

Joshua Joseph George

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EDUCATION

Masters in Applied Mathematics

University of Waterloo, Waterloo, Ontario.

Expected August 2026

Supervisors: Dr. Kirsten Morris and Dr. David Del Rey Fernández

BSc Honors Applied Mathematics

University of Alberta, Edmonton, Alberta.

May 2024

First Class Honors with Distinction

Supervisor: Dr. Bin Han

Honors Thesis: Linear Independence and Stability of Integer Shifts of Compactly Supported Distributions

RESEARCH EXPERIENCE

Undergraduate Research Assistant

May 2024 - present

Department of Mathematics and Statistics, University of Alberta.

Topic: A new recursive algorithm accurately compute tail probability distributions.

Work: Came up with a recursive algorithm that uses differentiation and the G -transformation to compute tail probability distributions effectively reducing the time complexity from $\mathcal{O}(n^4)$ to $\mathcal{O}(n)$. *Paper in Progress*

Supervisor: Dr. Hassan Safouhi

Undergraduate Research Assistant

May 2023 - August 2023

Max Planck Institute for Dynamics of Complex Technical Systems

Topic: Visualizing Evolutions of Feature Maps in Flow Simulations

Work: Extracting, Visualising and Analysing feature weights and maps from Convolutions Autoencoders. Using Grad - CAM to infer useful information from the models on the spatially discretized Navier Stokes Equation in a cylinder.

Supervisor: Mr. Yongho Kim & Dr. Jan Heiland

Undergraduate Research Assistant

May 2023 - present

Department of Mathematics and Statistics, University of Alberta.

Topic: Determinantal Point Processes for Image Processing

Work: Studied the theory behind Determinantal Point Processes from an image processing point of view.

Worked on the generalization of the theorem of the moments formula for DPixPs.

Supervisor: Dr. Yaozhong Hu

Undergraduate Research Assistant

January 2023 - April 2023

Department of Mathematics and Statistics, University of Alberta.

Topic: Linear Independence and Stability of Integer Shifts of Compactly Supported Distributions

Work: We explore the Linear independence of compactly supported distributions and prove results for the same, relate the Kernel of the space of semi-discrete convolutions of a distribution to the Fourier transform of the distribution and provide some correlation between Stability and Linear Independence.

Supervisor: Dr. Bin Han

Undergraduate Research Assistant

May 2022- September 2022

Department of Mathematics and Statistics, University of Alberta.

Topic: Prove the existence of periodic solutions of second-order differential equations.

Work: We start by studying the properties of the Dirac Delta and Green's Function and provide a specific solution to the second-order non autonomous differential equation. Later on, we study topics in Topological Degree Theory and prove the Brouwer fixed point theorem.

Supervisor: Dr. Mohammad Ali Niksirat

Undergraduate Research Assistant

May 2022- June 2022

Department of Physics, University of Alberta.

Work: Part of the undergraduate research cohort group. Determine the properties of the gas using data from the Gaia satellite to measure the motions of stars in young clusters.

Supervisor: Dr. Erik Rosolowsky

Undergraduate Research Assistant

May 2021- September 2021

Department of Mathematics and Statistics, University of Alberta.

Topic: Moments of Quadratic Dirichlet L - Functions.

Work: We studied the properties of Non- Holomorphic Eisenstein Series, Modular Forms and Dirichlet L - Functions and it's functional equation. During this time, encountered and reproved some results like the Prime Number Theorem, Riemann Roch Theorem and also proved other results in Analytic Number Theory, Function field Theory and Multiple Dirichlet Series Theory.

Supervisor: Dr. Manish Patnaik

TEACHING EXPERIENCE

Graduate Teaching Assistant

January 2025- April 2025

Department of Applied Mathematics, University of Waterloo.

Teaching Assistant under Dr. Michael Waite and Dr. Henry Shum (*Applied Real Analysis and Partial Differential Equations I*)

Tasks: Grading Assignments, run tutorials and office hours

Graduate Teaching Assistant

September 2024- December 2024

Department of Applied Mathematics, University of Waterloo.

Teaching Assistant under Dr. Eric Bembenek and Dr. Sean Speziale (*Honors Calculus I*)

Tasks: Grading Assignments and run tutorials

Undergraduate Teaching Assistant

January 2023- May 2024

Department of Mathematics and Statistics, University of Alberta.

Teaching Assistant under Dr. Alexander Litvak for Multivariate Calculus (*Intermediate Calculus I*)

Tasks: Grading Assignments

Undergraduate Teaching Assistant

January 2023- May 2024

Department of Mathematics and Statistics, University of Alberta.

