

# Ying Hu

(she/her/hers)

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## Academic Appointment

- 2018/08     Assistant professor (tenure track)  
- present   University of Nebraska Omaha
- 2015/08     CIRGET postdoctoral fellow  
- 2018/05   McGill University and Université du Québec à Montréal, Montréal, Canada

## Visiting Position

2018 Spring   Department of Mathematics, University of Georgia, Athens, GA

## Education

- 08/2015     Ph.D. in Mathematics, Louisiana State University, U.S.  
              Thesis Adviser: Oliver Dasbach  
              Thesis: Left-orderability, Cyclic Branched Covers and Representations of the Knot Group
- 05/2010     M.S. in Mathematics, Louisiana State University, U.S.
- 06/2008     B.S. in Math & Applied Math, Beijing Normal University, Beijing, China

## RESEARCH

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### Research Interests

Geometric topology:

- Foliations and flows on 3-manifolds
- Dynamics of group actions on dimension-1 spaces and left-orderability of groups
- Mapping class groups and dynamics on surfaces
- Knots, links and braids

### Publications and preprints

- 1 (with S. Boyer and C. Gordon) Slope detection and toroidal 3-manifolds, 60 pgs, 2021, preprint: <https://arxiv.org/abs/2106.14378>.
- 2 (with J. Baldwin and S. Sivek) Khovanov homology and the cinquefoil, 21 pgs, 2021, Journal of the European Mathematical Society, to appear preprint: <https://arxiv.org/abs/2105.12102>.
- 3 *Euler class of taut foliations and Dehn filling*, 25 pgs, 2019, Communications in Analysis and Geometry, to appear. preprint: <https://arxiv.org/abs/1912.01645>.
- 4 (with S. Boyer) *Taut foliations in branched cyclic covers and left-orderable groups*, Transactions of the American Mathematical Society, 372 (2019), no. 11, 7921 - 7957. preprint: <https://arxiv.org/abs/1711.04578v3>.
- 5 *Left-orderability and cyclic branched coverings*, Algebraic & Geometric Topology 15 (2015), no. 1, 399-413. preprint: <https://arxiv.org/abs/1311.3291>.

## Interdisciplinary Research

- 6 (with S. Ryu, S. Kim, J. White, H. Zhang), *Geometric analysis of insect wing vein network*, Proceedings of the ASME 2022 Fluids Engineering Division Summer Meeting, to appear.

## Grants/Awards/Honor

- 2021 - 2023 Co-PI, University of Nebraska Collaboration Initiative Grant,  
with S. Ryu (PI), Mechanical and Materials Engineering (UNL) and  
S. Kim (Co-PI), Civil and Environmental Engineering (UNL)
- 2021 NSF-AWM Mentoring Travel Grant
- Fall 2020 University of Nebraska Online Course Development Grant
- 2014-2015 VIGRE Traineeship, Louisiana State University
- 01/2014 Distinguished Graduate Student Talk in Knots in Washington XXXVII
- 2008-2012 Graduate School Enhancement Award, Louisiana State University
- 2008-2012 Graduate School Supplement Award, Louisiana State University

