

# Joshua Joseph George

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## EDUCATION

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### BSc Honors Applied Mathematics

Expected May 2024

University of Alberta, Edmonton, Alberta. *GPA-3.6. Major GPA: 3.83*

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

## RESEARCH EXPERIENCE

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### Undergraduate Research Assistant

May 2023 - August 2023

Max Planck Institute for Dynamics of Complex Technical Systems & Otto von Guericke University.

**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 same 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:** (*work in progress*)

**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 about 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 some topics in Topological Degree Theory and prove the Brouwer fixed point theorem and later on we prove the Infinite Dimensional 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

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### Undergraduate Teaching Assistant

September 2023- present

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

September 2023- present

Department of Computing Science, University of Alberta.

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

**Tasks:** Grading Assignments and Run Seminar Sessions

**Undergraduate Teaching Assistant**

January 2023- April 2023

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- April 2023

Department of Computing Science, University of Alberta.

Teaching Assistant under 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 Underclassman with introductory Honors Calculus and Linear Algebra courses.

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**HONORS AND AWARDS****Yahya Scholarship in Mathematics***Issued : September 2023*

University of Alberta.

Awarded to a student with superior academic achievement entering the fourth year of study for a Bachelor of Science with Honors in Mathematics. Selection based on academic standing.

**An Education Abroad Individual Award***Issued : June 2023*

University of Alberta.

The Education Abroad Individual Award is to help fund the international learning experience.

**University of Alberta Undergraduate International Scholarship***Issued : January 2023*

University of Alberta.

Awarded to students who is on a study permit with superior academic achievement who have completed at least one year of studies at the University of Alberta. Selection based on academic standing.

**Dr Clement W Bowman Scholarship in Honors Applied Mathematics***Issued : August 2022*

Department of Mathematics and Statistics, University of Alberta.

Awarded to students with superior academic achievement enrolled in the third year of the Applied Honors Mathematics Program.

**The Cyril G Wates Memorial Scholarship in Honors Pure Mathematics***Issued : August 2022*

Department of Mathematics and Statistics, University of Alberta.

To be awarded annually to a student of outstanding academic merit completing second year in Honors Mathematics.

**International student scholarship***Issued : August 2020*

University of Alberta.

Students with superior academics who will be entering their first year of an undergraduate degree studying on a Student Visa Permit

**Dean's List** *Fall 2021, Winter 2022, Fall 2022, Winter 2023***Two-time Mathematical Sciences Society Integration Bee Runner up***Fall 2020, Winter 2021***Math League competition***Issued : January 2020*

Department of Mathematics and Computer Science, Modern College of Business and Science, Muscat, Oman.

Runner up in Math League, an inter-school and university mathematics contest for students of grade 12

**Bronze Medal in Gulf Math Olympiad***Issued : November 2019***School Bronze Medal in International Math Olympiad***Issued : February 2019***Merit List Holder** *2014, 2015, 2016, 2017, 2018, 2019, 2020*

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**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

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

## EXTRACURRICULARS

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**President** May 2023 - Present  
 Mathematical Sciences Society, University of Alberta  
**Work:** Plan and organize social activities 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 - present  
 Catholic Student Association, University of Alberta

**Member** September 2021 - present  
 Undergraduate Physics Club & 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

## PROJECTS

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**Joshua George**, Robert Joseph, Davidson Noby (2022). "Water and Hydroelectric Power Sharing". The Mathematical Contest in Modeling. COMAP's Mathematical Contest in Modeling (MCM) 2022

**Joshua George**, Oluwatimilehin Ajayi, Gurmol Sohi (2021). "Fear of COVID-19 Vaccine Hesitancy using Sentiment Analysis and World Population Data", Stem Fellowship Journal

**Audio Classifier:** Built a deep audio classifier on the TESS emotional dataset using Convolutional Neural Networks. (2022)

## CONFERENCES AND SUMMER PROGRAMS

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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 Association of America Virtual MATHFEST, August 2021

The International Undergraduate Summer Enrichment Program, July – August 2021  
 Department of Mathematics and Statistics, University of Alberta

## PROGRAMMING/COMPUTER EXPERIENCE

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I have considerable programming experience mostly in Python. Other languages I have had some acquaintances with are Julia, C++, Matlab and MySQL. Over the past three years I have completed various courses online on Coursera along with University course work. Few relevant ones include Deep Learning Specialization, Coursera, DeepLearning.AI, Machine Learning with Python, Coursera, IBM, Creating BigQuery Datasets and Visualizing Insights, Coursera, Google, Applied Data Science using Python, Coursera, Specialization, University of Michigan. Most of the code is on my **Github**.