Postdoctoral Positions
Computational Modeling and Systems Neuroscience

Vaziri Laboratory of Neurotechnology and Biophysics
The Rockefeller University, New York, NY
https://vaziri.rockefeller.edu

Our lab has been focused on the **development and application of advanced optical imaging** technologies to advance neuroscience. Over the last years, we have developed a portfolio of optical technologies that allow for **large-scale and whole-brain optical recording and manipulation of neuroactivity** at high spatiotemporal resolution across model systems with with our most recent imaging technology capable of recording the activity of **up to 1 million neurons** distributed across different depths of both hemispheres of the mouse cortex at single cell resolution [1]. Using this data we have found an unbounded scaling of dimensionality with neuron number [2]. While half of the neural variance lies within a low number of behavior-related dimensions, we find this unbounded scaling of dimensionality to correspond to an ever-increasing number of internal variables without immediate behavioral correlates. The activity patterns underlying these higher dimensions are fine-grained and cortex-wide distributed, highlighting that large-scale recording is required to uncover the full neural substrates of internal and potentially cognitive processes.

Which fundamental questions in neuroscience would you be able to uniquely address with such capabilities and how would you use such data to inform computational models about the brain?

We are welcoming applications from creative, highly motivated, and ambitious candidates interested in pursuing projects based on their own ideas or within existing lines of work at the interface of experimental and computational system neuroscience.

Qualifications

- Highly motivated, ambitious, and creative
- Ph.D. in computational / systems neuroscience, computer science, physics, electrical engineering, or related field.
- Prior experimental work in one and more of these areas: statistical analysis of large-scale experimental data, computational modeling, machine leaning, systems neuroscience, multi-photon microscopy, design of behavioral experiments in rodents.
- Programming skills (Matlab, Python)
- Excellent organizational and communication skills, ability to work in an interdisciplinary team and willingness to work outside their core expertise

Salary range: $70,000–$70,000 per year

How to apply

Interested candidates should submit their **CV** (including **publication list**) and contact information of at least **two references** at:
https://academic-rockefelleruniversity.icims.com/jobs/1416/postdoctoral-associate-|-laboratory-of-neurotechnology-and-biophysics/job

For more information and to see our list of open positions, please visit https://vaziri.rockefeller.edu

References

[1.] J. Demas, J. Manley, F. Tejera, K. Barber, H. Kim, F. Martínez Traub, B. Chen, and A. Vaziri, *High-Speed, Cortex-Wide Volumetric Recording of Neuroactivity at Cellular Resolution using Light Beads Microscopy.* **Nature Methods 18**: 1103-1111 (2021).
[2.] J. Manley, J. Demas, H. Kim, F. Martínez Traub and A. Vaziri, *Simultaneous, cortex-wide and cellular-resolution neuronal population dynamics reveal an unbounded scaling of dimensionality with neuron number*, doi:10.1101/2024.01.15.575721**, bioRxiv** (2024).