

# Zhenkun Li

University of South Florida  
Department of Mathematics and Statistics

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## Employment

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| <b>University of South Florida, Department of Mathematics and Statistics</b><br>Assistant professor                       | 08/2023–present |
| <b>Stanford University, Department of Mathematics</b><br>Szegö Assistant Professor<br>Mentor: Professor Ciprian Manolescu | 09/2020–06/2023 |

## Education

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| <b>Massachusetts Institute of Technology</b><br>Ph.D. in Mathematics<br>Advisor: Professor Tomasz Mrowka<br>Thesis: Contributions to sutured monopole and sutured instanton Floer homology theories | 09/2015–05/2020 |
| <b>Peking University</b><br>B.S. in Mathematics   | 09/2011–06/2015 |

## Research Interests

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Low dimensional topology, especially in Knot theory, Gauge theory, and Floer homology.

## Research Publications

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- Zhenkun Li**, Boyu Zhang, Yi Xie, *Instanton homology and knot detection on thickened surfaces*, to appear: Sel. Math. (New series) (2022).
- John Baldwin, **Zhenkun Li**, Steven Sivek, Fan Ye, *Small Dehn surgeries and  $SU(2)$* , arXiv preprint: 2110.02874 (2021). to appear: Geom. Topol.
- Zhenkun Li**, Boyu Zhang, Yi Xie, *On Floer minimal knots in sutured manifolds*, Trans. Amer. Math. Soc. Ser. B **9** (2022), 499-516.
- Zhenkun Li**, Fan Ye, *An enhanced Euler characteristic of sutured instanton homology*, to appear: Int. Math. Res. (2021).
- Zhenkun Li**, Fan Ye, *Instanton Floer homology, sutures, and Euler characteristics*, arXiv preprint: 2101.05169 (2021). to appear: Quantum Topol.
- John A. Baldwin, **Zhenkun Li**, Fan Ye, *Sutured instanton Floer homology and Heegaard diagrams*, to appear: Compos. Math. (2020).
- Zhenkun Li**, Fan Ye, *Instanton Floer homology, sutures, and Heegaard diagrams*, J. Topol. **15** (2022), 39-107.
- Zhenkun Li**, Boyu Zhang, Yi Xie, *Two detection results of Khovanov homology on links*, Trans. Amer. Math. Soc. **374** (2021), 6649-6664.
- Zhenkun Li**, *Instanton and the depth of taut foliations*, Math. Res. Lett. **28** (2021), no. 4, 1197-1215.
- Sudipta Ghosh, **Zhenkun Li**, *Decomposing sutured monopole and instanton Floer homologies*, to appear: Sel. Math. (New series) (2020)
- Zhenkun Li**, *Knot homologies in monopole and instanton theories via sutures*, J. Symplectic Geom. **19** (2021), no. 6, 1339-1420.
- Zhenkun Li**, *Gluing maps and cobordism maps for sutured monopole Floer homology*, Algebr. Geom. Topol. **21** (2021), no. 6, 3019-3071.
- Zhenkun Li**, *Contact structures, excisions, and sutured monopole Floer homology*, Algebr. Geom. Topol. **20** (2020), no. 5, 2553-2588.

14. Qilong Guo, **Zhenkun Li**, *Width of the Whitehead double of a non-trivial knot*, J. Knot Theory and its Ramifications, **28** (2019), no. 14, 1950081.
15. Qilong Guo, **Zhenkun Li**, *Width of a Satellite knot and its companion*, Algebr. Geom. Topol. **18** (2018), no. 1, 1–13.

## Preprint

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1. **Zhenkun Li**, Boyu Zhang, Yi Xie, *A deformation of Asaeda-Przytycki-Sikora homology*, arXiv preprint: 2302.11109 (2023).
2. **Zhenkun Li**, Fan Ye, *Knot surgery formulae for instanton Floer homology II: applications*, arXiv preprint: 2209.11018 (2022).
3. **Zhenkun Li**, Fan Ye, *Guts of nearly fibered knots*, arXiv preprint: 2208.05382 (2022).
4. **Zhenkun Li**, Fan Ye, *Knot surgery formulae for instanton Floer homology I: the main theorem*, arXiv preprint: 2206.10077 (2022).
5. **Zhenkun Li**, Fan Ye, *SU(2) representations and a large surgery formula*, arXiv preprint: 2107.11005 (2021).
6. Sudipta Ghosh, **Zhenkun Li**, C.-M. Michael Wong, *Tau invariants in monopole and instanton theories*, arXiv preprint: 1910.01758 (2019).

