

Maxine Elena Calle

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Citizenship: U.S.A.

EMPLOYMENT AND EDUCATION

Brown University

Tamarkin Assistant Professor

NSF Postdoctoral Research Fellow

– Postdoc mentor: Thomas Goodwillie

Providence, RI

2027–2031

University of Bonn

Hausdorff Center for Mathematics postdoctoral scholar

– Postdoc mentor: Stefan Schwede

Bonn, Germany

2026–2027

University of Pennsylvania

Ph.D. in Mathematics

NSF Graduate Research Fellow

– Thesis advisor: Mona Merling

– Thesis title: “Algebraic K -theory of orbispaces”

M.A. in Mathematics

– Thesis advisor: Jonathan Block

– Thesis title: “An Introduction to Symplectic Geometry for Lagrangian Floer Homology”

Philadelphia, PA

2026

Reed College

B.A. in Mathematics, concentration in Philosophy

Phi Beta Kappa

– Thesis advisor: Kyle Ormsby

– Thesis title: “Morse Theory and Flow Categories”

Portland, OR

2020

RESEARCH INTERESTS

Algebraic topology, homotopy theory, and category theory, with a focus on higher algebraic K -theory, equivariant and stable homotopy theory, and applications to manifolds.

PAPERS AND PUBLICATIONS

Research publications

- *Segal K -theory factors through Waldhausen categories*. Joint with D. Chan. 2025. 14 pages. Available at arXiv:2506.13732. *To appear in Proceedings of the American Mathematical Society*.
- *A linearization map for genuine equivariant algebraic K -theory*. Joint with D. Chan and A. Mejia. 2023. 50 pages. Available at arXiv:2309.08025. *To appear in Algebraic & Geometric Topology*.
- *Squares K -theory and 2-Segal spaces*. Joint with M. Sarazola. *Annals of K-Theory* Vol. 11, No. 2 (2026), pp 261–308.
- *A genuine G -spectrum for the cut-and-paste K -theory of G -manifolds*. Joint with D. Chan. 2026. 15 pages. *Bulletin of the London Mathematical Society*, Vol. 58, No. 4: e70352. 16 pages.
- *Equivariant Trees and Partition Complexes*. Joint with J.E. Bergner, P. Bonventre, D. Chan, and M. Sarazola. 2026. *Theory and Applications of Categories*: Vol. 45, 2026, No. 15, pp 501–536.
- *The spectrum of the Burnside Tambara functor*. Joint with D. Chan, D. Mehrle, J.D. Quigley, B. Spitz, and D. Van Niel. 2026. *International Mathematics Research Notices*: Vol. 2026, Iss. 2, rnaf388. 26 pages.
- *Nested cobordisms, Cyl-objects and Temperley-Lieb algebras*. Joint with R.S. Hoekzema, L. Murray, N. Pacheco-Tallaj, C. Rovi, and S. Sridhar-Shapiro. 2025. *Topology and its Applications*: Vol. 376, 109448. 36 pages.

- *A combinatorial K-theory perspective on the edge reconstruction conjecture in graph theory.* Joint with J. J. Gould. 2025. *Homology, Homotopy, and Applications*: Vol. 27(1), pp.293–322.
- *The Spectrum of the Burnside Tambara Functor of a Cyclic Group.* Joint with S. Ginnett. 2023. *Journal of Pure and Applied Algebra*: Vol. 227, Iss. 8, 107344. 23 pages.
- *The Tambara Structure of the Trace Ideal on Cyclic Groups.* Joint with S. Ginnett, with an appendix by H. Chen and X. Chen. 2020. *Journal of Algebra*: Vol. 560, pp.114–143.
- *Sharp Sectional Curvature Bounds and a New Proof of the Spectral Theorem.* Joint with C. Dunn. 2020. *Involve, a Journal of Mathematics*: Vol. 13, No. 3, pp.445–454.
- *k-Plane Constant Curvature Conditions.* 2019. *Rose-Hulman Undergraduate Mathematics Journal*: Vol. 20, Iss. 2, Article 6. 20 pages.

