

Yu (Leon) Liu

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<https://leon2k2k2k.github.io>

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Education

- **Harvard University** August 2021 – May 2026
Ph.D. in Mathematics Advisors: Michael J. Hopkins and Daniel S. Freed
- **The University of Texas at Austin** August 2017 – December 2020
B.S. in Mathematics GPA: 3.93/4.0

Papers and Preprints

- **The Smith Fiber Sequence of Invertible Field Theories** 2026
with Arun Debray and co. Comm. Math. Phys.
- **A long exact sequence in the symmetry breaking** 2025
with Arun Debray and co. JHEP
- **\mathbb{E}_n -algebras in m -categories** 2024
in submission.
- **Unital k -Restricted ∞ -Operads** 2024
with Amartya Shekhar Dubey.
- **From bordisms of three-manifolds to domain walls between topological orders** 2024
with Dalton A R Sakthivadivel.
- **Braiding on complex oriented Soergel bimodules** 2024
in submission.
- **A braided monoidal $(\infty, 2)$ -category of Soergel bimodules** 2024
with Aaron Mazel-Gee, David Reutter, Catherina Stroppel, and Paul Wedrich.
– Presented by a senior coauthor in an ICM plenary talk.
- **Topological aspects of brane fields: solitons and higher-form symmetries** 2024
with Salvatore D. Pace. SciPost Phys.
- **Constructing the Virasoro groups from differential cohomology** 2023
with A. Debray, C. Weis. IMRN
- **Abelian duality in topological field theory** 2023
undergraduate thesis. Comm. Math. Phys.

Honors and Awards

- **Chateaubriand Fellowship (French Embassy in the U.S.)** 2023
Hosted at IHES
- **Dean's Honor Graduate with Research Distinction** December 2020
- **Mathematics Department Honors** December 2020
- **Emory and Ella Peterson Endowed Presidential Scholarship** April 2020
- **Jennifer T. Barrett Undergraduate Scholarship** September 2019
- **UT Distinguished College Scholar** August 2018 - May 2020

Services

- **Trivial Notions** Fall 2023 - Spring 2024
Co-organized Harvard's standard graduate student seminar
- **DRP mentorship** Spring 2023
Mentor two undergrad on SUSY field theories

- **Topological order seminar** Fall 2022
Organized joint Harvard/MIT seminar on topological order.
- **DRP mentorship** Fall 2022
Mentor one math undergrad and 3 physics undergrads
- **Reflection positivity seminar** Spring 2022
Co-organized an online seminar on Freed-Hopkins' invertible phases paper.
- **DRP mentorship** Fall 2021
Mentor two undergrads in TQFT

Teaching

- **M1b TF** Spring 2025
Teaching an entire section on second course of calculus Harvard
- **M1b TF** Spring 2024
Teaching an entire section on second course of calculus Harvard
- **M292Z CA** Fall 2023
Course assistant for Prof. Mike Hopkin's First steps in infinity categories Harvard
- **M262A CA** Fall 2023
Course assistant for Prof. Dan Freed's Quantum field theory from the geometric viewpoint Harvard
- **M1b TF** Spring 2023
Teaching an entire section on second course of calculus Harvard
- **M132b CA** Spring 2023
Course assistant for Prof. Mike Hopkin's differential topology Harvard

Research talks, Posters

- **A braided monoidal $(\infty, 2)$ category of Soergel bimodules** June 2024
Algebraic structures in Topology UPR
- **\mathbb{E}_n algebras in m -categories** May 2024
Bonn representation theory seminar Bonn
- **Stratification in physical systems** November 2023
Amherst topology seminar UMass Amherst
- **A long exact sequence in symmetry breaking** November 2023
CMSA quantum matter in math and physics Harvard CMSA
- **\mathbb{E}_n algebras in m -categories** August 2023
Purdue Topology seminar Purdue
- **A long exact sequence in symmetry breaking (Poster)** May 2023
Courcher summer school on quantum entanglement and topology CUHK
- **Abelian duality in topological field theories** March 2023
Topological orders and category theory seminar TsingHua and SUSTech
- **A braided monoidal $(\infty, 2)$ category of Soergel bimodules** March 2023
NEAT MAPS Northwestern
- **Symmetry breaking and crystalline phase** March 2023
APS March Meeting Las Vegas
- **Stratification in Physical Systems** Nov 2022
UCLA Algebraic Topology seminar UCLA
- **Long exact sequence in the symmetry breaking (Poster)** June 2022
Global Categorical Symmetry Perimeter Institute
- **Virasoro and Differential Cohomology** March 2022
GSTGC 2022 Georgia Tech