Nathanael Chwojko-Srawley

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EDUCATION

Undergraduate Degree at the University of Toronto	SEPT 2017
Specialist in Mathematics, Minor in Computer Science	-MAY 2022
GPA in 3rd and 4th year: **3.95/4**	

RESEARCH EXPERIENCE

Classifying Automorphism-Representable Groups — MAY 2021 -AUG 2021

Supervisor: Ehsaan Hossain

Research Opportunity Program (ROP)

Generalizing the classical result from group theory that there does not exist a group G such that $\text{Aut}(G) = \mathbb{Q}$ we tried to find condition on a group G for which $\text{Aut}(G) = H$ for various of groups H (ex. $H = \mathbb{R}, \mathbb{Z}, \prod_i \mathbb{Z}$)

Connections in Algebra and Geometry — SEPT 2021 -DEC 2021

Supervisor: Ehsaan Hossain

Senior Thesis

Using various resources (ex. The Stacks Project, Harthorne), I researched to find solutions to a list of open-ended problems my supervisor came up with in commutative algebra and algebraic geometry

Almost Global Existence for Nonlinear Wave Equations — MAY 2022 -AUG 2022

Supervisor: Yakov Shlapentokh-Rothman

Received Grant of $7500 From the MCSRA

Building off of the work of Sergiu Klainerman, we tried to find almost global existence for nonlinear wave equations in the setting of time dependent inhomogeneous media and Schwarzschild black hole exterior

TALKS AND CONFERENCES

Functional Analysis and Sobelev Spaces — JULY 2022

Canadian Undergraduate Mathematics Conference (CUMC)

Presented on topics within Functional Analysis concerning Sobelev spaces, as well as their application to my research in PDEs

Introduction to Modern Algebraic Geometry — OCT 2022

Mathematic Student Talk

Presented on the foundation of modern Algebraic Geometry, it's connection to differential geometry, and on the classification of algebraic surfaces.

Integral Extensions and Localizations

Senior Thesis

Presented proofs and consequences of the Lying-Over, Going-Up, and Going-Down theorem

Sept 2021

Consequences of Nakayama's Lemma

Senior Thesis

Presented Nakayama's lemma as well as some consequences (ex. M a finitely generated module over commutative ring A, then surjective endomorphism implies injective, and absolutely flat local ring is field)

Nov 2021

Applications of Category Theory

Missisauga's Mathematics Union

Presented on the intuition behind Category theory and "Categorical thinking", common examples of categorical construction, and the applications of Category theory to the fields of Algebra, Analysis, Physics, Computer Science

Nov 2021

Automorphism-Representable Groups

Smarti Gras Convention

Presented ROP research results, in particular some properties of free groups and groups G wher $\text{Aut}(G) = \mathbb{Z} \times \mathbb{Z}$ and $\text{Aut}(G) = \mathbb{Z}$

Aug 2021

Classification of Divisible Groups

Seminar

Presented on the classification of divisible groups, and elementary theory of injective modules.

Jul 2021

Akshay Venkatesh Fields Symposium

Fields Medal Symposium

Presentation by Emily Riehl on revisiting the foundations of Mathematics via type theory and univalent foundations

Oct 2022

Curvature in Metric Geometry

Seminar

Presentation introducing the notion of Gaussian from Riemann Geometry into in Metric Geometry

Sept 2022

A First Encounter with Diffeology

Seminar

Presentation introducing the notion of Diffeology, including many examples (Ex. all types of manifolds and orbifolds) and some basic constructions

Oct 2022

P=W Conjecture Solved

Seminar

Presentation on 2 recent papers by Mauilik and Shen proving the $P = W$ conjecture

Oct 2022

Teaching Experience

Teaching Assistant (TA)

Prepared and ran tutorials, graded assignments, held office hours, and invigilated tests. Courses a was a TA for are:

- Abstract Algebra (MAT301)
  Jan 2023-Apr 2023
- Abstract Algebra (MAT301)
  Sept 2022-Dec 2022
- Linear Algebra II (MAT224)
  July 2022-Aug 2022

- Linear Algebra II (MAT224)
  May 2022-June 2022
- Combinatorics (MAT202)
  Jan 2022-Apr 2022
- Calculus II (MAT136)
  Sept 2021-Dec 2021

Sept 2021
- Apr 2023

Volunteer Experience

UTM Math Club Server Moderator

Moderator for the Math discord server. Active community involvement in answering questions, sharing new perspectives, joining events, and guiding newer students (member count: ≈ 3785)

Nov 2020-

Every You Need To Know about Algebra (EYNTKA Algebra)

Pedagocial book on Algebra comprehensively covering area's in undergraduate mathematics from group, ring, module, and field theory, to commutative algebra and representation theory. Available at http://www.nathanaelsrawley.com/Notes

Aug 2019-