Preprints

- *On the classifying space of a Morse flow category.* Joint with F. Liu. 2026. 32 pages. Available at arXiv:2603.23695.
- *A comparison of definitions of equivariant trees.* Joint with J.E. Bergner, D. Chan, A. Osorno, and M. Sarazola. 2025. 31 pages. Available at arXiv:2512.14956. *Submitted.*
- *Equivariant algebraic K-theory for symmetric monoidal Mackey functors.* Joint with D. Chan and M. Péroux. 2023. 32 pages. Available at arXiv:2312.04705. *Submitted.*

Other publications

- *Looking into Mirror Symmetry at the 2024 JMM.* In *Feature Stories of the American Mathematical Society*, February 2024.
- *Bringing Math into The Conversation: My Summer as a Mass Media Fellow.* In *Notices of the American Mathematical Society*, February 2024, pp.274–275.
- *A brief illustrated guide to ‘scissors congruence’ – an ancient geometric idea that’s still fueling cutting-edge mathematical research.* Co-authored with M. Merling. 2023. *The Conversation U.S.*
- *Proving Fermat’s last theorem: 2 mathematicians explain how building bridges within the discipline helped solve a centuries-old mystery.* Co-authored with D. Bressoud. 2023. *The Conversation U.S.*

FELLOWSHIPS, GRANTS, AND AWARDS

Academic and research

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| • Mathematical Sciences Postdoctoral Research Fellowship
<i>National Science Foundation</i>
Award deferred (1 year) for a postdoctoral appointment at the University of Bonn | 2026 |
| • AIM SQuaREs grant for “Algebras over genuine equivariant operads”
<i>American Institute of Mathematics</i> | 2025 |
| • AIM SQuaREs grant for “An algebraic approach to Thom spectra”
<i>American Institute of Mathematics</i> | 2025 |
| • AIM SQuaREs grant for “Two-dimensional nested cobordisms and TQFTs with substructure”
<i>American Institute of Mathematics</i> | 2024 |
| • Herbert S. Wilf Memorial Award for excellence in research and communication
<i>University of Pennsylvania, Mathematics Department</i> | 2023-2024 |
| • Dean’s Scholar
<i>University of Pennsylvania, School of Arts & Sciences</i> | 2023 |
| • Graduate Research Fellowship
<i>National Science Foundation</i> | 2020–2025 |
| • Calabi Scholar
<i>University of Pennsylvania, Mathematics Department</i> | 2020–2025 |
| • Benjamin Franklin & Fontaine Fellowship
<i>University of Pennsylvania</i> | 2020–2025 |
| • Phi Beta Kappa
<i>Reed College</i> | 2020 |
| • Commendation for Academic Achievement
<i>Reed College</i> | 2016-2020 |

Teaching and pedagogy

- Prison Teaching Initiative Graduate Fellow 2024-2025
Prison Teaching Initiative at Princeton University
- CETLI Teaching Certificate 2024
Center for Teaching and Learning at the University of Pennsylvania
- Master TA 2023-2026
University of Pennsylvania, Mathematics Department
- Inclusive & Equitable Teaching Fellow 2023-2024
Center for Teaching and Learning at the University of Pennsylvania
- Good Teaching Award, Math 3700 Fall 2022
University of Pennsylvania, Mathematics Department

Service, communication, and outreach

- Postdoctoral/Advanced Graduate Ambassadorship 2023-2024
Lisa Simonyi and the Women and Mathematics Program at the Institute for Advanced Study
- Mass Media Fellow 2023
*American Association for the Advancement of Science
Sponsored by the American Mathematical Society and hosted by The Conversation U.S.*
- Penn Graduate Community-Engagement Research Fellow Summers 2021 and 2022
The Netter Center at the University of Pennsylvania
- Elevating Mathematics competition, honorable mention (joint with L. Williams) 2020
National Academies of Sciences, Engineering, and Medicine
- MAA MathFest Outstanding Presentation Award 2019
Joint Mathematics Meetings

TEACHING EXPERIENCE

The University of Pennsylvania

Philadelphia, PA

Instructor

Math 3120: Linear algebra Summer 2025

Teaching Assistant

Math 3700: Algebra Spring 2026

Math 2600: Honors Calculus II Spring 2023

Math 3700: Algebra Fall 2022

Grader

Math 6180: Algebraic Topology I Fall 2025

Workshop Facilitator

Trauma-Informed Pedagogy Spring 2025

Inclusive & Equitable Teaching in Mathematics (mini-course) Fall 2023

Mathematics Department TA Training Falls 2023–2025

School of Arts & Sciences Graduate TA Training: Inclusive & Equitable Teaching at Penn Fall 2023

