

Michael A. Hill

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EDUCATION

Massachusetts Institute of Technology Cambridge, MA
Ph.D. in Mathematics, 2006. Thesis Title: *Computational Methods for Higher Real K -theory with applications to tmf* . Thesis Advisor: Michael Hopkins. GPA: 4.0. Research in computational homotopy theory, the theory of topological modular forms, and structured ring spectra.

Harvard University Cambridge, MA
A.B. in Mathematics, *summa cum laude*, 2002. Phi Beta Kappa. John Harvard Scholarship for academic success. GPA: 3.9.

EMPLOYMENT

University of California at Los Angeles Los Angeles, CA
2015–Present Professor of Mathematics.

University of Virginia Charlottesville, VA
2010–2015 Associate Professor of Mathematics. Teach 2–3 courses a year. Director of Graduate Studies. Member of Computer Committee, Colloquium Committee. Organized topology seminar.
2009–2010 Assistant Professor of Mathematics. Member of Computer Committee. Organized topology seminar.

Harvard University Cambridge, MA
2009–2010 Visiting Post-Doc. Organized conference related to visiting position. Participated in seminars.

University of Virginia Charlottesville, VA
2006 – 2009 Whyburn Instructor of Mathematics. Taught 3 courses a year. Ran Putnam training sessions with other Whyburns. Participated in and organized seminars.

Harvard University Cambridge, MA
Summer 2006, 2007 Visiting Post-Doc.

PUBLICATIONS & PREPRINTS

- (1) [Interpreting the Bökstedt smash product as the norm](#) (with V. Angeltveit, A. Blumberg, T. Gerhardt, & T. Lawson). To appear in *Proceedings of the AMS*.
- (2) [The slice spectral sequence of the \$C_4\$ analog of real \$K\$ -theory](#) (with M. Hopkins and D. Ravenel). To appear in *Forum Mathematicum*.
- (3) [On the non-existence of elements of Kervaire invariant one](#) (with M. Hopkins and D. Ravenel). To appear in *Annals of Mathematics*.
- (4) [Operadic multiplications in equivariant spectra, norms, and transfers](#) (with A. Blumberg). *Advances in Mathematics* **285** (2015), 658-708.
- (5) [Topological modular forms with level structure](#) (with T. Lawson). *Inventiones mathematicae* **203**, 2, 359-416.

- (6) [Topological Modular Forms](#) (edited with C. Douglas, J. Francis, and A. Henriques). *Mathematical surveys and Monographs* **201** (2014).
- (7) [Equivariant multiplicative closure](#) (with M. Hopkins). In *Algebraic Topology: Applications and New Directions, Contemporary Mathematics* **620** (2014). 183–199.
- (8) [The algebraic \$K\$ -theory of truncated polynomial algebras in several variables](#) (with V. Angeltveit, T. Gerhardt, & A. Lindenstrauss). *Journal of K -Theory* **13** (2014), no 1. 57–81.
- (9) [The equivariant slice filtration: a primer](#). *Homology, Homotopy, and Applications* **14** (2012), no 2. 143–166. doi:10.4310/HHA.2012.v14.n2.a9.
- (10) [The Arf-Kervaire problem in algebraic topology: Sketch of the proof](#) (with M. Hopkins and D. Ravenel). Proceedings of the Current Developments in Mathematics, 2011.
- (11) The Arf-Kervaire problem in algebraic topology: History (with M. Hopkins and D. Ravenel). In the Proceedings of the Current Developments in Mathematics 2010.
- (12) [Homological Obstructions to String Orientations](#) (with C. Douglas and A. Henriques). *International Mathematics Research Notices* (2010). doi: 10.1093/imrn/rnq237
- (13) [Ext and the motivic Steenrod algebra over \$\mathbb{R}\$](#) . *Journal of Pure and Applied Algebra* **215**, (2011) no 5, 715–727. doi:10.1016/j.jpaa.2010.06.017
- (14) [Automorphic forms and cohomology theories associated to Shimura varieties of small discriminant](#) (with T. Lawson). *Advances in Mathematics* **225** (2010) no. 2.
- (15) [The topological Hochschild homology of \$\ell\$ and \$ko\$](#) (with V. Angeltveit and T. Lawson). *American Journal of Mathematics* **132** (2010), no. 2, 297–330.
- (16) [The spectra \$ko\$ and \$ku\$ are not Thom spectra: an approach using \$THH\$](#) (with V. Angeltveit and T. Lawson). *Geometry and Topology Monographs* **16** (2009), 1–8.
- (17) [On the existence of a \$v_2^{32}\$ -self map on \$M\(1, 4\)\$ at the prime 2](#) (with M. Behrens, M. Hopkins, and M. Mahowald). *Homology, Homotopy and Applications* **10** (2008), no. 3, 45–84.
- (18) [The 5-local homotopy of \$eo_4\$](#) . *Algebraic and Geometric Topology* **8** (2008), 1741–1761.
- (19) [The String bordism of \$BE_8\$ and \$BE_8 \times BE_8\$ through dimension 14](#). *Illinois Journal of Mathematics* **53** (2009) no. 1, 183–196.
- (20) [Cyclic comodules, \$j\$ -homology and the homology of \$j\$](#) . *Topology and Its Applications* **155** (2008), no. 15, 1730–1736.
- (21) [The 3-local \$tmf\$ homology of \$B\Sigma_3\$](#) . *Proceedings of the American Mathematical Society* **135** (2007), no. 12, 4075–4086.
- (22) [On the fate of \$\eta^3\$ in the higher analogues of Real bordism](#). Submitted.
- (23) [All about \$Tmf_1\(3\)\$](#) (with L. Meier). Submitted.
- (24) [The slice spectral sequence for certain \$RO\(C_{p^n}\)\$ -graded suspensions of \$H\mathbb{Z}\$](#) . (with M. Hopkins and D. Ravenel). Submitted.
- (25) [Topological cyclic homology via the norm](#) (with V. Angeltveit, A. Blumberg, T. Gerhardt, T. Lawson, M. Mandell). Submitted.
- (26) [\$G\$ -symmetric monoidal categories of modules over equivariant commutative ring spectra](#) (with A. Blumberg). Submitted.
- (27) [Incomplete Tambara functors](#) (with A. Blumberg). Submitted.

