



Department of Biomathematics Seminar Series:  
Frontiers in Systems and Integrative Biology

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MATH

# Cellular Variability and Information Flow in Signal Transduction Networks



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**4:00 PM**

**A2-342 MDCC, Moss Auditorium**

**Marion Davies Children Clinic**

## **ABSTRACT:**

Signaling networks acts as sensors, or measurement devices, that provides information on the extracellular environment to allow cells to respond to environmental changes appropriately. Experimental single cell measurements of signaling responses indicated high level of response variability raising the possibility that cellular responses are limited in their biochemical accuracy. I will discuss our efforts to examine the question of the accuracy of cellular signal transduction networks. I will show how cells utilize of temporal signal modulation--that is, dynamics--to reduce noise-induced information loss and increase the accuracy of cellular response. In the context of wound response signaling, I will discuss how cells communicate with each other optimally to allow for "local averaging" that increases information about their position relative to the wound. Finally, I will show that cellular population is composed of mixtures of different cellular states, and that the existence of multiple cellular states explains some of the observed cell to cell variability. Through the use of mixture of multiple classes of multivariate cellular responses combined with paracrine information sharing among cells, a cellular population can increase its response appropriately to environmental changes.

Host: Van Savage, Ph.D.

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