Graduate Student Seminar

UNIVERSITY OF NOTRE DAME
Department of Mathematics

Speaker: Stephan Stolz
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Monday, September 6, 2010
4:15 PM
231 Hayes-Healy Hall

Title: The Index Theorem and K-theory

Abstract:

The Atiyah-Singer Index Theorem is a celebrated result relating differential operators, topology and geometry. If D is a differential operator on a compact manifold, which is elliptic (a condition easy to check), then the kernel and cokernel of D are finite dimensional so that its index

index(D)=dim ker D - dim coker D

can be defined. The Atiyah-Singer Index Theorem gives a recipe for how to calculate index(D) in terms of algebraic topology, specifically in terms of a generalized cohomology theory called K-theory. Applied to a specific differential operator known as the Dirac operator, this can be used to show that some manifolds do not admit Riemannian metrics of positive scalar curvature.