

Nathanael Chwojko-Srawley

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EDUCATION

Undergraduate Degree at the University of Toronto <i>Specialist in Mathematics, Minor in Computer Science (Deans List Scholar)</i> GPA in last 3 years: 3.97/4	SEPT 2017 - MAY 2023
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Master Degree at the University of Toronto <i>Masters in Mathematics</i>	SEPT 2024 - AUG 2025
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RESEARCH EXPERIENCE

Classifying Automorphism-Representable Groups <i>Supervisor: Ehsaan Hossain</i> <i>Research Opportunity Program (ROP)</i> Generalizing the classical result from group theory that there does not exist a group G such that $\text{Aut}(G) = \mathbb{Q}$, I worked on finding conditions on a group G for which $\text{Aut}(G) = H$ exists for various of groups H	MAY 2021 - AUG 2021
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Almost Global Existence for Nonlinear Wave Equations <i>Supervisor: Yakov Shlapentokh-Rothman</i> <i>Received Grant of \$7500 From the MCSRA</i> 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	MAY 2022 - AUG 2022
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Parametric Dehn's Lemma <i>Supervisor: Yevgeniy Liokumovich</i> <i>Received Grant of \$7500 From the MCSRA</i> 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	MAY 2023 - AUG 2023
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SENIOR THESIS

Connections in Algebra and Geometry <i>Supervisor: Ehsaan Hossain</i> 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.	SEPT 2021 - DEC 2021
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TALKS I HAVE GIVEN

Automorphism-Representable Groups

Smarti Gras Convention

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

AUG 2021

Functional Analysis and Sobelev Spaces

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

JULY 2022

Introduction to Modern Algebraic Geometry

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.

OCT 2022

Consequences of Nakayama's Lemma

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, or that an absolutely flat local ring is a field)

NOV 2021

Applications of Category Theory

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

NOV 2021

Classification of Divisible Groups

Undergraduate Seminar

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

JUL 2021

TMWYF Insiders Perspective on Undergraduate Research

Speaker

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

[TMWYFInsidersPerspectiveonUndergraduateResearch](#)

OCT 2022

TEACHING EXPERIENCE

Teaching Assistant (TA)

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

SEPT 2021
- APR 2025

VOLUNTEER EXPERIENCE

UTM Math Club Administrator

Involved in the mathematical community in answering questions, sharing new perspectives, facilitating events, and guiding newer students
(member count: ≈ 3785)

Nov 2020-

Everything You Need To Know About Series

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>

AUG 2019-