Lina Necib

Curriculum Vitae

Kavli Institute for Astrophysics and Space Research
Massachusetts Institute of Technology
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Degrees

PhD in Theoretical Particle Physics – Massachusetts Institute of Technology 2012 – 2017
Advisor: Prof. Jesse Thaler

B.A. in Physics and Mathematics – Boston University 2008 – 2012

Employment

Associate Professor of Physics 2026– Present
Massachusetts Institute of Technology

Assistant Professor of Physics 2021– 2026
Massachusetts Institute of Technology
Maternity Leave: Spring 2021, Spring 2024

Postdoctoral Fellow 2020– 2021
Carnegie Observatories

University of California Presidential Fellow 2020– 2020
University of California, Irvine

Sherman Fairchild Postdoctoral Fellow 2017 – 2020
California Institute of Technology

Honors

Committed to Caring Mentoring Award 2025-2027
MIT Office of Graduate Education

NSF CAREER Award 2024
National Science Foundation

Sloan Fellowship 2024
Sloan Foundation

George E. Valley, Jr. Prize 2023
American Physical Society

University of California Presidential Fellowship 2020
University of California Irvine

Carnegie Observatories Postdoctoral Fellowship 2020
Carnegie Observatories

Sherman Fairchild Postdoctoral Fellowship 2017
California Institute of Technology

Sergio Vazquez Prize 2016
Massachusetts Institute of Technology

Praecis Presidential Graduate Fellowship 2012
Massachusetts Institute of Technology

Alumni Prize for Excellence in Physics 2012
Boston University

Phi Beta Kappa 2012
Boston University

College Scholar 2011
Boston University

Dean's List 2009-2012
Boston University

Mentoring

High School Students

- *Michael Huang*, (RSI) Summer 2022 & Fall 2022, Graduated: Spring 2023.
  After Graduation: Undergraduate student at MIT.
- *Celine Housna*, (RSI) Summer 2024.
- *Angie Zaatari*, (RSI) Summer 2025.

Undergraduate Students

- *Kate Habich*, (UROP - Wellesley) Fall 2021, Graduated: Spring 2022.
- *Peter M Berggren*, (UROP) Spring 2022 & Summer 2022, Graduated: Spring 2025.
- *Hang Su*, (MSRP) Summer 2022-Spring 2023, Graduated: Spring 2023.
  After Graduation: Graduate student at the University of Michigan.
- *Marina Malta Nogueira*, (UROP) Spring 2023, Expected graduation: Spring 2026.
- *Zeineb Mezghanni*, (MSRP) Summer 2023-Spring 2025, Graduated: Spring 2025.
  After Graduation: Graduate student at MIT.
- *Anna Orgel*, (UROP) Summer 2023, Graduated: Spring 2025.
- *Hanna Chen*, (UROP) Summer 2023-Fall 2023, Expected graduation: Spring 2026.
- *Charlotte Myers*, (UROP) Fall 2024-Spring 2025, Expected graduation: Spring 2027.
- *Alpha Andrew Pham*, (UROP) IAP 2025-IAP 2026, Expected graduation: Spring 2028.
- *Jason Zhang*, (UROP) Spring 2025-Summer 2025, Expected graduation: Spring 2028.
- *Andreas Thoyas*, (Northeastern University) Spring 2025-Summer 2026, Expected graduation: Spring 2027.
- *Amir Abdulgadir*, (MSRP) Summer 2025, Expected graduation: Spring 2028.
- *Guangyuan Leon Chen*, (UROP) Spring 2026-Summer 2026, Expected graduation: Spring 2029.
- *Jaylee Bouwhuis*, (UROP) Spring 2026, Expected graduation: Spring 2029.
- *Jailee Young*, (UROP) Spring 2026-Summer 2026, Expected graduation: Spring 2029.
- *Mark Gaskins*, (MSRP) Summer 2026, Expected graduation: Spring 2028.

PhD Students

- *Tri Nguyen*, 2019 - 2024. "Decoding Dark Matter Halos through the lens of Machine Learning."
  After MIT: CIERA Fellow at Northwestern University.

- *Xiaowei Ou*, 2020 - 2025. "Understanding the Milky Way with Stars."
  After MIT: GECO/Cosmic AI Fellow at the University of Virginia.
- *Xiuyuan Zhang*, 2021 - 2027 (Expected). "Probing the nature of Dark Matter"
- *Abdelaziz Hussein*, 2022 - 2027 (Expected). "The Dark Matter Distribution at the Center of Galaxies"
- *Zeineb Mezghanni*, 2025 - 2030 (Expected).
- *Daria Zaremba*, 2026 - 2031 (Expected).

Postdoctoral Associates

- *Dr. Nora Shipp*, Fall 2021-Summer 2023.
  After MIT: NSF Fellowship at CMU (2023-2024),
  Assistant Professor at the University of Washington starting 2024.
- *Dr. Nathaniel Starkman*, Brinson Prize Fellow, Fall 2024 - Present.
- *Dr. Elliot Davies*, Fall 2025 - Present.
- *Dr. Gonzalo Herrera*, NTN Fellow Fall 2025 - Present.
- *Dr. Isabel Sands*, MIT School of Science Fellowship Fall 2026 - Present.

Teaching Experience

8.05, Quantum Mechanics II, Recitation Instructor	Fall 2026
8.012, Physics I, Recitation Instructor	Fall 2025
8.01L, Physics I, Recitation Instructor	
8.012, Physics I, Lecturer	Fall 2024
8.012, Physics I, Lecturer	Fall 2023
8.012, Physics I, Lecturer	Fall 2022
8.012, Physics I, Recitation Instructor	Fall 2021

Service

Internal Service

IAIFI Fellowship Selection Committee (*Chair*)	Fall 2026
IAIFI Fellowship Selection Committee	Fall 2025
Pappalardo Fellowship Selection Committee	Fall 2025
Thesis Committee Member for: Jeffrey Krupa, MIT	Graduated Summer 2024
Thesis Committee Member for: Alexander Yelland, MIT	In progress
Thesis Committee Member for: Alexandra Klipfel, MIT	In progress
Thesis Committee Member for: Fatima Zaidouni, MIT	In progress
Speaker at MITCOBx	Spring 2025
Panelist for Laureates & Leaders Faculty Admission Panel	Fall 2024, Fall 2025
Panelist for MISTI	Fall 2023, Fall 2024
Astronomy Colloquium Organizer	Fall 2023, Spring 2024, Fall 2024
PhysPop Orientation	Fall 2023, Fall 2024, Fall 2025
Written Exam committee member	Spring 2023, Fall 2023, Fall 2024
Graduate Admissions committee member	Winter 2023, 2024, 2025
Barrett Prize committee member	Spring 2022
Attended Commencement	Spring 2022, Spring 2025, Spring 2026
Public Engagement Committee at IAIFI (*Chair*)	Summer 2022-Spring 2025

