Grant Molnar Curriculum Vitae

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

🌐 www.grantmolnar.com • ✉ Grant.S.Molnar.GR@dartmouth.edu

Education

PhD, Mathematics, *Dartmouth College*, Hanover, NH Fall 2018 - expected Spring 2023
Advisor: John Voight
Thesis: *Counting elliptic curves with a cyclic m-isogeny over $\mathbb{Q}$*

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 at BYU and Dartmouth Fall 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 cyclic m-isogeny. See Research Publications and Preprints *below*.

Math Instructor at BYU and Dartmouth Winter 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 TAed for lower-division courses, and by special request for upper-division courses as well. See Teaching Experience *below*.

Computer Skills

Fluent in...
Bash • LaTeX • Python • SageMath

Experience with...
C++ • Git • HTML • Magma • Mathematica • MatLab • PARI/GP

Research Publications and Preprints

Reactive means in the Iterated Prisoner's Dilemma, *with Caroline Hammond and Feng Fu*
Preprint. arXiv:2302.13909

A database of basic numerical invariants of Hilbert modular surfaces, *with Eran Assaf, Angelica Babei, Ben Breen, Edgar Costa, Juanita Duque-Rosero, Aleksander Horawa, Jean Kieffer, Avinash Kulkarni, Sam Schiavone,* **and** *John Voight*
Preprint. arXiv:2301.10302

Counting elliptic curves over the rationals with a 7-isogeny, *with John Voight*
Preprint. arXiv:2212.11354

Multiplicative summations into algebraically closed fields, *with Robert Dawson*
Preprint. arXiv:2111.09938

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

A family of analogues to the Ramanujan-Robin criterion, *with Steve Fan and Mits Kobayashi*

Odd, spoof quasiperfect factorizations, *with Jonathon Hales*

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

Invited Talks

Counting elliptic curves with a cyclic m-isogeny	February 9, 2023
Job Talk at Metron	
Counting elliptic curves with a 7-isogeny	January 19, 2023
BYU Colloquium	
Counting elliptic curves with a 7-isogeny	January 11, 2023
Simons Collaboration Annual Meeting	
Counting 7-isogenies	January 6, 2023
2023 Joint Mathematics Meeting	
A family of analogues to the Ramanujan-Robin Criterion	October 27, 2022
BYU Number Theory Seminar	

Other Conference Talks

Intersecting varieties with transcendental graphs	March 8, 2023
Arizona Winter School 2023: Unlikely Intersections	
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
33rd 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
32nd 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
31st 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 Seminar Talks

The Fox H-function	March 28, 2023
Dartmouth Graduate Student Seminar	
Geometric deep learning	February 14, 2023
Dartmouth Graduate Student Seminar	
Nearing nearrings	September 14, 2022
Dartmouth Graduate Student Seminar	
Universal algebra and coalgebra	March 30, 2022
Dartmouth Graduate Student Seminar	
Cogalois theory	February 16, 2022
Dartmouth Graduate Student Seminar	
Cyclic resolution of singularities	January 25, 2022
Reading Seminar on Hilbert Modular Surfaces	
What if the Riemann hypothesis is false?	January 19, 2022
Dartmouth Graduate Student Seminar	
Inverse semigroups: groups without identity	November 9, 2021
Dartmouth Graduate Student Seminar	
Counting 7-isogenies	November 8, 2021
Dartmouth Algebra and Number Theory Seminar	
A sober look at pointless topology	September 21, 2021
Dartmouth Graduate Student Seminar	
Fast-growing series are transcendental	April 21, 2021
Dartmouth Graduate Student Seminar (virtual)	
Coalgebras and Hopf algebras	April 15, 2021
Reading Seminar on Affine Group Schemes (virtual)	

Absurd equalities and Runge's method: the degenerate case   March 30, 2021
Dartmouth Algebra and Number Theory Seminar (virtual)

p-adic Hodge theory   March 2, 2021
Reading Seminar on Classical and Quadratic Chabauty (virtual)

