Siqi He

Personal Information[1]

Address: Morningside Center of Mathematics, Academy of Mathematics and Systems Science
No.55 Zhongguancun East Road, Beijing, China, 100190
Birth: Heng Yang, China, June 1991
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Research Interests

- Low dimensional topology and differential geometry
- Gauge theory with non-compact gauge group, in particular, the Kapustin-Witten equations, Vafa-Witten equations, Seiberg-Witten equations with multispinors
- $\mathbb{Z}/2$ harmonic spinors and related geometry problems
- Higgs bundles and the geometry of Hitchin moduli space

Education

Ph.D. in Mathematics, **California Institute of Technology**, June 2018
Advisor: Ciprian Manolescu, Yi Ni
B.S. in Mathematics, **Peking University**, June 2013

Employment

Research Assistant Professor, Simons Center for Geometry and Physics, Stony Brook University, Sep 2018 - Feb 2022
Postdoc Mentor: Simon Donaldson
Associate Professor, Morningside Center of Mathematics, CAS, Since Mar 2022

Publications and Preprints

1. Rotationally Invariant Singular Solutions to the Kapustin-Witten Equations, Math Research Letters, Vol.25, no.4.
2. A Gluing Theorem for the Kapustin-Witten Equations with a Nahm Pole, Journal of Topology, Volume.12, Issue.3, 2019.
3. (with Rafe Mazzeo) The Extended Bogomolny Equations and Generalized Nahm Pole Solutions, Geometry & Topology, Volume 23, Number 5, 2019.
4. (with Rafe Mazzeo) The Extended Bogomolny Equations and Generalized Nahm Pole Solutions II, Duke Math Journal, 169 (2020), no. 12, 2281–2335.
5. The Expansions of the Nahm Pole Solutions to the Kapustin-Witten Equations, submitted, arXiv:1808.03886.
6. (with Thomas Walpuski) Hecke modifications of Higgs bundles and the extended Bogomolny equation, J. Geom. Phys. 146 (2019), 103487, 17 pp.
7. (with Rafe Mazzeo) Classification of Nahm pole solutions of the Kapustin-Witten equations on $S^1 \times \Sigma \times \mathbb{R}^+$, Transactions of the American Mathematical Society, to appear.
8. (with Rafe Mazzeo) Opers and the twisted Bogomolny equations, arXiv:1902.11183, Ann. Sci. Éc. Norm. Supér. (4) 55 (2022), no. 5, 1329–1356.
9. The behavior of sequences of solutions to the Hitchin-Simpson equations, arXiv:2002.08109.
10. On the Moduli Space of the Octonionic Nahm's Equations, CAG, Volume 32, No 4, (2024).

