

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

Minor in English/Chinese Translation and Interpretation

Publications and Preprints

Quasi-flag manifolds and Moment Graphs, *arXiv preprint arXiv:2509.23521* 2025

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 Samarpita Ray

Traces for Square Categories, *in preparation* 2025

with Sanjana Agarwal, Ramyak Bilas, and Michael Zheng

Talks

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

Expository Talks

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

Conferences, Seminars and Workshops Participation

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

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

Seminars (Co)-organized

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

Mentor

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

Teaching

Instructor	
MATH-M330 Exploring Mathematical Ideas , <i>Indiana University Bloomington</i>	Fall 2025
MATH-M321 Intuitive Topology , <i>Indiana University Bloomington</i>	Spring 2025
MATH-M301 Linear Algebra and Applications , <i>Indiana University Bloomington</i>	Spring 2024
MATH-M211 Calculus I , <i>Indiana University Bloomington</i>	Fall 2023, 2024
MATH1110 Calculus I , <i>Cornell University</i> , Online	Spring 2021
Teaching Assistant	
MATH6320 Algebra II , <i>Cornell University</i>	Spring 2023
MATH3210 Manifolds and Differential Forms , <i>Cornell University</i>	Fall 2022
MATH3040 Prove It! , <i>Cornell University</i>	Spring 2022
MATH1110 Calculus I , <i>Cornell University</i> , Assistant Coordinator (Hybrid)	Fall 2021

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

Honors and Awards

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

Service and Outreach

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