

Alex M. Garcia

— Contacts —

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— Awards —

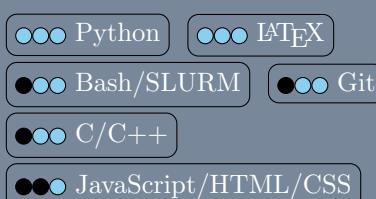
- ◊ Virginia Space Grant Consortium Research Fellow
2024-25, 2025-26
- ◊ Graduate Teaching Award (UF) 2023
- ◊ Outstanding Master's Thesis (UF) 2022

— Honors —

- ◊ Outstanding Research Presentation (UF) 2022
- ◊ Distinguished Contributions by a Graduate Student (UF) 2022
- ◊ Distinguished Service and Citizenship (UF) 2022
- ◊ Tutor of the Year Finalist; Honorable Mention (UIUC) 2021

— Technical Skills —

- = Expert
●●○ = Proficient
●○○ = Working Knowledge



— Education —

University of Virginia
2023 – Present

Doctorate of Philosophy in Astronomy
Master of Science in Astronomy (*Awarded 2025*)

University of Florida
2021 – 2023

Master of Science in Astronomy

University of Illinois
2017 – 2021

Bachelor's of Science in Engineering Physics (*Honors*)
Bachelor's of Science in Astronomy (*Distinction*)

— Select Publications —

Complete Publication List on last page; see also [NASA/ADS Library]

First Author: (8 total)

- ◊ **Garcia, A.**, et al. (2025) [*"The DREAMS Project: Disentangling the Impact of Halo-to-Halo Variance and Baryonic Feedback on Milky Way Dark Matter Density Profiles"*]. ApJ. Submitted.
- ◊ **Garcia, A.**, et al. (2025) [*"Metallicity Gradients in Modern Cosmological Simulations II: The Role of Bursty Versus Smooth Feedback at High Redshift"*]. ApJ. Submitted.
- ◊ Qi, J., **Garcia, A.** [equal contribution] et al. (2025) [*"Star Formation Rates, Metallicities, and Stellar Masses on kpc-scales in TNG50"*]. ApJ. 993, 32.
- ◊ **Garcia, A.**, et al. (2025) [*"Metallicity Gradients in Modern Cosmological Simulations I: Tension Between Smooth Stellar Feedback Models and Observations"*]. ApJ. 989, 147.
- ◊ **Garcia, A.**, et al. (2025) [*"Does the Fundamental Metallicity Relation Evolve with Redshift? II: The Evolution in Normalisation of the Mass-Metallicity Relation"*]. MNRAS. 536, 119.
- ◊ **Garcia, A.**, et al. (2024) [*"Does the Fundamental Metallicity Relation Evolve with Redshift? I: The Correlation Between Offsets from the Mass-Metallicity Relation and Star Formation Rate"*]. MNRAS. 531, 1398.
- ◊ **Garcia, A.**, et al. (2024) [*"Interplay of Stellar and Gas-Phase Metallicities: Unveiling Insights for Stellar Feedback Modeling with Illustris, IllustrisTNG, and EAGLE"*]. MNRAS. 529, 3342.
- ◊ **Garcia, A.**, et al. (2023) [*"Gas-phase metallicity break radii of star-forming galaxies in IllustrisTNG"*]. MNRAS. 519, 4716.

Student Papers Supervised:

- ◊ Carnevale, L., **Garcia, A.**, et al. (2025) *"The Mass Dependence of the Fundamental Metallicity Relation in Cosmological Simulations"*. Under Collaboration Review. [[Document Available](#)]
- ◊ Leisher, I., Torrey, P., **Garcia, A.**, et al. (2025) [*"Linking Warm Dark Matter to Merger Tree Histories via Deep Learning Networks"*]. ApJ. Submitted.

Student Theses Supervised: (Available upon request)

*Co-supervised with P. Torrey

- ◊ D. Western (Senior Thesis; UVA, In Progress)
- ◊ L. Carnevale (Senior Thesis; UVA, 2025)
- ◊ Z. Stevens* (Senior Thesis; UVA, 2024)
- ◊ C. O'Brien* (Senior Thesis; Ohio State, 2023)

—Student Mentoring—

- ◊ D. Western
2025
- ◊ D. Robinson
2025
- ◊ M. Kulkarni
2025
- ◊ L. Carnevale
2024 - 2025
- ◊ I. Leisher
2024 - 2025
- ◊ M. Liu
2024
- ◊ Z. Stevens
2023 - 2024
- ◊ C. O'Brien
2022 - 2024

