

# J.D. Quigley

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## Employment

Assistant Professor, University of Virginia. August 2023 - Present.

RTG Postdoctoral Scholar, University of Oregon. Mentor: Dan Dugger. September 2022 - August 2023.

Postdoctoral Fellow, Max Planck Institute for Mathematics. Mentor: Tobias Barthel. Fall 2022.

H.C. Wang Assistant Professor, Cornell University. Mentor: Inna Zakharevich. July 2019 - June 2022.

## Education

Ph.D. in Mathematics, University of Notre Dame. Advisor: Mark Behrens. June 2014 - May 2019.

B.S. in Mathematics, University of Illinois at Urbana-Champaign. August 2011 - December 2013.

## Honors, Awards, and Grants

NSF Standard Grant: Stable homotopy theory in algebra, topology, and geometry (PI), DMS-2203785. December 2022 - November 2025.

NSF RTG Grant: Electronic Computational Homotopy Theory Research Community (PI Daniel Isaksen, co-PIs Bertrand Guillou, J.D. Quigley, Vesna Stojanoska), DMS-2135884. August 2022 - July 2025.

AMS-Simons Travel Grant. July 2021 - June 2023.

Sady Dissertation Prize. Mathematics Department, University of Notre Dame. 2019.

Oberwolfach Junior Fellows Travel Grant. 2018, 2019.

AMS Graduate Student Travel Grant. 2016.

Honorable Mention, National Science Foundation Graduate Research Fellowship. 2015, 2016.

Elizabeth R. Bennett Scholarship in Mathematics. University of Illinois at Urbana-Champaign. 2013.

Elsie Thomas Fraser Award in Mathematics. University of Illinois at Urbana-Champaign. 2012.

## Publications

1. *A motivic analogue of the  $K(1)$ -local sphere spectrum*, with William Balderrama and Kyle Ormsby. **Journal of the European Mathematical Society**, to appear. [arXiv:2307.13512](https://arxiv.org/abs/2307.13512).
2. *The motivic lambda algebra and motivic Hopf invariant one problem*, with William Balderrama and Dominic Leon Culver. **Geometry & Topology**, to appear. [arXiv:2112.07479](https://arxiv.org/abs/2112.07479).

3. *Some smooth circle and cyclic group actions on exotic spheres.*  
**Proceedings of the American Mathematical Society**, to appear. arXiv:2209.01591.
4. *The 2-primary Hurewicz image of  $tmf$* , with Mark Behrens and Mark Mahowald.  
**Geometry & Topology** 27-7 (2023), 2763-2831.
5. *Ranks of  $RO(G)$ -graded stable homotopy groups of spheres for finite groups  $G$* , with J.P.C. Greenlees.  
**Proceedings of the American Mathematical Society, Series B** 10 (2023), 101-113.
6. *Free incomplete Tambara functors are almost never flat*, with Mike Hill and David Mehrle.  
**International Mathematics Research Notices** 2023-5, 4225-4291.
7. *Tate blueshift and vanishing for Real oriented cohomology theories*, with Guchuan Li and Vitaly Lorman.  
**Advances in Mathematics** 411 (2022), 108780.
8.  *$tmf$ -based Mahowald invariants.*  
**Algebraic & Geometric Topology** 22-4 (2022), 1789-1839.
9. *Algebraic slice spectral sequences*, with Dominic Culver and Hana Jia Kong.  
**Documenta Mathematica** 26 (2021), 1085-1119.
10. *Motivic Mahowald invariants over general base fields*,  
**Documenta Mathematica** 26 (2021), 561-582.
11.  *$kq$ -resolutions I*, with Dominic Culver.  
**Transactions of the American Mathematical Society** 374-7 (2021), 4655-4710.
12. *Real motivic and  $C_2$ -equivariant Mahowald invariants.*  
**Journal of Topology** 14-2 (2021), 369-418.
13. *The Segal Conjecture for topological Hochschild homology of the Ravenel spectra*, with Gabriel Angelini-Knoll.  
**Journal of Homotopy and Related Structures** 16-1 (2021), 41-60.
14. *The motivic Mahowald invariant.*  
**Algebraic & Geometry Topology** 19-5 (2019), 2485-2534.
15. *Computing Primitively-Rooted Squares and Runs in Partial Words*, with Francine Blanchet-Sadri, Justin Lazarow, Jordan Nikkel, and Xufan Zhang.  
**European Journal of Combinatorics** 68 (2018), 223-241.
16. *Squares and Primitivity in Partial Words*, with Francine Blanchet-Sadri, Michelle Bodnar, Jordan Nikkel, and Xufan Zhang.  
**Discrete Applied Mathematics** 185 (2015), 26-37.
17. *Squares in Partial Words*, with Francine Blanchet-Sadri, Yang Jiao, John Machacek, and Xufan Zhang.  
**Theoretical Computer Science** 530 (2014), 42-57.

