

**Title:**

Hume-Nash Machines: Context-Aware Models of Learning and Recognition

**Abstract:**

In this talk I'll describe a framework for pattern recognition problems which is grounded in the primacy of relational and contextual information at both the object and the category levels. I'll deal with semantic categorization scenarios involving a number of interrelated classes, the common intuition being the idea of viewing classification problems as non-cooperative games, whereby the competition between the hypotheses of class membership is driven by contextual and similarity information encoded in terms of payoff functions. Contrary to standard classification algorithms, which are based on the idea of assigning similar objects to the same class labels, thereby neglecting category-level similarities, our model will conform to the more general "Hume's similarity principle" which prescribes that similar objects should be assigned to similar categories. According to this perspective, the focus shifts from optimality to Nash equilibrium conditions. Particular emphasis will be given to evolutionary game-theoretic models which offer a fresh dynamical systems perspective to learning and classification problems. Example applications of these ideas will be presented showing the effectiveness of the approach.