Tyler Lawson

CONTACT
INFORMATION

Department of Mathematics
University of Minnesota
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Minneapolis, MN 55455

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EMPLOYMENT

University of Minnesota, Minneapolis, Minnesota   2017 to present
Professor.

University of Minnesota, Minneapolis, Minnesota   2012 to 2017
Associate professor.

University of Minnesota, Minneapolis, Minnesota   2007 to 2012
Assistant professor.

Massachusetts Institute of Technology, Cambridge, Massachusetts   2004 to 2007
NSF postdoctoral fellow and C.L.E. Moore instructor.

RESEARCH AND
PUBLICATIONS

"Chen–Khovanov spectra for tangles."
With R. Lipshitz and S. Sarkar. *Michigan Mathematical Journal*, to apppear.

"E_n-spectra and Dyer–Lashof operations."
Handbook of Homotopy Theory (2019), 793–850.

"An introduction to Bousfield localization."
Contemporary mathematics, to appear.

"The Witt vectors for Green functors."
With A. Blumberg, T. Gerhardt, and M. Hill. *Journal of Algebra* 537 (2019), 197–244.

"Calculating obstruction groups for E_∞ ring spectra."
Homotopy theory: tools and applications (2019), 179–203, Contemporary Mathematics 729.

"Secondary power operations and the Brown–Peterson spectrum at the prime 2."
Annals of Mathematics 188 (2018), no. 2, 513–576.

"Brauer groups and Galois cohomology of commutative S-algebras."
With D. Gepner. *Compositio Mathematica*, to appear.

"Strictly commutative complex orientation theory."
With M. J. Hopkins. *Mathematische Zeitschrift* 290 (2018), no. 1, 83–101.

"Localization of enriched categories and cubical sets."
Theory and Application of Categories 32 (2017), no. 35, 1213–1221.

"Vanishing of some Galois cohomology groups for elliptic curves."
With C. Wuthrich. *Elliptic Curves, Modular Forms, and Iwasawa theory* (2017), 373–399, Springer Proceedings in Mathematics and Statistics 188.

"The cube and the Burnside category."
With R. Lipshitz and S. Sarkar. *Categorification in Geometry, Topology, and Physics* (2017), 63–85, Contemporary Mathematics 684.

"Khovanov homotopy type, Burnside category, and products."
With R. Lipshitz and S. Sarkar. *Geometry and Topology* 24 (2020), no. 2, 623–745.

"Topological cyclic homology via the norm."
With V. Angeltveit, A. Blumberg, T. Gerhardt, M. Hill, and M. Mandell. *Documenta Mathematica* 23 (2018),

2101–2163.

"Topological modular forms with level structure."
With M. Hill. *Inventiones Mathematicae* 203 (2016), no. 2, 359–416.

"A note on H_∞ structures."
Proceedings of the American Mathematical Society 143 (2015), no. 7, 3177–3181.

"The Shimura curve of discriminant 15 and topological automorphic forms."
Forum of Mathematics, Sigma 3 (2015), e3.

"A descent spectral sequence for arbitrary $K(n)$-local spectra with explicit E_2-term."
With D. Davis. *Glasgow Mathematical Journal* 56 (2014), no. 2, 369–380.

"Commutative ring objects in pro-categories and generalized Moore spectra."
With D. Davis. *Geometry and Topology* 18 (2014), no. 1, 103–140.

"Interpreting the Bökstedt smash product as the norm."
With V. Angeltveit, A. Blumberg, T. Gerhardt, and M. Hill. *Proceedings of the American Mathematical Society* 144 (2016), no. 12, 5419–5433.

"Strictly commutative realizations of diagrams over the Steenrod algebra and topological modular forms at the prime 2."
With N. Naumann. *International Mathematics Research Notices* 2014, no. 10, 2773–2813.

"Commutativity conditions for truncated Brown–Peterson spectra of height 2."
With N. Naumann. *Journal of Topology* 5 (2012), no. 1, 137–168.

"Topological automorphic forms on $U(1, 1)$."
With M. Behrens. *Mathematische Zeitschrift* 267 (2011), no. 3–4, 497–522.