External Service

Grant Reviews

Panelist for the Department of Energy (DOE) High Energy Comparative Review	Fall 2026
Panelist for the German Research Foundation (DFG)	Fall 2026
Panelist for the Austrian Science Fund (FWF)	Spring 2026
Panelist for the Department of Energy (DOE) Early Career Award	Spring 2025
Panelist for the Swiss National Science Foundation	Spring 2025
Panelist for the Dutch Research Council	Spring 2024
Panelist on University Research Fellowships (URF)	Spring 2023
Panelist on ERC Grant	Spring 2022
Panelist on DOE Grant	Spring 2022
Panelist on NSF CAREER Grant	Fall 2021

Panels

Panelist for Future Faculty Fellowship Symposium at Princeton	Spring 2023

Meeting Organization

KITP workshop, Probing Dark Matter with Innovations in Stellar and Galactic Dynamics	Summer 2027
Charting the Dark (Sousse, Tunisia)	Summer 2027
Dark Matter and Stars (MIT)	Summer 2027
Lighting up the Dark: Understanding Dark Matter from Particles to Galaxies (Sexten, Italy)	Spring 2027
Boston-Area Workshop on Machine Learning	Fall 2024
Aspen Summer Conference 2024 Workshop on Machine Learning	Spring 2024
Generative AI Meeting at MIT/Harvard, January 2024	Fall 2023
FIRE Collaboration PI Meeting	Summer 2023
Gaia Hackathon	Summer 2022, IAP 2025, IAP 2026

Paper Referee

Referee for the Open Journal of Astrophysics	Since 2026
Referee for the Journal of Undergraduate Research in Physics & Astronomy	Since 2026
Referee for the Astronomy and Computing Journal	Since 2022
Referee for the Astrophysical Journal Letters (ApJL)	Since 2021
Referee for Journal of Cosmology and Astroparticle Physics (JCAP)	Since 2021
Referee for Monthly Notices of the Royal Astronomical Society (MNRAS)	Since 2018
Referee for Physical Review Letters (PRL)	Since 2018
Referee for Journal of High Energy Physics (JHEP)	Since 2018
Referee for Physical Review D (PRD)	Since 2017

International Thesis Committees

Wassim Tenachi, Université de Strasbourg, France	Summer 2024

Public Engagement

Education

Keynote Speaker at CU*IP, New York University	Winter 2025
Speaker at Cafe STEAM, International School of Boston	Winter 2024
Keynote Speaker at the Future Faculty Fellowship Symposium at Princeton	Spring 2023
Introducing Galaxy Zoo to K12 and educators	Spring 2023, Spring 2025

Lecturer for Warrior Scholar Project — Summer 2022
Luncheon with CCNY Physics Club — Spring 2022
Skype a Scientist — Spring 2020

Podcasts

Ga3da Falakia, Tunisian Podcast — Since Spring 2022
Physics in your native language video series — Fall 2021
Interview with The Cosmic Companion — Summer 2020
Mindscape Podcast with Sean Carroll — Spring 2020

Public Events

Presenting at Museum of Science Planetarium — Summer 2025
Speaker at MITCOBx — Spring 2025
Organized Exhibit at Cambridge Science Festival — Fall 2022, Fall 2023
Panelist for AstroCareers at the Museum of Science — Summer 2022
Astronomy on TAP, Santa Barbara, CA — Spring 2019
"Science on Saturday," Cambridge, MA — Spring 2015

Publications

Necib Group members are underlined. Papers arising from a supervised PhD thesis are indicated with an ∗. Author list in theoretical high energy physics is ordered alphabetically, while that of astronomy is ordered by contribution. For clarity, the lead author is designated by a ‡.

52*) Xiuyuan Zhang‡, Gonzalo Herrera, Andreas Thoyas, **Lina Necib** — Submitted to PRD arXiv:2610.28731
Simulation-Informed High-Velocity Dark Matter in the Effective Theory of Direct Detection

51) Nathaniel Starkman‡, Jacob Nibauer, Sarah Pearson, Sirui Wu, **Lina Necib** — Submitted to ApJ arXiv:2609.40057
When Streams Curve Away: a Test of Dark Matter from Extragalactic Stellar Stream Populations

50) Xiaowei Ou‡, **Lina Necib**, Carolina Cuesta-Lazaro, Paul Torrey, Niusha Ahvazi, Alyson M. Brooks, Berthy T. Feng, Alex M. Garcia, Jiaxuan Li, Jonah C. Rose, Xuejian Shen, Mark Vogelsberger — Submitted to ApJ arXiv:2609.27028
From starlight to dark matter: a stochastic interpolation approach to map dark matter from stellar density

49*) Zeineb Mezghanni‡, Elliot Y. Davies, Adriana Dropulic, Gonzalo Herrera, Abdelaziz Hussein, **Lina Necib** — Submitted to ApJ arXiv:2609.05600
Baryon-Accelerated Core Collapse in SIDM Halos and its Imprint on Galactic Disks

48) Tri Nguyen‡, **Lina Necib**, Ting S. Li, Justin I. Read, Andrés Bañares-Hernández, Claude-André Faucher-Giguère, Kohei Hayashi, Kevin McKinnon, Andrew B. Pace, Nathan R. Sandford, Hao Yang — Submitted to MNRAS arXiv:2606.26218
Dark Matter in Draco and Boötes I: Hints of a Core in an Ultra-Faint Dwarf from Simulation-Based Inference

47) *Euclid Collaboration*, Nathaniel Starkman‡, Jacob Nibauer, Sarah Pearson, Sirui Wu, Michael Walmsley, **Lina Necib**, et al. — Submitted to A&A arXiv:2606.21774
Euclid Quick Data Release (Q1): The geometry of dark matter halos from extragalactic streams

46) Charlotte Myers‡, Nathaniel Starkman, **Lina Necib** — Submitted to ApJ arXiv:2606.18386
Reconstructing Galactic Gravitational Potentials from Stellar Kinematics with Physics-Informed Neural Networks

45) Maya Silverman‡, Abdelaziz Hussein, Arpit Arora, Mariangela Lisanti, Manoj Kaplinghat, **Lina Necib**, Andreas Thoyas, Stephanie O'Neil, Robyn E. Sanderson, Xuejian Shen, Jorge Moreno
Mergers Matter: Gravothermal Collapse in Dwarf Halos with Self-Interacting Dark Matter
Submitted to ApJ
arXiv:2606.02566

44) **Lina Necib**‡, Dylan Folsom, Elliot Y. Davies, Nathaniel Starkman, Andreas Thoyas
Galactic Amnesia: The Information Washout of the Milky Way Merger History
Submitted to ApJ
arXiv:2605.04138

43) Gonzalo Herrera‡, Abdelaziz Hussein, **Lina Necib**, Elliot Y. Davies, Xuejian Shen
Formation and Redshift Evolution of Dark Matter Spikes
Submitted to ApJ
arXiv:2605.01023

42*) Xiuyuan Zhang‡, Andreas Thoyas, **Lina Necib**, Andrew Wetzel, Arpit Arora
Set the Night on FIRE: Building an Empirical Local Dark Matter Velocity Distribution
Submitted to ApJ
arXiv:2603.25783

