

 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 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

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 Kiefer, Avinash Kulkarni, Sam Schiavone, and John Voight
 Preprint. [arXiv:2301.10302](https://arxiv.org/abs/2301.10302)

Counting elliptic curves over the rationals with a 7-isogeny, with John Voight
 Preprint. [arXiv:2212.11354](https://arxiv.org/abs/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*

Reactive means and the prisoner's dilemma, with *Caroline Hammond and 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

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

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

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| The arithmetic of modular grids Building Bridges: 4th EU/US Summer School + Workshop on Automorphic Forms | July 17, 2018 |
| Zagier duality in level p modular spaces 32 nd Automorphic Forms Workshop | March 21, 2018 |
| Zagier duality in level p modular spaces 2018 BYU Student Research Conference | March 3, 2018 |
| Zagier duality in level p modular spaces Modular Forms are Everywhere Conference | May 24, 2017 |
| Weakly holomorphic modular forms of level 11 31 st Automorphic Forms Workshop | March 7, 2017 |
| Weakly holomorphic modular forms of level 11 2017 BYU Student Research Conference | March 4, 2017 |
| Congruence relations in modular forms of prime levels greater than 7 2015 BYU Student Research Conference | March 21, 2015 |
| Residues and independence numbers of graphs 2014 BYU Student Research Conference | March 15, 2014 |

Other Seminar Talks

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| Geometric deep learning Dartmouth Graduate Student Seminar | February 14, 2023 |
| Nearing nearrings Dartmouth Graduate Student Seminar | September 14, 2022 |
| 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 |

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| 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 |

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| 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

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

Reviewer

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| <i>zbMATH Open</i> | 2021 - Present |
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K-12 Outreach

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| 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

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| Ad Hoc 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 |

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| Representative for Math Department | 2020 - 2021 |
| ◦ <i>Service Committee Member</i> | 2020 - 2021 |
| ◦ <i>Budget Committee Member</i> | Summer 2020 |

Dartmouth Directed Reading Program

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

Other

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

Other

Achievements and Honors

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| 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

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| 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

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| 2023 <i>Simons Collaboration on Arithmetic Geometry, Number Theory, and Computation Annual Meeting</i> Simons Foundation's Gerald D. Fischbach Auditorium, New York City | January 11-12, 2023 |
| 2023 <i>Joint Mathematics Meetings</i> Hynes Convention Center, Boston | January 4-7, 2023 |
| <i>Hilbert Modular Forms Infrastructure Week 3</i> Dartmouth College, Hanover | December 12-16, 2022 |
| <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 |

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| <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 |
| 2021 <i>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 |
| 21 st <i>Algebra, Geometry and Combinatorics Day</i> Virtual (University of Notre Dame, Notre Dame) | April 10, 2021 |
| 2021 <i>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 |
| 2020 <i>Conférence de Théorie des Nombres Québec-Maine</i> Virtual (Université Laval, Québec) | September 26-27, 2020 |
| 14 th <i>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 |
| 2019 <i>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 |
| 33 rd <i>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 |
| 32 nd <i>Automorphic Forms Workshop</i> Tufts University, Medford | March 19-22, 2018 |
| <i>Modular Forms are Everywhere</i> Max Planck Institute for Mathematics, Bonn | May 15-26, 2017 |
| 31 st <i>Automorphic Forms Workshop</i> East Tennessee State University, Johnson City | March 6-9, 2017 |
| 2017 <i>BYU Student Research Conference</i> Brigham Young University, Provo | March 4, 2017 |
| 2016 <i>Connecticut Summer School in Number Theory</i> University of Connecticut, Storrs | August 8-14, 2016 |
| 2015 <i>BYU Student Research Conference</i> Brigham Young University, Provo | March 21, 2015 |

2014 *BYU Student Research Conference*
Brigham Young University, Provo

March 15, 2014