

FELIX KLEIN SEMINAR

Guest Speaker: Antonio Ache
University of Notre Dame

Date: Thursday, February 23, 2017

Time: 2:00 PM

Location: 258 Hurley Hall



Lecture Title:

Ricci Curvature and the manifold Learning problem

Abstract

Ricci Curvature is a notion that is central to geometric analysis, among others for its role in the proof of the Poincare Conjecture by means of the Ricci Flow, and in general for its relationship to the study of the geometry and topology of a space. In this talk we consider the statistical problem of estimating the Ricci curvature of a submanifold of Euclidean space from a point cloud that concentrates near the submanifold without knowing any further information. This problem is very much related to the manifold Learning Problem, which consists in understanding the geometric structure of sets of data points that live in high dimensional spaces and has become increasingly important in the last few years. After reviewing some basic but fundamental properties of Ricci curvature, we will mention some important problems in Manifold Learning and then we will explain the connection between probability theory and Ricci curvature that lies at the core of our method. The connection is given by an object called “Carré du Champ” used by Bakry and Emery in their study of logarithmic Sobolev inequalities. This is joint work with Micah Warren