

# Grant Molnar

# Curriculum Vitae

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

**PhD, Mathematics**, *Dartmouth College*, Hanover, NH Fall 2018 - Present  
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

## 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

## Other Work Experience

BYU Putnam Team Captain 2014 - 2016

Undergraduate Researcher 2013 - 2016

Math Circles Counselor 2013 - 2015

## 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   |

## 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*

Submitted for publication. [arXiv:2012.14403](#)

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

Journal of Number Theory (2021). *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*

**Odd, spoof quasiperfect factorizations**, *with Jonathon Hales*

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

**Visualizing Basel's problem**, *with Mits Kobayashi*

## Git Projects

**Spoof Quasiperfect Factorizations**

Fall 2021

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

## Conference Talks

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

## Other Talks

|   |                    |
|---|--------------------|
| <b>Universal algebra and coalgebra</b><br>Dartmouth Graduate Student Seminar                  | March 30, 2022     |
| <b>Cogalois theory</b><br>Dartmouth Graduate Student Seminar                                  | February 16, 2022  |
| <b>Cyclic resolution of singularities</b><br>Reading Seminar on Hilbert Modular Surfaces      | January 25, 2022   |
| <b>What if the Riemann hypothesis is false?</b><br>Dartmouth Graduate Student Seminar         | January 19, 2022   |
| <b>Inverse semigroups: groups without identity</b><br>Dartmouth Graduate Student Seminar      | November 9, 2021   |
| <b>Counting 7-isogenies</b><br>Dartmouth Algebra and Number Theory Seminar                    | November 8, 2021   |
| <b>A sober look at pointless topology</b><br>Dartmouth Graduate Student Seminar               | September 21, 2021 |
| <b>Fast-growing series are transcendental</b><br>Dartmouth Graduate Student Seminar (virtual) | April 21, 2021     |

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| <b>Coalgebras and Hopf algebras</b><br>Reading Seminar on Affine Group Schemes (virtual)                                    | April 15, 2021     |
| <b>Absurd equalities and Runge's method: the degenerate case</b><br>Dartmouth Algebra and Number Theory Seminar (virtual)   | March 30, 2021     |
| <b><math>p</math>-adic Hodge theory</b><br>Reading Seminar on Classical and Quadratic Chabauty (virtual)                    | March 2, 2021      |
| <b>Odd, spoof quasiperfect factorizations</b><br>Dartmouth Algebra and Number Theory Seminar (virtual)                      | February 9, 2021   |
| <b>A primer in social choice theory</b><br>Dartmouth Graduate Student Seminar (virtual)                                     | January 20, 2021   |
| <b>Examples of Kedlaya's algorithm</b><br>Reading Seminar on Classical and Quadratic Chabauty (virtual)                     | November 19, 2020  |
| <b>The LCM product and Grönwall's theorem</b><br>Dartmouth Algebra and Number Theory Seminar (virtual)                      | November 17, 2020  |
| <b>Reactive means and the prisoner's dilemma</b><br>Dartmouth Graduate Student Seminar (virtual)                            | October 7, 2020    |
| <b>Formal summation of divergent series: an algebraic approach</b><br>Dartmouth Algebra and Number Theory Seminar (virtual) | April 28, 2020     |
| <b>On the infinitude of the natural numbers</b><br>Dartmouth Graduate Student Seminar                                       | February 12, 2020  |
| <b>Variations of Hodge structures</b><br>Reading Seminar on Shimura Varieties   | November 26, 2019  |
| <b>Hodge structures</b><br>Reading Seminar on Shimura Varieties   | November 14, 2019  |
| <b>Savage's expected utility and making good decisions</b><br>Dartmouth Graduate Student Seminar                            | November 13, 2019  |
| <b>Geometric and generalized calculus</b><br>Dartmouth Graduate Student Seminar   | October 8, 2019    |
| <b>Summing divergent series</b><br>Dartmouth Graduate Student Seminar   | July 31, 2019      |
| <b>Real analysis: a nonstandard approach</b><br>Dartmouth Graduate Student Seminar  | April 17, 2019     |
| <b>Why save the universe? Set theory with a universal set</b><br>Dartmouth Graduate Student Seminar                         | January 16, 2019   |
| <b>The arithmetic of modular grids</b><br>Dartmouth Graduate Student Seminar  | September 26, 2018 |
| <b>The arithmetic of modular grids</b><br>BYU Master's Thesis Defense   | June 22, 2018      |
| <b>Dioids and idempotent geometry II</b><br>BYU Algebra Seminar   | March 13, 2018     |
| <b>Dioids and idempotent geometry I</b><br>BYU Algebra Seminar  | February 27, 2018  |
| <b>Zagier duality in level <math>p</math> modular spaces</b><br>BYU Number Theory Seminar                                   | February 22, 2018  |

