MASSACHUSETTS GENERAL HOSPITAL

Harvard-MIT Health Sciences & Technology

MGH/HST Athinoula A. Martinos Center for Biomedical Imaging

Research Fellowship in Acquisition and Reconstruction Strategies for High-Fidelity MRI

A post-doctoral position to develop acquisition/reconstruction strategies for high-fidelity MRI is available at the Martinos Center for Biomedical Imaging, Massachusetts General Hospital (MGH) and Harvard Medical School (HMS) in Boston under the supervision of Dr Berkin Bilgic and Dr Yohan Jun. This fellowship in image reconstruction and sequence development will be supplemented with further mentorship in clinical translation by Dr Camilo Jaimes.

The position will capitalize on state of the art clinical 3T magnets (Siemens: Vida, Prisma, Skyra; GE: Premier), while the developed software technologies will be able to take advantage of additional cutting edge hardware housed at the Martinos Center, such as the unique Connectome 2.0 magnet (with 500 mT/m maximum gradient and 600 T/m/s slew rate), a Terra.X 7T scanner, Skope field monitoring systems, combined B0 shim/radiofrequency "AC/DC" coils as well as a multi-channel TMS head coil. Additional systems that will become operational within a year include a Cima.X scanner (with 200 mT/m gradients) as well as a second 7T system featuring "Impulse" gradients that will push the gradient specifications to 200 mT/m max gradient and 900 T/m/s slew rate. This synergistic approach that combines software and hardware technologies exemplifies the collaborative environment at the Martinos Center.

The acquisition methods that will be explored span a range of applications (e.g. neurodevelopment, aging, degenerative diseases) and contrast mechanisms (e.g. diffusion, relaxometry, susceptibility). Potential research foci include,

i. high-resolution neuroimaging at the mesoscale to examine cortical architecture,
ii. efficient quantitative imaging to map biophysical tissue parameters and probe tissue composition,
iii. development of novel readouts to exploit Connectome 2.0's ultra-high gradient amplitude and slew rates,
iv. incorporation of field monitoring into the reconstruction to boost the fidelity of such novel readouts,
v. motion correction techniques and self-supervised AI reconstruction and to improve data fidelity.

The position provides an opportunity to collaborate with a diverse group of researchers developing cutting edge technology that impacts both the neuroscience and clinical research communities. This role will also provide an opportunity for an academic-industrial partnership with e.g. GE Healthcare and Siemens Healthineers in translating new technologies into work-in-progress packages.

A PhD in electrical/biomedical engineering, physics, or a related field is required. The candidate should have experience in MR physics, image reconstruction and pulse sequence programming. Experience with Pulseq, and Siemens IDEA and GE EPIC environments are desirable.

Application: Enquiries may be directed to Drs. Bilgic (bbilgic@mgh.harvard.edu) and Jun (yjun@mgh.harvard.edu). Further information can be provided in an in-person meeting in Hawaii. The position is full-time with benefits and is available immediately. MGH is an Equal Opportunity/Affirmative Action Employer.