Odd, spoof quasiperfect factorizations   February 9, 2021
Dartmouth Algebra and Number Theory Seminar (virtual)

A primer in social choice theory   January 20, 2021
Dartmouth Graduate Student Seminar (virtual)

Examples of Kedlaya's algorithm   November 19, 2020
Reading Seminar on Classical and Quadratic Chabauty (virtual)

The LCM product and Grönwall's theorem   November 17, 2020
Dartmouth Algebra and Number Theory Seminar (virtual)

Reactive means and the prisoner's dilemma   October 7, 2020
Dartmouth Graduate Student Seminar (virtual)

Formal summation of divergent series: an algebraic approach   April 28, 2020
Dartmouth Algebra and Number Theory Seminar (virtual)

On the infinitude of the natural numbers   February 12, 2020
Dartmouth Graduate Student Seminar

Variations of Hodge structures   November 26, 2019
Reading Seminar on Shimura Varieties

Hodge structures   November 14, 2019
Reading Seminar on Shimura Varieties

Savage's expected utility and making good decisions   November 13, 2019
Dartmouth Graduate Student Seminar

Geometric and generalized calculus   October 8, 2019
Dartmouth Graduate Student Seminar

Summing divergent series   July 31, 2019
Dartmouth Graduate Student Seminar

Real analysis: a nonstandard approach   April 17, 2019
Dartmouth Graduate Student Seminar

Why save the universe? Set theory with a universal set   January 16, 2019
Dartmouth Graduate Student Seminar

The arithmetic of modular grids   September 26, 2018
Dartmouth Graduate Student Seminar

The arithmetic of modular grids   June 22, 2018
BYU Master's Thesis Defense

Dioids and idempotent geometry II   March 13, 2018
BYU Algebra Seminar

Dioids and idempotent geometry I   February 27, 2018
BYU Algebra Seminar

Zagier duality in level p modular spaces   February 22, 2018
BYU Number Theory Seminar

Average values of arithmetic functions   October 12, 2017
BYU Number Theory Seminar

Weakly holomorphic modular forms of level 11   February 9, 2017
BYU Number Theory Seminar

Generating functions for canonical bases of certain
level 11 weakly holomorphic modular forms   January 26, 2017
BYU Number Theory Seminar

High rank elliptic curves with prescribed torsion   December 1, 2016
BYU Number Theory Seminar

Heuristics for elliptic curves of high rank   October 20, 2016
BYU Number Theory Seminar

A lemma regarding the Feit-Thompson conjecture   November 12, 2015
BYU Number Theory Seminar

Algebraic number theory and the Feit-Thompson conjecture   October 1, 2015
BYU Number Theory Seminar

Congruence relations in modular forms of prime levels greater than 7   March 19, 2015
BYU Number Theory Seminar

Hensel's lemma   February 12, 2015
BYU Number Theory Seminar

Newton polynomials   March 27, 2014
BYU Number Theory Seminar

Leadership and Community Service

Referee
Journal of Number Theory   2018 - Present
Mathematische Zeitschrift   2022 - Present

Reviewer
zbMATH Open   2021 - Present

K-12 Outreach
Utah Math Olympiad Committee Member   2015 - Present
Activity Leader at Lebanon Ward Pi Day (Arithmetic & Random Walk) March 25, 2023
Session Leader at Dartmouth Sonia Kovalevsky Day (Arithmetic)   May 21, 2022
Activity 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 Leader at Lebanon Ward Pi Day (Random Walk)   March 7, 2020
Volunteer at Dartmouth Sonia Kovalevsky Day   May 11, 2019
Activity 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
Ad Hoc Healthcare Committee Founder and Co-Chair   2022 - Present
  ○ *Budget Committee Member*   Summer 2022

Finance Officer	2021 - 2022
○ *Budget Committee Member*	Summer 2021
Representative for Math Department	2020 - 2021
○ *Service Committee Member*	2020 - 2021
○ *Budget Committee Member*	Summer 2020

