

Matthew Koban

matthew.koban@mail.utoronto.ca

Education

PhD in Mathematics (University of Toronto) 2022-Present
Supervisor(s): Dr. Lisa Jeffrey and Dr. Steven Rayan

MSc in Mathematics (University of Toronto) 2020-2021
Supervisor: Lisa Jeffrey
Thesis: *Geometric Quantization and the Hitchin Connection*.

BSc (Honours) in Mathematics 2017-2020
Supervisor: Dr. Steven Rayan Thesis: *Cohomology of Moduli Spaces of Higgs Bundles and TQFTs*.

Awards

Margaret Isobel Elliot Graduate Scholarship	2024
Blyth Fellowship	2023
Ontario Graduate Scholarship	2023
NSERC USRA Scholarship	2020
NSERC USRA Scholarship	2019
University of Saskatchewan Undergraduate Scholarship	2019

Research Experience

Research Assistant, QuanTA center, University of Saskatchewan Feb-Aug 2022

- Project Supervisor: Dr. Steven Rayan
- Investigated the relationship between Quiver Varieties and Higgs bundles on the projective line.

NSERC USRA Researcher, University of Saskatchewan May-Aug 2020

- Project Supervisor: Dr. Jenna Rajchgot
- Proved a structural result regarding basic double links which contain edge ideals.

NSERC USRA Researcher, University of Saskatchewan May-Aug 2019

- Project Supervisor: Dr. Steven Rayan
- Investigated the role of quantum tori in topological materials.

Teaching Experience

Teaching Assistant: Department of Mathematics, University of Toronto

- Courses: MAT133 - Calculus and Linear Algebra for Commerce;
MAT 137 - Calculus with proofs; MAT223 - Linear Algebra I,
MAT224 - Linear Algebra II;
MAT244 - Introduction to ODEs

Teaching Assistant: Department of Mathematics and Statistics, University of Saskatchewan

- Courses: MATH 123 - Calculus I for Engineers;
MATH 124 - Calculus II for Engineers

Papers

- On Basic Double Links of Squarefree Monomial Ideals. Joint with Patricia Klein and Jenna Rajchgot. *Journal of Commutative Algebra* 16(2), 213-229.

Contributed Talks

- **Moduli of Doubled Quiver Bundles** June 2024
- CMS Summer Meeting, Scientific Sessions, University of Saskatchewan
- **Introduction to Quiver Varieties with Examples** March 2024
- Bird's Eye Conference, University of Toronto
- **What is a Quiver Variety?** June 2023
- QuanTA Junior Symposium, University of Saskatchewan
- **Introduction to Topological Quantum Field Theory** December 2020
- Graduate Student Seminar, University of Toronto
- **TQFT, Quivers, and Higgs Bundles** November 2020
- Geometry and Mathematical Physics Seminar, University of Saskatchewan
- **Introduction To Category Theory** February 2019
- Mathematics and Statistics Student Society, University of Saskatchewan
- **Algebraic Aspects of Supersymmetry** November 2018
- Math 401 String Theory Honours Seminar
- **Mason- Stothers Theorem** January 2018
- Math 301 Honours Seminar

Miscellaneous Writings

- *Lie Groups and Curvature of Left-Invariant Metrics* April 2018
- Prepared as part of the Calabi-Yau seminar, University of Saskatchewan

Extracurricular

President: Mathematics and Statistics Student Society

April 2019- 2020