Sean Howe

Curriculum Vitae

Employment

July 2019 – **Assistant Professor**, *University of Utah.*

Sept. 2017 – June 2019 **NSF Postdoctoral Scholar**, *Stanford University.*

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 grants, distinctions, fellowships, etc.

2021-2023 AMS-Simons Travel Grant

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

2010 University of Arizona Candice Leigh Brown Prize in Creative Writing

Papers

Preprints:

2. *Slope classicality via completed cohomology.*
Sean Howe. `arXiv.org/abs/2111.15576`

1. *Zeta statistics and Hadamard functions.*
Margaret Bilu, Ronno Das, and Sean Howe. `arxiv.org/abs/2012.14841`

Published/to appear:

12. *The p-adic Jacquet-Langlands correspondence and a question of Serre.*
Sean Howe. To appear in **Compositio Mathematica**.
`arxiv.org/abs/1806.06807`

11. *Motivic Euler products in motivic statistics.*
Margaret Bilu and Sean Howe. **Algebra and Number Theory** 15-9 (2021), 2195-2259.
`arxiv.org/abs/1910.05207`

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10. *Overconvergent modular forms are highest weight vectors in the Hodge-Tate weight zero part of completed cohomology.*
Sean Howe. **Forum of Mathematics, Sigma**. Vol. 9:e17 1-24, March 2021.
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

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

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

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

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

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

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

2. *Steiner and Schwarz symmetrization in warped products and fiber bundles with density.*
Frank Morgan, Sean Howe, and Nate Harman. **Révista Matématica Iberoamericana**, 27(3):909–918, 2011.
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

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`

1. *Higher genus counterexamples to relative Manin-Mumford.*
Sean Howe. Master's thesis. 2012. `www.algant.eu/documents/theses/howe.pdf`

Invited Research Talks

10 Jan. 2022	Indiana University Number Theory Seminar (online).
7 Dec. 2021	Yale Algebra and Number Theory Seminar (online).
6 Dec. 2021	Canadian Mathematical Society Winter Meeting: Session on Galois representations and L-functions (online).
8 Nov. 2021	UC Berkeley Arithmetic Geometry and Number Theory Seminar (online).
5 July 2021	Fields Institute Number Theory Seminar (online).
9 June 2021	Canadian Mathematical Society 75th Anniversary Summer Meeting: Session on Representations of p-adic Groups and Langlands Correspondences (online).
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).
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.

Teaching

University of Utah:

2021-2022	Math 6370 (Graduate Number Theory), Math 4400 (Introduction to Number Theory)
2020-2021	Math 6370 (Graduate 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 and higher)

Doctoral students	Suo Jun Tan (current), Hanlin Cai (current, joint with Karl Schwede)
Postdocs	Gilbert Moss (Fall 2020 - present), Peter Wear (Fall 2020 - present)
Thesis committees	Allechar Serrano Lopez (Utah 2021), Christian Klevdal (Utah 2021), Kevin Childers (Utah 2020), Sabine Lang (Utah 2020), David Sherman (Stanford 2018)

Mentoring (undergraduate and highschool)

Fall 2021	Supervising three indepedendent REU projects.
Summer 2021	Organized and ran the University of Utah RTG pre-REU program on "Hidden structure and computation", an intensive monthlong summer program for 10 Utah students (4 men, 6 women), along with a pilot extension to 4 students in underrepresented groups from California State University in coordination with PUMP-Math. Supervised one undergraduate Independent REU project .
Spring 2021	Supervised two undergraduate Independent REU and one undergraduate Introduction to Research projects in Spring 2021.
Fall 2020	Supervised two undergraduate Introduction to Research projects in Fall 2020.

Summer 2020 — Organized and ran the University of Utah RTG pre-REU program on "Symmetry randomness, and computation", an intensive monthlong summer program for 10 Utah students (5 men, 5 women).

Spring 2020 — Hosted one ACCESS student for an undergraduate research project. Directed one undergraduate independent study .

2012-2017 University of Chicago — Mentored 17 undergraduates over a total of 4 summers through the University of Chicago REU program. Mentored five different undergraduates (12 quarter-long projects) for the University of Chicago Directed Reading Program. Mentored a local Chicago high school student on their senior capstone project.

Service/outreach (within University of Utah)

2021-2022 Committees — Graduate Recruitment

2020-2021 Committees — Colloquium (chair), Instructorship, Hiring; College of Science Council

2019-2020 Committees — Colloquium, Development

2019-2020 Outreach — Presenter at University of Utah Science Day outreach event for highschool students, presented one University of Utah undergraduate colloquium, led one meeting of the University of Utah Math Circle.

Service/outreach (external)

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

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.

Personal

United States citizen, Canadian citizen.