

# **BIOENGINEERING**

## **Spring 2019 Seminar**

**Date:** Thursday, May 09, 2019  
**Time:** 12:00 pm - 1:00pm  
**Location:** Krasnow, Room K229



## **Joshua Plotkin, Ph.D.**

**Biography:** Dr. Joshua Plotkin received undergraduate degrees in Biology and Music from the University of Michigan, Ann Arbor. He then attended the University of California, Los Angeles, where he received his PhD in Neuroscience. Dr. Plotkin was a postdoctoral scholar at UCLA and then at Northwestern University. He joined the faculty of Stony Brook University in 2015, where he is now an assistant professor in the department of Neurobiology and Behavior, and a member of the Center for Affective Neuroscience of Depression and Anxiety (CANDA). His lab is focused on elucidating the brain circuit alterations that underlie OCD related behaviors, and mechanisms guiding normal basal ganglia function.

**Title:** Dendritic synaptic integration in striatal spiny projection neurons and compulsive behaviors

**Abstract:** The striatum is the major input nucleus of the basal ganglia, a group of interconnected subcortical nuclei that guide action selection and motor control. Striatal spiny projection neurons (SPNs) are key circuit components of the striatum, and integrate highly convergent synaptic inputs from diverse cortical and subcortical brain regions. SPNs are situated in striosome (patch) and matrix compartments of the dorsal striatum, allowing compartmentalized control of discrete aspects of behavior. In my seminar I will discuss work we have done to elucidate the mechanisms guiding synaptic integration in striosome and matrix SPNs. I will present data that show dopamine signaling through D1-type receptors oppositely modulates dendritic responses to convergent glutamatergic synaptic stimulation in striosome vs matrix SPNs. This suggests a novel role for dopamine in shaping the balance of compartment-specific striatal output. I will then show how compartment-specific differences in dendritic voltage-gated calcium channel availability mediates this phenomenon. I will conclude by presenting data describing a novel axonal projection from the amygdala to dorsolateral striatum SPN dendrites, and how repetitive activation of this pathway can lead to the development of compulsive motor behaviors in mice.

<http://www.plotkinlab.com/>