

# CARNEGIE MELLON UNIVERSITY

## BME 2021 SPRING SEMINAR SERIES

### Editing the Neural Basis of Perception

Mouse V1

100μm



#### PRESENTED BY

##### **Ian Oldenburg**

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Cellular Biology  
Helen Wills Neuroscience Institute  
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#### SCHEDULE

**Tuesday, February  
16, 2021  
(10:45-11:45AM)**

Both sensory perception and motor action involve the coordinated effort of hundreds or thousands of interrelated and genetically similar neurons. Although, current technologies can manipulate genetically identified neurons in a region, they are incapable of selectively manipulating intermingled neurons that differ only by their functional properties. Therefore, new techniques are needed to manipulate cells chosen by their activity patterns in order to dissect the functional elements of perception. To address this technical gap, I developed new optical and optogenetic tools for use with multiphoton stimulation to rapidly and reliably activate or suppress many arbitrary neurons simultaneously in vivo. These tools allow us to manipulate individual or groups of cells selected by their functional properties with the precision to write distinct trains of action potentials in each cell. Using these tools, I am probing the logic of how cells interact in the cortex, recruit inhibition, and alter sensory representations.



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