

# CLARK BARWICK

*School of Mathematics, University of Edinburgh*



**James Clerk Maxwell Building**

**Peter Guthrie Tait Road**

**EDINBURGH**

**EH9 3FD**

**UNITED KINGDOM**

**email** ♦ [Clark.Barwick@ed.ac.uk](mailto:Clark.Barwick@ed.ac.uk)

**url** ♦ <http://www.maths.ed.ac.uk/~cbarwick/>

## **BASIC DATA**

✉ *Citizenship* ♦ United States ♦ *Visa* ♦ United Kingdom ♦ Tier 2 ♦ 2017–22

✉ *Research keywords* ♦ Homotopy theory ♦ higher category theory ♦ arithmetic geometry ♦ algebraic K-theory

## **APPOINTMENTS**

2017– *University of Edinburgh* ♦ Reader in Mathematics

2015–17 *Massachusetts Institute of Technology* ♦ Cecil & Ida Green Career Development Associate Professor of Mathematics

2013–15 *Massachusetts Institute of Technology* ♦ Cecil & 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 ♦ *New connections of representation theory to algebraic geometry & physics*

2006–07 *Matematisk Institutt, Universitetet i Oslo* ♦ Postdoctoral fellow ♦ *Geometry & arithmetic of structured ring spectra*

2005–06 *Mathematisches Institut Göttingen* ♦ Postdoctoral fellow ♦ *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

## PUBLICATIONS & PREPUBLICATIONS

### Journal articles

- 2018C From operator categories to topological operads. *Geom. Topol.*, vol. 22 (2018), pp. 1893–1959.
- 2018B Fibrations in  $\infty$ -category theory (with J. Shah). In *2016 MATRIX Annals*, pp. 17–42.
- 2018A Dualizing cartesian & cocartesian fibrations (with D. Nardin & J. Shah). *Theory App. Categ.*, vol. 33 (2018), no. 4, pp. 67–94.
- 2017 Spectral Mackey functors & 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.
- 2015B Multiplicative structures on algebraic K-theory. *Doc. Math.*, vol. 20 (2015), pp. 859–878.
- 2015A On exact  $\infty$ -categories & 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).
- 2012b A characterization of simplicial localization functors & a discussion of DK equivalences (with D. M. Kan). *Indag. Math. (N.S.)*, vol. 23 (2012), pp. 69–79.
- 2012a 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 & right model categories & left & right Bousfield completions. *Homology Homotopy Appl.*, vol. 12 (2010), no. 2, pp. 245–320.

### Preprint articles

- 2018 A comment on the vanishing of rational motivic Borel-Moore homology (with D. Nardin). [arXiv:1811.07656](https://arxiv.org/abs/1811.07656)
- 2018 On Galois categories & perfectly reduced schemes. [arXiv:1811.06125](https://arxiv.org/abs/1811.06125)

- 2018 Exodromy (with S. Glasman & P. Haine). Submitted to *Invent. Math.*  
arXiv:1807.03281
- 2016 Categorifying rationalization (with S. Glasman, M. Hoyois, D. Nardin, & J. Shah). arXiv:1610.07162
- 2016 Cyclonic spectra, cyclotomic spectra, & a conjecture of Kaledin (with S. Glasman). Submitted to *Adv. Math.* arXiv:1602.02163
- 2015 Spectral Mackey functors & equivariant algebraic K-theory (II) (with S. Glasman & J. Shah). Submitted to *Tunisian J. Math.* arXiv:1505.03098
- 2013 On the  $\mathcal{Q}$  construction for exact  $\infty$ -categories (with J. Rognes). arXiv:1301.4725
- 2011 On the unicity of higher categories (with C. Schommer-Pries). Submitted to *Ann. Math.* arXiv:1112.0040

### Books

- TO APPEAR *Parametrized higher categories & parametrized higher algebra* (with E. Dotto, S. Glasman, D. Nardin, & 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

### SCIENTIFIC GRANTS & AWARDS

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

### 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 ♦ Thesis title TBD
- ✎ Johansen, Rasmus ♦ Thesis title TBD
- 2017 Nardin, Denis ♦ Ph.D ♦ *Stability & distributivity over orbital  $\infty$ -categories*
- 2017 Shah, Jay ♦ Ph.D ♦ *Parametrized higher category theory*
- 2015 Glasman, Saul ♦ Ph.D ♦ *Day convolution & 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 & a discrete model of topological K-theory*
- 2013 Velcheva, Katerina ♦ Project: *Generalized edgewise subdivisions*
- 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*

## TEACHING EXPERIENCE

### University of Edinburgh

- SPRING 2019 *Fundamentals of pure mathematics* ♦ Lecturer ♦ MATH08064
- SPRING 2018 *Fundamentals of pure mathematics* ♦ 2 tutorials ♦ MATH08064
- SPRING 2018 *Introduction to number theory* ♦ 2 tutorials ♦ MATH10071
- FALL 2017 *General topology* ♦ Course organiser ♦ MATH10076

