Charles W. Rezk

Curriculum Vitae

Department of Mathematics
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Education	**University of Pennsylvania** (Philadelphia, PA)	*1987—1991*
	B.A. in mathematics, May 1991.	
	M.A. in mathematics, May 1991.	
	Massachusetts Institute of Technology (Cambridge, MA)	*1991—1996*
	Ph.D. in pure mathematics.	
	Date of graduation: May 1996.	
	Thesis title: "Spaces of Algebra Structures and Cohomology of Operads."	
	Thesis advisor: Michael J. Hopkins.	
Academic Positions	**Northwestern University** (Evanston, IL)	*1996—2001*
	Ralph P. Boas Visiting Assistant Professor (9/1996–8/1999).	
	Instructor (9/1999–8/2001).	
	University of Illinois at Urbana-Champaign (Urbana, IL)	
	Assistant Professor of Mathematics	*2001—2006*
	Associate Professor of Mathematics	*2006—2014*
	Professor of Mathematics	*2014—present*
Visiting Positions	**Institute for Advanced Study**, (Princeton, NJ)	*9/1999—3/2000 and 1/2001—3/2001*
	Member	
	Massachusetts Institute of Technology (Cambridge, MA)	*1/2006–5/2006*
	Visiting instructor	
	Mathematical Sciences Research Institute (Berkeley, CA)	*1/2014-5/2014*
	Simons Visiting Professor	
Honors	**Alfred P. Sloan Doctoral Dissertation Fellowship**	*1995—1996*
	AMS Centennial Fellowship	*1999—2000*
	Fellow of the AMS	*2014*
Service	**Editorial board,** *Compositio Mathematica*	*2015–2021*

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Publications and Creative Works[1]

Doctoral Thesis. "Spaces of Algebra Structures and Cohomology of Operads." (MIT, 1996)

Publications.

1. "Notes on the Hopkins-Miller theorem." In *Homotopy Theory via Algebraic Geometry and Group Representations,* Contemporary Mathematics 220, Amer. Math. Soc., 1998, pp. 313-366.

2. "Brown-Comenetz duality and the Adams spectral sequence," with Mark Mahowald. In *American Journal of Mathematics* **121** (1999), pp. 1153–1177.

3. "A model for the homotopy theory of homotopy theory." *Trans. Am. Math. Soc.* **353** (2001), 973–1007.

4. "Simplicial structures on model categories and functors," with B. Shipley and S. Schwede. *Am. J. of Math.* **123** (2001), 551–575.

5. "Every homotopy theory of simplicial algebras admits a proper model." *Topology and its Applications,* **119** (2002), 65–94.

6. "A resolution of the $K(2)$-local sphere at the prime 3," with P. Goerss, H.-W. Henn, and M. Mahowald. *Annals of Mathematics,* **162** (2005), 777–822.

7. "The units of a ring spectrum and a logarithmic cohomology operation." *Journal of the American Mathematical Society,* **19** (2006), 969–1014.

8. "Topological modular forms of level 3," with M. Mahowald. *Pure and Applied Math. Quarterly,* **5** (2009), 853–872.

9. "A cartesian presentation of weak n-categories." *Geometry & Topology,* **14** (2010), 521–571. "Correction to 'A cartesian presentation of weak n-categories'." *Geometry & Topology,* **14** (2010), 2301–2304.

10. "The congruence condition for power operations in Morava E-theory." *Homology, Homotopy, and Applications,* **11** (2010), 327–379.

11. "Modular isogeny complexes." *Algebraic & Geometric Topology,* **12** (2012), 1373–1404.

12. "Reedy categories and the Θ-construction," with J. Bergner. *Mathematische Zeitschrift,* **274** (2013), 499-514.

13. "A streamlined proof of Goodwillie's n-excisive approximation." *Algebraic & Geometric Topology,* **13** (2013), 1049–1051.

14. "Comparison of models for (∞, n)-categories, I," with J. Bergner. *Geometry & Topology,* **17** (2013), 2163–2202.

