



MSRI Evans Talk

Monday, Jan 24, 2005, 4:15 pm

to be held in 60 Evans on the UCB campus

“Appearance Manifolds”

David Donoho, Stanford University and MSRI

Consider a collection of images of an object taken when some underlying parameter is varied (pose, articulation, lighting). People in Vision say that this collection of images forms a manifold in high-dimensional space. In my talk, I will explain what this means by giving examples from the Vision literature and then using more traditional mathematical language to frame these concepts. Then I will discuss some of the (to me surprising) properties of such manifolds. For example, they often are nondifferentiable, and yet they can easily be in an appropriate sense isometric to euclidean space. There are fun problems to solve for appearance manifolds. These include: learning a parametrization for isometric manifolds when we observe only scattered points on the manifold and the manifold may have ‘holes’; navigating with high precision when the manifold is nondifferentiable.

I expect to be able to present slides from my own work with Carrie Grimes as well as from work of Dimitri Terzopoulos and Alex Vasilescu and others.