"Structured ring spectra and displays."
Geometry and Topology 14 (2010), no. 2, 1111–1127.

"Automorphic forms and cohomology theories on Shimura curves of small discriminant."
With M. Hill. *Advances in Mathematics* 225 (2010), no. 2, 1013–1045.

"The topological Hochschild homology of the Adams summand and connective K-theory."
With V. Angeltveit and M. Hill. *American Journal of Mathematics* 132 (2010), no. 2, 297–330.

"The plus construction, Bousfield localization, and derived completion."
Journal of Pure and Applied Algebra 214 (2010), no. 5, 596–604.

"Topological automorphic forms."
With M. Behrens. *Memoirs of the American Mathematical Society* 204 (2010), no. 958.

"Commutative Gamma-rings do not model all commutative ring spectra."
Homology, Homotopy, and Applications 11 (2009), no. 2, 189–194.

"The spectra ko and ku are not Thom spectra: an approach using THH."
With V. Angeltveit and M. Hill. *Geometry and Topology Monographs* 16 (2009), 1–8.

"An overview of abelian varieties in homotopy theory."
Geometry and Topology Monographs 16 (2009), 179–214.

"The Bott cofiber sequence in deformation K-theory and simultaneous similarity in $U(n)$."
Mathematical Proceedings of the Cambridge Philosophical Society 146 (2009), no. 2, 379–393.

"Realizability of the Adams–Novikov spectral sequence for formal A-modules."
Proceedings of the American Mathematical Society 135 (2007), no. 3, 883–890.

"The product formula in unitary deformation K-theory."
K-theory 37 (2006), no. 4, 395–422.

"Isogenies of elliptic curves and the Morava stabilizer group."
With M. Behrens. *Journal of Pure and Applied Algebra* 207 (2006), no. 1, 37–49.

"Completed representation ring spectra of nilpotent groups."
Algebraic and Geometric Topology 6 (2006), 253–286.

"The integral homology of orientable Seifert manifolds."
With J. Bryden, B. Pigott, and P. Zvengrowski. *Topology and its Applications* 127 (2002), 259–275.

PREPRINTS

"Unwinding the relative Tate diagonal."
arXiv:2002.02034

"Stable power operations."
With S. Glasman. arXiv:2002.02035

"Adjoining roots in homotopy theory."
arXiv:2002.01997

"Khovanov spectra for tangles."
With R. Lipshitz and S. Sarkar. arXiv:1706.02346

"Regularity of structured ring spectra and localization in K-theory."
With C. Barwick. arXiv:1402.6038

AWARDS AND FELLOWSHIPS

Research grant, Max Planck Institute for Mathematics.	2019
Simons Foundation Fellowship.	2018
NSF grant DMS-1610408, "Homotopy theory, geometry, and arithmetic."	2016 to 2019
NSF grant DMS-1560699, "FRG: Collaborative Research: Floer homotopy theory."	2016 to 2019
NSF grant DMS-1206008, "Methods of algebraic geometry in algebraic topology."	2012 to 2016
Alfred P. Sloan Research Fellowship.	2010 to 2012
NSF grant DMS-0805833, "Formal group laws in homotopy theory and K-theory."	2008 to 2012
C.L.E. Moore Instructorship, Massachusetts Institute of Technology.	2004 to 2007
National Science Foundation postdoctoral research fellowship DMS-0402950.	2004 to 2007
ARCS graduate fellowship.	2003 to 2004
Louise McKinney post-secondary scholarship.	1999
NSERC Undergraduate Student Research Award.	1998

EDUCATION

Stanford University, Stanford, California — 2000 to 2004
Ph.D. in Mathematics under advisor Gunnar Carlsson.
Dissertation: "Derived representation theory of nilpotent groups."

University of Calgary, Calgary, Alberta, Canada — 1995 to 2000
B.Sc. double major, Pure Mathematics with honors, Applied Mathematics with honors.
Minor in Computer Science.