- 2015 – Present** NSF Grant DMS–1509652: “Equivariant Derived Algebraic Geometry”. 3 year research grant for \$215,287
- 2012 – Present** NSF Grant DMS–1207774: “Computations in Equivariant Homotopy and Algebraic K-Theory”. 3 year research grant for \$293,000
- 2011 – Present** Alfred P. Sloan Research Fellow
- 2009 – 2013** NSF grant DMS–0906285: “Computations in Classical Chromatic Homotopy Theory, Algebraic K-Theory, and Motivic Homotopy”. 3 year research grant for \$100,886.
- 2008 – 2009** UVA Technology & Teaching Initiative Fellowship (with Christian Gromoll). Study computer based exams in mathematics classes

SELECT TEACHING & MENTORING EXPERIENCE

- University of California Los Angeles** Los Angeles, CA
- Spring 2016** Math 121 – Topology
Math 19 – *Fiat Lux*: Patterns and Symmetry in Art & Nature
- Winter 2016** Math 227B – Algebraic Topology II
- Fall 2015** Math 227A – Algebraic Topology I
- University of Virginia** Charlottesville, VA
- Spring 2015** Math 7800 – Algebraic Topology I
- Fall 2014** Math 8559 – Readings in Topology
Math 2310 – Multivariable Calculus
- Fall 2013** Math 7840 – Homotopy Theory
Math 5720 – Differential Geometry
- Northwestern University** Evanston, IL
- Spring 2013** Math 465 – Equivariant Stable Homotopy
- University of Virginia** Charlottesville, VA
- Spring 2013** Math 7752 – Algebra II
Independent Study: Differential Geometry
Inst – 1550: Carnival of Mathematics (Faculty Supervisor)
- Fall 2012** Math 5720 – Differential Geometry
Math 7751 – Algebra I
- Fall 2010** Math 5651 – Advanced Linear Algebra
Independent Study
- Spring 2009** Math 885 – Computational Algebraic Topology
- Graduate Students** University of Virginia
- (1) Kristen Mazur – May 2013
 - (2) Carolyn Yarnall – May 2013
 - (3) Scott Slinker
 - (4) Peter Bonventre
 - (5) John Bermann

DEPARTMENTAL SERVICE AT UVA

- 2012 – 2015** Director of Graduate Studies, Department of Mathematics
2012 Chair of Departmental Evaluation Committee
2006 – Present Organize the UVA weekly topology seminar.

NATIONAL SERVICE AND EDITORIAL POSITIONS

- 2015 – Present** Editor for [Mathematische Zeitschrift](#)
2014 – Present Cofounder and board member for [Spectra: the association for LGBT mathematicians](#)
2014 – Present Mentor for the [Math Alliance](#)
2012 – Present Mentor for the [Association for Women in Mathematics](#).

