

# Dominic Leon Culver

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## Employment

*Postdoctoral Fellow*, Max-Planck-Institut für Mathematik, August 2020 - present

*J.L. Doob postdoctoral fellow*, UIUC, August 2017-August 2020

## Research Interests

Stable homotopy theory, topological modular forms, chromatic homotopy theory, motivic homotopy theory

## Education

Ph.D. in Mathematics  
Advisor: Mark Behrens  
University of Notre Dame  
Received: August, 2017

B.A., Mathematics *summa cum laude*  
University of California, Berkeley  
Received: May, 2012

## Papers, Preprints, & Papers in preparation

PUBLISHED OR ACCEPTED

1. *On the  $E_2$ -term of the  $bo$ -based Adams spectral sequence*, with Agnès Beaudry, Mark Behrens, Prasit Bhattacharya, and Zhouli Xu, To appear in the Journal of Topology, available at [arXiv:1702.00230](https://arxiv.org/abs/1702.00230).

2. *BP* $\langle 2 \rangle$ -cooperations at odd primes, accepted, To appear in the Journal of Pure and Applied Algebra, available at [arXiv:1809.06898](https://arxiv.org/abs/1809.06898)
3. *The BP* $\langle 2 \rangle$ -cooperations, Algebraic & Geometric Topology 19 (2019) 807-862, available at [arXiv:1708.03001](https://arxiv.org/abs/1708.03001)
4. *A new basis for the complex K-theory cooperations algebra*, Topology and its applications, 234 (2017) 7-25.

#### PREPRINTS & IN PREPARATION

5. *On the  $tmf$ -resolution of  $Z$* , with Agnès Beaudry, Mark Behrens, Prasit Bhattacharya, and Zhouli Xu, submitted, available at [arXiv:1909.13379](https://arxiv.org/abs/1909.13379)
6. *The Adams spectral sequence for 3-local  $tmf$* , submitted, available at [arXiv:1902.04230](https://arxiv.org/abs/1902.04230)
7. *Complex motivic  $kq$ -resolutions*, with J.D. Quigley, submitted, available at [arXiv: 1905.11952](https://arxiv.org/abs/1905.11952)
8. *On the  $K(1)$ -local homotopy of  $tmf \wedge tmf$* , with Paul VanKoughnett, submitted, available at [arXiv:1908.01904](https://arxiv.org/abs/1908.01904)
9. *Algebraic Slice Spectral Sequences*, with Hana Kong and J.D. Quigley. Submitted. Available at [arXiv:2007.08682](https://arxiv.org/abs/2007.08682)
10. *The topological Hochschild homology of  $BP\langle 2 \rangle$  I: the case of  $\ell$  coefficients*, with Gabe Angelini-Knoll and Eva Honig, in preparation.
11. *Gross-Hopkins Duality at height 3 and the prime 5*, with Ningchuan Zhang, in preparation
12. *Geisser Rigidity for motivic Brown-Peterson spectra*, in preparation
13. *The motivic  $\Lambda$ -algebra*, with William Balderrama and J.D. Quigley, in preparation

## Teaching Experience

\*= course rated excellent by students

Math 595\* (advanced topics: Chromatic homotopy theory), instructor, UIUC (Spring 2020)

Math 417 (abstract linear algebra), instructor, UIUC (Fall 2019)

Math 526 (second semester algebraic topology), instructor, UIUC (Fall 2019)

Math 527 (Homotopy theory), Instructor, UIUC (Spring 2019)

Math 402 (non-Euclidean geometry), Instructor, UIUC (Spring 2018\*, Spring 2019)  
Math 347 (intro to proofs), Instructor, UIUC (Fall 2017, Fall 2018\*)  
Calculus 2 Instructor, University of Notre Dame (Spring 2015)  
Calculus 1, 2, and 3 TA while at the University of Notre Dame

## Invited Talks

*Algebraic slice spectral sequences*

Motivic Geometry Conference, at the CAS in Oslo, September 2020

*Complex motivic  $kq$ -resolutions*

Midwest Topology Seminar, April 2020

*Periodic Patterns in Stable Homotopy Groups*

Young Faculty Speaker at the Graduate Student Topology & Geometry conference, April 2020 (*Postponed due to COVID-19*)

Topology Seminar, University of Rochester, April 2020 (*Postponed due to COVID-19*)

Topology Seminar, University of Chicago, March 2020 (*Postponed due to COVID-19*)

Topology Seminar, Ohio State University, March 2020 (*Postponed due to COVID-19*)

