Andrew J. Blumberg

Curriculum Vitae
September 2015

Department of Mathematics
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Personal
Born: 1976
Citizenship: US

Education

2001–2005	**The University of Chicago**, Chicago, IL Ph.D. in Mathematics, June 2005. Thesis advisors : J. Peter May and Michael A. Mandell M.S. in Mathematics, Dec 2001.
1994–1998	**Harvard College**, Cambridge, MA A.B in Mathematics, May 1998. Awards: Magna cum laude with highest honors in mathematics

Employment

2014-present	**Associate Professor (with tenure)**, University of Texas at Austin
2008-2014	**Assistant Professor**, University of Texas at Austin (on leave 2008-2009)
2007-2009	**Hans Samelson Postdoctoral Fellow**, Stanford University
2006-2007	**Member**, Institute for Advanced Study
2005-2006	**Hans Samelson Postdoctoral Fellow**, Stanford University
1999-2001	**Chief technology officer and founder**, HotDispatch Inc.
1995–1999	**Research scientist**, MIT Artificial Intelligence Laboratory

Visiting positions

2015	**Member**, Hausdorff Institute for Mathematics, June-July
2013	**Visitor**, University of Copenhagen, August (2 weeks)
2013	**Visiting Scholar**, MIT, June-August
2012	**Visiting Scholar**, MIT, June-August
2011	**Visiting Scholar-in-Residence**, Indiana University, May (1 week)
2010	**Visitor**, University of Copenhagen, February (1 week)
2009	**Visiting Scholar**, University of Chicago, May-June

2008	**Visiting Scholar**, University of Chicago, May-June
2007	**Visiting Scholar**, MIT, November-December
2007	**Visiting Scholar**, University of Chicago, May-June
2006	**Member**, Mittag-Leffler Institute, February

Honors

2013	Invited participant, Microsoft Faculty Summit.
2012-2017	NSF CAREER Award
2012	Plenary speaker, birthday conference for Gunnar Carlsson, Ralph Cohen, and Ib Madsen.
2010-2012	DARPA Young Faculty Award
2005-2009	NSF Postdoctoral Fellowship
2005	Clay Mathematics Institute Liftoff Fellowship
1998–1999	McCormick Fellowship, University of Chicago (deferred)
1998	NSF Graduate Fellowship, Honorable mention

Grants

2016-2019	Co-principal investigator (with M. Walfish and T. Wies, NYU), TWC: Medium: Scaling proof-based verifiable computation, NSF regular grant, CNS #1514422, $220000 (out of $1151830).
2016-2018	Co-principal investigator (with M. Walfish, NYU), Realizing the promise of proof-based verifiable computation, AFOSR research grant, FA9550-15-1-0302, $450000 (out of $900000).
2012-2017	Principal investigator, CAREER: Algebraic K-theory, trace methods, and non-commutative geometry, NSF CAREER grant, DMS #1151577, $425874.
2010-2012	Principal investigator, Applied algebraic topology: categorical foundations, topological statistics, and practical implementations, DARPA YFA grant #N66001-10-1-4043, $300000.
2009-2012	Principal investigator, Algebraic invariants of structured ring spectra, arithmetic, and geometry, NSF Division of Mathematical Sciences grant #0906105, $146595.

Classroom teaching

2014–2015 **Associate Professor** in Mathematics, University of Texas at Austin
Mathematics 392 : Homotopy type theory
Mathematics 341 : Linear algebra

2012–2013 **Assistant Professor** in Mathematics, University of Texas at Austin
Mathematics 392 : Homological algebra
Mathematics 362 : Probability
Mathematics 367 : Algebraic topology II

2011–2012 **Assistant Professor** in Mathematics, University of Texas at Austin
Mathematics 408C : Calculus
Mathematics 341 : Linear algebra

2010–2011 **Assistant Professor** in Mathematics, University of Texas at Austin
Mathematics 378 : Mathematical statistics
Mathematics 392 : Topics in algebraic topology

