

Junrong Yan

Curriculum Vitae

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Education

2017–2022 **Ph.D.**, *Department of Mathematics*, University Of California, Santa Barbara.

Advisor: Xianzhe Dai

2013–2017 **B.S in Mathematics**, *School of Mathematical Sciences*, Nankai University.

Employment

2024–Current **Zelevinsky Postdoctoral Fellow**, *Department of Mathematics*, Northeastern University.

Mentor: Maxim Braverman

2022–2024 **Boya Postdoctoral Fellow**, *Beijing International Center for Mathematical Research*, Peking University.

Mentor: Xiaobo Liu

Awards and Grants

2018 Wilder Award at UCSB

2022 Boya Postdoctoral Fellowship at PKU

2023 General Program in China Postdoctoral Science Foundation

Research Interests

Global Analysis on noncompact manifolds; spectral theory of Dirac operators; mathematics of quantum field theory; comparison geometry of submanifolds

Papers

Published [1] Xianzhe Dai and Junrong Yan. *Witten deformation for noncompact manifolds with bounded geometry*, Journal of the Institute of Mathematics of Jussieu, 2023, 38 pages

[2] Xianzhe Dai and Junrong Yan. *Witten deformation on non-compact manifold: heat kernel expansion and local index theorem*, 2023, Math. Z., 28 pages

[3] Xinxing Tang and Junrong Yan. *CY/LG correspondence for Weil-Petersson metrics and tt structures*, Journal of Geometry and Physics, 2025, 34 pages

[4] Fagui Li and Junrong Yan. *A first eigenvalue estimate for embedded hypersurfaces in positive Ricci curvature manifolds*. Differential Geometry and its Applications, 2026, 10 pages

Preprint [1] Junrong Yan. *Witten deformation for non-Morse Functions and gluing formula for analytic torsions*, arxiv: 2301.01990, 2023, 39 pages

- [2] Junrong Yan. *A new analytic proof of gluing formula for analytic torsion forms*, arXiv:2301.02591, 2023, 40 pages
- [4] Martin Puchol and Junrong Yan. *Generalized Morse Functions, Excision and Higher Torsions*. arXiv:2407.17100, 2024, 107 pages
- [5] Xianzhe Dai and Junrong Yan. *Weyl Law for Schrödinger Operators on Noncompact Manifolds, Heat Kernel, and Karamata-Hardy-Littlewood Theorem*. arXiv:2504.15551, 2025, 28 pages
- [6] Maxim Braverman, Ahmad Reza Haj Saeedi Sadegh and Junrong Yan. *A Gluing Formula for the \mathbb{Z}_2 -valued Index of Odd Symmetric Operators*. arXiv:2505.07094, 2025, 18 pages
- [7] Minghao Wang and Junrong Yan. *Feynman Graph Integrals on Kähler Manifolds*. arXiv:2507.09170, 2025, 49 pages

Academic Activities

Referee for SIGMA (Symmetry, Integrability and Geometry: Methods and Applications)

Referee for Journal für die reine und angewandte Mathematik

Referee for Pacific Journal of Mathematics

Referee for CMP

Reviewer for zbmath

Undergraduate mentoring (2021 UCSB Directed reading program)

Jiasheng Lin Morse theory and Floer homology

Kai Yan & Xinzhe Li Gauge theory, TQFT and knot theory

Selected Talks

- Mar. 2026 **Graph integral on Kähler manifolds**, *George Mason University, Washington DC*
- Feb. 2026 **Weyl's law on complete manifolds**, *University of California, Santa Barbara, Santa Barbara*
- Feb. 2026 **Graph integral on Kähler manifolds**, *University of California, Irvine, Irvine*
- Jan. 2026 **Graph integral on Kähler manifolds**, *Boston University, Boston*
- Dec. 2025 **Graph integral on Kähler manifolds**, *Wuhan University, Wuhan*
- June. 2025 **Heat kernel expansion, Tauberian theory and Weyl law for Schrodinger operator on noncompact manifolds**, *AMS Special Session on Noncommutative Geometry and Applications, St. Louis*
- June. 2025 **Heat kernel expansion, Tauberian theory and Weyl law for Schrodinger operator on noncompact manifolds**, *Xiamen University, Xiamen*
- May. 2025 **Heat kernel expansion and Weyl's law for Schrödinger-type operators on noncompact manifolds**, *Tsinghua University, Beijing*
- April. 2025 **Heat kernel expansion and Weyl's law for Schrödinger-type operators on noncompact manifolds**, *University of Tokyo, Tokyo*
- Mar. 2025 **Witten deformation for non-Morse functions and gluing formulas**, *Go Fishing 2025–Possion Geometry Meeting, St. Louis*

- Dec. 2024 **Towards the comparison of higher torsion invariants**, *Around Local Index Theorem*, Paris
- Sept. 2024 **Higher torsions and Witten-type deformation**, *Northeastern University*, Boston
- Sept. 2024 **Witten deformation for non-Morse functions and gluing formulas**, *Harvard University*, Boston
- Aug. 2024 **Higher torsions and Witten-type deformation**, *Workshop on Global Analysis Manifolds 2024*, Wuhan
- Feb. 2024 **Witten deformation for non-Morse functions and higher Cheeger-Müller theorem**, *Conference on Dirac operators: analysis and geometry*, Beijing
- Nov. 2023 **Witten deformation for non-Morse functions and gluing formulas**, *University of Freiburg*, Freiburg
- Oct. 2023 **Witten deformation for non-Morse functions and gluing formulas**, *Université Paris-Saclay*, Orsay
- Mar. 2023 **Witten deformation for non-Morse functions and gluing formulas**, *Chern Institute of Mathematics, Nankai University*, Tianjin
- Sept. 2022 **Calabi-Yau/Landau-Ginzburg correspondence for tt^* Structures**, *Peking University*, Beijing
- Jun. 2022 **Calabi-Yau/Landau-Ginzburg correspondence for tt^* Structures**, *The Chinese University of Hong Kong*, Hongkong
- Jan. 2022 **Analytic torsion on noncompact manifolds**, *AMS Special Session on Intersections of geometric analysis and mathematical physics*, Seattle
- Jan. 2021 **Heat kernel expansion and local index theorem on noncompact manifolds**, *Peking University*, Beijing
- Dec. 2020 **Heat kernel expansion and local index theorem on noncompact manifolds**, *Chern Institute of Mathematics, Nankai University*, Tianjin
- Nov. 2020 **Heat kernel expansion and local index theorem on noncompact manifolds**, *East China Normal University*, Shanghai
- Apr. 2020 **Witten deformation on noncompact manifolds and mirror symmetry for Landau-Ginzburg model**, *UCSB Differential Geometry Seminar*, Santa Barbara
- Jan. 2020 **Witten deformation on noncompact manifolds**, *AMS Special Session on Differential Geometry and Global Analysis, I Honoring the Memory of Tadashi Nagano*, Denver
- Nov. 2019 **Witten deformation on noncompact manifolds**, *AMS Special Session on Topics in Global Geometric Analysis*, Los Angeles