Isabelle Goldstein, Ph.D

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Education

Brown University — Providence, RI USA
Doctor of Philosophy, Physics — 2018–2023
Master of Science, Physics — 2020

– Advisor: Savvas Koushiappas, PhD

Carnegie Mellon University — Pittsburgh, PA USA
Bachelor of Science, Physics — 2014–2018

Publications

1. "Scaling Relations for Dark Matter Halos Hosting Ultra-Faint Dwarf Galaxies"
   Levi K. C. Fisher, **Isabelle S. Goldstein**, Jason Kumar, Louis E. Strigari
   arXiv:2501.11138

2. "Kinematics of the Sagittarius Dwarf Spheroidal core: A 5D Analysis for a 6D Methodology with Gaia DR3"
   Isabelle S. Goldstein, Louis E. Strigari
   Mon Not R Astron Soc (2025) 1016-1027

3. "Viability of ultralight bosonic dark matter in dwarf galaxies"
   Isabelle S. Goldstein, Savvas M. Koushiappas, and Matthew G. Walker
   Phys. Rev. D 106, 063010 (2022)

4. "Could the 2.6 $M_\odot$ object in GW190814 be a primordial black hole?"
   Kyriakos Vattis, **Isabelle S. Goldstein**, and Savvas M. Koushiappas
   Phys. Rev. D 102, 061301(R) (2020)

Research Experience

Texas A&M University
Postdoctoral Researcher with Dr. Louis Strigari — 2023–Present

– Research focus on dark matter in dwarf galaxies using stellar kinematics.
– Worked with data from the Gaia space observatory.

Brown University
Graduate Student Research Assistant with Dr. Savvas Koushiappas — 2018–2023

– Experience in cosmology, astroparticle physics, axion-like dark matter, dwarf galaxy dynamics and primordial black holes.
– Coding fluency in Python, Fortran 90, C++, and Cluster high performance computing.

Carnegie Mellon University
Undergraduate Research Assistant with Dr. Matthew Walker — 2017–2018

– Examined the strength of standard dwarf galaxy detection methods using gamma ray data with stellar data from the Sloan Digital Sky Survey and Pan-STARRS.

Lawrence Berkeley National Labs
Assistant Researcher with the DESI and BOSS collaborations — Summer 2016

– Tested ultra faint spectra sky subtraction by integrating the Spectroperfectionism method into DESI and BOSS data analysis pipelines.

Carnegie Mellon University
Undergraduate Student Research Assistant with Dr. Shirley Ho 2015–2016

– Dark matter and galaxy cross correlation bias for redshift dependance.

Research Interests

My research interests lie in astrophysics and cosmology, particularly in the intersection between theory and observation. My previous work has focused on dark matter searches, as well as the large scale structure of dark matter in contrast to baryonic matter. I am interested in studying local group astrophysics to learn about the dark and light sector.

Mentoring Experience

LaVena Tilger, Texas A&M University Undergraduate Student 2025-Present
Mentored in usage of Gaia data, analysis methods, and writing a paper.

Angelica Whisnant, Ohio State University Graduate Student 2025-Present
Mentored in running Jeans analysis code and analyzing results.

Kaitlin Webber, Texas A&M University Graduate Student 2023-Present
Mentored while writing a paper.

Levi K. C. Fisher, University of Hawai'i Undergraduate Student 2024-2025
Mentored in running Jeans analysis code, analyzing results, and writing a paper.

Teaching Experience

Center for the Integration of Research, Teaching & Learning at Texas A&M
An Introduction to Evidence-Based Undergraduate Teaching Certificate Fall 2024

Brown University
Lab Instructor, PHYS 0470 Electricity and Magnetism Fall 2018, 2019, 2020

