

Dr. Tim Hallatt

ASTROPHYSICIST

[✉ thallatt@mit.edu](mailto:thallatt@mit.edu) | [🏡 thallatt.github.io/](https://thallatt.github.io/) | [🔗 tim-hallatt-904539273/](https://tim-hallatt-904539273/)

Academic Positions

MIT Kavli Institute for Astrophysics and Space Research

POSTDOCTORAL ASSOCIATE

Cambridge, Massachusetts

Sept. 2024 - present

- advisor: Prof. Sarah Millholland

Education

McGill University

PHD, PHYSICS

Montréal, Quebec

Sept. 2021 - July, 2024

- advisor: Prof. Eve J. Lee
- thesis title: "On the Formation of Planets in the Milky Way's Thick Disk"
- topic: theoretical astrophysics
- tools: **MESA** hydrodynamics/interior structure code, **REBOUND** dynamics code, **Python**, **Fortran**
- additional skills: machine learning with **scikit-learn**

McGill University

MSc, PHYSICS

Montréal, Quebec

Sept. 2019 - Sept. 2021

- advisor: Prof. Eve J. Lee
- thesis title: "Leveraging Exoplanet Occurrence Rates to Test Planet Formation Theory"
- topic: theoretical astrophysics

University of Western Ontario

HON. BSC, PHYSICS

London, Ontario

Sept. 2015 - April, 2019

- honours thesis advisor: Prof. Paul Wiegert
- thesis title: "The Dynamics of Interstellar Asteroids and Comets Within the Galaxy"
- topic: dynamics

Publications

PUBLISHED

Hallatt, T., Millholland, S., 2025. Shedding Light on Desert Dwellers. *Astrophysical Journal*, in press.

Hallatt, T., Millholland, S., 2025. Coupled Planetary Interior and Tidal Evolution. *Astrophysical Journal*, in press.

Hallatt, T., Lee, E. J., 2025. On the Formation of Planets in the Milky Way's Thick Disk. *Astrophysical Journal*, vol. 979, no. 120.

Hallatt, T., Lee, E. J., 2022. Sculpting the sub-Saturn Occurrence Rate via Atmospheric Mass Loss. *Astrophysical Journal*, vol. 924, no. 9.

Hallatt, T., Lee, E. J., 2020. Can Large-Scale Migration Explain the Giant Planet Occurrence Rate? *Astrophysical Journal*, vol. 904, no. 2.

Hallatt, T., Wiegert, P., 2020. The Dynamics of Interstellar Asteroids and Comets within the Galaxy: an Assessment of Local Candidate Source Regions for 1I/'Oumuamua and 2I/Borisov. *Astronomical Journal*, vol. 159, no. 4.

Cadieux, C., Plotnykov, M., Doyon, R., et al. (incl. **Hallatt, T.**), 2023. New Mass and Radius Constraints on the LHS 1140 Planets – LHS 1140 b is Either a Temperate Mini-Neptune or a Water World. *Astrophysical Journal Letters*, vol. 960, no. 1.

SUBMITTED (* - SUPERVISED STUDENT)

Mireles, I., Ulmer-Moll, S., Liveoak, D.* (incl. **Hallatt, T.**) 2025. Uncovering the Rapidly Evolving Orbits of the Dynamic TOI-201 System (submitted to *Science*).

WHITE PAPERS

Benneke, B., Cowan, N., Rowe, J. et al. (incl. **Hallatt, T.**), 2019. Exoplanet instrumentation in the 2020s: Canada's pathway towards searching for life on potentially Earth-like exoplanets. Canadian Long Range Plan for Astronomy and Astrophysics White Papers, LRP2020. [[link to paper](#)]

Seminars & Presentations

December 2025. [Oral] *Shedding Light on Desert Dwellers*. International Conference on Exoplanets and Planet Formation, Shanghai, China (**invited**).

November 2025. *Exoplanet Demographics: A Journey Through Space and Time*. Astrophysics Colloquium, Southwest Research Institute (SwRI), Boulder, Colorado (**invited**).

October 2025. *Shedding Light on Desert Dwellers*. Exoplanet Lunch, Princeton University, Princeton, USA (**invited**).

June 2025. *Exoplanet Demographics: A Journey Through Space and Time*. Astrophysics Seminar, University of Bern, Bern, Switzerland (**invited**).

June 2025. *Exoplanet Demographics: A Journey Through Space and Time*. Astrophysics Seminar, Max Planck Institute for Astronomy, Heidelberg, Germany.

June 2025. *Exoplanet Demographics: A Journey Through Space and Time*. Astrophysics Seminar, Institute of Astronomy, University of Cambridge, Cambridge, UK (**invited**).

May 2025. *Shedding Light on Desert Dwellers*. [Oral] AAS Division of Dynamical Astronomy meeting (DDA), Atlanta, Georgia.

April 2025. *Shedding Light on Desert Dwellers*. Exoplanet Lunch, Harvard & Smithsonian Center for Astrophysics, Cambridge, USA.

October 2024. *On the Formation of Planets in the Milky Way's Thick Disk*. Planet & Star Formation Coffee, Max Planck Institute for Astronomy, Heidelberg, Germany (online; **invited**)

September 2024. *On the Formation of Planets in the Milky Way's Thick Disk*. [Oral] MIT & Harvard Planetary Meeting, Cambridge, USA.

June 2024. *On the Formation of Planets in the Milky Way's Thick Disk*. [Poster] Exoplanets 5 conference, Leiden, Netherlands.

