

Department of Mathematics, Dartmouth College, 245 Kemeny Hall, Hanover, NH 03755
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Education

PhD, Mathematics, *Dartmouth College*, Hanover, NH Fall 2018 - expected Spring 2023
Advisor: John Voight

MA, Mathematics, *Dartmouth College*, Hanover, NH Fall 2018 - Winter 2020
Advisor: John Voight

MS, Mathematics, *Brigham Young University*, Provo, UT Winter 2017 - Summer 2018
Advisors: Michael Griffin and Paul Jenkins
Thesis: *The arithmetic of modular grids*

BS, Mathematics, *Brigham Young University*, Provo, UT Fall 2013 - Fall 2016

Professional Experience

Academic Researcher 2013 - Present

At BYU, I proved results about modular forms and algorithms on graphs. At Dartmouth, I instigated successful research into summing divergent series, the Prisoner's Dilemma, and the Ramanujan-Robin criterion. My thesis develops the arithmetic statistics of elliptic curves with N -isogeny.

Math Instructor 2017 - Present

I taught 30-student calculus courses in three different styles: lecturing, virtually with a "flipped classroom", and with handouts and group exercises. I was hand-picked to TA for upper-division courses.

Computer Skills

Fluent in...

Bash • \LaTeX • Python • SageMath

Experience with...

C++ • Git • HTML • Magma • Mathematica • MatLab • PARI/GP

Research Publications and Preprints

Multiplicative summations into algebraically closed fields, *with Robert Dawson*

Submitted for publication. arXiv:2111.09938

Telescopic, multiplicative, and rational extensions of summations, *with Robert Dawson*

Submitted for publication. arXiv:2105.04592

The arithmetic of modular grids, *with Michael Griffin and Paul Jenkins*

Mathematika **68**, 1080-1119 (2022). arXiv:2012.14403

Odd, spoof perfect factorizations, *with the BYU Computational Number Theory Group*

Journal of Number Theory **22**, 31-47 (2022). Quanta article. arXiv:2006.10697

Zagier duality for level p weakly holomorphic modular forms, with *Paul Jenkins*

The Ramanujan Journal **50**, 93–109 (2019). arXiv:1709.10023

Graphs with the strong Havel-Hakimi property, with *Michael Barrus*

Graphs and Combinatorics **32**, 1689–1697 (2016). arXiv:1505.00085

Expository Notes

Fast-growing series are transcendental, with *Robert Dawson*

Unpublished. arXiv:2102.12995

Manuscripts in Preparation

Counting 7-isogenies, with *John Voight*

LCM-products and the Ramanujan-Robin criterion, with *Steve Fan and Mits Kobayashi*

Odd, spoof quasiperfect factorizations, with *Jonathon Hales*

Reactive means and the prisoner's dilemma, with *Feng Fu*

Visualizing Basel's problem, with *Mits Kobayashi*

Selected Git Projects

Spoof Quasiperfect Factorizations

Fall 2021

<https://github.com/grantmolnar/Spoof-Quasiperfect-Factorizations>

Awards and Fellowships

Dartmouth Graduate Fellowship

Fall 2018 - Summer 2023

Gridley Fund for Graduate Mathematics

Fall 2018 - Summer 2019

NSF Graduate Research Fellowship Honorable Mention

April 2018

BYU Academic Scholarship

Spring 2015 - Winter 2016

BYU Math Department Scholarship

Fall 2016

BYU Math Department Scholarship

Fall 2015

BYU Academic Scholarship

Fall 2013 - Winter 2014

Teaching Experience

Dartmouth College, Hanover, NH (Instructor)

Math 8 (Calculus of One and Several Variables)

Fall 2021

Math 1 (Algebra and Calculus)

Fall 2020

Dartmouth College, Hanover, NH (Teacher's Assistant)

Math 100 / Computer Science 49/149 (Random Walk)

Spring 2022

Math 100 / Computer Science 49/149 (Decision Theory)

Spring 2021

Math 23 (Differential Equations)