## Publications with High school students

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1. Nithin Kavi, **Zhenkun Li**, Wendy Wu *Trunk of Satellite and Companion Knots*, Topology Appl. **272** (2020), 107054, 1–13.
2. Jessica Zhang, **Zhenkun Li**, *Classification of tight contact structures on a solid torus*, arXiv preprint: 2006.16461 (2020). to appear: Math. Res. Lett.
3. Yi Liang, **Zhenkun Li**, *Some computations on instanton knot homology*, to appear: J. Knot Theory and its Ramifications.

## Works in progress

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1. Sudipta Ghosh, **Zhenkun Li**, *Instanton, knot cobordisms, and bridge index*, in preparation.
2. John Baldwin, **Zhenkun Li**, Steven Sivek, Fan Ye, *Instanton Floer homology and grid diagram*, in preparation.

## Awards

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1. AMS-Simons Travel Grants, 2023-2024.

## Conferences and Talks

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- **Seminar talk**, University of California, Berkeley, Sep 13, 2023.
- **Seminar talk**, University of Maryland, Sep 11, 2023.
- **AMS sectional meeting**, University at Buffalo, Sep 9, 2023.
- **Gauge Theory and Low Dimensional Topology**, University of Miami, Apr 20, 2023.
- **Low Dimensional Topology and Circle-valued Morse Functions**, University of Miami, Feb 6, 2023.
- **AMS sectional meeting**, University of Utah, Oct 22, 2022.
- **Seminar talk**, Harvard University, Sep 15, 2022.
- **Loo-Keng Hua forum for young mathematicians**, Academy of Mathematics and Systems Science, Chinese Academic of Science, Sep 8, 2022.
- **Seminar talk**, Stanford University, Oct 5, 2021.
- **Workshop on Floer homology in low dimensional topology** (virtual), Simons Center at Stony Brook University, Jan 11–15, 2021.

- **Special session on low dimensional topology** (virtual), Joint Mathematics Meeting, Jan 9-10, 2021
- **Seminar talk** (virtual), Stanford University, Nov 17, 2020.
- **Seminar talk** (virtual), Gauge Theory Virtual, Nov 12, 2020.
- **Seminar talk** (virtual), Shanghai Jiaotong University, Nov 6, 2020.
- **Nearly Carbon Neutral Geometric Topology Conference** (Virtual) Jun 1-14, 2020.
- **Seminar talk** (virtual), Regensburg University, May 26, 2020.
- **Seminar talk**, Louisiana State University, Mar 11, 2020.
- **Seminar talk**, Columbia University, Feb 28, 2020.
- **Seminar talk**, California Institute of Technology, Feb 14, 2020.
- **Seminar talk**, Peking University, Jan 7, 2020.
- **Mini lectures**, Tsinghua University, Dec 24–26, 2019.
- **Workshop on gauge theory and Floer homology**, Peking University, Dec 21-22, 2019.
- **Seminar talk**, University of California, Los Angeles, Nov 15, 2019.
- **Seminar talk**, Rutgers University, Oct 22, 2019.
- **Seminar talk**, Princeton University, Sep 24, 2019.
- **AMS Sectional Meeting**, University of Wisconsin, Sep 14–15, 2019.
- **PCMI 2019**, research program seminar, Park City, Jul 05, 2019.
- **Boston Graduate topology seminar**, Boston College, Apr 27, 2019.
- **Seminar talk**, Simons Center for Geometry and Physics, Stony Brook University, Apr 18, 2019.
- **Seminar talk**, Peking University, Apr 11, 2019.
- **Seminar talk**, Center of Mathematical Sciences and Applications, Harvard University, Mar 4, 2019.
- **Fourteenth East Asian Conference on Geometric Topology**, Peking University, Jan 21–24, 2019.
- **Workshop in Geometric Topology**, Calvin College, June 14–16, 2018.
- **Tenth East Asian Conference on Knot Theory and Related Topics**, East China Normal University, Jan 26–29, 2015.