

Ryan Morrill

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Personal Statement

My primary interests are in teaching and mathematics outreach. I am very invested in promoting mathematics in the general community, and pushing those already with interest even further. My mathematical background is in algebraic and computational number theory; however, my current research interests lie in the scholarship of teaching and learning.

Education

- 1. PhD in Mathematics** *defended December 2023*
University of Calgary *Calgary, AB*
Thesis Supervisor: Dr. Mark Bauer
Thesis Title: *Computing Elliptic Curves of a Given Conductor*
- 2. MSc in Mathematics** *July 2017*
University of Alberta *Edmonton, AB*
Thesis Supervisors: Dr. Manish Patnaik
Thesis Title: *Theta Inversion and the The Law of Quadratic Reciprocity for an Arbitrary Number Field*
- 3. BSc in Mathematics** with a minor in Physical Sciences *May 2014*
University of Alberta *Edmonton, AB*

Teaching Experience (Principle instructor)

- 1. University of Alberta, Department of Mathematical and Statistical Sciences**
 - Introductory Statistics for Business and Economics, Winter 2024
 - Differential Equations, Winter 2024
 - Calculus for Business and Economics I, Fall 2023
 - Mathematical Reasoning for Teachers, Fall 2023
- 2. Mount Royal University, Department of Mathematics and Computing**
 - Puzzling Adventures in Mathematics, Winter 2023
- 3. University of Calgary - Department of Mathematics and Statistics**
 - University Calculus I, Fall 2022
 - Calculus for Engineers and Scientists, Fall 2021
- 4. University of Calgary - Werkland School of Education**
 - Analytical and Algorithmic Reasoning, Summer 2019

Math Outreach Initiatives

- 1. Lead Organizer / Instructor** - JAMES math circle, 2012-current
This is a weekly math enrichment program for students ages 11-16. It is an inclusive space for students to advance their mathematical thinking, logical reasoning, and problem solving, while building a mathematical community. I create fun and interactive sessions which promote collaboration.
University of Alberta, University of Calgary
- 2. Lead Organizer** - Tournament of the Towns, 2012-2019
This is a mathematics contest which I run as a problem solving workshop. The emphasis is on persistence, creativity and improvement on their mathematical writing.
University of Alberta, University of Calgary
- 3. Lead Organizer / Instructor** - Math Nite, 2017-2023
This is a weekly math enrichment program for students ages 13-17. It is focused on collaborating with their peers to solve difficult contest-style problems.
University of Calgary
- 4. Lead Organizer / Instructor** - Unfair Games Program, 2018-2019
I coordinated a small team of volunteers to elementary schools to play combinatorial games, teach mathematical thinking, and promote mathematics appreciation.
University of Calgary
- 5. Team Canada Leader and Coach** - International Mathematics Competition (IMC), 2012-2019
This is an international math competition for students ages 13-15. It values mathematical collaboration and building an international community around mathematics.
University of Alberta, University of Calgary
- 6. Organizer / Instructor** - CMS summer camp, 2012, 2014, 2016, 2018, 2019
This is a week long math enrichment camp for students ages 13-16. The focus is on building a mathematical community and culture while engaging in fun math activities.
University of Alberta, University of Calgary
- 7. Workshop lead** - SK Day Exploratory Math Workshop, 02/03/2019
Sonia Kovalevsky Day is an event for female high school and middle school students to promote women in mathematics. I led a workshop on graph theory and Euler's Formula.
University of Calgary
- 8. Instructor** - Tunsia Olympiad Math Camp, Summer 2018
This is a week long math enrichment camp for students ages 14-17. My focus was on lifting up students who were passionate about mathematics but lacked the resources to pursue further.
- 9. Committe Member** - SNAP Math Fair
The SNAP (Student-Centered, Non-competitive, All-inclusive, Problem-based) Math Fair is an event put on by students and teachers to promote mathematics appreciation in elementary schools.

Teaching Development

1. **Graduate Teaching Fellowship**, Fall 2021 / Fall 2022, (290 hours)
Mathematics and Statistics Department - University of Calgary
This is a two-step program involving teaching two courses and getting feedback on your teaching.
2. **Teaching Book Club**, Spring/Summer 2022, (14 hours)
Mathematics and Statistics Department - University of Calgary
We took turns presenting on a chapter from “How Learning Works” by Ambrose.
3. **Teaching Community of Practice**, Fall 2021, (20 hours)
Department of Mathematics and Statistics - University of Calgary
We formed a teaching square to create a teaching component and share feedback with our peers.
4. **Theories and Issues in Postsecondary Teaching and Learning for Graduate Students**, Winter 2019, (15 hours)
Taylor Institute for Teaching and Learning - University of Calgary
A cohort-based program consisting of seminar-style gatherings on teaching.
5. **SAGES program**, Fall 2018 / Winter 2019, (60 hours)
Taylor Institute for Teaching and Learning - University of Calgary
The SAGES (SoTL Advancing Graduate Education in STEM) program is a two-term course for graduate students in the scholarship of teaching and learning. Some activities include creating a teaching workshop for our peers, and writing a teaching research question and implementing it in a course.
6. **Graduate Teaching and Learning Program, level 1**, 09/2016, (15.5 hours)
Faculty of Graduate Studies and Research - University of Alberta
This program consisted of several seminar-style teaching workshops.

