Irene Moskowitz

PhD Candidate · Physics and Astronomy

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Education

Rutgers University — *Piscataway, NJ*

PhD Physics and Astronomy — *September 2020 - present*

- Advisor: Dr. Eric Gawiser
- Committee: Saurabh Jha, Alyson Brooks, Ron Gilman

University of Minnesota — *Minneapolis, MN*

BS Physics *cum laude* — *September 2014 - May 2018*

- Honors thesis advisor: Dr. Shaul Hanany
- Honors thesis title: Bolometer Response to Elevation Angle in Cosmic Microwave Background Experiment EBEX

Professional Experience

2022-Present	**Graduate Research Assistant**, Rutgers University
2021-2022	**Lovelace Graduate Fellow**, Physics and Astronomy, Rutgers University
2020-2021	**Graduate Teaching Assistant**, Physics and Astronomy, Rutgers University
2019-2020	**Teaching Specialist**, Minnesota Institute for Astrophysics, University of Minnesota
2019-2020	**Administrator**, Physics Force, University of Minnesota
2017-2018	**Undergraduate Teaching Assistant**, Physics and Astronomy, University of Minnesota
2015-2018	**Undergraduate Research Assistant**, Physics and Astronomy, University of Minnesota

Publications

Published

Moskowitz, I, Eric Gawiser, John Franklin Crenshaw, Brett H. Andrews, Alex I. Malz, Samuel Schmidt, and the LSST Dark Energy Science Collaboration. 2024. Improving Photometric Redshift Estimates with Training Sample Augmentation. ApJL, 967, L6

Moskowitz, I, Eric Gawiser, Abby Bault, Adam Broussard, Jeffrey A. Newman, Joe Zuntz, and the LSST Dark Energy Science Collaboration. 2023. Improved tomographic binning of 3x2pt lens samples: Neural network classifiers and optimal bin assignments. ApJ, 950, 49

In Review

The RAIL Team, incl. **I. Moskowitz**, and the LSST Dark Energy Science Collaboration. 2025. Redshift Assessment Infrastructure Layers (RAIL): Rubin-era photometric redshift stress-testing and at-scale production. Submitted to OJA.

In Prep

Zhang, Yun-Hao, Joe Zuntz, **Irene Moskowitz**, et al., and the LSST Dark Energy Science Collaboration. Enhanced data augmentation using self-organising maps: refining photometric redshift estimations and synthesizing redshift distribution uncertainties for LSST cosmology

Awards, Fellowships, & Grants

2021 **Lovelace Graduate Fellowship**, Rutgers Physics and Astronomy Department

2021 **LSSTC Grant #2021-42**, LSST Corporation

2024 **Chambliss Astronomy Achievement Award Honorable Mention**, American Astronomical Society

Presentations

Invited Talks

April 2025. *Mitigating galaxy clustering systematics with machine learning to learn about dark energy with LSST*. Seminar talk, Stony Brook University, Stony Brook, NY.

July 2023. *What's in a training sample?: Machine learning for photometric redshifts with DC2*. Plenary talk: July 2023 Dark Energy Science Collaboration Meeting, Palo Alto, CA.

Spring 2023. *Improved Tomographic Binning of 3x2pt Lens Samples: Neural Network Classifiers and Optimal Bin Assignments*. Invited talk: Princeton Galread, Princeton, NJ.

Contributed Presentations

Moskowitz, I., Gawiser E., *Mitigating Cosmological Parameter Bias from 3x2pt Systematics: Augmented photo-z training samples and optimal bin assignments*, iPoster: 245th Meeting of the AAS, National Harbor, MD. January 2025

Moskowitz, I., *Mitigating photo-z systematics for the 3x2pt method* Talk: Cosmology on the Beach, Playa del Carmen, Mexico. December 2024.

Moskowitz, I., Eric Gawiser, John Franklin Crenshaw, Brett Andrews, Alex Malz, Sam Schmidt. *Improving Photometric Redshift Estimates with Training Sample Augmentation.* Poster: July 2024 Dark Energy Science Collaboration Meeting, Zurich, Switzerland. July 2024.

Moskowitz, I. *Mitigating 3x2pt Systematics: Augmented Photo-z Training Samples and Optimal Tomographic Binning.* Talk: Cosmo21: Statistical Challenges in 21st Century Cosmology, Chania, Greece. May 2024.

Moskowitz, I. *Measuring Distances to 10 Billion Galaxies*. Talk contributed to The Hammers and the Nails: Connecting Data Scientists with Domain Experts workshop, Piscataway, NJ. April 2024.

Moskowitz, I, Eric Gawiser, John Franklin Crenshaw. *Improving Photometric Redshifts for LSST with Training Sample Augmentation.* Poster: 243rd Meeting of the American Astronomical Society, New Orleans, LA. January 2024.

Moskowitz, I. *Using Neural Network Classifiers and Optimal Bin Assignments to Improve Tomographic Redshift Binning of 3x2pt Galaxy Samples.* Oral presentation: 241st Meeting of the American Astronomical Society, Seattle, WA. January 2023.

Moskowitz, I., Eric Gawiser. *Improved Tomographic Binning of 3x2pt Galaxy Samples: Neural Network Classifiers, Optimal Bin Assignments, and Cosmological Parameter Biases.* Poster: 241st Meeting of the American Astronomical Society, Seattle, WA. January 2023.

Moskowitz, I., Liliya Williams. *Line of Sight Structure and the Deviations from the Fundamental Surface of Quads in Multi-Lens Plane Systems.* Poster: 235th Meeting of the American Astronomical Society, Honolulu, HI., January 2020.

Teaching Experience

Spring 2021	**Physics 342: Principles of Astrophysics**, Teaching Assistant	*Rutgers University*
Fall 2020	**Physics 205: General Physics Laboratory**, Teaching Assistant	*Rutgers University*
Spring 2020	**Astronomy 1001: Exploring the Universe**, Teaching Specialist	*University of Minnesota*
Fall 2019	**Astronomy 1001: Exploring the Universe**, Teaching Specialist	*University of Minnesota*
Spring 2018	**Astronomy 1001: Exploring the Universe**, Teaching Assistant	*Universiy of Minnesota*
Fall 2017	**Astronomy 1001: Exploring the Universe**, Teaching Assistant	*University of Minnesota*

Mentoring

2023-2024	**Joseph Santos**, Undergraduate Research Assistant, Rutgers University	*Near-Peer Mentor Program*

Outreach & Professional Development

Service and Outreach

2025 - present	**Dark Energy Science Collaboration Speakers Bureau**, co-chair
2025-present	**Dark Energy Science Collaboration Council**, member
2025	**Rutgers Graduate Admissions Committee**,
2023-2024	**Graduate Student Organization**, Mock Qualifier co-organizer
2022-present	**New Brunswick Health Science and Technology High School**, Part of a group of Rutgers Physics and Astronomy faculty and graduate students making monthly visits to physics classes. We complement the classroom curriculum with hands-on demonstrations of physics concepts.
2022-2023	**Astronomy Journal Club**, Co-organizer
2021-2022	**Nature thru Nurture**, Monthly visits to New Brunswick High School to reinforce physics learning through hands-on and small group demonstrations. Done in collaboration with the Nature thru Nurture after school program.

Development

Michigan Cosmology Summer School 2023

La Serena School of Data Science 2021

The Hammers and the Nails: Connecting Data Scientists with Domain Experts

Professional Memberships

American Astronomical Society