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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 & Core Developer**, Astropy 🔗  
Role: Member, Core Developer Team; lead maintainer for Cosmology, co-maintainer of Units.  
2025–2028: Coordination Committee (executive committee).  
2025–2026: Strategic Planning and Organizing Committee.  
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.

## 📄 PUBLICATIONS

Students I supervised or advised: [undergraduate<sup>†</sup>](#), [graduate<sup>†</sup>](#).

1. **N. Starkman**, A. Price-Whelan. *Coordinax: an extended framework for coordinates and differential geometry in JAX*. [IN-PREP](#)

2. **N. Starkman**. *Spatial Correlations in Extragalactic Stellar Stream Convexities: Distinguishing CDM, SIDM, and MOND*. [IN-PREP](#)
3. **N. Starkman**. *Directly Model the Stream: A State-Space Model for Gravitational Potentials from Stellar Streams*. [IN-PREP](#)
4. **N. Starkman**, J. Nibauer, S. Pearson, **S. Wu<sup>‡</sup>**, L. Necib. *When Streams Curve Away: a Test of Dark Matter from Extragalactic Stellar Stream Populations*. [SUBMITTED](#) [ADS](#) [arXiv:2609.40057](#)
5. Euclid Collaboration, **N. Starkman**, J. Nibauer, S. Pearson, **S. Wu<sup>‡</sup>**, M. Walmsley, L. Necib, et al. *Euclid Quick Data Release (Q1): The geometry of dark matter halos from extragalactic streams*. *Astronomy & Astrophysics* [SUBMITTED](#) [ADS](#) [arXiv:2606.21774](#)
6. **C. Myers<sup>‡</sup>**, **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](#) [arXiv:2606.18386](#)
7. L. Necib, D. Folsom, E. Y. Davies, **N. Starkman**, A. Thoyas. *Galactic Amnesia: The Information Washout of the Milky Way Merger History*. [SUBMITTED](#) [ADS](#) [arXiv:2605.04138](#)
8. **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](#)
9. **S. Wu<sup>‡</sup>**, **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](#) [arXiv:2605.07809](#)
10. **S. Wu<sup>‡</sup>**, **N. Starkman**, J. Nibauer, S. Pearson. *Potamides: JAX tools for curvature-based inference from stellar streams*. *Journal of Open Source Software* 11, 10712 [10.21105/joss.10712](#)
11. **C. Myers<sup>‡</sup>**, **N. Starkman**, L. Necib. *Physics-Informed Neural Networks for Modeling Galactic Gravitational Potentials*. *Advances in Neural Information Processing Systems (NeurIPS 2025)* [OpenReview](#)
12. 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 [10.3847/1538-4357/adb8e8](#) [ADS](#) [arXiv:2410.21174](#)
13. **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 [10.21105/joss.07771](#)
14. **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 [10.3847/1538-4357/ad94f2](#) [ADS](#) [arXiv:2311.16960](#)
15. **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 [10.1093/mnras/stae665](#) [arXiv:2310.01578](#)
16. **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 [10.1093/mnras/stad1166](#) [arXiv:2212.00949](#)
17. 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](#) [arXiv:2206.14220](#)
18. **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](#) [arXiv:2006.16272](#)
19. **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](#) [arXiv:1909.03048](#)
20. 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](#) [arXiv:1811.00553](#)
21. **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](#) [ADS](#) [arXiv:1802.09967](#)