## Invited Talks

- AWM Research Symposium at The University of Minnesota, June 2022.
- Topology and Geometry Seminar, Rutgers University - New Brunswick, March 2022.
- The 55th Annual Spring Topology and Dynamical Systems Conference, Waco, TX, March 2022.
- Groups Semigroups and Topology Seminar, University of Nebraska, Lincoln, December 2021.
- Canadian Mathematical Society Summer Meeting, June 2021.
- Geometry and Topology Seminar, Washington University in St. Louis, April 2021.
- Geometry and Topology Online Seminar, Warwick, UK, December 2020.
- Nearly Carbon Neutral Geometric Topology Conference, online, June 2020.
- Topology Seminar, University of Iowa, Iowa city, February 2020.
- Groups Semigroups and Topology Seminar, University of Nebraska, Lincoln, December 2019.
- Geometry and Topology Seminar, Washington University in St. Louis, October 2019.
- Conference "Phenomenon of Codimension 1 in Topology in Low Dimensions", CRM50 Thematic Program in Low-Dimensional Topology, Montreal, September 2019.
- BIRS-CMO Conference "Ordered Groups and Rigidity in Dynamics and Topology", June 2019
- Conference "Georgia Topology Conference", Athens, Georgia, May 2019
- GEAR/GGD seminar, University of Illinois Urbana-Champaign, February 2019
- Groups Semigroups and Topology Seminar, University of Nebraska, Lincoln, October 2018
- Conference "Perspectives on bordered Heegaard Floer theory", Montreal, Canada, May 2018
- Topology Seminar, University of Texas at Austin, TX, April 2018
- Topology Seminar, University of Georgia joint with Georgia Tech, Athens, GA, February, 2018
- American Mathematical Society Joint Meeting, San Diego, January 2018
- Canadian Mathematical Society Winter Meeting, University of Waterloo, December 2017
- Geometric Group Theory Seminar, McGill University, November 2017
- CIRGET Geometry and Topology Seminar, UQAM, November 2017
- Mathematical Congress of the Americas, Montreal, July 2017
- Canadian Mathematics Society Winter Meeting, Niagara Falls, December 2016
- Geometry and Topology Seminar, University of Georgia, February 2016

- Canadian Mathematics Society Winter Meeting, Montreal, December 2015
- Geometric Group Theory Seminar, McGill University, November 2015
- Diffeomorphism Groups: algebra, topology, homology, UC Berkeley, June 2015
- Graduate Student Conference in Algebra, Geometry and Topology, Temple University, May 2015
- Geometry and Topology Seminar, Tulane University, March 2015
- Central Spring Sectional Meeting, Michigan State University, East Lansing, MI, March 2015
- Spring Eastern Sectional Meeting Georgetown University, Washington, DC, March 2015
- Conference on Knot Theory and Its Applications to Physics and Quantum Computing: 60<sup>th</sup> birthday of Józef H Przytycki, University of Texas at Dallas, Jan 2015
- Topology Students Workshop, Georgia Institute of Technology, June 2014
- Distinguished graduate student talk at Knots in Washington XXXVII, January 2014
- AMS Sectional Meeting, University of South Florida, March 2011

## Expository Talks

- *On the AJ conjecture*, VIR Seminar on Knot theory, LSU, Fall 2013.
- *Examples of 3-dimensional manifolds*, G.E.A.U.X. Program, LSU, August 2013.
- *Volume of hyperbolic alternating link complements*, VIR Seminar on Algorithms and computations in Knot Theory, LSU, Spring 2013.
- *The A-polynomial and its computation*, Alpha-Math Workshop, LSU, May 2012.
- *Twisted Alexander polynomials and the Reidemeister torsion*, Junior topology seminar, LSU, Spring 2012.
- *Topology of Surfaces*, G.E.A.U.X. Program, LSU, August 2009.

## Conferences and Workshops

- *Contact Structures, Laminations and Foliations*, LMU in Munich, Germany, September 5 - 9, 2016.
- *Advanced School on Geometric Group Theory and LDT*, ICTP, Trieste, Italy, May 23 - June 3, 2016.
- *Representations of 3-manifold groups, geometric structures and exact computations*, Institute de Mathématique de Jussieu, June 22 - 26, 2015.
- *Moab topology conference*, Utah State University, May 18 - 21, 2015.
- *52nd Texas geometry and topology conference*, UT Austin, November 14- 16, 2014.
- *Orderable groups*, Cajón del Maipo, Chile, September 1 - 5, 2014.
- *Wasatch topology conference*, Park City, Utah, August 22 - 24, 2014.
- *Geometric Structures and Discrete Groups*, UT Austin, May 2 - 4, 2014.
- *AMS Joint Meetings & Six crash courses on Mapping Class Groups*, Baltimore, January 14-18, 2014.
- *Geometric topology in Cortona*, Tuscany, Italy, June 3 - 7, 2013.
- *Cube complexes and 3-Manifolds*, University of Illinois at Chicago, May 20 - 30, 2013.
- *3-Manifolds: Heegaard splittings, the curve complex, and hyperbolic geometry*, Rice University, Houston, April 19 - 21, 2013.
- *Moab topology conference*, Utah State University, May 30 - June 1, 2012.
- *Faces of geometry: 3-manifolds, groups & singularities*, Columbia University, New York, June 6 -10, 2011.
- *Examples of geometries*, Ohio State University, Columbus, May 23 - 29, 2011.
- *AMS Joint Meetings*, New Orleans, January 6 - 9, 2011.
- *Knot in Poland III*, Stefan Banach Mathematical Center, Warsaw/Bedlewo, Poland, July - August, 2010.
- *First National Forum of Young Topologists*, Tulane University, New Orleans, November 13 -15, 2009.

