

**Department of Applied Mathematics and Statistics
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SEMINAR

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304 Whitehead Hall
Refreshments: 3:30 p.m.
Seminar: 4:00 p.m.

**A STATISTICAL FRAMEWORK
FOR COARSE-TO-FINE CLASSIFICATION**

ABSTRACT

It is unlikely that complex, high-dimensional problems in machine perception and pattern recognition will yield directly to improved methods of inductive learning. For example, in the case of scene interpretation, it appears that some organizational framework is needed to confront the small amount of data relative to the large (essentially infinite) number of possible explanations, and to systematically exploit the hierarchical nature of the visual world. Computational efficiency is a powerful and general organizing principle. Coarse-to-fine classification is an example. The basic structure is a nested representation of the space of interpretations and a corresponding hierarchy of (binary) classifiers. I will focus on two new components: (i) a design principle for constructing a nested representation which is based on the "effective cost" of a classifier, defined as the ratio of cost to power; (ii) the "trace model" for the history of online computation under coarse-to-fine search. These ideas will be illustrated with a variety of experiments in object recognition.