysis. *Monthly Notices of the Royal Astronomical Society*, staf2118.

12. Wetzel, A., Samuel, J., Gandhi, P.J., Ponnada, S.B., Su, K.Y., **Arora, A.**, Angles-Alcazar, D., Hayward, C.C., Sanderson, R.E., Feldmann, R. and Cochrane, R., et. al., 2025. Second public data release of the FIRE-2 cosmological zoom-in simulations of galaxy formation. arXiv preprint arXiv:2508.06608.

11. Oeur, M., Loebman, S. R., Price-Whelan, A.M., **Arora, A.**, Necib, L., and Horta, D., 2025. OTI on FIRE: Testing the Efficacy of Orbital Torus Imaging to Recover the Galactic Potential. *The Astrophysical Journal*, ApJ 993(1), p.29.

10. Shipp N., Riley A. H., Simpson C. M., Bieri R., Necib L., **Arora A.**, Fragkoudi F., Gómez F. A., Grand R. J. J., Marinacci F., 2024. Auriga Streams II: orbital properties of tidally disrupting satellites of Milky Way-mass galaxies. *Monthly Notices of the Royal Astronomical Society accepted*, 542(2), pp.1109-1124.

9. Lucey M., Sanderson R. E., Horta D., Kundu A, Hopkins P.F., **Arora A.**, Singh J., Panithanpaisal N., 2024. Cosmological predictions for minor axis stellar density profiles in the inner regions of Milky Way-mass galaxies. *The Astrophysical Journal*, 982(2), 87.

8. Donlon, T., Newberg, H.J., Sanderson, R., Bregou, E., Horta, D., **Arora, A.** and Panithanpaisal, N.J., 2023. The Debris of the "Last Major Merger" is Dynamically Young. *Monthly Notices of the Royal Astronomical Society*, 531(1), pp.1422-1439.

7. Horta, D., Cunningham, E.C., Sanderson, R., Johnston, K.V., Deason, A., Wetzel, A., McCluskey, F., Garavito-Camargo, N., Necib, L., Faucher-Giguère, C.A., **Arora, A.** and Gandhi, P.J., 2023. The proto-galaxy of Milky Way-mass haloes in the FIRE simulations. *Monthly Notices of the Royal Astronomical Society*, 527(4), pp.9810-9825.

6. Garavito-Camargo, N., Price-Whelan, A.M., Cunningham, E.C., Samuel, J., Patel, E., Wetzel, A., Johnston, K.V., **Arora, A.**, Sanderson, R. and Garrison, L., 2023. LMC-mass satellite galaxies inducing 'apparent' co-rotation motions in Milky Way-like galaxies in FIRE. *The Astrophysical Journal*, 975(1), p.100.

5. Barry, M., Wetzel, A., Chapman, S., Samuel, J., Sanderson, R. and **Arora, A.**, 2023. The dark side of FIRE: predicting the population of dark matter subhaloes around Milky Way-mass galaxies. *Monthly Notices of the Royal Astronomical Society*, 523(1), pp.428-440.

4. Wetzel, A., Hayward, C.C., Sanderson, R.E., Ma, X., Anglés-Alcázar, D., Feldmann, R., Chan, T.K., El-Badry, K., Wheeler, C., Garrison-Kimmel, S., Nikakhtar, F., Panithanpaisal, N., **Arora, A.**, Gurvich, A.B., Samuel, J., et. al., 2023. Public data release of the FIRE-2 cosmological zoom-in simulations of galaxy formation. *The Astrophysical Journal Supplement Series*, 265(2), p.44.

3. Horta, D., Cunningham, E.C., Sanderson, R.E., Johnston, K.V., Panithanpaisal, N., **Arora, A.**, Necib, L., Wetzel, A., Bailin, J. and Faucher-Giguère, C.A., 2023. The Observable Properties of Galaxy Accretion Events in Milky Way–like Galaxies in the FIRE-2 Cosmological Simulations. *The Astrophysical Journal*, 943(2), p.158

2. Baptista, J., Sanderson, R., Huber, D., Wetzel, A., Sameie, O., Boylan-Kolchin, M., Bailin, J., Hopkins, P.F., Faucher-Giguere, C.A., Chakrabarti, S. and Vargya, D., Panithanpaisal, N., **Arora, A.** and Cunningham, E., 2022. Orientations of DM Halos in FIRE-2 Milky Way-mass Galaxies. *The Astrophysical Journal*, 958(1), p.44.

1. Panithanpaisal, N., Sanderson, R.E., **Arora, A.**, Cunningham, E.C. and Baptista, J., 2022. Constraining the Tilt of the Milky Way's Dark Matter Halo with the Sagittarius Stream. *The Astrophysical Journal in revision*, arXiv:2210.14983.