Nathanael Chwojko-Srawley

WEBSITE: http://www.nathanaelsrawley.com/
EMAIL: nathanael.srawley@mail.utoronto.ca

Education

Undergraduate Degree at the University of Toronto — Sept 2017 - May 2023
Specialist in Mathematics, Minor in Computer Science (Deans List Scholar)
GPA in last 3 years: 3.97/4

Master Degree at the University of Toronto — Sept 2024 - Aug 2025
Masters in Mathematics

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 $\mathrm{Aut}(G) = \mathbb{Q}$, I worked on finding conditions on a group G for which $\mathrm{Aut}(G) = H$ exists for various of groups H

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, I worked on finding almost global existence for nonlinear wave equations in the setting of time dependent inhomogeneous media and Schwarzschild black hole exterior

Parametric Dehn's Lemma — May 2023 - Aug 2023
Supervisor: Yevgeniy Liokumovich
Received Grant of $7500 From the MCSRA
Michael Freedman observed that the Parametric version of Dehn's Lemma is equivalent to the Poincare Conjecture. Using Classical techniques from Differential Geometry, I pushed further on finding isometries in the special case where there are generically at most 2 intersection points

Senior Thesis

Connections in Algebra and Geometry — Sept 2021 - Dec 2021
Supervisor: Ehsaan Hossain
I found solutions to a list of problems presented by my supervisor in the fields of commutative algebra and algebraic geometry. I presented interesting results at undergraduate seminars.

Talks I have given

Automorphism-Representable Groups — Aug 2021

Smarti Gras Convention

I presented my ROP research results, from elementary results using elementary group theory to the complications of

Functional Analysis and Sobelev Spaces — July 2022

Canadian Undergraduate Mathematics Conference (CUMC)

I 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

Mathematics Seminar

I presented on the foundations of modern Algebraic Geometry, its connection to Complex Geometry and GAGA-like connections, as well as preliminary ideas on the classification of algebraic surfaces.

Consequences of Nakayama's Lemma — Nov 2021

Undergraduate Seminar

I presented Nakayama's lemma as well as some consequences (ex. a finitely generated module M over a commutative ring A implies that surjective endomorphisms are injective, and some local-to-global results)

Applications of Category Theory — Nov 2021

Undergraduate Seminar

I presented on the intuitions behind Category theory and 'Categorical thinking', common examples of categorical constructions, and the applications of Category theory to the fields of Algebra, Analysis, Physics, and Computer Science

Classification of Divisible Groups — Jul 2021

Undergraduate Seminar

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

TMWYF Insiders Perspective on Undergraduate Research — Oct 2022

Speaker

I shared my experience doing math research, link can be found here:
TMWYFInsidersPerspectiveonUndergraduateResearch

Teaching Experience

Teaching Assistant (TA)

Sept 2021 - Apr 2025

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

- Abstract Algebra (MAT301)
  Jan 2023-Apr 2023
- Abstract Algebra (MAT301)
  Sept 2021-Dec 2021
- Linear Algebra II (MAT224)
  July 2021-Aug 2021
- Linear Algebra II (MAT224)
  May 2021-June 2021
- Linear Algebra I (MAT223)
  Sept 2024-Dec 2024
- Calculus I (MAT135)
  Sept 2024-Dec 2024
- Combinatorics (MAT202)
  Jan 2021-Apr 2021
- Abstract Mathematics (MAT246)
  Jan 2025-Apr 2025
- Calculus II (MAT136)
  Sept 2020-Dec 2020

Volunteer Experience

UTM Math Club Administrator

Nov 2020-

Involved in the mathematical community in answering questions, sharing new perspectives, facilitating events, and guiding newer students

(member count: ≈ 3785)

Everything You Need To Know About Series

Aug 2019-

Wrote pedagogical book on covering areas in undergraduate mathematics in Algebra, Real/Complex/Functional Analysis, Differential and Algebraic Geometry, Algebraic Topology, PDE, Class Field Theory, and so forth.

Available at https://nathanaelsrawley.com/notes