Jonathan Love

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Education and Employment

1 Sep 2024 – (ongoing)	Postdoctoral Scholar, **Leiden University**, Leiden, the Netherlands Supervisor: Jan Vonk
1 Aug 2021 – 31 Jul 2024	CRM-ISM Postdoctoral Fellow, **McGill University**, Montreal, Canada Supervisors: Henri Darmon, Eyal Goren, and Michael Lipnowski
Jun 2021	PhD in Mathematics, **Stanford University**, Stanford, USA Advisors: Akshay Venkatesh, Dan Boneh, and Ravi Vakil Thesis: "Isogeny Graphs, Zero-cycles, and Modular Forms: Computations over Algebraic Curves and Surfaces"
Nov 2016	MSc in Mathematics, **University of Toronto**, Toronto, Canada Advisor: Jacob Tsimerman Thesis: "Field Extensions Generated by Kernels of Isogenies"
Apr 2015	Honours Bachelor of Science in Mathematics, **University of Toronto**, Toronto, Canada

Papers and Preprints

- "Rational configuration problems and a family of curves." To appear in *Journal of Number Theory* (2024), 25 pgs (arXiv)
- "On elements of prescribed norm in maximal orders of a quaternion algebra" with Eyal Z. Goren. To appear in *Canadian Journal of Mathematics* (2024), 29 pgs (arXiv)
- "Torsion phenomena for zero-cycles on a product of curves over a number field" with Evangelia Gazaki. *Research in Number Theory*, Vol. 10, No. 35 (2024), 19 pgs (DOI)
- "Root Numbers of a Family of Elliptic Curves and Two Applications." *Indagationes Mathematicae*, Vol. 35, Issue 3 (2024) pp. 555-569 (DOI)
- "Rational Equivalences on Products of Elliptic Curves in a Family." *Journal de Théorie des Nombres de Bordeaux*, Vol. 32, No. 2 (2020) pp. 923-938. (DOI)
- "Supersingular Curves With Small Non-integer Endomorphisms" with Dan Boneh. In *Proceedings of the Fourteenth Algorithmic Number Theory Symposium*, ed. Steven D. Galbraith. *The Open Book Series*, Vol. 4, No. 1 (2020) pp. 7-22 (DOI)
- "Rational ℓ-torsion points on Jacobians of μ_ℓ-covers" with Wanlin Li and Eric Stubley. In preparation.
- "Supersingular elliptic curves, quaternion algebras and applications to cryptography" with Eyal Goren. 62 pgs. *Submitted* (arXiv)
- "Local and local-to-global principles for zero-cycles on geometrically Kummer K3 surfaces" with Evangelia Gazaki. 27 pgs. *Submitted* (arXiv)
- "Hyperelliptic curves mapping to abelian varieties and Applications to Beilinson's Conjecture for zero-cycles" with Evangelia Gazaki. 27 pgs. *Submitted* (arXiv)
- "An Arithmetic Variant of Raynaud's Theorem" with Libby Taylor. 16 pgs. *Submitted* (arXiv)

Recent and Upcoming Presentations

Nov 2024	KULB-seminars
Oct 2024	Intercity Number Theory Seminar
Sep 2024	Utretcht Algebraic Geometry Seminar
Jun 2024	Canadian Number Theory Association
Apr 2024	Front Range Number Theory Day
Dec 2023	CMS Session: Number theory by early career researchers
Oct 2023	Maine-Québec Number Theory Conference
Aug 2023	AMMCS Session: Computational Number Theory
Feb 2023	Fields Number Theory Seminar
Dec 2022	CMS Session: Diophantine Arithmetic Geometry and Number Theory
Dec 2022	Washington University in St. Louis AAG Seminar
Oct 2022	Québec-Maine Number Theory Conference
Jul 2022	Park City Mathematics Institute
Apr 2022	AMS Session: Explicit Methods in Modularity
Mar 2022	Montréal Online Biweekly Inter-University Seminar on Analytic Number Theory (MOBIUS ANT)
Nov 2021	Ottawa-Carleton Number Theory Seminar
Oct 2021	Maine-Québec Number Theory Conference
Sep 2021	Québec-Vermont Number Theory Seminar
Mar 2021	University of Virgina Number Theory Seminar
Feb 2021	Québec-Vermont Number Theory Seminar
Jul 2020	Fourteenth Algebraic Number Theory Symposium

Teaching Positions

Jan 2022 – Apr 2023 — Course Lecturer at McGill University
Number Theory / Honours Number Theory (math 346/377), Winter 2023
Discrete Structures (math 240), Winter 2022

Mar – May 2021 — Teaching Assistant at Arizona Winter Semester
Developed problem sets and held office hours for a 6-week course on p-adic numbers and p-adic modular forms.

