

# Brian Hepler

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## CONTACT INFORMATION

Department of Mathematics  
University of Wisconsin-Madison  
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Madison, Wisconsin 53706 USA

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brain-helper.com

## RESEARCH INTERESTS

The local topology of complex analytic spaces, perverse sheaves, mixed Hodge modules, and microlocal sheaf theory. More recently: enhanced ind-sheaves, and subanalytic geometry.

## EDUCATION

### Northeastern University

Ph.D. in Mathematics, May 2019

- Dissertation Topic: Hypersurface Normalizations and Numerical Invariants
- Thesis Advisor: David B. Massey

M.S. in Mathematics, May 2014

- GPA: 3.96/4.00

### Boston University

B.A. in Mathematics, May 2012

- Cum Laude with Distinction in Mathematics
- Undergraduate Advisor: Emma Previato
- GPA: 3.58/4.00

## EMPLOYMENT

### University of Wisconsin-Madison

Van Vleck Visiting Assistant Professor, August 2019–Current.

## PUBLICATIONS

6. Hepler, B., Hohl, A., and Sabbah, C., “Vanishing Cycles for Irregular Local Systems”, in preparation (2021).
5. Hepler, B., “The Weight Filtration on the Constant Sheaf on a Parameterized Space”, in *Arxiv e-prints (2019)* <https://arxiv.org/abs/1811.04328> (submitted for publication).
4. Hepler, B. “Deformation Formulas for Parameterizable Hypersurfaces,” in *Arxiv e-prints (2019)* <https://arxiv.org/abs/1711.11134> (Accepted, *Inst. Ann. Fourier*).
3. Hepler, B., “Rational Homology Manifolds and Hypersurface Normalizations,” in *Proc. Amer. Math. Soc.* 147 (2019), 1605-1613
2. Hepler, B. and Massey, D.B., “Some Special Cases of Bobadilla’s Conjecture”, in *Top. and Appl.* 217 (2017), pp. 56-69.
1. Hepler, B. and Massey, D.B., “Perverse Results on Milnor Fibers inside Parameterized Hypersurfaces”, in *Publ. RIMS Kyoto Univ.* 52 (2016), pp. 413-433.

## INVITED TALKS AND PRESENTATIONS

22. *Nearby and Vanishing Cycles for Enhanced Ind-Sheaves*. Virtual Talk. 2nd International Meeting of Young Researchers in Singularity Theory and Related Fields, IMPA, Brazil. February 7-11, 2022.
21. *Vanishing Cycles for Irregular Local Systems*. Virtual talk. Iberoamerican Webinar of Young Researchers in Singularity Theory and Related Topics, IMI at Universidad Complutense Madrid. November 17, 2021.