Winter 2020

Math 3 (Calculus)

Fall 2019

Math 22 (Linear Algebra)

Spring 2019

Math 22 (Linear Algebra)	Fall 2018
Brigham Young University , Provo, UT (Instructor)	
Math 112 (Calculus I)	Summer 2017
Brigham Young University , Provo, UT (Teacher's Assistant)	
Math 112 (Calculus I)	Fall 2017
Math 113 (Calculus II)	Winter 2017
Brigham Young University , Provo, UT (Grader)	
Math 570 (Matrix Analysis)	Winter 2017
Math 112 (Calculus I)	Fall 2015

Conference Talks

The LCM product and Grönwall's theorem	October 3, 2021
2021 Maine-Québec Number Theory Conference (virtual)	
Formal summation of divergent series	September 26, 2020
2020 Conférence de Théorie des Nombres Québec-Maine (virtual)	
The arithmetic of modular grids	October 5, 2019
2019 Maine-Québec Number Theory Conference	
The arithmetic of modular grids	March 8, 2019
33 rd Automorphic Forms Workshop	
The arithmetic of modular grids	July 17, 2018
Building Bridges: 4th EU/US Summer School + Workshop on Automorphic Forms	
Zagier duality in level p modular spaces	March 21, 2018
32 nd Automorphic Forms Workshop	
Zagier duality in level p modular spaces	March 3, 2018
2018 BYU Student Research Conference	
Zagier duality in level p modular spaces	May 24, 2017
Modular Forms are Everywhere Conference	
Weakly holomorphic modular forms of level 11	March 7, 2017
31 st Automorphic Forms Workshop	
Weakly holomorphic modular forms of level 11	March 4, 2017
2017 BYU Student Research Conference	
Congruence relations in modular forms of prime levels greater than 7	March 21, 2015
2015 BYU Student Research Conference	
Residues and independence numbers of graphs	March 15, 2014
2014 BYU Student Research Conference	

Other Talks

A family of analogues to the Ramanujan-Robin Criterion	October 27, 2022
BYU Number Theory Seminar	
Nearing nearings	September 14, 2022
Dartmouth Graduate Student Seminar	

Universal algebra and coalgebra Dartmouth Graduate Student Seminar	March 30, 2022
Cogalois theory Dartmouth Graduate Student Seminar	February 16, 2022
Cyclic resolution of singularities Reading Seminar on Hilbert Modular Surfaces	January 25, 2022
What if the Riemann hypothesis is false? Dartmouth Graduate Student Seminar	January 19, 2022
Inverse semigroups: groups without identity Dartmouth Graduate Student Seminar	November 9, 2021
Counting 7-isogenies Dartmouth Algebra and Number Theory Seminar	November 8, 2021
A sober look at pointless topology Dartmouth Graduate Student Seminar	September 21, 2021
Fast-growing series are transcendental Dartmouth Graduate Student Seminar (virtual)	April 21, 2021
Coalgebras and Hopf algebras Reading Seminar on Affine Group Schemes (virtual)	April 15, 2021
Absurd equalities and Runge's method: the degenerate case Dartmouth Algebra and Number Theory Seminar (virtual)	March 30, 2021
p-adic Hodge theory Reading Seminar on Classical and Quadratic Chabauty (virtual)	March 2, 2021
Odd, spoof quasiperfect factorizations Dartmouth Algebra and Number Theory Seminar (virtual)	February 9, 2021
A primer in social choice theory Dartmouth Graduate Student Seminar (virtual)	January 20, 2021
Examples of Kedlaya's algorithm Reading Seminar on Classical and Quadratic Chabauty (virtual)	November 19, 2020
The LCM product and Grönwall's theorem Dartmouth Algebra and Number Theory Seminar (virtual)	November 17, 2020
Reactive means and the prisoner's dilemma Dartmouth Graduate Student Seminar (virtual)	October 7, 2020
Formal summation of divergent series: an algebraic approach Dartmouth Algebra and Number Theory Seminar (virtual)	April 28, 2020
On the infinitude of the natural numbers Dartmouth Graduate Student Seminar	February 12, 2020
Variations of Hodge structures Reading Seminar on Shimura Varieties	November 26, 2019
Hodge structures Reading Seminar on Shimura Varieties	November 14, 2019
Savage's expected utility and making good decisions Dartmouth Graduate Student Seminar	November 13, 2019
Geometric and generalized calculus Dartmouth Graduate Student Seminar	October 8, 2019

