



Nathaniel Starkman
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@ MIT Kavli

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📄 Publications 🔗 [arXiv](#) 📦 [Zenodo](#) 📞 0000-0003-3954-3291



🏛️ EDUCATION

- 2018 – 2024 **PhD in Astronomy & Astrophysics**, University of Toronto 🔗 Toronto, ON, Canada
[NSERC CGS-D Fellow](#) 2020–2023. [NSERC CGS-M Fellow](#) 2019–2020.
Thesis: Charting Stellar Streams of the Milky Way
Supervisors: Jo Bovy, Jeremy Webb
- 2014 – 2018 **B.S. in Mathematical Physics and Astronomy**, Case Western Reserve University 🔗 Cleveland, OH, USA
Summa Cum Laude.
Supervisors: Stacy McGaugh
GPA 4.0.

🏢 PROFESSIONAL APPOINTMENTS

- 2024 – 2027 **Postdoctoral Associate**, MIT Kavli Institute for Astrophysics and Space Research 🔗 Cambridge, MA, USA
Brinson Prize Fellowship (2024–2027).
- 2021 – **Coordinator (2025 – 2028), Strategic Planner (2025 – 2026) & Core Developer**, Astropy 🔗 Remote
Coordination Committee (executive committee), 2025–2028.
Strategic Planning and Organizing Committee, 2025–2026.
Member, Core Developer Team; lead maintainer for Cosmology, co-maintainer of Units.
Funding: Astropy Cycle III — Cosmology and Quantity 2.0.
Team awards: 2025 AAS Lancelot M. Berkeley–New York Community Trust Prize, the 2023 IOP Publishing Top Cited Paper Award and the 2022 ADASS Prize for an Outstanding Contribution to Astronomical Software.
- May 2017 **SOURCE Participant**, Case Western Reserve University Cleveland, OH, USA
Mentor: [Stacy McGaugh](#) (CWRU Astronomy).
Role: summer research position.
Funding: [Support of Undergraduate Research and Creative Endeavors](#) (SOURCE).
Project: an algorithm for maximal disc decompositions of galactic rotation curves, applied to the SPARC database to extract lower bounds on the dark matter content of the sample galaxies. Published in Starkman et al. 2018.
- Jun 2016 **NSF-REU Participant**, Cornell Laboratory for Accelerator-based Sciences and Education (CLASSE) Ithaca, NY, USA
Mentor: [Ira Wasserman](#) (Cornell Astronomy).
Role: summer research position at CLASSE.
Funding: NSF [Research Experiences for Undergraduates](#).
Project: whether monopolar neutron-star magnetospheres can produce coherent curvature radiation. Coherent radiation near the light-cylinder boundary is a candidate source of FRB-like signals.
- May 2015 **Summer Researcher**, Case Western Reserve University Cleveland, OH, USA
Advisor: [John Ruhl](#) (CWRU Physics).
Funding: federal grants awarded to Prof. Ruhl.
Project: Markov Chain Monte Carlo programs predicting how well South Pole Telescope detectors can distinguish B-modes from noise.

🏆 GRANTS & FELLOWSHIPS

- Oct 2026 **Pacific Postdoc Program at the University of Washington**,
Pacific Postdoc Program Fellow, University of Washington 🔗