September 2023. *Constraining Planet Formation Theory via Exoplanet Occurrence Rates*. Stars & Planets Seminar, Yale University, New Haven, USA (**invited**).

July 2023. *On the Formation of Planets in the Milky Way's Thick Disk*. [Oral] Towards Other Earths III: the Planet-Star Connection, Instituto de Astrofísica e Ciências do Espaço, Porto, Portugal

June 2023. *On the Formation of Planets in the Milky Way's Thick Disk*. [Oral] Emerging Researchers in Exoplanet Science, Yale University, New Haven, USA.

May 2021. *Sculpting the sub-Saturn Occurrence Rate via Atmospheric Mass Loss*. [Oral] High Energy Exoplanets, European Space Agency XMM-Newton Workshop, Online.

November 2020. *Can Large-Scale Migration Explain the Giant Planet Occurrence Rate?* [Oral] ExoDem Conference, Caltech, Online.

October 2020. *Can Large-Scale Migration Explain the Giant Planet Occurrence Rate?* Exocoffee, Max Planck Institute for Astronomy (online; **invited**).

August 2020. *The Dynamics of Interstellar Asteroids and Comets Within the Galaxy*. [Oral] Division of Dynamical Astronomers Meeting, Online.

June 2020. *The Dynamics of Interstellar Asteroids and Comets Within the Galaxy*. [Poster] American Astronomical Society meeting, Online.

Select Awards & Fellowships

| | | |
|------|---|------------|
| 2021 | Alexander Graham Bell Canada Graduate Scholarship-Doctoral , NSERC | \$ 105,000 |
| 2021 | Perseverance Scholarship , McGill University | \$ 1200 |
| 2021 | L. Trottier Science Accelerator fellowship , McGill University | \$ 5000 |
| 2020 | Alexander Graham Bell Canada Graduate Scholarship-Master's , NSERC | \$ 17,500 |
| 2020 | Technologies for Exoplanetary Science Fellowship , NSERC | \$ 6500 |
| 2019 | Donald R. Hay Prize (for best thesis) , Physics & Astronomy Dept., University of Western Ontario | \$ 300 |
| | Dr. Gérard Hébert Scholarship in Physics (for community service, academic excellence, research potential) , Physics & Astronomy Dept., University of Western Ontario | \$ 1700 |

Media Citations & Interviews

[Science News \(2025\): Galactic chaos at cosmic noon may have stunted Milky Way planet formation](#)

[Astronomy Magazine \(2021\): Our Galaxy's Marvelous Rogues and Misfits](#)

[Scientific American \(2020\): Mystery of Interstellar Visitor 'Oumuamua Gets Trickier](#)

[Nature \(2019\): How Two Intruders From Interstellar Space are Upending Astronomy](#)

[Populär Astronomi \(2019\): Interstellar comet Borisov is a well-known stranger](#)

Mentorship

| | | |
|--------------|--|-------------------|
| 2025 | Ritika Sethi , PhD student; research mentorship on coupled orbital/structural evolution of low-mass planets | MIT |
| fall, 2025 | Haedam Im , Undergraduate; research mentorship on stellar rotation periods of hot Neptune hosts | MIT |
| summer, 2025 | DJ Liveoak , Undergraduate; research mentorship on dynamics of TOI-201 system | MIT |
| summer, 2023 | Vincent Savignac , Undergraduate; research mentorship on sub-Neptune core-envelope interaction | McGill University |
| 2020-2021 | Didar Seghi , Undergraduate; academic non-research mentorship | McGill University |
| 2019-2020 | Griffin Schwartz , Undergraduate; academic non-research mentorship | McGill University |
| 2019-2020 | Harper Sewalls , Undergraduate; academic non-research mentorship | McGill University |

Software

Author of PSAND: [Planet Structure ANd Dynamics code package](#) (published in Hallatt & Millholland 2025)

Service & Outreach

| | | |
|-----------------|---|-------------------------------|
| 2020-present | Peer reviewer , AAS Journals, Monthly Notices of the Royal Astronomical Society, Nature | |
| September, 2025 | Postdoc representative , MIT Physics visiting committee | MIT |
| August, 2025 | Panelist/judge , The Center for Excellence in Education's <i>Research Science Institute (RSI) encore presentations</i> (STEM research program) | MIT |
| August, 2023 | McGill STEM summer camp , Science Discussion/Q+A Group Leader | McGill University |
| 2023 | Trottier Space Institute , arXiv paper discussion organizer/leader | McGill University |
| 2020-2022 | Trottier Space Institute , meeting with seminar speaker organizer/leader | McGill University |
| 2021-2022 | McGill Graduate Association of Physics Students , VP Academic | McGill University |
| 2021-2022 | McGill Graduate Association of Physics Students mentorship program , lead organizer | McGill University |
| 2019-2022 | McGill Graduate Association of Physics Students mentorship program , mentor | McGill University |
| 2021-2022 | McGill Graduate Association of Physics Students , meeting with colloquium speaker organizer/leader | McGill University |
| 2019-2022 | McGill Hackathon , mentor | McGill University |
| 2022 | Vanderbilt Astronomy Club, public lecture , online | Vanderbilt University |
| 2021 | AstroMcGill public lecture. Our Galactic Neighbourhood: Insights From Exoplanets and Interstellar Objects , online | McGill University |
| 2018-2019 | Physics and Astronomy Students' Association , President | University of Western Ontario |
| 2016-2019 | Physics and Astronomy Students' Association Help Center , lead organizer/tutor | University of Western Ontario |