# **Jack** Richter-Powell

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## EDUCATION & ACADEMIC POSITIONS

### MASSACHUSETTS INSTITUTE OF TECHNOLOGY PhD Student
**Cambridge MA, USA | September 2023 - Current**

- Began PhD under supervision of Justin Solomon.
- Broad thesis goal: designing machine learning models with strong inductive biases for physical simulations.

### VECTOR INSTITUTE & UNIVERSITY OF TORONTO
**Research Assistant (Vector Affiliate) / Research Scientist Intern**
**Toronto, Canada | March 2022 - August 2023**

- Employed in pure research position under the supervision of David Duvenaud
- Research focus included: adjoint methods for PDE constrained optimization, adapative resolution ML models, and applications of ML to quantum phyiscal / chemical simulations.

### MCGILL UNIVERSITY | Joint Honours Mathematics & Computer Science
**Montréal, Canada | September 2017 - December 2021**

- GPA: 3.84
- Completed 9 courses at the graduate level (including core graduate mathematics curriculum)

## PUBLICATIONS

### NEURAL CONSERVATION LAWS Jack Richter-Powell, Yaron Lipman, Ricky Q.T Chen
**NeurIPS 2022 – arXiv**

- Developed a unified framework for parameterizing divergence-free vector fields, which we showed also yields exact solutions of the continuity equation
- Demonstrated this scheme on applications to fluid dynamics and dynamical optimal transportation

### INPUT CONVEX GRADIENT NETWORKS Jack Richter-Powell, Jonathan Lorraine, Brandon Amos
**Spotlight submission at NeurIPS 2021 OTML Workshop – arXiv**

- Developed a new type of implicit model for parameterizing gradients of convex functions
- Explored connections to Brenier's theorem from Optimal Transport and pullback metrics in Riemmanian Geometry

## INDUSTRY POSITIONS

### ERICSSON CANADA Data Scientist Intern
**Montréal, Canada | January 2020 - May 2020**

- Applied machine learning techniques to provide insights about nationwide cellular networks (equipment failures, utilization metrics)
- Worked with advanced geographic databases to develop models for cellular user segmentation

## AWARDS

### NSERC USRA - SUMMER 2020 Natural Sciences and Engineering Research Council Grant

- Received a federal grant to research the field of optimal transport, under supervision of Prakash Panangaden and Rustum Choksi

- Investigated new scalable computational methods for Wasserstein distances

### MISC

- Offered doctoral position at Cambridge in Department of Applied Mathematics and Theoretical Physics (DAMTP) in 2022 – declined for personal reasons.
- Visiting researcher at the Technical University of Denmark (DTU) – August/September 2022.
- Dean's honour list (McGill) - 2019, 2021
- Robert Bruce Scholarship (McGill) - 2021

## ACADEMIC SERVICE

- Served as a reviewer for JMLR, NeurIPS 2021 OTML workshop
- Served as a course assistant for Analysis 2 (MATH 255) at McGill