# Yifei Zhu

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## POSITIONS

**Southern University of Science and Technology,** Shenzhen, Guangdong, China
Tenure-track assistant professor,  February 2020 to present
Visiting assistant professor,  December 2016 to January 2020

**Academy of Mathematics and Systems Science, Chinese Academy of Sciences,** Beijing, China
Visiting scholar,  October 2016 to January 2017

**Northwestern University,** Evanston, Illinois, USA
Visiting assistant professor,  September 2013 to August 2016
Mentor: Paul Goerss

## EDUCATION

**University of Minnesota,** Twin Cities, Minnesota, USA
Ph.D. in Mathematics,  June 2013
Advisor: Tyler Lawson

**Peking University,** Beijing, China
B.S. in Mathematics,  July 2007

## RESEARCH INTERESTS

Algebraic topology and related fields, particularly algebraic geometry and number theory.

## PUBLICATIONS

*Norm coherence for descent of level structures on formal deformations*
Preprint, to appear in Journal of Pure and Applied Algebra.

*Morava E-homology of Bousfield–Kuhn functors on odd-dimensional spheres*

Proceedings of the American Mathematical Society **146** (2018), no. 1, 449–458.

*Semistable models for modular curves and power operations for Morava E-theories of height 2*

Advances in Mathematics **354** (2019), 106758, 29 pp.

*The Hecke algebra action and the Rezk logarithm on Morava E-theory of height 2*

Transactions of the American Mathematical Society **373** (2020), no. 5, 3733–3764.

*The power operation structure on Morava E-theory of height 2 at the prime 3*

Algebraic and Geometric Topology **14** (2014), no. 2, 953–977.

## AWARDS AND FELLOWSHIPS

2019    Fourth Young Faculty Teaching Competition, Second place,
Southern University of Science and Technology.

2018–2020    National Natural Science Foundation of China grant 11701263,
"Methods of algebraic geometry and number theory in algebraic topology."

2018–2020    Finance Commission of Shenzhen Municipality start-up research grant.

2017–2022    Overseas High-Caliber Personnel (Level C) fellowship, Shenzhen.

2007–2013    Teaching assistantship, University of Minnesota.

2007    Outstanding Graduating Student award, Peking University.

2005–2006    Outstanding Student award, School of Mathematical Sciences, Peking University.

## Conference Presentations

*Algebraic topology and arithmetic*

Fudan-Guanghua International Forum for Young Scholars, Fudan University, Shanghai, December 2019.

*Algebraic topology and arithmetic*

2019 Young Mathematician Forum, Beijing International Center for Mathematical Research, Peking University, Beijing, December 2019.

*Power operations in elliptic cohomology and related arithmetic topics*

Special Session on Algebraic and Geometric Topology, AMS-CMS Joint International Meeting, Shanghai, June 2018.

*Toward calculating unstable higher-periodic homotopy types*

International Workshop on Algebraic Topology, Southern University of Science and Technology, Shenzhen, June 2018.

*Symmetry encoded by norm maps*

International Workshop on Loop Spaces, Supersymmetry and Index Theory, Chern Institute of Mathematics, Tianjin, July 2017.

*Algebraic geometry of ring spectra and multiplicative invariants for families of manifolds*

Workshop on Algebraic and Geometric Topology, Nankai University School of Mathematical Sciences, Tianjin, June 2017.

*Toward calculating unstable higher-periodic homotopy types* (scheduled)

AMS Special Session on Homotopy Theory, Sectional Meeting, Bloomington, April 2017.

Session on chromatic power operations, with P. Nelson and P. VanKoughnett

Operations in Highly Structured Homology Theories, Banff, May 2016.

*Modular equations for Lubin–Tate formal groups at chromatic level 2*

AMS Session on Algebraic Geometry, Joint Meetings, Seattle, January 2016.

*Power operation calculations in elliptic cohomology*

AMS Special Session on Homotopy Theory, Joint Meetings, Baltimore, January 2014.

