

# Sean Howe

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## Curriculum Vitae

### Employment

- July 2019 – **Assistant Professor**, *University of Utah*.  
Sept. 2017 – **NSF Postdoctoral Scholar**, *Stanford University*.  
June 2019

### Education

- 2017 **PhD in Mathematics**, *University of Chicago*, advised by Matt Emerton.  
2012 **Master in Mathematics**, *ALGANT master program at Leiden University and Université Paris-Sud 11*. Degrees awarded by *Leiden University* and *Université de Bordeaux*, advised by Bas Edixhoven.  
2010 **BS in Mathematics**, *University of Arizona*, minor in Creative Writing.

### Selected distinctions, fellowships, etc.

- 2019 MSRI Research Member: Derived Algebraic Geometry  
2017 NSF Mathematical Sciences Postdoctoral Research Fellowship  
2017 University of Chicago Lawrence and Josephine Graves Prize (for excellence in undergraduate teaching by a graduate student in the department of mathematics)  
2016 University of Chicago Harper Dissertation Fellowship

### Papers

#### Preprints:

2. *Zeta statistics and Hadamard functions*.  
Margaret Bilu, Ronno Das, and Sean Howe. [arxiv.org/abs/2012.14841](https://arxiv.org/abs/2012.14841)
1. *The  $p$ -adic Jacquet-Langlands correspondence and a question of Serre*.  
Sean Howe. [arxiv.org/abs/1806.06807](https://arxiv.org/abs/1806.06807)

#### Published/to appear:

11. *Motivic Euler products in motivic statistics*.  
Margaret Bilu and Sean Howe. To appear in **Algebra and Number Theory**.  
[arxiv.org/abs/1910.05207](https://arxiv.org/abs/1910.05207)
10. *Overconvergent modular forms are highest weight vectors in the Hodge-Tate weight zero part of completed cohomology*.  
Sean Howe. **Forum of Mathematics, Sigma**. Volume 9, March 2021.  
[arxiv.org/abs/2008.08029](https://arxiv.org/abs/2008.08029)

9. *A unipotent circle action on  $p$ -adic modular forms.*

Sean Howe. **Transactions of the American Mathematical Society Series B**, 7 (2020), 186-226.  
[arxiv.org/abs/2003.11129](https://arxiv.org/abs/2003.11129)

8. *Motivic random variables and representation stability I: Configuration spaces.*

Sean Howe. **Algebraic & Geometric Topology**, 20-6 (2020), 3013–3045.  
[arxiv.org/abs/1610.05723](https://arxiv.org/abs/1610.05723)

7. *Motivic random variables and representation stability II: Hypersurface sections.*

Sean Howe. **Advances in Mathematics**, Volume 350, 9 July 2019, Pages 1267-1313.  
[arxiv.org/abs/1610.05720](https://arxiv.org/abs/1610.05720)

6. *Transcendence of the Hodge-Tate filtration.*

Sean Howe. **Journal de Théorie des Nombres de Bordeaux**. 30 no. 2 (2018), p. 671-680.  
[arxiv.org/abs/1610.05242](https://arxiv.org/abs/1610.05242)

5. *Presentations of quaternionic  $S$ -unit groups.*

Ted Chinburg, Holley Friedlander, Sean Howe, Michiel Kosters, Bhairav Singh, Matthew Stover, Ying Zhang, and Paul Ziegler. **Experimental Mathematics**, Volume 24, Issue 2, 2015.  
[arxiv.org/abs/1404.6091](https://arxiv.org/abs/1404.6091)

4. *The Log-Convex Density Conjecture and vertical surface area in warped products.*

Sean Howe. **Advances in Geometry**, 15.4:455–468, 2015.  
[arxiv.org/abs/1107.4402](https://arxiv.org/abs/1107.4402)

