

Christopher Schommer-Pries

University of Notre Dame,
Department of Mathematics
255 Hurley, Notre Dame, IN 46556
✉ cschomme@nd.edu

Employment

- 2016-present **University of Notre Dame, Notre Dame, IN**, Assistant Professor.
2012–2016 **Max Planck Institute for Mathematics, Bonn, Germany**, Advanced Researcher.
2010–2012 **Massachusetts Institute of Technology, Cambridge, MA**, CLE Moore Instructor and NSF Postdoctoral Fellow.
2009–2010 **Harvard University, Cambridge, MA**, NSF Postdoctoral Fellow.
Summer 2009 **Max Planck Institute for Mathematics, Bonn, Germany**, Postdoctoral Fellow.

Education

- 2003–2009 **Ph. D. in Mathematics, University of California, Berkeley, CA.**
Advisor: Peter Teichner
Thesis: "The classification of Two-Dimensional Extended Topological Field Theories"
1999–2003 **B.S. in Mathematics, Harvey Mudd College, Claremont, CA.**
Advisor: Weiqing Gu
Thesis: "Cayley Manifolds in the Calabi-Yau 4-Torus"

Grants

- current **Principal investigator, NSF Division of Mathematical Sciences (Topology), Topological Quantum Field Theory, \$251,691.00.**
Aug 2022-July 2025
Principal investigator, AMS-Simons Travel Grant, \$4,400.00.
June 2012- June 2015
Principal investigator, NSF Division of Mathematical Sciences, Postdoctoral Research Fellowship, \$135,000.00.
Sep 2009- Aug 2013

Awards and Honors

- 2009 Herb Alexander Prize for outstanding doctoral dissertation

Publications (reverse-chronological)

Note on collaboration. For jointly authored papers, names are presented in alphabetical order, following the convention in mathematics. On all such papers, all co-authors have contributed equally to the paper.

Legend:

- (*) undergraduate at the time of research
- (@) graduate student at the time of research
- (+) postdoctoral appointee at the time of research

- 1 **On the Unicity of the Homotopy Theory of Higher Categories**, *Journal of the AMS*, 34 (2021), no. 4, 1011–1058., (with C. Barwick).
arXiv:1112.0040 (47 pages)
- 2 **Singular cohomology from supersymmetric field theories**, *Advances in Mathematics*, 390 (2021), Paper No. 107944, (with Nathaniel Stapleton).
arXiv:1403.1303 (54 pages)
- 3 **Dualizable Tensor Categories**, *Memoirs of the AMS*, 268 (2020), no. 1308, (with C. Douglas and N. Snyder).
arXiv:1312.7188 (95 pages)
- 4 **The balanced tensor product of module categories**, *Kyoto Journal of Mathematics*, Volume 59, Number 1 (2019), 167-179. (with C. Douglas and N. Snyder).
arXiv:1406.4204 (19 pages)
- 5 **Tori Detect Invertibility of Topological Field Theories**, *Geometry and Topology*, 22 (2018) 2713-2756, 2018.
arXiv:1511.01772 (43 pages)
- 6 **Dualizability in Low-Dimensional Higher Category Theory**, *Topology and Field Theories, Contemp. Math.*, vol. 613, Amer. Math. Soc., Providence, RI, 2014.
arXiv:1308.3574 (65 pages)
- 7 **Central extensions of smooth 2-groups and a finite dimensional string 2-group**, *Geometry and Topology*, 15 (2):609-676, 2011.
arXiv:0911.2483 (66 pages)
- 9 **Examples of Cayley 4-Manifolds**, *Houston Journal of Mathematics*, 30 (1) : 55-87, 2004, (With W. Gu).
(32 pages)

Unrefereed Papers

- 8 **The Classification of Two-Dimensional Extended Topological Field Theories**, *Ph. D. Dissertation, University of California, Berkeley, 2009*.
arXiv:1112.1000 (317 pages)

Papers Submitted

- 11 **Invertible Topological Field Theories**, Submitted to *Journal of Topology* June 2019. Under revision..
arXiv:1712.08029 (78 pages)

Preprints (reverse-chronological)

- 10 **Semisimple Field Theories Detect Stable Diffeomorphism**, (with David Reutter).
arXiv:2206.10031 (61 pages)
- 12 **Modular categories as representations of the 3-dimensional bordism 2-category**, (with B. Bartlett, C. Douglas, and J. Vicary).
arXiv:1509.06811 (71 pages)
- 13 **Extended 3-dimensional bordism as the theory of modular objects**, (with B. Bartlett, C. Douglas, and J. Vicary).
arXiv:1411.0945 (64 pages)

Journal Rankings

Note on impact factors and citations: In assessing the quality of research, mathematicians tend not to place emphasis on journal impact factors and citation counts. A statement from the American Mathematical Society discussing the reasons for this can be found at <https://www.ams.org/profession/leaders/culture/CultureStatement09.pdf>.