41) Elliot Y. Davies‡, Adam M. Dillamore, Vasily Belokurov, **Lina Necib**
The erasure of Galactic bar resonances by dark matter subhaloes
Submitted to MNRAS
arXiv:2603.04490

40) Charlotte Myers‡, Nathaniel Starkman, **Lina Necib**
Physics-Informed Neural Networks for Modeling Galactic Gravitational Potentials
NeurIPS
arXiv:2602.01806

39) Tal Shpigel‡, Dylan Folsom, Mariangela Lisanti, **Lina Necib**, Mark Vogelsberger, Lars Hernquist
How to Build an Empirical Speed Distribution for Dark Matter in the Solar Neighborhood
ApJ 1003 no.1, 102
arXiv:2510.21914

38) Dylan Folsom‡, Carlos Blanco, Mariangela Lisanti, **Lina Necib**, Mark Vogelsberger, Lars Hernquist
Dark Matter Velocity Distributions for Direct Detection: Astrophysical Uncertainties are Smaller Than They Appear
PRL 135 no.21, 211004
arXiv:2505.07924

37*) Xiuyuan Zhang‡, **Lina Necib**, Denis Erkal
Darkness in the Crust: Searching for the truly "Dark" Subhalos with Paleo-detectors
JCAP 2609 104
arXiv:2504.13247

36*) Xiaowei Ou‡, **Lina Necib**, Andrew Wetzel, Anna Frebel, Jeremy Bailin, Micah Oeur
Decoding the Galactic Twirl: The Downfall of Milky Way-mass Galaxy Rotation Curves in the FIRE Simulations
ApJ 994 no.1, 128
arXiv:2503.05877

35*) Tri Nguyen‡, Justin I. Read, **Lina Necib**, Siddharth Mishra-Sharma, Claude-André Faucher-Giguère, Andrew Wetzel, Tjitske K. Starkenburg
Trial by FIRE: Probing the dark matter density profile of dwarf galaxies with GraphNPE
MNRAS 541 no. 3, 2707
arXiv:2503.03812

34*) Abdelaziz Hussein‡, **Lina Necib**, Manoj Kaplinghat, Stacy Y. Kim, Andrew Wetzel, Justin I. Read, Martin P. Rey, Oscar Agertz
Theoretical Predictions for the Inner Dark Matter Distribution in the Milky Way Informed by Simulations
Submitted to PRD
arXiv:2501.14868

33) Nora Shipp‡, Alexander Riley, Christine Simpson, Rebekka Bieri, **Lina Necib**, Arpit Arora, Francesca Fragkoudi, Facundo Gomez, Robert J. J. Grand, Federico Marinacci
Auriga Streams II: orbital properties of tidally disrupting satellites of Milky Way-mass galaxies
MNRAS 542, no. 2, 1109
arXiv:2410.09143

32) Adriana Dropulic‡, Nora Shipp, Stacy Kim, Zeineb Mezghanni, **Lina Necib**, Mariangela Lisanti
StreamGen: Connecting Populations of Streams and Shells to Their Host Galaxies
ApJ 990, no. 2, 162
arXiv:2409.13810

31) Dylan Folsom‡, Mariangela Lisanti, **Lina Necib**, Danny Horta, Mark Vogelsberger, Lars Hernquist
Cosmological Simulations of Stellar Halos with Gaia Sausage-Enceladus Analogs: Two Sausages, One Bun?
ApJ 983 no. 2, 119
arXiv:2408.02723

30) Cian Roche‡, **Lina Necib**, Tongyan Lin, Xiaowei Ou, Tri Nguyen
The Escape Velocity Profile of the Milky Way from Gaia DR3
ApJ 972 no. 1, 70
arXiv:2402.00108

29*) Tri Nguyen‡, Xiaowei Ou‡, Nondh Panithanpaisal, Nora Shipp, **Lina Necib**, Robyn Sanderson, Andrew Wetzel
Synthetic Gaia DR3 surveys from the FIRE cosmological simulations of Milky-Way-mass galaxies
ApJ 966 no. 1, 108
arXiv:2306.16475

28*) Xiaowei Ou‡, Anna-Christina Eilers, **Lina Necib**, Anna Frebel
The Dark Matter Profile of the Milky Way Inferred from its Circular Velocity Curve
MNRAS 528 no. 1, 693
arXiv:2303.12838

27) David Shih‡, Matthew Buckley, **Lina Necib**
Via Machinae 2.0: Full-Sky, Model-Agnostic Search for Stellar Streams in Gaia DR2
MNRAS 529, no. 4, 4745
arXiv:2303.01529

26) Shuyu Wang‡, **Lina Necib**, Alexander P. Ji, Xiaowei Ou, Mariangela Lisanti, Mithi A.C. de los Reyes, Allison L. Strom, Mimi Truong
High-Resolution Chemical Abundances of the Nyx Stream
ApJ 955 no. 2, 129
arXiv:2210.15013

25*) Tri Nguyen‡, Siddharth Mishra-Sharma, Reuel Williams, **Lina Necib**
Uncovering dark matter density profiles in dwarf galaxies with graph neural networks
PRD 107 no.4, 043015
arXiv:2208.12825

24) Nora Shipp‡, Nondh Panithanpaisal, **Lina Necib**, Robyn Sanderson, Denis Erkal, Ting S. Li, Isaiah B. Santistevan, Andrew Wetzel, Lara R. Cullinane, Alexander P. Ji, Sergey E. Koposov, Kyler Kuehn, Geraint F. Lewis, Andrew B. Pace, Daniel B. Zucker, Joss Bland-Hawthorn, Emily C. Cunningham, Stacy Y. Kim, Sophia Lilleengen, Jorge Moreno, Sanjib Sharma
Streams on FIRE: Populations of Detectable Stellar Streams in the Milky Way and FIRE
ApJ 949 no.2, 44
arXiv:2208.02255

23*) Xiaowei Ou‡, **Lina Necib**, Anna Frebel
Robust Clustering of the Local Milky Way Stellar Kinematic Substructures with Gaia eDR3
MNRAS 521 no.2, 2623
arXiv:2208.01056

22) Xuejian Shen‡, Philip F. Hopkins, **Lina Necib**, Fangzhou Jiang, Michael Boylan-Kolchin, Andrew Wetzel
Dissipative Dark Matter on FIRE: II. Observational signatures and constraints from local dwarf galaxies
ApJ 966 no.1, 131
arXiv:2206.05327

21) David Shih‡, Matthew R. Buckley, **Lina Necib**, John Tamanas
Via Machinae: Searching for Stellar Streams using Unsupervised Machine Learning
MNRAS 509 no.4, 5992
arXiv:2104.12789

20) Xuejian Shen‡, Philip F. Hopkins, **Lina Necib**, Fangzhou Jiang, Michael Boylan-Kolchin, Andrew Wetzel
Dissipative Dark Matter on FIRE: I. Structural and kinematic properties of dwarf galaxies
MNRAS 506 no.3, 4421
arXiv:2102.09580

19) **Lina Necib**‡, Tongyan Lin
Substructure at High Speed II: The Local Escape Velocity and Milky Way Mass with Gaia eDR3
ApJ 926 no.2, 189
arXiv:2102.02211

