Analysis on Singular Spaces

University of Auckland
Wednesday 18 October 2023

Abstracts

Speaker: Gayana Jayasinghe

Title: An extension of the Lefschetz fixed point theorem

Abstract: Atiyah and Bott generalized the Lefschetz fixed point theorem to elliptic complexes on smooth manifolds, and its various incarnations now appear in many areas of mathematics and physics. I will describe a generalization of this theorem for Hilbert complexes associated to Dirac type operators on stratified pseudomanifolds, comparing the local and global formulas for some complexes as the domains of operators change, as well as with related results including the Lefschetz-Riemann-Roch formulas of Baum-Fulton-MacPherson on singular algebraic varieties. I will show how one can compute indices of spin-Dirac operators, self-dual and anti-self dual complexes and other important invariants in mathematics and physics. This is based on the work in https://arxiv.org/abs/2309.15845.

Speaker: Yiannis Loizides

Title: A fixed point formula for Dirac operators on Lie groupoids

Abstract: I will describe an equivariant index formula for a family of Dirac operators on the source fibres of a Lie groupoid. The result complements work of Heitsch-Lazarov and Pflaum-Posthuma-Tang. This is work in progress with Liu, Sadegh and Sanchez.

Speaker: Jesse Gell-Redman

Title: Dirac Operators on Singular Spaces

Abstract: I will discuss some completed work, and some work in progress, on the Fredholm analysis and index theory of Dirac operators on pseudomanifolds. This includes a generalization of Getzler's proof of the families index theorem to wedge spaces satisfying a "Geometric Witt condition", an important distinguishing feature of some operators related to the spectrum of their induced boundary families. This is joint work with Pierre Albin and Paolo Piazza, and separate work of my PhD student Jayson Liu.