Christian Carrick
Curriculum Vitae

PERSONAL DETAILS

Mail carrick@math.uni-bonn.de

Research Algebraic topology: equivariant/chromatic/motivic homotopy, synthetic spectra, higher real K-theories, stacks

POSITIONS AND EDUCATION

NSF Postdoctoral Fellow August 2025-July 2027

Mathematisches Institut, Universität Bonn
Supervisor: Markus Hausmann

NSF Postdoctoral Fellow (Guest Researcher) June 2024-July 2025

Utrecht Geometry Center, Universiteit Utrecht
Supervisor: Lennart Meier

Postdoctoral Researcher (Onderzoeker) Jan 2023-May 2024

Utrecht Geometry Center, Universiteit Utrecht
Supervisor: Lennart Meier

Trimester Program Participant Sep 2022-Dec 2022

Hausdorff Institute of Mathematics, Bonn
Spectral methods in algebra, geometry, and topology

Ph.D. Mathematics Sep 2017-May 2022

UCLA
Advisor: Michael A. Hill. Dissertation: *Stacks and Real-oriented homotopy theory*

A.B. Mathematics 2012-2016

Harvard University
Magna cum laude. GPA: 3.85. Advisor: Michael J. Hopkins. Senior Thesis: *An elementary proof of Quillen's theorem for complex cobordism*

AWARDS AND HONORS

Pacific Journal of Mathematics Award
Award for 3 best dissertations in Mathematics at UCLA. Awarded $3500 June 2022.

UCLA Dissertation Year Fellow
Research fellowship for $20,000. Awarded for 2021-2022 academic year.

Harvard College Research Program Fellow
Research fellowship for $3000. Awarded Summer 2016.

Derek Bok Teaching Award
Award for outstanding teaching as a course assistant at Harvard University. Awarded Spring 2016 and Fall 2016.
Program for Research in Science and Engineering (PRISE) Fellow
Research fellowship at Harvard University for $3000. Awarded Summer 2015.
Northern California Scholarship Foundation (NCSF) Winner
Scholarship for $32000. Awarded Fall 2012.

PUBLICATIONS

Slice spectral sequences through synthetic spectra
Submitted.
On higher real K-theories and finite spectra
jt. with Mike Hill. Submitted.
On periodic families in the stable stems of height two
jt. with Jack Davies. Submitted.
The descent spectral sequence for topological modular forms
jt. with Jack Davies and Sven van Nigtevecht. Submitted.
On MU homology of connective models of higher real K-theories
jt. with Mike Hill. Accepted for publication in Proceedings of the AMS.
Nonvanishing of products in v2 periodic families at the prime 3
jt. with Jack Davies. Submitted.
Descent spectral sequences through synthetic spectra
jt. with Jack Davies and Sven van Nigtevecht. Accepted for publication in International Mathematics Research Notices (IMRN).
Chromatic defect, Wood's theorem, and higher real K-theories
Accepted for publication in Geometry and Topology.
A synthetic approach to detecting v1 periodic families
jt. with Jack Davies. Accepted for publication in Transactions of the AMS.
The homological slice spectral sequence in motivic and Real bordism.
jt. with Mike Hill and Doug Ravenel. Advances in Mathematics, Volume 458, Part A, 2024.
Cofreeness in Real bordism theory and the Segal conjecture.
Proc. Am. Math. Soc., Volume 150(7), July 2022, 3161-3175.
Smashing localizations in equivariant stable homotopy
Journal of Homotopy and Related Structures, 17, 355-392 (2022).

INVITED TALKS

Beijing Algebraic Topology Seminar
Slice spectral sequences through synthetic spectra. 11/2025.
Bonn Algebraic Topology Seminar
Slice spectral sequences through synthetic spectra. 11/2025.
Princeton Algebraic Topology Seminar
Higher real K-theories and finite spectra. 10/2025.
Utrecht-Nijmegen TopICS Seminar
Higher real K-theories and finite spectra. 4/2025.
University of Bochum Topology Seminar
Chromatic defect, Wood's theorem, and higher real K-theories. 11/2024.
New Mexico Topology Seminar
Synthetic spectra and the image of J. 3/2024.