—Service—

Student/Postdoc Leadership Council
 NSF-Simons CosmicAI Institute
 2025 - Present

Referee
 MNRAS
 2023, 2024, 2025

Host
 Journal Club (UVA)
 2024 - Present

Member
 Dark Skies, Bright Kids Outreach Group (UVA)
 2023 - Present

Graduate Student Rep.
 Committee for DEI (UF)
 2021 - 2023

—Other Work—

Planetarium Assistant
 Kika Silva Pla Planetarium
 Gainesville, FL
 2021 - 2023

Tutor/Lead Tutor
 College of Engineering (UIUC)
 Urbana, IL
 2018 - 2021

—Contributed Talks & Presentations—

Conference & Workshop Contributions:

- ◊ NSF Summit for AI Institute Leadership – Reston, VA [Poster] October 2025
- ◊ GOALS Workshop – Charlottesville, USA September 2025
- ◊ Open SkAI – Chicago, USA [Poster] September 2025
- ◊ Simulation Based Inference for Galaxy Evolution – Bristol, UK May 2025
- ◊ DREAMS Workshop – New York, USA May 2025
- ◊ Student Research Conference – Hampton University, USA April 2025
- ◊ The Multi-phase ISM in Galaxies – Bologna, Italy [Poster] September 2024
- ◊ Connecting Simulations and Observations – Barossa, Australia June 2024
- ◊ Regulating Star Formation Across Time – Baltimore, USA [Video] April 2024
- ◊ Building Galaxies from Scratch – Vienna, Austria [Poster] February 2024
- ◊ Resolving Galaxy Ecosystems – Hong Kong December 2023

Invited Seminars

- ◊ Astronomy Seminar – U. Kentucky November 2025
- ◊ Cosmology Group – U. Maryland October 2024
- ◊ Astronomy Seminar – Virginia Tech September 2024
- ◊ Astronomy Seminar – Australian National University June 2024

Other Formal Presentations:

- ◊ Astronomy on Tap – U. Virginia November 2025
- ◊ ANR Dark Meeting – U. Lyon (*virtual*) July 2025
- ◊ Conroy Group Meeting – CfA Harvard-Smithsonian April 2025
- ◊ McCormick Observatory Public Night – U. Virginia July 2024
- ◊ Ellison Group Meeting – U. Victoria (*virtual*) February 2024
- ◊ Vogelsberger Group Meeting – MIT November 2023
- ◊ Kewley Group Meeting – CfA Harvard-Smithsonian November 2023
- ◊ Ellison Group Meeting – U. Victoria (*virtual*) May 2023

—Teaching—

Institution		Course	Semester
Virginia	ASTR	1210 ◊ Intro Sky & Solar System	FA 25
		2110 ◊ Intro to Astrophysics	FA 24
		†1250 ◊ Alien Worlds	SU 24
		4470 ◊ Computational Astrophysics	SP 24
		3830 ◊ Planetary Astronomy (+Lab)	SP 24
		1220 ◊ Stars, Galaxies, and Universe	SP 24
		5110 ◊ Astronomical Techniques	FA 23
Florida	AST	†1022 ◊ Astronomy Laboratory	SP 23
		†1022 ◊ Astronomy Laboratory	SP 22
		1002 ◊ Discovering the Universe	FA 21
Illinois	ASTR	330 ◊ Extraterrestrial Life	SP 21
		330 ◊ Extraterrestrial Life	W 21
		100 ◊ Introduction to Astronomy	FA 20
		150 ◊ Killer Skies: Astro-Disasters	FA 20

†Primary instructor (UVA; Summer 2024 – UF; Spring 2023, 2022)

Complete Publication List

See also: [\[NASA/ADS Library\]](#)

