PhD and Postdoc positions:
Systems Neuroscience & Machine Learning

Research Institute of Molecular Pathology (IMP) and University of Vienna, Austria

Background

Over the last decade neuroscience has been revolutionizing our understanding of the brain. This revolution is expected to continue and transform other fields such as artificial intelligence, information processing and computing in the coming decade. The underlying drivers of this transformation have been the emergence of new optical and molecular tools combined with advanced mathematics, statistics and machine learning tools. Our lab has made major contributions in this context which has put us now internationally at the forefront of the field.

What we do

We have pioneered optical techniques that allow near-simultaneous activation [1, 2] and recording of neuronal activity at the whole-brain level and with single-cell resolution in small model organisms [3, 4]. Thereby we are now for the first time in a unique position to discover the underlying principle of some of the most fundamental question about the brain: How is sensory information represented by the brain? How does the brain learn? How does the brain make decision?

We are addressing these questions in model organisms such as zebrafish larvae and rodents.

Projects

We are currently looking for highly motivated and ambitious candidates for the following projects:

- **Dynamic transformation of sensory inputs across brain hierarchies and behavior**
- **Dynamics of neuronal circuits underlying decision making**
- **Algorithms underlying cortical computation**

Qualifications

- Highly motivated, ambitious and passionate about science
- Degree (Bachelor, Masters or PhD) in (systems) neuroscience, physics or statistics
- Experience with two-photon and/or confocal microcopy (desired)
- Experience working with zebrafish or rodents as a neuroscience model organism and/or with genetic tools
- Experience with animal behavioral assays (desired)
- Experience with craniotomy surgery in rodents for chronic brain imaging and stereotaxis instruments (desired)
- Experience in data-acquisition and analysis (e.g. Matlab)
- Ability to work in an interdisciplinary team, managing multiple tasks, good organizational skills, willingness to work outside their core expertise
- Good communication and presentation skills (Scientific English, Powerpoint)

The successful applicants will be embedded in the larger Vienna biology and physics community and benefit from our network of collaborations. These provide opportunities for research experience at top research institutions in Europe and the US. Candidates should send their CV including publications, transcripts and the contact information of two references to Prof. Alipasha Vaziri (vaziri@imp.ac.at) and visit our website www.vaziria.com for more information

References

1. Andrasfalvy, B., et al., *Two-photon Single Cell Optogenetic Control of Neuronal Activity by Sculpted Light.* **PNAS**, 2010. **107**.
2. Losonczy, A., et al., *Network mechanisms of theta related neuronal activity in hippocampal CA1 pyramidal neurons.* **Nature Neuroscience**, 2010. **13**(8): p. 967-72.
3. Schrodel, T., et al., *Brain-wide 3D imaging of neuronal activity in Caenorhabditis elegans with sculpted light.* **Nature Methods**, 2013. **10**(10): p. 1013-1020.
4. Prevedel, R., et al., *Simultaneous whole-animal 3D imaging of neuronal activity using light-field microscopy.* **Nature Methods**, 2014. **11**(7): p. 727-730.