Reed College

Portland, OR

Individual Tutor and Drop-in Tutor at the Math Help Center

Spring 2017–Spring 2020

Math 111: Calculus, Math 112: Introduction to Analysis, Math 113: Discrete Structures,

Math 201: Linear Algebra, Math 202: Vector Calculus, Math 311: Complex Analysis,

Math 321: Real Analysis, and Math 332: Abstract Algebra

Course Assistant

Fall 2018–Spring 2020

Math 202: Vector Calculus

Prison teaching

Co-instructor at State Correctional Institution Chester

Chester, PA

Mathematics in the Courtroom

Spring 2026

Co-instructor at South Woods State Prison

Bridgeton, NJ

Math-015: Beginning Mathematics

Fall 2024

Math-015: Beginning Mathematics

Spring 2022

Co-instructor at Garden State Youth Correctional Facility

Crosswicks, NJ

Math-015: Beginning Mathematics

Fall 2021

Mathematics Tutor at South Woods State Prison
Math-010: Number Systems, Math-015: Beginning Mathematics,
Math-020: Elementary Algebra
Course Development team leader
Math-015: Beginning Mathematics

Bridgeton, NJ
2023–2025

Summer 2024

OTHER EXPERIENCE AND SERVICE

Seminar and conference organization

- **Talbot Workshop** 2023–2026
 - Talbot 2026: Topological holography
co-organizer with A. Karapetyan, C. Li, and S. Xue
 - Talbot 2025: Homological stability,
co-organizer with A. Karapetyan and E. Sukarto
 - Talbot 2024: Topological cyclic homology of ring spectra,
co-organizer with A. Holeman, A. Karapetyan, L. Keenan, and E. Sukarto
 - Talbot 2023: Computations in stable motivic homotopy theory,
co-organizer with A. Holeman, L. Keenan, E. Sukarto, and L. Yang
- **Atlantic Meeting on Topology, Representation theory, and K -theory (AMTRaK),** 2024–2025
co-organizer with A. Chedalavada and B. Spitz
 - Homological stability, at the University of Pennsylvania March–April 2025
 - Hermitian K -theory, at the University of Virginia February 2025
 - Dualizable categories and continuous K -theory, at Johns Hopkins University November 2024
 - Equivariant and parametrized homotopy theory, at the University of Pennsylvania September 2024
- **Gender Minorities in Topology and Related Areas Konfernce (GeMTRAK)** April 2024
at the University of Pennsylvania, *co-organizer with M. Ong and H. Stufflebeam*
- **Graduate Geometry/Topology Seminar** at the University of Pennsylvania, 2022–2023
co-organizer with A. Mejia
- **Graduate Pizza Seminar** at the University of Pennsylvania, *co-organizer with K. Canzius* 2021–2022
- **UP GRADe** workshop at the University of Pennsylvania, *co-organizer with* October 2021
A. Gibney, J. Hartmann, M. Merling, M. Ong, and E. Urheim

Community building and mentorship

- **Directed Reading Program** at the University of Pennsylvania, *co-organizer with*
L. Ferreira Guilhoto (Fall 2023–Spring 2025) and mentor for the following projects:
 - Shotaro Hiranuma, *Continuing in category theory* Spring 2025
Category theory and logic Fall 2024
 - Talia Becker Calazans, *Combinatorial topology* Fall 2023
 - Elena Isasi Theus, *Algebraic topology and the mathematical basis of topological data analysis* Spring 2023
Fundamentals of computational applied topology Fall 2022
 - Cianán Conefrey-Shinozaki, *2D topological quantum field theories* Spring 2022
 - Michael Zeng, *Simplicial homotopy theory* Fall 2021
- **Prison Education Program** at Eastern University, *volunteer* Spring 2024
- **Prison Teaching Initiative** at Princeton University, *volunteer* 2021–2025
- **GeMs in Math** group at the University of Pennsylvania, *co-coordinator* 2021–2025
- **STEMGeMs** at Reed College, *co-leader and department liaison* 2019–2020
- **Peer Mentor Program** at Reed College, *mentor* 2017–2018

Science communication, outreach, and other service

- **Penn Grad Talks** at Penn Arts & Sciences Spring 2026
Natural Sciences finalist