Jan 2017 – Mar 2021 — Teaching Assistant / Course Assistant at Stanford University
Linear Algebra and Multivariable Calculus (Math 51), Fall 2018, Fall 2020
Differential Equations (Math 53), Spring 2017
Modern Mathematics: Discrete Methods (Math 62DM), Winter 2018, Winter 2020
Applied Matrix Theory (Math 104), Spring 2020
Linear Algebra and Matrix Theory (Math 113), Winter 2021
Groups and Rings (Math 120), Fall 2017, Spring 2019

Summer 2018, 19 — Mentor at Canada/USA Mathcamp
Developed curriculum for and taught 25 hours of course material each summer.

Sep 2012 – Aug 2016 — Teaching Assistant at University of Toronto
Calculus (mat135), Fall 2012
Calculus! (mat137), 2013-14
Engineering Calculus (mat187), Winter 2013
Groups, Rings, and Fields (mat347), 2014-15, 2015-16.

Outreach, Mentorship, and Service

Jul 2024	Program Committee: Algorithmic Number Theory Symposium (ANTS XVI)
Jan 2024	Organizer: JMM Special Session on Explicit Computations with Stacks
Sep 2023 – Dec 2023	Research Supervisor at McGill University Supervising two undergraduate students studying elliptic curves (math 470)
Summer 2021	Academic Coordinator at Canada/USA Mathcamp A 5-week long summer program for mathematically advanced high school students. Designed the academic schedule for the program, invited guest speakers, and coordinated teacher training and development.
Mar 2018	Teaching Assistant at Geometry of Redistricting (San Francisco) 2-day conference hosted by the Metric Geometry and Gerrymandering Group. Facilitated group activities designed to train high school math teachers and college professors in the mathematics of gerrymandering, voting, and apportionment.
Apr 2017 – Jun 2021	Directed Reading Program Mentor at Stanford University Worked with eight undergraduate students on an individual basis; one meeting per week for 10 weeks each
Mar 2015	Lecturer at March Break Math Academy, Toronto, Canada Also Mar 2014. 5 days, 7 hours per day. Hosted by University of Toronto Schools.
various	Guest Speaker Gunn High School Math Circle, Palo Alto, Feb 2020 The Wilberforce School, Princeton, Mar 2019 University of Toronto Mississauga Math Circle, Apr 2015, Nov 2015, Feb 2016 Pre-Concert Lecture for Aradia Ensemble, Toronto, Oct 2014

Grants and Awards

2021-23	CRM-ISM Postdoctoral Fellowship
Jun 2021	Centennial Teaching Assistant Award, Stanford University
Jul 2020	Selfridge Prize, Algorithmic Number Theory Symposium

Computer Skills

Working	Sage, Mathematica, Magma, Python
Basic	html, css, php, Javascript, pari/gp

My Github repository (https://github.com/jonathanrlove) contains a sample of my computational work, including the following projects:

- Computing supersingular isogeny graphs and identifying curves that have non-integer endomorphisms of small degree (supporting the paper "Supersingular Curves With Small Non-integer Endomorphisms")
- Producing rational equivalences on certain products of elliptic curves (supporting the paper "Torsion phenomena for zero-cycles on a product of curves over a number field")
- Computing cusp forms over function fields, using an algorithm that tests for isomorphisms between rank 2 vector bundles (supporting my PhD thesis)

- A tool to assist people studying for the Stanford PhD qualifying exams by organizing and compiling past problems
- Interactive workbooks used in a class about lattices at Canada/USA Mathcamp