

Heyi Zhu

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RESEARCH INTERESTS

I am interested in algebraic topology and its applications to related fields. Some specific topics I've been thinking about include different kinds of operations (such as Dyer-Lashof operations and power operations) on multiplicative cohomology theories and their interactions, and periodic families in the classical and the motivic Adams spectral sequences of the (motivic) sphere.

EDUCATION

University of Illinois, Urbana-Champaign Urbana, IL

Ph.D. in Mathematics

Sept 2016 – August 2025

- Advisor: Charles W. Rezk

M.S. in Mathematics

May 2024

Haverford College Haverford, PA

B.Sc. in Mathematics

Sept 2012 – May 2016

- Phi Betta Kappa, *magna cum laude*

PUBLICATIONS & PREPRINTS

The \mathbb{C} -motivic Adams-Novikov spectral sequence for topological modular forms,

December 2024

(with Daniel C. Isaksen, Hana Jia Kong, Guchuan Li, and Yangyang Ruan). *Adv. Math.*, Volume 458, Part B. Paper No. 109966, 47 pp. doi.org/10.1016/j.aim.2024.109966 [arXiv:2302.09123](#) [\[math.AT\]](#)

Generalized Nishida relations and Dyer-Lashof operations on MU -dual Steenrod algebra

In preparation

w_1 -periodicity in the Adam spectral sequence of the sphere,

In preparation

(with Daniel C. Isaksen, Hana Jia Kong, Guchuan Li, and Yangyang Ruan).

TALKS & PRESENTATIONS

Research Talk

UCLA Algebraic Topology Seminar

May 2023

- Adams-Novikov spectral sequence of the \mathbb{C} -motivic modular forms spectrum at $p = 2$.

Expository Talks

IWoAT Summer School 2022

August 2022

- held by Shanghai Center for Mathematical Sciences & School of Mathematical Sciences, Fudan University, and by Yanqi Lake Beijing Institute of Mathematical Sciences and Applications.
- Sequel of talks on higher ∞ -categorical algebras

The electronic Computational Homotopy Theory Reading Seminar

February 2021

- On the ∞ -categorical construction of Thom spectra

UIUC Graduate Student Homotopy Theory Seminar

Topics include:

- Construction of the motivic connective topological modular form spectrum
- Unit space of ring spectrum
- Basics of higher categories

April 2023

November 2022

February, August 2021

February 2019

TEACHING EXPERIENCES

Computer Lab Teaching Assistant

UIUC Department of Mathematics

Fall 2024 – Present

- Programming Python coding problems and leading Zoom lab sessions for Math 257 Linear Algebra w/ Computer Applications, focusing on the applications of NumPy, SciPy libraries

Teaching Assistant

UIUC Department of Mathematics

Fall 2017 – Spring 2024

- 14 semesters as classroom TA leading in-person and Zoom sessions for Math 221: Calculus I, Math 231: Calculus II, and Math 257 Linear Algebra w/ Computer Applications.

AWARDS

Graduate College Block Grant Fellowship

- Awarded by Department of Mathematics in support to outstanding incoming or currently enrolled graduate students

Summer 2024
Summer 2020

On the list of Teachers Ranked as Excellent

- List of instructors that demonstrated excellent teaching, compiled each semester by Measurement and Evaluation, Center for Innovation in Teaching & Learning

Spring 2022
Fall 2021

University Fellowship

- Awarded by Department of Mathematics in support to outstanding first year graduate students

Summer 2017

SKILLS & INTERESTS

Computational tools: Python, L^AT_EX, SageMath, Macaulay2, Mathematica

Libraries: NumPy, SciPy, Gurobi, Pandas, JSON, Matplotlib, PrairieLearn; Beamer

Languages: Fluent in Mandarin Chinese and English

Interests: Ballroom dancing, Piano, and Chinese calligraphy: my name is written 朱赫奕 in Chinese semi-cursive calligraphy.