The SCImago Journal Rank (SJR indicator) is a measure of scientific influence of scholarly journals that accounts for both the number of citations received by a journal and the prestige of the journals from where those citations come. Here are the 2021 percentile scores (among mathematics journals) of the journals in which my papers have appeared/been submitted.¹

Journal	Papers	Percentile
Journal of the AMS	1	99.5%
Memoirs of the AMS	1	97%
Geometry and Topology	2	97%
Journal of Topology	1 submitted, under revision	94%
Advances in Mathematics	1	94%
Kyoto Journal of Mathematics	1	75%
Contemporary Mathematics	1	26%
Houston Journal of Mathematics	1	22%

Papers in Preparation (ordered by proximity to completion)

Higher Categories via higher A_∞ -operads, (with Nate Bottman and Viktoriya Ozornova).

The Relative Tangle Hypothesis.

A finite presentation of the 3-dimensional bordism bicategory, (with B. Bartlett, C. Douglas, and J. Vicary).

Dualizable tensor categories II: Homotopy $SO(3)$ -actions, (with C. Douglas, and N. Snyder).

Twisted cohomology via twisted field theories, (with S. Stolz and P. Teichner).

On Waldhausen's Splitting of A-theory.

¹Retrieved from <http://www.scimagojr.com> Aug 22, 2022.

Coherence for symmetric monoidal bicategories.

Extensions of Symmetric Monoidal Bicategories, (with B. Bartlett, C. Douglas, and J. Vicary).

Supervision of Students and Postdocs

Masters Students Supervised (at Bonn).

Piotr Pstrągowski, On Dualizable Objects in Monoidal Bicategories and the Cobordism Hypothesis, 2014. Went to graduate school in Mathematics at Northwestern University.

Ph. D. Students Supervised (at Notre Dame).

Tim Champion, Free Duals and A New Universal Property for Stable Equivariant Homotopy Theory, Ph. D. 2021. Current Position: Postdoctoral Fellow, Johns Hopkins University.

Traci Warner, in progress (estimated Ph. D. 2024)

Lorenzo Riva, in progress (estimated Ph. D. 2025) (co-advising with Stephan Stolz)

Katherine Novey, in progress (estimated Ph. D. 2026) (co-advising with Stephan Stolz)

Cory Gillette, in progress (estimated Ph. D. 2026)

Postdoctoral Researchers Supervised.

Rune Haugseng, 2013-2015

Tobias Barthel, 2014-2016

Drew Heard, 2014-2016

Claudia Scheimbauer, 2015-2016

Teaching Experience

Teaching Experience (at Notre Dame).

Math 10350, Calculus A (for the life and social sciences), Fall 2016, 2017

Math 10450, Glynn Honors Mathematics Seminar I, (Knots and Surfaces) Fall 2019

Math 10460, Glynn Honors Mathematics Seminar II, (Knots and Surfaces) Spring 2018, Spring 2019, Spring 2022, Spring 2023 (anticipated), (The Math of Voting and Elections) Spring 2021

Math 13187, University First Year Seminar, (Knots and Surfaces) Fall 2019, Fall 2022, (The Math of Voting and Elections) Fall 2020

Math 20550, Calculus III (multi-variable calculus), Fall 2018

Math 40745, Topology Through Inquiry, Spring 2023 (anticipated)

Math 40960, Topics in Topology, Spring 2021 (Topology Through Inquiry)

Math 70330, Intermediate Geometry and Topology, Fall 2018

Math 80440, Topics in topology (Bordism Old and New), Spring 2017

Math 80440, Topics in topology (The H-principle), Spring 2018

Math 80440, Topics in topology (Manifolds, Bordisms, and Topological Field Theories), Spring 2022

3 unit undergraduate directed reading for Anne Weithman Spring 2021 (The Math of Voting and Elections)

Teaching Experience (at Bonn).

Central Lecture of the Graduiertenkolleg 1150, Topics in Homotopy and Cohomology, Summer 2013

Graduate mini-courses, designed and taught.