*On complex motivic  $kq$ -resolutions*

AMS special session on motivic methods at the University of Virginia, March 2020 (*Cancelled due to COVID-19*)

*Towards the Topological Hochschild Homology of  $BP\langle 2 \rangle$ ,*

JMM special session, Denver, Colorado, January 2020

Topology Seminar, University of Notre Dame, November 2019

Topology Seminar, Northwestern University, October 2019

*Complex motivic  $kq$ -resolutions,*

AMS special session in Madison Wisconsin, September 2019

Topology Seminar, University of Virginia, March 2019

Topology Seminar, MSU, November 2018

eCHT seminar<sup>1</sup>, April 2018

Topology Seminar, UIUC, September 2017

Topology Seminar, Wayne State University, January 2017

Topology Seminar, University of Chicago, November 2016

Topology Seminar Northwestern University, November 2016

Topology Seminar University of Rochester, November 2016

## Grants, honors & awards

US Junior Oberwolfach Fellowship, 2019

Richard Sady Prize, University of Notre Dame, 2013

McCarthy Science Fellowship, University of Notre Dame, 2013

Dorothea Klumpke Roberts Prize in Mathematics, UC Berkeley, 2012

Highest Honors, undergraduate, UC Berkeley, 2012

## Refereeing

Advances in Mathematics

Homotopy, Homology, and its Applications

## Mentoring

Advised reading courses: Alexei Grinberg (Serre's *Linear Representations of Finite Groups*), Steven Zhang (Topological K-theory and its applications)

Undergraduate Research Projects advised:

- *Decomposition Theorems for Spectra*, with Yichen Ding, Xiaomin Lin, and Chengyi Liu.

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<sup>1</sup>electronic Computational Homotopy Theory seminar

- *Finding Weierstrass equations for elliptic curves*
- *Finite subalgebras of the Steenrod algebra and their modules*

## Conferences & Workshops

Mathematics Research Communities: Geometric Representation Theory and Equivariant Elliptic Cohomology Theory (June 2019)  
 Elliptic Cohomology after Lurie, Oberwolfach Arbeitsgemeinschaft (April 2019)  
 Homotopy Theory Summer Berlin (June 2018)  
 Midwest summer school on trace methods in algebraic K-theory, UIC (August 2017)  
 European Talbot workshop (June 2017)  
 Talbot Workshop (May 2017)  
 West Coast Algebraic Topology Summer School, University of Oregon (July 2016)  
 West Coast Algebraic Topology Summer School, University of Oregon (August 2015)  
 Young Topologist Meeting 2015, EPFL (July 2015)  
 West Coast Algebraic Topology Summer School, UBC, Canada (July 2014)  
 Introductory Workshop: Algebraic Topology, MSRI (January 2014)  
 Field theories, conformal nets and Kac-Moody groups, WWU Münster, Germany (October 2013)  
 GAP XI: Higher Geometry and Quantum Field Theory, University of Pittsburgh (August 2013)  
 11th Annual Graduate Student Topology & Geometry Conference, University of Notre Dame (March 2013)

## Service

Organizer of the UIUC Topology seminar (Spring 2018-Spring 2020)  
 Co-Organizer of JMM special session on geometric representation theory and equivariant elliptic cohomology (January 2020)  
 Co-organizer of Midwest Topology seminar at UIUC (Winter 2019)  
 Founding member of GLASSND (Graduate student LGBTQ and Ally Student Society at Notre Dame) (2014-2015)  
 Co-organizer of graduate student topology seminar at Notre Dame (Fall 2014-Fall 2015)  
 Organizer of the Graduate Student Seminar at Notre Dame (Fall 2013-Spring 2014)  
 Organizer of "Homotopy theory problem seminar" (Summer 2013)

## Languages

1. English: Native speaker
2. German: A2 level proficiency

## References

Mark Behrens (Adviser), University of Notre Dame, [mbehren1@nd.edu](mailto:mbehren1@nd.edu)

Paul Goerss, Northwestern University, [pgoerss@math.northwestern.edu](mailto:pgoerss@math.northwestern.edu)

Dan Isaksen, Wayne State University, [isaksen@wayne.edu](mailto:isaksen@wayne.edu)

Vesna Stojanoska, University of Illinois, Urbana-Champaign [vesna@illinois.edu](mailto:vesna@illinois.edu)

Randy McCarthy (Teaching), University of Illinois, Urbana-Champaign, [rmccrthy@illinois.edu](mailto:rmccrthy@illinois.edu)