Nicolo Fellini

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Languages: English

Research interests

Number Theory
Automorphic forms, Diophantine equations, L-functions, The Langlands program, sieve theory and the parity problem, obstructions to local-global principles.

Mathematical modeling
Decision support systems, stochastic optimization, simulation models, graph theory.

Education

PhD, Mathematics, Queen's University 2021–Present
Supervisor: Ram Murty.

MSc, Mathematics, University of Toronto 2020–2021
Supervisor: Stephen Kudla.
Project: Real Analytic Modular Forms and Their Representations

HBSc, Mathematics Specialist, University of Toronto 2016–2020
Thesis Supervisors: Adam Stinchcombe and David Martell.
Thesis: Optimizing Timber Harvest in Flammable Boreal Forest Suitable for Woodland Caribou.

Awards

∗ designates a competitive award

∗ **Ontario Graduate Scholarship**, Queen's University 2024–2025

R.S McLaughlin Fellowship, Queen's University 2023–2024

Department of Mathematics Graduate Program Award, University of Toronto University 2020

Faculty of Arts And Science Fellowship, University of Toronto University 2020

∗ **Canadian Forest Workforce Diversity Undergraduate Supplement**, 2020
Natural Sciences and Engineering Research Council of Canada (NSERC)
and Natural Resources Canada – Canadian Forest Services

∗ **NSERC Undergraduate Student Research Award**, University of Toronto 2020

∗ **NSERC Undergraduate Student Research Award**, University of Toronto 2019

∗ **NSERC Undergraduate Student Research Award**, University of Toronto 2018

Refereed publications

Authors are always listed alphabetically by last name, as is convention in my fields of study.

Journal articles

Nicolo Fellini, *Congruences relations of Ankeny–Artin–Chowla type for real quadratic fields*, (2024). Submitted.

Conference Proceedings

Nicolo Fellini and M. Ram Murty, *Fermat Quotients and the Ankeny–Artin–Chowla conjecture*, (2024), International Conference on Class Groups of Number Fields and Related Topics conference proceedings, Springer.

Presentations

† designates an invited talk

Research presentations at international conferences for the broader mathematical community

† Congruence relations for class numbers of real quadratic fields, Jun. 2024
Canadian Matematical Society (CMS), Canada

† Variations of a conjecture of Ankeny,Artin, and Chowla , Jun. 2023
Canadian Matematical Society (CMS), Canada

Research presentations at seminars for number theorists

1. Number Theory Seminar, Queen's University Sep. 2021 - Pres.
I have given approximately 20 talks in the Queen's Number Theory seminar.

† Number Theory Seminar, University of Ottawa Oct. 2024

† Mobius ANT Seminar, University of Montreal Laval, Canada Feb. 2024

† Number Theory Seminar, University of Waterloo, Canada Oct. 2023

Expository presentations on modern research topics for junior researchers

† Mathematics and Statistics graduate seminar, Queen's University, Canada Sep. 2024

† Mathematics and Statistics graduate seminar, Queen's University, Canada Sep. 2022

† Mathematics and Statistics graduate seminar, Queen's University, Canada Oct. 2021

Courses taught

Course Instructor Jan. 2023 – Jun. 2024
Department of Mathematics and Statistics
Queen's University

Course	Level	Audience	#Students	#Terms
Differential Calculus	1st year	Science majors	150	1
Multivariable Differential Calculus	1st year	Science majors	250	2
Multivariable Differential and Integral Calculus	1st year	Engineering majors	200	1

For each of the four courses in the above table, I was a co-instructors for courses with approximate enrollment between 1000-1800 students. My duties included 2-3 lectures a week, facilitation of problem solving sessions, course administration, organization of graders and teaching assistants, and assessment design (i.e., assignment, exam, and test questions).

Teaching Assistant Sep. 2021 – Apr. 2025
Department of Mathematics and Statistics
Queen's University

Course	Level	#Students	Duties	#Terms
Complex variables	3rd Year	75	Tutorial Leader	1
Introduction to algebra	2nd year	75	Tutorial Leader	2
Mathematics From a Historical Perspective	3rd year	110	Office Hours	2
Number Theory and Cryptography	Graduate	40	Tutorial leader Office Hours	2
Mathematical Modeling	3rd Year	25	Office Hours	1

The tutorials I lead often consisted of group discussion/activities where I would let the students work on a selection of curated problems that I would chose to give them practice applying important concepts. As needed, I would supplement these activities with mini-lectures to explain the technical material from the course or to clarify any misconceptions.