## Preprints

1. *Symmetries of exotic spheres via complex and quaternionic Mahowald invariants*, with Boris Botvinnik.  
Submitted. arXiv:2309.04275.
2.  *$v_1$ -periodic motivic homotopy over prime fields*, with Hana Jia Kong.  
Submitted. arXiv:2209.08603.
3. *On the equivalence of two theories of real cyclotomic spectra*, with Jay Shah.  
Submitted. arXiv:2112.07462.
4. *On the parametrized Tate construction*, with Jay Shah.  
Submitted. arXiv:2110.07707.
5. *Chromatic complexity of the algebraic K-theory of  $y(n)$* , with Gabriel Angelini-Knoll.  
Submitted. arXiv:1908.09164.

## Talks

### Invited conference talks

- Algebraic Structures in Topology II, San Juan, Puerto Rico. June 2024.
- International Workshop on Algebraic Topology, Beijing International Center for Mathematical Research, Peking University. July 2023.
- Baues Memorial Conference, MPIM Bonn, Germany. October 2022.
- Mini-symposium: K-Theory, Symmetry, and Periodicity, Free University of Berlin. September 2022.
- Motivic Geometry Conference, University of Oslo, Norway. August 2022.
- Parallel Session on Algebraic Topology, Union College Mathematics Conference. June 2022.
- Special Session on Homotopy Theory, AMS Sectional Meeting, University of Virginia. March 2022. (cancelled)
- Midwest Topology Seminar. October 2020.
- Special Session on Motivic Aspects of Topology and Geometry, AMS Sectional Meeting, University of Virginia. March 2020. (cancelled)
- Workshop on Equivariant Stable Homotopy Theory and  $p$ -adic Hodge Theory, Banff International Research Station. March 2020.
- Graduate Student Session, International Workshop on Algebraic Topology, Fudan University. August 2019.
- Equivariant Topology & Derived Algebra (A Jolly Pleasant Conference for Greenlees), Norwegian University of Science and Technology. August 2019.
- Special Session on Structured Homotopy, AMS Sectional Meeting, University of Michigan. October 2018.
- Young Topologists Meeting, University of Copenhagen. July 2018.
- Special Session on Homotopy Theory, AMS Sectional Meeting, Ohio State University. March 2018.
- Young Topologists Meeting, University of Stockholm. July 2017.

## Invited colloquium and seminar talks

Columbia Topology Seminar. November 2023.  
 University of Virginia Topology Seminar. September 2023.  
 University of Washington Topology Seminar. March 2023.  
 University of Oregon Topology Seminar. February 2023.  
 Case Western Reserve University Colloquium. January 2023.  
 University of Oregon Colloquium. January 2023.  
 University of Kentucky Colloquium. January 2023.  
 University of Virginia Colloquium. January 2023.  
 Université Sorbonne Paris Nord Topology Seminar. November 2022.  
 Max Planck Institute for Mathematics Topology Seminar. September 2022.  
 University of Pennsylvania Homotopy Theory Seminar. September 2022.  
 University of Osnabrueck Topology Seminar. September 2022.  
 Monthly meeting, NSF FRG on Trace Methods and Cut-and-Paste K-Theory. October 2021.  
 Electronic Computational Homotopy Theory Seminar. April 2021.  
 Indian Institute of Technology Roorkee Motivic Homotopy Theory Seminar. April 2021.  
 University of Michigan Algebraic Topology Seminar. April 2021.  
 Princeton University Algebraic Topology Seminar. February 2021.  
 Free University of Berlin Topology Seminar. November 2020.  
 University of California, Los Angeles Topology Seminar. November 2020.  
 Johns Hopkins University Topology Seminar. February 2020.  
 Wayne State University Topology Seminar. November 2019.  
 Massachusetts Institute of Technology Topology Seminar. October 2019.  
 Cornell University Topology and Geometric Group Theory Seminar. September 2019.  
 University of Osnabrueck Topology Seminar. April 2019.  
 University of Rochester Topology Seminar. February 2019.  
 University of Virginia Topology Seminar. November 2018.  
 University of Illinois at Urbana-Champaign Topology Seminar. November 2018.  
 University of Chicago Topology Seminar. November 2018.  
 Northwestern University Topology Seminar. October 2018.  
 University of Kentucky Topology Seminar. October 2018.  
 University of Notre Dame Topology Seminar. October 2018.  
 University of Oslo Topology Seminar. August 2018.  
 Michigan State University Geometry and Topology Seminar. November 2017.  
 Ohio State University Motivic Cohomology and Homotopy Theory Seminar. October 2017.

## Selected expository and contributed talks

K-Theory Summer School at University of Southern California. August 2018.  
 European Talbot Workshop. June 2017.  
 Talbot Workshop. May 2017.  
 Talbot Workshop. April 2016.

## Teaching

### University of Virginia

Instructor, Transition to Higher Mathematics. Spring 2024.

Instructor, Algebraic Topology II. Fall 2023.

### University of Oregon

Instructor, Sequences and Series. Spring 2023.

Instructor, Single-Variable Integral Calculus. Winter 2023.

### Cornell University

Instructor, Multivariable Calculus (2 sections). Spring 2022.

Instructor, Prove It!. Fall 2021.

Instructor, Topics in Topology: Stable Homotopy Theory. Spring 2021.

