

Jonas Eschenfelder

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EDUCATION

- **Simon Fraser University** 2022-ongoing
PhD Earth Sciences Burnaby, Canada
 - Provisional Title: **Seasonal effects on river channel formation in the Canadian High Arctic**
- **Imperial College London** 2018-2022
MSc Geophysics London, UK
 - First Class Honours
 - Thesis title: **Heavy Metal Concentrations in River Sediments: Inverse and Forward Modelling of Observations from Clyde River, Scotland**

RESEARCH EXPERIENCE

- **Seasonality of hydrologic connectivity** September 2025-ongoing
Simon Fraser University
 - Supervisor: Prof. Shawn Chartrand
 - What controls the surface water flow response to a rain event on sub-seasonal timescales?
 - Developing a numerical model to efficiently calculate surface and subsurface hydrology in thawing landscapes.
 - Using field data and climate reanalysis to tune model parameters and run a historic climate analysis on representative fieldsites in the Canadian High Arctic.
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- **Erodibility of frozen sediment** July 2023-March 2026
Simon Fraser University
 - * Supervisor: Prof. Shawn Chartrand
 - * How does the presence of ground ice influence sediment transport dynamics at a grain-scale?
 - * Developed and built a novel experimental set-up to quantify particle flux as a function of thaw depth and explore grain-scale dynamics coupling thawing and entrainment.
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- **Morphological comparison of polygonal patterned ground** September 2022-July 2023
Simon Fraser University
 - * Supervisor: Prof. Shawn Chartrand
 - * How does the morphology of polygonal patterned ground vary within polygon fields?
 - * Developed a semi-automatic mapping tool 'pyAPDT' to map polygonal patterned ground in LiDAR-derived digital elevation models and applied the tool in the Arctic and Antarctic.
 - * Explored how polygon morphology changes with age and the presence of channels within polygon fields.
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- **MSc research project** September 2021-January 2022
Imperial College London
 - * Title: Heavy Metal Concentrations in River Sediments: Inverse and Forward Modelling of Observations from Clyde River, Scotland
 - * Supervisor: Dr. Gareth Roberts
 - * Awarded Roland Schlich grant to present at EGU General Assembly 2022.
 - * Developed a method to use conservative mixing models to compare river sediment samples to a geochemical baseline with the goal to quantify pollution amounts, and constrain pollution source locations.

3rd-Year independent research project

September 2020-December 2020

Imperial College London

- * Title: A seismic study of New Zealand using Kostrov summation
- * Supervisor: Prof. Ian Bastow
- * Studied stress and strain distribution across New Zealand's North and South Islands using the Harvard central moment tensor catalogue and historic earthquake data.

Undergraduate Research Assistant

July 2020 - September 2020

Imperial College London

- * Project: Using HiRISE images to characterise fresh impact clusters on Mars
- * Supervisor: Prof. Gareth Collins
- * Manually mapped new crater clusters on Mars using HiRISE images.

JOURNAL ARTICLES

- J. Eschenfelder, S.M. Chartrand, A.M. Jellinek, C. Culha (2026) **Seasonal freezing increases High Arctic erosion and landscape response to climate extremes**. *Communications Earth & Environment* DOI: 10.1038/s43247-026-03468-1
- J. Eschenfelder, A.G. Lipp, G.G. Roberts (2023). **Quantifying excess heavy metal concentrations in drainage basins using conservative mixing models**. *Journal of Geochemical Exploration*, Vol. 248, DOI: 10.1016/2023.107178
- T. Neidhart, E.K. Samsom, K. Milijoković, G.S. Collins, J. Eschenfelder, I.J. Daubar (2023). **Diversity of New Martian Crater Clusters Informs Meteoroid Atmospheric Interactions**. *Journal of Geophysical Research: Planets*, Vol. 128, Iss. 4, DOI: 10.1029/2022JE007611
- I.J. Daubar, C.M. Dundas, A.S. McEwen, A. Gao, D. Wexler, S. Piquex, G.S. Collins, K. Milijoković, T. Neidhart, J. Eschenfelder et al. (2022). **New Craters on Mars: An Updated Catalog**. *Journal of Geophysical Research: Planets*, Vol. 127, Iss. 7, DOI: 10.1029/2021JE007145