18) **Lina Necib**‡, Tongyan Lin
Substructure at High Speed I: Inferring the Escape Velocity in the Presence of Kinematic Substructure
ApJ 926 no.2, 188
arXiv:2102.01704

17) Laura J. Chang‡, **Lina Necib**
Dark Matter Density Profiles in Dwarf Galaxies: Linking Jeans Modeling Systematics and Observation.
MNRAS 507 no.4, 4715
arXiv:2009.00613

16) Joshua Berger‡, Yanou Cui, Mathew Graham, **Lina Necib**, Gianluca Petrillo, Dane Stocks, Yun-Tse Tsai, Yue Zhao.
Prospects for Detecting Boosted Dark Matter in DUNE through Hadronic Interactions.
PRD 103 no.9, 095012
arXiv:1912.05558

15) **Lina Necib**‡, Bryan Ostdiek, Mariangela Lisanti, Timothy Cohen, Marat Freytsis, Shea Garrison-Kimmel.
Chasing Accreted Structures within Gaia DR2 using Deep Learning.
ApJ 903 no.1, 25
arXiv:1907.07681

14) **Lina Necib**‡, Bryan Ostdiek, Mariangela Lisanti, Timothy Cohen, Marat Freytsis, Shea Garrison-Kimmel, Philip F. Hopkins, Andrew Wetzel, Robyn Sanderson.
Evidence for a Vast Prograde Stellar Stream in the Solar Vicinity.
Nature Astronomy 4, 1078
arXiv:1907.07190

13) Bryan Ostdiek‡, **Lina Necib**, Timothy Cohen, Marat Freytsis, Mariangela Lisanti, Shea Garrison-Kimmel, Andrew Wetzel, Robyn E. Sanderson, Philip F. Hopkins.
Cataloging Accreted Stars within Gaia DR2 using Deep Learning.
A&A 636 A75
arXiv:1907.06652

12) **Lina Necib**‡, Mariangela Lisanti, Shea Garrison-Kimmel, Andrew Wetzel, Robyn Sanderson, Philip F. Hopkins, Claude-André Faucher-Giguère, Dušan Kereš.
Under the FIRElight: Stellar Tracers of the Local Dark Matter Velocity Distribution in the Milky Way.
ApJ 883 no.1, 27
arXiv:1810.12301

11) **Lina Necib**‡, Mariangela Lisanti, Vasily Belokurov.
Inferred Evidence for Dark Matter Kinematic Substructure with SDSS-Gaia.
ApJ 874 no.1, 3
arXiv:1807.02519

10) Frédéric A. Dreyer‡, **Lina Necib**, Gregory Soyez, Jesse Thaler.
Recursive Soft Drop.
JHEP 1806 093/arXiv:1804.03657

9) Jonah Herzog-Arbeitman, Mariangela Lisanti, **Lina Necib**‡.
The Metal-Poor Stellar Halo in RAVE-TGAS and its Implications for the Velocity Distribution of Dark Matter.
JCAP 1804 052/arXiv:1708.03635

8) Gordan Krnjaic‡, Pedro A. N. Machado, **Lina Necib**.
Distorted Neutrino Oscillations from Time Varying Cosmic Fields.
PRD 97 no.7, 075017
arXiv:1705.06740

7) Jonah Herzog-Arbeitman, Mariangela Lisanti, Piero Madau, **Lina Necib**‡.
Empirical Determination of Dark Matter Velocities using Metal-Poor Stars.
PRL 120 no.4, 041102
arXiv:1704.04499

6) **Lina Necib**‡, Jarrett Moon, Taritree Wongjirad, Janet Conrad.
Boosted Dark Matter at Neutrino Experiments.
PRD 95 no.7, 075018
arXiv:1610.03486

5) Ian Moult, **Lina Necib**‡, Jesse Thaler.
New Angles on Energy Correlation Functions.
JHEP 1612 153
arXiv:1609.07483

4) Mariangela Lisanti, Siddharth Mishra-Sharma‡, **Lina Necib**, Benjamin R. Safdi.
Deciphering Contributions to the Extragalactic Gamma-Ray Background from 2 GeV to 2 TeV.
ApJ 832 no.2, 117
arXiv:1606.04101

3) Nicolas Bernal, **Lina Necib**‡, Tracy R. Slatyer.
Spherical Cows in Dark Matter Indirect Detection.
JCAP 1612 no. 030
arXiv:1606.00433

2) Nayara Fonseca, **Lina Necib**‡, Jesse Thaler.
Dark Matter, Shared Asymmetries, and Galactic Gamma Ray Signals.
JCAP 1602, no. 052
arXiv:1507.08295

1) Kaustubh Agashe, Yanou Cui, **Lina Necib**‡, Jesse Thaler.
(In)direct Detection of Boosted Dark Matter.
JCAP 1410, no. 062
arXiv:1405.7370

N-th Author Papers

29) Xiaowei Ou, Andrew B. Pace, Nitya Kallivayalil, Amery Gration, Christopher T. Garling, Nathan R. Sandford, **Lina Necib**, Niusha Ahvazi, Andres Almeida, Kaia R. Atzberger, Yanbo Pan, Jack T. Warfield
From observing strategies to velocity dispersion bias: forward modeling unresolved binaries in ultra-faint dwarf galaxies
Submitted to ApJ
arXiv:2609.19407

28) Emma Tasso, Madeline Lucey, Robyn Sanderson, Aritra Kundu, **Lina Necib**
The Dynamics of Old Inner Galaxy Stars in Milky Way-mass Galaxies Using FIRE-2 Simulations
MNRAS 550 no. 1, stag1139
arXiv:2606.16079

27) Lucas S. Mandacarú Guerra, Stephanie O'Neil, Mariangela Lisanti, Sandip Roy, Robyn Sanderson, Aritra Kundu, Arpit Arora, **Lina Necib**, Nora Shipp, Xuejian Shen
Probing Atomic Dark Matter with Stellar Streams in Milky Way-mass Galaxies
ApJ 1009 no. 1, 76
arXiv:2603.20367

26) Ethan Lilie, Jonah C. Rose, Mariangela Lisanti, Alex M. Garcia, Paul Torrey, Kassidy E. Kollmann, Jiaxuan Li, Olivia Mostow, Bonny Y. Wang, Stephanie O'Neil, Xuejian Shen, Alyson M. Brooks, Arya Farahi, Nitya Kallivayalil, **Lina Necib**, Andrew B. Pace, Mark Vogelsberger
The DREAMS Project: Disentangling the Impact of Halo-to-Halo Variance and Baryonic Feedback on Milky Way Dark Matter Speed Distributions
ApJ 1002 no. 2, 168
arXiv:2512.04157

