

Yun Liu | Curriculum Vitae

Department of Mathematics – Indiana University Bloomington

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Research Interests

My research focuses on the intersection between homotopy theory, category theory and representation theory. I am interested in equivariant cohomology theory for compact Lie groups, in particular GKM spaces. I am also working on trace methods of combinatorial K-theory, Quillen's model category, and models of ∞ -categories.

Employment

Zorn Postdoc Fellow, Indiana University Bloomington, Bloomington, Indiana, USA 2023-Present
Graduate Teaching Assistant, Cornell University, Ithaca, New York, USA 2017-2023

Education

Ph.D. in Mathematics, Cornell University, Ithaca, New York, USA 2016–2023
Advisor: Yuri Berest

Thesis: Towers of Borel Fibrations and Generalized Quasi-Invariants

M.S. in Computer Science 2018

B.S. in Mathematics and Applied Mathematics, Fudan University, Shanghai, China 2011–2016

B.S. with College and University Honors

Publications and Preprints

with Yuri Berest and Ajay C. Ramadoss
Relative Join Construction and Towers of Borel Fibrations, *in preparation* 2025
with Yuri Berest and Ajay C. Ramadoss

Homotopy theory of Co-H-categories and Relative Hopf Comodules, in preparation 2025
with Julia Plavnik and Samanta Ray

with Julia Flavnik and Samarpita Ray
Traces for Square Categories, in preparation 2025
with Sanjana Agarwal, Ramyak Bilas, and Michael Zheng

Talks

QuaSv-Con III, Iowa State University Nov 2025

Geometry and Topology Seminar, University of Iowa Nov 2025

AMS Central Sectional Meeting, Saint Louis University, Contributed Paper Session I, Oct 2025

AMS Southeastern Sectional Meeting , Tulane University, Contributed Paper Session I	<i>Oct 2025</i>
Topology Seminar , Purdue University	<i>Sep 2025</i>
Workshop on Homotopy Theory , The Fields Institute	<i>Jul 2025</i>
Focus Program on Algebraic Topology In Memory of Fred Cohen	
Midwest Panorama of Geometry and Topology , University of Iowa, Early Career	<i>Jun 2025</i>
Quantum Topology and Algebra Seminar , Indiana University Bloomington	<i>Oct 2024</i>
Representation Theory and Related Geometry , University of Georgia, Contribute Talk	<i>May 2024</i>
Topology Seminar , Cornell University	<i>May 2024</i>
Midwest Topology Seminar , Loyola University Chicago, Contributed Talk	<i>Mar 2024</i>
Topology Seminar , Indiana University Bloomington	<i>Oct 2023</i>
Topology Seminar , University of Virginia	<i>May 2023</i>
Workshop on Higher Structures , Penn State University	<i>Dec 2022</i>

Expository Talks

Quantum Topology and Algebra Seminar , Indiana University Bloomington	<i>Apr 2025</i>
Model Category Outside Topology	
HoMoToPIESS Student Seminar , Cornell University	<i>Nov 2022</i>
Classifying Space of Commutativity	
Olivetti Club , Cornell University	<i>Mar 2021</i>
A Brief Introduction to Noncommutative Geometry	
Topology and Geometric Group Theory Seminar , Cornell University	<i>Dec 2020</i>
What is Group Cohomology	
Homotopy Group Student Seminar , Cornell University	<i>Sep 2020</i>
Bar Constructions	
Homotopy Group Student Seminar , Cornell University	<i>Mar 2019</i>
Categories of Fibrant Objects	
Homotopy Group Student Seminar , Cornell University	<i>Mar 2019</i>
Categories of Cofibrant Objects	

Conferences, Seminars and Workshops Participation

Scissors Congruence and K-theory , University of Pennsylvania	<i>Jul 2025</i>
Thematic Program , University of Notre Dame	<i>Jun 2025</i>
Discrete Groups in Topology and Algebraic Geometry	
School on Univalent Mathematics , University of Minnesota Twin Cities	<i>Jul 2024</i>
Formalising Algebraic Geometry , American Institute of Mathematics, Online workshop	<i>Jun 2024</i>
Algebraic Structures in Topology II , San Juan, Puerto Rico	<i>Jun 2024</i>
eCHT Hopf Rings Reading Seminar , Online	<i>Winter 2024</i>
Midwest Topology Seminar , University of Illinois, Urbana-Champaign	<i>2023</i>