3. *Isoperimetric problems in sectors with density.*

Alexander Díaz, Nate Harman, Sean Howe and David Thompson. **Advances in Geometry**, 14.4:589–619, 2012.  
[arxiv.org/abs/1012.0450](https://arxiv.org/abs/1012.0450)

2. *Steiner and Schwarz symmetrization in warped products and fiber bundles with density.*

Frank Morgan, Sean Howe, and Nate Harman. **Révista Matemática Iberoamericana**, 27(3):909–918, 2011.  
[arxiv.org/abs/0911.1938](https://arxiv.org/abs/0911.1938)

1. *Isoperimetric inequalities for wave fronts and a generalization of Menzin’s conjecture for bicycle monodromy on surfaces of constant curvature.*

Sean Howe, Matt Pancia and Valentin Zakharevich. **Advances in Geometry**, 11:273–292, 2011.  
[arxiv.org/abs/0902.0104](https://arxiv.org/abs/0902.0104)

**Theses:**

2. *Overconvergent modular forms and the  $p$ -adic Jacquet-Langlands correspondence.*

Sean Howe. University of Chicago PhD thesis. 2017.  
[math.utah.edu/~howe/papers/thesis.pdf](https://math.utah.edu/~howe/papers/thesis.pdf)

1. *Higher genus counterexamples to relative Manin-Mumford.*

Sean Howe. Master’s thesis. 2012. [www.algant.eu/documents/theses/howe.pdf](http://www.algant.eu/documents/theses/howe.pdf)

## Invited Research Talks

- 13 May 2021 University of California San Diego Number Theory Seminar (online)
- 4 Feb. 2021 Essen SAGA Oberseminar (online)
- 2 Dec. 2020 TATA: Recent developments around p-adic modular forms (online)
- July 2020 Bonn: Local Langlands and p-adic methods. [CANCELLED]
- 25 June 2020 Recent Advances in Modern  $p$ -adic Geometry (RAMPaGe) (online)
- June 2020 Canadian Mathematical Society 75th Anniversary Summer Meeting: Session on Representations of p-adic Groups and Langlands Correspondences [CANCELLED]
- 4 Apr. 2020 AMS Spring Central Sectional Meeting - Special Session on Stability in Topology, Arithmetic, and Representation Theory [CANCELLED]
- 14 Mar. 2020 AMS Spring Southeast Sectional Meeting - Special Session on Youth and Enthusiasm in Arithmetic Geometry and Number Theory [CANCELLED]
- 12 Nov. 2019 University of Toronto Number Theory Seminar.
- 7 Nov. 2019 Quebec-Vermont Number Theory Seminar.
- 21 Oct. 2019 University of Chicago Geometry and Topology Seminar.
- 18 Oct. 2019 Northwestern Number Theory Seminar.
- 17 Oct. 2019 University of Chicago Number Theory Seminar.
- 17 May 2019 London: The p-adic Langlands Programme and Related Topics.
- 19 Feb. 2019 MSRI Derived Algebraic Geometry Seminar.
- 28 Jan. 2019 University of Arizona Colloquium.
- 25 Jan. 2019 University of Oregon Colloquium.
- 15 Jan. 2019 University of Utah Colloquium.
- 14 Jan. 2019 University of Utah Representation Theory and Number Theory Seminar.
- 17 Oct. 2018 Harvard Number Theory Seminar.
- 8 Mar. 2018 UC San Diego Number Theory Seminar.
- 22 Feb. 2018 California Institute of Technology Number Theory Seminar.
- 18 Feb. 2018 UC Irvine Number Theory Seminar.
- 12 Feb. 2018 UC Berkeley Number Theory and Arithmetic Geometry Seminar.
- 23 Jan. 2018 University of Chicago Number Theory Seminar.
- 12 Jan. 2018 San Diego: Joint Mathematics Meetings 2018, Special Session on Research from the SMALL Undergraduate Research Program.
- 5 Dec. 2017 New York University Algebraic Geometry Seminar.
- 4 Apr. 2017 John Hopkins University Number Theory Seminar.
- 3 Apr. 2017 Boston University Number Theory Seminar.
- 1 Feb. 2017 University of Oregon Number Theory Seminar.
- 5 Dec. 2016 Stanford University Number Theory Seminar.
- 18 Nov. 2016 Columbia University Automorphic Forms and Arithmetic Seminar.
- 31 Oct. 2016 Northwestern University Number Theory Seminar.
- 14 Oct. 2016 University of Wisconsin-Madison Geometry and Topology Seminar.
- 27 Sep. 2016 University of Chicago Number Theory Seminar.

