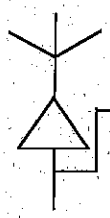


CNBC

Center for the Neural Basis of Cognition

July 31, 2012

Narayayan Krishnamurthy
302 Benedum
nak54@pitt.edu

Dear Narayanan:

We are pleased to inform you that the Committee has chosen to award you a one-year GSR appointment in the Multimodal Neuroimaging Training Program (MNTP) beginning August 1, 2012. You will receive a stipend of **$21,600**/year paid as a GSR. The award includes full tuition and health insurance. Funds for travel and supplies will be available based on need and available funding.

As a MNTP student, you must remain a student in good standing in your department and meet CNBC requirements. You are expected to attend the Summer Symposium and to present your research at the external advisory meeting. Finally, your graduate thesis committee should be composed of multiple modal faculty (at least two modalities).

Congratulations on behalf of the entire MNTP Committee on being selected. Please acknowledge this funding (NIH/NIDA R90 DA023420; Multimodal Neuroimaging Training Program) on any publications resulting from your research. If you have any questions or concerns, you may contact us or Darlene Thiel.

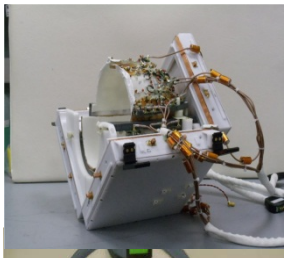
Sincerely,

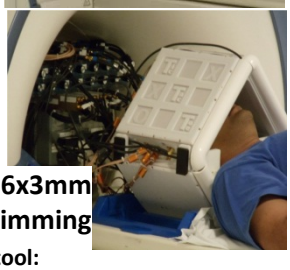
Seong-gi Kim, PhD
Co-Director, Pitt

William Eddy, PhD
Co-Director, CMU

cc: Tamer Ibrahim, PhD
Glenn Peterson

Progress Update Neuroimaging at 7T, MNTP Fellow 2012-2013:

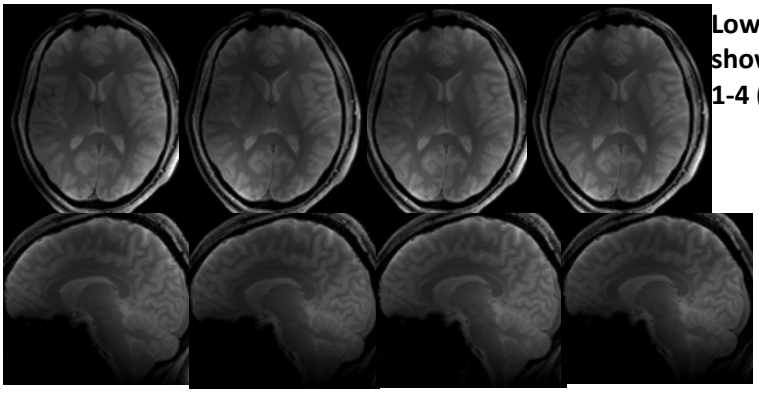




I worked on 7Tesla 20Channel Transmit and 32 Channel receive coils for neuroimaging. As part of the multi-modal training fellowship, I was the TA for the Near IR Spectroscopy and optical imaging module, which involved working with 3 summer workshop trainees who had the task of designing, developing and recording the hemodynamic response in a finger tapping and medial nerve stimulation task. Enclosed is the progress report of the 7Tesla neuroimaging project.

- **Evaluation of 20Ch Transmit coil with 32 Channel Receiver*** (shown on the right):

Using the RF shimming tool* we have been able to obtain shimming parameters (amplitudes and phases) which result in whole brain homogeneity (max/min) < 3 at RF absorption levels SAR <2 W/Kg, well below FDA limits of 3.2W/Kg. Shown below are 4 of the best shimming pattern obtained, after incorporating the effects of the 32 channel receive array on the transmit field.



