

# Jeremy Booher | Curriculum Vitae

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## Research Interests

Algebraic number theory and arithmetic geometry, especially:

- Galois representations
- curves in characteristic  $p$
- computational number theory

## Employment

- 2022- **Assistant Professor**, *University of Florida*.
- 2019-2022 **Postdoctoral Fellow and Teaching Lecturer**, *University of Canterbury*.  
Mentor: Felipe Voloch
- 2016-2019 **Postdoctoral Research Associate**, *University of Arizona*.  
Mentor: Bryden Cais

## Education

- 2011-2016 **PhD in Mathematics**, *Stanford University*.  
Thesis: *Geometric Deformations of Orthogonal and Symplectic Galois Representations*, advised by Brian Conrad.
- 2010-2011 **Master of Advanced Study in Mathematics**, *Cambridge University*.
- 2006-2010 **A.B. in Mathematics**, *Harvard University*.  
Secondary Field: computer science. Senior thesis on moonshine advised by Dick Gross.

## Research

- with with Ross Bowden, Javad Doliskani, Tako Boris Fouotsa, Steven D. Galbraith, Sabrina Kunzweiler, Simon-Philipp Merz, Christophe Petit, Benjamin Smith, Katherine E. Stange, Yan Bo Ti, Christelle Vincent, José Felipe Voloch, Charlotte Weitkämper, Lukas Zobernig, Failing to hash into supersingular isogeny graphs, preprint. [paper]
- with Bryden Cais, Iwasawa Theory for  $p$ -torsion Class Group Schemes in Characteristic  $p$ , submitted. [paper, code]

- with Vishal Arul, Steven R. Groen, Everett W. Howe, Wanlin Li, Vlad Matei, Rachel Pries, and Caleb Springer, Doubly isogenous genus-2 curves with  $D_4$ -action, submitted. [paper, code]
- with Felipe Voloch, Recovering affine curves over finite fields from L-functions, Pacific Journal of Mathematics 314-1 (2021), 1–28. [paper]
- with Brandon Levin,  $G$ -Valued Crystalline Deformation Rings in the Fontaine-Laffaille Range, submitted. [paper]
- with Renee Bell, William Chen, and Yuan Liu, Tamely Ramified Covers of the Projective Line with Alternating and Symmetric Monodromy, to appear in Algebra & Number Theory. [paper]
- with Felipe Voloch, Recovering Algebraic Curves from L-functions of Hilbert Class Fields, Research in Number Theory 6, 43 (2020). [paper]
- with Rachel Pries, Realizing Artin-Schreier Covers of Curves with Minimal Newton Polygon in Positive Characteristic, Journal of Number Theory, Volume 214, (2020) pages 240-250. [paper]
- with Fiona Abney-McPeck, Hugo Berg, Sun Mee Choi, Viktor Fukala, Miroslav Marinov, Theo Müller, Paweł Narkiewicz, Rachel Pries, Nancy Xu, and Andrew Yuan, Realizing Artin-Schreier covers with minimal  $a$ -numbers in characteristic  $p$ , to appear in Involve. [paper]
- with B. Cais,  $a$ -Numbers in Artin-Schreier Covers, Algebra & Number Theory, Vol. 14 (2020), No. 3, 593–653. [paper, code]
- with S. Patrikis,  $G$ -Valued Galois Deformation Rings when  $\ell \neq p$ , Mathematical Research Letters, Vol. 26, No. 4 (2019), pp. 973-990. [paper]
- Minimally Ramified Deformations when  $\ell \neq p$ , Compositio Mathematica, Volume 155 / Issue 1 (2019) pages 1-37. [paper]
- Producing Geometric Deformations of Orthogonal and Symplectic Galois Representations, Journal of Number Theory, Volume 195, (2019) pages 115-158. [paper]
- with A. Etropolski, and A. Hittson, Evaluations of cubic twisted Kloosterman sheaf sums, International Journal of Number Theory, 6 (2010), pages 1349-1365. [paper]

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## Awards and Fellowships

- 2018-2020 AMS-Simons Travel Grant
- 2010-2011 Harvard Herchel Smith Fellowship for study at Cambridge
- 2008 Certificates of Excellence and Distinction in Teaching from Harvard (for linear algebra)

