Gillian Dora Beltz-Mohrmann, PhD

Postdoctoral Fellow, Cosmological Physics & Advanced Computing Group, Argonne National Laboratory

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Email: gbeltzmohrmann@anl.gov **DOB:** February 4, 1994
Website: https://gbeltzmo.github.io **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: *Developing an Accurate Probe of the Galaxy-Halo Connection: Baryonic Effects, Small-Scale Galaxy Clustering, and Halo Model Extensions*

M.A., Astrophysics, Vanderbilt University — 2018

B.A., Astrophysics, German, *cum laude*, 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: 70

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 — Jan. 2023
Toward Accurate Modeling of Galaxy Clustering on Small Scales: Halo Model Extensions & Lingering Tension

CAMELS Workshop, Center for Computational Astrophysics — Dec. 2022
Toward Accurate Modeling of Galaxy Clustering on Small Scales: Halo Model Extensions & Lingering Tension

High-Energy and AstroPhysics Seminar, University of Utah — Jan. 2022
Developing an Accurate Probe of the Galaxy-Halo Connection

Kavli Institute for Particle Astrophysics and Cosmology Seminar, Stanford University — Dec. 2021
Developing an Accurate Probe of the Galaxy-Halo Connection

Kavli Institute for Cosmological Physics Seminar, University of Chicago — Nov. 2021
Developing an Accurate Probe of the Galaxy-Halo Connection

Galaxies and AGN Journal Club talk, Johns Hopkins University — July 2021
The impact of baryonic physics on the abundance, clustering, & concentration of halos

Galaxy Lunch talk, Yale University — March 2021
The impact of baryonic physics on the abundance, clustering, & concentration of halos

Contributed Talks

N-Body Shop Workshop — June 2022
Accurate Modeling of Galaxy Clustering on Small Scales

Kavli Institute for Theoretical Physics: Galaxy-Halo Connection Across Cosmic Time — Aug. 2020
HMF Discrepancies between Hydrodynamic and DMO Simulations

Universität Innsbruck: The Connection Between Galaxies and Dark Matter Halos — March 2020
Taking Halo Modeling to the Next Level

Contributed Posters

The First Shanghai Assembly on Cosmology and Galaxy Formation — Nov. 2019
Taking HOD Modeling to the Next Level: Results from SDSS & Hydrodynamic Simulations

Santa Cruz Galaxy Workshop — Aug. 2019
Can We Ignore Baryons in Halo Modeling?

SKILLS & EXPERIENCE

Programming Languages: PYTHON, C, MATLAB, BASH, GIT, LaTeX
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:
$\sim$ 80 hours using 2.3 meter telescope at Wyoming Infrared Observatory
$\sim$ 80 hours using 0.6 meter telescope at Williams College
$\sim$ 200 hours using 0.6 meter telescope at Wellesley College
$\sim$ 100 hours using 8″ reflector telescopes at Wellesley College and Vanderbilt University
$\sim$ 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 *Introductory Astronomy Lab*

Astronomy Tutor, Vanderbilt University — Fall 2016
Private tutor for undergraduate students in *Introduction to Astronomy*

Supplemental Instruction Leader, Wellesley College — 2014–2016
Lead problem-solving sessions for students in *Introductory Mechanics*

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