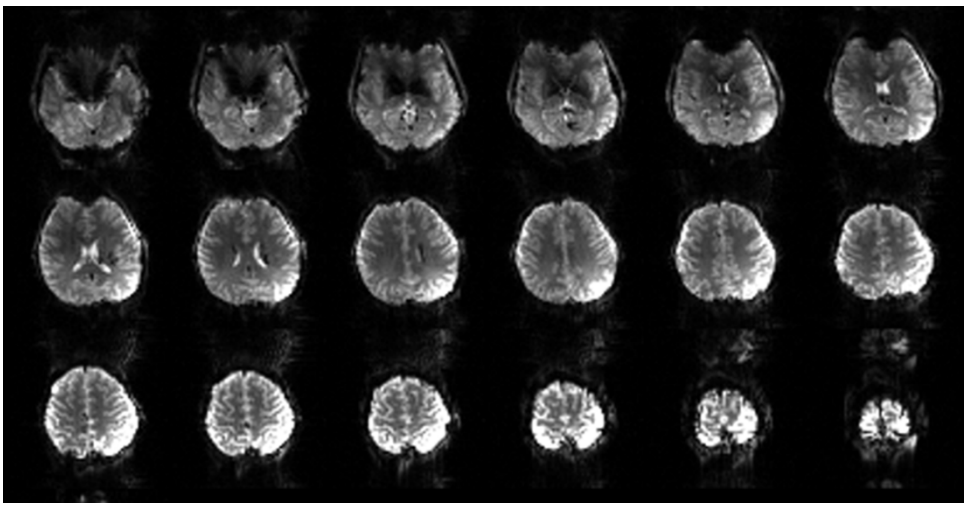
Low flip angle GRE Images TR 10, 1.6x1.6x3mm showing homogeneity at 7T, left to right, shimming 1-4 (amplitudes and phase) from RF shimming tool:

Trial	Mean B1 (T)	Max/Min B1	SARave W/Kg	SARpeak W/Kg
1	5.2e-8	2.90	1.61	5.36
2	5.0e-8	2.77	1.57	5.38
3	5.3e-8	2.86	1.67	5.20
4	4.4e-8	2.66	1.70	5.65

Ongoing evaluation of coils for whole brain excitation:

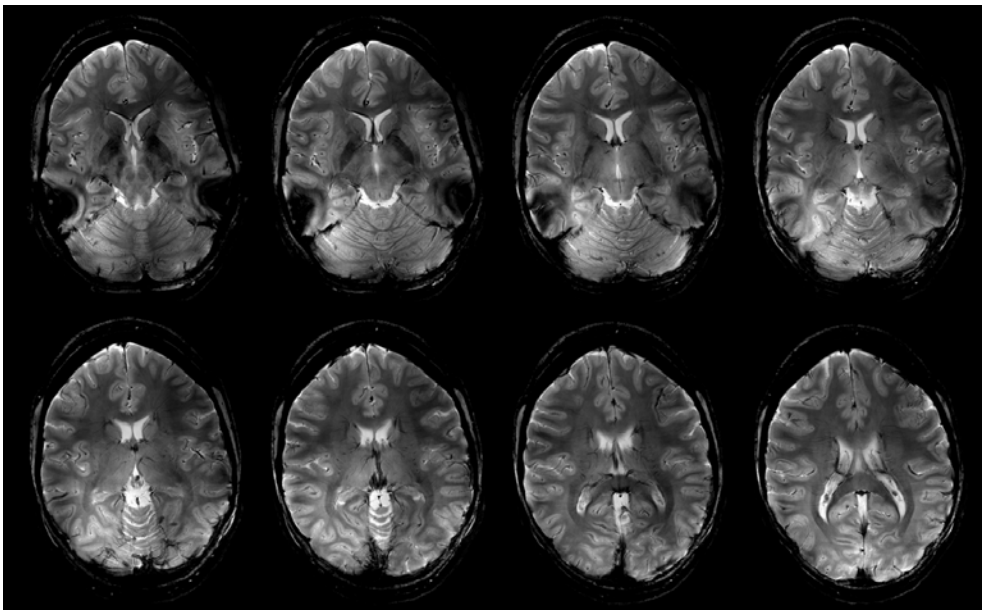
We have shown via. modeling and experiments the that receive array geometry be it 32 channel helmet array or 8/16 cylindrical receive array, causes subtle changes in spin excitation and changes in local and global RF absorption at 7T (1).

- Ongoing goal of this work is to use eigen modes for whole brain excitation
- Test coils for reliable invariance across subjects
- Acquire high resolution images in patients with mild cognitive impairment, with a high risk for Alzheimer's Disease.



Echo Planar Images, 20x20x3mm, bandwidth per pixel 2442Hz/Px, TE=20, TR=1451, scan time 1min.

Susceptibility Weighted Images 0.2x0.2x3mm obtained with TR=1030,Flip Angle=50, TE=15, Using the 20 Ch Tx and 32 Ch Rx coils, scan time 11min. A homogenous excitation pattern using shimming trial 3 was used to obtain these images. The Homogeneity of spin excitation this coil is much superior when compared with the commercially available Nova 32 Ch coil for 7T.



References

1. Krishnamurthy N, Zhao T, Ibrahim T. Effects of Receive-Only Inserts on SAR, B1+ Field and Tx Coil Performance. JMRI (In Press). 2013.

*Coils, Simulation, and Shimming Tool were developed at the RF Group Headed by Dr Tamer Ibrahim at University of Pittsburgh