

# Aaron Mazel-Gee

## Curriculum Vitae

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date of birth: Dec 29, 1986  
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### Research Interests

Homotopy theory, derived algebraic geometry, and their connections throughout mathematics and physics.

This currently means: algebraic K-theory and the cyclotomic trace via factorization homology and Goodwillie calculus; Fukaya categories, arboreal singularities, and microlocal sheaves; duality phenomena in quantum field theory via factorization homology; foliations and their characteristic classes via deformation theory; quantum field theory and shifted symplectic/Poisson structures; motivic modular forms (a motivic analog of  $tmf$ ) via Goerss–Hopkins obstruction theory for  $\infty$ -categories.

### Education

- 2010–2016 **PhD student in Mathematics**, *University of California*, Berkeley, CA.  
Thesis: *Goerss–Hopkins obstruction theory via model  $\infty$ -categories* (available on website).  
Advisor: Peter Teichner.  
Winner of the Kenneth Ribet & Lisa Goldberg Award.
- Aug–Dec 2015 **Visiting PhD student**, *Montana State University*, Bozeman, MT.
- Jan–Dec 2013 **Visiting PhD student**, *Massachusetts Institute of Technology*, Cambridge, MA.
- Jan–Dec 2012 **Visiting PhD student**, *Max Planck Institute for Mathematics*, Bonn, Germany.
- 2005–2009 **ScM and ScB in Mathematics**, *Brown University*, Providence, RI.

### Employment

- 2017–present **Research Assistant Professor**, *University of Southern California*, Los Angeles, CA.
- 2016–2017 **Zassenhaus Assistant Professor**, *Ohio State University*, Columbus, OH.

### Publications

- Oct 17, 2017 **The geometry of the cyclotomic trace**, with David Ayala and Nick Rozenblyum, arXiv:1710.06409.
- Oct 17, 2017 **Factorization homology of enriched  $\infty$ -categories**, with David Ayala and Nick Rozenblyum, arXiv:1710.06414.
- Oct 17, 2017 **A naive approach to genuine  $G$ -spectra and cyclotomic spectra**, with David Ayala and Nick Rozenblyum, arXiv:1710.06416.
- Preprint  **$E_\infty$  automorphisms of motivic Morava  $E$ -theories**, draft available upon request.
- Preprint **Goerss–Hopkins obstruction theory for  $\infty$ -categories**, draft available upon request.
- Oct 16, 2015 **Model  $\infty$ -categories III: the fundamental theorem**, arXiv:1510.04777.
- Oct 15, 2015 **Model  $\infty$ -categories II: Quillen adjunctions**, arXiv:1510.04392.
- Oct 14, 2015 **Hammocks and fractions in relative  $\infty$ -categories**, arXiv:1510.03961.
- Oct 13, 2015 **All about the Grothendieck construction**, arXiv:1510.03525.
- Oct 12, 2015 **The universality of the Rezk nerve**, arXiv:1510.03150.  
Under revision for *Algebraic & Geometric Topology*.
- Oct 8, 2015 **A user’s guide to co/cartesian fibrations**, arXiv:1510.02402.
- Jan 13, 2015 **Quillen adjunctions induce adjunctions of quasicategories**, arXiv:1501.03146.  
*New York Journal of Mathematics* 22 (2016), 57–93.
- Dec 29, 2014 **Model  $\infty$ -categories I: some pleasant properties of the  $\infty$ -category of simplicial spaces**, arXiv:1412.8411.
- Sep 29, 2014 **From fractions to complete Segal spaces**, with Zhen Lin Low, arXiv:1409.8192.  
*Homology, Homotopy, and Applications* 17 (2015), no. 1, 321–338.
- Aug 25, 2013 **A relative Lubin–Tate theorem via meromorphic formal geometry**, with Eric Peterson and Nathaniel Stapleton, arXiv:1308.5435.  
*Algebraic & Geometric Topology* 15 (2015), 2239–2268.

- Sep 2, 2009 **A cubical antipodal theorem**, with Kyle E. Kinneberg, Tia Sondjaja, and Francis Su, arXiv:0909.0471.
- Aug 2, 2006 **Maximum volume space quadrilaterals**, *Expeditions in Mathematics*, with Thomas Banchoff and Nicholas Haber.

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## Awards

- 2017 **AMS-Simons Travel Grant**, *American Mathematical Society and the Simons Foundation*.
- 2016 **Kenneth Ribet & Lisa Goldberg Award in Algebra**, *UC Berkeley*, dissertation award.
- 2016 **Outstanding Graduate Student Instructor Award**, *UC Berkeley*.
- 2009-2014 **Graduate Student Research Fellowship**, *National Science Foundation*.
- 2013 **Distinguished Graduate Student Speaker**, *USTARS conference*.
- 2009 **Howell Prize for Excellence in Mathematics**, *Brown University*.
- 2009 **Magna cum laude** (highest honor awarded), *Brown University*.
- 2009 **Phi Beta Kappa**, *Brown University*.
- 2009 **1st place, Crossword Puzzle Competition**, *Brown University*.
- 2009 **1st place, Intramural Ultimate Frisbee League**, *Brown University*.
- 2008 **Karen T. Romer Undergraduate Teaching and Research Award**, *Brown University*.
- 2005 **Governor's Scholarship**, *California*.