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[1]All papers and preprints are available from `https://faculty.math.illinois.edu/~rezk`.

15. "An ∞-categorical approach to R-line bundles, R-module Thom spectra, and twisted R-homology," with M. Ando, A. Blumberg, D. Gepner, and M. Hopkins. *Journal of Topology* **7** (2014), 869–893.

16. "Units of ring spectra and Thom spectra via structured ring spectra," with M. Ando, A. Blumberg, D. Gepner, and M. Hopkins. *Journal of Topology* **7** (2014), 1077–1117.

17. "On Hopkins' Picard groups for the prime 3 and chromatic level 2", with P. Goerss, H.-W. Henn, and M. Mahowald. *Journal of Topology* **8** (2015), 267–294.

18. "Isogenies, power operations, and homotopy theory." In *Proceedings of the ICM, Seoul 2014,* vol. 2 (2014), 1125–1146.

19. "Spectral algebra models of unstable v_n-periodic homotopy theory." To appear in *Surveys around Ohkawa's theorem on Bousfield classes.* (arXiv:1703.02186)

20. "Classifying spaces for 1-truncated compact Lie groups." *Algebraic & Geometric Topology* **18** (2018), 525–546.

21. "Spectral algebra models of unstable v_n-periodic homotopy theory," with M. Behrens. 45 pages. In *Bousfield classes and Ohkawa's theorem,* Springer Proc. Math. Stat., 309, Singapore, 2020.

22. "Looijenga line bundles in complex analytic elliptic cohomology." *Tunisian Journal of Mathematics* **2** (2019), 1–42.

23. "The Bousfield-Kuhn functor and topological André-Quillen cohomology", with M. Behrens,*Inventiones Mathematicae,* **220** (2020), 949-1022.

24. "Comparison of models of (∞, n)-categories, II", *Journal of Topology,* **13** (2020), 1554-1581.

25. "Spectral algebra models of unstable v_n-periodic homotopy theory," 45 pages. In *Surveys around Ohkawa's theorem on Bousfield classes,* Springer Proceedings in Mathematics and Statistics 309, Springer, 2020, 275-323.

26. "Spectral algebraic geometry." To appear as a chapter in *Stable categories and structured ring spectra,* edited by A. Blumberg, T. Gerhardt, M. Hill. MSRI Publications.

Conference procedings edited.

1. *Homotopy theory: Tools and applications,* with Daniel G. Davis, Hans-Werner Henn, J.F. Jardine, Mark W. Johnson, eds. *Contemporary Mathematics* **729**, AMS, 2019.

Works submitted for publication and other preprints.

1. "Rings of power operations for Morava E-theories are Koszul." (arXiv:1204.4831)

2. "Free colimit completions of ∞-categories." (arXiv:2210.08582)

Selected invited presentations at conferences.

