

Dr. Tim Hallatt

THEORETICAL ASTROPHYSICIST

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Academic Positions

Massachusetts Institute of Technology (MIT); MIT Kavli Institute for Astrophysics and Space Research

Cambridge, Massachusetts

POSTDOCTORAL ASSOCIATE

Sept. 2024 - present

- advisor: Dr. Sarah Millholland

Education

McGill University

Montréal, Quebec

PHD, PHYSICS

Sept. 2021 - July, 2024

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

McGill University

Montréal, Quebec

MSc, PHYSICS

Sept. 2019 - Sept. 2021

- advisor: Dr. Eve J. Lee
- thesis title: “Leveraging Exoplanet Occurrence Rates to Test Planet Formation Theory”
- topic: theoretical planet formation

University of Western Ontario

London, Ontario

HON. BSc, PHYSICS

Sept. 2015 - April, 2019

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

Publications

PUBLISHED

Hallatt, T., Lee, E. J., 2025. On the Formation of Planets in the Milky Way’s Thick Disk. *Astrophysical Journal*, vol. 979, no. 120. ([link to paper](#))

Hallatt, T., Lee, E. J., 2022. Sculpting the sub-Saturn Occurrence Rate via Atmospheric Mass Loss. *Astrophysical Journal*, vol. 924, no. 9. ([link to paper](#))

Hallatt, T., Lee, E. J., 2020. Can Large-Scale Migration Explain the Giant Planet Occurrence Rate? *Astrophysical Journal*, vol. 904, no. 2. ([link to paper](#))

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. ([link to paper](#))

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 (accepted by *Astrophysical Journal Letters*; [link to paper](#)).

SUBMITTED

Hallatt, T., Millholland, S., 2025. Shedding Light on Desert Dwellers (submitted to AAS Journals).

Hallatt, T., Millholland, S., 2025. Coupled Planetary Interior and Tidal Evolution (submitted to AAS Journals).

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. Online at <https://www.zenodo.org/communities/lrp2020>, id.65. ([link to paper](#))

Seminars & Presentations

December 2025. *Shedding Light on Desert Dwellers*. International Conference on Exoplanets and Planet Formation, Shanghai, China (**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 presentation. 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 presentation. MIT & Harvard Planetary Meeting, Cambridge, USA.

June 2024. *On the Formation of Planets in the Milky Way's Thick Disk*. Poster presentation at 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 presentation. 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 presentation. Emerging Researchers in Exoplanet Science, Yale University, New Haven, USA.

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

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

October 2020. *Can Large-Scale Migration Explain the Giant Planet Occurrence Rate?*. Oral presentation. Exocoffee, Max Planck Institute for Astronomy, Online.

August 2020. *The Dynamics of Interstellar Asteroids and Comets Within the Galaxy*. Oral presentation. Division of Dynamical Astronomers Meeting, Online. [Link to presentation](#)

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

Select Awards & Fellowships

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| 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 |
| 2019 | Dr. Gérard Hébert Scholarship in Physics (for community service, academic excellence, research potential) , Physics & Astronomy Dept., University of Western Ontario | \$ 1700 |

Media Citations & Interviews

Universe Magazine (2025): [Galactic imbalance: Ancient radiation “killed” planets in embryo](#)

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](#)

Service & Outreach

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| 2020-present | Peer Reviewer , AAS Journals, Monthly Notices of the Royal Astronomical Society | |
| August, 2023 | McGill STEM summer camp , Science Discussion/Q+A Group Leader | McGill University |
| 2023 | Trottier Space Institute , arXiv discussion organizer/leader | McGill University |
| 2020-2022 | Trottier Space Institute , Meeting With 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 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 |

Mentorship

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| 2025 | DJ Liveoak , Undergraduate; research mentorship on dynamical evolution of hot Jupiters with companion planets | MIT |
| summer, 2023 | Vincent Savignac , Undergraduate; research mentorship on sub-Neptune core-envelope interaction | McGill University |
| 2020-2021 | Didar Seghi , Undergraduate; academic mentorship | McGill University |
| 2019-2020 | Griffin Schwartz , Undergraduate; academic mentorship | McGill University |
| 2019-2020 | Harper Sewalls , Undergraduate; academic mentorship | McGill University |