- **Math Circles** at West Philadelphia High School
Volunteer Spring 2024
- **The Conversation U.S.**
Freelancer (Fall 2023) and AMS-AAAS 2023 Mass Media Fellow (Summer 2023) 2023
- **Math Circles in West Philadelphia** project at the University of Pennsylvania
Graduate fellow, joint project with M. Ong, mentored by M. Merling and Y. Ou Summer 2022
Philadelphia, PA
- **Mathematics Enrichment and Academically-Based Community Service** project
at the University of Pennsylvania
Graduate fellow mentored by M. Merling Summer 2021
Philadelphia, PA
- **Referee and reviewer**
PUMP Journal of Undergraduate Research, MathSciNet

SELECTED RESEARCH WORKSHOPS

- **AIM Workshop** at American Institute of Mathematics
Invited participant in “Scissors congruences, algebraic K -theory and Steinberg modules” July 2024
Caltech, CA
- **Women in Topology IV** at the Hausdorff Institute
Team member for research project on cobordism categories August 2023
Bonn (Germany)
- **RTG Collaborative Workshop in Homotopy Theory**
Team member for research project on equivariant homotopy theory August 2022
Lexington, VA
- **Collaborative Mathematics Research Group** at Reed College
Participant in undergraduate research program on algebraic topology Summer 2019
Portland, OR
- **NSF REU** program at California State University, San Bernardino
Participant in undergraduate research program on differential geometry Summer 2018
San Bernardino, CA

SELECTED TALKS AND PRESENTATIONS

Research conference talks

- AMS 2025 Fall Eastern Sectional Meeting, Special Session: Homotopy theory
Segal K -theory factors through Waldhausen categories St. Louis, MO
October 2025
- CMO Workshop: Equivariant Topological Quantum Field Theory
Cut-and-paste K -theory of manifolds and cobordism Oaxaca, Mexico
September 2025
- Mathematical Congress of the Americas, Special Session: Interactions of
equivariant bordism and low dimensional topology Miami, FL
July 2025
Towards algebraic K -theory of orbifolds
- Joint Mathematics Meetings, Special Session: Homotopical combinatorics
The Edge Reconstruction Conjecture and Combinatorial K -theory Seattle, WA
January 2025
- Binghamton University Graduate Combinatorics, Algebra, and Topology Conference (BUGCAT)
The Edge Reconstruction Conjecture and Combinatorial K -theory Binghamton, NY
October 2024
- AMS 2024 Fall Eastern Sectional Meeting, Special Session: Homotopy theory and K -theory
Squares K -theory and 2-Segal spaces Albany, NY
October 2024
- Graduate Student Conference in Algebra, Geometry, and Topology
Equivariant Trees and Partition Complexes Philadelphia, PA
June 2024
- Joint Mathematics Meetings, Special Session: Equivariant techniques in stable homotopy theory
A linearization map for equivariant A -theory San Francisco, CA
January 2024
- Joint Mathematics Meetings, Special Session: Topics in equivariant algebra
Ideals in the Burnside Tambara functor on a cyclic group San Francisco, CA
January 2024
- Binghamton University Graduate Combinatorics, Algebra, and Topology Conference (BUGCAT)
Equivariant Partition Complexes and Trees Binghamton, NY
November 2022
- Nebraska Conference for Undergraduate Women in Mathematics
The Tambara Structure of the Trace Ideal Lincoln, NE
January 2020
- Undergraduate Mathematics Symposium
Putting the ‘ k ’ in Curvature: k -Plane Constant Curvature Conditions Chicago, IL
November 2018

