

**Department of Applied Mathematics and Statistics  
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**SEMINAR**

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November 3, 2005  
304 Whitehead Hall  
Refreshments: 3:30 p.m.  
Seminar: 4:00 p.m.

**AN ARTIFICIAL VISION SYSTEM: THE DISCOVERY OF STRUCTURE**

**ABSTRACT**

We describe how a visual system can automatically define features of interest from the observation of a large enough number of images. The principle complements the low-level feature extractors provided by PCA filters by analyzing their spatial interactions. This is achieved by modeling an internal representation in the system, composed with ternary variables obtained by thresholding the filters, using a Markov random field model. The result is a probability distribution on the internal state of the system which adjusts with its environment, under what we call a principle of homeostasis. When new images enter the system, they are confronted to this internal distribution, and images which appear as salient in this regard are detected as visually relevant.

(This is joint work with Thomas Feldman.)