[1] Lastest updated October 27, 2026

11. The Branched Deformation of the Special Lagrangian Submanifolds, arXiv:2202.12282, GAFA, Volume 33, pages 1266–1321, (2023).
12. Existence of nondegenerate $\mathbb{Z}/2$ harmonic 1-forms via $\mathbb{Z}_3$ symmetry, Geom. Dedicata 219 (2025), no. 2, Paper No. 28, 13 pp.
13. (with Rafe Mazzeo, Xuesen Na, Richard Wentworth) The Algebraic and Analytic Compactifications of the Hitchin Moduli Space, Moduli 1 (2024), Paper No. e2, 45 pp.
14. (with Jie Liu) The spectral variety of rank two Higgs bundle over projective variety, Proc. Lond. Math. Soc. (3) 129 (2024), no. 5, Paper No. e70004, 45 pp.
15. (with Jie Liu, Ngaiming Mok) The spectral base and quotients of bounded symmetric domains by co-compact lattices, arXiv:2401.15852.
16. (with Jiahuang Chen) On the existence and rigidity of critical $\mathbb{Z}_2$ eigenvalues, arXiv:2404.05387.
17. (with Greg Parker) Connect sum and torus sum formulas for $\mathbb{Z}_2$ harmonic spinors and 1-forms on 3-manifolds, arXiv:2407.10922, to appear in Geometry & Topology.
18. (with Richard Wentworth, Boyu Zhang) $\mathbb{Z}/2$ harmonic 1-forms, $\mathbb{R}$-trees, and the Morgan-Shalen compactification, to appear in Inventiones Mathematicae.
19. (with Johannes Horn, Nianzi Li)The asymptotics of the SL2(C)-Hitchin metric on the singular locus: subintegrable systems, arXiv:2506.04957.
20. (with Jiahuang Chen) On the non-Archimedean Hitchin map for SL2(F), arXiv:2511.03469.
21. (with Willem Adriaan Salm) Metric perturbations and deformations of k-nondegenerate Z/2-harmonic 1-forms, arxiv.org:2603.14949.
22. (with Willem Adriaan Salm, Andriy Haydys)Deformation rigidity for Z/2 eigensections, arxiv:2604.17044.
23. (With Jiahuang Chen, Dashen Yan) Calabi Surgery for Z/2 harmonic 1-forms, arxiv:2607.24281.
24. (with Greg Parker, Thomas Walpuski)The universal moduli space of non-degenerate Z/2 harmonic spinors, arXiv:2609.02848.
25. (with Jiahuang Chen, Willem Adriaan Salm)Prescribed Singular Sets for Z/2-Harmonic 1-Forms on R^n, arXiv:2609.13059.
26. (with Jie Liu, Siqing Zhang)Local obstructions to the surjectivity of spectral morphisms, arXiv:2609.17139.
27. (with Jiahuang Chen)Examples of Z/2-Harmonic 1-Forms, arXiv:2609.18915.

Conference and Seminar Talks

- Multi-valued Harmonicity, London, Sep 2026.
- Conference on Analysis, Geometry, and Randomness, Sanya, Sep 2026.
- Pacific Rim Complex and Symplectic Geometry Conference, Shanghai, Aug 2026.
- ICBS, Beijing, Aug 2026
- Special activity of the Hitchin-Ngo La, Shanghai, May 2026.
- Teichmüller Theory and Related Topics, USTC, April 2026.
- Geometry and topology seminar, Rugters, April 2026.
- Gauge theory and string topology, Nov 2025.
- East China Topology Conference, Oct 2025.
- EIT Topology Conference, Aug 2025.
- Symposium on Geometry at Large, July 2025.
- 2025 International Conference on PDEs and Geometric analysis (VI), June 2025.
- Geometry and topology seminar, Zhejiang University, May 2025.
- Geometry and topology seminar, Shanghai Tech, April 2025.