Summary: 32 total papers, 10 h-index, 10 i10-index, 15 g-index

First Author

8. **Garcia, A.**, Rose, J., Torrey, P., Caputo, A., Lisanti, M., Pace, A., Liu, H., Hussein, A., Liu, H., Villaescusa-Navarro F., Barry, J., Leisher, I., Costanza, B., Kho, J., Lille, E., Jiaxuan, L., Bhowmick, A., Nguyen, T., O'Neil, S., Ou, X., Shen, X., Kallivayalil, N., Necib, L., Vogelsberger, M. [*"The DREAMS Project: Disentangling the Impact of Halo-to-Halo Variance and Baryonic Feedback on Milky Way Dark Matter Density Profiles"*]. 2025. ApJ. Submitted.
7. **Garcia, A.**, Torrey, P., Bhagwat, A., Shen, X., Vogelsberger, M., McClymont, W., Nagarajan-Swenson, J., Zhu, P., Zimmerman, D., Zier, O., Biddle, S., Wright, R., Grasha, K., Keating, L., Kannan, R., Smith, A., Garaldi, E., Puchwein, E., Ciardi, B., Hernquist, L., Kewley, L. [*"Metallicity Gradients in Modern Cosmological Simulations II: The Role of Bursty Versus Smooth Feedback at High Redshift."*]. 2025. ApJ. Submitted.
6. Qi, J. & **Garcia, A.** (equal contribution from Qi and Garcia), Robinson, D., Torrey, P., Moreno J., Green, K., Evans, A., Hemler Z., Hernquist L., Ellison, S. [*"Star Formation Rates, Metallicities, and Stellar Masses on kpc-scales in TNG50"*]. 2025. ApJ. 993 32.
5. **Garcia, A.**, Torrey, P., Bhagwat, A., Wright, R., Chen, Q., Grasha, K., Ridolfo, S., Hemler, Z., Sarkar, A., Chakraborty, P., Nelson, E., Sanders, R., Costa, T., Vogelsberger, M., Kewley, L., Ellison, S., Hernquist, L. [*"Metallicity Gradients in Modern Cosmological Simulations I: Tension Between Smooth Stellar Feedback Models and Observations"*]. 2025. ApJ. 989 147.
4. **Garcia, A.**, Torrey P., Ellison S., Grasha K., Chen Q., Hemler Z., Zimmerman D., Wright R., Zovaro H., Nelson E., Sanders R., Kewley L., Hernquist L. [*"Does the Fundamental Metallicity Relation Evolve with Redshift? II: The Evolution in Normalisation of the Mass-Metallicity Relation"*]. 2025. MNRAS 536, 119.
3. **Garcia, A.**, Torrey, P., Ellison, S., Grasha, K., Hernquist, L., Zovaro, H., Chen, Q., Hemler, Z., Kewley, L., Nelson, E., Wright, R. [*"Does the Fundamental Metallicity Relation Evolve with Redshift? I: The Correlation Between Offsets from the Mass-Metallicity Relation and Star Formation Rate"*]. 2024. MNRAS 531, 1398.
2. **Garcia, A.**, Torrey, P., Grasha, K., Hernquist, L., Ellison, S., Zovaro, H., Hemler, Z., Nelson, E., Kewley, L. [*"Interplay of Stellar and Gas-Phase Metallicities: Unveiling Insights for Stellar Feedback Modeling with Illustris, IllustrisTNG, and EAGLE"*]. 2024. MNRAS 529, 3342.
1. **Garcia, A.**, Torrey P., Hemler Z., Hernquist, L., Kewley L., Nelson E., Grasha K., Zovaro H., Chen Q., [*"Gas-phase metallicity break radii of star-forming galaxies in IllustrisTNG"*]. 2023. MNRAS 519, 4716.

Co-Author

‡Undergraduate Student Led

25. Green, K., et al. including **Garcia, A.**. *"The Resolved Star Formation and Stellar Mass Properties of Luminous Infrared Galaxies"*. Under Collaboration Review.
24. ‡Carnevale, L., **Garcia, A.**, et al. [*"The Mass Dependence of the Fundamental Metallicity Relation in Cosmological Simulations"*]. Under Collaboration Review.

