

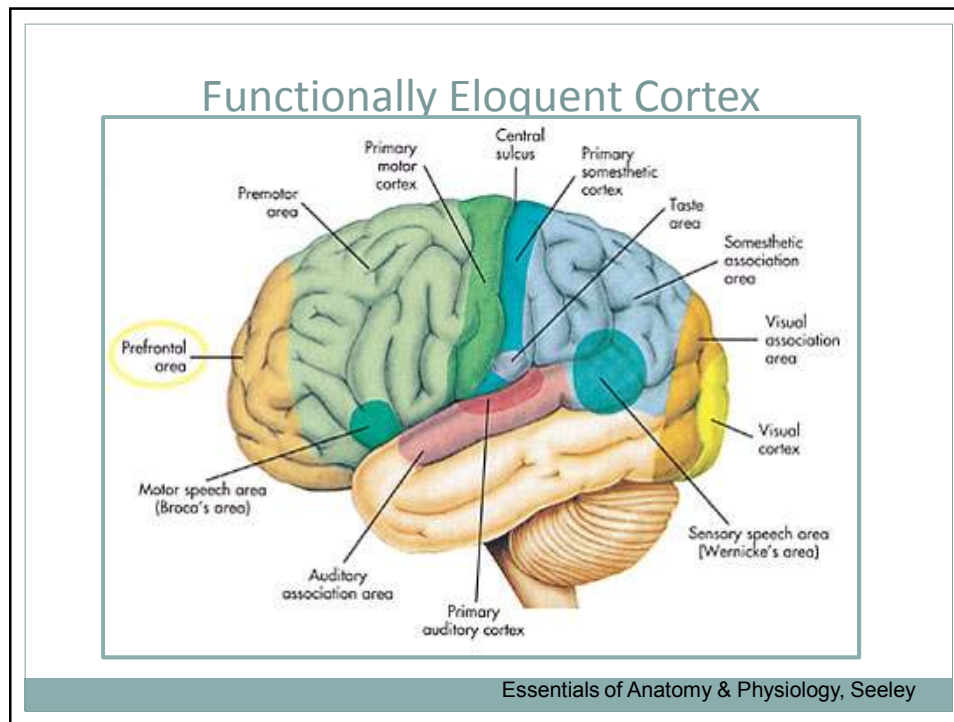


## QIBA: FMRI SUBCOMMITTEE

ANNUAL MEETING MAY 2011

### Goals of Pre-surgical Planning

- Identify eloquent cortex to minimize post surgical deficits
- Maximize surgical resection



## Readouts – Quantitative Metrics of Interest

- 'Activation' is defined as change in hemodynamic response (BOLD signal)
- Location of activation
- 3D spatial extent of activation
- Distance of border of activation cluster to margin of resection
- For Language specific tasks, laterality index of language (Lt vs Rt) localizes language dominance to one hemisphere or another
  - × Based upon signal magnitude change

## QIBA fMRI Subcommittee

### Current Claims:

- A. On a test-retest basis, fMRI can be performed to a level such that the center of mass and the borders of activation of a focus of interest are reproducible to within 5mm.
- B. On a test-retest basis, fMRI can be performed reproducibly to a level such that the relative magnitude of activation in homologous regions across hemispheres should be within 10%.
- C. Quantitative measures of “risk” to eloquent brain structures: Given A and distance to surgical margin, eloquent tissue within 10 mm is considered at risk