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| <b>Average values of arithmetic functions</b><br>BYU Number Theory Seminar  | October 12, 2017  |
| <b>Weakly holomorphic modular forms of level 11</b><br>BYU Number Theory Seminar  | February 9, 2017  |
| <b>Generating functions for canonical bases of certain level 11 weakly holomorphic modular forms</b><br>BYU Number Theory Seminar | January 26, 2017  |
| <b>High rank elliptic curves with prescribed torsion</b><br>BYU Number Theory Seminar   | December 1, 2016  |
| <b>Heuristics for elliptic curves of high rank</b><br>BYU Number Theory Seminar   | October 20, 2016  |
| <b>A lemma regarding the Feit-Thompson conjecture</b><br>BYU Number Theory Seminar  | November 12, 2015 |
| <b>Algebraic number theory and the Feit-Thompson conjecture</b><br>BYU Number Theory Seminar                                      | October 1, 2015   |
| <b>Congruence relations in modular forms of prime levels greater than 7</b><br>BYU Number Theory Seminar                          | March 19, 2015    |
| <b>Hensel's lemma</b><br>BYU Number Theory Seminar  | February 12, 2015 |
| <b>Newton polynomials</b><br>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     |

### Other

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|---|----------------|
| Dartmouth Algebra and Number Theory Seminar Organizer | 2019 - Present |
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| Dartmouth Graduate Student Council Healthcare Committee Co-Chair      | 2022 - Present |
| Dartmouth Graduate Student Council Finance Officer                    | 2021 - 2022    |
| ◦ <i>Budget Committee Member</i>                                      | Summer 2021    |
| Dartmouth Directed Reading Program Mentor (Decision Theory)           | Spring 2022    |
| Dartmouth Directed Reading Program Mentor (Fractional Calculus)       | Winter 2022    |
| Dartmouth Graduate Student Council Representative for Math Department | 2020 - 2021    |
| ◦ <i>Service Committee Member</i>                                     | 2020 - 2021    |
| ◦ <i>Budget Committee Member</i>                                      | Summer 2020    |

## Computer Skills

### Fluent in...

Bash •  $\text{\LaTeX}$  • Python • SageMath

### Experience with...

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

## Other

### Achievements and Honors

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|---|---------------|
| 3 <sup>rd</sup> Place in Virginia Tech Regional Math Competition          | October 2016  |
| 2 <sup>nd</sup> Place in Search for High Rank Elliptic Curve at 2016 CTNT | 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 • Rock-Climbing

## Conferences and Workshops Attended

|   |                      |
|---|----------------------|
| <i>Explicit Methods for Modularity</i>  | April 11-15, 2022    |
| Virtual   |                      |
| <i>Arizona Winter School 2022: Automorphic Forms Beyond <math>GL_2</math></i> | March 5-9, 2022      |
| Virtual   |                      |
| <i>Hilbert Modular Forms Infrastructure Week 2.0</i>                          | February 21-25, 2022 |
| Dartmouth College, Hanover  |                      |
| 2021 <i>Maine-Québec Number Theory Conference</i>                             | October 2-3, 2021    |
| Virtual   |                      |
| <i>Spring 2021 Algebraic Geometry Northeastern Series</i>                     | May 4-5, 2021        |
| Virtual   |                      |
| 21 <sup>st</sup> <i>Algebra, Geometry and Combinatorics Day</i>               | April 10, 2021       |
| Virtual   |                      |

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| 2021 <i>Joint Mathematics Meetings</i><br>Virtual   | January 6-9, 2021      |
| Fall 2020 <i>Algebraic Geometry Northeastern Series</i><br>Virtual  | October 23-25, 2020    |
| 2020 <i>Maine-Québec Number Theory Conference</i><br>Virtual  | September 26-27, 2020  |
| 14 <sup>th</sup> <i>Algorithmic Number Theory Symposium</i><br>Virtual  | June 29 - July 4, 2020 |
| UNCG Summer School in Computational Number Theory and Algebra:<br><i>Ergodic Theory with Applications to Continued Fractions</i><br>Virtual                           | May 18-22, 2020        |
| 2019 <i>Maine-Québec Number Theory Conference</i><br>University of Maine, Orono   | October 5-6, 2019      |
| Fall 2019 <i>Algebraic Geometry Northeastern Series</i><br>Boston College, Boston   | September 20-22, 2019  |
| 33 <sup>rd</sup> <i>Automorphic Forms Workshop</i><br>Duquesne University, Pittsburgh   | March 6-10, 2019       |
| <i>Building Bridges: 4<sup>th</sup> EU/US Summer School +<br/>Workshop on Automorphic Forms and Related Topics</i><br>Alfréd Rényi Institute of Mathematics, Budapest | July 9-20, 2018        |
| 32 <sup>nd</sup> <i>Automorphic Forms Workshop</i><br>Tufts University, Medford   | March 19-22, 2018      |
| <i>Modular Forms are Everywhere</i><br>Max Planck Institute for Mathematics, Bonn   | May 15-26, 2017        |
| 31 <sup>st</sup> <i>Automorphic Forms Workshop</i><br>East Tennessee State University, Johnson City   | March 6-9, 2017        |
| 2017 <i>BYU Student Research Conference</i><br>Brigham Young University, Provo  | March 4, 2017          |
| 2016 <i>Connecticut Summer School in Number Theory</i><br>University of Connecticut, Storrs   | August 8-14, 2016      |
| 2015 <i>BYU Student Research Conference</i><br>Brigham Young University, Provo  | March 21, 2015         |
| 2014 <i>BYU Student Research Conference</i><br>Brigham Young University, Provo  | March 15, 2014         |