

# Gillian Dora Beltz-Mohrmann, PhD

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

**Office:** C145, Building 360, 9700 S. Cass Avenue, Lemont, IL 60439

**Phone:** (908) 577-2812

**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: <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: 65**

### 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

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

### Contributed Talks

- |  |            |
|--|------------|
| N-Body Shop Workshop   | June 2022  |
| <i>Accurate Modeling of Galaxy Clustering on Small Scales</i>                      |            |
| Kavli Institute for Theoretical Physics: Galaxy-Halo Connection Across Cosmic Time | Aug. 2020  |
| <i>HMF Discrepancies between Hydrodynamic and DMO Simulations</i>                  |            |
| Universität Innsbruck: The Connection Between Galaxies and Dark Matter Halos       | March 2020 |
| <i>Taking Halo Modeling to the Next Level</i>                                      |            |

### Contributed Posters

- |   |           |
|---|-----------|
| The First Shanghai Assembly on Cosmology and Galaxy Formation | Nov. 2019 |
|---|-----------|

## SKILLS & EXPERIENCE

---

**Programming Languages:** PYTHON, C, MATLAB, BASH, GIT, L<sup>A</sup>T<sub>E</sub>X

**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

---

AAS (virtual) Congressional Visits Day	Sept. 2020
Science Day with Nashville Girl Scout Troop	March 2019
Meet the Astronomer Night at Dyer Observatory	Oct. 2018
Volunteer for Summer Academy at Vanderbilt for the Young	July 2017
Vanderbilt Student Volunteers for Science	Fall 2016
Whitin Observatory Volunteer, Wellesley College	2012–2016

## 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