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## Research Talks

- February 2022 VIASM Arithmetic Geometry Online Seminar, *Iwasawa Theory for  $p$ -torsion Class Group Schemes in Characteristic  $p$*

- February 2022 University of Utah Number Theory and Representation Theory Seminar, *G-Valued Crystalline Deformation Rings in the Fontaine-Laffaille Range*
- November 2021 University of Florida Colloquium, *Can You Hear the Shape of a Curve*
- October 2021 University of Canterbury Seminar, *Can You Hear the Shape of a Curve*
- September 2021 Number Theory Down Under, *Can You Hear the Shape of a Curve*
- May 2021 University of Auckland Algebra and Combinatorics Seminar, *Invariants in Towers of Curves over Finite Fields*
- April 2021 Perspectives on Algebra, Geometry and Number Theory, *Doubly isogenous genus-2 curves with  $D_4$ -action*
- January 2021 POINT Seminar, *Invariants in Towers of Curves over Finite Fields*
- November 2020 VaNTAGe Seminar, *Can You Hear the Shape of a Curve?*
- November 2020 New Zealand Number Theory Day, *Tamely Ramified Covers of the Projective Line and Markoff Triples*
- October 2020 Number Theory Down Under, *Invariants in Towers of Curves over Finite Fields*
- August 2020 CCR Colloquium, *Invariants in Towers of Curves over Finite Fields*
- June 2020 CTNT, *G-Valued Crystalline Deformation Rings in the Fontaine-Laffaille Range*
- March 2020 University of Canterbury COGENT Seminar, *Tamely Ramified Covers of the Projective Line and Markoff Triples*
- January 2020 JMM Special Session on Explicit Methods in Characteristic  $p$ , *Tamely Ramified Covers of the Projective Line and Markoff Triples*
- December 2019 West Coast Number Theory, *Tamely Ramified Covers of the Projective Line and Markoff Triples*
- August 2019 New Zealand Number Theory Day,  *$a$ -Numbers of Curves in Artin-Schreier Covers*
- May 2019 Barrett Memorial Lectures,  *$a$ -Numbers of Curves in Artin-Schreier Covers*
- April 2019 Emory Algebra and Number Theory Seminar,  *$a$ -Numbers of Curves in Artin-Schreier Covers*
- March 2019 Hawai'i Number Theory Day and AMS Sectional Meeting,  *$a$ -Numbers of Curves in Artin-Schreier Covers*
- September 2018 Front Range Number Theory Day,  *$a$ -Numbers in Artin-Schreier Covers*
- September 2018 University of Arizona Number Theory Seminar,  *$a$ -Numbers in Artin-Schreier Covers*
- November 2017 UCSD Number Theory Seminar, *G-Valued Galois Deformation Rings when  $\ell \neq p$*
- October 2017 University of Arizona Algebra and Number Theory Seminar, *G-Valued Galois Deformation Rings when  $\ell \neq p$*
- July 2017 Journées Arithmétique, *Geometric Deformations of Symplectic and Orthogonal Galois Representations*
- September 2016 University of Arizona Algebra and Number Theory Seminar, *Geometric Deformations of Symplectic and Orthogonal Galois Representations*

- December 2015 Bay Area Algebraic Number Theory and Arithmetic Geometry Day, *Geometric Deformations of Symplectic and Orthogonal Galois Representations*
- November 2015 Junior Number Theory Day at Rutgers University-Newark, *Geometric Deformations of Symplectic and Orthogonal Galois Representations*
- November 2015 Princeton and IAS Number Theory Seminar, *Geometric Deformations of Symplectic and Orthogonal Galois Representations*
- November 2015 University of Utah Representation Theory and Number Theory Seminar, *Geometric Deformations of Symplectic and Orthogonal Galois Representations*

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## Selected Workshops and Conferences Attended

- January 2022 NZMRI Summer Workshop: Number Theory and Related Topics
- January 2021 NZMRI Summer Meeting
- July 2020 ANTS-XIV
- June 2020 ICERM Workshop on Arithmetic Geometry, Number Theory, and Computation
- October 2019 Banff/CMO: Modularity and Moduli Spaces
- June 2019 MRC: Explicit Methods in Characteristic  $p$
- June 2018 Mathematics is a long conversation: a celebration of Barry Mazur
- July 2017 Journées arithmétiques
- May 2015 UC Berkeley:  $p$ -adic Methods in Number Theory
- February 2014 MSRI: Perfectoid Spaces and their Applications  
Arizona Winter School 2013, 2014, 2015, 2017, 2018, 2019

