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 Virginia Charlottesville, VA
2010–Present Associate Professor of Mathematics. Member of Computer Committee, Colloquium Committee. Teach 2–3 courses a year. Organized topology seminar.
2009–2010 Assistant Professor of Mathematics. Member of Computer Committee. Teach 2–3 courses a year. Organized 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) Ext and the motivic Steenrod algebra over $\mathbb{R}$. To appear in *Journal of Pure and Applied Algebra*.
(2) Automorphic forms and cohomology theories associated to Shimura varieties of small discriminant (with T. Lawson). To appear in *Advances in Mathematics*.
(3) The topological Hochschild homology of ℓ and ko (with V. Angeltveit and T. Lawson). To appear in *American Journal of Mathematics*.
(4) 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.
(5) 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.
(6) The 5-local homotopy of eo_4. *Algebraic and Geometric Topology* **8** (2008), 1741–1761.

(7) The String bordism of BE_8 and $BE_8 \times BE_8$ through dimension 14. To appear in *Illinois Journal of Mathematics*.
(8) Cyclic comodules, j-homology and the homology of j. *Topology and Its Applications* **155** (2008), no. 15, 1730–1736.
(9) The 3-local tmf homology of $B\Sigma_3$. *Proceedings of the American Mathematical Society* **135** (2007), no. 12, 4075–4086.
(10) Homological obstructions to string orientations (with C. Douglas and A. Henriques). Submitted to *Geometry and Topology*.
(11) On the non-existence of elements of Kervaire invariant one (with M. Hopkins and D. Ravenel). Preprint on the arXiv.
(12) The homotopy of $EO_{2(p-1)}$ (with M. Hopkins and D. Ravenel). Preprint.
(13) The action of finite subgroups of the Morava stabilizer group on the Lubin-Tate space of lifts (with M. Hopkins and D. Ravenel). In preparation.
(14) The homotopy of $EO_{f(p-1)}(\mathbb{Z}/p)$ (with M. Hopkins and D. Ravenel). In preparation.

Grants

2009 – Present 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 assessment in mathematics classes using self-scheduled, repeatable exams. Oversee 6 graduate student proctors and 4 graduate student coders.

Teaching Experience

University of Virginia Charlottesville, VA

Fall 2010	Math 5651 – Advanced Linear Algebra
Spring 2009	Math 885 – Computational Algebraic Topology
Fall 2008	Course coordinator for Math 132 – Calculus II
	Math 231 – Multivariable Calculus
Spring 2008	Math 552 – Introduction to Abstract Algebra
	Applied Math 308 – Linear Algebra
Fall 2007	Math 551 – Advanced Linear Algebra
Spring 2007	Math 351 – Linear Algebra
Fall 2006	Math 231 – Multivariable Calculus
	Applied Math 212 – Multivariable Calculus

Massachusetts Institute of Technology Cambridge, MA

2004 – 2005 Taught recitation sections for Differential Equations and Calculus I.

Organizational Experience

Seminars.

2006 – Present Organize the UVA weekly topology seminar.

2007 – 2008 Organized a reading group on algebraic geometry for graduate students and interested faculty.

Conferences.

Mar. 2010	Organizer of AIM SQuaRE: Computations in Algebraic K-Theory.
Aug. 2009	Coorganizer of "FRG Workshop: Manifolds, Strings, and 2D Quantum Field Theory". Harvard University.
Oct. 2008	Coorganizer of AMS special session in Homotopy Theory: Huntsville, AL.
Nov. 2007	Coorganizer of "Algebraic and Geometric Topology: A Conference in Honor of Bob Stong". University of Virginia.
2004 – 2007	Cofounder and coorganizer of "Talbot" conference attracting over 25 participants from the US and Europe and funded by National Science Foundation grant DMS-0512714.

Selected Presentations

(1) Cascades Topology Conference, Banff, April 2010: *Equivariant homotopy around the Kervaire Invariant One problem*
(2) 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*
(3) Indiana University Colloquium, December 2010: *On the Non-Existence of Kervaire Invariant One Manifolds*
(4) Current Developments in Mathematics Conference, Harvard University, November 2009: *The Arf-Kervaire Problem in Algebraic Topology*
(5) Northwestern University Colloquium, October 2009
(6) Peter May Birthday Conference, October 2009
(7) Worchester High School Program, September 2009: *Ruler, Compass, and Origami Constructions*
(8) University of Illinois at Urbana-Champaign Lecture Series, September 2009
(9) University of Illinois at Urbana-Champaign Colloquium, September 2009: *On the Non-Existence of Kervaire Invariant One Manifolds*
(10) University of Oslo, August 2009: *The Slice Spectral Sequence*
(11) Conference on p-adic Geometry, Norway, August 2009: *On the slice filtration and the Kervaire invariant one problem*
(12) Isle of Skye Algebra and Topology Conference, June 2009: *On the Non-Existence of Kervaire Invariant One Manifolds*
(13) Georgia Topology Conference, May 2009: *On the Non-Existence of Manifolds of Kervaire Invariant One*
(14) University of Virginia, April 2009: *On the Non-Existence of Manifolds of Kervaire Invariant One*
(15) Wellesley College, February 2009: *Ruler, Compass, and Origami Constructions: Trisecting an Angle and Doubling a Cube*
(16) University of Rochester, January 2009: *Large Scale Phenomena in Stable Homotopy*
(17) AMS Annual Meeting, Washington, DC, January 2009: *Differentials in homotopy fixed point spectral sequences.*
(18) University of Minnesota, December 2008: *Geometric Approaches to Homotopy Fixed Point Spectral Sequences.*
(19) University of California, San Diego, Colloquium, November 2008: *Asymptotics in Homotopy Theory*

[4] (20) University of Chicago, October 2007: *Applications of higher real K-theories to real Johnson-Wilson spectra.*
(21) Oberwolfach: Homotopy Theory Workshop, September 2007: *Recent computational work on EO_n.*
(22) Talbot Conference, February 2007: *$K(1)$-local tmf.*
(23) Birthday Conference for Doug Ravenel and Steve Wilson, March 2007: *The topological Hochschild homology of ℓ and ko.*