Tim Hill

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Education

2021- present	**Doctor of Philosophy**, Earth Sciences, Simon Fraser University Thesis (tentative): *Statistical emulation of Greenland Ice Sheet hydrology and dynamics* Supervisors: Dr. Gwenn Flowers, Dr. Derek Bingham
2019 - 2021	**Master of Mathematics**, Applied Mathematics, University of Waterloo Thesis: *Mathematical modelling of supraglacial meltwater production and drainage* Supervisor: Dr. Christine Dow
2014 - 2019	**Bachelor of Science**, Honours Co-operative Mathematical Physics, University of Waterloo

Research interests

I am interested in applying and developing numerical models of glaciers and ice sheets, including glacier hydrology, mass balance, and ice dynamics. My end goal is to improve our understanding of the mechanisms controlling the response of glaciers and ice sheets to continuing warming.

Scholarships and awards

2021/9 - 2024/9	Provost Prize of Distinction *Simon Fraser University*
2021/9 - 2024/9	Canada Graduate Scholarship – Doctoral *Natural Sciences and Engineering Research Council of Canada*
2021/7	Outstanding Teaching Assistant Award *University of Waterloo Department of Applied Mathematics*
2021/2	Hydrology Section Poster Award (runner up) *Canadian Geophysical Union Student Conference 2021*
2020/9	Joseph Wai-Hung Liu Graduate Scholarship *University of Waterloo Faculty of Math*
2020/9	President's Graduate Scholarship *University of Waterloo*

2020/9	Ontario Graduate Scholarship *Government of Ontario*
2019/9	President's Graduate Scholarship *University of Waterloo*
2019/9	Canadian Graduate Scholarship – Masters *Natural Sciences and Engineering Research Council of Canada*
2019/7	Northern Scientific Training Program *Polar Knowledge Canada*
2018/9	Science Scholarship for Excellence *University of Waterloo Faculty of Science*
2018/5	Undergraduate Student Research Award *Natural Sciences and Engineering Research Council of Canada*
2018/1	Xerox work report award for outstanding written communication *University of Waterloo*
2017/9	Undergraduate Student Research Award *Natural Sciences and Engineering Research Council of Canada*
2017/9	Research Experience Award *University of Waterloo*
2014/9	President's Scholarship of Distinction *University of Waterloo*

Research experience

2019/5 - 2019/9	**Research Assistant**, Climate Research Division, Environment and Climate Change Canada
2019/7	**Field Assistant**, McGill Arctic Research Station, Nunavut
2018/5 - 2018/8	**Undergraduate Research Assistant**, Department of Applied Mathematics, University of Waterloo
2017/9 - 2017/12	**Undergraduate Research Assistant**, Institute for Quantum Computing, University of Waterloo
2016/9 - 2017/4	**Research Assistant**, Climate Research Division, Environment and Climate Change Canada

Teaching

2020/9 - 2020/12	**Teaching Assistant**, University of Waterloo *Math 227: Calculus 3 for Honours Physics*

Publications

Hill, T. and Dow, C. F. (*2021*). Modeling the Dynamics of Supraglacial Rivers and Distributed Meltwater Flow with the Subaerial Drainage System (SaDS) Model. *Journal of Geophysical Research: Earth Surface*. 126, e2021JF006309. https://doi.org/10.1029/2021JF006309

Hill, T. (2021) *Mathematical modelling of supraglacial meltwater production and drainage*. Masters thesis, UWSpace. http://hdl.handle.net/10012/17307

Hill, T., Dow, C. F., Bash, E. A., and Copland, L. (2021) Application of an improved surface energy balance model to two large valley glaciers in the St. Elias Mountains, Yukon. *Journal of Glaciology. Journal of Glaciology, 67*(262), 297-312. DOI: 10.1017/jog.2020.106

Nassar, R., Mastrogiacomo, J. P., Bateman-Hemphill, W., McCracken, C., MacDonald, C. G., **Hill, T.**, O'Dell, C., Kiel, M., & Crisp, D. (2021). Advances in quantifying power plant CO2 emissions with OCO-2. *Remote Sensing of Environment*, *264*, 112579. DOI: 10.1016/j.rse.2021.112579

