

Gillian Dora Beltz-Mohrmann, PhD

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Citizenship: United States

Research Interests: Large-scale structure, Cosmology, Galaxy-halo connection, Small-scale clustering

ACADEMIC POSITIONS

Postdoctoral Fellow, Argonne National Lab	August 2022–
Graduate Research Assistant, Vanderbilt University	2016–2022

EDUCATION

Ph.D., Astrophysics, Vanderbilt University	2022
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>	
M.A., Astrophysics, Vanderbilt University	2018
B.A., Astrophysics, German, <i>cum laude</i> , Wellesley College	2016
Advisors: Kim McLeod, James Battat	

REFERENCES

Dr. Andrew Hearin, Argonne National Laboratory	ahearin@anl.gov
Professor Andreas Berlind, Vanderbilt University	andreas.a.berlind@vanderbilt.edu
Professor Frank van den Bosch, Yale University	frank.vandenbosch@yale.edu
Professor Ferah Munshi, George Mason University	fmunshi@gmu.edu

MEMBERSHIP

Dark Energy Spectroscopic Instrument (DESI) Collaboration	2022–
LSST Dark Energy Science Collaboration (DESC)	2022–
CAMELS Collaboration	2022–
N-Body Shop Collaboration	2020–
LasDamas Project (Co-Investigator & Allocation Manager on XSEDE)	2017–
American Astronomical Society	2015–

HONORS & AWARDS

Vanderbilt Physics & Astronomy Dept. - Most Outstanding Student Publication Award	2020
Vanderbilt Data Science Symposium - Graduate Student Poster Competition (1st place)	2019
Vanderbilt Akunuri V. Ramayya Award for Outstanding Teaching Assistant	2018
Vanderbilt Provost Graduate Fellowship	2016–2021
Undergraduate Chambliss Astronomy Achievement Award (Honorable Mention)	2016
Wellesley College Sarah Frances Whiting Medal for Achievement in Astronomy	2014

GRANTS

XSEDE - Awarded 58.4k Node Hours (2.8M CPU hours) on Stampede2	2019, 2020
Vanderbilt Physics & Astronomy Dept. - McMinn Research Grants (\$3,000 total)	2019, 2020
Vanderbilt College of Arts and Sciences - Graduate Summer Research Award (\$1,900)	2018

PUBLICATIONS

Refereed First & Second Author Publications: 6

Total Citations: 69

Submitted & Published

6. **Beltz-Mohrmann, G. D.**, Szewciw, A. O., Berlind, A. A., Sinha, M., 2022, “Toward Accurate Modeling of Galaxy Clustering on Small Scales: Extensions to the Standard Halo Model”, arXiv:2211.16105
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 & POSTERS

Invited Talks

- | | |
|---|------------|
| KITP: 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> | Jan. 2023 |
| CAMELS Workshop, Center for Computational Astrophysics
<i>Toward Accurate Modeling of Galaxy Clustering on Small Scales:
Halo Model Extensions & Lingering Tension</i> | Dec. 2022 |
| High-Energy and AstroPhysics Seminar, University of Utah
<i>Developing an Accurate Probe of the Galaxy-Halo Connection</i> | Jan. 2022 |
| Kavli Institute for Particle Astrophysics and Cosmology Seminar, Stanford University
<i>Developing an Accurate Probe of the Galaxy-Halo Connection</i> | Dec. 2021 |
| Kavli Institute for Cosmological Physics Seminar, University of Chicago
<i>Developing an Accurate Probe of the Galaxy-Halo Connection</i> | Nov. 2021 |
| Galaxies and AGN Journal Club talk, Johns Hopkins University
<i>The impact of baryonic physics on the abundance, clustering, & concentration of halos</i> | July 2021 |
| Galaxy Lunch talk, Yale University
<i>The impact of baryonic physics on the abundance, clustering, & concentration of halos</i> | March 2021 |

Contributed Talks

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|---|-----------|
| N-Body Shop Workshop
<i>Accurate Modeling of Galaxy Clustering on Small Scales</i> | June 2022 |
| Kavli Institute for Theoretical Physics: Galaxy-Halo Connection Across Cosmic Time
<i>HMF Discrepancies between Hydrodynamic and DMO Simulations</i> | Aug. 2020 |

Contributed Posters

The First Shanghai Assembly on Cosmology and Galaxy Formation <i>Taking HOD Modeling to the Next Level: Results from SDSS & Hydrodynamic Simulations</i>	Nov. 2019
Santa Cruz Galaxy Workshop <i>Can We Ignore Baryons in Halo Modeling?</i>	Aug. 2019

SKILLS & EXPERIENCE

Programming Languages: PYTHON, C, MATLAB, BASH, GIT, L^AT_EX

Machine Learning: scikit-learn

Parallel Computing: MPI, OPENMP

High Performance Computing: Experience on Stampede2 supercomputer:

Running cosmological N-body simulations using GADGET-2 & GADGET-4, generating power spectra and initial conditions using CAMB and 2LPTIC, identifying spherical overdensity halos using ROCKSTAR, and running large MCMC parameter searches

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

TEACHING

Co-mentored high school student Caleigh Dennis	2017–2019
Two-time 1st place winner at Middle Tennessee Science & Engineering Fair	
Graduate Teaching Assistant, Dept. of Physics & Astronomy, Vanderbilt University	2016–2019
Instructor for <i>Introductory Astronomy Lab</i>	
Astronomy Tutor, Vanderbilt University	Fall 2016
Private tutor for undergraduate students in <i>Introduction to Astronomy</i>	
Supplemental Instruction Leader, Wellesley College	2014–2016
Lead problem-solving sessions for students in <i>Introductory Mechanics</i>	
Physics Tutor, Wellesley College	2013–2016
Helproom and private tutor for all undergraduate physics courses	

OUTREACH

Conference for Undergraduate Women in Physics at Argonne National Lab	Jan. 2023
Volunteered to run a python workshop to teach students about coding and galaxy clustering	
AAS (virtual) Congressional Visits Day	Sept. 2020
Spoke with state representatives about the importance of funding scientific research	
Science Day with Nashville Girl Scout Troop	March 2019
Built bottle rockets and talked to girls about being an astronomer	
Meet the Astronomer Night at Dyer Observatory	Oct. 2018
Gave a public talk about large-scale structure	
Volunteer for Summer Academy at Vanderbilt for the Young	July 2017
Helped design week long python course for middle school students	
Vanderbilt Student Volunteers for Science	Fall 2016
Gave monthly science demonstrations to middle school classes	
Whitin Observatory Volunteer, Wellesley College	2012–2016
Gave monthly public talks and telescope demonstrations	

PRE-DOCTORAL POSITIONS

LIGO Summer Undergraduate Research Fellow, Caltech	Summer 2015
NSF Summer REU, University of Wyoming	Summer 2014
Summer Research Fellow, Keck Northeast Astronomy Consortium, Williams College	Summer 2013
Undergraduate Research Assistant, Wellesley College	2013–2016