## FELLOWSHIPS & AWARDS

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|             |                                                                                                                                                                                                                 |          |
|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| Oct 2026    | <b>Pacific Postdoc Program</b>                                                                                                 |          |
|             | A one-month fellowship at at the University of Washington in Seattle                                                                                                                                            |          |
| Jan 2025    | <b>AAS Lancelot M. Berkeley–New York Community Trust Prize</b> , American Astronomical Society                                 |          |
|             | <i>to the Astropy Collaboration</i>                                                                                                                                                                             |          |
|             | Team award, as a core developer and Coordination Committee member of Astropy.                                                                                                                                   |          |
| Feb 2024    | <b>Brinson Prize Fellowship</b>                                                                                                |          |
|             | “to support early-career astrophysicists and cosmologists who are committed to chasing bold ideas with creative, nimble, and innovative research.”                                                              |          |
| Feb 2024    | <b>NSERC PDF</b>                                                                                                               | declined |
|             | Postdoctoral Fellowships program (Natural Sciences and Engineering Research Council of Canada). Declined                                                                                                        |          |
| Nov 2023    | <b>IOP Publishing Top Cited Paper Award, North America</b> , 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    | <b>Jackman Massey Bursary</b>                                                                                                                                                                                   |          |
| May 2022    | <b>OSOTF HUDD Award at Massey</b> , Massey College                                                                             |          |
|             | Ontario Student Opportunity Trust Fund                                                                                                                                                                          |          |
| 2022        | <b>ADASS Prize for an Outstanding Contribution to Astronomical Software</b> , Astronomical Data Analysis Software and Systems  |          |
|             | <i>to the Astropy Project</i>                                                                                                                                                                                   |          |
|             | Team award, as a core developer of Astropy.                                                                                                                                                                     |          |
| 2020 – 2023 | <b>NSERC - CGS D</b>                                                                                                         |          |
|             | Alexander Graham Bell Canada Graduate Scholarship-Doctoral Award (Natural Sciences and Engineering Research Council of Canada)                                                                                  |          |
| 2019 – 2020 | <b>NSERC - CGS M</b>                                                                                                         |          |
|             | Canada Graduate Scholarships 1st Year Program (Natural Sciences and Engineering Research Council of Canada)                                                                                                     |          |
| Sep 2018    | <b>Graduate Admissions Award</b>                                                                                                                                                                                |          |
|             | UofT Faculty of Arts & Science                                                                                                                                                                                  |          |
| 2018 – 2024 | <b>University of Toronto Graduate Fellowship</b> , University of Toronto                                                                                                                                        |          |
| May 2018    | <b>Donald A. Glaser Award</b>                                                                                                                                                                                   |          |
|             | To an outstanding Mathematics and Physics Senior                                                                                                                                                                |          |
| May 2018    | <b>John Schoff Millis Award</b>                                                                                                                                                                                 |          |
|             | To the senior with the best academic record in the College of Arts and Sciences                                                                                                                                 |          |
| May 2018    | <b>Summa Cum Laude</b>                                                                                                                                                                                          |          |
| Apr 2017    | <b>Outstanding Junior Award of Arts and Sciences</b>                                                                                                                                                            |          |
| Apr 2017    | <b>The Albert A. Michelson Prize</b>                                                                                                                                                                            |          |
|             | “To a [3rd year] physics major who has demonstrated superior performance”                                                                                                                                       |          |
| Mar 2017    | <b>Goldwater Scholarship Honorable Mention</b>                                                                                                                                                                  |          |
|             | “For exceptional promise of becoming this nation’s next generation of research leaders”                                                                                                                         |          |
| Apr 2016    | <b>Phi Beta Kappa Academic Award</b>                                                                                                                                                                            |          |
| Mar 2016    | <b>Goldwater Scholarship Honorable Mention</b>                                                                                                                                                                  |          |
| 2014 – 2018 | <b>Dean’s High Honor List</b>                                                                                                                                                                                   |          |
|             | To the students with the best academic record. Awarded semesterly                                                                                                                                               |          |
| 2014 – 2018 | <b>Case Western Reserve University Merit Scholarship</b>                                                                                                                                                        |          |

## MAJOR GRANTS

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|          |                                                                                                                            |            |
|----------|----------------------------------------------------------------------------------------------------------------------------|------------|
| Jul 2022 | <b>Astropy Cycle III Funding Grant</b>  | USD 12,000 |
|          | USD 12,000 NASA ROSES and Moore Foundation funding to Astropy Lead: “Cosmology in Astropy”                                 |            |

