

Zipei Nie

Email: znie@illinois.edu

Education

Princeton University	Princeton, NJ, USA
Ph.D. in Mathematics	Sep 2015 – Jun 2020
Advisor: Zoltán Szabó	
Thesis: On $(1, 1)$ -knots and L-space conjecture	
Massachusetts Institute of Technology	Cambridge, MA, USA
B.S. in Mathematics	Sep 2011 – Jun 2015

Positions

University of Illinois Urbana-Champaign	Urbana-Champaign, IL, USA
J.L. Doob Research Assistant Professor	Oct 2024 – present
Mentor: Jacob Rasmussen	
Huawei Technologies France SASU	Paris, France
Senior Researcher in Mathematics	May 2021 – Oct 2024
Institut des Hautes Études Scientifiques	Bures-sur-Yvette, France
Invited Researcher	March 2023 – June 2023
Shanghai Huawei Technology Co., Ltd.	Shanghai, China
Senior Researcher in Mathematics	July 2020 – May 2021
Citadel Securities	Chicago, IL, USA
Quantitative Researcher Internship	May 2019 – Aug 2019

Awards

Alibaba Global Mathematics Competition	
Honorable Mention in Geometry & Topology	2020
Silver Award in Geometry & Topology	2018
Princeton University, Centennial Fellowship	2015
MIT, Hartley Rogers Jr. Prize	2013
William Lowell Putnam Math Competition	
Putnam Fellow	2012, 2013, 2014
Top Twenty-five	2011
Gold Medal in International Mathematical Olympiad	2010
Gold Medal in Romanian Master of Mathematics	2010

Teaching

Lecturer, Mathematical Olympiad Training Program, Shanghai	2013, 2014, 2020
Organizer & Instructor, Putnam Training Sessions, Princeton University	2015, 2017, 2019
Teacher, Educational Studies Program, Massachusetts Institute of Technology	2013

Research Papers

1. Zipei Nie. Chainmail links and non-left-orderability. *arXiv preprint arXiv:2310.16830*, 2023
2. Zipei Nie. Petal diagram from simple braids. *arXiv preprint arXiv:2310.09569*, 2023
3. Alexei Lisitsa, Zipei Nie, and Alexei Vernitski. Automated reasoning for proving non-orderability of groups. *arXiv preprint arXiv:2310.05891*, 2023
4. Zhiyi Huang, Chris Lambert, Zipei Nie, and Richard Peng. Simpler analyses of union-find. *arXiv preprint arXiv:2308.09021*, 2023

5. Zipei Nie and Hang Zhou. Euclidean capacitated vehicle routing in random setting: A 1.55-approximation algorithm. In *32nd Annual European Symposium on Algorithms (ESA 2024)*. Schloss-Dagstuhl-Leibniz Zentrum für Informatik, 2024
6. Zipei Nie. On a conjecture of Knuth about forward and back arcs. *arXiv preprint arXiv:2301.05704*, 2023
7. Zipei Nie. The number of correct guesses with partial feedback. *arXiv preprint arXiv:2212.08113*, 2022
8. Zipei Nie. Matrix anti-concentration inequalities with applications. In *Proceedings of the 54th Annual ACM SIGACT Symposium on Theory of Computing*, pages 568–581, 2022
9. Lin Li and Zipei Nie. Non-left-orderability of cyclic branched covers of pretzel knots $P(3, -3, -2k - 1)$. *Proceedings of the Japan Academy, Series A: Mathematical Sciences*, 98(10), 2022
10. Ruiquan Gao, Zhongtian He, Zhiyi Huang, Zipei Nie, Bijun Yuan, and Yan Zhong. Improved online correlated selection. In *2021 IEEE 62nd Annual Symposium on Foundations of Computer Science (FOCS)*, pages 1265–1276. IEEE, 2022
11. Zipei Nie. An explicit description of $(1, 1)$ L-space knots, and non-left-orderable surgeries. *Communications of Huawei Research*, VOL-001:212–219, 2021
12. Zipei Nie. On 1-bridge braids, satellite knots, the manifold $v2503$ and non-left-orderable surgeries and fillings. *arXiv preprint arXiv:2003.14296*, 2020
13. Zipei Nie. Topologically slice $(1, 1)$ -knots which are not smoothly slice. *arXiv preprint arXiv:1901.07774*, 2019
14. Zipei Nie. Left-orderability for surgeries on $(-2, 3, 2s + 1)$ -pretzel knots. *Topology and its Applications*, 261:1–6, 2019
15. Weibo Fu and Zipei Nie. Linear restrictions on cone polynomials. *arXiv preprint arXiv:1510.04630*, 2015
16. Zipei Nie. On the minimum area of null homotopies of curves traced twice. *arXiv preprint arXiv:1412.0101*, 2014
17. Zipei Nie and Anthony Y Wang. Hilbert functions and the finite degree Zariski closure in finite field combinatorial geometry. *Journal of Combinatorial Theory, Series A*, 134:196–220, 2015
18. Zipei Nie and Anthony Y Wang. Points on lines in \mathbb{F}_q^3 . *MIT SPUR Final Papers*, 2013

Invited Talks

IHES - Huawei Workshop on Artificial Intelligence and Computer Science	2024
The 32nd Annual European Symposium on Algorithms	2024
Peking University - BICMR, Automated Reasoning Seminar	2023
Peking University - BICMR, Applied & Computational Mathematics Seminar	2023
ETH Zürich Graduate Student Colloquium in Mathematics	2023
The 1st ACDA Workshop in Aussois	2022
The 54th ACM Symposium on Theory of Computing	2022
ETH Zürich Algorithms and Complexity Seminar	2022
Nanjing University Technology Innovation Forum	2022
The Nearly Carbon Neutral Geometric Topology Conference	2020
University of British Columbia Topology Seminar	2020

Professional Service

Reviewer for: Symposium on Discrete Algorithms (SODA), International Colloquium on Automata, Languages, and Programming (ICALP), Symposium on Simplicity in Algorithms (SOSA), Symposium on Theoretical Aspects of Computer Science (STACS).