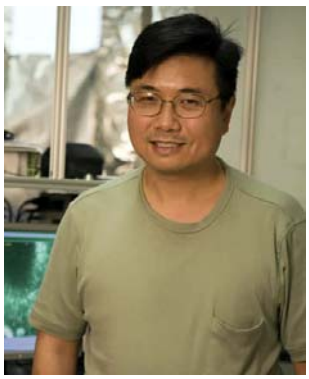
# JOHNS HOPKINS
BIOMEDICAL ENGINEERING

**Monday October 13, 1:00PM, Ross G007**
Light lunch will be provided at noon



## Decoding Ca2+ at a Ca2+ cocktail party—How calmodulin listens as it regulates Ca2+ channels

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Abstract: Cells rely on Ca2+ fluctuations as a universal means of communication—a *lingua franca* of life at the microscopic level. For example, a sudden inrush of Ca2+ triggers nerve cells to convey the thoughts of our brain; and like bursts of Ca2+ cause a heart cell to beat. A longstanding mystery has been how cells and molecules manage to appropriately sense and respond to a cacophony of Ca2+ fluctuations within cells. One particularly elegant and powerful example of optimal Ca2+ decoding concerns the widespread Ca2+ bio-sensor *calmodulin*. This sensor is often positioned right near a cellular Ca2+ entry portal, called a *Ca2+ channel*. While this configuration aides rapid reception of the local Ca2+ flow, it entails serious challenges on another front. In particular, if calmodulin were to respond only to this local Ca2+, and altogether ignore Ca2+ entering through other entry portals at a distance, cellular havoc would result. It would be as if you could only listen to yourself or a close confidant, and never pay attention to the concerns of others. Several years ago, we discovered that calmodulin can somehow switch focus between local Ca2+ and global Ca2+ entering at a distance, much like we can focus on conversations near and afar in a cocktail party. In this manner, calmodulin can preserve cellular harmony. How this remarkable and vital capability arises has been an utter paradox, given the large degree to which local Ca2+ dwarfs global Ca2+. This talk reveals the answer to this mystery, and offers a revealing look at the mechanistic secrets underlying biological signal processing.

**Upcoming seminars**:
October 20: Dr. Justin Sanchez, Univ. of Florida, Gainesville
October 27: Dr. Atam Dhawan, New Jersey Institute of Technology

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