20. *Vanishing Cycles for Irregular Local Systems*. Poster presentation. Algebraic Geometry Northeast Series (AGNES), Boston College, Boston. October 24, 2021.
19. *The Riemann-Hilbert Correspondence for Good Meromorphic Connections*. Expository Talk. Summer School on the Irregular Riemann-Hilbert Correspondence, ERC Nedag & ANR CatAG at Centre Paul Langevin. Aussois, France. September 19-24, 2021.
18. *Enhanced Ind-Sheaves and Vanishing Cycles at Fixed Angle*. Virtual talk. Metric Geometry of Singularities, University of Chicago Center in Paris. Paris, France. June 2-4, 2021.
17. *Irregular Perverse Sheaves in Dimension One*. Expository talk. UW-Madison topology and singularities seminar, UW-Madison, WI, USA. October 19th, 2020.
16. *Sabbah-Mochizuki-Kedlaya's Hukuhara-Levelt-Turrittin Theorem and Deligne's Stokes structures*. Expository talk. UW-Madison topology and singularities seminar, UW-Madison, WI, USA. October 12, 2020.
15. *The Weight Filtration on a Parameterized Surface*. Geometry and Topology Seminar, University of Western Ontario, Ontario, Canada. February 10, 2020.
14. *Deformation Formulas for Parameterizable Hypersurfaces*. Poster presentation. HYPERjarcs, memorial conference for Stefan Papadima. University of Tokyo, Tokyo, Japan. December 1-6, 2019.
13. *The Weight Filtration on a Parameterized Surface*. AMS Special Session on Geometry and Topology of Singularities, UW-Madison, Madison, Wisconsin, USA, September 14-15, 2019.
12. *The Weight Filtration on a Parameterized Surface*. Non-Isolated Singularities and Derived Geometry, 60th Birthday Celebration of David Massey. UNAM, Cuernavaca, Mexico, July 29-August 3, 2019.
11. *Hypersurface Normalizations and Numerical Invariants*. Poster presentation. D-Modules, Quantum Geometry, and Related Topics. RIMS, Kyoto, Japan, December 3-7 2018.
10. *The Comparison Complex on a Local Complete Intersection*. Poster presentation. 15th International Workshop on Real and Complex Singularities, ICMC São Carlos, Brazil, July 22-28 2018.
9. *The Comparison Complex on a Local Complete Intersection*. Poster presentation. Mixed Hodge Modules and Birational Geometry, SFB/TRR 45 Summer School. Mainz, Germany, July 9-13 2018.
8. *Perverse Sheaves, Finite Maps, and Numerical Invariants*. AMS Special Session on Singularities of Spaces and Maps, Northeastern University, USA, April 21-22, 2018.
7. *Deformation Formulas for Parameterizable Hypersurfaces*. Poster presentation. Singularities, Toric Geometry and Differential Equations, Technische Universität Chemnitz, Germany, March 19-23, 2018.
6. *Perverse Results on Milnor Fibers inside Parameterized Hypersurfaces* Geometry and Topology Seminar, University of Wisconsin at Madison. December 8th, 2017.
5. *Perverse Sheaves and Singularities*. Boston Graduate Math Colloquium (BGMC), Boston University. October 21st, 2017.
4. *Deformation Formulas for Parameterizable Hypersurfaces: Generalizing Milnor's Double-Point Formula*. Poster presentation. Algebraic Geometry Northeast Series (AGNES), Northeastern University. October 14, 2017.

3. *The Lê numbers of one-parameter families of parameterized hypersurfaces*, Geometry, Algebra, Singularities, Combinatorics Seminar Seminar (GASC), Northeastern University. October 23rd, 2017.
2. *The Lê numbers of one-parameter families of parameterized hypersurfaces*. Third Pacific Rim Mathematical Association (PRIMA), Oaxaca, MX. (Special Session: Singularities of Spaces and Mappings). August, 2017.
1. *Perverse Results on Parameterized Hypersurfaces*. Northeastern University Graduate Student Seminar. September 30th, 2016.