Instructor, Finite Math for the Life and Social Sciences (2 sections). Fall 2020.

Instructor, Calculus III. Spring 2020.

Instructor, Calculus I (2 sections). Fall 2019.

### University of Notre Dame

Head TA, Calculus B (2 sections). Spring 2019.

Head TA, Calculus A (2 sections). Fall 2017.

Instructor, Elements of Calculus I. Fall 2016.

TA, Calculus B (2 sections), Notre Dame. Spring 2016.

TA, Calculus A (3 sections), Notre Dame. Fall 2015.

## Supervision

### Postdoctoral Researchers

David Mehrle (University of Kentucky), remote mentor for eCHT Postdoctoral Fellowship. Fall 2023 - Spring 2024.

### Undergraduate research projects and directed readings

Amartya Shekhar Dubey (National Institute of Science Education and Research, Bhubaneswar, India), "Computations in stable homotopy theory" (remote advisor). Summer 2023.

Ting Gong (Notre Dame), "Algebraic number theory" by Jarvis and "Algebraic number theory" by Neukirch. Fall 2018 - Spring 2019.

Anthony Napolitano (Notre Dame), "Modern cryptography and elliptic curves" by Shemanske. Fall 2017 - Spring 2018.

Christian Hokaj (Notre Dame), "Elliptic curves, modular forms, and their L-functions" by Lozano-Robledo. Fall 2016 - Spring 2017.

## External service

Referee or quick opinion\* for *Duke Mathematical Journal*\*; *Memoirs of the American Mathematical Society*; *Communications of the American Mathematical Society*; *Journal of the Institute of Mathematics of Jussieu*; *International Mathematics Research Notices* (\*, 2 times); *Proceedings of the Royal Society of Edinburgh, Section A*; *Mathematische Zeitschrift*; *New York Journal of Mathematics*; *Journal of Topology* (2 times); *Algebraic & Geometric Topology* (3 times, \* 1 time); *Journal of Homotopy and Related Structures*; *Journal of Automata, Languages, and Combinatorics*.

Reviewer for *zbMATH* and *MathSciNet*.

Panelist for NSF DMS.

Co-organizer, Electronic Computational Homotopy Theory Online Research Community, Fall 2019 - Present.

Main research seminar (co-organizer, Fall 2019 - Spring 2024), reading seminar on Mahowald invariants (co-organizer, Fall 2022), reading seminar on synthetic spectra (technical assistant, Spring 2022), reading seminar on equivariant homotopy theory (co-instructor, Fall 2021), mini-courses (co-organizer, Fall 2021 and Spring 2022), reading seminar on equivariant algebra (co-organizer, Spring 2021), Kan seminar (instructor, Fall 2019 and Fall 2020), and reading seminar on motives (co-organizer, Spring 2020).

Team leader (with Teena Gerhardt) of a research team for the Cut-and-Paste Approaches to K-theory FRG Workshop, Vanderbilt University. Summer 2024.

External expert for a Master's project exam, École Polytechnique Fédérale de Lausanne. Spring 2021.

## Internal service (at University of Virginia unless otherwise noted)

Co-organizer, University of Virginia Topology Seminar. Fall 2023 - Present.

Coordinator, Math 2310 (Calculus III). Spring 2024.

Chair, Geometry/Topology RTG Postdoc Search Committee. Fall 2023 - Spring 2024.

Lower Division Committee. Fall 2023 - Spring 2024.

Co-organizer, University of Oregon Topology Seminar. Winter 2023 - Spring 2023.

K-12 Education & Outreach Committee, Math Department, Cornell University. Fall 2021 - Spring 2022.

Co-organizer, Cornell Topology and Geometric Group Theory Seminar. Fall 2021.

Advanced Placement Exams Committee, Math Department, Cornell University. Fall 2019 - Spring 2021.

Co-organizer, Notre Dame Graduate Student Topology Seminar. Fall 2016 - Spring 2019.

Topics included functor calculus (Spring 2019), geometric group theory (Fall 2018), topological field theories (Spring 2018), operads and delooping machinery (Fall 2017), equivariant stable homotopy theory (Spring 2017), and rational homotopy theory (Fall 2016).

## Outreach

Instructor, Math Circle (for grades 5-7), Charlottesville, VA. August 2023 - Present.

Co-organizer, Starr Hill Pathways visit to UVA Geometry Lab, Charlottesville, VA. November 2023.

Instructor, Math Circle (for grades 10-12), Eugene, OR. March 2023 - June 2023.

Volunteer, Eugene Math Festival, Eugene, OR. February 2023.

Advisor and Faculty Organizer, Math Explorer's Club, Cornell University. Fall 2019 - Spring 2022.

Instructor, Little Circle (Ithaca Math Circle for grades K-3). Spring 2021 - Spring 2022.

Volunteer, Robinson Community Learning Center, South Bend, IN. Spring 2017 - Spring 2019.

Volunteer and Instructor, Riverbend Community Math Center, South Bend, IN. Summer 2014 - Summer 2016.

Assistant Manager, Illinois Geometry Lab, University of Illinois at Urbana-Champaign. Spring 2014.