USD 8,000 NASA ROSES and Moore Foundation funding to Astropy Lead: "Quantity 2.0: unitful calculations beyond NumPy"

## SOFTWARE

### **preamble**

A LaTeX preamble worth reusing

### **galactoPINNs** 2026

Physics-informed neural networks for galactic potentials

### **diffraction**

Extras for Diffraction

### **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

### **mvgekde**

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 | <b>Marche III: Big Bang, Big Stars, Big Computers (Jesi)</b>                                                                    | Jesi, Italy              |
|          | Energy Structures of Extragalactic Stellar Streams Reveal Dark Matter Halos                                                     |                          |
| Jun 2026 | <b>EAS 26-S10 (Lausanne)</b>                 | Lausanne, Switzerland    |
|          | The Geometry of Dark Matter Halos from Extragalactic Streams                                                                    |                          |
| Feb 2026 | <b>CWRU Seminar (Cleveland)</b>                                                                                                 | Cleveland, OH, USA       |
|          | Computationally Unscrambling EGGS (Extra-Galactic Gravity from Streams)                                                         |                          |
| Nov 2025 | <b>TevPA (Valencia)</b>                                                                                                         | Valencia, Spain          |
|          | The Geometry of Dark Matter Halos from Extragalactic Streams                                                                    |                          |
| Oct 2025 | <b>DARK seminar (Copenhagen)</b>                                                                                                | Copenhagen, Denmark      |
|          | The Geometry of Dark Matter Halos from Extragalactic Streams                                                                    |                          |
| Oct 2025 | <b>Texas A&amp;M Seminar (Texas)</b>                                                                                            | College Station, TX, USA |
|          | The Geometry of Dark Matter Halos from Extragalactic Streams                                                                    |                          |
| Sep 2025 | <b>CCA Software seminar (NYC)</b>                                                                                               | New York, NY, USA        |
|          | unxt, coordinax, and software development in JAX                                                                                |                          |
| Sep 2025 | <b>Princeton Thunch Seminar (Princeton)</b>  | Princeton, NJ, USA       |
|          | Euclid: The Geometry of Dark Matter Halos from Extragalactic Streams                                                            |                          |
| Mar 2025 | <b>DARK seminar (Copenhagen)</b>                                                                                                | Copenhagen, Denmark      |
|          | Bayesian models for detecting streams in LSST data                                                                              |                          |
| Oct 2024 | <b>CWRU Seminar</b>                          | Cleveland, OH, USA       |
|          | Stream Members Only: Data-Driven Characterization of Stellar Streams for Inference on the Galactic Potential                    |                          |
| Jan 2023 | <b>CITA Seminar</b>                                                                                                             | Toronto, ON, Canada      |
|          | Astropy Cosmology: the Present and the Expanding Future                                                                         |                          |
| Mar 2022 | <b>Oxford Physics Colloquium</b>                                                                                                | Online                   |
|          | Straight Lightning as a Signature of Macroscopic Dark Matter (Invited Colloquium Talk)                                          |                          |

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|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| Oct 2021 | <b>Origins Science Scholars Lecture Series</b><br>Science of Origins: Dark Matter and the Milky Way                                                                | Online             |
| Aug 2020 | <b>Johns Hopkins University Physics Journal Club</b><br>Straight Lightning as a Signature of Macroscopic Dark Matter                                               | Online             |
| Aug 2017 | <b>Origins Cruise to the British Isles, Iceland and Norway (Talk)</b><br><a href="#">🔗</a><br>The Life and Death of the Universe: An Overview Lecture on Cosmology |                    |
| 2017     | <b>Cosmology Overview at CWRU Origins (Talk)</b><br>The Universe: A Brief History                                                                                  | Cleveland, OH, USA |

