

# Madelyn Leembruggen

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## EDUCATION

### Harvard University, Cambridge, MA

May 2024

PhD in Theoretical Physics

Dissertation Title: Buckling, wrinkling, and crumpling of simulated thin sheets

Ford Pre-Doctoral Fellow | NSF Graduate Research Fellow | Ashford Fellow

### University of Cincinnati, Cincinnati, OH

April 2018

Triple major in Physics, Astrophysics, Mathematics

Goldwater Scholar | Phi Beta Kappa | Louis Stokes Alliance for Minority Participation Scholar

## SKILLS

*Communicating:* Public speaking, science writing (lay/technical), curriculum creation, grant writing

*Media:* Premiere Pro, Photoshop, Lightroom, website maintenance, camera/sound/lighting

*Computation:* Python, C++, Mathematica, LaTeX, Word, Excel, PowerPoint

## SCIENCE COMMUNICATION

### Curriculum Developer

2022-present

*Galactic Polymath, Minneapolis, MN*

- Planning lessons and creating assets for grades 5-12 based on current scientific research projects.
- Aligning educational material to national educational standards such as NGSS and Common Core.

### SciShow Script Writer

2024-present

*Complexly, Indianapolis, IN*

- Writing and fact-checking video scripts on topics in physics, astronomy, and material science.

### Jackson Wild Media Lab Fellow

2023

*Jackson Wild, Jackson, WY*

- Produced a 5-minute documentary from brief to premiere in 5 days, coordinating clients, interviewees, a small production team, and a composer.

### Freelance Science Speaker

2021-present

- TEDx speaker and guest scientist expert on podcasts and YouTube videos.

### President, Co-Founder

2020-present

*A World of Women in STEM, Cambridge, MA*

- Conceptualized, designed, and launched an online learning platform dedicated to 7<sup>th</sup>-10<sup>th</sup> graders which garnered 35,000+ website hits and 500,000+ video views within our first two years.
- Leading a team of 30+ contributors split into multiple working groups as we develop multiple pieces of media per month. Supervising the teams from idea conception to final production.
- Filming videos and editing in Premiere Pro and Audition, with additional photography and editing skills in Photoshop and Lightroom.
- Applying to grants and managing \$3,000+ in awarded funds.

## RESEARCH AND TEACHING EXPERIENCE

### Physics Department Teaching Fellow

2021-2023

*Harvard University, Cambridge, MA*

- Received the White Prize for Excellence in Teaching in 2021 and 2024.
- Taught two intro level undergraduate courses (50+ students) surveying theoretical physics, and one advanced graduate level course (10 students) about specialized topics in condensed matter physics.

### Graduate Researcher, Computational Soft Condensed Matter

2019-present

*Harvard University, Cambridge, MA* | Advisor: Chris H. Rycroft (University of Wisconsin-Madison)

- Lead and managed doctoral thesis research comprised of 3 projects with experimental collaborators.
- Built custom C++ libraries; processed and visualized large amounts of data in Python.
- Developed research talks from 2 to 90 minutes long for audiences from general to technical.

**Undergraduate Researcher, Theoretical Cosmology** **2016-2018**  
*University of Cincinnati, Cincinnati, OH* | Advisor: L.C.R. Wijewardhana

- Co-authored 7 papers probing the viability of a theoretical dark matter candidate called the axion, considering a range of proposed properties, and its potentially detectable signatures.

**UNIVERSITY SERVICE**

**Equity & Inclusion Committee, Grad Rep** **2019-2022**  
*Harvard University, American Physical Society Inclusion, Diversity, and Equity Alliance (APS IDEA)*

- Chair of subgroup to create and conduct a community engagement assessment and report.
- Key member of the Harvard Physics Statement of Values and Code of Conduct subgroups.

**Women in Physics, Co-Chair** **2019-2021**  
*Harvard University, Cambridge, MA*

- Led efforts to found, organize, and present a workshop on Building Inclusive Community for first year physics graduate students which serves 20-40 graduate students each year.
- Planned and hosted events, dinners, and social events for up to 60 attendees.

**SELECTED HONORS AND AWARDS**

**Teaching and Leadership**

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|--|-------------|
| The White Prize for Excellence in Teaching, Harvard University Physics Department                  | 2021 & 2024 |
| The Robbins Prize for Graduate Leadership, Harvard University Physics Department                   | 2020        |
| Presidential Leadership Medal of Excellence, University of Cincinnati                              | 2018        |
| Eleanor Hicks Outstanding Female Senior Award, University of Cincinnati College of Arts & Sciences | 2018        |
| Outstanding Tutor of the Year Award, College Reading & Learning Association                        | 2017        |

**Research**

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|---|------|
| Leroy Apker Award finalist, American Physical Society | 2018 |
| Barry M. Goldwater Scholar                            | 2017 |

**Fellowships and Scholarships**

|  |           |
|--|-----------|
| Ford Foundation Pre-Doctoral Fellow, National Academy of Sciences, Engineering, and Medicine | 2018      |
| Graduate Research Fellow, National Science Foundation  | 2018      |
| Ashford Fellow, Harvard University   | 2018      |
| Graduate Prize Fellow, Harvard University Graduate School of Arts & Sciences                 | 2018      |
| Violet M. Diller Scholarship, University of Cincinnati Department of Physics                 | 2016-2018 |
| Cincinnati Academic Scholarship, University of Cincinnati                                    | 2014-2018 |
| Louis Stokes Alliance for Minority Participation Scholar, National Science Foundation        | 2014-2018 |

**Academic Honors**

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|---|------|
| Helen Weinberger Award, University of Cincinnati Phi Beta Kappa Society | 2018 |
| Graduating Senior Award, University of Cincinnati Department of Physics | 2018 |
| Chapter Junior Award, University of Cincinnati Phi Beta Kappa Society   | 2017 |
| Junior Award, University of Cincinnati Department of Physics            | 2017 |

**SELECTED PUBLICATIONS**

**M. Leembruggen**, A. Dawadi, J. Andrejevic, A. Kudrolli, C.H. Rycroft (2024). “Crumpling of thin sheets via wrinkling of cylinders.” In preparation.

**M. Leembruggen**, J. Andrejevic, A. Kudrolli, C.H. Rycroft (2024). “Bendability parameter for twisted ribbons to describe longitudinal wrinkling and delineate the near-threshold regime.” *Physical Review E Letters* 109, L053001

**M. Leembruggen**, J. Andrejevic, A. Kudrolli, C.H. Rycroft (2023). “A computational model of thin elastic ribbons”. *Physical Review E* 108, 015003

J. Eby, **M. Leembruggen**, P. Suranyi, L.C.R. Wijewardhana (2018). “Stability of Condensed Fuzzy Dark Matter Halos”. *Journal of Cosmology and Astroparticle Physics*. 2018(10)058

J. Eby, **M. Leembruggen**, J. Leeney, P. Suranyi, L.C.R. Wijewardhana. (2017). “Collisions of Dark Matter Axion Stars with Astrophysical Sources”. *Journal of High Energy Physics*. 2017(4)99

J. Eby, **M. Leembruggen**, P. Suranyi, L.C.R. Wijewardhana. (2016). “Collapse of Axion Stars”. *Journal of High Energy Physics*. 2016(12)66