Postdoctoral Fellowship in Motion-Resilient Pediatric Neuroimaging

Perelman School of Medicine
UNIVERSITY *of* PENNSYLVANIA

Description of Research:

Dr. Dylan Tisdall is recruiting a postdoctoral fellow to join the Robust Methods for Magnetic Resonance (RMMR) group at the University of Pennsylvania (http://rmmrgroup.org). The fellow will join an NIH-funded project combining the resources of RMMR and NOUS Imaging (http://firmm.io) to develop and disseminate novel acquisition and reconstruction methods. Research will focus on improving the quality, accessibility, and validity of clinical and research neuroimaging studies in infants and young children.

Without vNavs | With vNavs
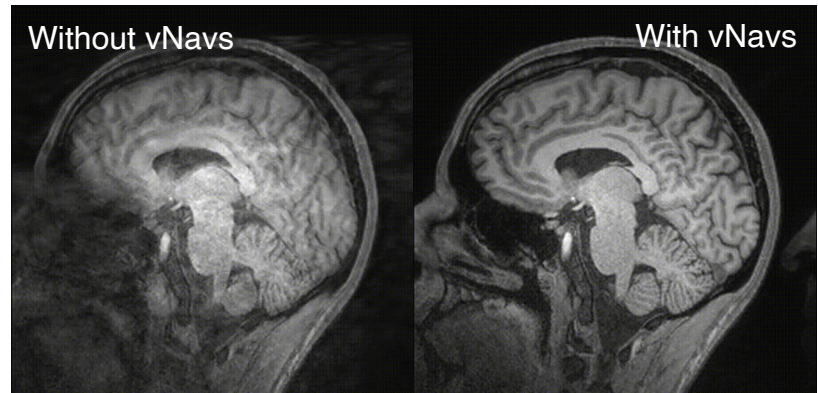
The major technical goals of the project will be: 1) development of novel methods to detect and quantify subject motion using navigators or self-navigated acquisitions; 2) integration of these technologies with real-time displays of motion and data quality, to help scanner operators adapt their protocols to each subject; and 3) development of prospective and retrospective motion-correction methods. Fellows will build upon the lessons learned and technologies developed in the volumetric navigators (vNavs) motion tracking and prospective correction framework — used in the Adolescent Brain Cognitive Development (ABCD), Human Connectome Project – Development, and HEALthy Brain and Child Development Phase 1 studies. They will also collaborate with NOUS imaging, whose widely used FIRMM motion monitoring and display product is currently being refined for clinical applications. Work will include:

- developing novel pulse sequences and image reconstruction pipelines to minimize motion effects in structural, functional, and diffusion-weighted MRI;
- developing methods for predicting image quality from real-time motion measurements;
- collaborating with NOUS Imaging on the integration of these technologies with FIRMM; and
- collaborating in the evaluation these technologies in pediatric neuroimaging studies.

Qualifications:

Applicants should have a PhD in Biomedical Engineering, Computer Science, Electrical Engineering, or a related field. A track record of research in the acquisition and/or analysis of medical imaging data, particularly MRI, is preferred. Experience with MRI pulse sequence development and/or reconstruction, particularly in the Siemens IDEA environment, is highly valued. However, researchers with strong scientific and C/C++ programming backgrounds can also receive training to learn pulse sequence development during the fellowship. Experience with Python, Matlab, Mathematica, or other tools for rapid prototyping and data analysis is also desired.

Neuroimaging Research at Penn:

The University of Pennsylvania hosts a diverse research program in neuroscience and neuroimaging, with a strong emphasis on cross-department collaboration. Research-dedicated MRI instrumentation includes two 3T Siemens Prisma scanners and a 7T Siemens Terra scanner, as well as research-shared 1.5T and 3T scanners in the adjacent adult and pediatric hospitals. Our research-dedicated 3T and 7T scanners also have Kineticor motion-tracking cameras installed, which can be integrated with the new technologies developed in this project.

Applying:

The University of Pennsylvania is an equal opportunity employer; women and members of other underrepresented populations in science and engineering are particularly encouraged to apply.

Please contact Dr. Dylan Tisdall (mtisdall@pennmedicine.upenn.edu) and provide 1) a cover letter outlining research interests, experience, and qualifications; 2) a CV; and 3) the names of two references.