CONFERENCE PRESENTATIONS

- J. Eschenfelder, S. Chartrand, M. Jellinek (2026) **Seasonal variation of hydrologic connectivity for High Arctic stream segments**. *EGU General Assembly 2026*. DOI: 10.5194/egusphere-egu26-5967
- J. Eschenfelder, S. Chartrand, M. Jellinek, C. Culha (2025). **Where, when, and why do frozen landscapes erode faster than unfrozen ones?**. *EGU General Assembly 2025*. DOI: 10.5194/egusphere-egu25-7036
- J. Eschenfelder, C. Culha, S. Chartrand, M. Jellinek (2024). **Morphological comparison of polygonal pattered ground across the Arctic and Antarctic: Implications for polygon formation on Earth and Mars**. *EGU General Assembly 2024*. DOI: 10.5194/egusphere-egu24-12138
- J. Eschenfelder, A. Lipp, G. Roberts (2022). **Quantifying heavy metal concentrations throughout drainage basins from river sediment mixing**. *EGU General Assembly 2022*. DOI: 10.5194/egusphere-egu22-213

INVITED TALKS

- August 2026: **Northwest Hydraulic Consultants, Canada** Understanding erosion and hydrology in seasonally frozen landscapes.
- July 2026: **Ludong University, China** How do Arctic rivers form? Lab experiments and scaling theory towards a physics-based erosion model. *Hosted by: Prof. Ying Zhao*
- September 2025: **Simon Fraser University, Canada**. How do Arctic landscapes erode? - Using lab experiments to understand cold region riverbeds.
- March 2025: **University of British Columbia, Canada**. Using scaling and experiments to understand permafrost erosion. *Hosted by Prof. Marwan Hassan*
- April 2024: **TU Dresden**. Erodibility of a frozen bed: particle-scale interactions between thaw front and entrainment. *Hosted by Prof. Bernhard Vowinkel*

FIELD EXPERIENCE

- **Sorbas Basin, Spain** June 2019
Imperial College London
 - * Introduction to geological fieldwork and mapping.
- **Appenines, Italy** June 2022
Imperial College London
 - * Course title: Geology of an active mountain belt
 - * Conduct structural geology and geodynamic fieldwork to understand the orogenic history of the Appenines mountain range.
- **Devon Island, Canada** July-August 2024
Simon Fraser University
 - * Installed instruments to measure ground temperature, soil moisture, and climate data in a polar desert.
 - * Collected high-resolution LiDAR and thermal imagery of polygonal patterned ground and developing channel networks.
 - * Conducted field surveys of thaw depth
 - * Collected field observations of sediment deposits, active surface and subsurface hydrology and polygonal patterned ground morphometrics.
- **Toolik Field Station, Alaska, USA** August 2024
Simon Fraser University
 - * Assisted Dr. Cansu Culha with conducting fieldwork on Retrogressive Thaw Slumps and Gullies.
 - * Collected water samples and phone based LiDAR imagery.

COMMUNITY CONTRIBUTIONS

- **Academic representative** 2018-2019
Department of Earth Science and Engineering, Imperial College London
 - * Voted for by fellow first year students in the department
 - * Responsible for liaising with teaching staff to provide feedback from students.
 - * Introduced regular student surveys to formalise feedback from students.
- **Wellbeing and Events officer** 2019-2020
Royal School of Mines Union, Imperial College London
 - * Voted for by fellow students from the Earth Science and Engineering department and Materials Science department.
 - * Responsible for organising events to promote the mental and physical wellbeing within the student body.
 - * Founded the "Mastermines" student-staff quiz night to increase cohesion between staff and students.
- **Session Co-convenor** 2024
AGU 2024
 - * **Session title:** Landscape Changes and Carbon Cycling in Cold regions
 - * Worked with other researchers to select presentations and organise oral and poster sessions at AGU 2024 annual meeting.
- **Executive Board Member GEAR up Research Day** 2026
Faculty of Environment, SFU
 - * Help organise an event aimed at all graduate students in the Faculty of Environment.
 - * Developed concepts for panels on "Science Communication" and "Graduate studies 101" including curating the speakers list.
 - * Worked on advertising the event across social media and SFU internal services.

MISCELLANEOUS QUALIFICATIONS

- Wilderness First Aid
- Gun safety training & Provincial Arms License (BC, Canada)