1131-92-308 **Andrea K. Barreiro*** (abarreiro@smu.edu), POB 750156, Dallas, TX 75275. *Constraining neural networks with spiking statistics.*

As experimental tools in neuroscience have advanced, measuring whole-brain dynamics with single-neuron resolution is becoming closer to reality. However, a task that remains technically elusive is to measure the interactions within and across brain regions that govern such system-wide dynamics. We propose a method to derive constraints on hard-to-measure neural network attributes — such as inter-region synaptic strengths — using easy-to-measure spiking statistics.

First, we propose a closure formula for multi-population firing rate models which allows fast evaluation of equilibrium statistics. Second, fast evaluation allows us to survey the high-dimensional parameter space of admissible networks, to find which part of parameter space is consistent with the experimental data.

As a test case, we studied interactions in the olfactory system. We used two micro-electrode arrays to simultaneously record from olfactory bulb (OB) and anterior piriform cortex (PC) of anesthetized rats who were exposed to several odors. We were able to make several predictions about the network, notably that inhibition within the afferent region (OB) has to be less than inhibition in PC. This is joint work with Cheng Ly (VCU), S.H. Gautam and Woodrow Shew (U. Arkansas). (Received July 17, 2017)