



Mon, Aug 25

**Porter Hall
Room B34
12:30 p.m.**



Sandra Kuhlman
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Neuroscience Applications of 2-Photon Microscopy Imaging in Rodent Brains, In-Vivo

Sandra Kuhlman is an Assistant Professor in the Department of Biological Sciences at Carnegie Mellon University.

Neuroscience Applications of 2-Photon Microscopy Imaging in Rodent Brains, In-Vivo"

As adults we constantly face challenges in our environment and must adapt our brain circuits to navigate new situations. The two driving questions of my research are: What are the neural substrates of learning? How are neural circuits for learning constructed in the first place? By splicing the DNA that codes for fluorescent proteins found in jellyfish and corals into the genome of mice, in combination with state-of-the-art multiphoton laser-scanning microscopy, we visualize and track the circuit changes that occur in the brains of animals as they learn new skills. In the first part of the talk I will give an overview of the techniques used in mice to monitor circuit dynamics, including synaptic structure and neuronal activity.

Long-range feedback connections are a prominent feature of all sensory cortices. Historically, much progress has been made in neuroscience by identifying discrete, local circuits that perform specific functions. However, this strategy for understanding the brain is incomplete and does not always take into account the richness of reciprocal and long-rang feedback connections between brain regions. Given recent progress in molecular tools and behavioral analyses, the mouse is an ideal model system to explore these issues. In the second part of the talk I will outline a specific biological question we are currently addressing in the visual system. The ultimate goal is to understand how information is encoded and stored in reciprocally connected networks. We look forward to incorporating engineering approaches to address this issue.

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