Speaker: **Robert Frank**

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Title: **Statistical induction, neural networks,**
                  and grammatical knowledge

Date: Tuesday, September 18, 2007
Time: 10:00am
Place: CLS Library (370 Temple St., ground floor, turn right at entrance)

Abstract:

The past decade has witnessed a resurgence of attention to the role of statistical induction in human language learning. One line of such work argues that proper attention to statistical patterns overcomes traditional arguments from the poverty of the stimulus (APS), and thereby obviates the need for innate grammatical knowledge. In this talk, I will first survey the current state of this debate, focusing attention on artificial neural networks, specifically Elman's Simple Recurrent Networks (SRNs). SRNs are a particularly flexible and powerful technique for statistical induction, and have achieved what appear to be the most impressive results to date. Proponents of SRNs have indeed taken such results to indicate decisively that the APS has been overcome. To assess the veracity of such claims, I will report on two lines of work that explores the capacity of SRNs to extract grammatical generalizations. In one set of experiments, we studied the ability of these networks to learn the structure-sensitive mappings implicated in grammatical operations such as passive and question formation. In another set, we considered the task of learning constraints on referential dependencies in reflexive and pronominal anaphora. Both of these tasks require a more refined sensitivity to grammatical structure than those studied previously. We find that the statistical nature of the training do indeed lead SRNs to a state of knowledge that allows them to succeed quantitatively on data of the sort on which they were trained, but we also observe that networks' generalizations diverge in certain key respects from the target generalizations. We also find variation in networks' ability to extend their grammatical generalizations to novel structures, but find little to no ability at all to generalize to novel lexical items. I conclude by assessing the standing of the APS in light of these results.