

# Gillian D. Beltz-Mohrmann, Ph.D.

Department of Physics and Program in Statistical & Data Sciences  
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Professional Appointments	<b>Assistant Professor - Smith College</b>	2025-
	Department of Physics and Program in Statistical & Data Sciences	
	<b>Postdoctoral Research Fellow - Argonne National Laboratory</b>	2022-2025
	Cosmological Physics and Advanced Computing Group	
	<b>Graduate Research Assistant - Vanderbilt University</b>	2016-2022
	Department of Physics & Astronomy	
Education	<b>Vanderbilt University</b> , Nashville, TN	May 2022
	Ph.D. in Astrophysics	Advisor: Andreas Berlind
	Thesis: <i>Developing an Accurate Probe of the Galaxy-Halo Connection: Baryonic Effects, Small-Scale Galaxy Clustering, and Halo Model Extensions</i>	
	<b>Wellesley College</b> , Wellesley, MA	May 2016
	B.A., <i>cum laude</i>	Advisors: Kim McLeod, James Battat
	Major: Astrophysics; Minor: German	
Honors & Awards	<b>Most Outstanding Student Publication Award</b>	2020
	Vanderbilt Physics & Astronomy Department	
	<b>Graduate Student Poster Competition Winner</b>	2019
	Vanderbilt Data Science Symposium	
	<b>Akunuri V. Ramayya Award for Outstanding Teaching Assistant</b>	2018
	Vanderbilt Physics & Astronomy Department	
	<b>Provost Graduate Fellowship</b>	2016–2021
	Vanderbilt University	
1st & 2nd Author Publications	<b>Undergraduate Chambliss Achievement Honorable Mention</b>	2016
	227th American Astronomical Society Meeting	
	<b>Sarah Frances Whiting Medal for Achievement in Astronomy</b>	2014
	Wellesley College	
	<b>Submitted &amp; Published</b>	
	Total Citations: 105	
	8. <b>Beltz-Mohrmann, G. D.</b> , Pope, A., et al., 2025, “Illuminating the Physics of Dark Energy with the Discovery Simulations,” submitted to The Open Journal of Astrophysics, arXiv:2503.05947	
	7. Pearl, A. N., <b>Beltz-Mohrmann, G. D.</b> , Hearin, A. P., 2024, “DiffOpt: Parallel optimization of Jax models,” Journal of Open Source Software, 9(104), 7522	
	6. <b>Beltz-Mohrmann, G. D.</b> , Szewciw, A. O., Berlind, A. A., Sinha, M., 2023, “Toward Accurate Modeling of Galaxy Clustering on Small Scales: Halo Model Extensions and Lingering Tension,” The Astrophysical Journal, 948, 100	
	5. Szewciw, A. O., <b>Beltz-Mohrmann, G. D.</b> , Berlind, A. A., Sinha, M., 2021, “Toward Accurate Modeling of Galaxy Clustering on Small Scales: Constraining the Galaxy-Halo Connection with Optimal Statistics,” The Astrophysical Journal, 926, 15	
	4. <b>Beltz-Mohrmann, G. D.</b> , Berlind, A. A., 2021, “The impact of baryonic physics on the abundance, clustering, and concentration of halos,” The Astrophysical Journal, 921, 112	
	3. <b>Beltz-Mohrmann, G. D.</b> , Berlind, A. A., Szewciw, A. O., 2020, “Testing the Accuracy of Halo Occupation Distribution Modelling using Hydrodynamical Simulations,” Monthly Notices of the Royal Astronomical Society, 491, 5771	