Departmental Service

1. **Teaching and Learning Committee**, 2018-2022.
Department of Mathematics and Statistics - University of Calgary
2. **VP Events, Events Committee, President**, 2018-2022
Graduate University Mathematics Society (GUMS) - University of Calgary
3. **Calgary Junior Mathematics Contest Committee**, 2018-current
Department of Mathematics and Statistics - University of Calgary
4. **TA orientation and TA workshop organizer**, 2018-2020
Department of Mathematics and Statistics - University of Calgary
5. **TA orientation advisor and volunteer**, 2021-2022
Department of Mathematics and Statistics - University of Calgary

Conferences and Seminars organized

1. **Alberta Graduate Mathematics and Statistics Conference (AGMSC)**, 06/2022
I was a committee member organizing this conference. The purpose of this conference is to bring graduate students from across Alberta together to collaborate and network.
2. **Graduate Student Seminar**, 01/2022-04/2022
I was the organizer for one semester. This seminar aims at helping graduate students practice their public speaking and presentation skills.
3. **Shotgun Talk Extravaganza**, 01/2021, 03/2023
I started this event to give graduate students a casual and light-hearted setting to practice their talks. The content of the talks could be on non-academic topics.
4. **Modular Symbol Learning Seminar**, 02/2020-03/2020
I started this seminar to understand Cremona's method to compute elliptic curves of a given conductor. We met once a week and I taught the background material for the technique to graduate students and faculty.

Awards

1. **GSA Graduate Citizenship Award**, 2019
Graduate Students Association, University of Calgary
This award is in recognition of students who have demonstrated initiative in improving the graduate student experience for graduate students at the University of Calgary. This award is meant to recognize individuals who have created an initiative which benefits the graduate community at the University of Calgary.
2. **Eric Milner Scholarship**, 2019
Department of Mathematics and Statistics, University of Calgary
This award is given to one who has demonstrated expertise in mathematics and a capacity to share this expertise with others. This prestigious award is granted to one student per year.
3. **Alberta Graduate Excellence Scholarships(AGES) - Doctoral Research**, 2019
Province of Alberta, Alberta Advanced Education
This award is to recognize outstanding academic achievement in graduate studies.
4. **Fred A. McKinnon Award**, 2019
Faculty of Science, University of Calgary
This award is given to select students in the Faculty of Science for excellence in teaching. I was awarded it for being the best graduate teaching assistant in the Math and Science Department.
5. **Graduate Assistant Teaching Excellence Award**, 2018, 2017
Department of Mathematics and Statistics, University of Calgary
Awarded for excellent communication skills, solid academic background, and passionate devotion towards teaching.

6. Graduate Student Teaching Award, 2016

Faculty of Science, University of Alberta

The Graduate Student Teaching Awards annually recognize outstanding graduate teaching assistants in each faculty at the University of Alberta.

Media Coverage

1. “PhD student seeks to demystify mathematics through fun outreach initiatives”, *UToday (September 2021)*
<https://science.ucalgary.ca/news/phd-student-seeks-demystify-mathematics-through-fun-outreach-initiatives>
2. “For the Love of Math”, *Science Contours (Spring 2016)*
<https://www.ualberta.ca/science/about-us/contours/2016-spring-contours/2016/june/for-the-love-of-math>

Conferences and Workshops Attended

<u>Date</u>	<u>Conference</u>	<u>Paper Contributed</u>
07/2023	First Year Math and Stats in Canada Meet Up	
05/2023	First Year Math and Stats in Canada One-Day Online Conference	
05/2023	Alberta Math Dialogue 2023	
03/2023	Alberta Number Theory Days XIV	
11/2022	Indigenizing University Mathematics 2	
06/2022	Alberta Graduate Mathematics and Statistics Conference 2022	
05/2022	First Year Math and Stats in Canada One-Day Online Conference	
04/2022	Gathering 4 Gardner 14	How to get Even
11/2021	Alberta Number Theory Days XIII	
07/2021	Inclusive Paths to Number Theory	
04/2020	Alberta Number Theory Days XII	
06/2019	Workshop on Arithmetic Topology	
05/2018	Alberta Math Dialogue 2018	
04/2018	Gathering 4 Gardner 13	Playing Nice with a Crooked Coin
03/2017	Alberta Number Theory Days IX	
01/2017	Joint Mathematics Meetings 2017	
03/2016	Gathering 4 Gardner 12	Black or White
04/2014	Ted Lewis Workshop on SNAP Math Fairs 2014	
03/2014	Gathering 4 Gardner 11	Stone Piles
04/2013	Ted Lewis Workshop on SNAP Math Fairs 2013	
04/2012	Ted Lewis Workshop on SNAP Math Fairs 2012	