ECHT Online Research Seminar
  Chromatic defect, Wood's theorem, and higher real K-theories. 11/2023.
University of Groningen
  The Segal Conjecture and $\mathbb{F}_1$. 10/2023.
University of Bonn Topology Seminar
  Chromatic defect, Wood's theorem, and higher real K-theories. 10/2023.
International Workshop on Algebraic Topology Beijing
  Chromatic numbers and Real-oriented spectra. 7/2023.
Utrecht Geometry Center Seminar
  The Segal Conjecture and $\mathbb{F}_1$. 2/2023.
UCSD Visiting Algebraic Topology Seminar
  The homology of $BP_{\mathbb{R}}\langle n \rangle$. 3/2022.
Chicagoland Algebraic Topology Seminar (University of Chicago)
  The Segal conjecture and Real bordism theory. 11/2021
AMS Fall Western Sectional Meeting (Special Session on Equivariant and Motivic Homotopy Theory)
  The Segal conjecture and Real bordism theory. 11/2021
UCLA Visiting Algebraic Topology Seminar
  Smashing Localizations in Equivariant Stable Homotopy. 10/2019
Chico Topology Conference (contributed)
  A new proof of the Segal conjecture via Real bordism theory. 4/2022.

SERVICE

TopICS Intercity Topology Seminar
  Organized a monthly invited seminar joint with Universiteit Utrecht, Universiteit Radboud, and Vrije Universiteit Amsterdam. Fall 2023, Spring 2024.
ssplot.netlify.app
  I developed and maintain a website to display and manipulate spectral sequence diagrams automatically using output from Macaulay2. From Spring 2021.
UCLA Directed Research Program (DRP) Mentor
  Mentored undergraduates on chromatic homotopy theory. Winter 2021, Spring 2021.
UCLA Participating Algebraic Topology Seminar Organizer
  Organized seminars on Higher Real K-theories in Fall 2020, on Stacks in Winter 2020, and on Motivic Homotopy in Fall 2021.
UCLA Juvitop Seminar Founder and Organizer
  Founded the UCLA Juvitop Seminar in Fall 2018. Organized seminars on Structured Ring Spectra in Winter 2019 and on Computations in Chromatic Homotopy in Fall 2018.
Harvard College Tutoring Programs
  Tutored High School Students in the Cambridge After School Program and the CHANCE tutoring program. Fall 2015 thru Spring 2016.

TEACHING AND ADVISING EXPERIENCE

Instructor   2025-Present
Universität Bonn

- **Advised Masters's thesis (in progress):** Daniel Arone and Ben Steffan.

Instructor   2023-2025
Universiteit Utrecht

- **Advised Bachelor's theses:** Chris Vos and Jacco Hijmans, Spring 2024. I advised a joint
  bachelor's thesis on the Adams spectral sequence and Ext over the Steenrod algebra. Students
  also created highly flexible and sophisticated Ext resolution software.

- **Advised Masters's thesis:** Luca Dal Forno, Spring 2024. I advised a master's thesis on Day
  Convolution for equivariant ∞-operads.

- **Master's seminar:** Topological K-theory, Spring 2024.

- **Orientation to Mathematical Research (OMR):** Abelian and derived categories, Winter
  2024. I advised four Master's students on a research project related in homological algebra.

Teaching Assistant   2017-2022
UCLA Department of Mathematics

- **Math 33a:** Linear Algebra, Winter 2021.

- **Math 31b:** Calculus II, Winter 2021, Fall 2020, Spring 2020, Winter 2020, Spring 2019, Winter
  2019, Fall 2018.

- **Math 31a:** Calculus I, Fall 2020, Fall 2019, Spring 2019, Winter 2019, Fall 2018.

- **Math 32b:** Multivariable Calculus II, Summer 2020, Winter 2020, Summer 2019, Spring 2018.

- **Math 32a:** Multivariable Calculus I, Winter 2018.

- **Math 1a:** Precalculus, Fall 2017.

Course Assistant   2016
Harvard University, Department of Mathematics

- **Math 131:** Topology, Fall 2016. Derek Bok Teaching Award.

- **Math 101:** Sets, Groups, and Topology, Spring 2016. Derek Bok Teaching Award.

- **Math 101:** Sets, Groups, and Topology, Fall 2016.