International Workshop on Algebraic Topology 2020, scheduled

    International conference, 5 days.

    Joint organizer with A. Beaudry, M. Behrens, D. Isaksen, J. Kong, R. Liu, X.D. Shi, G. Wang, Z. Xu.

    Beijing International Center for Mathematical Research, Peking University, August 17–21, 2020.

Summer School on Higher (Infinity-Categorical) Algebra, scheduled

    International conference, 5 days.

    Joint organizer with A. Beaudry, M. Behrens, D. Isaksen, J. Kong, Z. Lü, X.D. Shi, G. Wang, Z. Xu.

    Shanghai Center for Mathematical Sciences, Fudan University, August 10–14, 2020.

International Workshop on Algebraic Topology 2019

    International conference, 3 days, 140 participants.

    Joint organizer with A. Beaudry, M. Behrens, D. Isaksen, J. Kong, Z. Lü, G. Wang, Z. Xu.

    Shanghai Center for Mathematical Sciences, Fudan University, August 19–21, 2019.

Summer School on Equivariant Stable Homotopy Theory

    International conference, 5 days, 140 participants.

    Joint organizer with A. Beaudry, M. Behrens, D. Isaksen, J. Kong, Z. Lü, G. Wang, Z. Xu.

    Shanghai Center for Mathematical Sciences, Fudan University, August 13–17, 2019.

Special Session on Algebraic and Geometric Topology, AMS-CMS Joint International Meeting

    International conference, 4 days, 50 participants.

    Joint organizer with M. Hill, Z. Lü, and J. Ma.

    Fudan University, Shanghai, June 11–14, 2018.

International Workshop on Algebraic Topology

    International conference, 4 days, 70 participants.

    Joint organizer (principal) with A. Beaudry, M. Behrens, Z. Huan, H. Miller, N. Stapleton, G. Wang, Z. Xu.

    Southern University of Science and Technology, Shenzhen, June 6–9, 2018.

Operations in Highly Structured Homology Theories
>    International conference, 5 days, 40 participants.
>    Organizer for Session on Chromatic Power Operations.
>    Banff International Research Station, May 22–27, 2016.

*Algebraic topology and arithmetic*
>    Southern University of Science and Technology, December 2019.

*Power operations in elliptic cohomology and semistable models for modular curves*
>    Chinese Academy of Sciences Topology Seminar, November 2018.

*Toward calculating unstable higher-periodic homotopy types*
>    Electronic Computational Homotopy Theory Seminar (through the online platform Zoom for an international community), April 2018.

*Power operations in elliptic cohomology and moduli of elliptic curves*
>    Nankai University, November 2016.

*Toward calculating unstable higher-periodic homotopy types*
>    Chinese Academy of Sciences Topology Seminar, November 2016.

*Power operation calculations in elliptic cohomology*
>    Southern University of Science and Technology, October 2016.

*Modular equations and Hecke operators for local elliptic spectra*
>    University of Chicago Topology Seminar, January 2016.

*Local moduli for elliptic spectra*
>    University of Notre Dame Topology Seminar, January 2016.

*Computing power operations for Morava E-theory of height 2 at a prime*
>    University of Rochester Topology Seminar, October 2015.

*The Hecke algebra action on Morava E-theory of height 2*
>    University of Illinois at Urbana-Champaign Topology Seminar, October 2014.

*Finite subgroups of a formal group of height 2 over $\mathbb{F}_9$*
>    University of Louisiana at Lafayette Topology Seminar, March 2014.

*A formal group of height 2 over $\mathbb{F}_9$*
>    Northwestern University Topology Seminar, October 2013.

*Power operations in height-2 Morava E-theory and its $K(1)$-localization*
>    University of Illinois at Urbana-Champaign Topology Seminar, September 2013.

*Power operations in an elliptic cohomology theory*
>    University of Minnesota Topology Seminar, April 2013.

*Computing power operations in Morava E-theory at height 2 for the prime 3*
>    Wayne State University Topology Seminar, March 2013.

