

# CLARK EDWARD BARWICK

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*Birthdate* : 9 January 1980

*Citizenship* : United States

*Visa* : United Kingdom, Tier 2, 2017–22

*Research* : Homotopy theory, algebraic  $K$ -theory, higher category theory, related areas

## APPOINTMENTS HELD

- 2017– *University of Edinburgh* : Reader in Mathematics
- 2015–17 *Massachusetts Institute of Technology* : Cecil and Ida Green Career Development Associate Professor of Mathematics
- 2013–15 *Massachusetts Institute of Technology* : Cecil and Ida Green Career Development Assistant Professor of Mathematics
- 2010–13 *Massachusetts Institute of Technology* : Assistant Professor
- 2008–10 *Harvard University* : Benjamin Peirce Lecturer
- 2007–08 *Institute for Advanced Study* : Visitor, Term I; Member, Term II. Programme: *New connections of representation theory to algebraic geometry and physics*
- 2006–07 *Matematisk Institutt, Universitetet i Oslo* : Postdoctoral Fellow. Programme: *Geometry and arithmetic of structured ring spectra*
- 2005–06 *Mathematisches Institut Göttingen* : Postdoctoral Fellow. Programme: *Homotopical algebraic geometry*

## EDUCATION

- 2005 *University of Pennsylvania*: Ph.D, Mathematics. Thesis advisor: Tony Pantev  
2001 *University of North Carolina at Chapel Hill*: B.S., Mathematics

## GRANTS, HONORS, AND AWARDS

- 2015 Fulbright Scotland Visiting Professor, University of Glasgow  
2012–13 NSF Grant, *The Legacy of Daniel Quillen: K-Theory and Homotopical Algebra*. (DMS 1206449)  
2010–12 Solomon Buchsbaum AT&T Research Fund, *The Chromatic Splitting Conjecture and the Algebraic K-Theory of the Sphere Spectrum*.  
2009–10 NSF Collaborative Research Grant, *Homotopy Theory: Applications and New Dimensions* with Michael Hopkins, Jacob Lurie, Haynes Miller, and Mark Behrens (DMS 0905950)

## PUBLICATIONS AND PREPUBLICATIONS

### Journal articles

- To appear* From operator categories to topological operads. *Geom. Topol.*  
2017 Spectral Mackey functors and equivariant algebraic K-theory (I). *Adv. Math.*, vol. 304 (2017), no. 2, pp. 646–727.  
2016 On the algebraic K-theory of higher categories. *J. Topol.*, vol. 9 (2016), pp. 245–347.  
2015a Multiplicative structures on algebraic K-theory. *Doc. Math.*, vol. 20 (2015), pp. 859–878.  
2015b On exact  $\infty$ -categories and the Theorem of the Heart. *Compos. Math.*, vol. 151 (2015), no. 11, pp. 2160–2186.  
2013  $n$ -relative categories: A model for the homotopy theory of  $n$ -fold homotopy theories. *Homology Homotopy Appl.*, vol. 15 (2013), no. 2, pp. 281–300 (with D. M. Kan).  
2012a A characterization of simplicial localization functors and a discussion of DK equivalences (with D. M. Kan). *Indag. Math. (N.S.)*, vol. 23 (2012), pp. 69–79.  
2012b Relative categories: Another model for the homotopy theory of homotopy theories (with D. M. Kan). *Indag. Math. (N.S.)*, vol. 23 (2012), pp. 42–68.  
2010 On left and right model categories and left and right Bousfield completions. *Homology Homotopy Appl.*, vol. 12 (2010), no. 2, pp. 245–320.

## Preprint articles

- 2016 Categorifying rationalization (with S. Glasman, M. Hoyois, D. Nardin, and J. Shah). [arXiv:1610.07162](#)
- 2016 Fibrations in  $\infty$ -category theory (with J. Shah). Submitted to *MATRIX Conference Proceedings Volume*. [arXiv:1607.04343](#)
- 2016 Cyclonic spectra, cyclotomic spectra, and a conjecture of Kaledin (with S. Glasman). Submitted to *Adv. Math.* [arXiv:1602.02163](#)
- 2015 Spectral Mackey functors and equivariant algebraic K-theory (II) (with S. Glasman and J. Shah). Submitted to *Compos. Math.* [arXiv:1505.03098](#)
- 2013 On the  $Q$  construction for exact  $\infty$ -categories (with J. Rognes). [arXiv:1301.4725](#)
- 2011 On the unicity of higher categories (with C. Schommer-Pries). [arXiv:1112.0040](#)