	<ol style="list-style-type: none"> <li>2. Dale, D. A., <b>Beltz-Mohrmann, G. D.</b>, et al., 2016, “Radial Star Formation Histories in Fifteen Nearby Galaxies,” <i>The Astronomical Journal</i>, 151, 4</li> <li>1. Souza, S. P., <b>Beltz-Mohrmann, G.</b>, Sami, M., 2014, “The Light Curve and Period of MT696,” <i>The Journal of the American Association of Variable Star Observers</i>, 42, 154</li> </ol>	
<b>Nth Author Publications</b>	<b>Submitted &amp; Published</b>	
	Total Citations: 20	
	<ol style="list-style-type: none"> <li>3. OpenUniverse Collaboration et al., 2025, “OpenUniverse2024: A shared, simulated view of the sky for the next generation of cosmological surveys”, arXiv:2501.05632</li> <li>2. Lange, Johannes U. et al., 2024, “Systematic Effects in Galaxy-Galaxy Lensing with DESI”, <i>The Open Journal of Astrophysics</i>, 7, 57</li> <li>1. Yuan, Sihan et al., 2024, “Redshift evolution and covariances for joint lensing and clustering studies with DESI Y1”, <i>Monthly Notices of the Royal Astronomical Society</i>, 533, 1</li> </ol>	
<b>Teaching</b>	<b>SDS 271 Programming for Data Science in Python</b> , Smith College      Fall 2025 <b>SDS 291 Multiple Regression</b> , Smith College      Fall 2025 <b>Python workshop</b> , Conference for Undergraduate Women in Physics      Jan. 2023 <b>Graduate Teaching Assistant</b> , Vanderbilt University      Fall 2016 – Spring 2019 Introductory Astronomy Lab instructor <b>Astronomy Tutor</b> , Vanderbilt University      Fall 2016 <b>Summer Academy at Vanderbilt for the Young</b> July 2017 <b>Supplemental Instruction Leader</b> , Wellesley College      Fall 2014 – Spring 2016 <b>Physics Tutor</b> , Wellesley College      Fall 2013 – Spring 2016	
<b>Mentoring</b>	<b>Harmandeep Gill</b> (University of Toronto, undergraduate)      October 2024 - Topic: Modeling Lyman Break Galaxies in Jax <b>Ivan Kraskov</b> (University of Toronto, undergraduate)      October 2024 - Topic: Modeling IGM absorption in Jax <b>Emily Martsen</b> (University of Chicago, graduate)      September 2024 - June 2025 Topic: Measuring the Two-point Clustering of Galaxy Clusters <b>DESI Mentorship Program</b> October 2023 - <b>Resherle Verna</b> (UT Austin, graduate)      Summer 2023 GEM Fellowship Program Topic: Forward modeling galaxy SEDs with Jax <b>Caleigh Dennis (Harpeth Hall High School)</b> September 2017 – May 2019 Topic: Measuring the rotation of galaxy groups in SDSS 1st place winner at Middle Tennessee Science & Engineering Fair in 2018 & 2019	
<b>Recent Talks</b>	<b>Cosmology from Lyman-Break Galaxies</b> May 2025 University of Toronto <i>Modeling the Galaxy-Halo Connection of LBGs</i> <b>ELG Mock Challenge Workshop</b> February 2025 Donostia International Physics Center <i>Lessons Learned from the DESI Emulator Mock Challenge</i> <i>Simulation-based Forward Modeling with Diffsky</i> <b>Winter DESI Meeting</b> , Cancun, Mexico      December 2024 <i>Updates on the DESI Emulator Mock Challenge</i> <b>University of Arizona</b> October 2024 <i>A Differentiable Forward Model of the Galaxy-Halo Connection</i> <b>Cosmology Talks Miniworkshop</b> (invited expert)      August 2024 <i>Cosmology Beyond 2pt Statistics</i> <b>DHWFEST</b> , University of Utah      July 2024 <i>A New Forward Model of the Galaxy-Halo Connection</i> <b>Summer DESI Meeting</b> , Marseille, France      July 2024	