	A one-month fellowship at the Dark Universe Science Center at the University of Washington in Seattle, funded by the Dark Universe Science Center and the Simons Institute.	
Feb 2024	Brinson Prize Fellowship , Prize Fellow, Brinson Foundation 🔗 “to support early-career astrophysicists and cosmologists who are committed to chasing bold ideas with creative, nimble, and innovative research.”	USD 360,000
Feb 2024	NSERC PDF 🔗 Postdoctoral Fellowships program (Natural Sciences and Engineering Research Council of Canada). Declined	declined
Jul 2022	Astropy Cycle III Funding Grant 🔗 USD 12,000 NASA ROSES and Moore Foundation funding to Astropy Lead: “Cosmology in Astropy”	USD 12,000
Jul 2022	Astropy Cycle III Funding Grants 🔗 USD 8,000 NASA ROSES and Moore Foundation funding to Astropy Lead: “Quantity 2.0: unitful calculations beyond NumPy”	USD 8,000
2020 – 2023	NSERC - CGS D 🔗 Alexander Graham Bell Canada Graduate Scholarship-Doctoral Award (Natural Sciences and Engineering Research Council of Canada)	CAD 105,000
2019 – 2024	Massey Junior Fellow , Junior Fellow, Massey College University of Toronto's graduate college for those showing exceptional promise and engagement within academia and the world beyond it.	
2019 – 2020	NSERC - CGS M 🔗 Canada Graduate Scholarships (Natural Sciences and Engineering Research Council of Canada)	CAD 17,500
2018 – 2024	University of Toronto Graduate Fellowship , University of Toronto	CAD 23,000–32,000 p.a.

🏆 AWARDS

Jan 2025	AAS Lancelot M. Berkeley–New York Community Trust Prize , American Astronomical Society 🔗 , <i>to the Astropy Collaboration</i> Team award, as a core developer and Coordination Committee member of Astropy.
Nov 2023	IOP Publishing Top Cited Paper Award, North America , IOP Publishing 🔗 <i>to the Astropy Collaboration</i> Team award, as an author of the v5.0 paper: top 1% most-cited in Astronomy and Astrophysics.
May 2022	Jackman Massey Bursary
May 2022	OSOTF HUDD Award at Massey , Massey College 🔗 Ontario Student Opportunity Trust Fund
2022	ADASS Prize for an Outstanding Contribution to Astronomical Software , Astronomical Data Analysis Software and Systems 🔗 <i>to the Astropy Project</i> Team award, as a core developer of Astropy.
Sep 2018	Graduate Admissions Award UofT Faculty of Arts & Science
May 2018	Donald A. Glaser Award To an outstanding Mathematics and Physics Senior
May 2018	John Schoff Millis Award To the senior with the best academic record in the College of Arts and Sciences
May 2018	Summa Cum Laude
Apr 2017	Outstanding Junior Award of Arts and Sciences
Apr 2017	The Albert A. Michelson Prize “To a [3rd year] physics major who has demonstrated superior performance”
Mar 2017	Goldwater Scholarship Honorable Mention “For exceptional promise of becoming this nation’s next generation of research leaders”
Apr 2016	Phi Beta Kappa Academic Award
Mar 2016	Goldwater Scholarship Honorable Mention

2014 – 2018 **Dean's High Honor List**

To the students with the best academic record. Awarded semesterly

2014 – 2018 **Case Western Reserve University Merit Scholarship**

PUBLICATIONS

Students I supervised or advised: [undergraduate[†]](#), [graduate[‡]](#).