*The structure of power operations in Morava E-theory at height 2 for the prime 3*
>    University of Chicago Algebraic Topology Seminar, March 2013.

*Computing power operations for Morava E-theory of height 2 at the prime 3*
>    University of Virginia Topology Seminar, February 2013.

## SELECTED CONFERENCES AND WORKSHOPS

Workshop on Arithmetic Topology
>    Pacific Institute for the Mathematical Sciences, University of British Columbia, Vancouver, June 10–14, 2019.

Arbeitsgemeinschaft: Topological Cyclic Topology
>    Mathematisches Forschungsinstitut, Oberwolfach, April 1–7, 2018.

West Coast Algebraic Topology Summer School
>    On connections between algebraic topology and number theory.
>    University of Oregon, Eugene, August 8–12, 2016.

Operations in Highly Structured Homology Theories
   Organizer and speaker, Session on Chromatic Power Operations.
   Banff International Research Station, May 22–27, 2016.

Mid-Atlantic Topology Conference—in honor of Nick Kuhn
   University of Virginia, Charlottesville, April 25–26, 2015.

West Coast Algebraic Topology Summer School
   University of Washington, Seattle, August 26–28, 2011.

New Contexts in Homotopy Theory—in honor of Peter May
   University of Chicago, Chicago, October 16–18, 2009.

## SEMINAR ORGANIZING

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|---|---|
| 2017–present | Southern University of Science and Technology, Geometry & Topology Seminar |
| | Joint organizer with S. Garoufalidis and Q. Li. |
| 2011–2012 | University of Minnesota, Student Topology Seminar |
| | Joint organizer with D. Bashkirov, R. Hank, and E. Manlove. |
| | Collaboratively designed and created wiki pages for the seminar. |

## TEACHING EXPERIENCE

**Southern University of Science and Technology**

- Courses taught:

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|---|---|
| MA101a | Mathematical Analysis I |
| MA102a | Mathematical Analysis II |
| MA301 | Functions of Real Variables |
| MA323 | Topology |
| MA327 | Differential Geometry |
| MAT8010 | Combinatorics (graduate level) |
| MAT8024 | Differentiable Manifolds (graduate level) |

- Graduate advising: Liu Jizhang (2019 to present).

- Undergraduate advising: Liu Jizhang (2017–2019), Zhu Yaxi (2018 to present), Gao Zican (2018–2019, thesis only), Liang Tongtong (2019 to present), Lin Ruijun (2019 to present), Liao Wenbo (2019 to present), Yu Jinghao (2019 to present), Ruan Xiabing (2019 to present).

- Tutorial fellow, Shuli College, advising 7 students of Class 2019 and 12 students of Class 2017. Led a discussion session on math course study for freshmen of the College in Fall 2018 with three teaching-track faculty members.

**Northwestern University**

- Courses taught:

  Math 230  Differential Calculus of Multivariable Functions
  Math 234  Multiple Integration and Vector Calculus
  Math 240  Linear Algebra
  Math 300  Foundations of Higher Mathematics

- Regularly served as course coordinator for Math 230—the most-enrolled calculus course with the largest instructor group.

- Served as faculty mentor for Math 230's *Gateway Science Workshop* program for two consecutive terms, with recognition from the Provost.

- Involved in *Math Review Study Tables*—drop-in question and answer / group study sessions run prior to calculus exams in residence halls, initiated and co-sponsored by the Office of Residential Academic Initiatives and the Department of Mathematics.

- Involved in piloting the use of *Crowdmark*—a collaborative online grading and analytics platform, with recognition from the Mathematics Department Chair. Experienced with technology and administrative matters.

- Involved in transitioning common calculus course websites from *Blackboard* to *Canvas*.

**University of Minnesota**

- Teaching assistant for courses:

  Math 1151  Precalculus II
  Math 1271  Calculus I
  Math 2263  Multivariable Calculus
  Math 8602  Real Analysis

- Teaching assistant training, 2007. One of two (among 15) international math graduate students who were exempted from language classes.