Postdoctoral Associate: Neurotechnologies for Mesoscale Optical Interrogation of Neuronal Circuits

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About Us

The emergence of new optical technologies combined with advanced computational and molecular tools have led to major advances of our understanding of how the circuitry and dynamics of neuronal populations give rise to brain functions and behavior. 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 an emphasis on development of imaging tools for highly scattering brain tissues [1-5]. In our most recent imaging technology, we have demonstrated that **up to 1 million neurons** distributed across different depths of both hemispheres of the mouse cortex can be recorded at single cell resolution [5].

Job Description

We are looking to recruit a Postdoctoral Associate to join our multidisciplinary and collaborative lab to work at the interface of optics and neuroscience on a project aimed at advancements and applications of our recently developed Light Beads Microscopy (LBM) technology. As part of an experienced team embedded in a collaborative environment, you will be involved in the conception and spearhead the design, construction, and testing of a novel optical imaging platform for large-scale, volumetric high-resolution optical interrogation of neuronal activity. You will be supported by several senior members of the lab and build on the existing and currently developed protypes while driving the development of various computational aspects of the system and perform neuro-imaging experiments and data analysis. In collaboration with both members of our lab and our network of external collaborators the developed system will be subsequently applied to understand neurocomputations underlying visual perception and generation of flexible and adaptive behavior. Further, you will contribute to our various ongoing efforts on disseminating our technologies, both through open-source mechanisms and through commercial partners.

Qualifications

We are welcoming applications from creative, highly motivated, and ambitious candidates interested in pursuing interdisciplinary projects at the forefront of microscopy and imaging technology development by combing advanced optics, systems neuroscience and computation with the following qualifications:

- Ph.D. in physics, (quantum) optics, optical engineering, electrical engineering or systems neuroscience or related area
- Prior experimental work in one and more of these areas is highly desirable: designing and constructing optical setups or instruments, working experience with ultra-fast laser systems, multi-photon microscopy, fiber optics, AMO physics, statistical data analysis, systems neuroscience, *in vivo* rodent imaging and handling
- Programming skills (Required: Matlab or Python, Preferred: Zemax, SolidWorks, Autodesk Inventor)
- Excellent organizational and communication skills, ability to work in an interdisciplinary team and willingness to work outside their core expertise

How to apply

Interested candidates should send their **CV** including **list of** their **publications** as well as the contact information of at least **two references** to vaziriadmin@rockefeller.edu. For more information and to see our list of open positions, please visit our website at: https://vaziri.rockefeller.edu/

References
1. Andrasfalvy, B., et al., *Two-photon Single Cell Optogenetic Control of Neuronal Activity by Sculpted Light.* **PNAS**, (2010). 107(26): 11981-11986.
2. Losonczy, A., et al., *Network mechanisms of theta related neuronal activity in hippocampal CA1 pyramidal neurons.* **Nature Neuroscience**, (2010). 13(8): 967-72.
3. Prevedel, R. et al., *Fast volumetric calcium imaging across multiple cortical layers using sculpted light*. **Nature Methods,** (2016). 13: 1021-1028
4. Weisenburger, S. et al., *Volumetric Ca2+ Imaging in the Mouse Brain using Hybrid Multiplexed Sculpted Light (HyMS) Microscopy*. **Cell** (2019), 177: 1-17.
5. Demas, J., et al., *High-Speed, Cortex-Wide Volumetric Recording of Neuroactivity at Cellular Resolution using Light Beads Microscopy*. **Nature Methods,** (2021). 18: 1103-1111.