21. **N. Starkman**, A. Price-Whelan. *Coordinax: an extended framework for coordinates and differential geometry in JAX*. [IN-PREP](#)
20. **N. Starkman**. *Spatial Correlations in Extragalactic Stellar Stream Convexities: Distinguishing CDM, SIDM, and MOND*. [IN-PREP](#)
19. **N. Starkman**. *Directly Model the Stream: A State-Space Model for Gravitational Potentials from Stellar Streams*. [IN-PREP](#)
18. **N. Starkman**, J. Nibauer, S. Pearson, [S. Wu[‡]](#), L. Necib. *When Streams Curve Away: a Test of Dark Matter from Extragalactic Stellar Stream Populations*. [SUBMITTED](#) [X](#) [arXiv:2609.40057](#)
17. Euclid Collaboration, **N. Starkman**, J. Nibauer, S. Pearson, [S. Wu[‡]](#), M. Walmsley, L. Necib, et al. *Euclid Quick Data Release (Q1): The geometry of dark matter halos from extragalactic streams*. *Astronomy & Astrophysics* [SUBMITTED](#) [ADS](#) [X](#) [arXiv:2606.21774](#)
16. [C. Myers[†]](#), **N. Starkman**, L. Necib. *Reconstructing Galactic Gravitational Potentials from Stellar Kinematics with Physics-Informed Neural Networks*. *Monthly Notices of the Royal Astronomical Society* [SUBMITTED](#) [ADS](#) [X](#) [arXiv:2606.18386](#) 
15. L. Necib, D. Folsom, E. Y. Davies, **N. Starkman**, A. Thoyas. *Galactic Amnesia: The Information Washout of the Milky Way Merger History*. [SUBMITTED](#) [ADS](#) [X](#) [arXiv:2605.04138](#)
14. **N. Starkman**, J. Nibauer. *phasecurvefit: A High-Performance JAX Framework for Phase-Space Walks with Pluggable Metrics and Strategies*. *Journal of Open Source Software* [SUBMITTED](#) [pyOpenSci review](#) 
13. [S. Wu[‡]](#), **N. Starkman**, S. Pearson, J. Nibauer, J. Miro-Carretero, D. Martinez-Delgado. *Potamides: Mapping Dark Matter Halo Shapes from Stellar Stream Tracks in the Local Universe*. *The Astrophysical Journal* [ACCEPTED](#) [ADS](#) [X](#) [arXiv:2605.07809](#)
12. [S. Wu[‡]](#), **N. Starkman**, J. Nibauer, S. Pearson. *Potamides: JAX tools for curvature-based inference from stellar streams*. *Journal of Open Source Software* 11, 10712 [DOI](#) [10.21105/joss.10712](#) 
11. [C. Myers[†]](#), **N. Starkman**, L. Necib. *Physics-Informed Neural Networks for Modeling Galactic Gravitational Potentials*. *Advances in Neural Information Processing Systems (NeurIPS 2025)* [OpenReview](#) 
10. J. Nibauer, A. Bonaca, D. N. Spergel, A. M. Price-Whelan, J. E. Greene, **N. Starkman**, et al. *Stream-Sculptor: Hamiltonian Perturbation Theory for Stellar Streams in Flexible Potentials with Differentiable Simulations*. *The Astrophysical Journal* 983, 68 [DOI](#) [10.3847/1538-4357/adb8e8](#) [ADS](#) [X](#) [arXiv:2410.21174](#)
9. **N. Starkman**, A. M. Price-Whelan, J. Nibauer. *unxt: A Python package for unit-aware computing with JAX*. *Journal of Open Source Software* 10, 7771 [DOI](#) [10.21105/joss.07771](#)  
8. **N. Starkman**, J. Nibauer, J. Bovy, J. Webb, K. Tavangar, A. Price-Whelan, et al. *Stream Members Only: Data-Driven Characterization of Stellar Streams with Mixture Density Networks*. *The Astrophysical Journal* 980, 253 [DOI](#) [10.3847/1538-4357/ad94f2](#) [ADS](#) [X](#) [arXiv:2311.16960](#)  
7. **N. Starkman**, G. Starkman, A. Kosowsky. *Angular Correlations of Cosmic Microwave Background Spectrum Distortions from Photon Diffusion*. *Monthly Notices of the Royal Astronomical Society* 529, 2274 [DOI](#) [10.1093/mnras/stae665](#) [X](#) [arXiv:2310.01578](#)  
6. **N. Starkman**, J. Bovy, J. Webb, D. Calvetti, E. Somersalo. *On the fast track: Rapid construction of stellar stream paths*. *Monthly Notices of the Royal Astronomical Society* 522, 5022 [DOI](#) [10.1093/mnras/stad1166](#) [X](#) [arXiv:2212.00949](#)    
5. The Astropy Collaboration, A. M. Price-Whelan, P. L. Lim, N. Earl, **N. Starkman**, L. Bradley, D. L. Shupe, et al. *The Astropy Project: Sustaining and Growing a Community-oriented Open-source Project and the Latest Major Release (v5.0) of the Core Package*. *The Astrophysical Journal* 935, 167 [ADS](#) [X](#) [arXiv:2206.14220](#)    

