

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., 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., Plotnikov, 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., Lee, E. J. On the Planet-Forming Environment of the Milky Way’s Thick Disk. Submitted to *ApJ*.

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

September 2023. *On the Planet-Forming Environment of the Milky Way's Thick Disk*. Stars & Planets Seminar, Yale University, 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, Insitituto 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, 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

Additional Research Experience

University of Tübingen; Institute for Theoretical Astrophysics

Tübingen, Germany

ADVISOR: DR. ROLF KUIPER

May 2018 - Aug. 2018

- radiation-hydrodynamics simulations of HII regions
- tools: **PLUTO** hydrodynamics code, **Makemake** & **Sedna** radiation transport and photoionization solvers

Media Citations & Interviews

Astronomy Magazine: Our Galaxy's Marvelous Rogues and Misfits

Scientific American: Mystery of Interstellar Visitor 'Oumuamua Gets Trickier

Nature: How Two Intruders From Interstellar Space are Upending Astronomy

Populär Astronomi: Interstellar comet Borisov is a well-known stranger

Service & Outreach

August, 2023	McGill STEM summer camp , Science Discussion/Q+A Group Leader	<i>McGill University</i>
2023	Trottier Space Institute , arXiv discussion organizer/leader	<i>McGill University</i>
2020-2022	Trottier Space Institute , Meeting With Speaker organizer/leader	<i>McGill University</i>
2021-2022	McGill Graduate Association of Physics Students , VP Academic	<i>McGill University</i>
2021-2022	McGill Graduate Association of Physics Students mentorship program , lead organizer	<i>McGill University</i>
2019-2022	McGill Graduate Association of Physics Students mentorship program , mentor	<i>McGill University</i>
2021-2022	McGill Graduate Association of Physics Students , Meeting with Speaker organizer/leader	<i>McGill University</i>
2019-2022	McGill Hackathon , mentor	<i>McGill University</i>
2022	Vanderbilt Astronomy Club , public lecture., Online	<i>Vanderbilt University</i>
2021	AstroMcGill public lecture. Our Galactic Neighbourhood: Insights From Exoplanets and Interstellar Objects , Online	<i>McGill University</i>
2018-2019	Physics and Astronomy Students' Association , President	<i>University of Western Ontario</i>
2016-2019	Physics and Astronomy Students' Association Help Center , lead organizer/tutor	<i>University of Western Ontario</i>

Mentorship

summer, 2023	Vincent Savignac , Undergraduate; research mentorship on sub-Neptune core-envelope interaction	<i>McGill University</i>
2020-2021	Didar Seghi , Undergraduate; academic mentorship	<i>McGill University</i>
2019-2020	Griffin Schwartz , Undergraduate; academic mentorship	<i>McGill University</i>
2019-2020	Harper Sewalls , Undergraduate; academic mentorship	<i>McGill University</i>