– Course Instructor: Dr. Savvas Koushiappas
Number supervised: 22, 24, 32

Lab Instructor, PHYS 0060 & 0160 Spring 2019

– Course Instructor: Dr. Meenakshi Narain
Number supervised: 15

Lab Instructor, PHYS 0220 Astronomy Spring 2020

– Course Instructor: Dr. Jonathan Pober
Number of students: 200

Course Teaching Assistant, PHYS 0070 Analytical Mechanics Spring 2021

– Course Instructor: Dr. James Valles
Number of students: 85

Scholarships and Awards

- Physics Merit Fellowship
  Brown University Department of Physics 2022-2023
- Award of Excellence as a Graduate Teaching Assistant
  Brown University Department of Physics, PHYS 0070 2021
- RI Space Grant Graduate Fellow with the NASA RI Space Grant Consortium 2021
- National Science Foundation Graduate Research Fellowship Program Honorable Mention 2020
- Associate Member of Sigma Xi Scientific Research Honors Society
  Brown University Chapter, Elected to Membership 2020
- Award of Excellence as a Graduate Teaching Assistant
  Brown University Department of Physics, PHYS 0470 2018
- Senior Leadership Recognition Award
  Carnegie Mellon University Department of Physics 2018
- NASA Pennsylvania Space Grant
  Investigating the CMB lensing potential: stacking with galaxies and gamma radiation density 2015
- H. Joseph Gerber Medal of Excellence
  Connecticut Academy of Science and Engineering 2014
- CERN Special Award at the Intel International Science and Engineering Fair
  European Organization for Nuclear Research 2014

Seminars & Colloquiua

Yale University, Astrophysics Seminar
Title: *Kinematics of the Sagittarius Dwarf Spheroidal core: A 5D Analysis for a 6D Methodology with Gaia DR3* 2025

University of Oklahoma, High Energy Seminar
Title: *Constraining dark matter density profiles with dwarf galaxy kinematics: the 2D and the 6D story* 2025

Conferences

Conference Presentations or Posters

iPoster presented at the Roman Symposium: Cosmic Cartography with Roman, STScI 2025
Title: *A Kinematic Analysis of the Sagittarius Dwarf Spheroidal Core: A 5D Analysis for a 6D Methodology*

Poster presented at Galactic Frontiers II, Dartmouth College 2025
Title: *A Kinematic Analysis of the Sagittarius Dwarf Spheroidal Core: A 5D Analysis for a 6D Methodology*

Talk presented at the Center for Theoretical Underground Physics and Related Areas 2025
Title: *Kinematics of the Sagittarius Dwarf Spheroidal Core: A 5D Analysis for a 6D Methodology with Gaia DR3*

Talk presented at the Virgo Consortium Workshop, University of Sussex, UK 2025
Title: *Constraining Dwarf Galaxy Dark Matter Distributions: Spherical Jeans Analyses for 3D Velocity Data*

Poster presented at Small Galaxies, Cosmic Questions II, Durham University, UK 2024
Title: *Constraining Dwarf Galaxy Dark Matter Distributions: Spherical Jeans Analyses for 3D Velocity Data*

Talk presented at the Center for Theoretical Underground Physics and Related Areas 2024
Title: *Constraining Dwarf Galaxy Dark Matter Distributions: Spherical Jeans Analyses for Line-of-Sight and 3D Velocity Data*

iPoster presented at 243rd annual meeting of the American Astronomical Society 2024
Title: *The Viability Of Ultralight Bosonic Dark Matter In Dwarf Galaxies*

iPoster presented at 243rd annual meeting of the American Astronomical Society 2024
Title: *The Viability Of Ultralight Bosonic Dark Matter In Dwarf Galaxies*

Talk presented at the Theoretical Astroparticle and Cosmology Symposium in Texas, Rice University 2023
Title: *The Viability Of Ultralight Bosonic Dark Matter In Dwarf Galaxies*

Poster presented at Essential Cosmology for the Next Generation 2016
Title: *Cross correlations of the CMB lensing potential and Sloan Digital Sky Survey galaxies*

Conferences Organized

LOC Co-chair for the Mitchell Conference on Collider, Dark Matter, and Neutrino Physics 2025
Texas A&M University

LOC Co-chair for Texas A&M Astrosymposium 2024, 2025
Texas A&M University

LOC graduate student organizer for the Conference for Undergraduate Women in Physics 2022
Brown University, *Cancelled due to Covid-19*

Conferences Attended

LSST Dark Matter Workshop, Kavli Institute for Cosmological Physics at the University of Chicago 2019

Summer School on Cosmology, International Centre for Theoretical Physics 2016

Additional Experience

Community outreach

- Texas A&M Postdoc-Graduate Mentorship Program Mentor 2023-Present
- Guest speaker at the Urban Assembly School for Emergency Management (NYC, NY) 2022
  Pursuing STEM in undergraduate and graduate level education
- Pittsburgh Glass Center teaching assistant for community glassblowing classes and demonstrations 2015–2018