UC DAVIS HEALTH | SCHOOL OF MEDICINE

Department of
Physiology and Membrane Biology

# Distinguished Lecture Series in Physiology

## Michael Hoppa, Ph.D.

Associate Professor
Department of Biology
Dartmouth College of Research

# "Optical approaches to decode synaptic transmission"

Our understanding of brain function is being revolutionized by the deployment of calcium-sensitive optical reporters (GCaMP) that have the ability to resolve single action potentials. However, while the flow of information through a neural circuit is digital (mediated by action potentials), the modulation of how information flows through a neural circuit is not. My laboratory's research seeks to identify the organization, function, and therapeutic potential for ion channels and their binding partners for regulating synaptic function. Ion channel research was propelled by the invention of glass electrodes to precisely measure electrical signals in cell membranes. However, the average neuron in a human brain sends electrical signals across axons that are only 1/1000th the width of a human hair while also sometimes spanning tens of centimeters in length. This precludes the use of standard electrophysiology. Our group has devised and refining optical techniques to measure ion channel activity using genetically encoded optical indicators to overcome these size barriers in the axon and terminals. In this talk, I will describe two new roles of voltage-gated potassium channels and novel binding partners for regulating synapse function using quantitative optogenetic reporters

Thursday, December 1, 2022
GBSF & Zoom
12 p.m.

December
**1**

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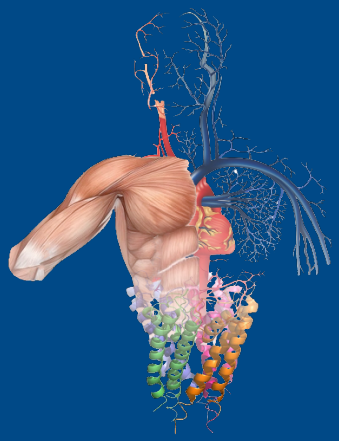

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