- 2014 July The Galatius-Madsen-Tilman-Weiss Theorem (3 hours of lectures) International Max-Planck Research School on Moduli Spaces
- 2014 March Structures on tensor categories inspired by local topological field theory (6 hours of course lectures). Erlangen, Germany
- 2013 Jan Dualizability in Low Dimensional Higher Category Theory (6 hours of course lectures). Hamburg, Germany
- 2012 May Thematic Program on Topology and Field Theories, Notre Dame. Dualizability in Low Dimensional Higher Category Theory (4 hours of course lectures)
- 2011 Feb Workshop and School on Higher Gauge Theory, TQFT and Quantum Gravity, Lisbon, Portugal. Two-Dimensional Extended Topological Field Theories (6 hours of course lectures)

Service

Service at Notre Dame.

Topology (RTG/Aov) postdoc search committee, 2016-present

Topology (Aov) faculty search committee, 2016-2020

Graduate Admissions committee, 2017-2021

Undergraduate advisor, 2017-2020

Attended all sessions of "Math Major Mentoring Night", 2017-present

Co-organizer, Topology seminar, 2016-present

Co-organizer, Homotopy Theory Working Seminar, 2017-2018

Currently supervise four graduate students (Traci Warner, Lorenzo Riva, Katherine Novey, Cory Gillette)

Served on the Qualifying Exam Committees for: Tim Champion, Traci Warner, Jacob Landgraf, Taylor Sutton, Sarah Petersen, Bridget Schreiner, Hari Rau-Murthy, Nikolai Konovalov, Connor Malin, Guoqi Yan, Sihao Ma, Lorenzo Riva, Justin Beck, and Annie Holden.

Served on the Ph. D. Thesis Defense Committee for: Jennifer Garbett (2017), Phillip Jedlovec (2018), James D. Quigley (2019), Jens Kjaer (2019), Jeremy Mann (2019), Laura Murray (2020), Jake Landgraf (2021), Tim Champion (2021), Sarah Petersen (2022)

Service at the Max-Planck Institute for Mathematics.

Scientific Committee, 2013-2016

Additional Service.

Served on the Ph. D. Thesis Defense Committee (viva) for: Renee Hoekzema (2018) at Oxford University, UK

Profesional Activities

Outreach.

Co-organizer and mentor in local Math Circles unit (a free weekly after school enrichment program for grade school children. Fall 2019-Spring 2020 (My unit specialized on ages 4-7 years old), and Fall 2022-current (3rd-5th graders).)

Conferences organized.

Mathematics and Quantum Field Theory, Center for Mathematics at Notre Dame, upcoming Summer 2024

Low-dimensional topology and quantum field theory, SwissMAP Research Station, Switzerland. Upcoming May 2023

Tensor categories and topological quantum field theories, Mathematical Sciences Research Institute, Berkeley, CA, March 2020

Introductory Workshop: Higher Categories and Categorification, Mathematical Sciences Research Institute, Berkeley, CA, Feb. 2020

Connections between quantum field theory and topological modular forms, Notre Dame, September 2017

Midwest Topology Seminar, Notre Dame, winter 2017

European Talbot on Topological Field Theory, Scientific mentor (with P. Teichner), Germany, June 2016

Higher Structures, Bonn, Germany, Oct. 2015

West Coast Algebraic Topology Summer School, Pacific Institute for the Mathematical Sciences, Vancouver Canada, 2014

Seminars organized.

2017-2018 Co-organized weekly Notre Dame Homotopy Theory Working Seminar

2016– Co-organized weekly Notre Dame Topology and Geometry Seminar

2014-2015 Co-organized weekly topology seminar at MPIM (with P. Teichner)

2012-2013 Co-organized weekly seminar on higher category theory (with P. Teichner) at MPIM

2011 Summer Co-organized weekly seminar on Quantum Field Theory (with K. Ormsby) at MIT

2004 Fall&Sp Co-organized weekly graduate student seminar Many Cheerful Facts at UC Berkeley

Mathematics Journals, refereed for or advised.