CONFERENCE ORGANIZING & COORGANIZING

- Apr. 2016** AIM Workshop: Equivariant Derived Algebraic Geometry
Feb. 2016 Banff Workshop: Equivariant Derived Algebraic Geometry
Apr. 2015 Mid-Atlantic Topology Conference
Jun. 2014 Summer Graduate School in Algebraic Topology
Spring 2014 MSRI Semester: Algebraic Topology
Jul. 2013 MSRI Summer Workshop for Graduate Students
Jun. 2012 Virginia Conference on Algebraic Topology
Feb. 2012 Banff workshop: Equivariant homotopy and algebraic K -theory
Oct. 2010 MSRI Hot-Topics Workshop: The Kervaire Invariant One Problem
Mar. 2010 AIM SQuaRE: Computations in Algebraic K -Theory
Aug. 2009 “FRG Workshop: Manifolds, Strings, and 2D Quantum Field Theory”, Harvard
Oct. 2008 AMS special session in Homotopy Theory, Huntsville, AL
Nov. 2007 “Algebraic and Geometric Topology: A Conference in Honor of Bob Stong”, UVA
2004 – 2007 Cofounder of “Talbot” young researchers conference (funded by National Science Foundation grant DMS-0512714)

SELECTED PRESENTATIONS

- (1) Banff Workshop on Equivariant Derived Algebraic Geometry: “Musings on eDAG”. February 2016
- (2) Trimester Seminar, Hausdorff Institute: “Equivariant Dyer-Lashof Algebra”. May 2015
- (3) Homotopy Workshop, Oberwolfach: “Flavors of equivariant commutativity”. March 2015
- (4) MIT Topology Seminar: “Flavors of equivariant commutativity”, February 2015
- (5) Johns Hopkins Topology Seminar: “Norms, Transfers, and Operads”, February 2015
- (6) Midwest Topology Conference, Northwestern University: “On the spectrum of an equivariant commutative ring”, October 2014
- (7) International Congress of Mathematicians: “On the non-existence of elements of Kervaire invariant one”, August 2014
- (8) MSRI - CIMAT Summer School on Algebraic Topology: “Equivariant Stable Homotopy Theory” (4 lectures), June 2014
- (9) MSRI Conference: Reimagining the foundations of algebraic topology: “Derived equivariant algebraic geometry”, April 2014

- (10) Joint Mathematics Meetings, homotopy special session: “The Kervaire invariant”, January⁵ 2014
- (11) UCLA Colloquium: “Homotopy spheres and homotopy groups of spheres”, November 2013
- (12) University of Minnesota, October 2013: *Equivariant Operadic Actions and the Transfer*
- (13) Invited Address, AMS Sectional Meeting, Louisville, KY, October 2013: *Framed manifolds and equivariant homotopy: A solution to the Kervaire Invariant One problem*
- (14) Copenhagen University, August 2013: 10 lecture Master Class *Computations in equivariant homotopy*
- (15) Vietnam Institute for Advanced Study in Mathematics, July 2013: series of 9 lecture *The mathematics around the Kervaire Invariant One problem*
- (16) MSRI Summer School on Algebraic Topology, June 2013: series of 4 lecture *Equivariant Stable Homotopy*
- (17) Guterman Lecture, Tufts University (invited address with a focus on undergraduates), April 2013: *Ruler, Compass, and Origami Constructions*
- (18) Equivariant, Chromatic, and Motivic Homotopy Theory, Northwestern University, March 2013: *An equivariant algebraic refinement of Hochschild homology*
- (19) Algebraic Topology: Applications and New Directions, Stanford, July 2012: *Equivariant symmetric monoidal categories*
- (20) Homotopy Algebra and its applications, Luminy, June 2012: *What should we mean by a genuine equivariant commutative ring?*
- (21) Lehigh Topology Conference, Lehigh, May 2012: *Indexing and G-sets: Frobenius Reciprocity to Equivariant Localization*
- (22) Workshop on the Kervaire Invariant, Israel, May 2011: Series of 7 talks.
- (23) VCU Undergraduate Conference, April 2011: *Groups and Games*
- (24) University of Chicago, April 2011: *Equivariant localizations and symmetric monoidal categories*
- (25) Northwestern University Topology Seminar, April 2011: *Equivariant Symmetric Monoidal Categories*
- (26) Graduate Student Topology Conference, April 2011: *Spaces and Group Actions*
- (27) Oberwolfach, September 2011: *Equivariant Localizations*
- (28) Structured Ring Spectra - TNG, Hamburg, August 2011: *Localizations and commutative rings*
- (29) University of Michigan Colloquium, February 2010: *On the non-existence of Kervaire Invariant One Manifolds*
- (30) MSRI Hot-Topics Workshop:
- (31) Oberwolfach Lecture Series, September 2010: *The Kervaire Invariant One Problem*
- (32) Homotopy Theory and Derived Algebraic Geometry, September 2010: *Equivariant Computations and the Kervaire Invariant*
- (33) Cascades Topology Conference, Banff, April 2010: *Equivariant homotopy around the Kervaire Invariant One problem*
- (34) Informal Workshop on the solution by Hill, Hopkins, and Ravenel of the Kervaire Invariant Problem, Princeton University, February 2010: *Equivariant Computations and the Gap Theorem*
- (35) Indiana University Colloquium, December 2010: *On the Non-Existence of Kervaire Invariant One Manifolds*
- (36) Current Developments in Mathematics Conference, Harvard University, November 2009: *The Arf-Kervaire Problem in Algebraic Topology*