- Complex geometry seminar, Beijing, April 2025.
- Joint IMR-IoM Workshop on Complex Geometry, HongKong, Feb 2025.
- East Asian Gauge Theory Conference on Gauge Theory and Related Topics, Nara, Dec 2024.
- Colloquium, Institute for Theoretical Sciences of Westlake University, Dec 2024.
- Geometric Structures, BIMSA, Dec 2024.
- Geometry and Topology Seminar, Humboldt-Universität zu Berlin, Oct 2024.
- Workshop on minimal submanifolds, Beijing Normal University, Oct 2024.
- Differential Geometry seminar, National Center for Theoretical Sciences, Oct 2024.
- Pacific Rim Complex and Symplectic Geometry Conference, IBS Korea, July 2024.
- Frontiers in Geometry and Topology, YMSC, July 2024.
- 2024 Geometry and Topology conference, LiShui, June 2024.
- Moduli space seminar, YMSC, June 2024.
- Advances in Higgs Bundles, University of Maryland, April 2024.
- New trends in Geometry analysis, UCAS, March 2024.
- Geometry seminar, West Lake University, Nov 2023.
- Higgs bundles, non-Abelian Hodge correspondence and related topics, NanKai, Nov 2023.
- IMS Anniversary Symposium on Geometry and Topology, Shanghai Tech, Oct 2023.
- Department Seminar, AMSS, Sep 2023.
- New Trends in Geometry Analysis, LiShui, Jul 2023.
- Topology Seminar, Peking University, April 2023.
- Topology Seminar, BNU, Mar 2022.
- Recent Progress in Mathematics, AMSS, Mar 2022.
- MSRI, Berkeley, Oct 2022.
- Geometry and Topology Seminar, USTC, Oct 2022.
- Geometry Seminar, Shanghai Tech, Sep 2022.
- YMSC, Tsinghua University, Sep 2022.
- ICCM 2023, Beijing, July 2022.
- Topology Seminar, AMSS, June 2022.
- East Asian Conference on Geometric Topology, Online, Jan 2022.
- Geometry and Topology Seminar, StonyBrook University, Nov 2021.
- Geometry and Topology Seminar, UMass, Nov 2021.
- RIKEN Interdisciplinary Theoretical and Mathematical Sciences, Oct 2021.
- NUS analysis and PDE seminar, Oct 2021.
- Simons Collaboration of Special Holonomy, Sep 2021.
- Webinar on APDE, Aug 2021.
- IISc Geometry and Topology seminar, May 2021.
- Topology Seminar, Texas AM, April 2021.
- Geometry and Topology Seminar, University of Waterloo, Feb 2021.
- Geometry, Analysis, and Quantum Physics of Monopoles, Banff, Feb 2021.
- Colloquium, Chinese University of HongKong, Dec 2020.
- Colloquium, Hong Kong University of Science and Technology, Dec 2020.

- Colloquium, Chinese Academy of Science, Dec 2020.
- Colloquium, Fudan University, Dec 2020.
- Colloquium, Zhejiang University, Dec 2020.
- Geometry Seminar, UCSD, Nov 2020.
- Topology Seminar, University of Miami, March 2020.
- Geometry and Topology Seminar, Stanford, Feb 2020.
- Simons Collaboration on Special Holonomy, Jan 2020.
- Topology Seminar, Chinese Academic of Science, Dec 2019.
- AMS Sectional Meeting, Gainesville, Nov 2019.
- AMS Sectional Meeting, Binghamton, Oct 2019.
- Geometry Seminar, Berkeley, April 2019.
- Topology Seminar, Princeton, April 2019.
- Geometry and Topology Seminar, Duke, March 2019.
- CMSA Math Physics Seminar, Harvard, Nov 2018.
- Symplectic Geometry, Gauge Theory Seminar, Columbia, Oct 2018.
- Geometric Analysis Seminar, University of Oregon, May 2018.
- Geometry Seminar, Stanford, February 2018.
- Geometry and Topology Seminar, UCLA, February 2018.
- Gauge Theory and Special Holonomy, Imperial College, January 2018.
- Geometry and Topology Seminar, UC Davis, November 2017.
- Gauge Theory, Topology and Symplectic Geometry Seminar, Harvard, Novmber 2017.
- Topology and Symplectic Geometry Seminar, Simons Center, November 2017.
- Geometry and Topology Seminar, MIT, November 2017.
- The Analysis of Gauge-Theoretic Moduli Spaces, Banff, September 2017.
- Graduate Student Seminar, Caltech, April 2017.
- Geometry and Topology Seminar, UCLA, February 2016.
- Graduate Student Seminar, Caltech, September 2015.

Invited Mini Courses

The extended Bogomolny equation, Higgs bundles, and the Kobayashi-Hitchin correspondence, 4 lectures, ICTS, India, Sep 2026
Lectures on Hitchin equation and SL(2,C) gauge theory, 4 lectures, westlake university, Jan 2026
Lectures on gauge theory with structure group SL(2,C), 4 lectures, YMSC, Dec 2025
Lectures on Z2 harmonic 1-froms, 4 lectures, Australia National university, Nov 2025
Lectures on differential topology, 4 lectures, Yunnan normal university, July 2025
Lectures on Calibrated Geometry, 8 lectures, USTC, July 2023
An Introduction to Gauge Theory, 10 lectures, Chern Institution, July-August 2020
Recent Developments in Higgs Bundles, 4 lectures, Peking University, Dec 2019