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## Teaching Experience

- Spring 2018 **Single-variable calculus (Math 125)**, *USC*, lead instructor (two sections).
- Fall 2017 **Single-variable calculus (Math 125)**, *USC*, lead instructor (one section).
- Fall 2016 **Seminar  $\infty$** , *Ohio State*, lead instructor.
- Fall 2016 **Linear algebra (Math 2568)**, *Ohio State*, lead instructor (three sections).
- Summer 2016 **Multivariable calculus (Math W53 – online course)**, *UC Berkeley*, T.A. under Michael Hutchings.  
No student evaluations collected, due to an administrative glitch.
- Spring 2016 **An invitation to factorization algebras (Math 276)**, *UC Berkeley*, jointly taught with Peter Teichner.
- Spring 2016 **Linear algebra (Math 110 – proof-based)**, *UC Berkeley*, T.A. under Edward Frenkel.  
Average student ratings for two sections: 6.3/7 and 6.4/7.
- Spring 2015 **Directed Reading Program**, *UC Berkeley*, mentor for Robert Housden on category theory and sheaf theory.
- Spring 2015 **Single-variable calculus (Math 1B)**, *UC Berkeley*, T.A. under Nikolai Reshetikhin.  
Average student ratings for two sections: 6.4/7 and 6.9/7.
- Fall 2011 **Single-variable calculus (Math 1A)**, *UC Berkeley*, T.A. under Ian Agol.  
Average student ratings for two sections: 6.5/7 and 6.8/7.
- Summer 2009 **7th grade math teacher**, *Breakthrough Summerbridge (Austin, TX)*.  
Designed and implemented lesson plans for high-potential students from underserved communities.
- Spring 2009 **Combinatorial topology (Math 141)**, *Brown University*, T.A. under Thomas Banchoff.
- Fall 2008 **Multi-variable calculus for engineers (Math 20)**, *Brown University*, T.A. under Benoît Pausader.
- Spring 2008 **Non-Euclidean geometry (Math 104)**, *Brown University*, T.A. under Thomas Banchoff.
- 2007-2009 **MathCounts**, *The Wheeler School*, assistant coach under Thomas Wharton.
- 2001-2010 **Math tutor**, self-employed.

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## Service

- 2016-present **Associate journal editor**, *Journal of Geometry, Topology, and Mathematical Physics*.
- 2016 **Journal referee**, *Advances in Mathematics*.
- 2015 **Journal referee**, *Topology and its Applications*.
- 2010-2015 **Berkeley–Stanford student topology seminar (“xkcd group”)**.  
Co-founder and organizer; travel grant co-administrator.

2006-2009 **Math Department Undergraduate Group**, *Brown University*.  
President, 2007-2009; coordinated volunteer tutoring program, 2007-2008; organized annual undergraduate math conference (“SUMS”), 2008-2009.

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## Selected Talks

Full list of talks (over 70 in all, both original and expository) available on website.

### Original

- 2017 **The geometry of the cyclotomic trace**, *CATS5 conference (Lisbon National Museum of Natural History and Science)*, *Derived week (Kavli Institute for the Physics and Mathematics of the Universe)*, *Northwestern University*, *University of Notre Dame*, *Indiana University*, *Montana State University*, *UC Berkeley*, *USC*, *Université Toulouse III*, *Pomona College*.
- 2013-2016 **Goerss–Hopkins obstruction theory for  $\infty$ -categories**, *Harvard University*, *Purdue University*, *Johns Hopkins University*, *Stanford University*, *University of Chicago*, *University of Illinois at Urbana-Champaign*, *Ohio State University*, *University of Oregon*, topology seminars; *xkcd group meeting (Stanford University)*, *Young Topologists Meeting (University of Copenhagen)*, “*Structured ring spectra and their invariants*” conference (*University of Manchester*), “*Operations in highly structured homology theories*” workshop (*Banff International Research Station*).
- Apr 19, 2013 **You could’ve invented *tmf***, *USTARS conference*, distinguished graduate student speaker.
- Nov 29, 2012 ***tmf* and transchromatic detection via  $p$ -adic modular forms**, *University of Regensburg*, topology seminar.

### Expository

- Nov 23, 2016 **The 2016 Nobel prize in physics: topological phases of matter**, *San Quentin State Prison*, *Prison Universities Project*.
- Fall 2016 **The zen of  $\infty$ -categories**, *Ohio State*, series of 14 lectures (roughly 21 hours total) in Seminar  $\infty$ .
- Spring 2016 **Locally constant factorization algebras**, *UC Berkeley*, series of ten lectures (15 hours total) in Math 276 seminar.
- Dec 10, 2014 **Poincaré–Koszul duality**, *Stanford University*, topology progress seminar.
- Apr 21, 2014 **Algebraic cobordism, algebraic orientations, and motivic Landweber exactness**, *MSRI*, motivic homotopy seminar.
- Dec 14, 2012 **Model categories for algebraists, or: What’s *really* going on with injective and projective resolutions, anyways?**, *UC Berkeley*, toolbox seminar.
- Dec 6, 2011 **Dieudonné modules and the classification of formal groups**, *Stanford University*, *xkcd* seminar.
- Apr 21, 2009 **Envy-free division algorithms: why nobody should be jealous of anyone else, ever**, *Brown University*, senior lecture for a general audience.

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## References

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