Office hours were run in a very similar way. Typically, these were smaller groups (5-15) students so the emphasis was normally on addressing specific problems. For project based courses (such as the Mathematical modeling course), office hours were focused on helping students improve their communication skills by providing a space for the students to share what they were working on and soliciting feedback.

Teaching assistant Sep.2019–Aug.2021
Mathematics Department
University of Toronto

Course	Level	#Students	Duties	#Terms
Decision Support Systems	Graduate	25	Tutorial Leader, Office Hours	1
Head Teaching Assistant[(a)]			Weekly TA workshops, tutorial design	2
Integral calculus	1st year	40	Tutorial leader, exam design	1
Differential calculus	1st year	40	Tutorial leader	1
Differential calculus[(b)]	1st year	450	Active-learning facilitator	2

(*a*) My duties as a head teaching assistant included the regular work of a teaching assistant as well as additional administrative task. In particular, I was tasked with running weekly meetings with 20 other teaching assistants to discuss what should be covered in tutorials for the coming week, conduct short training modules, as well as be support for any issues that arose. Additionally, I was tasked with altering the previously in-person assessments (assignments, test, quizzes) to online alternatives due to COVID-19.

(*b*) I was part of a team of teaching assistants specially selected to work in a large active-learning flipped classroom that met three times weekly. I facilitated discussions within student groups, diagnosed and clarified misconceptions in real time, and helped students develop their own strategies to tackle problems.

Event administration

Queen's Number Theory Seminar 2021–Pres.
Role: Organizer
Description: Weekly planning and organization of department wide Number Theory Seminar.

Mathematics and Statistics Graduate Student Seminar & Coffee Time 2024–2025
Role: Co-founder and main organiser.
Description: Departmental community building initiative. The aim of this initiative was to rekindle the interactions, many of which have disappeared in the wake of the Covid-19 pandemic, among graduate students. To achieve this, we have been offering a seminar every other week with a coffee time in the intervening weeks. The seminar has a specific empathises on making mathematics accessible and when possible, fun! The coffee time is a low stakes opportunity for graduate students to meet, talk, and discuss their work (research, grading, teaching) or any issues at large within the department.

Number theory by early career researchers (CMS) 2024
Role: Co-organizer.
Description: This session aims to give a platform to graduating PhD students, recently graduated PhD holders and postdocs to showcase their research in the field of Number Theory. We hope that this will be a great opportunity to exchange ideas, network and gain exposure to different subjects in number theory. We plan to consider all contributions in algebraic, analytic, computational and elementary number theory, as well as arithmetic geometry.

Workshops and mini-courses taught

- Facilitative teaching for teaching assistants, Queen's University 2024

  The mini- course offered an overview of facilitative teaching, aiming to equip new teaching assistants with effective tools for conducting office hours/tutorials and working in the Math Learning Centre, a large drop-in help center. I developed the materials, activities, and accompanying "TA handbook" for the training.

- Effective grading for teaching assistants, Queen's University 2024

  The mini-course offered an overview of effective grading with the aim of equipping new teaching assistants with the tools for providing helpful feedback on students work. Additionally, I gave an overview of the electronic systems we use at Queen's University for grading. In addition, I developed the materials and activities used for the training.

- How to write mathematics, University of Toronto 2020, 2021

  This workshop focused on how to both write mathematics and the tools generally used to prepare mathematical documents. This involved an introduction to LaTeXas well as many examples of how to *not* write mathematics.

Outreach

Undergraduate mentor, Summer Research Experience, University of British Columbia 2022

Organized weekly meetings with four undergraduate students to guide, help, and supervise a summer research project related to various number theory topics.

Association for Women in Mathematics, Student Chapter, University of Toronto 2018–2020

I am a founding member and was the treasurer of the student chapter of the Association for Women in Mathematics at the University of Toronto. My duties included general financial oversight, budgeting, seeking funds, and record keeping. In addition, I was responsible for the preparation and organization of events such as a lecture series featuring gender minority mathematicians.

DEEP Counsellor, Engineering Outreach, University of Toronto 2017

The Da Vinci Engineering Enrichment Program (DEEP) is designed for highly motivated high school students with an aptitude for science and math. My role as DEEP Counsellor was to help plan lessons, reinforce concepts, help instructors with record keeping, and prepare resources for lab experiments and activities.

I conducted two "crash" course lectures on calculus and orbital mechanics as part of this work.