Invited Talks

1. **What is it like to be a mathematician?**
Math Attack Society, Calgary, AB
Math Attack Contest, 12/2022
2. **Which pentomino is the least convex?**
University of Calgary (online), Calgary, AB
Calgary Junior High Math Contest Banquet, 06/2022
3. **Having fun with error correcting codes**
The Renert School, Calgary, AB
Math and Science Celebration, 05/2022
4. **It's Magical! Introducing the Gilbreath Principle**
University of Calgary (online), Calgary, AB
Calgary Junior High Math Contest Banquet, 05/2021
5. **An Introduction to Elliptic Curve Cryptography**
Math Attack Society (online), Alberta
Math Attack Contest, 12/2021
6. **Learn To do Magic**
University of Calgary and University of Lethbridge (online), AB
Inclusive Paths to Number Theory, 08/2021
7. **Computing elliptic curves of a given conductor**
University of Calgary, Calgary, AB
Eric Milner Colloquium Talk, 11/2019
8. **How to get even and take your seat**
Durban University of Technology, Durban, South Africa
SAIMC, 07/2019
9. **Math Unfair Games**
City Montessori School, Lucknow, India
InIMC, 07/2017
10. **The JAMES math circle**
Banff International Research Station, Banff, AB
Ted Lewis workshop on SNAP Math Fairs 2013, 04/2013

Contributed Talks

1. **Math Circles in Alberta**
First Year Math and Stats in Canada
FYMSiC Meetup, 07/2023

2. **Finding elliptic curves of a given conductor**

Mount Royal University, Calgary, AB
Alberta Math Dialogue 2023, 05/2023

3. **Playing Nice With a Weighted Coin**

Ritz-Carlton Hotel, Atlanta, GA
Gathering for Gardner 13, 04/2018

4. **A Grid of Liars**

Joint Mathematics Meetings 2017, Atlanta, GA
Unusual topics for a math circle, 01/2017

Contributed Talks (Local)

1. **Life is unfair for Player 2... or is it?**

University of Calgary, Calgary, AB
Graduate student seminar, 03/2023

2. **What's the deal with isogenies on elliptic curves?**

University of Calgary, Calgary, AB
Graduate student seminar, 02/2023

3. **A (potential) reason to care about elliptic curves**

University of Calgary, Calgary, AB
Graduate student seminar, 10/2022

4. **Error Correcting Codes**

University of Calgary, Calgary, AB
AGMSC 2022, 07/2022

5. **Elliptic curves and modular forms**

University of Calgary, Calgary, AB
Graduate student seminar, 03/2022

6. **An introduction to addition and other things (on elliptic curves)**

University of Calgary, Calgary, AB
Graduate student seminar, 12/2021

7. **The Shafaravich-Tate Group**

University of Calgary (online), Calgary, AB
Graduate student seminar, 07/2021

8. **It's magical! Introducing the Gilbreath Principle**

University of Calgary (online), Calgary, AB
Grad student seminar, 05/2021

9. **A (Very) Brief Introduction to Galois Cohomology and Descent method**

University of Calgary (online), Calgary, AB
Graduate student seminar, 03/2021

10. **Let's learn some card magic**
University of Calgary (online), Alberta
Shotgun Talk Extravaganza, 01/2021
11. **Mathematical Recreations: The Chip Firing Game**
University of Calgary (online), Calgary, AB
Graduate student seminar, 10/2020
12. **Hercules and the Hydra**
University of Calgary (online), Calgary, AB
Graduate student seminar, 06/2020
13. **Conducting Computation of Curves of Common Conductor**
University of Calgary, Calgary, AB
Graduate student seminar, 11/2019
14. **Puzzling with Trick or Treaters**
University of Calgary, Calgary, AB
Graduate student seminar, 10/2018
15. **Some things about the Law of Quadratic Reciprocity**
University of Calgary, Calgary, AB
Graduate student seminar, 10/2018
16. **The Law of Quadratic Reciprocity for an Arbitrary Number Field**
University of Calgary, Calgary, AB
Alberta Math Dialogue 2018, 05/2018
17. **Dirichlet's Theorem on Primes in Progression**
University of Calgary, Calgary, AB
Graduate student seminar, 03/2018
18. **Theta Inversion and the Law of Quadratic Reciprocity for an arbitrary number field**
University of Calgary, Calgary, AB
Number theory research seminar, 11/2017

Hobbies

1. Recreational gymnastics
2. Board games
3. Exotic pets
4. Card and coin magic