TEACHING  
EXPERIENCE

Spring	2022	Lecturer. MATH 552: Topology 2
Fall	2021	Lecturer. MATH 221: Calculus 1
Spring	2021	Lecturer. MATH 551: Topology 1
Spring	2021	Lecturer. MATH 521: Analysis 1
Fall	2020	Lecturer. MATH 699: Directed Study (Cat. Theory and Sheaves)
Fall	2020	Lecturer. MATH 221: Calculus 1
Spring	2020	Lecturer. MATH 340: Linear Algebra
Spring	2020	Lecturer. MATH 551: Topology 1
Fall	2019	Lecturer. MATH 521: Analysis 1
Spring	2019	Teaching Assistant. MATH 3175: Group Theory
Fall	2018	Teaching Assistant. MATH 2321: Calculus 3 for Sci/ Eng.
Summer	2018	Mentor. REU-RTG: Regular Abstract Polytopes.
Spring	2018	Lecturer. MATH 1342: Calculus 2 for Sci/ Eng.
Fall	2017	Teaching Assistant. MATH 1342: Calculus 2 for Sci/ Eng.
Summer	2017	Lecturer. MATH 1231: Calculus 1 for Business and Economics.
Spring	2017	Teaching Assistant. MATH 2321: Calculus 3 for Sci/ Eng.
Fall	2016	Lecturer. MATH 1213: Interactive Mathematics.
Spring	2016	Lecturer. MATH 1251: Calculus and Differential Equations for Biology 1.
Fall	2015	Lecturer. MATH 1213: Interactive Mathematics.
Spring	2015	Teaching Assistant. MATH 1215: Mathematical Thinking.
Fall	2014	Lecturer. MATH 1231: Calculus 1 for Business and Economics.
Spring	2014	Teaching Assistant. MATH 2321: Calculus 3 for Sci/ Eng.
Fall	2013	Teaching Assistant. MATH 2321: Calculus 3 for Sci/ Eng.
Spring	2013	Teaching Assistant. MATH 2321: Calculus 3 for Sci/ Eng.
Fall	2012	Teaching Assistant. MATH 2321: Calculus 3 for Sci/ Eng.

HONORS AND  
AWARDS

2021-2023	AMS-Simons Travel Grant, -American Mathematical Society & Simons Foundation
2017-2018	Best Teaching Assistant Award, -Northeastern University Mathematics Department
2013-2018	Northeastern University Graduate Student Teaching Assistantship
2012-2013	Robert Brian Massey Fellowship for Mathematics - Worldwide Center of Mathematics <a href="http://www.centerofmath.org/">http://www.centerofmath.org/</a>
2012	Robert E. Bruce Prize for Excellence in Mathematics, -Boston University

WORK  
EXPERIENCE

	2012–2019	Teaching Assistant Northeastern University, Mathematics Department
	2013, 2015	Bridge to Calculus Mentoring Program -Boston Public Schools <a href="https://cos.northeastern.edu/mathematics/about/outreach/bridge-to-calculus/">https://cos.northeastern.edu/mathematics/about/outreach/bridge-to-calculus/</a>
	2012–2013	Teaching Assistant, Mathematics Co-op -Worldwide Center of Mathematics <a href="http://www.centerofmath.org/">http://www.centerofmath.org/</a>
	2011–2012	“Math Help” Tutor for all math classes at Boston University - Boston University
RELEVANT SKILLS	Programming:	$\LaTeX$ (advanced proficiency), Python, MatLab, Sage, Singular, Macaulay 2 (proficient)
	Languages:	English (native), French (working proficiency)
SYNERGISTIC ACTIVITIES	2017–2018	Organizer, Boston Graduate Math Colloquium (BGMC) -I am a co-organizer of the BGMC with Boston University, Boston College, and Harvard University. <a href="https://sites.google.com/view/bgmc">https://sites.google.com/view/bgmc</a>
	2021	Organizer & Moderator, Reddit’s /r/math Topology reading group. -Hosted on Discord with over 100 members from Reddit’s /r/math community, I led discussions and assign problems from Munkres’ <i>Topology</i> . We met every Sunday morning during Summer 2021.
REFERENCES		<b>David Massey</b> , Professor of Mathematics, Northeastern University, (617)373-5527, <a href="mailto:d.massey@neu.edu">d.massey@neu.edu</a>  <b>Laurentiu Maxim</b> , Professor of Mathematics, University of Wisconsin at Madison, (608) 262-2930, <a href="mailto:maxim@math.wisc.edu">maxim@math.wisc.edu</a>  <b>Jörg Schürmann</b> , Professor of Mathematics, University of Münster +49 (0) 251-8332734, <a href="mailto:jschuerm@uni-muenster.de">jschuerm@uni-muenster.de</a>  <b>Mark de Cataldo</b> , Professor of Mathematics, State University of New York at Stony Brook, (631) 632-8284, <a href="mailto:mark.decataldo@stonybrook.edu">mark.decataldo@stonybrook.edu</a>