



# Computer Vision and Statistics for Neuroscience

## 2 Postdoc Openings

## Duke University and John Hopkins U.

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The Allen Institute for Brain Science, John Hopkins University, Duke University, UNC, UCSF, and UCSD, are collaborating on an \$8.7 million, five-year Transformative Research Award from the National Institutes of Health (NIH) to lead the creation of a publicly accessible model of synapse populations in mouse and human brains. Synapses play a crucial role in many brain diseases and disorders, and the Open Synaptome Project that will be generated through this grant promises to change the way researchers approach the study of those diseases.

Transformative Research Awards from the NIH recognize projects that have the potential to drive major advances in biomedical and behavioral research with their novel approaches and broad impact.

Synapses are the areas of connection and information transfer between individual neurons in the brain. A single neuron can have as many as ten thousand synapses, each of which is itself a complex signal-processing machine. Although many brain diseases and disorders are rooted in abnormalities of synapse populations, including neurotransmitter-related diseases like Parkinson's and major depression, their tiny size and highly complex nature have made synapses historically challenging to study, and the related diseases difficult to diagnose and treat.

Researchers on this grant are part of an international consortium that includes neurobiologists, biophysicists, clinicians, mathematicians and computer scientists. They will use powerful new imaging technologies to measure, analyze and model synapse populations in both mouse and human brains. A three-dimensional imaging technique pioneered by PI Smith (Allen Institute) during his tenure at Stanford University called array tomography will be used to study the complex protein expression at each synapse site.

The outcome of the project will be the Open Synaptome Project, in which the data and tools for the study's pipeline will be made publicly available for researchers around the world, enabling labs to more efficiently and effectively study synapse populations in other regions of the brain. Because the work funded by this grant will take place in both mouse and human brain samples, the resulting synaptome model will fuel our ability to translate knowledge from commonly used laboratory models into treatments for human disorders.

The postdoc candidates must have well demonstrated background (via publications in leading journals and conferences) in the areas of computer vision and image processing (position one) and statistical analysis (position two) as well as development of efficient software for complex problems. Experience in big data in neuroscience is a plus. The successful candidates will collaborate closely with JHU, UNC, and the Allen Institute. The positions are immediately available, though some flexibility on the starting date exists.

If qualified and interested, please contact the Duke PI at [guillermo.sapiro@duke.edu](mailto:guillermo.sapiro@duke.edu) or the JHU PI at [jovo@jhu.edu](mailto:jovo@jhu.edu).