	<i>DESI Alternative Clustering Methods</i>	
	<b>New Strategies for Extracting Cosmology from Galaxy Surveys</b>	July 2024
	Sesto, Italy	
	<i>Simulation-based Forward Modeling of Cross-Survey Cross-Correlations with Diffsky</i>	
	<b>Fundamental Physics from Future Spectroscopic Surveys</b>	May 2024
	Lawrence Berkeley National Lab	
	<i>Making multi-wavelength, multi-redshift predictions for Cross-Survey Cosmological Analyses</i>	
	<b>Winter DESI Meeting</b> , Hawaii, USA	Dec. 2023
	<i>Introducing DESI-Diffsky: A Differentiable Forward Model for Making Multi-wavelength, Multi-tracer DESI Mocks</i>	
	<b>KITP Workshop</b> , UC Santa Barbara	Jan. 2023
	Building a physical understanding of galaxy evolution with data-driven astronomy	
	<i>Toward Accurate Modeling of Galaxy Clustering on Small Scales: Halo Model Extensions &amp; Lingering Tension</i>	
	<b>CAMELS Workshop</b> , Center for Computational Astrophysics	Dec. 2022
	<i>Toward Accurate Modeling of Galaxy Clustering on Small Scales: Halo Model Extensions &amp; Lingering Tension</i>	
	<b>N-Body Shop Workshop</b> , Center for Computational Astrophysics	June 2022
	<i>Accurate Modeling of Galaxy Clustering on Small Scales</i>	
	<b>High-Energy and AstroPhysics Seminar</b> , University of Utah	Jan. 2022
	<i>Developing an Accurate Probe of the Galaxy-Halo Connection</i>	
	<b>KICP Seminar</b> , University of Chicago	Nov. 2021
	<i>Developing an Accurate Probe of the Galaxy-Halo Connection</i>	
	<b>Galaxies and AGN Journal Club</b> , Johns Hopkins University	July 2021
	<i>Impact of baryonic physics on the abundance, clustering, &amp; concentration of halos</i>	
	<b>Galaxy Lunch talk</b> , Yale University	March 2021
	<i>Can we ignore baryons in halo modeling?</i>	
	<b>KITP Workshop</b> , UC Santa Barbara	Aug. 2020
	Galaxy-Halo Connection Across Cosmic Time	
	<i>HMF Discrepancies between Hydrodynamic and DMO Simulations</i>	
	<b>Galaxy-halo Connection Workshop</b> , Universität Innsbruck	March 2020
	<i>Taking Halo Modeling to the Next Level</i>	
<b>Grants</b>	<b>XSEDE Grant</b>	2019, 2020
	Awarded 58.4k total Node Hours (2.8M CPU hours) on Stampede2	
	<b>McMinn Research Grant</b>	2019, 2020
	Vanderbilt Physics & Astronomy Department (\$3,000 total)	
	<b>Graduate Summer Research Award</b>	2018
	Vanderbilt College of Arts and Sciences (\$1,900)	
<b>Skills &amp; Experience</b>	<b>Programming Languages:</b> PYTHON, C, BASH, GIT, L <sup>A</sup> T <sub>E</sub> X	
	<b>Misc.:</b> Jax, scikit-learn, emcee, GADGET, CAMB, 2LPTIC, ROCKSTAR	
	<b>Parallel Computing:</b> MPI, OPENMP	
	<b>Observing Experience:</b>	
	~ 80 hours using 2.3 meter telescope at Wyoming Infrared Observatory	
	~ 80 hours using 0.6 meter telescope at Williams College	
	~ 200 hours using 0.6 meter telescope at Wellesley College	
	~ 100 hours using 8'' reflector telescopes at Wellesley College and Vanderbilt University	
	~ 100 hours using 6'' and 12'' historic refractor telescopes at Wellesley College	
<b>Public Service &amp; Outreach</b>	Science Careers in Search of Women panelist, Argonne	March 2023
	Conference for Undergraduate Women in Physics, Argonne	Jan. 2023
	AAS Congressional Visits Day (virtual)	Sept. 2020
	Science Day with Nashville Girl Scout Troop	March 2019
	Meet the Astronomer Night at Dyer Observatory	Oct. 2018
	Vanderbilt Student Volunteers for Science	Fall 2016

	Whitin Observatory Volunteer, Wellesley College	2012–2016
<b>In the Media</b>	<b>DESI Blog:</b> At the Big Reveal: DESI’s December 2024 Unblinding Results <b>Podcast:</b> Particle Mysteries: The Coldest Case - “Chasing Shadows” <b>YouTube:</b> Science 101: What are dark matter and dark energy?	
<b>Collaborations</b>	<b>Dark Energy Spectroscopic Instrument (DESI)</b> 2022– C3 and GQC Working Groups Alternative Clustering Methods Topical Group (co-leader, November 2024-) <b>LSST Dark Energy Science (DESC)</b> 2022– <b>Large Suite of Dark Matter Simulations (LasDamas)</b> 2017–2022 Co-Investigator & XSEDE Allocation Manager <b>CAMELS</b> 2022– <b>N-Body Shop</b> 2020– <b>American Astronomical Society</b> 2015–	
<b>Professional Service</b>	<b>Scholarly Journal Peer Reviewer:</b> Monthly Notices of the Royal Astronomical Society Astronomy & Astrophysics Journal of Cosmology and Astroparticle Physics Physics of the Dark Universe	