- May 15, 2007 – Workshop on Stacks in Geometry and Topology, Fields Instutute, Toronto – "Morava E-theory of commutative S-algebras and the Frobenius congruence"
- Aug 9, 2007 – Abel Symposium, Oslo, Norway – "Colinear approximations to homotopy theory"
- Jun 26, 2008 – Homotopical Group Theory and Topological Algebraic Topology (invited), Bonn, Germany – "The Frobenius congruence for power operations in Morava E-theory"
- Jun 30, 2008 – HOCAT 2008: Homotopy Structures in Geometry and Algebra (invited), CRM, Barcelona, Spain – "Homotopy theory and $(\infty, 1)$-categories"
- May 28, 2009 – Topological Field Theories Conference, Northwestern – "Cartesian presentations of weak n-categories"
- June 11, 2012 – Virginia Topology conference, U. of Virginia – "Power operations in ellitpic cohomology"
- March 27, 2013 – Equivariant, Chromatic, and Motivic Homotopy Theory, Northwestern University – "Power operations at height 2"
- May 11, 2013 – Midwest Topology Seminar, U. of Kentucky, Lexington – "p-isogeny modules, and calculations in multiplicative stable homotopy at height 2"
- April 10, 2014 – Reimagining the Foundations of Algebraic Topology, MSRI – "Calculations in multiplicative stable homotopy theory at height 2"
- June 24, 2014 – Manifolds, K-theory, and Related Topics, Dubrovnik, Croatia – "Koszul resolutions of power operation algebras"
- August 18, 2014 – ICM Invited Lecture, Topology Section, Seoul, South Korea – "Isogenies, power operations, and homotopy theory"
- June 1-19, 2015 – Felix Klein lectures, Hausdorff Institue/Max Planck Institute, Bonn (six 120 minute lectures)
- June 29, 2015 – Advances in Homotopy Theory Conference, Strasbourg, France – "Calculating with power operations for Morava E-theory at height 2"
- October 29, 2016 – AMS Sectional Meeting invited address, Minneapolis, MN – "On some approximations to homotopy theory"
- June 8, 2017 – The Transatlantic Homotopy Theory Conference, Regensburg – "Looijenga line bundles and complex analytic elliptic cohomology"
- April 3, 2019 – Oberwolfach Arbeitsgemeinschaft: Elliptic cohomology according to Lurie — "The eye of the storm: Lubin-Tate spectra"
- June 24-28, 2019 – Summer School on Higher Topos Theory and Univalent Foundations – "Higher topos theory" (five 90 minute lectures)
- October 5, 2019 – Midwest Topology Seminar, U. of Chicago – "On maps of E_∞ and H_∞-ring spectra"
- June 25-26, 2021 – Toposes Online (IHES) – "Higher Topos Theory" (four 60 minute lectures) [zoom]

- February 3, 2022 – Princeton algebraic topology seminar – "Understanding accessible ∞-categories" [zoom]
- March 20, 2023 – Homotopy theory in honor of Paul Goerss, Northwestern – "Reflections on free colimit completions"

Graduate students supervised.

- Rekha Santhanam (Ph.D. student, 2003–May, 2008). Ph.D. Thesis "Units of Equivariant Ring Spectra". Was postdoc at JHU. Currently Asst Prof at IIT Bombay.
- Barry Walker (Ph.D. student, 2004–May, 2008). Ph.D. Thesis "Multiplicative Orientations of K-Theory and p-adic analysis". Was instructor at Northwestern. position; has worked recently as a NetMath mentor.
- Nathaniel Stapleton (Ph.D. student, 2006–May, 2011). Ph.D. Thesis "Transchromatic Generalized Character Maps". Was postdoc at MIT, then at MPIM Bonn, then at Regensburg. Currently Asst Prof at U Kentucky, Lexington.
- Peter Nelson (Ph.D. student, 2010–2016). Ph.D. Thesis "A small presentation for Morava E-theory power operations". Was a postdoc at University of Haifa.
- Zhen Huan (Ph.D. student, 2010–2017). Ph.D. Thesis "Quasi-elliptic cohomology". Currently a research associate at Sun Yat-sen University, Guangzhuo, China.
- Mychael Sanchez [Smith] (Ph.D. student, 2011–2018). Ph.D. Thesis "Equivariant E_∞-algebras". Currently an Asst Prof at Univerity of New Mexico, Valencia Campus.
- Nima Rasekh (Ph.D. student, 2013–2018). Ph.D. Thesis "A Theory of Elementary Higher Toposes". Postdoc at EPFL, Lausanne, Switzerland.
- William Balderrama (Ph.D. student, 2016–2021). Ph.D. Thesis "Deformations of Homotopy Theories via Algebraic Theories". Currently a postdoc at U. of Virginia.
- Robert Joseph Rennie (passed prelim Spring 2019, 2017–2022). Currently an instructor at Colorado College.
- Abhra Abir Kundu (passed prelim Fall 2020, 2018–present).
- Heyi Zhu (passed prelim Summer 2021, 2018–present).