Advances in Mathematics

Algebraic and Geometric Topology

Communications in Contemporary Mathematics

Communications in Mathematical Physics

Crelle

Documenta Mathematica

Duke Mathematical Journal
Geometry and Topology
Inventiones
Journal of the AMS
Journal of the EMS
Journal of Homotopy and Related Structures
Quantum Topology
Transformation Groups

■ Talks at Notre Dame (since ND employment)

- 2020 Sept **Notre Dame, IN**, *Modular functors and TQFTs, part II*, Algebra and Math Physics seminar.
- 2020 Sept **Notre Dame, IN**, *Modular functors and TQFTs*, Algebra and Math Physics seminar.
- 2018 Feb **Notre Dame, IN**, *Invertible Topological Field Theories, part III*, Homotopy Theory Working Seminar.
- 2017 Nov **Notre Dame, IN**, *Invertible Topological Field Theories, part II*, Homotopy Theory Working Seminar.
- Nov **Notre Dame, IN**, *Invertible Topological Field Theories, part I*, Homotopy Theory Working Seminar.
- Aug **Notre Dame, IN**, *2-Dimensional Topological Field Theories and Commutative Frobenius Algebra*, RTG Geometry/Topology summer workshop for undergraduates.
- April **Notre Dame, IN**, *The algebraic K-theory of manifolds via manifolds*, Notre Dame Topology Seminar.
- 2016 Sept. **Notre Dame, IN**, *Tori detect invertible topological Field Theories*, Notre Dame Topology Seminar.

■ Talks at Notre Dame (prior to ND employment)

Plenary Talks.

- 2012 May **Notre Dame University, IN**, *Dualizability in Low-Dimensional Higher Category Theory*, Thematic Program on Topology and Field Theory, 4 lecture mini-course.

Colloquia.

- 2016 Jan. **Notre Dame, IN**, *Topological Field Theories*, Colloquium Talk.

Conference Presentations (Invited).

- 2012 June **Notre Dame University, IN**, *Uniqueness of the Homotopy Theory of Higher Categories*, Thematic Program on Topology and Field Theory.

Seminars and Contributed Talks.

- 2012 March **Notre Dame, IN**, *On the Uniqueness of the Homotopy Theory of Higher Categories*, Notre Dame Topology Seminar.

Plenary Talks

- 2019 July **Park City, UT**, *Invertible Topological Field Theories (2 lectures)*, Quantum Field Theory and Manifold Invariants, IAS/Park City Mathematics Institute (PCMI) Research Program.
- 2014 March **Erlangen, Germany**, *Structures on tensor categories inspired by local topological field theory*, Structures on Tensor Categories and Topological Field Theories, Lecture Series (6 hours).
- 2013 March **Bad Boll, Germany**, *The structure of tensor categories from 3-dimensional topology*, Plenary Lecture, Annual meeting of DFG priority program (SPP 1388) in representation theory.

Colloquia

- 2014 Nov **Oxford, England**, *Extended 3-dimensional topological field theories*, Topology Colloquium.
- 2013 Jan **Hamburg, Germany**, *The structure of tensor categories from 3-dimensional topology*, Colloquium.

Conference Presentations (Invited)

- 2023 Aug (anticipated) **Regensburg, Germany**, *TBD*, Functorial Field Theories Conference, University of Regensburg.
- 2019 May **Stony Brook, NY**, *The Tangle Hypothesis*, String field theory, BV quantization, and moduli spaces, Simons Center for Geometry and Physics.
- 2018 Dec. **Cambridge, UK**, *The Relative Tangle Hypothesis*, Manifolds, Isaac Newton Institute for Mathematical Sciences.
- July **Cambridge, UK**, *The Relative Tangle Hypothesis*, Higher structures in homotopy theory, Isaac Newton Institute for Mathematical Sciences .
- 2017 June **Regensburg, Germany**, *Parallels between transchromatic character theory and QFT dimensional reduction*, The Transatlantic Transchromatic Homotopy Theory Conference.
- 2016 May **Oberwolfach, Germany**, *Extensions of Bordism Categories*, Workshop: Factorization Algebras and Functorial Field Theories.
- May **Athens, GA**, *From 2-Morse functions to presentations*, Georgia Topology Conference on Parameterized Morse Theory.
- March **Bonn, Germany**, *Higher Categorical Structures from 3D Topological Field Theories*, Closing conference for semester on Higher Structures.
- 2015 Oct **Oxford, England**, *Extended topological field theory in dimension three*, Clay workshop, Manifolds Unlocking Higher Structures.
- July **Aarhus, Denmark**, *Extended topological field theory in dimension three*, New developments in TQFT.
- March **Oberwolfach, Germany**, *Non-semisimple Tensor Categories and Extended Topological Field Theory*, Subfactors and Conformal Field Theory.