Invited participant, "Equivariant techniques in stable homotopy theory"   May 2021
American Institute of Mathematics

Topology seminar   February 2021
Michigan State University
"Cocycle representatives for local systems of differential graded modules."

Topology seminar   May 2020
Massachusetts Institute of Technology
"Obstruction theory for ring spectra."

Invited speaker, "Mayday 2019"   October 2019
Chicago, Illinois
"Calculations in Hopf rings."

Topology seminar   April 2019
Mathematical Institute of the University of Bonn
"Adjoining roots in algebra and topology."

Invited participant, "Arbeitsgemeinschaft:Elliptic Cohomology according to Lurie"   April 2019
Oberwolfach, Germany

Topology seminar   February 2019
Max Planck Institute for Mathematics, Bonn, Germany
"Khovanov homotopy types."

Visiting scientist   Spring 2019
Max Planck Institute for Mathematics, Bonn, Germany

Lecture series, "European Autumn School in Topology"   September 2018
Utrecht, The Netherlands
"Structured ring spectra."

Topology seminar   August 2018
Isaac Newton Institute, Cambridge, UK
"Unit groups are confusing."

Topology seminar   July 2018
Isaac Newton Institute, Cambridge, UK
"Stable power operations."

Speaker, "British Topology Meeting"   September 2018
The Open University, Milton Keynes, UK
"Secondary operations."

Long-term visitor, "Homotopy Harnessing Higher Structures"   Fall 2018
Isaac Newton Institute, Cambridge, UK

Invited speaker, "Chromatic Homotopy Theory: Journey to the Frontier"   May 2018
University of Colorado Boulder
"The Adams-Novikov spectral sequence as a Goodwillie tower."

Topology seminar   May 2018
University of Chicago
"Primary and secondary operations for ring spectra."

Electronic Computational Homotopy Theory Seminar   January 2018
Wayne State University
"The MU-dual Steenrod algebra and unstable operations."

Invited speaker, "Homotopy theory: tools and applications" July 2017
University of Illinois at Urbana-Champaign
"Higher multiplication and the Brown–Peterson spectrum."

Participant, "Floer homotopy theory: PI retreat" January 2017
University of California, Los Angeles

Topology seminar September 2016
Massachusetts Institute of Technology
"Realizing the action of the Dyer–Lashof algebra."

Colloquium April 2016
University of Illinois at Urbana-Champaign
"Homotopy theory and modular surfaces."

Invited speaker, "K-theory: Future Directions" May 2015
Ohio State University
"Continuous homology and topological cyclic homology."

Topology seminar April 2015
University of Chicago
"Construction and mapping for commutative ring spectra."

Invited participant and speaker, "Homotopy theory" March 2015
Oberwolfach, Germany
"Modular surfaces and chromatic level 3."

Colloquium October 2014
Northwestern University
"Homotopy theory and modular surfaces."

Invited speaker, "Algebra and Number Theory Day" April 2014
Johns Hopkins University
"Topological modular forms and level structures."

Topology Seminar March 2014
Massachusetts Institute of Technology
"Comodules and connections."

Invited speaker, "Introductory workshop: Algebraic Topology" January 2014
Mathematical Sciences Research Institute
"Topological automorphic forms."

Invited speaker, Cascade Topology Seminar November 2013
University of Washington
"Tate spectra and the squaring map on Hochschild homology."

Mentor, "Talbot 2013: Chromatic Homotopy Theory" April 2013
South Lake Tahoe, California

Invited participant and speaker, "Equivariant, Chromatic, and Motivic Homotopy Theory" March 2013
Northwestern University
"Topological modular forms and level structure."

Invited lecture, Midwest Topology Seminar October 2012
Michigan State University
"Elliptic cohomology theories and modular forms with level structure."

"Homotopy theory," AMS special session January 2012
Boston, Massachusetts

"Truncated Brown-Peterson spectra."

Topology seminar   December 2011
Wayne State University
"Formal group laws and multiplicative ring spectra."

Topology seminar   November 2011
University of Georgia
"Descent methods for topological Picard and Brauer groups."

Topology seminar   May 2011
University of Chicago
"Relative Picard and Brauer groups."