4. **N. Starkman**, J. S. Sidhu, H. Winch, G. Starkman. *Straight Lightning as a Signature of Macroscopic Dark Matter*. Physical Review D 103, 063024  [10.1103/PhysRevD.103.063024](https://doi.org/10.1103/PhysRevD.103.063024)  [arXiv:2006.16272](https://arxiv.org/abs/2006.16272)   
3. **N. Starkman**, J. Bovy, J. Webb. *An extended Pal 5 stream in Gaia DR2*. Monthly Notices of the Royal Astronomical Society  [10.1093/mnras/staa534](https://doi.org/10.1093/mnras/staa534)  [arXiv:1909.03048](https://arxiv.org/abs/1909.03048) 
2. P. Li, F. Lelli, S. S. McGaugh, **N. Starkman**, J. M. Schombert. *A constant characteristic volume density of dark matter haloes from SPARC rotation curve fits*. Monthly Notices of the Royal Astronomical Society  [10.1093/mnras/sty2968](https://doi.org/10.1093/mnras/sty2968)  [arXiv:1811.00553](https://arxiv.org/abs/1811.00553)
1. **N. Starkman**, F. Lelli, S. S. McGaugh, J. Schombert. *A new algorithm to quantify maximum discs in galaxies*. Monthly Notices of the Royal Astronomical Society 480, 2292  [10.1093/mnras/sty2011](https://doi.org/10.1093/mnras/sty2011)  [ADS](https://ui.adsabs.org/abs/2018MNRAS.480.2292S)  [arXiv:1802.09967](https://arxiv.org/abs/1802.09967)

SOFTWARE DEVELOPMENT

preamble

A LaTeX preamble worth reusing

galactoPINNs 2026

Physics-informed neural networks for galactic potentials

diffraxtra

Extras for Diffrax

spexial

scipy.special in JAX

dataclassish

dataclasses, for everything

zeroth

Efficiently get the index-0 element of any iterable

plum

Multiple dispatch in Python

unxt 2025

Units in JAX

trackstream 2023

Stellar stream tracks

jaxmore

There's more to JAX

oncequinox

Singletons for Equinox

quax-blocks

Building blocks for quax classes

plotting_backends

Dispatch over plotting backends

galactic_dynamics_interoperability

Interoperability between galactic dynamics libraries

optional_dependencies

Construct checks for optional dependencies

coordinax

Coordinates in JAX

quax

Multiple dispatch in JAX

macro_lightning 2020

Constrain macroscopic dark matter with lightning

phasecurvefit 2026

Paths through phase space

potamides 2026

Constrain gravitational potentials from stellar stream curvature

mvgkde

Multivariate Gaussian KDE

is_annotated

Check whether a type hint is Annotated

immutablemap

An immutable mapping, JAX-compatible

galax

Galactic dynamics in JAX

quaxed

Pre-quaxed libraries

cosmology.api

A standard interface for cosmology libraries

Astropy 2022

Astronomy in Python

INVITED TALKS

Aug 2026	Marche III: Big Bang, Big Stars, Big Computers (Jesi) Energy Structures of Extragalactic Stellar Streams Reveal Dark Matter Halos	Jesi, Italy
Jun 2026	EAS 26-S10 (Lausanne)  The Geometry of Dark Matter Halos from Extragalactic Streams	Lausanne, Switzerland
Feb 2026	CWRU Seminar (Cleveland) Computationally Unscrambling EGGS (Extra-Galactic Gravity from Streams)	Cleveland, OH, USA
Nov 2025	TevPA (Valencia) The Geometry of Dark Matter Halos from Extragalactic Streams	Valencia, Spain
Oct 2025	DARK seminar (Copenhagen) The Geometry of Dark Matter Halos from Extragalactic Streams	Copenhagen, Denmark
Oct 2025	Texas A&M Seminar (Texas) The Geometry of Dark Matter Halos from Extragalactic Streams	College Station, TX, USA
Sep 2025	CCA Software seminar (NYC) unxt, coordinax, and software development in JAX	New York, NY, USA
Sep 2025	Princeton Thunch Seminar (Princeton)  Euclid: The Geometry of Dark Matter Halos from Extragalactic Streams	Princeton, NJ, USA