7 May 2012 University of Leiden Algebra and Number Theory Seminar.

## General Audience Talks

- 22 Jan. 2017 “The simple average geometry of complicated equations.” University of Chicago, Pizza Science Discussion (a Physical Sciences Division event).
- 4 Aug. 2012 “Moody Monty Hall.” Madison, WI: MathFest 2012 – Special session “Great Talks for a General Audience: Coached Presentations by Graduate Students.”
- 29 Apr. 2010 “The Isoperimetric Problem: How Carthage Was Built Inside the Hide of an Ox.” Tucson, AZ: 2010 Galileo Circle Reception.

## Teaching

### University of Utah:

2020-2021 Math 6370 (Number Theory), Math 6320 (Graduate Algebra II)

2019-2020 Math 6320 (Graduate Algebra II)

### Stanford University:

2018-2019 Math 21 (Calculus III, two sections), Math 106 (Functions of a Complex Variable)

### University of Chicago:

*Recognition:* Lawrence and Josephine Graves prize for excellence in undergraduate teaching (departmental award), nominated by students for a divisional teaching prize.

2016-2017 Math 196 (Linear Algebra), Math 153 (Calculus 3), and Math 152 (Calculus 2).

2015-2016 Math 133 (Calculus 3) and Math 153 (Calculus 3).

2013-2014 TA for Math 274 (Differentiable Manifolds and Integration), Math 203 (Analysis in  $\mathbb{R}^n$ -1), and Math 267 (Introduction to the Representation Theory of Finite Groups).

## Mentoring

Doctoral students Suo Jun Tan (current, Utah), Hanlin Cai (current, Utah, joint with Karl Schwede)

2020-2021 Supervised two undergraduate Introduction to Research projects in Fall 2020. Supervised two undergraduate Independent REU and one undergraduate Introduction to Research projects in Spring 2021.

2019-2020 Ran University of Utah RTG pre-REU program on “Symmetry randomness, and computation” in Summer 2020. Hosted one ACCESS student for an undergraduate research project in Spring 2020. Directed one undergraduate independent study in Spring 2020.

2016-2017 Mentored a local Chicago high school student on their senior capstone project.

2013-2016 Mentored 17 undergraduates over a total of 4 summers through the University of Chicago REU program.

2012-2016 Mentored five different undergraduates (12 quarter-long projects) for the University of Chicago Directed Reading Program.

## Other Service

2017 – Referee for Algebra and Number Theory, Duke Mathematical Journal, Forum of Mathematics Pi, Journal of the American Mathematical Society

2019 Presenter at University of Utah Science Day outreach event for highschool students.

- 2019 Presented one University of Utah undergraduate colloquium.
- 2019 Led one meeting of the University of Utah Math Circle.
- 2018 Led one meeting of the Berkeley Math Circle.
- 2017 Led study group at 2017 Arizona Winter School.
- 2014-2017 Organized yearly workshops on improv skills for effective communication and teaching for the University of Chicago Math Department. Organized University of Chicago Physical Sciences Division workshops on Improv for Science Communication.
- 2013-2014 Co-organized AWM panels on math careers for University of Chicago undergraduates.
- 2012-2014 Alumni contact for AMS Math in Moscow program.

## █ Languages

English, native speaker.

French, ILR level 2 - limited working proficiency.

## █ Personal

United States citizen, Canadian citizen.