

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., Millholland, S., 2025. Shedding Light on Desert Dwellers. *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. ([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 (* - SUPERVISED STUDENT)

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

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. 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**).

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 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

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

2020-present	Peer Reviewer , AAS Journals, Monthly Notices of the Royal Astronomical Society	
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 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

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