

Sean Howe | CV | April 3, 2026

✉ 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

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) Orsay, France and Leiden, Netherlands

Masters from Leiden University and Université de Bordeaux

2012

University of Arizona

BS in Mathematics (minor in Creative Writing)

Tucson, Arizona

2010

Awards

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

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

Funding — Grants Awarded

09/2026–08/2031: NSF CAREER Grant (PI). #2540284. \$450,000.

CAREER: p -adic harmonics, periods, and probability in λ -rings.

06/2026–05/2027: NSF Conference Grant (PI). #2609489. \$49,950.

ICM 2026 Satellite Conference on Moduli of Galois Representations and the p -adic LLC.

09/2025–08/2030: Simons Travel Support for Mathematicians (PI). \$42,000.

p -adic geometry, p -adic automorphic forms, and motivic probability theory.

08/2025–07/2027: NSF Standard Grant in Algebra and Number Theory (PI). #2501816. \$140,000.

Differential and analytic techniques in p -adic geometry and applications to p -adic automorphic forms.

08/2022–07/2026: NSF Standard Grant in Algebra and Number Theory (PI). #2201112. \$180,000.
Geometric methods in the p -adic Langlands program.

09/2022–08/2027 [**declined to accept NSF grant**]: Simons Collaboration Grant (PI). \$42,000.
 p -adic automorphic forms, p -adic geometry, and motivic combinatorics.

07/2021–06/2023: AMS-Simons Travel Grant (PI). \$6,000.

07/2017–06/2021: NSF Math. Sciences Postdoctoral Research Fellowship (PI). #1704005. \$150,000.

Papers

Preprints:

12. *The relativistic p -adic sunscreen conjecture.*

Sean Howe. <https://arxiv.org/abs/2604.01245>

11. *Admissible pairs and p -adic Hodge structures III: Variation and unlikely intersection.*

Sean Howe and Christian Klevdal. <https://arxiv.org/abs/2603.22610>

10. *The geometric Sen morphism is the unique lift of the Kodaira–Spencer morphism.*

Sean Howe. <https://arxiv.org/abs/2512.09669>

9. *The de Jong fundamental group of a non-trivial abelian variety is non-abelian.*

Sean Howe. <https://arxiv.org/abs/2512.09661>

8. *The de Jong fundamental group of \mathbb{P}_C^1 depends on C and is not always topologically countably generated.*

Sean Howe. <https://arxiv.org/abs/2512.09651>

7. *A cohomological smoothness conjecture for moduli of mixed characteristic local shtukas with one leg.*

Sean Howe. <https://arxiv.org/abs/2508.11595>

6. *Inscription, twistors, and p -adic periods.*

Sean Howe. <https://arxiv.org/abs/2508.11589>

5. *p -adic Fourier theory in families.*

Andrew Graham, Pol van Hoften, and Sean Howe. <https://arxiv.org/abs/2507.05374>

4. *The completed Kirillov model and local-global compatibility for functions on Igusa varieties.*

Sean Howe. <https://arxiv.org/abs/2506.24089>

3. *Equidistribution and arithmetic Λ -distributions.*

Matthew Bertucci and Sean Howe. <https://arxiv.org/abs/2505.24748>

2. *The negative σ -moment generating function.*

Sean Howe. <https://arxiv.org/abs/2505.01205>

1. *Random matrix statistics and zeroes of L -functions via probability in λ -rings.*

Sean Howe. <https://arxiv.org/abs/2412.19295>

Published/to appear:

20. *Transitivity of the B_{dR}^+ loop group action on Schubert cells.*

Sean Howe. To appear in **Proceedings of the American Mathematical Society**.

<https://arxiv.org/abs/2505.01204>

19. *Characterizing perfectoid covers of abelian varieties*
Rebecca Bellovin, Hanlin Cai, and Sean Howe, with an appendix by Tongmu He.
To appear in **Algebraic Geometry**.
<https://arxiv.org/abs/2501.03974>
18. *Admissible pairs and p -adic Hodge structures II: The bi-analytic Ax-Lindemann theorem.*
Sean Howe and Christian Klevdal. **Inventiones Mathematicae**, 2025.
<https://arxiv.org/abs/2308.11064>
17. *Admissible pairs and p -adic Hodge structures I: Transcendence of the de Rham lattice.*
Sean Howe and Christian Klevdal. To appear in **Algebra and Number Theory**.
<https://arxiv.org/abs/2308.11065>
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. **Revista 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

