

Gillian D. Beltz-Mohrmann, Ph.D.

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Professional Appointments **Postdoctoral Research Fellow - Argonne National Laboratory** 2022-
Cosmological Physics and Advanced Computing Group
Graduate Research Assistant - Vanderbilt University 2016-2022
Department of Physics & Astronomy

Education **Ph.D. - Vanderbilt University**, Nashville, TN May 2022
Ph.D. in Astrophysics Advisor: Andreas Berlind
Thesis: *Developing an Accurate Probe of the Galaxy-Halo Connection: Baryonic Effects, Small-Scale Galaxy Clustering, and Halo Model Extensions*
B.A. - Wellesley College, Wellesley, MA May 2016
B.A., *cum laude* Advisors: Kim McLeod, James Battat
Major: Astrophysics; Minor: German

Honors & Awards **Most Outstanding Student Publication Award** 2020
Vanderbilt Physics & Astronomy Department
Graduate Student Poster Competition Winner 2019
Vanderbilt Data Science Symposium
Akunuri V. Ramayya Award for Outstanding Teaching Assistant 2018
Vanderbilt Physics & Astronomy Department
Provost Graduate Fellowship 2016–2021
Vanderbilt University
Undergraduate Chambliss Achievement Honorable Mention 2016
227th American Astronomical Society Meeting
Sarah Frances Whiting Medal for Achievement in Astronomy 2014
Wellesley College

1st & 2nd Author Publications **Submitted & Published**
Total Citations: 97

6. **Beltz-Mohrmann, G. D.**, 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., **Beltz-Mohrmann, G. D.**, 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. **Beltz-Mohrmann, G. D.**, Berlind, A. A., 2021, “The impact of baryonic physics on the abundance, clustering, and concentration of halos”, *The Astrophysical Journal*, 921, 112
3. **Beltz-Mohrmann, G. D.**, 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
2. Dale, D. A., **Beltz-Mohrmann, G. D.**, Egan, A. A., Hatlestad, A. J., Herzog, L. J., Leung, A. S., McLane, J. N., Phenicie, C., Roberts, J. S., Barnes, K. L., Boquien, M., Calzetti, D., Cook, D. O., Kobulnicky, H. A., Staudaher, S. M., van Zee, L., 2016, “Radial Star Formation Histories in Fifteen Nearby Galaxies”, *The Astronomical Journal*, 151, 4
1. Souza, S. P., **Beltz-Mohrmann, G.**, Sami, M., 2014, “The Light Curve and Period of MT696”, *The Journal of the American Association of Variable Star Observers*, 42, 154