25) Alex M. Garcia, Jonah C. Rose, Paul Torrey, Andrea Caputo, Mariangela Lisanti, Andrew B. Pace, Hongwan Liu, Abdelaziz Hussein, Haozhe Liu, Francisco Villaescusa-Navarro, John Barry, Ilem Leisher, Belen Costanza, Jonathan Kho, Ethan Lilie, Jiaxuan Li, Niusha Ahvazi, Aklant Bhowmick, Tri Nguyen, Stephanie O'Neil, Xiaowei Ou, Xuejian Shen, Arya Farahi, Nitya Kallivayalil, **Lina Necib**, Mark Vogelsberger
The DREAMS Project: Disentangling the Impact of Halo-to-Halo Variance and Baryonic Feedback on Milky Way Dark Matter Density Profiles
ApJ 1002 no. 1, 8
arXiv:2512.03132

24) Jonah C. Rose, Mariangela Lisanti, Paul Torrey, Francisco Villaescusa-Navarro, Alex M. Garcia, Arya Farahi, Carrie Filion, Alyson M. Brooks, Nitya Kallivayalil, Kassidy E. Kollmann, Ethan Lilie, Jiaxuan Li, Olivia Mostow, Akaxia Cruz, Tri Nguyen, Sandip Roy, Andrew B. Pace, Niusha Ahvazi, Stephanie O'Neil, Xuejian Shen, Francis-Yan Cyr-Racine, Adrian M. Price-Whelan, Marla Geha, **Lina Necib**, Mark Vogelsberger, Julian B. Muñoz, Julianne J. Dalcanton
The DREAMS Project: Disentangling the Impact of Halo-to-Halo Variance and Baryonic Feedback on Milky Way Satellite Galaxies
ApJ 1006 no. 2, 244
arXiv:2512.02095

23) Isabel S. Sands, Philip F. Hopkins, Sam B. Ponnada, Dusan Keres, **Lina Necib**, Yen-Hsing Julius Lin
Galactic Center Gamma-Ray Emission in MHD Galaxy Formation Simulations with Full Cosmic Ray Spectra
Submitted to ApJ
arXiv:2509.18351

22) Andrew Wetzel, Jenna Samuel, ..., **Lina Necib**, et al.
Second public data release of the FIRE-2 cosmological zoom-in simulations of galaxy formation
Preprint
arXiv:2508.06608

21) Micah Oeur, Sarah R. Loebman, Adrian M. Price-Whelan, Arpit Arora, **Lina Necib**, Danny Horta
OTI on FIRE: Testing the Efficacy of Orbital Torus Imaging to Recover the Galactic Potential
ApJ 993, no. 1, 29
arXiv:2505.05590

20) Maria C. Straight, Michael Boylan-Kolchin,..., **Lina Necib**, et al.
Central densities of dark matter haloes in FIRE-2 simulations of low-mass galaxies with cold dark matter and self-interacting dark matter
MNRAS 543, no. 3, 1995
arXiv:2501.16602

19) Francisco J. Mercado, Jorge Moreno,..., **Lina Necib**, et al.
Effects of Galactic Environment on Size and Dark Matter Content in Low-mass Galaxies
ApJ 983, no. 2, 93
arXiv:2501.04084

18) Tri Nguyen, Francisco Villaescusa-Navarro,..., **Lina Necib**, et al.
How DREAMS are made: Emulating Satellite Galaxy and Subhalo Populations with Diffusion Models and Point Clouds
ApJ 997 no. 2, 336
arXiv:2409.02980

17) Arpit Arora, Robyn E. Sanderson, Sukanya Chakrabarti, Andrew Wetzel, Thomas Donlon II, Danny Horta, Sarah R. Loebman, **Lina Necib**, Micah Oeur
The imprint of dark matter on the Galactic acceleration field
ApJ 974, no. 2, 223
arXiv:2406.12957

16) Jonah C. Rose, Paul Torrey,..., **Lina Necib**, et al.
Introducing the DREAMS Project: DaRk mattEr and Astrophysics with Machine learning and Simulations
ApJ 982, no. 2, 68
arXiv:2405.00766

15) Isabel S. Sands, Philip F. Hopkins, Xuejian Shen, Michael Boylan-Kolchin, James Bullock, Claude-André Faucher-Giguère, Francisco J. Mercado, Jorge Moreno, **Lina Necib**, Xiaowei Ou, Sarah Wellons, Andrew Wetzel
Confronting the Diversity Problem: The Limits of Galaxy Rotation Curves as a tool to Understand Dark Matter Profiles
ApJ 1000, no.1, 127
arXiv:2404.16247

14*) Xiaowei Ou, Anirudh Chiti, Nora Shipp, Joshua D. Simon, Marla Geha, Anna Frebel, Mohammad K. Mardini, Denis Erkal, **Lina Necib**
Signatures of Tidal Disruption of the Hercules Ultrafaint Dwarf Galaxy
ApJ 966, no.1, 33
arXiv:2403.00921

13) Danny Horta, Emily C. Cunningham, Robyn E. Sanderson, Kathryn V. Johnston, Alis Deason, Andrew Wetzel, Fiona McCluskey, Nicolas Garavito-Camargo, **Lina Necib**, Claude-André Faucher-Giguère, Arpit Arora, Pratik J. Gandhi
The proto-galaxy of Milky Way-mass haloes in the FIRE simulations
MNRAS 527, no.4, 9810
arXiv:2307.15741

12) Danny Horta, Emily C. Cunningham, Robyn E. Sanderson, Kathryn V. Johnston, Nondh Panithanpaisal, Arpit Arora, **Lina Necib**, Andrew Wetzel, Jeremy Bailin, Claude-André Faucher-Giguère — ApJ 943, no.2, 158 arXiv:2211.05799
The observable properties of galaxy accretion events in Milky Way-like galaxies in the FIRE-2 cosmological simulations

11) Henrique Reggiani, Alexander P. Ji, Kevin C. Schlaufman, Anna Frebel, **Lina Necib**, Tyler Nelson, Keith Hawkins, Jhon Yana Galarza — AJ 163, no. 6 252 arXiv:2203.16364
The Chemical Composition of Extreme-Velocity Stars

10) Arka Banerjee, Kimberly K. Boddy, ...,**Lina Necib**, et al. — arXiv:2203.07049
Snowmass2021 Cosmic Frontier White Paper: Cosmological Simulations for Dark Matter Physics

9) Shin'ichiro Ando, Sebastian Baum, ...,**Lina Necib**, et al. — arXiv:2203.06781
Snowmass2021 Cosmic Frontier: Synergies between dark matter searches and multiwavelength/multimessenger astrophysics

8) Philip F. Hopkins, Andrew Wetzel, ..., **Lina Necib**, et al. — MNRAS 519, no.2, 3154 arXiv:2203.00040
FIRE-3: Updated Stellar Evolution Models, Yields, & Microphysics and Fitting Functions for Applications in Galaxy Simulations

7) Daniel McKeown, James S. Bullock, Francisco J. Mercado, Zachary Hafen, Michael Boylan-Kolchin, Andrew Wetzel, **Lina Necib**, Philip F. Hopkins, Sijie Yu — MNRAS 513 no.1, 55 arXiv:2111.03076
Amplified J-factors in the Galactic Center for velocity-dependent dark matter annihilation in FIRE simulations

6) Anirudh Chiti, Anna Frebel, Joshua D. Simon, Denis Erkal, Laura J. Chang, **Lina Necib**, Alexander P. Ji, Helmut Jerjen, Dongwon Kim, John E. Norris — Nature Astronomy 5, 392 arXiv:2012.02309
An Extended Halo Around an Ancient Dwarf Galaxy.