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## Teaching Experience

[University of Canterbury](#) (note: most courses have multiple lecturers)

- semester 1, 2022 Math 201: Multivariable Calculus (18 lectures)
- semester 1, 2022 EMth 118: Engineering Math 1A (24 lectures)
- semester 2, 2021 EMth 211: Engineering Linear Algebra and Statistics (24 lectures)
- semester 2, 2021 Math 324 : Cryptography and Coding Theory (12 lectures)

[University of Arizona](#)

- spring 2019 Math 446/546: Theory of Numbers
- fall 2018 Math 313: Linear Algebra (two sections)
- spring 2018 Math 432/532: Topological Spaces
- fall 2017 Math 313: Linear Algebra (two sections)
- spring 2017 Math 446: Theory of Numbers
- spring 2017 Math 129: Calculus II
- fall 2016 Math 125: Calculus I

### Teaching Assistant at Stanford

- winter 2016 Math 51: Linear Algebra and Differential Calculus of Several Variables
- spring 2015 Math 53: Differential Equations
- spring 2014 Math 51: Linear Algebra and Differential Calculus of Several Variables
- fall 2012 Math 51: Linear Algebra and Differential Calculus of Several Variables
- multiple Course Assistant for various undergraduate and graduate algebra, number theory, and representation theory courses

### Outreach through Teaching

- spring 2017-spring 2019 presenter and assistant for weekly Tucson Math Circle
- summers 2013 - 2016 Teaching Assistant at Stanford University Mathematics Camp
- summer 2007, 2008, 2010, 2011 Counselor at PROMYS

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## Service

### Student Research

- 2021-2022 University of Canterbury Summer Project on Cohen-Lenstra Heuristics for Artin-Schrier Curves
- 2020-2021 University of Canterbury Summer Project on Covers of Non-Ordinary Curves
- summer 2019 PROMYS returning student project on covers with minimal  $a$ -numbers
- summer 2016 PROMYS returning student project on the dynamics of superballs
- summer 2012 Stanford Undergraduate Research in Mathematics project on class numbers

### Mentoring

- 2019 Reading Course in Measure Theory and Support Applying to Graduate School
- 2017,2018 Mentor for Undergraduate Teaching Assistant Program
- 2017-2018 Reading Course/Honors Project on Number Theory and  $p$ -adic Numbers
- 2017 Mentor for Linear Algebra Honors Project
- 2015-2016 Mentor for Enhancing Diversity in Graduate Education Program
- 2014-2016 Mathematics Department Mentoring for new graduate students
- winter 2015 Mentoring for first time TA's
- 2007-2010 Mentor for youth prison tutoring program

### Expository Talks

- January 2022 A Gentle Introduction to the Langlands Program for the NZMRI Summer Workshop (3 talks)
- 2020- 2021 Talks for UC Student Colloquium: The Transcendence of  $e$ , Brussels Sprouts and the Euler Characteristic, Square Roots Modulo  $n$  and Zero Knowledge Proofs

- October 2020 Talk for secondary school students: Brussels Sprouts and the Euler Characteristic
- June 2020 *Zeta Functions of Curves and the Weil Conjectures* for ANTS Summer School
- July 2019 PROMYS Guest Lecture: Brussels Sprouts and the Euler Characteristic
- 2011-2016 Multiple talks for high school students as part of the SPLASH program at Stanford
- [Professional Service](#)
- 2021 Co-organizer of the University of Canterbury Math and Statistics Seminar
- 2016-2019 Organizer of University of Arizona Algebra and Number Theory Seminar
- ongoing Reviewer for Algebra and Number Theory, Algorithmic Number Theory Symposium, IMRN, Journal of the London Math Society, Journal of Number Theory, Journal de Théorie des Nombres de Bordeaux, Journal of Pure and Applied Algebra, Math Reviews, MRL, Math. Zeitschrift, Research in Number Theory, Proc. AMS, ...