

Sean Howe | Curriculum Vitae

✉ sean.howe@utah.edu

Employment

University of Utah
Assistant Professor

Salt Lake City, Utah
July 2019 – Present

Stanford University
NSF Postdoctoral Scholar

Stanford, California
Sept. 2017 – June 2019

Visiting Positions

Institute for Advanced Study
Member: Special Year in p -adic Arithmetic Geometry

Princeton, New Jersey
2023-2024

Hausdorff Research Institute for Mathematics
Visitor: Hausdorff Trimester Program on the Arithmetic of the Langlands Program

Bonn, Germany
Summer 2023

Mathematical Sciences Research Institute
Research Member: Derived Algebraic Geometry

Berkeley, California
Spring 2019

Education

University of Chicago (advised by Matt Emerton)
PhD in Mathematics

Chicago, Illinois
2017

ALGANT master program (advised by Bas Edixhoven)
Masters from Leiden University and Université de Bordeaux

Orsay, France and Leiden, Netherlands
2012

University of Arizona
BS in Mathematics (minor in Creative Writing)

Tucson, Arizona
2010

Selected grants, distinctions, fellowships, etc.

Fall 2024: University of Utah Faculty Fellowship Award
A university-wide research award funding one semester of release from teaching and service duties.

Spring 2023: University of Utah Early Career Teaching Award
Awarded annually since 1999 to at most 6 early-career faculty university-wide. Since the award was created in 1999, this was the second award in mathematics and the first to a tenure-line professor in mathematics.

Spring 2023: University of Utah Department of Mathematics Undergraduate Faculty Teaching Award

Aug 2022 - Jul 2025: NSF Standard Grant in Algebra and Number Theory
DMS-2201112. \$180,000. Title: *Geometric methods in the p -adic Langlands program.*

Sep 2022 - Aug 2027 (declined): Simons Collaboration Grant
\$8,400/year for up to five years. Title: *p -adic automorphic forms, p -adic geometry, and motivic combinatorics*

Jul 2021 - Jun 2023: AMS-Simons Travel Grant
\$5,000 direct award, plus \$1,000 for home department.

Jul 2017 - June 2021: NSF Mathematical Sciences Postdoctoral Research Fellowship
DMS-1704005. \$150,000.

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. *Admissible pairs and p -adic Hodge structures II: The bi-analytic Ax-Lindemann theorem*
Sean Howe and Christian Klevdal. <https://arxiv.org/abs/2308.11064>

1. *Admissible pairs and p -adic Hodge structures I: Transcendence of the de Rham lattice*
Sean Howe and Christian Klevdal. <https://arxiv.org/abs/2308.11065>

Published/to appear:

16. *Cohomological and motivic inclusion-exclusion.*

Ronno Das and Sean Howe. **Compositio Mathematica**. 160, 9, pp. 2228–2283. 2024.
<https://arxiv.org/abs/2204.04165>.

15. *The conjugate uniformization via 1-motives.*

Sean Howe, Jackson Morrow, and Peter Wear. **Mathematische Zeitschrift** 307, 47 (2024)
<https://arxiv.org/abs/2208.10551>

14. *Slope classicality in higher Coleman theory via highest weight vectors in completed cohomology.*

Sean Howe. **Proceedings of the National Academy of Sciences**. Vol. 19, No. 45, November 2022.
[arXiv.org/abs/2111.15576](https://arxiv.org/abs/2111.15576)

13. *Zeta statistics and Hadamard functions.*

Margaret Bilu, Ronno Das, and Sean Howe. **Advances in Mathematics**. Vol. 407, October 2022.
arxiv.org/abs/2012.14841

12. *The p -adic Jacquet-Langlands correspondence and a question of Serre.*

Sean Howe. **Compositio Mathematica**. 158(2), 245-286. 2022.
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

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.*

A. Díaz, N. Harman, S. Howe and D. 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.*

F. Morgan, S. Howe, and N. Harman. **Révista Matemática 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 (since PhD)

28 July 2025: Summer Research Institute in Algebraic Geometry, session on p -adic geometry, p -adic Hodge theory, and Shimura varieties

25 Nov. 2024: Séminaire de Mathématique at the Institut des Hautes Études Scientifiques

21 Nov. 2024: Strasbourg Arithmetic and Algebraic Geometry seminar

12 Sept. 2024: FRAGMENT seminar at Colorado State University

11 Apr. 2024: University of Wisconsin-Madison Number Theory Seminar

22 Jan. 2024: IAS/Princeton Arithmetic Geometry Seminar

30 Nov. 2023: Boston College Number Theory Seminar

4 Nov. 2023: John Hopkins University and University of Maryland Algebraic Number Theory Day.

13 Oct. 2023: Columbia Automorphic Forms and Arithmetic Seminar.

11 Oct. 2023: Philadelphia Area Number Theory Seminar.
6 Jul. 2023: Hausdorff Institute Trimester Seminar.
23 Jun. 2023: Heidelberg University Algebra and Number Theory Seminar.
17 Nov. 2022: 4th Kyoto-Hefei Workshop on Arithmetic Geometry (online).
23 May 2022: Rencontres arithmétiques de Caen.
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.

Teaching

University of Utah:

2022-2023: 2 × Math 2270 (Linear Algebra), Math 1220 (Calculus II, online), Math 4400 (Introduction to Number Theory)

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: 2 × Math 21 (Calculus III), 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)

Graduated doctoral students:

Hanlin Cai (2024, joint with Karl Schwede) — First position: Postdoc at Columbia University

Current doctoral students: Matthew Bertucci (6th year), Minhua Cheng (4th year, joint with Jon Chaika), Madison Delmoe (4th year, joint w/Aaron Bertram), Shea Engle (3rd year, joint w/Aaron Bertram), Abhay Goel (3rd year, joint w/Gordan Savin), Suo Jun Tan (5th year)

Postdocs: Daniel Gulotta (2023 – present), Gilbert Moss (2020–2022), Peter Wear (2020–2023)

Thesis committees: Donald Chacon-Taylor (Utah 2022), 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)

Spring 2024: Supervised one honors thesis

Spring 2023: Supervised one independent REU project and one honors thesis

Fall 2022: Supervised one UROP project and one honors thesis

Summer 2022: Supervised one independent REU project

Spring 2022: Supervised one independent REU project and two UROP projects

Fall 2021: Supervised three independent 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)

Departmental committees:

Colloquium — 2019-2020, 2020-2021 (chair)

Development — 2019-2020, 2022-2023

Graduate Recruitment — 2021-2022, 2024-2025

Hiring — 2020-2021

Instructorship — 2020-2021

University committees:

College of Science Council — 2020-2021, 2021-2022

Office of Nationally Competitive Scholarships Endorsement Committee — 2024-2025

Outreach:

University of Utah Science day presenter — 2019-2020

Math department undergraduate colloquium presenter — 2019-2020

Math circle meeting leader — 2019-2020 (one)

Service/outreach (external)

2017 – present: Refereeing/quick opinions for journals including: Algebra and Number Theory, Compositio Mathematica, Duke Mathematical Journal, Inventiones Mathematicae, Forum of Mathematics Pi, the Journal of the American Mathematical Society, Transactions of the AMS

2024: NSF panelist

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.