Invited seminar talks

Texas State Topology Seminar <i>Classifying spaces and Morse flow categories</i>	San Marcos, TX May 2026
University of New Mexico Geometry & Topology Seminar <i>Towards algebraic K-theory of orbifolds</i>	Las Cruces, NM March 2026
University of Pennsylvania Geometry & Topology Seminar <i>Nested cobordisms and TQFTs</i>	Philadelphia, PA February 2026
University of Copenhagen Algebra and Topology Seminar <i>Towards algebraic K-theory of orbifolds</i>	Online February 2026
Topological Quantum Field Theory Club Seminar <i>Nested cobordisms and TQFTs</i>	Online January 2026
University of Indiana Bloomington Topology Seminar <i>Cut-and-paste K-theory of manifolds and SK-automorphisms</i>	Bloomington, IN December 2025
Universität Bonn Topology Seminar <i>Towards algebraic K-theory of orbifolds</i>	Bonn, Germany November 2025
Brown University Topology Seminar <i>Cut-and-paste K-theory of manifolds and SK-automorphisms</i>	Providence, RI November 2025
PIMS Collaborative Research Group "Diagram Categories in Homotopy Theory" Seminar <i>Cut-and-paste K-theory of manifolds and SK-automorphisms</i>	Online October 2025
University of Pennsylvania Geometry & Topology Seminar <i>Towards algebraic K-theory of orbifolds</i>	Philadelphia, PA February 2025
University of Chicago Topology Seminar <i>Towards A-theory of orbifolds</i>	Chicago, IL January 2025
Northwestern University Topology Seminar <i>Towards A-theory of orbifolds</i>	Evanston, IL January 2025
University of Virginia Topology Seminar <i>Towards A-theory of orbifolds</i>	Charlottesville, VA November 2024
Johns Hopkins University Topology Seminar <i>Towards A-theory of orbifolds</i>	Baltimore, MD October 2024
Texas State Topology Seminar <i>A linearization map for equivariant A-theory</i>	San Marcos, TX March 2024
University of Indiana Bloomington Topology Seminar <i>Nested Cobordisms and TQFTs</i>	Bloomington, IN March 2024
University of Minnesota Topology Seminar <i>All connective G-spectra come from K-theory</i>	January 2024 Minnesota, MN
Loyola University TACO Seminar <i>Equivariant Partition Complexes and Trees</i>	Chicago, IL November 2023
Michigan State University RTG Seminar <i>Nested Cobordisms and TQFTs</i>	East Lansing, MI November 2023
SUNY Binghamton Geometry and Topology Seminar <i>Nested Cobordisms and TQFTs</i>	Binghamton, NY September 2023
UCLA Algebraic Topology Seminar <i>Equivariant Partition Complexes and Trees</i>	Los Angeles, CA May 2023
UCSD Topology Seminar <i>Equivariant Partition Complexes and Trees</i>	San Diego, CA May 2023
Purdue University Topology Seminar <i>Equivariant Partition Complexes and Trees</i>	Lafayette, IN April 2023
University of Rochester Topology Seminar <i>Equivariant Partition Complexes and Trees</i>	Rochester, NY April 2023
University of Virginia Topology Seminar <i>Equivariant Partition Complexes and Trees</i>	Charlottesville, VA February 2023

Invited expository talks

Penn Arts & Sciences Penn Grad Talks <i>What is math good for, anyways?</i> (short talk)	Philadelphia, PA March 2026
Moduli spaces of pseudo-holomorphic curves workshop <i>Orbispaces as stacks: geometry and examples</i>	Otego, NY May 2025
SLMath Hot Topics Workshop: Life after the Telescope Conjecture <i>Cyclotomic spectra</i>	Berkeley, CA December 2024
Talbot 2024: Topological cyclic homology of ring spectra <i>THH as a cyclotomic spectrum</i>	Nacogdoches, TX August 2024
Scissors congruences, algebraic K-theory and Steinberg modules AIM Workshop <i>The scissors congruence K-theory of polytopes is a Thom spectrum</i>	Pasadena, CA July 2024
Spaces of Manifolds: Algebraic and Geometric Approaches BIRS seminar <i>The stable parametrized h-cobordism theorem: the K-theory part</i>	Online October 2023
Scissors Congruence, Algebraic K-Theory, and Trace Methods summer school <i>Cut-and-paste K-theory of manifolds and square K-theory</i>	Bloomington, IN June 2023
Talbot 2022: Scissors congruence and algebraic K-theory <i>Square K-theory and Manifold Invariants</i>	New Lebanon, NY June 2022

Talks for undergraduates

Reed College Mathematics Colloquium <i>The Edge Reconstruction Conjecture and Combinatorial K-theory</i>	Portland, OR October 2024
Providence College Mathematics Colloquium <i>The Edge Reconstruction Conjecture and Combinatorial K-theory</i>	Providence, RI September 2024
Temple University Math Club <i>Scissors Congruence: how to cut up shapes and get away with it</i>	Philadelphia, PA March 2024
Penn Undergraduate Mathematics Society (PUMS) speaker series <i>Social choice problems and algebraic topology</i> (short talk) <i>Configurations in the plane</i> (short talk) <i>Scissors Congruence: how to cut up shapes and get away with it</i>	Philadelphia, PA April 2024 November 2023 December 2022