Recent Talks	University of Arizona	October 2024
	<i>A Differentiable Forward Model of the Galaxy-Halo Connection</i>	
	Cosmology Talks Miniworkshop (invited expert)	August 2024
	<i>Cosmology Beyond 2pt Statistics</i>	
	DHWFEST , University of Utah	July 2024
	<i>A New Forward Model of the Galaxy-Halo Connection</i>	
	Summer DESI Meeting , Marseille, France	July 2024
	<i>Updates on the DESI Emulator Mock Challenge - Alternative Clustering Methods</i>	
	New Strategies for Extracting Cosmology from Galaxy Surveys	July 2024
	Sesto, Italy	
	<i>Simulation-based Forward Modeling of Cross-Survey Cross-Correlations with Diffsky</i>	
	Fundamental Physics from Future Spectroscopic Surveys	May 2024
	Lawrence Berkeley National Lab	
	<i>Making multi-wavelength, multi-redshift predictions for Cross-Survey Cosmological Analyses</i>	
	Winter DESI Meeting , Hawaii, USA	Dec. 2023
	<i>Introducing DESI-Diffsky: A Differentiable Forward Model for Making Multi-wavelength, Multi-tracer DESI Mocks</i>	
	KITP Workshop , 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 & Lingering Tension</i>	
	CAMELS Workshop , Center for Computational Astrophysics	Dec. 2022
	<i>Toward Accurate Modeling of Galaxy Clustering on Small Scales: Halo Model Extensions & Lingering Tension</i>	
	N-Body Shop Workshop , Center for Computational Astrophysics	June 2022
	<i>Accurate Modeling of Galaxy Clustering on Small Scales</i>	
High-Energy and AstroPhysics Seminar , University of Utah	Jan. 2022	
<i>Developing an Accurate Probe of the Galaxy-Halo Connection</i>		
KICP Seminar , University of Chicago	Nov. 2021	
<i>Developing an Accurate Probe of the Galaxy-Halo Connection</i>		
Galaxies and AGN Journal Club , Johns Hopkins University	July 2021	
<i>Impact of baryonic physics on the abundance, clustering, & concentration of halos</i>		
Galaxy Lunch talk , Yale University	March 2021	
<i>Can we ignore baryons in halo modeling?</i>		
KITP Workshop , UC Santa Barbara	Aug. 2020	
Galaxy-Halo Connection Across Cosmic Time		
<i>HMF Discrepancies between Hydrodynamic and DMO Simulations</i>		
Galaxy-halo Connection Workshop , Universität Innsbruck	March 2020	
<i>Taking Halo Modeling to the Next Level</i>		
Teaching	Conference for Undergraduate Women in Physics , Argonne	Jan. 2023
	Developed and led a Python workshop	
	Graduate Teaching Assistant , Vanderbilt University	Fall 2016 – Spring 2019
	Introductory Astronomy Lab instructor	
	Astronomy Tutor , Vanderbilt University	Fall 2016
	Summer Academy at Vanderbilt for the Young	July 2017
	Supplemental Instruction Leader , Wellesley College	Fall 2014 – Spring 2016
Physics Tutor , Wellesley College	Fall 2013 – Spring 2016	
Mentoring	Harmandeep Gill (University of Toronto, undergraduate)	October 2024 -
	Ivan Kraskov (University of Toronto, undergraduate)	October 2024 -
	Emily Martsen (University of Chicago, graduate)	September 2024 -
	Topic: Measuring the Two-point Clustering of Galaxy Clusters	
	DESI Mentorship Program	October 2023 -
Resherle Verna (UT Austin, graduate)	Summer 2023	
GEM Fellowship Program		

Topic: Forward modeling galaxy SEDs with Jax
Caleigh Dennis (Harpeth Hall High School) 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

Grants

XSEDE Grant 2019, 2020
 Awarded 58.4k total Node Hours (2.8M CPU hours) on Stampede2

McMinn Research Grant 2019, 2020
 Vanderbilt Physics & Astronomy Department (\$3,000 total)

Graduate Summer Research Award 2018
 Vanderbilt College of Arts and Sciences (\$1,900)

Skills & Experience

Programming Languages: PYTHON, C, BASH, GIT, L^AT_EX
Misc.: Jax, scikit-learn, emcee, GADGET, CAMB, 2LPTIC, ROCKSTAR
Parallel Computing: MPI, OPENMP
Observing Experience:
 ~ 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

Public Service & Outreach

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

Collaborations

Dark Energy Spectroscopic Instrument (DESI) 2022–
 C3 Working Group
 Alternative Clustering Methods Topical Group (co-leader, November 2024-)

LSST Dark Energy Science (DESC) 2022–
Large Suite of Dark Matter Simulations (LasDamas) 2017–2022
 Co-Investigator & XSEDE Allocation Manager

CAMELS 2022–
N-Body Shop 2020–
American Astronomical Society 2015–

Professional Service

Scholarly Journal Peer Reviewer:
 Monthly Notices of the Royal Astronomical Society
 Astronomy & Astrophysics
 Journal of Cosmology and Astroparticle Physics
 Physics of the Dark Universe

Nth Author Publications

Submitted & Published
 Total Citations: 4

2. Lange, Johannes U. et al., 2024, "Systematic Effects in Galaxy-Galaxy Lensing with DESI", arXiv:2404.09397
1. Yuan, Sihan et al., 2024, "Redshift evolution and covariances for joint lensing and clustering studies with DESI Y1", submitted to Monthly Notices of the Royal Astronomical Society, arXiv:2403.00915