## Books

- To appear* *Parametrized higher categories and parametrized higher algebra* (with E. Dotto, S. Glasman, D. Nardin, and J. Shah). Introduction: [arXiv:1608.03654](#) / Exposé I: [arXiv:1608.03657](#) / Exposé IV: [arXiv:1608.07704](#) / Appendix: On the fibrewise effective Burnside  $\infty$ -category: [arXiv:1607.02786](#) / Appendix: A note on stable recollements: [arXiv:1607.02064](#)

## TEACHING

### University of Edinburgh

- Aut. 2017 *General topology* (MATH 10076)

### Massachusetts Institute of Technology

- Spr. 2017 *Topics in algebraic topology: The Gamma function and the field with one element* (18.917)
- Aut. 2016 *Linear algebra* (18.06)
- Spr. 2016 *Linear algebra* (18.06)
- Spr. 2015 *Topics in algebraic topology: Hurewicz theorems for algebraic K-theory* (18.917)
- Spr. 2015 *Project laboratory in mathematics* (18.821)
- Spr. 2014 *Undergraduate seminar in topology* (18.904)
- Spr. 2014 *Calculus with theory II* (18.024)
- Aut. 2013 *Calculus with theory I* (18.014)
- Aut. 2012 *Graduate topology seminar (Kan seminar)* (18.915)
- Spr. 2012 *Topics in algebraic topology: Algebraic K-theory* (18.917)

- Spr. 2012 *Calculus with theory II* (18.024)
- Aut. 2011 *Calculus with theory I* (18.014)
- Spr. 2011 *Analysis I* (18.100C)
- Aut. 2010 *Multivariable calculus* (18.02 – 3 recitations)

### Harvard University

- Spr. 2010 *Algebraic topology II* (Math 231br)
- Aut. 2009 *Algebraic topology I* (Math 231a)
- Aut. 2009 *Topology I* (Math 131)
- Spr. 2009 *p-adic realizations of motives* (Math 289)
- Spr. 2009 *Elementary calculus II* (Math Xb – 1 recitation)
- Aut. 2008 *Linear algebra and applications* (Math 121)

### SELECTED INVITED PRESENTATIONS

- July 2020 Institut des Hautes Études Scientifiques. *Motivic, equivariant, and non-commutative homotopy theory*
- Dec. 2018 Isaac Newton Institute for Mathematical Sciences. *Homotopy harnessing higher structures*
- July 2018 Mathematisches Forschungsinstitut Oberwolfach. *Topology*
- June 2018 Sabhal Mor Ostaig. *International conference on manifolds, groups and homotopy*
- May 2018 Casa Matemática Oaxaca.  *$\infty$ -categories,  $\infty$ -operads, and their applications*
- Sep. 2016 Purdue University. *Midwest topology seminar*. ‘How to rationalize an exact category’
- June 2016 American Institute of Mathematics. *Equivariant derived algebraic geometry*. ‘Parametrized higher category theory and higher algebra’
- June 2016 MATRIX. *Higher structures in geometry and physics*. ‘Parametrized higher category theory’
- May 2016 Plenary speaker. Caesarea. *Caesarea Workshop*. ‘Parametrized higher category theory’
- Dec. 2015 Plenary speaker. University of Glasgow. *Scottish topology seminar*. ‘Transfers in equivariant stable homotopy theory’ / ‘Equivariant stable homotopy theory and parametrized higher category theory’
- Sep. 2015 Clay Mathematics Institute. *Algebraic topology: Manifolds unlocking higher structures*. ‘Modes of equivariance’
- May 2015 Ohio State University. *K-theory: Future directions*. ‘Equivariant algebraic K-theory’
- Aug. 2014 City University of New York. *Differential cohomologies*. ‘Absolute noncommutative motives’