Long Term Visiting

Brin Visitor,	University of Maryland, April 2024
Visitor,	Stanford University, February 2024
Member,	MSRI, Berkeley, October-December 2022
Visitor,	Stanford University, January-March 2020
Visitor,	Stanford University, January-February 2018
Visitor,	Stanford University, January-February 2017
Visitor,	Simons Center for Geometry and Physics, September-October 2014

Teaching

AMSS, Instructor:
Spring 2025, Advanced Geometry and Topology
Spring 2024, Riemannian Geometry
Fall 2023, Lectures on Minimal Surfaces
Stony Brook University, Instructor:
Ma 303, Ordinary Differential Equations, Fall 2020 (80 students)
Ma 125, Calculus I, Fall 2019 (300 students)
Ma 123, Precalculus, Fall 2018 (300 students)
California Institute of Technology, Teaching Assistant:
Ma 1a, Calculus, Fall 2017
Ma 1c, Calculus, Spring 2017
Ma 2a, Differential Equations, Winter 2016
Ma 6a, Discrete Math, Fall 2016
Ma 1c, Calculus, Spring 2016
Ma 151b, Algebraic and Differential Topology, Winter 2015
Ma 151a, Algebraic and Differential Topology, Fall 2015
Ma 1c, Calculus, Spring 2015
Ma 1b, Calculus, Winter 2014
Ma 1a, Calculus, Fall 2014
Ma 1c, Calculus, Spring 2014
Ma 3, Introduction to Probability and Statistics, Winter 2013
Ma 2, Differential Equations, Fall 2013

Awards

ICCM Silver Medal for PhD Thesis, 2018
Chinese Government Awards for Academic Excellence, 2009-2013
Gold Medal for team of S.T. Yau college math contests, 2012

Service

Co-Organizer:	New Developments in Analytic and Geometric Aspects of Gauge Theory, Institute for Advanced Study in Mathematics (IASM), Hangzhou, China, May 30–June 4, 2027 (upcoming; BIRS workshop 27w5674) Shanghai conference on geometry and physics, Shanghai 2026 Recent Progresses in Differential Geometry, Beijing 2026 Low Dimensional Topology and Related Topics, Beijing 2025 New Trends in Low Dimensional Topology, YunNan 2023 Morningside Center of Mathematics Geometry Summer School, Beijing 2023 Morningside Center of Mathematics Geometry Summer School, Beijing 2022 AMS Sectional Meeting, Penn State 2020 Simons Center Math Group Meeting 2020
Referee services:	Geometry & Topology, Duke Math Journal, Communication in Analysis and Geometry, Communications in Partial Differential Equations, SIGMA, Journal of Geometry and Physics, Advances in Mathematics, Communications in Mathematical Physics, Journal of London Math Society, Journal of Differential Geometry, Asian Journal of Math, Kirby's Problem List 3, Comm. Pure Appl. Math, SIGMA, Surveys in Differential Geometry, IMRN (3), Compositio Mathematica, Journal of Functional Analysis.
Quick Opinions:	Inventiones Mathematicae, J. Reine. Angew. Math, Advances in Mathematics, Journal of Differential Geometry, Communications in Mathematical Physics, Journal of London Math Society, GAFA, Compositio Mathematica, Proceedings of the London Mathematical Society (PLMS).
Supervision:	Jiahuang Chen, 2023-current, Shiyuan Liang, 2025-current.
Thesis Committees:	Lite Du, CAS 2023, 2026, Kainan Guo, CAS 2024, Guoquan Zhang, CAS 2026.
Other Committees:	Committees for Graduate Admission 2024, 2025, 2026, Committees for Postdoc Admission 2023, 2024, 2025, 2026, ICBS Prize committee for Differential Geometry Section.

Languages

Chinese:	Mother tongue
English:	Fluent