Teaching Assistant under Dr. Alexander Litvak for Multivariate Calculus (*Intermediate Calculus I*)

Tasks: Grading Assignments

Undergraduate Teaching Assistant

January 2023- May 2024

Department of Computing Science, University of Alberta.

Teaching Assistant under Dr. Mohammad Reza Salavatipour and Dr. Carrie Demmans for Formal Logic and Systems in Computing Science

Tasks: Grading Assignments and Run Seminar Sessions

Undergraduate Teaching Assistant

September 2022- December 2022

Department of Mathematics and Statistics, University of Alberta.

Teaching Assistant under Dr. Volker Runde for Multivariate Real Analysis I (*Honors Advanced Calculus I*)

Tasks: Grading Assignments

Undergraduate Teaching Assistant

September 2021- April 2022

Department of Mathematics and Statistics, University of Alberta.

Teaching Assistant in Decima Robinson Center.

Tasks: Helped first and second years with introductory Honors Calculus and Linear Algebra courses.

HONORS AND AWARDS

University of Waterloo Senate Graduate Scholarship

Issued : June 2025

Graduate Research Scholarship

Issued : September 2024

University of Waterloo

First Class with Distinction in Honors Applied Math

Issued : June 2024

University of Alberta

Yahya Scholarship in Honors Pure Mathematics

Issued : September 2023

An Education Abroad Individual Award

Issued : June 2023

Mathematical and Statistical Sciences Undergraduate Student Research Award

Issued : May 2023

University of Alberta Undergraduate International Scholarship

Issued : January 2023

Dr Clement W Bowman Scholarship in Honors Applied Mathematics

Issued : August 2022

The Cyril G Wates Memorial Scholarship in Honors Pure Mathematics

Issued : August 2022

The Mathematical Contest in Modeling (Successful Participant Award)

Issued: February 2022

International student scholarship

Issued : August 2020

Dean's List Fall 2021, Winter 2022, Fall 2022, Winter 2023 Fall, 2024, Winter 2025

Two-time Mathematical Sciences Society Integration Bee Runner up

Fall 2020, Winter 2021

Bronze Medal in Gulf Math Olympiad

Issued : November 2019

Merit List Holder 2014, 2015, 1016, 2017, 2018, 2019, 2020

CONFERENCES AND SUMMER PROGRAMS

NSF-FRG Collaboration: Singularities in Incompressible Flows: Computer Assisted Proofs and Physics-Informed Neural Networks. Princeton University. August 2025.

Emerging Research Trends in Computer Science. The Cornell, Maryland, Max Planck Pre-doctoral Research School in Computer Science (CMMRS). Max Planck SWS. July 2025.

Principled Scientific Discovery with Formal Methods. IBM J Watson Research Center, Yorktown Heights. NY. July 2025.

Ontario Graduate Math and Statistics Conference. University of Toronto. May 2025.

Alberta Graduate Math and Statistics Conference. University of Alberta. July 2024.

New Directions in Compressible and Incompressible Flows: A Conference in Honor of Alexis Vasseur's 50th Birthday Conference, Max Planck Institute for Mathematics in the Sciences, June 2023

Alberta Number Theory Days conference, Banff International Research Station, November 2021

Mathematical Assosication of America Virtual MATHFEST, August 2021

The International Undergraduate Summer Enrichment Program, July – August 2021

RELEVANT COURSEWORK

Real Analysis I & II

Multivariate Real Analysis I & II

Honors Complex Analysis

Honors Linear Algebra I & II

Honors Ordinary Differential Equations I & II

Group Theory I

Partial Differential Equations I & II

Applied Functional Analysis

Optimization for Data Science

Math for Deep Learning

Mathematical modeling in life sciences

Numerical Methods I

Statistics I & II

Algorithms I

Machine Learning I & II

Measure Theory

Introduction to the Foundations of computation I & II

Fourier Analysis

Numerical Partial Differential Equations

Symbolic Logic

EXTRACURRICULARS

President

May 2023 - May 2024

Mathematical Sciences Society, University of Alberta

Work: Plan and organize social activitie and host math contests. Act as a liaison between the Society and the Faculty of Science, its various departments, and associate student groups as delegated by the President

Treasurer

September 2023 - May 2024

Catholic Student Association, University of Alberta

Social Executive

September 2021 - May 2022

Google Developer Student Club, University of Alberta

Google cloud higher education summer challenge

June – September 2021

Track: Data analyst

Tasks: Perform foundational data tasks in Google Cloud using Python and SQL