Dartmouth Directed Reading Program

Mentor (Fuzzy Logic)	Winter 2023
Mentor (Decision Theory)	Spring 2022
Mentor (Fractional Calculus)	Winter 2022

Other

LMFDB Contributor	2019 - Present
Dartmouth Algebra and Number Theory Seminar Organizer	2019 - 2022
BYU Putnam Team Captain	2014 - 2016
Math Circles Counselor	2013 - 2015

Other

Achievements and Honors

3rd Place in Virginia Tech Regional Math Competition	October 2016
2nd 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

Arizona Winter School 2023*: Unlikely Intersections*	March 4-8, 2023
University of Arizona, Tucson	
2023 *Simons Collaboration on Arithmetic Geometry,*	
Number Theory, and Computation Annual Meeting	January 11-12, 2023
Simons Foundation's Gerald D. Fischbach Auditorium, New York City	
2023 *Joint Mathematics Meetings*	January 4-7, 2023
Hynes Convention Center, Boston	
Hilbert Modular Forms Infrastructure Week 3	December 12-16, 2022
Dartmouth College, Hanover	
Modular Curves Workshop 2	November 5-9, 2022
MIT, Boston	

Big Data Conference 2022   August 26, 2022
Virtual (Harvard University, Cambridge)

Explicit Methods for Modularity   April 11-15, 2022
Virtual (Simons Collaboration)

Arizona Winter School 2022*: Automorphic Forms Beyond* GL_2 March 5-9, 2022
Virtual (University of Arizona, Tucson)

Hilbert Modular Forms Infrastructure Week 2   February 21-25, 2022
Dartmouth College, Hanover

2021 *Maine-Québec Number Theory Conference*   October 2-3, 2021
Virtual (University of Maine, Orono)

Spring 2021 *Algebraic Geometry Northeastern Series*   May 4-5, 2021
Virtual (Brown University, Providence)

21$^\text{st}$ *Algebra, Geometry and Combinatorics Day*   April 10, 2021
Virtual (University of Notre Dame, Notre Dame)

2021 *Joint Mathematics Meetings*   January 6-9, 2021
Virtual (American Math Society, Mathematical Association of America)

Fall 2020 *Algebraic Geometry Northeastern Series*   October 23-25, 2020
Virtual (Stony Brook University, Stony Brook)

2020 *Conférence de Théorie des Nombres Québec-Maine*   September 26-27, 2020
Virtual (Université Laval, Québec)

14$^\text{th}$ *Algorithmic Number Theory Symposium*   June 29 - July 4, 2020
Virtual (University of Auckland, Auckland)

UNCG Summer School in Computational Number Theory and Algebra:
Ergodic Theory with Applications to Continued Fractions   May 18-22, 2020
Virtual (University of North Carolina, Greensboro)

2019 *Maine-Québec Number Theory Conference*   October 5-6, 2019
University of Maine, Orono

Fall 2019 *Algebraic Geometry Northeastern Series*   September 20-22, 2019
Boston College, Boston

33$^\text{rd}$ *Automorphic Forms Workshop*   March 6-10, 2019
Duquesne University, Pittsburgh

Building Bridges: 4th *EU/US Summer School +*
Workshop on Automorphic Forms and Related Topics   July 9-20, 2018
Alfréd Rényi Institute of Mathematics, Budapest

32$^\text{nd}$ *Automorphic Forms Workshop*   March 19-22, 2018
Tufts University, Medford

Modular Forms are Everywhere   May 15-26, 2017
Max Planck Institute for Mathematics, Bonn

31$^\text{st}$ *Automorphic Forms Workshop*   March 6-9, 2017
East Tennessee State University, Johnson City

2017 *BYU Student Research Conference*   March 4, 2017
Brigham Young University, Provo

2016 *Connecticut Summer School in Number Theory*   August 8-14, 2016
University of Connecticut, Storrs
2015 *BYU Student Research Conference*   March 21, 2015
Brigham Young University, Provo
2014 *BYU Student Research Conference*   March 15, 2014
Brigham Young University, Provo