Submitted to Journal

23. Lille, E., Rose, J., Lisanti, M., **Garcia, A.**, Kollmann, K., Li, J., Mostow, O., Shen, X., Brooks, A., Farahi, A., Kallivayalil, N., Necib, L., Pace, A., Torrey, P., Vogelsberger, M. *"The DREAMS Project: Disentangling the Impact of Halo-to-Halo Variance and Baryonic Feedback on Milky Way Dark Matter Velocity Distributions"*. 2025. ApJ. Submitted.
22. Rose, J., Lisanti, M., Torrey, P., Villaescusa-Navarro F., **Garcia, A.**, Farahi, A., Fillion, C., Brooks, A., Kallivayalil, N., Kollmann, K., Lilie, E., Li, J., Mostow, O., Cruz, A., Nguyen, T., Pace, A., Ahvazi, N., O'Neil, S., Shen, X., Cyr-Racine, F., Caputo, A., Price-Whelan, A., Geha, M., Greene, J., Necib, L., Vogelsberger, M., Muñoz, J., Dalcanton, J. [*"The DREAMS Project: Disentangling the Impact of Halo-to-Halo Variance and Baryonic Feedback on Milky Way Satellite Galaxies"*]. 2025. ApJ. Submitted
21. Rose, J., Lisanti, M., Torrey, P., Villaescusa-Navarro F., **Garcia, A.**, Farahi, A., Fillion, C., Brooks, A., Kallivayalil, N., Kollmann, K., Lilie, E., Roy, S., Pace, A., Ahvazi, N., O'Neil, S., Shen, X., Greene, J., Vogelsberger, M. [*"The DREAMS Project: A New Suite of 1,024 Simulations to Contextualize the Milky Way and Assess Physics Uncertainties"*]. 2025. ApJ. Submitted.
20. Ahvazi, N., Pace, A., Garling, C., Ou, X., Kallivayalil, N., Torrey, P., Benson, A., Bhowmick, A., Torres-Albà, N., **Garcia, A.**, Kho, J., Warfield, J., Atzberger, K. [*"The Abundance and Properties of the lowest Luminosity Dwarf Galaxies around the Milky Way: Insights from Semi-Analytic Models"*]. 2025. ApJ. Submitted.
19. Heretz, P., Triani, P., Battisti, A., **Garcia, A.**, Torrey, P., Pope, A., Calzetti, D., Kewley, L. *"A New Metallicity Diagnostic Suitable for Low Spectral Resolution Surveys of Star-Forming Galaxies"*. 2025. ApJ. Submitted.

18. ‡Leisher, I., Torrey, P., **Garcia, A.**, Rose, J., Villaescusa-Navarro F., Lubberts, Z., Farahi, A., O’Neil, S., Shen, X., Mostow, O., Kallivayalil, N., Zimmerman, D., Narayana, D., Vogelsberger, M. [[“Linking Warm Dark Matter to Merger Tree Histories via Deep Learning Networks”](#)]. 2025. ApJ. Submitted.
17. Garling, C., **Garcia, A.**, Ahvazi, N., Kallivayalil, N., McQuinn, K., Feldmann, R., Cohen, R. [[“A Unified Framework Connecting Chemical Enrichment with Resolved Star Formation Histories”](#)]. 2025. ApJ. Submitted.
16. Bhowmick, A., Blecha, L., Torrey, P., Kelley, L., Natarajan, P., Weinberger, R., **Garcia, A.**, Hernquist, L., Di Matteo, T., Somerville, R., Vogelsberger, M. [[“Heavy seeds and the first black holes: Insights from the BRAHMA simulations”](#)]. 2025. ApJ. Submitted.
15. Narayanan, D., Torrey, P., Stark, D., Chirsholm, J., Finkelstein, S., **Garcia, A.**, Marinacci, F., Kelley-Derzon, J., Sales, L., Savitch, E., Vogelsberger, M., Zimmerman, D. [[“The Growth of Dust in Galaxies in the First Billion Years with Applications to Blue Monsters”](#)]. 2025. Submitted.
14. Jain, S., Sanders, R., Khostovan, A., Jones, T., Shapley, A., Reddy, N., **Garcia, A.**, Torrey, P., Coil, A. [[“A Uniform Analysis of Gas-phase Metallicity Evolution with 1 – 3 Gyr Time Sampling over the Past 12 Billion Years”](#)]. 2025. Submitted.
13. Silvestrini, M., Torta, C., Busillo, V., Farahi, A., **Garcia, A.**, Kallivayalil, N., Napolitano, R., Rose, J., Torrey, P., Villaescusa-Navarro, F., Vogelsberger, M. “*CASCO: Cosmological and Astrophysical parameters from Cosmological simulations and Observations IV. Testing warm dark matter cosmologies with galaxy scaling relations: a joint simulation–observation study using DREAMS simulations*”. 2025. A&A. Submitted (Second Review).
12. Chen, Q., **Garcia, A.**, Li, Z., Wisnioski, E., Grasha, K., Torrey, P., Remus, R., Kimming, L., Battisti, A., Buder, S. “*How Mergers and Flybys Shape Azimuthal Age Patterns in Spiral Galaxies*” 2025. MNRAS. Submitted (Second Review).
11. Nyguen, T., Villaescusa-Navarro, F., Misha-Sharma, S., Cuesta-Lazaro, C., Torrey, P., Farahi, A., **Garcia, A.**, Rose, J., O’Neil, S., Vogelsberger, M., Shen, X., Roche, C., Anglés-Alcazar, D., Kallivayalil, N., Muñoz, J., Cyr-Racine, F., Roy, S., Necib, L., Kollmann, K. [[“How DREAMS are made: Emulating subhalo populations under alternative dark matter scenarios with Diffusion Models”](#)]. 2024. MNRAS. Submitted.