Mar 2025	DARK seminar (Copenhagen) Bayesian models for detecting streams in LSST data	Copenhagen, Denmark
Oct 2024	CWRU Seminar Stream Members Only: Data-Driven Characterization of Stellar Streams for Inference on the Galactic Potential	Cleveland, OH, USA
Jan 2023	CITA Seminar Astropy Cosmology: the Present and the Expanding Future	Toronto, ON, Canada
Mar 2022	Oxford Physics Colloquium Straight Lightning as a Signature of Macroscopic Dark Matter (Invited Colloquium Talk)	Online
Aug 2020	Johns Hopkins University Physics Journal Club Straight Lightning as a Signature of Macroscopic Dark Matter	Online
Aug 2017	Origins Cruise to the British Isles, Iceland and Norway (Talk) The Life and Death of the Universe: An Overview Lecture on Cosmology	Reykjavik, Iceland

PRESENTATIONS

Aug 2026	New Frontiers in Cosmology (Talk) Energy Structures of Extragalactic Stellar Streams Reveal Dark Matter Halos	A Coruña, Spain
Jul 2026	Near Field Cosmology in the Era of Big Data (Talk) Energy Structures of Extragalactic Stellar Streams Reveal Dark Matter Halos	Toronto, ON, Canada
Jun 2026	DARK Seminar (Talk) Energy Structures of Extragalactic Stellar Streams Reveal Dark Matter Halos	Copenhagen, Denmark
Jan 2026	York Seminar (Talk) Euclid: The Geometry of Dark Matter Halos from Extragalactic Streams	Toronto, ON, Canada
Nov 2025	TeVPA (Talk) Euclid: The Geometry of Dark Matter Halos from Extragalactic Streams	Valencia, Spain
Oct 2025	IAUS 403 (Talk) Euclid: The Geometry of Dark Matter Halos from Extragalactic Streams	Córdoba, Spain
Sep 2025	Cosmology 2025 (Talk) Euclid: The Geometry of Dark Matter Halos from Extragalactic Streams	Portoferraio, Italy
Sep 2025	MKI Journal Club (Talk) Euclid: The Geometry of Dark Matter Halos from Extragalactic Streams	Cambridge, MA, USA
May 2025	DDA #56 Extra-Galactic Gravity using Streams (EGGS) from Euclid's Zoo(niverse)	Atlanta, GA, USA
May 2025	Euclid LU-SWG (Talk) Extra-Galactic Gravity using Streams (EGGS) from Euclid's Zoo(niverse)	Lausanne, Switzerland
Aug 2024	ASA: Astrostatistics Interest Group Paper Competition Stream Members Only: Data-Driven Characterization of Stellar Streams	not attended
Aug 2024	Streams 24: The theory edition (Talk) From JAX to Galax, a new generation of stellar stream tools Using ML to select stellar stream members	Durham, UK
May 2024	Division on Dynamical Astronomy #55 (Talk) Stream Members Only: Data-Driven Characterization of Stellar Streams	Toronto, ON, Canada
May 2024	Globular Clusters and Their Tidal Tails (Talk) Stream Members Only: Data-Driven Characterization of Stellar Streams	Toronto, ON, Canada
Oct 2023	DESC sprint week	Pittsburgh, PA, USA
May 2023	Astropy Conference (Talk) An Interoperable Future with Astropy	Cambridge, MA, USA
Mar 2023	IAUS379: Dynamical Masses of Local Group Galaxies (Poster) Stellar Stream Track Reconstruction, with Errors	Potsdam, Germany

