UNIVERSITY OF CALIFORNIA RIVERSIDE

DEPARTMENT OF MATHEMATICS

COLLOQUIUM

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"The differential geometry of the Riemann manifold of Landmark points: metrics, geodesics, curvature, with applications to image processing"

Abstract: In the past few years there has been a growing interest, in diverse scientific communities, in endowing Shape Spaces with Riemannian metrics, so to be able to measure similarities between shapes and perform statistical analysis on data sets (e.g. for object recognition, target detection and tracking, classification, and automated medical diagnostics).

The knowledge of curvature on a Riemannian manifold is essential in that it allows one to infer about the existence of conjugate points, the behavior of geodesic curves, the well-posedness of the problem of computing the implicit mean (and higher statistical moments) of samples on the manifold, and more. In shape analysis such issues are of fundamental importance since they allow one to build templates, i.e. shape classes that represent typical situations in different applications (e.g. in the field of computational anatomy).

The actual differential geometry of Shape Spaces has started to emerge only very recently: in this talk we will explore the sectional curvature for the Shape Space of landmark points, endowed with the Riemannian metric induced by the action of a diffeomorphism group. Applications to Image Processing will be discussed and numerical results will be shown.

Wednesday, November 3rd, 2010

Surge 284

4:10-5:00pm

Tea Time at 3:40pm