Invited speaker, "The Kervaire invariant and stable homotopy theory"   April 2011
International Centre for Mathematical Sciences, Edinburgh, Scotland
"Relative Picard and Brauer groups."

"Algebraic K-Theory and Homotopy Theory," AMS special session   March 2011
Iowa City
"Topological modular forms with level 3 structure."

Topology seminar   February 2011
Massachusetts Institute of Technology
"Relative Picard and Brauer groups."

Topology seminar   November 2009
Massachusetts Institute of Technology
"p-divisible groups, automorphic forms, and displays."

Invited speaker, "p-adic Geometry and Homotopy Theory"   August 2009
Loen, Norway
"Topological automorphic forms."

Invited participant and speaker, "Workshop on p-divisible groups and homotopy theory"   June 2009
University of Illinois at Urbana-Champaign
"Ring spectra and displays."

Organizer, Midwest Topology Seminar   May 2009
University of Minnesota

Lecture series   May 2008
University of Bergen, Norway

"Applications of Ring Spectra," AMS special session   April 2008
Bloomington, Indiana
"Elliptic cohomology and abelian surfaces."

Speaker, "New Topological Contexts for Galois Theory and Algebraic Geometry"   March 2008
Banff, Alberta, Canada
"Topological automorphic forms."

Topology seminar   October 2007
University of Chicago
"Rings of integers, division algebras, arithmetic Fuchsian groups, and topological automorphic forms."

Invited participant and speaker, "Homotopy theory"   September 2007
Oberwolfach, Germany
"Topological automorphic forms."

Colloquium
Boston College
"Shimura varieties and stable homotopy theory."

May 2007

Invited lecture, Midwest Topology Seminar
Wayne State University
"Topological Hochschild homology of ku and ko."

April 2007

Colloquium
Purdue University
"Moduli of abelian varieties and stable homotopy theory."

February 2007

Colloquium
University of Minnesota
"Moduli of abelian varieties and stable homotopy theory."

January 2007

Topology seminar
Stanford University
"Stable simultaneous similarity and deformation K-theory."

May 2006

Topology seminar
University of Illinois at Urbana-Champaign
"Ring spectra associated to Shimura varieties and the $K(n)$-local sphere."

December 2005

Topology seminar
Northwestern University
"Ring spectra associated to Shimura varieties and the $K(n)$-local sphere."

December 2005

Seminar on global methods in chromatic homotopy theory
Harvard University
"Topological automorphic forms II."

December 2005

Invited participant and speaker, "Stable and Algebraic Homotopy"
Schloss Ringberg, Germany
"Stable simultaneous similarity and deformation K-theory."

October 2005

Topology seminar
University of Chicago
"Completed representation rings of nilpotent groups."

January 2004

Participant, "Homotopy Theory and its Applications," Fields Institute program
University of Western Ontario

September 2003

Mathematical Sciences Research Institute (MSRI) summer graduate school
"Excursions in Computational Number Theory—Polynomials with Integer Coefficients"
Simon Fraser University

2002

Pacific Institute for the Mathematical Sciences workshop
"Invariants of Three-Manifolds"
Nakoda Lodge, Morley, Alberta, Canada

1999

Professional
Activities

Conference organizing

Workshop organizer, "Derived and Chromatic Homotopy Theory"
Isaac Newton Institute, Cambridge, UK

September 2018

Organizer, "Special session on topology and arithmetic"
AMS sectional meeting special section
Joint organizer with C. Westerland. 7 speakers, 2 days.

October 2016

Scientific committee co-chair, "West Coast Algebraic Topology Summer School" August 2016
Eugene, Oregon
Joint co-chair with M. Hill. 80 participants, 5 days.

Organizer, "Equivariant Derived Algebraic Geometry" February 2016
Banff International Research station workshop
Joint organizer with A. Blumberg, T. Gerhardt, M. Hill. 41 participants, 5 days.

Organizer, "Algebraic K-Theory and Equivariant Homotopy Theory" February 2012
Banff International Research station workshop
Joint organizer with V. Angeltveit, A. Blumberg, T. Gerhardt, M. Hill. 20 participants, 5 days.