## PRESENTATIONS

|          |                                                                                                                                                                         |                       |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Aug 2026 | <b>New Frontiers in Cosmology (Talk)</b><br>Energy Structures of Extragalactic Stellar Streams Reveal Dark Matter Halos                                                 | A Coruña, Spain       |
| Jul 2026 | <b>Near Field Cosmology in the Era of Big Data (Talk)</b> <a href="#">🔗</a><br>Energy Structures of Extragalactic Stellar Streams Reveal Dark Matter Halos              | Toronto, ON, Canada   |
| Jun 2026 | <b>DARK Seminar (Talk)</b><br>Energy Structures of Extragalactic Stellar Streams Reveal Dark Matter Halos                                                               | Copenhagen, Denmark   |
| Jan 2026 | <b>York Seminar (Talk)</b><br>Euclid: The Geometry of Dark Matter Halos from Extragalactic Streams                                                                      | Toronto, ON, Canada   |
| Nov 2025 | <b>TeVPA (Talk)</b> <a href="#">🔗</a><br>Euclid: The Geometry of Dark Matter Halos from Extragalactic Streams                                                           | Valencia, Spain       |
| Oct 2025 | <b>IAUS 403 (Talk)</b> <a href="#">🔗</a><br>Euclid: The Geometry of Dark Matter Halos from Extragalactic Streams                                                        | Córdoba, Spain        |
| Sep 2025 | <b>Cosmology 2025 (Talk)</b> <a href="#">🔗</a><br>Euclid: The Geometry of Dark Matter Halos from Extragalactic Streams                                                  | Portoferraio, Italy   |
| Sep 2025 | <b>MKI Journal Club (Talk)</b><br>Euclid: The Geometry of Dark Matter Halos from Extragalactic Streams                                                                  | Cambridge, MA, USA    |
| May 2025 | <b>DDA #56</b> <a href="#">🔗</a><br>Extra-Galactic Gravity using Streams (EGGS) from Euclid's Zoo(niverse)                                                              | Atlanta, GA, USA      |
| May 2025 | <b>Euclid LU-SWG (Talk)</b><br>Extra-Galactic Gravity using Streams (EGGS) from Euclid's Zoo(niverse)                                                                   | Lausanne, Switzerland |
| Aug 2024 | <b>ASA: Astrostatistics Interest Group Paper Competition</b> <a href="#">🔗</a><br>Stream Members Only: Data-Driven Characterization of Stellar Streams                  | not attended          |
| Aug 2024 | <b>Streams 24: The theory edition (Talk)</b> <a href="#">🔗</a><br>From JAX to Galax, a new generation of stellar stream tools Using ML to select stellar stream members | Durham, UK            |
| May 2024 | <b>Division on Dynamical Astronomy #55 (Talk)</b> <a href="#">🔗</a><br>Stream Members Only: Data-Driven Characterization of Stellar Streams                             | Toronto, ON, Canada   |
| May 2024 | <b>Globular Clusters and Their Tidal Tails (Talk)</b> <a href="#">🔗</a><br>Stream Members Only: Data-Driven Characterization of Stellar Streams                         | Toronto, ON, Canada   |
| Oct 2023 | <b>DESC sprint week</b>                                                                                                                                                 | Pittsburgh, PA, USA   |
| May 2023 | <b>Astropy Conference (Talk)</b><br>An Interoperable Future with Astropy                                                                                                | Cambridge, MA, USA    |
| Mar 2023 | <b>IAUS379: Dynamical Masses of Local Group Galaxies (Poster)</b> <a href="#">🔗</a><br><a href="#">🔗</a><br>Stellar Stream Track Reconstruction, with Errors            | Potsdam, Germany      |
| Jan 2023 | <b>AAS 2023 (Talk)</b><br>Astropy Tutorials on Units & Constants                                                                                                        | Seattle, WA, USA      |
| Oct 2022 | <b>CATS-2022</b> <a href="#">🔗</a><br>Streams22: A workshop for assembling a Community Atlas of Tidal Streams                                                           | Pasadena, CA, USA     |
| Jun 2021 | <b>AAS 2021 (Talk)</b><br>Astropy Tutorials on Units & Constants, Coordinates, and Cosmology                                                                            | Online                |

