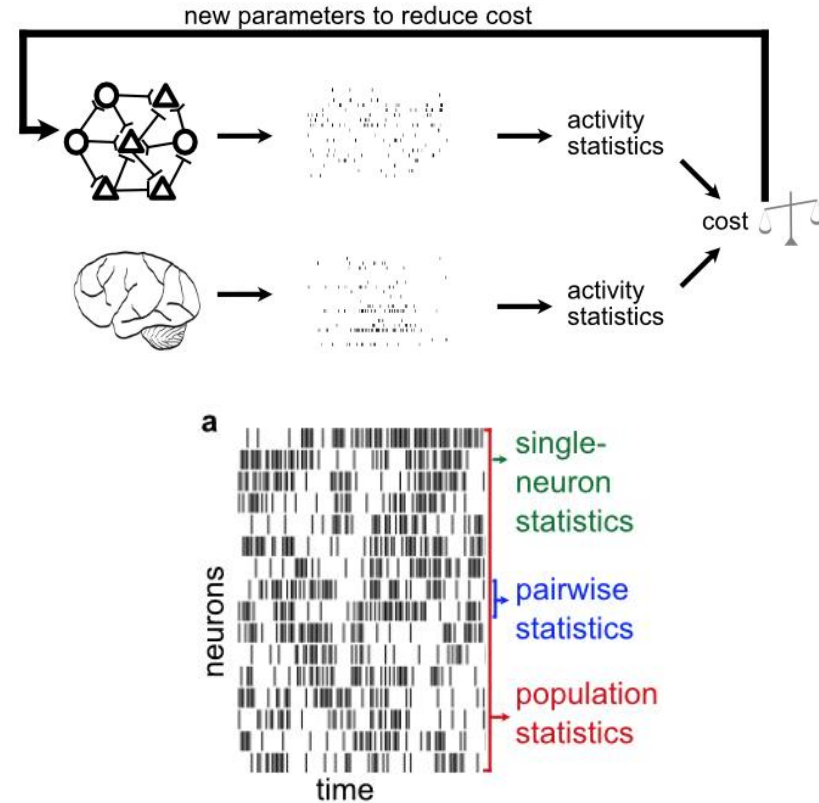


Automatic fitting of spiking networks to neuronal activity

- Fitting a spiking network model to produce realistic neuronal activity is a fundamental problem in theoretical neuroscience
- Large networks with thousands neurons and tens of parameters are hard to fit with brute force
- We developed a Bayesian optimization framework to automatically fit a spiking network to the activity statistics of real neuronal recordings
- It matches population statistics (i.e., those returned by dimensionality reduction) between model-generated activity and activity recorded from the brain.



Automatic fitting of spiking networks to neuronal activity

- Our framework outperforms random search and can recover ground truth statistics in simulation
- Applying the framework to multi-electrode recordings in macaque V4, we found that a spatial balanced network (Huang et al, 2019) better reproduces a variety of activity statistics than the classical balanced network
- The method is an efficient way to identify deficiencies in spiking network models and suggest improvements to better match recorded activity

