

# Andres Ross

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**Languages:** English (fluent), Spanish (fluent), French (working proficient)

## Education

**University of British Columbia** 2022, Vancouver  
MSc Applied Mathematics, GPA 4.0/4.0

- Courses: Advanced Machine Learning, Stochastic Differential Equations, Modern Control, Optimal Transport, Dynamical Systems, Numerical analysis.
- “International tuition award”, “Faculty of applied science graduate award” and “Research Assistantship” in recognition of academic achievement and research potential.

**McGill University** 2020, Montreal

Honors Math and Physics, GPA 3.66/4.0 (**First class honors**)

- Hugh M. Brock Scholarship awarded for academic standing and leadership in community.
- Montreal Hospital (meal assistance) & BeyondMe (mentorship for children with disabilities)

## Experience

**University of British Columbia**, Vancouver

*Research student – Data Driven Methods for Atomistic Simulations* May 2020 – Present

- **Lead** the design and development of the **AI** extension to our current simulations.
- Modeled **ML** interatomic potentials with 0.05% accuracy using **Python** and **Julia**.
- Enabled **parallel computing** (multi-threading/processing) for expensive computations.
- Re-designed the current architecture as an **Equivariant Neural Network** in **PyTorch**.
- **Collaborated** with Cambridge, RUB, Harvard, and SJTU developing our codes.

**McGill University**, Montreal

*Research student – Transitioning Copper Smelters to Industry 4.0* Jan 2019 – May 2019

- Studied a **real-world business** problem (ICT in copper smelters) and [published](#) a quantitative framework to justify implementation of control systems.
- Detected **anomaly events** with %0.002 accuracy using quantitative models in **python**.
- **Coordinated** efforts to support **data acquisition modernization** in copper smelters.

**The Ottawa Hospital Research Institute**, Ottawa

*Researcher – AI for Liver Cancer Treatment* May 2018 – Sep 2018

- **Assessed** current liver cancer treatment and proposed data science modernization.
- Built a synchronous **ETL** pipeline from breathing data acquisition to classification.
- Engineered from the ground up a **machine learning** algorithm that predicted with **84% accuracy**, in real time, errors during liver cancer treatment using **Python**
- Designed representative features using **time series analysis** and **rolling statistics** that lead to a 10% false negative rate and are currently being tested for implementation.

**McGill University**, Montreal

*Research Assistant - Immune detection models* May 2017 - Sep 2017

- Spearheaded the study of **Mutual Information** as a cost function in **adversarial immune detection models** on Python.
- **Speaker** at the Canadian undergraduate research conference.

## **Publications**

Navarra, A.; Wilson, R.; Parra, R.; Toro, N.; Ross, A.; Nave, J.-C.; Mackey, P.J. Quantitative Methods to Support Data Acquisition Modernization within Copper Smelters. *Processes* 2020, 8, 1478. <https://doi.org/10.3390/pr8111478>.

A. Navarra, A. Ross, N. Toro, F. Ayala and T. Marin, "Quantitative methods for copper smelter reengineering projects", Peer-reviewed contribution to the proceedings of the Philip Mackey Honorary Symposium (Copper 2019).

M. Liu, A. Ross, J. E. Cygler, and E. Vandervoort. " TH-A-SAN2-10: Adaptive Margins with An Early Warning System for Motion-Tracking Errors in Liver SBRT." *Med. Phys.* 46(6), 499-500, 2019. Presented at 61st American Association of Physicists in Medicine Annual Meeting (San Antonio, TX)