Seminar Announcement

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Wednesday, May 1, 2013
Green Hall, Room 0120
10:10AM

Host: Arye Nehorai, PhD

Odor Processing in Biological and Artificial Olfactory Systems

How does the nervous system encode complex sensory stimuli? Studying how the multidimensional and dynamic odor signals are encoded as neural representations and processed by olfactory circuits in the brain will provide valuable insights into the design and computational principles of sensory systems.

In this talk, I will explain how odor signals are processed in the relatively simple olfactory system of the locust. Using electrophysiological recordings, I will characterize odor representations in the first three olfactory processing centers. To clarify the contributions of these olfactory circuits to the odor encoding process, I will present well-constrained computational models of these circuits and demonstrate the transformations that occur as information is transmitted from one circuit to the next.

The fundamental olfactory processing principles are not only important for understanding how the brain interprets odor signals, but are also necessary for engineering solutions inspired by biological computations for addressing several high dimensional and non-linear problems. To conclude, I will briefly discuss my complementary research in the application of olfactory design and computational principles to develop a neuromorphic ‘electronic nose’.