Next Generation Multiphoton Neuroimaging Technology
For Investigating Neural Circuitry At Scale

Abstract: Much of neural circuitry is buried deep in scattering tissue, beyond the reach of single-photon approaches. Thus, multiphoton imaging (usually two-photon or three-photon) is the leading way to image neural activity with subcellular resolution deep in the brain. Moreover, in the living brain, moment-to-moment neuronal dynamics occur at the subsecond time scale, and across millimeter length scales. We are developing new multiphoton imaging technology to cover this region of the parameter space, and thus enable new neuroscience experiments. I will discuss our accomplishments to date, our latest unpublished work, and our plans for the future of multiphoton imaging in neuroscience.

Biography: Spencer LaVere Smith (B.S., physics and mathematics, U. Iowa; Ph.D, neuroscience and neuroengineering, UCLA; postdocs at UCLA and University College London). Smith’s research uses state-of-the-art multiphoton imaging, electrophysiology, and quantitative behavior to reverse engineer the neuronal activity dynamics that encode visual stimuli and guide adaptive behavior. His lab (slslab.org, labrigger.com) has developed novel multiphoton imaging instrumentation to measure neuronal activity across multiple brain areas simultaneously with subcellular resolution. His awards include the Hettleman Prize (2017), the McKnight Technological Innovation Award (2015), a Klingenstein-Simons Fellowship (2013), and a Human Frontier Science Program Career Development Award (2012).