

# QIUYU REN (任秋宇)

## PERSONAL INFORMATION

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Language: Chinese, English, French

## EDUCATION

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<b>University of California, Berkeley</b> Ph.D. candidate in Mathematics Advisor: Ian Agol	August 2021 - Present
<b>Massachusetts Institute of Technology (MIT)</b> B.S. in Mathematics GPA: 5.0/5.0	August 2018 - June 2021
<b>Peking University</b> Major in Mathematics	September 2017 - July 2018
<b>The Affiliated High School of SCNU</b>	September 2014 - June 2017

## RESEARCH PAPERS

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- Cosmetic surgery on satellite knots. arxiv:2411.13828.
- FrontierMath: A Benchmark for Evaluating Advanced Mathematical Reasoning in AI, with Elliot Glazer, Ege Erdil, Tamay Besiroglu, et al. arXiv:2411.04872.
- Khovanov homology and exotic 4-manifolds, with Michael Willis, submitted. arXiv:2402.10452.
- Toroidal Hitomezashi patterns, with Shengtong Zhang, *Discrete Mathematics* 348 (2025), 114231. Link.
- Slice genus bound in  $DTS^2$  from  $s$ -invariant, to appear in *Algebraic and Geometric Topology*. arXiv:2306.17816.
- Lee filtration structure of torus links, to appear in *Geometry and Topology*. arXiv:2305.16089.
- A short proof to Defant and Kravitz's theorem on the length of Hitomezashi loops, with Shengtong Zhang, *Annals of Combinatorics* (2024). Link.
- Spectral asymptotics for kinetic Brownian motion on Riemannian manifolds, with Zhongkai Tao, submitted. arXiv:2212.05394.
- Spectral asymptotics for kinetic Brownian motion on locally symmetric spaces, with Zhongkai Tao. arXiv:2208.13111.
- On the union of essentially distinct  $\delta$ -tubes. arXiv:1908.06000.

## INVITED TALKS

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- *Topic TBD*
  - Conference: New perspectives on skein modules, Centre International de Rencontres Mathématiques (CIRM), France, July 2025.
  - Conference on Modern Developments in Low-Dimensional Topology, International Centre for Theoretical Physics (ICTP), Italy, June 2025.

- AMS 2025 Spring Western Sectional Meeting, California Polytechnic, May 2025.
- First International Online Knot Theorem Congress, February 2025.
- *Lasagna s-invariants with application to exotic 4-manifolds (2 lectures)*. Conference on quantum topology at Belalp, Switzerland, September 2024.
- *Lasagna s-invariant detects exotic 4-manifolds*
  - University of Georgia research topology seminar, October 2024.
  - Columbia University geometric topology seminar, September 2024.
  - Conference: New structures in low-dimensional topology, Erdős Center, Rényi Institute, Hungary, July 2024.
- *Khovanov skein lasagna module detects exotic 4-manifolds*
  - UCSB topology seminar, December 2024.
  - Moscow State University knots and representation theory seminar (online), September 2024.
  - AMS 2024 Fall Central Sectional Meeting, University of Texas, San Antonio, September 2024.
  - Knot Online Seminar (K-OS), June 2024.
  - Research seminar on quantum topology and categorification (QTCat), University of Hamburg, June 2024.
  - University of South Florida geometry and topology seminar, April 2024.
  - Simons Collaboration satellite conference: Floer homology, low-dimensional topology, and algebra, Princeton University, March 2024.
  - UC Davis geometry and topology seminar, March 2024.
- *Lee filtration structure of torus links, adjunction inequality, and applications*
  - Texas A&M University topology seminar, October 2023.
  - Caltech geometry and topology seminar, September 2023.
  - Stanford University topology seminar, September 2023.
  - MIT geometry and topology seminar, September 2023.
- *J-holomorphic curves*. Kylerec workshop at Foresthill, CA, June 2022.

## AWARDS AND GRANTS

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Mathematics Summer Grant Award, UC Berkeley	2024
Mathematics Summer Grant Award, UC Berkeley	2022
Jon A. Bucsela Prize, MIT	2021
<i>Recognition of distinguished scholastic achievement, professional promise and enthusiasm for mathematics. Awarded yearly to one or two math major undergraduate students in their last year of study.</i>	
Rank 7.5, 78 <sup>th</sup> William Lowell Putnam Mathematical Competition, USA	2019
The Hartley Rogers Jr. Prize (SPUR), MIT	2019
<i>Best paper(s) and presentation(s) in the Summer Program for Undergraduate Research (SPUR).</i>	
Freshmen Scholarship, Peking University	2017

Gold Medal, 58 <sup>th</sup> International Mathematical Olympiad (IMO), Brazil	2017
Outstanding Graduate Award, The Affiliated High School of SCNU	2017

## SERVICES AND MISCELLANY

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- Co-organizing the student low-dimensional topology seminar with Audrey Rosevear, Fall 2024 - Present.
- Co-organized the student 3-manifold seminar with Ethan Dlugie, UC Berkeley, Fall 2023 - Spring 2024.
- Supervised an independent reading for a UC Berkeley undergraduate student, Fall 2023.
- Mentor at the Peer Mentor Program for new math PhD students at UC Berkeley, Fall 2023.
- Co-organized a reading group on Kobayashi-Hitchin correspondence (Donaldson-Uhlenbeck-Yau theorem), Fall 2022.
- Third place in the 2021 Berkeley Half Marathon (20-29 age group).
- Organized an online reading group on Donaldson's theory for 4-manifolds, Summer 2021.
- Tutor at MIT Math Learning Center, Fall 2020.
- Third place in the 2019 Baystate Marathon (20-29 age group); qualified for the Boston Marathon (canceled due to Covid-19).
- First place in the 2018 Baystate Half Marathon (under 20 age group).

Programming languages: C++, Delphi, Java, JavaScript, Lean, Pascal, Python, Tex, Wolfram Language