Alex Kazachek

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Education

University of Western Ontario
2019 – 2023 (Projected)

HBSc in Mathematics & Data Science.

GPA of 3.91.

Awards

RBC Data Science Scholarship
2021 Fall

Albert O. Jeffery Scholarship
2021 Fall

Cecil G. Gracey Scholarship
2020 & 2021 School Years

NSERC USRA
2021 Summer

Borwein Memorial Prize
2020 Winter

Dean's Honour Roll
2019 & 2020 School Years

Skills

Programming

Performing statistical analysis in R, such as simulation and estimating time series.

Computing with Mathematica to find entanglement measures.

Implementing cryptographic protocols in Python.

Creating static web sites using React.js.

Design

Typesetting with LaTeX and Markdown.

Creating dynamic documents with knitr and Jupyter.

Visualizing math and data with Ti*k*Z, Manim, and ggplot2.

Academics

Summer of Math Exposition 2021 Entry
2021 Summer

Co-created animated video with Jacqueline Đoàn, geometrically motivating and building intuition for the spectral theorem for normal operators. Over 30,000 views on YouTube.

MaCAW x PASA Coffee Seminar Talk
2021 Fall

Title How to Differentiate a Function That Has No Derivative

Modified Abstract A Sobolev space consists of functions which admit weak derivatives. Being a Banach space, it is more well-behaved than the space of differentiable functions. Its definition is motivated by the Dirichlet problem, which is then solved via Stampacchia's theorem.

CUMC 2021 Student Talk
2021 Summer

Title A Mathematical Definition of Entanglement and Its Measurement

Modified Abstract Entangled states are formalized as operators over the tensor products of Hilbert spaces. On certain states, known as pure, the level of entanglement may be measured by entanglement entropy. This value may be extended to all states by the convex roof construction, yielding entanglement of formation.

Work Experience

University of Western Ontario | Undergraduate Marker
2021 Fall

Marking assessments for Mathematical Structures (Math 2155), covering logic, proof techniques, and set theory.

University of Western Ontario | Research Assistant
2021 Summer

Assisted research in quantum state geometry and information theory. In particular, examined entanglement of states associated to certain Kähler manifolds. Supervised by Dr. Tatyana Barron and funded by NSERC.

Clubs & Committees

Canadian Undergraduate Mathematics Conference | Committee Member
2021 Summer

Created new website for this and forthcoming CUMCs. Implemented desktop and mobile support, and bilingual localization (English & French).

Organized the career and mathematical communication panels, as well as the Lean and Beamer workshops.

Math Club at Western | VP Academics
2020 & 2021 School Years (on-going)

Launched biweekly mathematics contests for undergraduate students, and helping write and grade these contests.

Introduced student seminars, an opportunity for undergraduate students in mathematics or related disciplines to share their independent studies and projects.