Mid-Atlantic Topology Conference , University of Pennsylvania	2023
Derived Categories and Moduli Spaces , Cornell University	2022
Supergroupoids and Bracket Structures in Mathematics and Physics , The Fields Institute	2022
Hypergeometry, Integrability and Lie Theory , Lorentz Center, Online Workshop	2020
Higher Categories and Categorification , MSRI, Introductory Workshop	2020
Higher Categories and Categorification , MSRI, Connections for Women Workshop	2020
Derived Algebraic Geometry IMT-SCU, Sichuan University, Annual Program	2019
New Trends in Geometry and Mathematical Physics , Congressi Stefano Franscini, ETH	2019
Modern Trends in Non-Commutative Geometry , Northwestern University	2019
Derived Geometry and Higher Categorical Structures in Geometry and Physics	2018
Séminaire de Mathématiques Supérieures, The Fields Institute	
Topology Festival , Cornell University	2017-2025

Seminars (Co)-organized

AWM Speaker Series , Co-organizer, Indiana University Bloomington	2025
Department Colloquium , Co-organizer, Indiana University Bloomington	2025
Olivetti Club , Organizer, Cornell University	2018
What is Seminar , Organizer, Cornell University	2017

Mentor

Research Experiences for Undergraduate , Indiana University Bloomington, Mentor	Summer 2025
Project: Computing HH_0 for Polytopes in \mathbb{R}^2	
Directed Reading Program , Cornell University, Mentor	2020–2022
Topics: Category Theory, Model Categories and Higher Categories	

Teaching

Instructor

MATH-M330 Exploring Mathematical Ideas , Indiana University Bloomington	Fall 2025
MATH-M321 Intuitive Topology , Indiana University Bloomington	Spring 2025
MATH-M301 Linear Algebra and Applications , Indiana University Bloomington	Spring 2024
MATH-M211 Calculus I , Indiana University Bloomington	Fall 2023, 2024
MATH1110 Calculus I , Cornell University, Online	Spring 2021

Teaching Assistant

MATH6320 Algebra II , Cornell University	Spring 2023
MATH3210 Manifolds and Differential Forms , Cornell University	Fall 2022
MATH3040 Prove It! , Cornell University	Spring 2022
MATH1110 Calculus I , Cornell University, Assistant Coordinator (Hybrid)	Fall 2021

MATH4560 Geometry of Discrete Groups , Cornell University	Fall 2020
MATH4340 Honors Introduction to Algebra , Cornell University	Spring 2020
MATH6310 Algebra , Cornell University	Fall 2019
PHIL3300 Foundations Of Mathematics , Cornell University, Partial	Spring 2019
MATH3360 Applicable Algebra , Cornell University	Spring 2019
MATH4310 Linear Algebra , Cornell University	Fall 2018
MATH2940 Linear Algebra for Engineers , Cornell University	Summer 2018,2020,2021
MATH2210 Linear Algebra , Cornell University, Recitation	Spring 2018
MATH2310 Linear Algebra with Applications , Cornell University, Recitation	Fall 2017

Honors and Awards

Department of Mathematics Teaching Award , Cornell University	2022
Cornell University Fellowship , Cornell University	2016–2017
Outstanding Undergraduates in Shanghai , Fudan University	2016
Honored Student , Fudan University, Program of Top Talented Students in Mathematics	2016
Tencent First Class Scholarship for Outstanding Undergraduates , Fudan University	2016
Xiangqian Scholarship for Exchange Students , Fudan University	2014

Service and Outreach

Sonia Kovalevsky Day , Indiana University Bloomington, Co-organizer	Dec 2025
Science Fest , Indiana University Bloomington, Co-organizer	Nov 2025
Julia Robinson Festival , Indiana University Bloomington, Volunteer	Apr 2025
Sprouts Math Circle , Indiana University Bloomington, Volunteer	2025
AWM Chapter , Indiana University Bloomington, Outreach Coordinator	2025
Math Club , Indiana University Bloomington, Talk Title: All (Categorical) Concepts are Kan Extensions	Oct 2023
Mathematics TA Training Workshop , Cornell University, Facilitator	2022
Active Learning Initiative , Cornell University, Facilitator	2022
Fudan Soccer Association , Fudan University, Vice President	2015-2016
Fudan Soccer Association , Fudan University, Secretary and Vice President	2014-2015