2009–2010 **Assistant Professor** in Mathematics, University of Texas at Austin
Mathematics 365 : Real analysis
Mathematics 341 : Linear algebra

2005–2006 **Lecturer** in Mathematics, Stanford University
Mathematics 51 : Linear algebra and differential calculus of several variables

2002–2005 **Lecturer in the college** in Mathematics, University of Chicago
Mathematics 195-196 : Mathematical methods for biological or social sciences
Mathematics 131-132 : Calculus

2001–2002 **College Fellow** in Mathematics, University of Chicago
Mathematics 203-205: Analysis in $\mathbb{R}^n$, mentors: N. Monod, A. Kiselev

Additional teaching

2010–2015 **Research supervision**, five regular research students (Fontes, Reyes, Royer, Sulyma, Zhu), two graduated (Franklin, Pancia).

2011–2013 **Research supervision**, jointly with M. Walfish (CS department), supervising undergraduate students V. Vu and B. Braun (senior thesis for Braun). Braun and Vu are Dean's Honored Graduates, and Vu was a co-winner of the first prize Mitchell award.

2012–2013 **Undergraduate reading courses**, Reading course in theoretical computer science.

2010–2012 **Research supervision**, three graduate student RAs, DARPA grant, (Gal, Pancia, Orem)

2010–2011 **Undergraduate reading courses**, Reading course in analysis

2010–2011 **Undergraduate research supervisor**, Independent study in privacy

2009–2011 **Co-advisor**, Master's thesis in CS (Raluca Popa, MIT). Won prize, best master's thesis.

2002–2004 **Undergraduate mentor**, Directed research program (University of Chicago)

2001–2004 **Course assistant**, Summer research experience for undergraduates (REU)

2001–2003 **Lecturer**, Warm-up program for entering graduate students

Editorial positions

2015–present **Associate editor**, Advances in Mathematics

2013–present **Editor**, Journal of Topology

Service

2015	**Organizer**, Texas undergraduate topology and geometry conference.
2014	**Co-organizer**, West coast algebraic topology summer school: Topological field theories.
2014	**Co-organizer**, Algebraic Topology: Methods, Computation, and Science (ATMCS) 6.
2014	**Co-organizer**, MSRI emphasis semester on algebraic topology
2013–2014	**Co-organizer**, IMA emphasis year on computational and applied algebraic topology
2013–2014	**Organizer**, Directed research program (UT Austin)
2012	**Co-organizer**, West coast algebraic topology summer school: Advances in algebraic K-theory
2012	**Co-organizer**, BIRS Workshop on Algebraic K-theory and equivariant homotopy theory
2011-2012	**Organizer**, Student seminars on algebraic topology and computational topoogy
2010–present	**Technical advisor**, Patient privacy rights
2010	**Co-organizer**, Workshop at Indiana University on algebraic K-theory and fixed point theory
2009	**Co-organizer**, 70th birthday conference in honor of J. Peter May
2008–2009	**Organizer**, "Infinity categories" reading group and lecture series
2007–2009	**Co-organizer**, Stanford topology progress seminar
2005–2006	**Co-organizer**, Stanford topology progress seminar
2003–2005	**Committee member**, Directed research program
2004	**Co-organizer**, Summer research experience for undergraduates (REU)

Peer-review

Referee	Algebraic and Geometric Topology, International Math Research Notices, Advances in Mathematics, Journal of Topology, Math Zeitschrift, Journal of K-theory, Journal of Pure and Applied Algebra, Journal of the AMS, "Homotopy, Homology, and Applications", Compositio Mathematica, Proceedings of the London Mathematical Society, Transactions of the American Mathematical Society, Geometry and Topology, Acta Mathematica.
Grant review	NSF regular grants (three times, in-person), NASA (by mail), Polish NSF.