- Apr. 2014 Mathematical Sciences Research Institute. *Reimagining the foundations of algebraic topology*. ‘Redshift and higher categories’
- Nov. 2013 University of Louisiana. *Lloyd Roeling conference*. ‘Multiplicative structures on K-theory and a Barratt–Priddy–Quillen theorem’
- Oct. 2013 Temple University. *Higher structures in algebra, geometry and physics*. ‘The algebraic K-theory of higher categories’
- Apr. 2013 University of Notre Dame. *Graduate student topology & geometry conference*. ‘Algebraic K-theory of higher categories’
- July 2012 Stanford. *Algebraic topology: Applications and new directions*. ‘Dévissage’
- July 2012 European Congress of Mathematics. *Thematic session on homotopy theory* ‘Waldhausen K-theory as a Goodwillie derivative’
- May 2012 University of New Mexico. *Witt vectors in arithmetic, geometry, and topology*. ‘Higher  $\lambda$ -structures’
- Mar. 2011 University of Iowa. *Homotopy theory*. ‘Higher algebraic K-theory of  $\infty$ -categories’
- Nov. 2010 Nagoya. *Witt vectors, foliations, and absolute de Rham cohomology*. ‘A homotopical perspective on the de Rham–Witt complex’
- Aug. 2010 Fields Institute. *Homotopy theory and derived algebraic geometry*. ‘Equivariant derived algebraic geometry and K-theory’
- Aug. 2009 Loen. *p-adic geometry and homotopy theory*. ‘Equivariant derived algebraic geometry and K-theory’
- June 2009 Plenary speaker. Universidad de Salamanca *School of derived algebraic geometry*: ‘Applications of derived algebraic geometry to homotopy theory’
- Mar. 2008 Banff International Research Station. *New topological contexts for Galois theory and algebraic geometry*. ‘ $\infty$ -categories’
- Mar. 2007 Fields Institute. *Geometric applications of homotopy theory*. ‘Differential calculus in spectral algebraic geometry’
- Sep. 2006 Matematisk Institutt Universitetet i Oslo. *Topological algebraic geometry*. ‘Crystals and D-crystals in spectral algebraic geometry’
- July 2006 Mathematisches Forschungsinstitut Oberwolfach. *Algebraic K-theory*: ‘D-crystals’
- May 2006 Université de Nice. *Higher stacks in algebraic geometry*. ‘An overview of positive characteristic topological algebraic geometry’ / ‘Rezk multi- $(\infty, n)$ -categories’

## ADVISING

### Postdoctoral

- 2014–17 Marc Hoyois. MIT C. L. E. Moore Instructor.  
2013–16 Emanuele Dotto. MIT C. L. E. Moore Instructor.  
2013–14 Hirsh, Joseph. MIT NSF Postdoctoral Fellow.

### Graduate

Haine, Peter

Johansen, Rasmus

- Ph.D 2017 Nardin, Denis. *Stability and distributivity over orbital  $\infty$ -categories*  
Ph.D 2017 Shah, Jay. *Parametrized higher category theory*  
Ph.D 2015 Glasman, Saul. *Day convolution and the Hodge filtration on THH*

### Undergraduate

- 2017 Young de la Sota, Miguel. Project: *Critical homotopy theory*  
2014 Sutton, Taylor. Project:  *$\Phi$ -monoidal envelopes*  
2014 Haine, Peter. Project: *Quasicategories and a discrete model of topological  $K$ -theory*  
2013 Velcheva, Katerina. Project: *Generalized edgewise subdivisions*. Submitted to *Homology, Homotopy, and Applications*  
2012 Zhang, Leon. Project: *The Zariski topology on Green functors*  
2011 Hahn, Jeremy. Project:  *$\Theta_n$ -sets as a model for  $(\infty, n)$ -category theory*

## MEMBERSHIPS

- 2018– Edinburgh Mathematical Society  
2018– European Mathematical Society  
2018– London Mathematical Society

## SERVICE TO THE PROFESSION

- 2020 Coorganising thematic program at Mathematical Sciences Research Institute: *Higher categories and categorification*.  
2018 Coorganising conference of semester at Newton Institute semester: *Homotopy harnessing higher structures*  
2017– Member of National Science Foundation award panels in Washington DC

2007– Referee for >100 articles for journals including: *Inventiones Mathematicæ*, *Duke Mathematical Journal*, *Compositio Mathematica*, *Geometry & Topology*, *Advances in Mathematics*, *Journal of Topology*, *Transactions of the American Mathematical Society*, *Journal of Pure and Applied Algebra*.