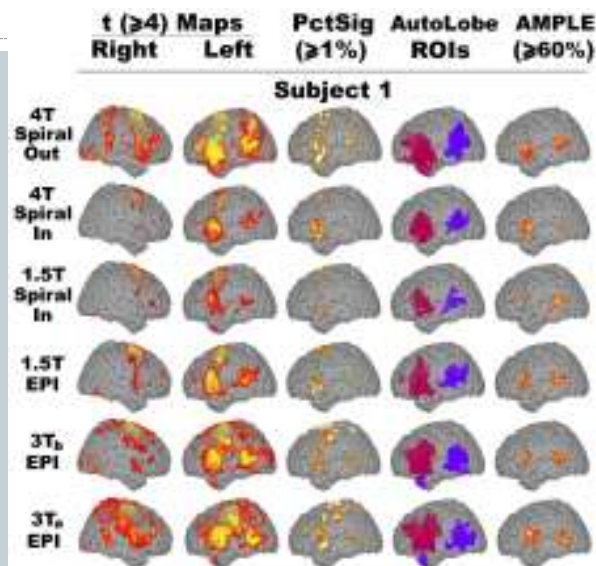
## Current Activities

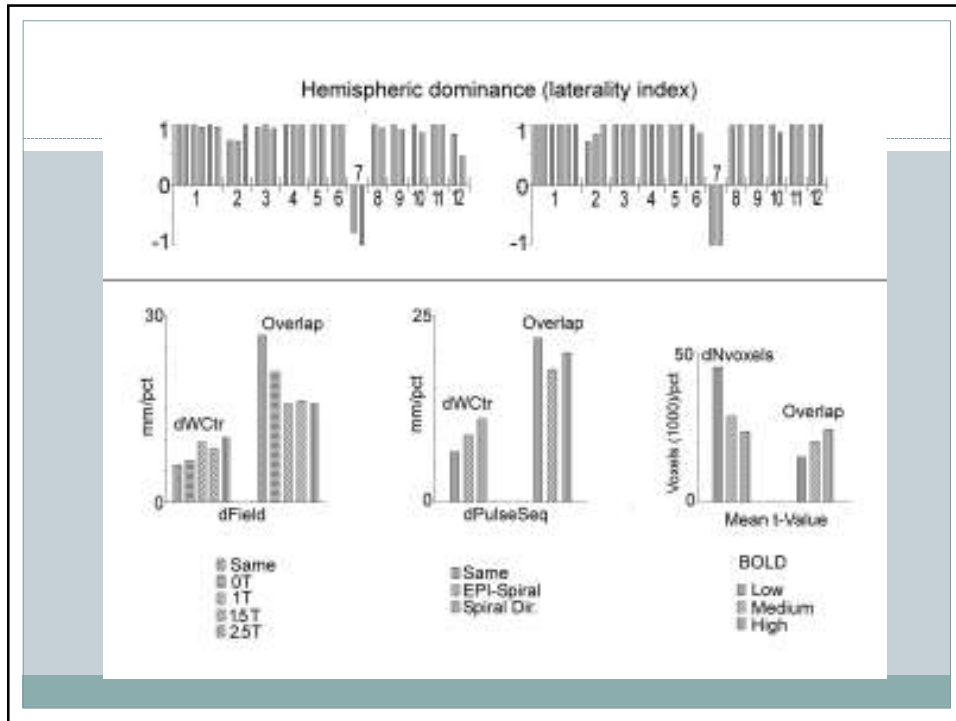
- Ongoing development of a strategic plan to identify knowledge gaps
- Continuation of ground work activities (workflow matrix)
- Assessing test-retest reproducibility in 2 QIBA funded studies
- 2 subcommittee groups
  - Reproducibility
  - DICOM WG-16 cooperative activities

## QIBA fMRI Study Deliverables

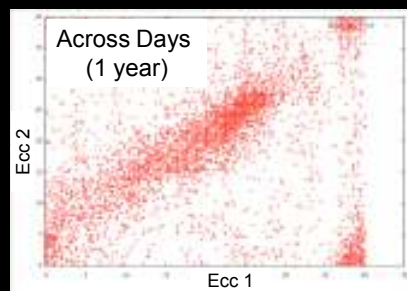
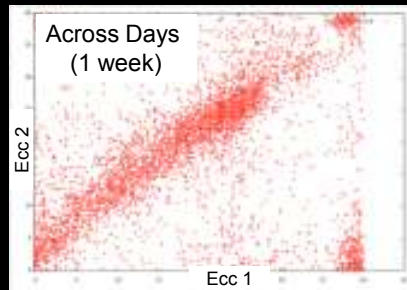
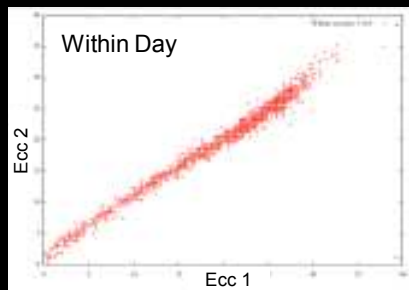
- To derive quantitative measures of variability and reproducibility in healthy individuals and a select group of patients.
- These measures will be compared across fMRI paradigms including motor, language, vision and audition.
- The strength of the two projects will be the use of standardized post processing sequences to enhance the comparability of the results from the two sites.
- This study is designed to fulfill a critical gap in our knowledge concerning reproducibility as it pertains to presurgical mapping, the context of use in our profile.

## Duke University (Jim Voyvodic PhD)





**Repeatability of Functional Specificity**  
(Visual Field Eccentricity – Scatter Plots)



## Year Two Pending Study Johns Hopkins School of Medicine (Jay Pillai MD and Domenico Zaca PhD)

- Validation of Breath-hold cerebrovascular reactivity (BH CVR) mapping as a technique for detecting risk of neurovascular uncoupling (NVU). NVU is an important consideration in presurgical mapping because it can result in false negatives on BOLD activation maps.
- Feasibility and optimization of BH CVR calibration methods for application to BOLD presurgical mapping

## Next Steps

- Continue Profile writing based on current knowledge regarding methodology and variance factors
- Use currently funded projects to refine claims as described in profile
- Continue development of strategic plan for gap identification in the area of clinical efficacy
- Continue Dialog with DICOM WG-16

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