Publications (mathematics)

1. Andrew J. Blumberg, David Gepner, and Goncalo Tabuada. Homotopy invariant algebraic K-theory of stable ∞-categories. In preparation.

2. Matthew Ando, Andrew J. Blumberg, and David J. Gepner. Equivariant units and equivariant twisted cohomology theories. In preparation.

3. Andrew J. Blumberg and Michael A. Mandell. Tate-Poitou duality and the fiber of the cyclotomic trace for the sphere spectrum. Preprint, arxiv:1508.00014 [math.KT].

4. Andrew J. Blumberg and Michael A. Mandell. The homotopy groups of the algebraic K-theory of the sphere spectrum. Preprint, arxiv:1408.0133 [math.AT].

5. Andrew J. Blumberg and Michael A. Mandell. The nilpotence theorem for the algebraic K-theory of the sphere spectrum. Preprint, arxiv:1405.6112 [math.AT].

6. Vigleik Angeltveit, Andrew J. Blumberg, Teena Gerhardt, Michael A. Hill, and Tyler Lawson. Relative cyclotomic spectra and topological cyclic homology via the norm. Preprint, arxiv:1401.5001 [math.AT].

7. Andrew J. Blumberg and Michael A. Hill. Operadic multiplications in equivariant spectra, norms, and transfers. To appear in *Advances in Mathematics*.

8. Andrew J. Blumberg and Michael A. Mandell. The homotopy theory of cyclotomic spectra. To appear in *Geometry and Topology*.

9. Andrew J. Blumberg, David Gepner, and Goncalo Tabuada. Higher K-theory of endomorphisms via non-commutative motives. *Transactions of the American Mathematical Society* (2015).

10. Andrew J. Blumberg and Emily Riehl. Homotopical resolutions associated to deformable adjunctions. *Algebraic and geometric topology* **14** (2014), 3021-3048.

11. Vigleik Angeltveit, Andrew J. Blumberg, Teena Gerhardt, Michael A. Hill, and Tyler Lawson. Interpreting the Bokstedt smash product as the norm. Preprint, arxiv:1206:4218 [math.AT]

12. Matthew Ando, Andrew J. Blumberg, and David J. Gepner. Generalized parametrized objects, multiplicative Thom spectra, and twisted umkehr maps. Preprint (submitted), arxiv:1112.2203 [math.AT]

13. Andrew J. Blumberg and Michael A. Mandell. Localization for $THH(ku)$ and the topological Hochschild homology of Waldhausen categories. Preprint (submitted), arxiv:1111.4003 [math.AT]

14. Andrew J. Blumberg, David Gepner, and Goncalo Tabuada. Uniqueness of the multiplicative cyclotomic trace. *Advances in Mathematics* 260 (2014), 191–232.

15. Andrew J. Blumberg, David Gepner, and Goncalo Tabuada. A universal characterization of higher algebraic K-theory. *Geometry and Topology* 17 (2013), 733-838.

16. Andrew J. Blumberg and Michael A. Mandell. Localization theorems in topological Hochschild homology and topological cyclic homology. *Geometry and Topology* 16 (2012), 1053-1120.

17. Matthew Ando, Andrew J. Blumberg, David J. Gepner, Michael J. Hopkins, and Charles Rezk. Units of ring spectra and Thom spectra. Preprint (split into two papers below for submission), arXiv:0810.4535 [math.AT]

18. Matthew Ando, Andrew J. Blumberg, David J. Gepner, Michael J. Hopkins, and Charles Rezk. Units of ring spectra and Thom spectra via structured ring spectra. *Journal of Topology* (2014).

19. Matthew Ando, Andrew J. Blumberg, David J. Gepner, Michael J. Hopkins, and Charles Rezk. Parametrized spectra, units, and Thom spectra via ∞-categories. *Journal of Topology* 7 (2014), 869–893.