Summing divergent series Dartmouth Graduate Student Seminar	July 31, 2019
Real analysis: a nonstandard approach Dartmouth Graduate Student Seminar	April 17, 2019
Why save the universe? Set theory with a universal set Dartmouth Graduate Student Seminar	January 16, 2019
The arithmetic of modular grids Dartmouth Graduate Student Seminar	September 26, 2018
The arithmetic of modular grids BYU Master's Thesis Defense	June 22, 2018
Dioids and idempotent geometry II BYU Algebra Seminar	March 13, 2018
Dioids and idempotent geometry I BYU Algebra Seminar	February 27, 2018
Zagier duality in level p modular spaces BYU Number Theory Seminar	February 22, 2018
Average values of arithmetic functions BYU Number Theory Seminar	October 12, 2017
Weakly holomorphic modular forms of level 11 BYU Number Theory Seminar	February 9, 2017
Generating functions for canonical bases of certain level 11 weakly holomorphic modular forms BYU Number Theory Seminar	January 26, 2017
High rank elliptic curves with prescribed torsion BYU Number Theory Seminar	December 1, 2016
Heuristics for elliptic curves of high rank BYU Number Theory Seminar	October 20, 2016
A lemma regarding the Feit-Thompson conjecture BYU Number Theory Seminar	November 12, 2015
Algebraic number theory and the Feit-Thompson conjecture BYU Number Theory Seminar	October 1, 2015
Congruence relations in modular forms of prime levels greater than 7 BYU Number Theory Seminar	March 19, 2015
Hensel's lemma BYU Number Theory Seminar	February 12, 2015
Newton polynomials BYU Number Theory Seminar	March 27, 2014

Leadership and Community Service

Referee

<i>Journal of Number Theory</i>	2018 - Present
<i>Mathematische Zeitschrift</i>	2022 - Present

Reviewer	
<i>zbMATH Open</i>	2021 - Present
K-12 Outreach	
Utah Math Olympiad Committee Member	2015 - Present
Session Leader at Dartmouth Sonia Kovalevsky Day (Arithmetic)	May 21, 2022
Activity Station Leader at Lebanon Ward Pi Day (Random Walk)	April 8, 2022
Exploring Mathematics Camp Leader (Graph Theory)	July 27-31, 2020
Exploring Mathematics Camp Leader (Cryptography)	July 13-17, 2020
Activity Station Leader at Lebanon Ward Pi Day (Random Walk)	March 7, 2020
Volunteer at Dartmouth Sonia Kovalevsky Day	May 11, 2019
Activity Station Leader at Dartmouth Science Day (Nim)	May 4, 2019
Math Circles Guest Speaker (Tropical Algebra)	February 24, 2018
Math Circles Guest Speaker (Continued Fractions)	October 21, 2017
Proofreader for Utah State Math Contest	February 2017
Dartmouth Graduate Student Council	
Healthcare Committee Founder and Co-Chair	2022 - Present
◦ <i>Budget Committee Member</i>	Summer 2022
Finance Officer	2021 - 2022
◦ <i>Budget Committee Member</i>	Summer 2021
Representative for Math Department	2020 - 2021
◦ <i>Service Committee Member</i>	2020 - 2021
◦ <i>Budget Committee Member</i>	Summer 2020
Other	
LMFDB Contributor	2019 - Present
Dartmouth Algebra and Number Theory Seminar Organizer	2019 - Present
Dartmouth Directed Reading Program Mentor (Decision Theory)	Spring 2022
Dartmouth Directed Reading Program Mentor (Fractional Calculus)	Winter 2022
BYU Putnam Team Captain	2014 - 2016
Math Circles Counselor	2013 - 2015
Other	
Achievements and Honors	
3 rd Place in Virginia Tech Regional Math Competition	October 2016
2 nd Place in Search for High Rank Elliptic Curve	
at 2016 Connecticut Summer School in Number Theory	August 2016
Gold Palm Eagle Scout	December 2012
Black Belt (Taekwondo)	August 2012
Special Training	
Dartmouth Mathematics Teaching Seminar	Spring 2020
BYU Mathematics Teaching Seminar	Fall 2018
Academic Interests	
Analytic Number Theory • Arithmetic Geometry • Game Theory • Logic	