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| May 2021 | <b>CASCA AGM (Poster)</b><br>Straight Lightning as a Signature of Macroscopic Dark Matter                                                                                                      | Online              |
| May 2021 | <b>CASCA AGM (Poster)</b><br>Stellar Stream Track Reconstruction, with Errors                                                                                                                  | Online              |
| May 2021 | <b>Stellar Stats Workshop (Talk)</b><br>Stellar Stream Track Reconstruction, with Errors                                                                                                       | Toronto, ON, Canada |
| Aug 2020 | <b>STScI 2020 The Local Group: Assembly and Evolution Symposium (Poster)</b><br>Constraints on Milky Way Halo Triaxiality from Palomar 5                                                       | Online              |
| Jul 2020 | <b>Kaplan cosmology course (Talk)</b><br>Paid lecturer in Kaplan Cosmology course at Case Western Reserve University                                                                           | Cleveland, OH, USA  |
| Dec 2019 | <b>30th Texas Symposium On Relativistic Astrophysics (Talk)</b><br>Resolving the Recombination Visibility Function Width Tension Awarded best graduate student presentation                    | Portsmouth, UK      |
| Sep 2019 | <b>5th Gaia Challenge Conference (Talk)</b><br>Using Manifold Learning Techniques to Identify Stream Progenitors                                                                               | Paris, France       |
| Sep 2019 | <b>5th Gaia Challenge Conference (Talk)</b><br>Extending the Pal5 Stream Detection Limits                                                                                                      | Paris, France       |
| Aug 2019 | <b>Great Lakes Cosmology Workshop (Talk)</b><br>Parameterizing the recombination visibility function                                                                                           | Rochester, NY, USA  |
| Jun 2018 | <b>The Standard Model at 50 Years</b> <br>A Celebratory Symposium for the Standard Model Conference Volunteer | Cleveland, OH, USA  |
| May 2018 | <b>CWRU SOURCE Intersections (Poster)</b><br>A new algorithm to quantify maximal disks                                                                                                         | Cleveland, OH, USA  |
| Oct 2017 | <b>CWRU Physics Seminar (Talk)</b><br>Understanding the Dark Matter distribution in galaxies using maximal disks                                                                               | Cleveland, OH, USA  |
| Aug 2017 | <b>CWRU Astronomy Summer Seminar (Talk)</b><br>Understanding the Dark Matter distribution in galaxies using maximal disks                                                                      | Cleveland, OH, USA  |
| Jun 2017 | <b>Dwarf Galaxies on the Shoulders of Giants</b><br>Workshop on topics related to dwarf galaxies and the dark matter problem<br>Conference Volunteer                                           | Cleveland, OH, USA  |
| Aug 2016 | <b>Cornell CLASSE Summer Seminar (Talk)</b><br>Coherent curvature radiation in a neutron star's monopolar magnetic field                                                                       | Ithaca, NY, USA     |