20. Matt Ando, Andrew J. Blumberg, and David Gepner. Twists of K-theory and TMF. *Proc. Symp. Pure Math.*, 81 (2010), 27-63.

21. Andrew J. Blumberg and Michael A. Mandell. Derived Koszul duality and involutions in the algebraic K-theory of spaces. *Journal of Topology* (2011) 4, 327-342.

22. Andrew J. Blumberg and Michael A. Mandell. Algebraic K-theory and abstract homotopy theory. *Advances in Mathematics* 226 (2011), 3760-3812.

23. Andrew J. Blumberg, Ralph L. Cohen, and Christian Schlichtkrull. THH of Thom spectra and the free loop space. *Geometry and Topology* 14 (2010), 1165-1242.

24. Andrew J. Blumberg. THH of Thom spectra which are E_∞ ring spectra. *Journal of Topology* 3 (2010), 535-560.

25. Andrew J. Blumberg, Ralph L. Cohen, and Constantin Teleman. Open-closed field theories, string topology, and Hochschild homology. *Alpine perspectives on algebraic topology*, edited by C. Ausoni, K. Hess, and J. Scherer, Contemp. Math. 504 (2009), 53-76.

26. Andrew J. Blumberg and Michael A. Mandell. The localization sequence for the algebraic K-theory of topological K-theory. *Acta Mathematica* 200 (2008), 155-179.

27. Andrew J. Blumberg. Continuous functors as a model for the equivariant stable category. *Algebraic and geometric topology* 6 (2006), 2257-2295.

28. Andrew J. Blumberg. A discrete model for S^1-equivariant homotopy theory. *Journal of Pure and Applied Algebra* 210 (2007), 29-41.

Publications (computer science)

1. Riad S. Wahby, Sebastian Angel, Max Howald, Joshua B. Leners, Andrew J. Blumberg, and Michael Walfish. Harmful devices considered harmless. Preprint, arxiv:1506.01449 [cs.OS].

2. Riad S. Wahby, Srinath Setty, Zuocheng Ren, Andrew J. Blumberg, and Michael Walfish. Efficient RAM and control flow in verifiable outsourced computation. *22nd Network and Distributed System Security Symposium* (2015).

3. Michael Walfish and Andrew J. Blumberg. Verifying computations without reexecuting them: from theoretical possibility to near-practicality. *Communications of the ACM (CACM)* 58 (2015), 74-84.

4. Andrew J. Blumberg, Itamar Gal, Michael A. Mandell, and Matthew Pancia. Robust statistics, hypothesis testing, and confidence intervals for persistent homology on metric measure spaces. *Foundations of Computational Mathematics* 14 (2014), 745–789.

5. Andrew J. Blumberg and Michael A. Mandell. Quantitative homotopy theory in topological data analysis. *Foundations of Computational Mathematics* 13 (2013), 885–911.

6. Ben Braun, Ariel Feldman, Srinath Setty, Zuocheng Ren, Andrew J. Blumberg, and Michael Walfish. Verifying computations with state. In *Proceedings of the 24th ACM Symposium on Operating Systems Principles (SOSP)*, (2013).

7. Victor Vu, Srinath Setty, Andrew J. Blumberg, and Michael Walfish. A hybrid architecture for interactive verifiable computation. In *Proceedings of IEEE Symposium on Security and Privacy* (2013).

8. Srinath Setty, Victor Vu, Benjamin Braun, Andrew J. Blumberg, Bryan Parno, and Michael Walfish. Resolving the conflict between generality and plausibility in verified computation. In *Proceedings of Eurosys* (2013).

9. Srinath Setty, Victor Vu, Nikhil Panpalia, Benjamin Braun, Andrew J. Blumberg, and Michael Walfish. Taking proof-based verified computation a few steps closer to actual practicality. In *Proceedings of Usenix Security Symposium* (2012).