Jan 2023	AAS 2023 (Talk) Astropy Tutorials on Units & Constants	Seattle, WA, USA
Oct 2022	CATS-2022  Streams22: A workshop for assembling a Community Atlas of Tidal Streams	Pasadena, CA, USA
Jun 2021	AAS 2021 (Talk) Astropy Tutorials on Units & Constants, Coordinates, and Cosmology	Online
May 2021	CASCA AGM (Poster) Straight Lightning as a Signature of Macroscopic Dark Matter	Online
May 2021	CASCA AGM (Poster) Stellar Stream Track Reconstruction, with Errors	Online
May 2021	Stellar Stats Workshop (Talk) Stellar Stream Track Reconstruction, with Errors	Toronto, ON, Canada
Aug 2020	STScI 2020 The Local Group: Assembly and Evolution Symposium (Poster) Constraints on Milky Way Halo Triaxiality from Palomar 5	Online
Jul 2020	Kaplan cosmology course (Talk) Paid lecturer in Kaplan Cosmology course at Case Western Reserve University	Cleveland, OH, USA
Dec 2019	30th Texas Symposium On Relativistic Astrophysics (Talk) Resolving the Recombination Visibility Function Width Tension Awarded best graduate student presentation	Portsmouth, UK
Sep 2019	5th Gaia Challenge Conference (Talk) Using Manifold Learning Techniques to Identify Stream Progenitors	Paris, France
Sep 2019	5th Gaia Challenge Conference (Talk) Extending the Pal5 Stream Detection Limits	Paris, France
Aug 2019	Great Lakes Cosmology Workshop (Talk) Parameterizing the recombination visibility function	Rochester, NY, USA
May 2018	CWRU SOURCE Intersections (Poster) A new algorithm to quantify maximal disks	Cleveland, OH, USA
Oct 2017	CWRU Physics Seminar (Talk) Understanding the Dark Matter distribution in galaxies using maximal disks	Cleveland, OH, USA
Aug 2017	CWRU Astronomy Summer Seminar (Talk) Understanding the Dark Matter distribution in galaxies using maximal disks	Cleveland, OH, USA
Jun 2017	Dwarf Galaxies on the Shoulders of Giants Workshop on topics related to dwarf galaxies and the dark matter problem Conference Volunteer	Cleveland, OH, USA
Aug 2016	Cornell CLASSE Summer Seminar (Talk) Coherent curvature radiation in a neutron star's monopolar magnetic field	Ithaca, NY, USA

CONFERENCES

Sep 2026	Astropy 2026 Conference Role: Coordination Committee and Strategic Planning Committee; moderated online discussion and helped moderate the AI sessions.	Online
Aug 2026	Astrophysics and Space Science in Marche III: Big Bang, Big Stars, Big Computers Role: SOC	Jesi, Italy
Jan 2026	Gaia Hackathon  Role: LOC	Cambridge, MA, USA
Jun 2025	Astropy Coordination Meeting  Role: SOC	Santa Cruz, CA, USA
May 2025	Division of Dynamical Astronomy #56   Role: SOC	Atlanta, GA, USA
Jan 2025	Gaia Hackathon  Role: LOC	Cambridge, MA, USA

