IGSN CONFERENCE
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Session 1: Neuroscientific Perspectives: From Cellular Models to Neural Circuits and Behavioral Functions

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FROM BIOSENSOR DESIGN TO BRAIN FUNCTION: ILLUMINATING NEURAL SIGNALING, CIRCUITS, AND BEHAVIOR

How neural circuits give rise to behavior remains one of the central questions in neuroscience. Addressing this challenge requires approaches that link neuronal activity to circuit function and behavioral output across multiple scales.

This presentation highlights a combined strategy of tool development and circuit analysis. First, **PinkyCaMP**, a red-shifted genetically encoded calcium indicator, is introduced as a new tool enabling robust monitoring of neuronal activity in living systems.

Second, hippocampal circuit function is examined in the context of neuromodulation. Using a combination of **calcium imaging with miniature microscopes**, optogenetic manipulation, and electrophysiological recordings, serotonergic influences on hippocampal processing are dissected, revealing pathway-specific effects on spatial learning.

Together, these approaches demonstrate how advances in optical tools and in vivo circuit interrogation can uncover fundamental principles of how brain activity shapes behavior.