10. Srinath Setty, Richard McPherson, Andrew J. Blumberg, and Michael Walfish. Making argument systems for outsourced computation practical (sometimes). In *Proceedings of the 19th Network and Distributed System Security Symposium (NDSS)* (2012).

11. Raluca A. Popa, Andrew J. Blumberg, Hari Balakrishnan, and Frank Li. Location privacy and accountability in aggregate statistics for mobile systems. In *Proceedings of ACM Conference on Computer and Communications Security (ACM CCS)* (2011).

12. Srinath Setty, Andrew J. Blumberg, and Michael Walfish. Toward practical and unconditional verification of remote computations. In *Proceedings of the 13th Workshop on Hot Topics in Operating Systems (HotOS)* (2011).

13. Andrew J. Blumberg and Peter Eckersley. On locational privacy, and how to avoid losing it forever. *Electronic Frontier Foundation whitepaper* (2009).

14. Raluca A. Popa, Hari Balakrishnan, and Andrew J. Blumberg. Protecting privacy in location-based vehicular services. In *Proceedings of Usenix Security Symposium* (2009).

Invited Lectures

Conference talks :

1. Algebraic topology: Manifolds unlocking higher structures, Oxford, 2015
2. Johns Hopkins-University of Maryland Algebra and Number Theory Day, March 2015
3. Oberwolfach meeting on homotopy theory, March 2015
4. ICM Satellite Conference on Algebraic K-theory, Beijing, August 2014
5. Midwest Topology Seminar, IUPUI, April 2014
6. Workshop on order in complex systems, Rutgers University, November 2013
7. Workshop on group actions in homotopy theory, University of Copenhagen, August 2013
8. Northwestern workshop on equivariant, chromatic, and motivic homotopy theory, March 2013
9. AMS Sectional meeting, Special session of computational algebraic topology, University of Akron, October 2012
10. Birthday conference for Gunnar Carlsson, Ralph Cohen, and Ib Madsen, plenary speaker, July 2012
11. Graduate student topology conference, young faculty speaker, March 2012
12. BIRS Workshop on Algebraic K-theory and equivariant homotopy theory, February 2012
13. Conference on applied algebraic topology, Fields Institute, November 2011
14. Conference on structured ring spectra, Hamburg, August 2011 (cancelled)
15. Oberwolfach workshop, Algebraic K-theory, May 2011
16. AMS Sectional meeting, Special session on algebraic K-theory, University of Iowa, March 2011

17. Conference on homotopy theory and derived algebraic geometry, Fields Institute, August 2010
18. Computers, Freedom, and Privacy, San Jose State University, June 2010
19. Georgia Topology Conference, University of Georgia, May 2010
20. AMS Sectional meeting, Special session on topological quantum field theory, Western Michigan University, October 2008
21. Midwest Topology Seminar, Wayne State, Detroit, May 2007
22. Conference on the arithmetic of structured ring spectra, Rosendal, Norway, August 2005
23. Norwegian Topology Symposium, Trondheim, Norway, November 2004
24. AMS Sectional meeting, Special session on homotopy theory, Northwestern, October 2004

Seminar talks :

- 2015 : Columbia, University of Chicago, UIC, Hausdorff Institute for Mathematics
- 2014 : UCSD, Johns Hopkins
- 2013 : University of Minnesota
- 2011 : University of Chicago, UIUC, Stanford, Indiana University, Nagoya University, MIT
- 2010 : University of Copenhagen, Notre Dame, University of Minnesota
- 2009 : University of Chicago, MIT, Stanford
- 2008 : University of Chicago, Berkeley, MIT, Stanford, Rutgers, University of Texas at Austin
- 2007 : Johns Hopkins, Purdue, University of Chicago, Northwestern, Stanford
- 2006 : Mittag-Leffler Institute, Johns Hopkins, University of Chicago, IAS, MIT
- 2005 : Stanford
- 2004 : Purdue, Northwestern, UIUC, Stanford, Brown