Oct 2024	JAXtronomy Workshop 	New York, NY, USA
	Role: SOC	
Jun 2024	Astropy Core Developer Conference	Santa Cruz, CA, USA
May 2024	From JAX to Galax 	Toronto, ON, Canada
	Workshop at Globular Clusters and Their Tidal Tails	
Feb 2023	The Future of Astrophysical Data Infrastructure 	Online
Mar 2022	Astropy Core Developer Conference (Talk)	Boston, MA, USA
	The future of interoperability with Python's Protocols Role: Core developer, maintainer for Astropy Cosmology and Units	
Jul 2021	ComSciCon GTA 2021 	Online
	Role: Organizing Committee member for the Toronto ComSciCon – a workshop series for graduate students on science communication skills	
Jul 2020	ComSciCon GTA 2020 	Online
	Role: Organizing Committee member for Toronto's first ComSciCon	
Apr 2020	Massey Telescope Public Talk Series	Toronto, ON, Canada
	Role: Co-host and gave talk on Ojibwe (First Nation) constellations	
Oct 2019	.Astronomy 11 	Toronto, ON, Canada
	Role: Local Organizing Committee member and lead workshop on scientific plotting	
Jul 2019	ComSciCon Canada 2019 	Hamilton, ON, Canada
	Selected participant at Canada's first national science communication workshop for graduate students	
Jun 2018	The Standard Model at 50 Years 	Cleveland, OH, USA
	A Celebratory Symposium for the Standard Model Conference Volunteer	

MENTORING

May 2026	Reem Hamraz Google Summer of Code for Astropy 
	Hardening Astropy's core stability
2025 – 2026	Amir Abdul (Howard)
	Baryon Modeling in External Galaxies with Stellar Streams
	Leadership Alliance National Symposium, July 23–25, 2025
	2025 NSBP-NSHP Joint Annual Conference, November 19–23, 2025
	2026 APS Global Physics Summit, March 14–20, 2026
2025 – 2026	Taisiia Karasova (MIT) with Prof. Lina Necib (MIT)
	Machine Learning Galaxy intrinsic sizes
2024 – 2026	Charlotte Myers (MIT) with Prof. Lina Necib (MIT)
	Physics-Informed Neural Networks for Modeling Galactic Gravitational Potentials
	NeurIPS Paper
2023 – 2025	Connor McKeigan (Astronomy, UofT) with Prof. Ting Li (UofT)
	Undergraduate thesis project: “Characterizing the stellar streams of S ₅ ”
2019 – 2022	Massey Tutoring Program
	Volunteer math and physics tutor to prospective first-generation college students
	2019, 2020 and 2022.

TEACHING

2019 – 2020	Lead Observer: AST101-325 , University of Toronto
	Role: Trained and liaised with TAs and students in all courses using the campus telescope facilities.
2019 – 2024	TA, AST 201: Stars and Galaxies , University of Toronto
	Role: Designed and ran weekly course tutorial sections, created exam questions, proctored exams, and graded course projects.
	2019, 2021–2024.
2018 – 2023	TA, AST 101: The Sun and its Neighbours , University of Toronto
	Role: Designed and ran weekly course tutorial sections, planetarium shows, & observing nights; created

exam questions, proctored exams, and graded course projects.
2018, 2021–2023.

Aug 2015 **Grader: Honors Mechanics**, CWRU

Graded assignments and exams

2014 – 2015 **Physics Instructor for IB Physics**, Montessori High School, Cleveland

Prepared and tutored IB physics class, assigning and grading homework, for IB exam

PEER REVIEW

- Journals — Astronomy & Astrophysics · The Astrophysical Journal · European Physical Journal C · Monthly Notices of the Royal Astronomical Society · Journal of Open Source Software ([commensurability: a Python package for classifying astronomical orbits based on their toroid volume](#))
- Panels — National Science Foundation project funding panel

PROFESSIONAL SERVICE

2022 – 2023 **Massey House Committee**

Junior Fellow governance committee at Massey college.

