



Athinoula A.
Martinos
Center
For Biomedical Imaging

MGH/HST Athinoula A. Martinos
Center for Biomedical Imaging



Postdoctoral Research Fellow Position at Massachusetts General Hospital

The Athinoula A. Martinos Center for Biomedical Imaging, Department of Radiology at Massachusetts General Hospital is offering one postdoctoral position based on an NIH-funded Brain Initiative project developing novel multi-modal neuroimaging methodology in animal models. This position is open now until filled.

Potential candidates will be considered based on the following two research directions:

Research Direction #1 Multi-modal neuroimaging in animal brains, (Biologists/biomedical engineers/electrophysiologists)

- a) Implement the MRI/EEG/calcium recording methods to specify brain state fluctuation correlated to pupil dynamics in awake rodents
- b) Target specific nuclei with deep brain optogenetic stimulation methods to study circuit-specific brain state neuromodulation.
- c) Develop an advanced fiber-optic imaging device for MRI compatible concurrent brain dynamic signal recordings, e.g., Ca^{2+} , Glutamate, dopamine, and other neuromodulators.

Experience with viral transfection, 2-PM or optical fiber recordings, or *in vivo*. / *in vitro*. electrophysiology in animal models (rodents) is highly desirable. The candidates should bear experience or strong interests in brain functional imaging, e.g. task-based BOLD fMRI.

Research Direction #2 Advanced fMRI and computational method development (Bio-engineering and computational neuroscientists)

- a) Develop and optimize the high spatiotemporal fMRI method with high field MRI (>11.7T).
- b) Advanced resting-state fMRI analysis method development based on the neural network-based learning schemes. (being familiar with recurrent neural network design and implementation, e.g. ESN, GRU, et al.)
- c) Machine learning-based multi-modal brain signal dynamic signal analysis, e.g. LFP, Calcium, fMRI, pupil dynamics, et al.

Candidates with strong computational skills and fMRI data processing experience are highly encouraged to apply for this position. The candidate should have strong teamwork skills to fit in a multi-disciplinary group.

Please send your CV, contact information of three references, and a cover letter describing your background, interests, and research goals to Dr. Yu by e-mail: xyu9@mg.harvard.edu. Please include "Postdoc Application for Multi-modal fMRI" in the subject line of your email.

We welcome trainees with high motivation, curiosity, and scientific maturity. Also, Dr. Yu's lab has extensive experience to support trainees to apply for international scholarships and help junior researchers to build their academic careers.

Here is the selected publication in 2019-20 from Yu lab:

1. Chen Y, Sobczak F, Pais-Roldán P, Schwarz C, Koretsky AP, Yu X. Mapping the Brain-Wide Network Effects by Optogenetic Activation of the Corpus Callosum. *Cereb Cortex*. 2020 Oct 01; 30(11):5885-5898. PMID: [32556241](#).
2. Sobczak F, He Y, Sejnowski TJ, Yu X. Predicting the fMRI Signal Fluctuation with Recurrent Neural Networks Trained on Vascular Network Dynamics. *Cereb Cortex*. 2020 Sep 17. PMID: [32940658](#).
3. Drew PJ, Mateo C, Turner KL, Yu X, Kleinfeld D. Ultra-slow Oscillations in fMRI and Resting-State Connectivity: Neuronal and Vascular Contributions and Technical Confounds. *Neuron*. 2020 09 09; 107(5):782-804. PMID: [32791040](#).
4. Pais-Roldán P, Takahashi K, Sobczak F, Chen Y, Zhao X, Zeng H, Jiang Y, Yu X. Indexing brain state-dependent pupil dynamics with simultaneous fMRI and optical fiber calcium recording. *Proc Natl Acad Sci U S A*. 2020 03 24; 117(12):6875-6882. PMID: [32139609](#).
5. Ovsepian SV, Jiang Y, Sardella TCP, Malekzadeh-Najafabadi J, Burton NC, Yu X, Ntziachristos V. Visualizing cortical response to optogenetic stimulation and sensory inputs using multispectral handheld optoacoustic imaging. *Photoacoustics*. 2020 Mar; 17:100153.
6. Handwerker J, Pérez-Rodas M, Beyerlein M, Vincent F, Beck A, Freytag N, Yu X, Pohmann R, Anders J, Scheffler K. A CMOS NMR needle for probing brain physiology with high spatial and temporal resolution. *Nat Methods*. 2020 01; 17(1):64-67. PMID: [31768059](#).
7. Chen X, Sobczak F, Chen Y, Jiang Y, Qian C, Lu Z, Ayata C, Logothetis NK, Yu X. Mapping optogenetically-driven single-vessel fMRI with concurrent neuronal calcium recordings in the rat hippocampus. *Nat Commun*. 2019 11 20; 10(1):5239. PMID: [31748553](#).
8. He Y, Wang M, Yu X. High spatiotemporal vessel-specific hemodynamic mapping with multi-echo single-vessel fMRI. *J Cereb Blood Flow Metab*. 2020 Oct; 40(10):2098-2114. PMID: [31696765](#).
9. Chen Y, Pais-Roldan P, Chen X, Frosz MH, Yu X. MRI-guided robotic arm drives optogenetic fMRI with concurrent Ca²⁺ recording. *Nat Commun*. 2019 06 10; 10(1):2536. PMID: [31182714](#).
10. Pais-Roldán P, Edlow BL, Jiang Y, Stelzer J, Zou M, Yu X. Multimodal assessment of recovery from coma in a rat model of diffuse brainstem tegmentum injury. *Neuroimage*. 2019 04 01; 189:615-630. PMID: [30708105](#).