Organizer, Midwest Topology Seminar May 2009
University of Minnesota
6 speakers, 2 days

Editorial work

Editor, *Journal of Homotopy and Related Structures* 2018 to 2021

Refereeing

Acta Mathematica
Advances in Mathematics
Algebraic and Geometric Topology
Bulletin of the London Mathematical Society
Cambridge University Press
Compositio Mathematica
Documenta Mathematica
Geometry and Topology
Glasgow Mathematical Journal
Homology, Homotopy, and Applications
International Mathematics Research Notices
Inventiones Mathematica
Journal of Algebra and its Applications
Journal of Homotopy and Related Structures
Journal of K-theory
Journal of the London Mathematical Society
Journal of Pure and Applied Algebra
Journal of Topology
Manuscripta Mathematica
New York Journal of Mathematics
Proceedings of the American Mathematical Society
Transactions of the American Mathematical Society

Reviews

Twenty-five reviews currently published by MathSciNet.

Other

Panelist, National Science Foundation DMS-Topology (2 years).

Participant, Mathoverflow.net 2009 to present
Question-and-answer website on topics in research mathematics.

UNIVERSITY   Organizer for the University of Minnesota's Topology Seminar.
SERVICE

Coach for William Lowell Putnam Mathematical Competition 2007 to 2017

Committee work

Promotions committee, Ph.D. writtens committee	2020 to 2021
Faculty search committee, Ph.D. writtens committee	2019 to 2020
Ordway committee, Ph.D. writtens committee	2017 to 2018
Ordway visitor committee, Ph.D. writtens committee, Undergraduate programs committee	2016 to 2017
Postdoctoral committee, Ph.D. writtens committee, Undergraduate programs committee	2015 to 2016
Ordway visitor committee, Undergraduate programs committee	2014 to 2015
Postdoctoral committee, Undergraduate programs committee	2013 to 2014
Postdoctoral committee, Undergraduate programs committee	2012 to 2013
Computer committee, Undergraduate programs committee	2011 to 2012
Computer committee, Undergraduate programs committee	2010 to 2011
Computer committee, Postdoctoral committee, Putnam committee	2009 to 2010
Honors committee, Postdoctoral committee, Putnam committee	2008 to 2009
Putnam committee	2007 to 2008

TEACHING
EXPERIENCE

University of Minnesota

Taught Math 1001, 2374, 2573 honors, 5285-5286 honors, 5345 honors, 5378, 8301-8302, 8306-8307, 8253-8254 and 8360.
Transitioned Math 2374 course website from WebVista to Moodle.
Graduate advisor, Yifei Zhu (2009 to 2013), Erin Manlove (2010 to 2017), Robert Hank (2011 to 2016), Maggie Ewing (2013 to 2017), Daniel Hess (2014 to 2019), Zeshen Gu (2016 to present), Sarah Milstein (2017 to present), Liam Keenan (2020 to present), Zane Huttinga (2020 to present)
Graduate reading courses, Zane Huttinga (2020), Jacob Hegna (2020), Liam Keenan (2019), Sarah Milstein (2017), Zeshen Gu (2016), Erin Manlove (2010), Weiwei Wu (2009).
Undergraduate advising, Rajendra Beekie (2017), Lucy Yang (2016), Andrew Senger (2013, 2014), Jeremiah Peterson (2013), Ashley Richter (2010), Joseph Loubert (2009), Robert Hank (2008).

Massachusetts Institute of Technology

Taught a one-year graduate sequence in algebraic topology, an undergraduate number theory seminar, and recitations in linear algebra.
Teaching assistant training, 2004.

Stanford University

Led review sessions for the graduate algebra qualifying exam, and taught sections in calculus and multivariate calculus.
Teaching assistant training, 2001.

University of Calgary

Teaching assistant, 1998 to 2000.
Taught sections in linear algebra, calculus, multivariate calculus, real analysis, and discrete mathematics.
Teaching assistant in the Department of Computer Science, 2000.
Taught lab sections in assembly language programming.