2019 – 2024 **MasseyScope Committee Member**, Massey College

Organizing astronomy outreach with a focus on underprivileged communities

2019 – 2020 **Sigma Nu Alumni Advisory Board**

Role: Member of the Sustainability and Chapter Operations committees

2018 – **Canadian Astronomical Society (CASCA)**, Canadian Astronomical Society

2015 – 2017 **Executive Board Member for Chabad at CWRU**

Organized events on campus: dinners, holidays, charity events, and outreach programs Role: General Executive Board Member (2016-2017) Role: Chief financial officer (2015 -2016)

2015 – 2018 **Sigma Nu Fraternity**

Member in good standing. Served as webmaster (2016-2018) in charge of the fraternity webpage for news, programmed events, and intra-fraternal governance

OUTREACH

Aug 2026 **Public Talk in Jesi, Italy**, Astrophysics and Space Science in Marche III



Oct 2021 **Origins Science Scholars Lecture Series**, Origins Science Scholars

program, Case Western Reserve University

Science of Origins: Dark Matter and the Milky Way

Online

2019 – 2021 **AstroTours Telescope Organizer**, Dunlap Institute for Astronomy &

Astrophysics, University of Toronto 

Organizer for all telescope outreach in Dunlap's public event

2019 – 2022 **Massey Telescopes Outreach Coordinator**, Massey College

Organizing committee member for astronomy outreach and appreciation at

Massey College

2019 **Planet Party Toronto Volunteer**, Department of Astronomy and

Astrophysics, University of Toronto

2018 – 2020 **Astronomy on Tap Toronto Volunteer**, Department of Astronomy and

Astrophysics, University of Toronto

2018 – 2019 **AstroTours Planetarium Presenter**, Dunlap Institute for Astronomy &

Astrophysics, University of Toronto

Regular planetarium show designer and presenter for Dunlap's AstroTours public outreach

2018 – 2021 **AstroTours Toronto Outreach Volunteer**, Dunlap Institute for

Astronomy & Astrophysics, University of Toronto

2017 **Cosmology Overview at CWRU Origins (Talk)**

The Universe: A Brief History

Cleveland, OH, USA

SMALL GRANTS

- Sep 2023 **Dunlap Student Training Grant**
To attend the DESC sprint week
- Jun 2023 **Collaboration Meeting Grant**
To visit the Center for Computational Astrophysics and collaborate on the paper
- May 2023 **Astropy Moore Travel Grant**
To participate in the 2023 Astropy Coordination meeting
- Sep 2022 **Dunlap Student Training Grant** [🔗](#)
To attend Streams22: the Community Atlas of Tidal Streams workshop
- Sep 2022 **Streams22 Conference Bursary** [🔗](#)
To attend Streams22: the Community Atlas of Tidal Streams workshop
- Dec 2019 **Reinhardt Travel Award**
To present at the 30th Texas Symposium on Relativistic Astrophysics
- Dec 2019 **STScI Travel Funding**
To attend STScI 2020 The Local Group: Assembly and Evolution Symposium
- Aug 2019 **Dunlap Student Travel Grant**
To present at the 5th Gaia Challenge Workshop (Value: \$2,075)
- Aug 2019 **Reinhardt Travel Award**
To present at the Great Lakes Cosmology Workshop
- Jul 2019 **ComSciCon Canada Travel Award**
To attend the first Canadian Science Communication Conference, ComSciConCAN

MEDIA

- May 2023 **The JCR: A Massey Podcast - ChatGPT: Friend or Foe**, The JCR: A Massey Podcast - ChatGPT: Friend or Foe [🔗](#)
Panelist for a public podcast interviewing researchers on how generative AI is used in various scientific fields
- Feb 2023 **The New Scientist**, The New Scientist [🔗](#)
Featured in article on various strategies to detect dark matter, including the method from my paper
- Mar 2022 **Massey Dialogue: Science and Aesthetics**, Massey Dialogue: Science and Aesthetics [🔗](#)
Panelist for interdisciplinary salon discussion series
- May 2021 **Smithsonian Feature Article**, Smithsonian Feature Article [🔗](#)
Interviewed for feature article about my paper
- Sep 2020 **Massey Dialogue: Techplomacy with Consul General Rana Sarkar**, Massey Dialogue: Techplomacy with Consul General Rana Sarkar [🔗](#)
Panelist and co-organizer for a salon discussion on the Future of regulating Big Tech