1 June 2026: UCLA Number Theory Seminar

4 May 2026: Stanford Number Theory Seminar

23 Apr. 2026: University of Idaho Algebra Seminar

13 Apr. 2026: Oregon State University Colloquium

19 Feb. 2026: Geometrization of the local Langlands correspondence (CIRM)

15 Jan. 2026: University of Oxford Number Theory Seminar

10 Dec. 2025: University of Maryland Number Theory and Representation Theory Seminar
24 Nov. 2025: Arithmetic Geometry in Shenzhen
13 Nov. 2025: University of California Irvine Department Colloquium
7 Nov. 2025: University of Oregon Number Theory Seminar
1 Nov. 2025: Michigan Number Theory Day
24 Oct. 2025: Northwestern University Number Theory Seminar
23 Oct. 2025: University of Chicago Number Theory Seminar
28 Jul. 2025: Summer Research Institute in Algebraic Geometry: Session on p -adic geometry, p -adic Hodge theory, and Shimura varieties
5 Feb. 2025: Harvard Number Theory Seminar
4 Feb. 2025: MIT Number Theory Seminar
3 Feb. 2025: Harvard Arithmetic Statistics Seminar
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: CMS 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:

2025-2026: Math 1105 (Business Mathematics), Math 6950 (Topics in Algebraic Topology), Math 6150 (Complex Geometry).

2022-2023: $2 \times$ 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: $2 \times$ Math 21 (Calculus III), Math 106 (Functions of a Complex Variable)

University of Chicago:

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:

Matthew Bertucci (PhD 2025, joint w/Karl Schwede) — First position: Visiting Assistant Professor at Willamette University

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

Current doctoral students: Suo Jun Tan (6th year), Minhua Cheng (5th year, joint with Jon Chaika), Madison Delmoe (5th year, joint w/Aaron Bertram), Shea Engle (4th year, joint w/Aaron Bertram), Abhay Goel (4th year, joint w/Gordan Savin), Ben Leviloff (2nd year)

Postdocs: Daniel Gulotta (2023 – 2025), Gilbert Moss (2020–2022), Peter Wear (2020–2023)

Thesis committees: Simon Bohun (Utah current), Yotam Svoray (Utah 2026), 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 2026: Supervised one undergraduate Introduction to Research project (Jeffrey Zou).

Summer 2025: Ran a research project for 24 students through the Polymath Jr. online REU program

Spring 2025: Supervised one undergraduate Introduction to Research project (Lily Terpstra).

Spring 2024: Supervised one honors thesis (Daniel Koizumi).

Spring 2023: Supervised one independent REU project (Daniel Koizumi) and one honors thesis (Emil Geisler).

Fall 2022: Supervised one Undergraduate Research Opportunity project (Daniel Koizumi) and one honors thesis (Emil Geisler)

Summer 2022: Supervised one Independent REU project (Emil Geisler)

Spring 2022: Supervised one Independent REU project (Emil Geisler) and two Undergraduate Research Opportunity projects (Daniel Koizumi and Summer Soller).

Fall 2021: Supervised three Independent REU projects (Daniel Koizumi, Emil Geisler, and Summer Soller).

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, along with a pilot extension to 4 students from California State University in coordination with PUMP-Math. Supervised one undergraduate Independent REU project (Daniel Koizumi).

Spring 2021: Supervised two undergraduate Independent REU (Lela Feaster and Emil Geisler) and one undergraduate Introduction to Research project (Summer Soller).

Fall 2020: Supervised two undergraduate Introduction to Research projects (Lela Feaster and Emil Geisler).

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.

Spring 2020: Hosted one ACCESS student for an undergraduate research project (Lela Feaster). Directed one undergraduate independent study (J.J. Garzella).

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, 2025-2026

Hiring — 2020-2021

Instructorship — 2020-2021

Putnam — 2025-2026

Seminars:

Co-organizer of Representation Theory and Number Theory Seminar — 2019-present

University committees:

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

Office of Nationally Competitive Scholarships Endorsement Committee — 2024-2026

Outreach:

University of Utah Science day presenter — 2019-2020

Math department undergraduate colloquium presenter — 2019-2020

Math circle / high school program speaker — 2019-2020, 2022-2023, 2024-2025

Service/outreach (external)

Spring 2027: Lead organizer for "Hot Topics: Geometric Sen theory, the p-adic Simpson correspondence, and modularity" at SLMath

Summer 2026: Organizer for "The Australian direction," an arithmetic geometry conference held at the University of Utah and a satellite to the 2026 International Congress of Mathematicians.

2025 – present: Co-founder and co-organizer of the Utah Representation Theory and Number Theory Symposium, a biannual meeting between Utah, Utah State, and Brigham Young.

2024: NSF panelist

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

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.