5) Carine Babusiaux, Maria Bergemann, Adam Burgasser, ..., **Lina Necib**, et al. — arXiv:1904.04907
The Detailed Science Case for the Maunakea Spectroscopic Explorer

4) Ting Li, Manoj Kaplinghat, Andrew B. Pace, ..., **Lina Necib**, et al. — BAAS 51 no. 3, 252
Dark Matter Physics with Wide Field Spectroscopic Surveys

3) Keith Bechtol, Alex Drlica-Wagner, Kevork N. Abazajian, ..., **Lina Necib**, et al. — BAAS 51 no. 3, 207 arXiv:1903.04425
Dark Matter Science in the Era of LSST

2) Ting S. Li, Manoj Kaplinghat, Keith Bechtol, ..., **Lina Necib**, et al. — arXiv:1903.03155
Astrophysical Tests of Dark Matter with Maunakea Spectroscopic Explorer

1) Alex Drlica-Wagner, Yao-Yuan Mao, ..., **Lina Necib**, et al. — arXiv:1902.01055
Probing the Fundamental Nature of Dark Matter with the Large Synoptic Survey Telescope

Invited Presentations

Colloquia

Dancing in the Dark: Data, Models, and the Milky Way's Dark Matter — October 7, 2026
Columbia University, Astronomy Colloquium

Dancing in the Dark: Data, Models, and the Milky Way's Dark Matter — September 24, 2026
Yale University, Astronomy Colloquium

Mapping the Dark Matter in the Milky Way with Stars: The Signal We Already Have — July 22, 2026
CERN, Theory Colloquium

Dancing in the Dark: Data, Models, and the Milky Way's Dark Matter — July 15, 2026
Kapteyn Astronomical Institute, University of Groningen, Colloquium

Dancing in the Dark: Data, Models, and the Milky Way's Dark Matter — July 9, 2026
Observatoire astronomique de Strasbourg, Université de Strasbourg, Colloquium

Mapping out the Dark Matter in the Milky Way with Stars — February 19, 2026
University of California Irvine, Physics and Astronomy Colloquium

Mapping out the Dark Matter in the Milky Way — May 1, 2025
Harvard University, ITC Colloquium

Mapping out the Dark Matter in the Milky Way — April 18, 2025
University of New Hampshire, Physics Colloquium

Mapping out the Dark Matter in the Milky Way — March 5, 2025
Johns Hopkins University/STScI, Astronomy Colloquium

Mapping out the Dark Matter in the Milky Way — February 25, 2025
UMass Amherst, Astronomy Colloquium

Mapping out the Dark Matter in the Milky Way — January 31, 2025
Northwestern University, Physics & Astronomy Colloquium

Mapping out the Dark Matter in the Milky Way — December 11, 2024
University of Chicago, Astronomy Colloquium

Mapping out the Dark Matter in the Milky Way — November 22, 2024
University of Connecticut, Physics Colloquium

(Machine) Learning of Dark Matter — November 6, 2023
University of North Carolina Chapel Hill, Physics and Astronomy Colloquium

Shining Light on Dark Matter — April 24, 2023
Cornell Physics Colloquium

Tracing Dark Matter with Stars — February 8, 2023
UMass Boston Physics Colloquium

Searching for the Dark with the Light — November 23, 2022
Latin-American Webinars in Physics — **Remote**

Tracing Dark Matter with Stars around the Milky Way — September 30, 2022
Dartmouth Physics Colloquium

Searching for the Dark with the Light: Stars as Tracers of Dark Matter — March 31, 2022
MIT Physics Colloquium

Tracing Dark Matter with Stars — October 25, 2021
Brown University Physics Colloquium

Tracing Dark Matter with Stars — October 21, 2021
University of Heidelberg Colloquium — **Remote**

Tracing Dark Matter with Stars — September 2021
Boston University Physics Colloquium

Tracing Dark Matter with Stars — June 2021
Carnegie Observatories Colloquium — **Remote**

Tracing Dark Matter with Stars — February 2021
Southern Methodist University Physics Colloquium — **Remote**

Dark Matter in the Era of *Gaia* — October 2020
Indiana University Physics Colloquium

Dark Matter in the Era of *Gaia* — September 2020
Emory University Physics Colloquium

Dark Matter in the Era of *Gaia* — July 2020
KIPAC Stanford Astrophysics Colloquium

Dark Matter in the Era of *Gaia* — December 2019
Carnegie Observatories Colloquium

Dark Matter in the Era of *Gaia* — September 2019
MIT Astronomy Colloquium

Dark Matter in the Era of *Gaia* — May 2019
California Institute of Technology Physics Colloquium

Seminar Talks

Dancing in the Dark: Data, Models, and the Milky Way's Dark Matter — October 9, 2026
Carnegie Mellon University, McWilliams Center Astrophysics Seminar

Mapping out the Dark Matter in the Milky Way — April 21, 2025
University of Notre Dame, Physics and Astronomy Seminar

Mapping out Dark Matter in the Milky Way — February 20, 2025
Sydney Consortium for Particle Physics and Cosmology — **Remote**

(Machine) Learning of Dark Matter — September 5, 2023
Rutgers University

(Machine) Learning of Dark Matter — April 21, 2023
Princeton University

Searching for the Dark with the Light: Stars as Tracers of Dark Matter — October 28, 2022
University of Southern California

Tracing Dark Matter with Stars — April 21, 2022
Brookhaven National Laboratory

Tracing Dark Matter with Stars — February 2022
University of California Berkeley/LBNL seminar

Tracing Dark Matter with Stars — November 2021
Kavli IPMU, University of Tokyo

Tracing Dark Matter with Stars — October 2021
Harvard University

Tracing Dark Matter with Stars, Part II — June 2021
SLAC

Tracing Dark Matter with Stars — March 2021
TRIUMF

Tracing Dark Matter with Stars — February 2021
SLAC

Tracing Dark Matter with Stars — January 2021
Queen's University

Tracing Dark Matter with Stars — December 2020
University of Texas Austin

Dark Matter in the Era of *Gaia* — December 2020
Tsung-Dao Lee Institute

Dark Matter in the Era of *Gaia* — October 2020
University of Colorado Boulder

Tracing Dark Matter with Stars — September 2020
Virginia Tech

Tracing Dark Matter with Stars — July 2020
Fermilab

Dark Matter in the Era of *Gaia* — April 2020
University of California Irvine

Dark Matter in the Era of *Gaia* — January 2020
University of Surrey

Dark Matter in the Era of *Gaia* — October 2019
Perimeter Institute

Dark Matter in the Era of *Gaia* — October 2019
Harvard University

Dark Matter in the Era of *Gaia* — September 2019
Boston University

Properties of Dark Matter in the Era of *Gaia* — September 2019
LHC Results Forum

