

# Junrong Yan

## Curriculum Vitae

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📄 [j-yan783.github.io/j-yan\\_math.github.io](https://j-yan783.github.io/j-yan_math.github.io)

### Education

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

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

2022(expected) Advisor: Xianzhe Dai

### Awards

2018 Wilder Award at UCSB

### Research Interests

Geometric Analysis and PDEs    Currently working on Morse theory and Witten deformation on noncompact manifolds;  
Witten Deformed Laplacian and its heat kernel, index theorem, analytic torsion e.t.c.;  
Gluing formula for analytic torsion (forms)

Mathematics    Intending to understand Landau-Ginzburg model and Calabi-Yau/Landau-Ginzburg corre-  
Physics    spondence from index theoretic viewpoint; Renormalization theory and BV quantization

### Papers

Published    Xianzhe Dai and Junrong Yan. *Witten Deformation for Noncompact Manifolds with*  
online    *Bounded Geometry*, Journal of the Institute of Mathematics of Jussieu, 1-38 (2020)

Submitted    Xianzhe Dai and Junrong Yan. *Witten Deformation on Non-compact Manifold: Heat*  
*Kernel Expansion and Local Index Theorem*, arXiv:2011.05468, 1-31 (2020)

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

Xinxing Tang and Junrong Yan. *Weil-Peterson Metric in the Landau-Ginzburg B-Models*,  
in preparation

### Academic Activities

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

Referee for Journal für die reine und angewandte Mathematik

Mentor for 2021 UCSB Directed Reading Program

### 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