

Junrong Yan

Curriculum Vitae

+1(805) 869-9019

j_yan@math.ucsb.edu

j-yan783.github.io/j-yan_math.github.io

Education

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

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

Advisor: Xianzhe Dai

Awards

2018 Wilder Award at UCSB

Research Interests

Geometric Analysis Understanding mirror symmetry from the index theoretic points of view; the analysis of PDEs on noncompact manifolds; gluing formula of global invariants

Mathematics Renormalization theory in QFT and string theory
Physics

Papers

Published Xianzhe Dai and Junrong Yan. *Witten Deformation for Noncompact Manifolds with Bounded Geometry*, Journal of the Institute of Mathematics of Jussieu, 1-38 (2021)

Xianzhe Dai and Junrong Yan. *Witten Deformation on Non-compact Manifold: Heat Kernel Expansion and Local Index Theorem*, Math. Z.

Preprint Xinxing Tang and Junrong Yan. *Calabi-Yau/Landau-Ginzburg Correspondence for Weil-Petersson Metrics and tt^* Structures*, arXiv:2205.05791, 34 pages

In progress Xianzhe Dai and Junrong Yan. *Analytic Torsion for Witten Deformation on Non-compact Manifold*, in preparation

Xianzhe Dai and Junrong Yan. *The Non-semiclassical Weyl Law for Schrodinger Operators on Non-compact Manifolds*, in preparation

Junrong Yan. *Witten deformation for non-Morse Functions and gluing formula for analytic torsions*, in preparation

Junrong Yan. *A new analytic proof of gluing formula for analytic torsion forms*, in preparation

Academic Activities

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

Referee for Journal für die reine und angewandte Mathematik

Reviewer for zbmath

Undergraduate mentoring (2021 UCSB Directed reading program)

Jiasheng Lin Morse theory and Floer homology
Kai Yan & Gauge theory, TQFT and knot theory
Xinzhe Li

Talks and Presentations

- 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*
- Dec. 2020 **Heat kernel expansion and local index theorem on noncompact manifolds**, *Chern Institute of Mathematics, Nankai University*
- Nov. 2020 **Heat kernel expansion and local index theorem on noncompact manifolds**, *East China Normal University*
- Nov. 2020 **Witten deformation on noncompact manifolds: heat kernel expansion and local index theorem**, *UCSB Differential Geometry Seminar*
- Apr. 2020 **Witten deformation on noncompact manifolds and Mirror Symmetry for Landau-Ginzburg model**, *UCSB Differential Geometry Seminar*
- Jan. 2020 **Witten deformation on noncompact manifolds**, *AMS Special Session on Differential Geometry and Global Analysis, I Honoring the Memory of Tadashi Nagano*, Colorado Convention Center, Denver
- Nov. 2019 **Witten deformation on noncompact manifolds**, *AMS Special Session on Topics in Global Geometric Analysis*, UC Riverside
- May 2019 **Witten Deformation on noncompact manifolds**, *UCSB Differential Geometry Seminar*
- Nov. 2018 **Positive scalar curvature and index theorem**, *UCSB Differential Geometry Seminar*

Academic Visiting

Nov. 2020-Jun. 2020, *Peking University*, Professor Huijun Fan
Sept. 2021, *Tongji University*, Professor Changliang Wang

Selected Conferences and Workshops Attended

- Jun. 2018 *25th Southern California Geometric Analysis Seminar*, UC Irvine
- Jun. 2018 *International Conference on Differential Geometry*, Capital Normal University and East China Normal University
- Dec. 2018 *A Celebration of Mathematical Relativity in Miami*, University of Miami
- Jan. 2019 *26th Southern California Geometric Analysis Seminar*, UC San Diego
- Apr. 2019 *Convergence and Low Regularity in General Relativity*, Simons Center
- Jun. 2019 *Workshop on Index Theory, Duality and Related Fields*, Chern Institute of Mathematics, Nankai University
- Jul. 2019 *Summer School of Geometry and Analysis on Manifolds*, East China Normal University
- Sept. 2019 *Special Holonomy-Geometry and Physics*, University of Freiburg

Dec. 2019 *Workshop on gauge theory and Floer homology*, Peking University
 Feb. 2020 SCGAS 2020 Winter School and 27th Southern California Geometric Analysis Seminar, UC Irvine
 Aug. 2020 *2020 Virtual Workshop on Ricci and Scalar Curvature*
 2020-2021 *The Hypoelliptic Laplacian and NCG Seminar*, Washington University in St. Louis.
 2020-2021 *Séminaire Opérateurs de Dirac + Analyse et Géométrie*, IMJ-PRG
 Aug.2021 *Conference on Complex Analysis and Geometry*, National University of Singapore
 Aug.2021 *Conference on Index Theory and Related Topics*, National University of Singapore

Teaching Activities

Instructor *Math 3B: Calculus with Applications*, Summer 2021

Teaching *Math 8: Transitions to Higher Mathematics*, Spring 2018

Assistant *Math 8: Transitions to Higher Mathematics*, Fall 2018

Math 6B: Vector Calculus, Winter 2019

Math 34B: Calculus for Social and Life Sciences, Spring 2019

Math 6A: Vector Calculus, Fall 2019

Math 6A: Vector Calculus, Winter 2020

Math 6A: Vector Calculus, Summer 2020

Math 8: Transitions to Higher Mathematics, Fall 2020

Math 6A: Vector Calculus, Winter 2021

Math 6A: Vector Calculus, Spring 2021

Reader *Math 117: Methods of Analysis*, Fall 2017

Math 108B: Introduction to Linear Algebra, Winter 2018

Math 117: Methods of Analysis, Fall 2019