Dark Matter in the Era of *Gaia* — September 2019
Fermilab

Dark Matter in the Era of *Gaia* — September 2019
Texas A&M

Dark Matter in the Era of *Gaia* — July 2019
Ohio State University

Dark Matter in the Era of *Gaia* — May 2019
Los Alamos National Laboratory

The Stellar Local Velocity Distribution and its Implications for Dark Matter — April 2019
California Institute of Technology

Dark Matter in Disequilibrium and Implications for Direct Detection — March 2019
University of California Irvine

Dark Matter in Disequilibrium and Implications for Direct Detection — January 2019
SLAC

Dark Matter in Disequilibrium and Implications for Direct Detection — December 2018
University of California Santa Barbara

Dark Matter in Disequilibrium and Implications for Direct Detection — December 2018
Johns Hopkins University

Dark Matter in Disequilibrium and Implications for Direct Detection — December 2018
University of Maryland

Dark Matter in Disequilibrium and Implications for Direct Detection — November 2018
KICP, University of Chicago

Dark Matter in Disequilibrium and Implications for Direct Detection — November 2018
Lawrence Berkeley National Laboratory

Dark Matter in Disequilibrium and Implications for Direct Detection — October 2018
Rutgers University

Dark Matter in Disequilibrium and Implications for Direct Detection — October 2018
University of Kentucky

Dark Matter in Disequilibrium and Implications for Direct Detection — September 2018
SuperCDMS Collaboration

Dark Matter in Disequilibrium: The Velocity Distribution — June 2018
Fermilab

Empirical Determination of the Dark Matter Velocity Distribution — May 2018
University of California San Diego

Empirical Determination of the Dark Matter Velocity Distribution — March 2018
Princeton University

Boosted Dark Matter in Neutrino Experiments — March 2018
Brookhaven National Laboratory

Empirical Determination of the Dark Matter Velocity Distribution — March 2018
Brookhaven National Laboratory

Empirical Determination of the Dark Matter Velocity Distribution — March 2018
New York University

Empirical Determination of the Dark Matter Velocity Distribution — March 2018
University of Michigan Ann Arbor

Empirical Determination of the Dark Matter Velocity Distribution — February 2018
Rutgers University

Empirical Determination of the Dark Matter Velocity Distribution — December 2017
University of California Irvine

Empirical Determination of the Dark Matter Velocity Distribution — November 2017
University of Oregon

Empirical Determination of the Dark Matter Velocity Distribution — November 2017
Boston University

Empirical Determination of the Dark Matter Velocity Distribution — October 2017
University of Illinois Urbana-Champaign

Empirical Determination of the Dark Matter Velocity Distribution — October 2017
University of California Santa Barbara

Empirical Determination of the Dark Matter Velocity Distribution — October 2017
California Institute of Technology

Using Simulations to Improve Dark Matter Searches — February 2017
Harvard University

Spherical Cows of Dark Matter Indirect Detection — November 2016
University of California Berkeley

Spherical Cows of Dark Matter Indirect Detection — October 2016
Harvard University

Boosted Dark Matter in Neutrino Experiments — October 2016
Harvard University

Spherical Cows of Dark Matter Indirect Detection — October 2016
Cornell University

Spherical Cows of Dark Matter Indirect Detection — September 2016
Princeton University

Boosted Dark Matter in Neutrino Experiments — June 2016
Tufts University

(In)Direct Detection of Boosted Dark Matter — April 2016
SLAC

Invited Conference Talks

(Machine) Learning the Dark Matter Map — September 8, 2026
Open SkAI 2026, Chicago, IL, USA

Theory and Machine Learning for Indirect Detection of Dark Matter — July 21, 2026
Closing In on Thermal Relics with Indirect, Direct, and Collider Searches for Dark Matter, CERN, Switzerland

Theory and Machine Learning for Indirect Detection of Dark Matter — July 13, 2026
Dark Matter and Stars: Multi-Messenger Probes of Dark Matter and Modified Gravity, Southampton, UK **Plenary**

Predicting the Weather of the Milky Way — June 23, 2026
AAS Division on Dynamical Astronomy (DDA) 2026, Special Session on New Probes of Dark Matter, Chicago, IL, USA

Mapping out the Dark Matter in the Milky Way with Stars — May 28, 2026
Mitchell Conference, College Station, Texas, USA

Mapping out the Dark Matter in the Milky Way with Stars — April 26, 2026
PONT D'Avignon 2026, Avignon, France

Mapping out the Dark Matter in the Milky Way with Stars — September 8, 2025
Cosmology 2025, Elba Island, Italy

Mapping out the Dark Matter in the Milky Way with Stars — September 2, 2025
Invisibles Workshop, CERN, Switzerland

Mapping out the Dark Matter in the Milky Way — August 23, 2025
New approaches to dark matter in galaxies and the Local Group, Banff, Canada

(Machine) Learning of Dark Matter — August 12, 2025
IAIFI Workshop, Cambridge, MA

Mapping out the Dark Matter in the Milky Way with Stars — July 16, 2025
Dark Matter and Stars, Kingston, Ontario, Canada

Phase Space Distribution of Dark Matter — May 21, 2025
DREAMS Workshop, NYC, NY, USA

(Machine) Learning of the Dark Matter — May 6, 2025
Cosmic Horizons, Austin, TX, USA — **Plenary-Remote**

(Machine) Learning the Genealogy of the Milky Way — February 2, 2024
Harvard Data Science Initiative, Cambridge, MA, USA

(Machine) Learning of Dark Matter — December 4, 2023
Dark Camels, Center for Computational Astrophysics, Flatiron Institute, NYC, NY, USA

(Machine) Learning of Dark Matter around the Milky Way — October 5, 2023
Brookhaven Forum, Advancing Searches for New Physics, Upton, NY, USA — **Plenary-Remote**

Shining Light on Dark Matter — May 9, 2023
Pheno 2023, University of Pittsburgh, PA, USA — **Plenary**

Shining Light on Dark Matter — May 1, 2023
LCTP Workshop, University of Michigan Ann Arbor, MI, USA

George E. Valley Jr. Prize: Shining Light on Dark Matter — April 18, 2023
APS April Meeting 2023, Minneapolis, MN, USA

Identifying Kinematic Substructure with Machine Learning — February 21, 2023
Building a Physical Understanding of Galaxy Evolution with Data-driven Astronomy, Santa Barbara, CA, USA

Gaia: An Insight into a Billion Stars — January 27, 2023
Workshop on Atomic Dark Matter, Pittsburgh, PA, USA

Shining Light on Dark Matter — November 30, 2022
Kashiwa Dark Matter Symposium 2022, Kashiwa, Japan — **Plenary-Remote**

Robust Clustering of Local Kinematic Stellar Structures with *Gaia* — July 29, 2022
Towards Real Time Galactic Dynamics, Leiden, Netherlands

Clustering Stellar Structures and Connections to Dark Matter — July 14, 2022
Summiting the Unknown, Seattle, WA, USA

Identifying Kinematic Substructure with Machine Learning — March 24, 2022
New Methods and Ideas at the Frontiers of Particle Physics, Aspen, CO, USA

