

Seminar

CENTER FOR
ADAPTIVE NEURAL SYSTEMS

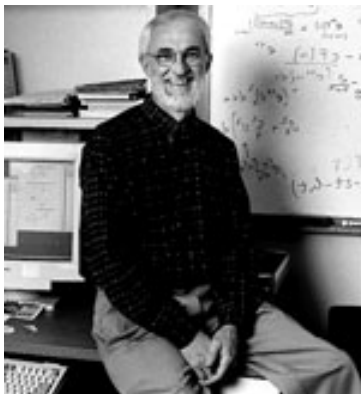
IRA A. FULTON SCHOOL OF ENGINEERING

JOINTLY HOSTED BY:
THE DEPARTMENT OF MATHEMATICS & STATISTICS,
MATHEMATICAL BIOLOGY SEMINAR



Dynamics of Perceptual Bistability John Rinzel, PhD

Abstract: When visualizing an ambiguous scene (such as the Necker cube) one may perceive ongoing temporal alternation between the possible interpretations. Various dynamical models lead to alternating mutual exclusivity with neuronal competition implemented as reciprocal inhibition between neuronal populations. Slow negative feedback sets the basic time scale (seconds) for switching. We will describe two mechanistic frameworks for the switching behavior. If the negative feedback is strong enough it can overcome dominance and alternations occur intrinsically and periodically; noise perturbs the regularity. In an alternative, attractor-based, framework negative feedback is relatively weaker and switches are induced by noise operating on a bistable system. Statistics of the observed alternations provide constraints that favor an operating range near the transition zone between the two mechanisms.



Generally, I am interested in the biophysical mechanisms and theoretical foundations of dynamic neural computation. With a background in engineering (BS: Univ of Florida, 1967) and applied mathematics (PhD: Courant Institute, NYU, 1973) I use mathematical models to understand how neurons and neural circuits generate and communicate with electrical and chemical signals for physiological function. I especially relish developing reduced, but biophysically-based, models that capture a neural system's essence. Before joining the CNS faculty (and jointly that of NYU's Courant Institute of Mathematical Sciences) in 1997, I was in the Mathematical Research Branch at the NIH for nearly 25 years.

Location and Time:

Location: Coor L1-20, ASU
Date: Feb. 21, 2008
Time: 4:00 pm— 5:00 pm

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Map: <http://www.asu.edu/tour/main/coor.html>



"designing adaptive engineered systems to promote adaptation in neural systems"