Nathalie Redick

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Education

University of California, Davis | MSc Geophysics   September 2024 – June 2026
Davis, CA
– *Coursework*: Regional Synthesis of Geophysical & Geological Data for Geodynamic Modelling

McGill University | BA Computer Science   September 2019 – August 2023
Montreal, QC   3.75/4.00
– Minor in **Earth & Planetary Sciences**, Supplementary Minor Concentration in Computer Science
– *Relevant Coursework*: Mineralogy, Petrology, Geology in the Field, Field School I, Earth Physics, Earth System Modelling, Structural Geology, Volcanology, Algorithms & Data Structures, Data Science, Linear Algebra I & II, Probability, Statistics, Applied Machine Learning, Probabilistic Programming, Machine Learning Applied to Climate Change.

Experience

Technology Analyst @ Morgan Stanley   *Montreal, QC* | July 2023 – August 2024
– Worked collaboratively to provide agile metrics analysis for internal dev. teams globally, user support, & documentation.
– Utilized DB2 SQL, MongoDB, & Python to process metrics & maintain project infrastructure.

Data Science Intern @ Esri Canada   *Remote* | May – August 2022
– Automated a workflow for updating national hydrography data using the Multi-Task Road Extractor **deep learning** model.
– Improved the baseline model by ∼4% accuracy to **96.3% accuracy & 0.85 MIOU** by designing new input image layers & geomorphological indicators.

Research

Machine Learning For Geospatial Analysis @ McGill University 🔗   *Montreal, QC* | September 2022 – July 2024
Advised by Dr. James Kirkpatrick & Dr. Matthew Tarling.
– Designed a guided machine learning workflow for geospatial analysis.
– Our objective was to create a tool that can be used by anyone, regardless of their technical background.

Using U-Net to Identify Landslides @ McGill University 🔗   *Montreal, QC* | May 2021 – August 2022
Advised by Dr. James Kirkpatrick & Dr. Veronica Prush.
– Implemented an image segmentation ML model to identify landslides using geophysical & morphological indicators.
– Current iteration of the model boasts **95.3% accuracy & a loss of 0.19.**

Field Work

Graduate Volcanology Seminar @ McGill University   *Montreal, QC* | October 2022
– Participated in a 1-week field seminar to study the volcanological features and history of the Long Valley region of California.

Field School I (2.5 weeks) @ McGill University   *Montreal, QC* | May – May 2021
– Produced maps of geologic units & structures in both Rainbow Basin, CA & Dublin Gulch, CA.
– Gained experience with field mapping, using a Brunton compass, & topographic maps.

Awards

Geotop 2021 Scholarship Competition, Geotop ($1500)   2021
– Selected based on my research proposal to *Use ML to Identify Landslides* & academic performance.

Best Overall Hack, MAIS Hacks 2020   2020
– Lead a team against 115 participants to create a XGBoost-driven web app (*Python, HTML/CSS*) that predicts MBTI Personality Type based on Twitter data.

Extra-curriculars

Vice President of Communications @ The Monteregian Society   *Montreal, QC* | September 2020 – April 2023
– Managed communications for the undergraduate student council for Earth & Planetary Sciences at McGill University.

Member @ ML for Geoscience Reading Group, McGill University   *Montreal, QC* | January – May 2021
– Participated in a reading group to examine current papers in ML applications in the geosciences.

Skills

Programming Languages: Python, Julia, C++, C, Java, DB2/SQL/MySQL, R, Bash, MATLAB, HTML/CSS, OCaml, MIPS Assembly
Tools: Git, Linux/Unix, LaTeX, Jupyter, QGIS/ArcGIS, AWS EC2, VS Code, RESTful APIs, MongoDB, Jira, Jenkins, Liquibase

Publications & Presentations

1. Redick, N. R., Tarling, M. S. & Kirkpatrick, J. D. *Code-Free Deep Learning for Geospatial Applications* in. AGU23 (AGU, Jan. 23, 2024). https://agu.confex.com/agu/fm23/meetingapp.cgi/Paper/1366363 (2024).

2. Redick, N. R. A Review of Pumice Raft Formation Environments, Saturation, and Dispersal Mechanisms. *McGill Science Undergraduate Research Journal* **18,** B19–B25. ISSN: 1718-0783. https://msurjonline.mcgill.ca/article/view/187 (2024) (1 Mar. 20, 2023).

3. Redick, N. R. *Building an Accessible Machine Learning Workflow for Geospatial Analysis* Apr. 4, 2023. https://escholarship.mcgill.ca/concern/presentations/2n49t738j?locale=en.