Identifying Kinematic Substructure with Machine Learning — March 17, 2022
Nature of Dark Matter on Small Scales, Remote

Dark Matter in the Era of Simulations and Data — June 2021
CERN-CKC Theory Workshop, Jeju Island, South Korea — **Plenary-Remote**

Dark Matter in the Era of *Gaia* — March 2020
Exploring the Dark Side of the Universe, Pointe-A-Pitre, Guadeloupe — **Plenary-Remote**

Dark Matter in the Era of *Gaia* — January 2020
Theory Meets Experiment, Quy Nhon, Vietnam — **Plenary**

Dark Matter in the Era of *Gaia* — August 2019
Searching for new physics - Leaving no stone unturned!, Salt Lake City, UT, USA

Dark Matter in the Era of *Gaia* — June 2019
234th AAS Meeting, Saint Louis, MO, USA

The Stellar Local Velocity Distribution and its Implications for Dark Matter — April 2019
In the Balance: Stasis and Disequilibrium in the Milky Way, KITP, Santa Barbara, CA, USA

Dark Matter in Disequilibrium and its Implications on Direct Detection — October 2018
Interplay between Particle and Astroparticle Physics, Cincinnati, OH, USA

Reconstructing the Dark Matter Velocity Distribution from the Stars — August 2018
Galaxy Formation and Evolution in Southern California, Pasadena, CA, USA

Dark Matter in Disequilibrium and its Implications on Direct Detection — July 2018
Identification of Dark Matter, Providence, RI, USA — **Plenary**

Dark Matter in Disequilibrium: The Velocity Distribution — June 2018
Near Field Cosmology Workshop, Chicago, IL, USA

Light Dark Matter at Neutrino Detectors — October 2017
Light Dark World, Pittsburgh, PA, USA

Conference Talks

Predicting the Weather of the Milky Way — July 2026
How Stars Move Around and What They Tell Us about Galaxies' Masses, Formation and Evolution, Sexten, Italy

Unveiling the Milky Way's Merger History Using Graph Neural Networks — June 16, 2025
Dancing in the Dark: When Galaxies Shape Galaxies, Sexten, Italy

Extracting Dark Matter from Dwarfs — June 9, 2025
Valencia Workshop on the Small-Scale Structure of the Universe and Self-Interacting Dark Matter, Valencia, Spain

Mapping out the Dark Matter in the Milky Way — March 2025
UCLA Dark Matter, Los Angeles, CA, USA

Empirical Determination of the Dark Matter Velocity Distribution — February 2018
UCLA Dark Matter, Los Angeles, CA, USA

Empirical Determination of Dark Matter Velocity Distribution — September 2017
Dark Matter of Southern California, Pasadena, CA, USA

Empirical Determination of Dark Matter Velocity Distribution — August 2017
TeVPA, Columbus, Ohio, USA

Constructing Stable Observables with Energy Correlation Functions — November 2016
Jet Substructure "Planning for the Future", Fermilab, USA

Spherical Cows of Dark Matter Indirect Detection — September 2016
TeVPA, CERN, Switzerland

Boosted Dark Matter in Neutrino Experiments — July 2016
Dark Side of the Universe, Bergen, Norway

Dark Matter, Shared Asymmetries, and Galactic Gamma Ray Signals — May 2016
Pheno Symposium, Pittsburgh, USA

(In)Direct Detection of Boosted Dark Matter — September 2015
TAUP, Torino, Italy

Public Talks

Mapping out Dark Matter in the Milky Way — August 13, 2025
Planetarium Show at the Museum of Science, Cambridge, MA, USA

Mapping out Dark Matter in the Milky Way — January 24, 2025
Conference of Undergraduate Womxn in Physics, NYC, NY, USA

(Machine) Learning the Genealogy of the Milky Way — September 25, 2024
Simons Presidential Lecture, NYC, NY, USA

The Genealogy of the Milky Way and the Search for Dark Matter — March 7, 2023
Friends of KITP, Santa Barbara, CA, USA

The Genealogy of the Milky Way and the Search for Dark Matter — March 23, 2022
Winter Aspen, Aspen, CO, USA

Chasing Dark Matter with the *Gaia* Enceladus — April 2019
Astronomy on TAP, Santa Barbara, CA, USA

Research Contracts and Grants

Charting the Inner Darkness: Mass-Dependent Profiles of Dark Matter Halos with Machine Learning — 05/2026-03/2029 $240,000
Department of Energy

Unveiling the Invisible: Decoding Dark Matter Distributions in Galaxy Images Using Advanced Machine Learning — 06/2025-05/2027 $149,116
MIT School of Science, Research Innovation Seed Fund

Sloan Fellowship — 09/2024-09/2026 $75,000
Alfred P. Sloan Foundation

CAREER: Building the Merger Tree of the Milky Way with Machine Learning — 07/2024-06/2029 $835,053
National Science Foundation

Collaborative Research: CDS&E: Systematic Predictions for Dynamical Signatures of New Dark Matter Physics in Galaxies
National Science Foundation
08/2023-07/2026
$398,629

Shining Light on Dark Matter: Using Stars as Tracers of Dark Matter
Department of Energy
06/2023-04/2026
$107,000

Mapping out the Dark Matter in Hydrodynamic Simulations
MIT International Science and Technology Initiatives (MISTI) Global Seed Fund
05/2023-01/2025
$29,200

Building merger trees with machine learning
The Simons Foundation
02/2023-01/2025
$25,857

Dark and Bright: Streams and Debris around the Solar Neighborhood
MIT School of Science, Research Support Committee
07/2022-06/2025
$75,000

Computing and Observing Allocations

Computing Allocations

TACC/Bridges-2, Stampede3
Discover: 1,500,000 ACCESS Credits (PI)
2025

TACC/Bridges-2, Stampede3
Accelerate: 3,000,000 ACCESS Credits (PI)
2025

TACC/Frontera
32,000 Node Hours (PI)
2025

TACC/Frontera
23,000 Node Hours (PI)
2025

TACC/Frontera: GPUs
3,600 Node Hours (PI)
2024

TACC/Frontera
108,000 Node Hours (PI)
2024

TACC/Frontera: GPUs
4,000 Node Hours (PI)
2023

TACC/Frontera
194,000 Node Hours (PI)
2023

XSEDE/Bridges-2: GPUs
5,000 Node Hours (PI)
2022

XSEDE/Stampede
52,000 Node Hours (PI)
2022

XSEDE/Stampede
1,600 Node Hours (PI)
2019

Observing Allocations

Magellan/FIRE
High-resolution spectroscopy, 1 night (co-PI)
Semester 2025B

Magellan/MIKE
High-resolution spectroscopy, 2 nights (PI)
Semester 2021A

Magellan/MIKE
High-resolution spectroscopy, 4 nights (PI)
Semester 2020B

Magellan/MIKE — Semester 2020A
High-resolution spectroscopy, 2 nights (co-PI)

Keck/HIRES — Semester 2020A
High-resolution spectroscopy, 1 night (PI)