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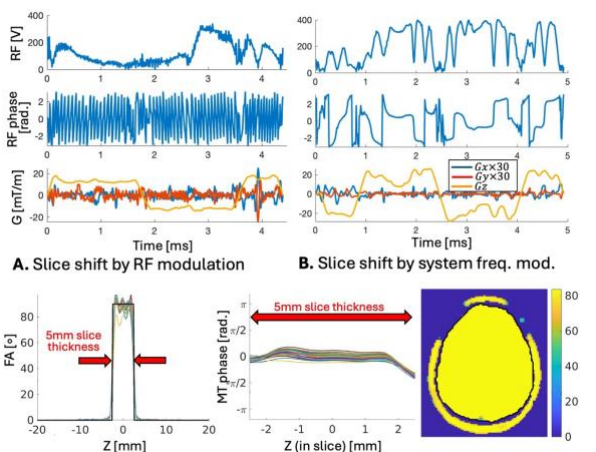
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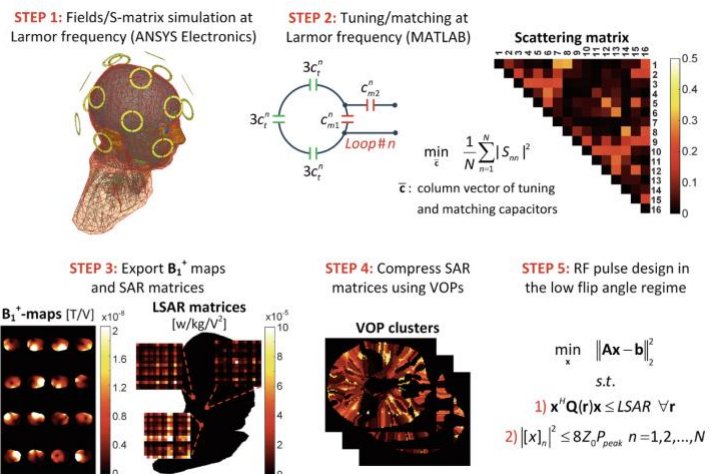
Postdoctoral fellowship: Parallel transmission and RF engineering for ultra-high field MRI

I am looking for highly accomplished and motivated candidates to work in my laboratory located in the Athinoula A. Martinos Center for Biomedical Imaging in Charlestown, Massachusetts, on RF modelling, pulse design and coil design and construction for 7T MRI. The laboratory is part of the Massachusetts General Hospital. The ideal candidate should have a PhD in mathematics, physics and/or engineering. Practical expertise with RF hardware development and computational modelling is required. A proven track record of publications is essential.

Ultra-high field MRI has improved image quality and resolution compared to conventional 1.5T and 3T field strength but suffers from severe distortions of the RF field. This leads to non-uniform flip-angle and contrast weighting across the field-of-view and low contrast in the temporal lobes of the brain and the cerebellum. To resolve this problem, we are developing RF compensation methods optimized to reduce RF distortions in-vivo. The work is a combination of computational modelling, optimization, hardware design and development and sequence design, testing and clinical translation. My laboratory has expertise in various domains of UHF method development and, therefore, there are many projects to choose from. Those range from 1) pTx coil design and construction, 2) novel coil concepts and optimization strategies leveraging advanced electromagnetics and deep learning and 3) pTx sequence design and translation. I have a deep network of collaborations across Harvard/MGH that are crucial to facilitate the development and translation of RF methods. Some important collaborations for this project are with Dr. Jason Stockmann, a well-known RF engineer and B_0 shimming expert, Dr. Daniel Paech, Clinical Director of 7T MRI at the Brigham and Women's hospital, and Dr. Lawrence Wald, former President of the ISMRM and well-known MRI physicist and engineer.



A. Slice shift by RF modulation **B.** Slice shift by system freq. mod.
C. Slice select, phase and FA profiles of exemplary fully optimized (FO) pulse
Optimal control of RF waveforms for slice-selection with in-plane flip-angle compensation for UHF MRI.



RF coil simulation and optimization process for UHF MRI. The simulation employs the so-called "co-simulation" strategy followed by RF pulse design with explicit SAR constraints.

My laboratory is part of the Magnetic Resonance Physics and Instrumentation Group (MRPIG) at the A. A. Martinos Center for Biomedical Imaging. The MRPIG houses 12 Principal Investigators and dozens of postdocs and graduate students who develop instrumentation and computational methods to bring new levels

of understanding of disease and biology using non-invasive imaging. Our goal is to bridge experimental and computational areas by developing new hardware methodology and expanding image acquisition and reconstruction methods to exploit newly generated capabilities. Some of our projects include: Ultra-high field neuro-MRI (UHF), methods for functional brain imaging and connectomics, RF coil detector and transmit arrays, parallel imaging acquisition and reconstruction methods for speeding up MRI and motion mitigation, parallel transmit pulse design, RF safety for patients with deep brain stimulators, portable MR technology, developing Magnetic Particle Imaging (MPI) for studying brain function.

The A. A. Martinos Center for Biomedical Imaging is a large research institute home to more than 350 investigators, postdocs and graduate students with deep ties to the Massachusetts General Hospital, the Massachusetts Institute of Technology and Harvard Medical School. It is an internationally renowned center with unique scanning capabilities including three 3T MRI scanners, two PET-MRI scanners, two 7T MRI scanners, one 'Connectome' high-gradient strength 3T system as well as machine shops, an RF laboratory, a maker space and extensive computational capabilities. Members of the center animate regular science and social events including the weekly 'Brainmap' science seminars, 'Science on Tap' and 'Why & How' events, Martinovate (entrepreneurship talks and events) and the Molecular Imaging speaker series, which makes it an ideal environment to learn and grow scientifically and personally.

Please contact me directly for more information if interested in this position.

A handwritten signature in black ink, consisting of a stylized, cursive name followed by the initials 'BG' written in a simpler, blocky font.