Personal Interests

Reading • Writing • Philosophy • Hiking

Conferences and Workshops Attended

<i>Modular Curves Workshop 2</i> MIT, Boston	November 5-9, 2022
<i>Big Data Conference 2022</i> Virtual (Harvard University, Cambridge)	August 26, 2022
<i>Explicit Methods for Modularity</i> Virtual (Simons Collaboration)	April 11-15, 2022
<i>Arizona Winter School 2022: Automorphic Forms Beyond GL_2</i> Virtual (University of Arizona, Tucson)	March 5-9, 2022
<i>Hilbert Modular Forms Infrastructure Week 2</i> Dartmouth College, Hanover	February 21-25, 2022
<i>2021 Maine-Québec Number Theory Conference</i> Virtual (University of Maine, Orono)	October 2-3, 2021
<i>Spring 2021 Algebraic Geometry Northeastern Series</i> Virtual (Brown University, Providence)	May 4-5, 2021
<i>21st Algebra, Geometry and Combinatorics Day</i> Virtual (University of Notre Dame, Notre Dame)	April 10, 2021
<i>2021 Joint Mathematics Meetings</i> Virtual (American Math Society, Mathematical Association of America)	January 6-9, 2021
<i>Fall 2020 Algebraic Geometry Northeastern Series</i> Virtual (Stony Brook University, Stony Brook)	October 23-25, 2020
<i>2020 Conférence de Théorie des Nombres Québec-Maine</i> Virtual (Université Laval, Québec)	September 26-27, 2020
<i>14th Algorithmic Number Theory Symposium</i> Virtual (University of Auckland, Auckland)	June 29 - July 4, 2020
<i>UNCG Summer School in Computational Number Theory and Algebra: Ergodic Theory with Applications to Continued Fractions</i> Virtual (University of North Carolina, Greensboro)	May 18-22, 2020
<i>2019 Maine-Québec Number Theory Conference</i> University of Maine, Orono	October 5-6, 2019
<i>Fall 2019 Algebraic Geometry Northeastern Series</i> Boston College, Boston	September 20-22, 2019
<i>33rd Automorphic Forms Workshop</i> Duquesne University, Pittsburgh	March 6-10, 2019
<i>Building Bridges: 4th EU/US Summer School + Workshop on Automorphic Forms and Related Topics</i> Alfréd Rényi Institute of Mathematics, Budapest	July 9-20, 2018
<i>32nd Automorphic Forms Workshop</i> Tufts University, Medford	March 19-22, 2018

<i>Modular Forms are Everywhere</i>	May 15-26, 2017
Max Planck Institute for Mathematics, Bonn	
31 st <i>Automorphic Forms Workshop</i>	March 6-9, 2017
East Tennessee State University, Johnson City	
2017 <i>BYU Student Research Conference</i>	March 4, 2017
Brigham Young University, Provo	
2016 <i>Connecticut Summer School in Number Theory</i>	August 8-14, 2016
University of Connecticut, Storrs	
2015 <i>BYU Student Research Conference</i>	March 21, 2015
Brigham Young University, Provo	
2014 <i>BYU Student Research Conference</i>	March 15, 2014
Brigham Young University, Provo	