

STATISTICS COLLOQUIUM

MONDAY, OCTOBER 03, 2011

TALK: 4:00 PM — SCIENCE CENTER RM. 309

RECEPTION: 5:15 PM — SCIENCE CENTER, 7TH FLOOR

“Three versions of manifolds”

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ABSTRACT

The focus is on the problem of supervised dimension reduction (SDR). We first formulate the problem with respect to the inference of a geometric property of the data, the gradient of the regression function with respect to the manifold that supports the marginal distribution. We provide an estimation algorithm, prove consistency, and explain why the gradient is salient for dimension reduction. We then reformulate SDR in a probabilistic framework and propose a Bayesian model, a mixture of inverse regressions. In this modeling framework the Grassman manifold plays a prominent role. We close with a third perspective, that of learning the manifold the data is supported on. This idea couples Gaussian processes with Lie groups. A probabilistic model for handwritten digits is used to illustrate this perspective.