### Massachusetts Institute of Technology

- SPRING 2017 *Topics in algebraic topology* ♦ ‘The Gamma function & the field with one element’  
♦ 18.917
- FALL 2016 *Linear algebra* ♦ 18.06
- SPRING 2016 *Linear algebra* ♦ 18.06
- SPRING 2015 *Topics in algebraic topology* ♦ ‘Hurewicz theorems for algebraic K-theory’ ♦ 18.917
- SPRING 2015 *Project laboratory in mathematics* ♦ 18.821
- SPRING 2014 *Undergraduate seminar in topology* ♦ 18.904
- SPRING 2014 *Calculus with theory II* ♦ 18.024
- FALL 2013 *Calculus with theory I* ♦ 18.014
- FALL 2012 *Graduate topology seminar* ♦ ‘Kan seminar’ ♦ 18.915
- SPRING 2012 *Topics in algebraic topology* ♦ ‘Algebraic K-theory’ ♦ 18.917
- SPRING 2012 *Calculus with theory II* ♦ 18.024

- FALL 2011 *Calculus with theory I* ♦ 18.014  
 SPRING 2011 *Analysis I* ♦ 18.100C  
 FALL 2010 *Multivariable calculus* ♦ 18.02 ♦ 3 recitations

### Harvard University

- SPRING 2010 *Algebraic topology II* ♦ Math 231br  
 FALL 2009 *Algebraic topology I* ♦ Math 231a  
 FALL 2009 *Topology I* ♦ Math 131  
 SPRING 2009 *p-adic realizations of motives* ♦ Math 289  
 SPRING 2009 *Elementary calculus II* ♦ Math Xb ♦ 1 recitation  
 FALL 2008 *Linear algebra & applications* ♦ Math 121

## TEACHING GRANTS & AWARDS

- 2018 Nominee, Best Overall Teacher Award ♦ University of Edinburgh  
 2013 Cecil & Ida Green Assistant Professorship ♦ Massachusetts Institute of Technology  
 2010 Derek Bok Certificate of Excellence ♦ Harvard University

## SELECTED INVITED PRESENTATIONS

- JULY 2020 Institut des Hautes Études Scientifiques ♦ *Motivic, equivariant, & non-commutative homotopy theory*  
 DEC 2018 Isaac Newton Institute for Mathematical Sciences ♦ *Homotopy harnessing higher structures* ♦ ‘Exodromy’  
 JUNE 2018 Sabhal Mor Ostaig ♦ *International conference on manifolds, groups & homotopy* ♦ ‘Exodromy & the stratified abelian conjecture’  
 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 & higher algebra’  
 JUNE 2016 MATRIX ♦ *Higher structures in geometry & physics* ♦ ‘Parametrized higher category theory’  
 MAY 2016 Plenary speaker ♦ *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 & 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’
- APRIL 2014 Mathematical Sciences Research Institute • *Reimagining the foundations of algebraic topology* • ‘Redshift & higher categories’
- NOV 2013 University of Louisiana • *Lloyd Roeling conference* • ‘Multiplicative structures on K-theory & a Barratt–Priddy–Quillen theorem’
- OCT 2013 Temple University • *Higher structures in algebra, geometry & physics* • ‘The algebraic K-theory of higher categories’
- APRIL 2013 University of Notre Dame • *Graduate student topology & geometry conference* • ‘Algebraic K-theory of higher categories’
- JULY 2012 Stanford • *Algebraic topology: Applications & 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, & topology* • ‘Higher  $\lambda$ -structures’
- MARCH 2011 University of Iowa • *Homotopy theory* • ‘Higher algebraic K-theory of  $\infty$ -categories’
- NOV 2010 Nagoya • *Witt vectors, foliations, & absolute de Rham cohomology* • ‘A homotopical perspective on the de Rham–Witt complex’
- AUG 2010 Fields Institute • *Homotopy theory & derived algebraic geometry* • ‘Equivariant derived algebraic geometry & K-theory’
- AUG 2009 Loen • *p-adic geometry & homotopy theory* • ‘Equivariant derived algebraic geometry & K-theory’
- JUNE 2009 Plenary speaker • Universidad de Salamanca • *School of derived algebraic geometry* • ‘Applications of derived algebraic geometry to homotopy theory’
- MARCH 2008 Banff International Research Station • *New topological contexts for Galois theory & algebraic geometry* • ‘ $\infty$ -categories’
- MARCH 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 & 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’

## MEMBERSHIPS

- ✎ Edinburgh Mathematical Society
- ✎ European Mathematical Society
- ✎ London Mathematical Society

## SERVICE TO THE PROFESSION

- ✎ Coorganiser of thematic program at Mathematical Sciences Research Institute • *Higher categories & categorification*
- ✎ Coorganiser of conference of semester at Newton Institute semester • *Homotopy harnessing higher structures*
- ✎ Member of National Science Foundation award panel in Washington DC • 2017
- ✎ Referee for >100 articles for journals including: *Acta Mathematica*, *Inventiones Mathematicæ*, *Duke Mathematical Journal*, *Compositio Mathematica*, *Geometry & Topology*, *Advances in Mathematics*, *Journal of Topology*, *Transactions of the American Mathematical Society*, *Journal of Pure & Applied Algebra*