Hill, T., and Nassar, R. (2019) Pixel size and revisit rate requirements for monitoring power plant CO_2 emissions from space. *Remote Sensing*. 11(13): 1608. DOI: 10.3390/rs11131608

Nassar, R., **Hill, T. G.**, McLinden, C., Wunch, D., Jones, D., and Crisp, D. (2017) Quantifying CO2 emissions from individual power plants from space. *Geophysical Research Letters*. 44(19): 10045-10053. DOI: 10.1002/2017GL074702

Presentations

Primary author

Hill, T.*, and Dow, C. F. (2021) Modelling the Dynamics of Supraglacial Rivers and Distributed Meltwater Flow. Oral presentation at Northwest Glaciologists Annual Meeting.

Hill, T.* (2021) Surface energy balance modelling in the St. Elias Mountains, Yukon. Queen's University. (Invited).

Hill, T.*, and Dow, C. F. (2021) Modelling glacier melt rates and surface hydrology at the basin scale. Poster presentation at CGU Student Conference 2021.

Hill, T.*, and Dow, C. F. (2020) Modelling the Seasonal Evolution of Supraglacial Hydrology with Natural Stream Development and Dynamic Topography. Oral presentation at AGU Fall Meeting 2020.

Hill, T.*, and Dow, C. F. (2020) Glacier energy balance modelling: Methods and tests on Lowell Glacier. Oral presentation at Glacier Ocean Iceberg (GO-Ice) workshop, Canmore, Canada.

Hill, T. *, and Nassar, R. (2019) Improving power plant CO_2 emission estimates from satellites: pixel size, shape, and image averaging. Poster presentation at Carbon Assimilation Workshop, Toronto, Canada.

Hill, T. *, Stastna, M., and Lamb, K. (2018) Ice dynamics with the MITgcm. Oral presentation at Applied Mathematics Summer Student Conference, Waterloo, Canada.

Contributing author

Mastrogiacomo, J.-P.*, Nassar, R., **Hill, T.**, Pavlick, R., Nelson, R., O'Dell, C., Eldering, A., and Crisp, D. (2021) Quantifying CO_2 Emissions from Smaller Point Sources by Using Multiple OCO-3 Images. Poster presentation at IWGGMS 17, online, 14-17 June 2021.

Nassar, R.*, Mastrogiacomo, J.-P., Bateman-Hemphill, W., McCracken. C., MacDonald, C., **Hill, T.**, O'Dell, C., Nelson, R., Kiel, M., Pavlick, R., Eldering, A., and Crisp, D. (2021) Space-based detection of CO2 emission reductions due to COVID-19 at Europe's largest fossil fuel power plant and implications for CO2 emission monitoring, EGU General Assembly 2021, online, 19–30 Apr 2021, EGU21-8979, https://doi.org/10.5194/egusphere-egu21-8979.

Nassar, R.*, **Hill, T.**, McCracken, C., MacDonald, C., Zheng, T., Kiel, M., Nelson, R., Crisp, D. (2019) Quantifying localized anthropogenic CO2 sources from space: Current capabilities and requirements for a policy-relevant monitoring system. Oral presentation at AGU Fall Meeting 2019, San Francisco, USA. https://agu.confex.com/agu/fm19/meetingapp.cgi/Paper/493320

Nassar, R.*, **Hill, T.**, McLinden, C., Wunch, D., Jones, D., and Crisp, D. (2017) Quantifying CO_2 emissions from individual power plants using OCO-2 observations. Oral presentation at AGU Fall Meeting 2017, San Francisco, USA.

Credentials

2020/2	Crevasse Rescue Training – Level 1, The University of Calgary
2019/5	Standard First Aid and CPR-C
2018/6	Certificate in High Performance Computing, Compute Canada

Community and volunteer activities

2020/5 – 2021/9 **President**, University of Waterloo Outers Club

2019/4 – 2020/4 **Executive**, University of Waterloo Outers Club