- 2014 Oct **Geneva, Switzerland**, *Extended 3D TQFTs*, Higher Structures 2014.
- Sept **Oberwolfach, Germany**, *Rational Homotopy Theory via Quantum Field Theory*, Topologie.
- April **MSRI Berkeley, CA, USA**, *The unicity of the homotopy theory of higher categories*, Reimagining the foundations of algebraic topology.
- March **BIRS Banff, Canada**, *From Higher Morse Theory to the cobordism hypothesis*, Parameterized Morse Theory in Low-Dimensional and Symplectic Topology (14w5119).
- Feb **ESI Vienna, Austria**, *Extended Topological Field Theories and Tensor Categories*, Modern Trends in Topological Field Theories.
- 2013 Dec **Luxembourg, Luxembourg**, *String connections and torsion*, Higher Lie Theory.
- April **Osnabrück, Germany**, *The structure of fusion tensor categories via topological field theory*, 19th annual meeting of NRW Topologie.
- 2012 Dec **Nijmegen, The Netherlands**, *The structure of tensor categories via 3D topological field theories and topology*, Higher Geometric Structures along the Lower Rhine II.
- Sept **Oberwolfach, Germany**, *The Structure of Tensor Categories via Local Topological Field Theories and Higher Categories*, Topologie.
- Aug **Ruhr-University Bochum, Germany**, *A Finite Dimensional Model of the String Group*, Strings and Automorphic Forms in Topology.
- July **Luminy, France**, *The Unicity of the Homotopy Theory of Higher Categories*, CATS4: Higher Categorical Structures and their Interactions with Algebraic Geometry.
- Jan **Boston, MA, USA**, *On the Uniqueness of the Homotopy Theory of Higher Categories*, Joint Mathematics Meeting of the AMS and MAA.

■ Seminars and Contributed Talks

- 2020 July **Bonn, Germany (virtual)**, *Topological Field Theories and Stable Diffeomorphism*, Max-Planck Institute for Mathematics, Quantum Field Theory seminar.
- 2020 July **International, virtual**, *Tangle Hypothesis (4 lectures)*, Quantum Field Theory and Manifolds - offshoot of Spring 2020 MSRI program.
- 2017 Nov **Indianapolis, IN**, *Invertible Topological Field Theories*, IU/PU/IUPUI Joint Topology Seminar.
- Oct **Columbus, OH**, *The structure of tensor categories via 3-dimensional topology*, quantum algebra/quantum topology seminar, Ohio State University.
- May **Chicago, IL**, *The structure of tensor categories via 3-dimensional topology*, University of Chicago Topology Seminar.
- March **Berkeley, CA**, *Extended topological field theories in low dimensions*, UC Berkeley Topology seminar.
- March **Berkeley, CA**, *Pontryagin-Thom as a bridge from homotopy to (higher) categories*, UC Berkeley Topology pre-seminar.
- 2016 Sept. **Lafayette, Indiana**, *Tori detect invertible topological field theories*, Midwest Topology Seminar at Purdue.

- May-June **Bonn, Germany**, *The Cobordism Hypothesis*, (4 lectures as part of a seminar series).
- 2015 Nov **Paris, France**, *Non-semisimple extended topological field theories*, Paris 7.
- June **Porto, Portugal**, *Extended 3-dimensional topological field theories*, AMS-EMS-SPM special session: Higher Dimensional Algebra in Geometry and Quantum Field Theory, Workshop on homotopy theory, manifolds, and field theories.
- June **Bonn, Germany**, *Extended 3-dimensional topological field theories*.
- 2014 May **Cambridge, England**, *Classifying 3-dimensional TQFTs via generators and relations*, Geometry and Topology seminar.
- 2013 Jan **Hamburg, Germany**, *Dualizability in Low-Dimensional Higher Category Theory*, Lecture Series (6 hours).
- 2012 Nov **Universität Bonn, Germany**, *On the Unicity of the Homotopy Theory of Higher Categories*, Topology Seminar.
- May **Wesleyan University, CT**, *The Structure of Fusion Categories*, Topology Seminar.
- March **Chicago, IL**, *On the Uniqueness of the Homotopy Theory of Higher Categories*, University of Chicago Topology Seminar.
- March **Northwestern University, IL, USA**, *On the Uniqueness of the Homotopy Theory of Higher Categories*, Topology Seminar.
- 2007-2013 An additional 78 talks given durring the years 2007 through 2013.