

Jack Hollis Farrell

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<https://jackfarrell.ca> Department of Physics
[GitHub](#)

EDUCATION

Ph.D. Physics, University of Colorado Boulder

2021–Present

- Advisor: Prof. Andrew Lucas
- GPA 4.00/4.00

Honours B.Sc. Physics, University of Toronto

2017–2021

- Major in Physics, Minors in Mathematics and English.
- GPA 3.96/4.00

TEACHING

Instructor of Record, University of Colorado Boulder

- PHYS 1400: Fundamentals of Scientific Inquiry ([student projects](#)) ([slides](#))

2025

Guest Lecturer, University of Colorado Boulder

- PHYS 5210: Graduate Classical Mechanics 2024
- PHYS 4410: Quantum Mechanics II 2023

Teaching Assistant, University of Colorado Boulder

- PHYS 1125 2023
- PHYS 1110 2023
- PHYS 1110 2022
- PHYS 1110 2021

Teaching Assistant, University of Toronto

2020–2021

- Extra help for programming in **Python** for physics majors

Physics Tutor, Victoria College Physics Tutors

2019–2020

- Extra help for first- and second-year physics classes

INVITED TALKS

1. *Generalized Time-Reversal Symmetry and Effective Theories for Nonequilibrium Matter*, CTQM Seminar, Center for Theory of Quantum Matter (2024). [slides](#)

CONTRIBUTED PRESENTATIONS

1. *(title forthcoming)*, APS Global Physics Summit (2026) — Oral presentation. [slides](#)
2. *Endpoint of a Ballistic Dyakonov-Shur Instability*, APS March Meeting (2025) — Oral presentation. [slides](#)

3. *Generalized Time-Reversal Symmetry and Effective Theories for Nonequilibrium Matter*, UQM: Ultra Quantum Matter (2024) — Poster Presentation. [poster](#)
4. *Effective Theories for Nonequilibrium Matter*, APS March Meeting (2024) — Oral presentation. [slides](#)
5. *Hydrodynamics with Helical Symmetry*, APS March Meeting (2023) — Oral presentation. [slides](#)

HONOURS

<i>University of Toronto BMO National Scholarship</i>	2017–2021
• Full scholarship to U of T, covering tuition and living fees for four years.	
<i>NSERC Canada Graduate Scholarship (CGS-M)</i> , NSERC	2021
• Declined: offered at U of T, UBC, University of Waterloo / Perimeter Institute.	
• Research grant for first-year Ph.D. students.	
<i>NSERC Undergraduate Summer Research Award</i>	2020
• Project: <i>Computational Electron Hydrodynamics</i>	
• Supervisors: Prof. Thomas Scaffidi & Prof. Nicolas Grisouard	
<i>Hymie and Roslyn Mida Award in Theoretical Physics</i>	2020
• Award for outstanding research potential in theoretical physics.	
<i>NSERC Undergraduate Summer Research Award</i>	2019
• Project: <i>Balloon-Borne Spectrometer Mission</i>	
• Supervisor: Prof. Kaley A. Walker	
<i>University of Toronto Scholar</i>	2018–2019
• The University of Toronto Scholars Program recognizes exceptional students in first, second, or third year.	

PUBLICATIONS

1. Johannes Geurs, Tatiana A. Webb, Yinjie Guo, Itai Keren, **Jack H. Farrell**, Jikai Xu, Kenji Watanabe, Takashi Taniguchi, Dmitri N. Basov, James Hone, Andrew Lucas, Abhay Pasupathy, Cory R. Dean. *Supersonic flow and hydraulic jump in an electronic de Laval nozzle* (2023), arXiv: [2509.16321](#)
2. **Jack H. Farrell**, Xiaoyang Huang, Aaron J. Friedman, Isabella Zane, Paolo Glorioso, and Andrew Lucas. *Generalized time-reversal symmetry and effective theories for nonequilibrium matter* (2023), arXiv: [2310.12233](#)
3. **Jack H. Farrell**, Xiaoyang Huang, and Andrew Lucas. *Hydrodynamics with Helical Symmetry* (2022), arXiv: [2208.12269](#)
4. **Jack H. Farrell**, Nicolas Grisouard, and Thomas Scaffidi. *Terahertz Radiation from the Dyakonov-Shur Instability of Hydrodynamic Electrons in a Corbino Geometry* (2022), arXiv: [2112.07683](#)