## CONFERENCES

|          |                                                                                                                                                                                                                                 |                     |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|
| Sep 2026 | <b>Astropy 2026 Conference</b><br>Role: Coordination Committee and Strategic Planning Committee; moderated online discussion and helped moderate the AI sessions.                                                               | Online              |
| Aug 2026 | <b>Astrophysics and Space Science in Marche III: Big Bang, Big Stars, Big Computers</b><br>Role: SOC                                                                                                                            | Jesi, Italy         |
| Jan 2026 | <b>Gaia Hackathon</b> <br>Role: LOC                                                                                                          | Cambridge, MA, USA  |
| Jun 2025 | <b>Astropy Coordination Meeting</b> <br>Role: SOC                                                                                            | Santa Cruz, CA, USA |
| May 2025 | <b>Division of Dynamical Astronomy #56</b>  <br>Role: SOC | Atlanta, GA, USA    |
| Jan 2025 | <b>Gaia Hackathon</b> <br>Role: LOC                                                                                                          | Cambridge, MA, USA  |
| Oct 2024 | <b>JAXtronomy Workshop</b> <br>Role: SOC                                                                                                     | New York, NY, USA   |
| Jun 2024 | <b>Astropy Core Developer Conference</b>                                                                                                                                                                                        | Santa Cruz, CA, USA |
| May 2024 | <b>From JAX to Galax</b> <br>Workshop at Globular Clusters and Their Tidal Tails                                                             | Toronto, ON, Canada |

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|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| Feb 2023 | <b>The Future of Astrophysical Data Infrastructure</b>                                     | Online               |
| Mar 2022 | <b>Astropy Core Developer Conference (Talk)</b><br>The future of interoperability with Python's Protocols Role: Core developer, maintainer for Astropy Cosmology and Units | Boston, MA, USA      |
| Jul 2021 | <b>ComSciCon GTA 2021</b>                                                                 | Online               |
|          | Role: Organizing Committee member for the Toronto ComSciCon – a workshop series for graduate students on science communication skills                                      |                      |
| Jul 2020 | <b>ComSciCon GTA 2020</b>                                                                 | Online               |
|          | Role: Organizing Committee member for Toronto's first ComSciCon                                                                                                            |                      |
| Apr 2020 | <b>Massey Telescope Public Talk Series</b>                                                                                                                                 | Toronto, ON, Canada  |
|          | Role: Co-host and gave talk on Ojibwe (First Nation) constellations                                                                                                        |                      |
| Oct 2019 | <b>Astronomy 11</b>                                                                       | Toronto, ON, Canada  |
|          | Role: Local Organizing Committee member and lead workshop on scientific plotting                                                                                           |                      |
| Jul 2019 | <b>ComSciCon Canada 2019</b>                                                              | Hamilton, ON, Canada |
|          | Selected participant at Canada's first national science communication workshop for graduate students                                                                       |                      |

## MENTORING

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

## TEACHING

|             |                                                                                                                                                                                                                                                                   |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2019 – 2020 | <b>Lead Observer: AST101-325</b> , University of Toronto<br>Role: Trained and liaised with TAs and students in all courses using the campus telescope facilities.                                                                                                 |
| 2019 – 2024 | <b>TA, AST 201: Stars and Galaxies</b> , University of Toronto<br>Role: Designed and ran weekly course tutorial sections, created exam questions, proctored exams, and graded course projects.<br>2019, 2021–2024.                                                |
| 2018 – 2023 | <b>TA, AST 101: The Sun and its Neighbours</b> , University of Toronto<br>Role: Designed and ran weekly course tutorial sections, planetarium shows, & observing nights; created exam questions, proctored exams, and graded course projects.<br>2018, 2021–2023. |
| Aug 2015    | <b>Grader: Honors Mechanics</b> , CWRU<br>Graded assignments and exams                                                                                                                                                                                            |
| 2014 – 2015 | <b>Physics Instructor for IB Physics</b> , Montessori High School, Cleveland<br>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 – **Massey 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 – **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

- 2019 – 2021 **AstroTours Telescope Organizer**   
Organizer for all telescope outreach in Dunlap's public event
- 2019 – 2022 **Massey Telescopes Outreach Coordinator**  
Organizing committee member for astronomy outreach and appreciation at Massey College
- 2019 **Planet Party Toronto Volunteer**
- 2018 – 2020 **Astronomy on Tap Toronto Volunteer**
- 2018 – 2019 **AstroTours Planetarium Presenter**  
Regular planetarium show designer and presenter for Dunlap's AstroTours public outreach
- 2018 – 2021 **AstroTours Toronto Outreach Volunteer**

## 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

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- 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