## TEACHING AND MENTORING

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### Teaching Experience

University of Nebraska Omaha

- Applied Topology (Spring 2021)
- Introduction to Abstract Mathematics (Spring 2022)
- Introduction to Analysis (Fall 2019 - 2022)
- Advanced Linear Algebra (Spring 2020 - 2022)
- Calculus I (Fall 2018 - 2021)
- Calculus II (Spring 2019 - 2020)

McGill University

- Calculus I (Fall 2015 - 2017)

Louisiana State University

- Calculus I (Summer 2013)
- Co-instructor of Calculus recitations (Fall 2012, Fall 2013)
- Pre-Calculus (Fall 2011)
- Trigonometry (Spring 2010, Spring 2014)
- Collage Algebra (Fall 2010)

### Undergraduate Mentoring

- UN Collaboration Grant Project, with Sangjin Ryu (UNL) and Seunghee Kim (UNL), (2021 - 2022)

Mentee: Jacob White

Research project: In vitro models of insect wing vein networks for studying insect blood circulation

- UNO Course Mentoring Program (Fall 2021)

Mentee: Cole Long

- Kerrigan Undergraduate Research Program, UNO (Summer 2019)

Mentee: Gage Hoefer

Research project: Visualizing hyperbolic structures on the once punctured torus.

- Noyce Teacher Scholarship Program, UNO (Spring 2019)

Mentee: Valeria Loza

- Vertically Integrated Research (VIR) on Topology, LSU (2008-2015)

*Organized groups of senior undergraduate students on course projects, guided them in the learning of the materials, assisted them in solving problems and preparing presentations.*

### Teaching Workshops/Conferences

- *IBL workshop*, Academy of Inquiry-based Learning, June 2019.
- *National Council of Teachers of Mathematics Regional Conference and Exposition*, Kansas City, November 2018
- *Teaching Techniques for Instructors Workshop*, McGill University, September 2017.
- *Learning to Teach Day*, McGill University, November 2016.

## PROFESSIONAL ACTIVITIES

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### Academic Services

- Co-organizer of the special session "Developments in Knot Theory and Low-dimensional Topology" at the Fall Central Section Meeting of the AMS, Creighton University, October 9-10, 2021.
- Co-organizer of the session "Foliations, flows, and dynamics in 3-manifolds" at the NCNGT Conference, June 14-25, 2021.
- Co-organizer of the special session "Geometric group theory and topology in low dimensions" at Canadian Mathematics Society Winter Meeting, Niagara Falls, 2016.
- Co-organizer of "CIRGET working group in Low dimensional topology," Spring 2016, Fall 2017
- Referee for journals: Proc. Amer. Math. Soc.; J. of Lond. Math. Soc.; J. Knot Theory Ramifications; Trans. of Amer. Math. Soc.

### Synergistic Activities

- (1) *Treasurer of Association for Women in Mathematics LSU Student Chapter (2014-2015)*

In charge of the finance of the student organization, helped organize (under)graduate student events, assisted in planning workshops and panel discussions to provide guidance for undergraduate students.

- (2) *G.E.A.U.X Program (2009, 2013)*

Served as a committee member of this orientation program for incoming mathematics graduate students, participated in panel discussion on aspects of graduate study, gave and organized topology presentations.

### Departmental Services

- Member of the Upper Curriculum Committee, University of Nebraska Omaha

## OTHER SKILLS

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### Computational Software

Python, C++, Mathematica, MATLAB, SnapPy, Sage, Singular, Gap

### Languages

Proficient in Chinese and English; Working knowledge in French