Accepted to Journal

10. Kewley, L., Grasha, K., **Garcia, A.**, Torrey, P., Rich, J., Hemler, Z., Zhu, P., Chen, Q., Seibert, M., Hernquist, L., Madore, B., “*Extragalactic Archaeology via Gas-Phase Oxygen Abundance Gradients*”. 2025. Nature Astronomy. Accepted. In Press.
9. ‡Mostow, O., Torrey, P., Rose, J., **Garcia, A.**, Ahvazi, N., Lisanti, M., Kallivayalil, N. [[“How Many Bursts Does it Take to Form a Core at the Center of a Galaxy?”](#)]. 2025. ApJ. Accepted. 995, 25.
8. Costanza, B., Wang, B., Villaescusa-Navarro, F., **Garcia, A.**, Rose, J., Vogelsberger, M., Torrey, P., Farahi, A., Shen, X., Leisher, I. [[“On the Sensitivity of Different Galaxy Properties to Warm Dark Matter”](#)]. 2025. ApJ 994, 62.
7. Kho, J., Bhowmick, A., Torrey, P., **Garcia, A.**, Ahvazi, N., Blecha, L. [[“Signatures of BH seeding on the \$M_{\text{BH}} - \sigma\$ relation: Predictions from the BRAHMA simulations”](#)]. 2025. ApJ 994, 172.
6. Chakraborty, P., Sarkar, A., Smith, R., Ferland, G., McDonald, M., Forman, W., Vogelsberger M., Torrey, P., **Garcia, A.**, Bautz, M., Foster, A., Miller, E., Grant, C. [[“Unveiling the Cosmic Chemistry II: ‘direct’ Te based metallicity of galaxies at \$3 < z < 10\$ with JWST/NIRSpec”](#)]. 2025. ApJ 985, 24.
5. Rose, J., Torrey, P., Villaescusa-Navarro, F., Lisanti, M., Nyguen, T., Roy, S., Kollmann, K., Vogelsberger, M., Cyr-Racine, F., Medvedev, M., Genel, S., Anglés-Alcazar, D., Kallavayalil, N., Wang, B., Costanza, B., O’Neil, S., Cian, R., Karmakar, S., **Garcia, A.**, Low, R., Lin, S., Mostow, O., Cruz, A., Caputo, A., Farahi, A., Muñoz, J., Necib, L., Teyssier, R., Dalcanton, J., Spergel, D. [[“Introducing the DREAMS project: DaRk mattEr and Astrophysics with Machine learning and Simulations”](#)]. 2025. ApJ. 982, 68.
4. Sarkar, A., Chakraborty, P., Vogelsberger, M., McDonald, M., Torrey, P., **Garcia, A.**, Khullar, G., Ferland, G., Forman, W., Wolk, S., Schneider, B., Bautz, M., Miller, E., Grant, C., ZuHone, J. [[“Unveiling the Cosmic Chemistry: Revisiting the Mass-Metallicity Relation with JWST/NIRSpec at \$4 < z < 10\$ ”](#)]. 2025. ApJ 978 136.
3. Chen, Q., Grahsa, K., Battisti A., Wisnioski, E., Li, Z., Park, H., Groves, B., Torrey, P., Mendel, T., Madore, B., Seibert, M., Sextl, E., **Garcia, A.**, Rich, J., Beaton, R., Kewley, L. [[“Quantifying azimuthal variations within the interstellar medium of spiral galaxies with the TYPHOON survey”](#)]. 2024. MNRAS 534, 883.
2. Shurui, L., Villascusa-Navarro, F., Rose, J., Torrey, P., Farahi, A., Kollman, K., **Garcia, A.**, Roy, S., Vogelsberger M., Kallivayalil, N., Cai, F., Luo, W. [[“Can we constrain warm dark matter masses with individual galaxies?”](#)]. 2024. ApJ 970, 170.
1. ‡Hartley, A., Nelson, E., Suess, K., **Garcia, A.**, Park, M., Hernquist, L., Bezanson, R., Nevin, R., Pillepich, A., Schecter, A., Terrazas, B., Torrey, P., Wellons, S., Whitaker, K., Williams, C. [[“The First Quiescent Galaxies in TNG300”](#)]. 2023. MNRAS 522, 3138.