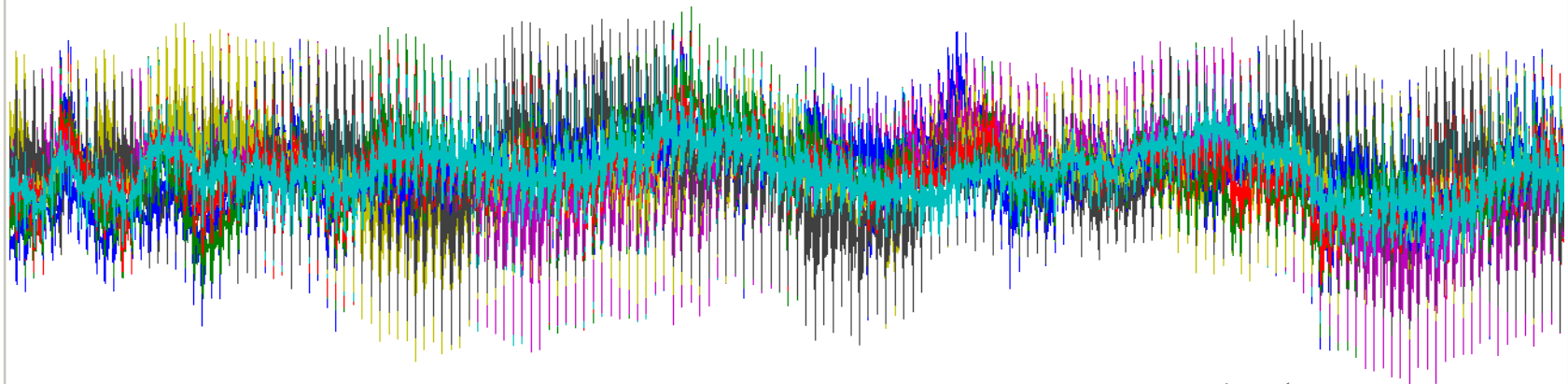
Electrophysiological development in the left parietal, temporal, and occipital lobes:

An experimental case study



Audrey De Paepe
Friday August 12th, 2016

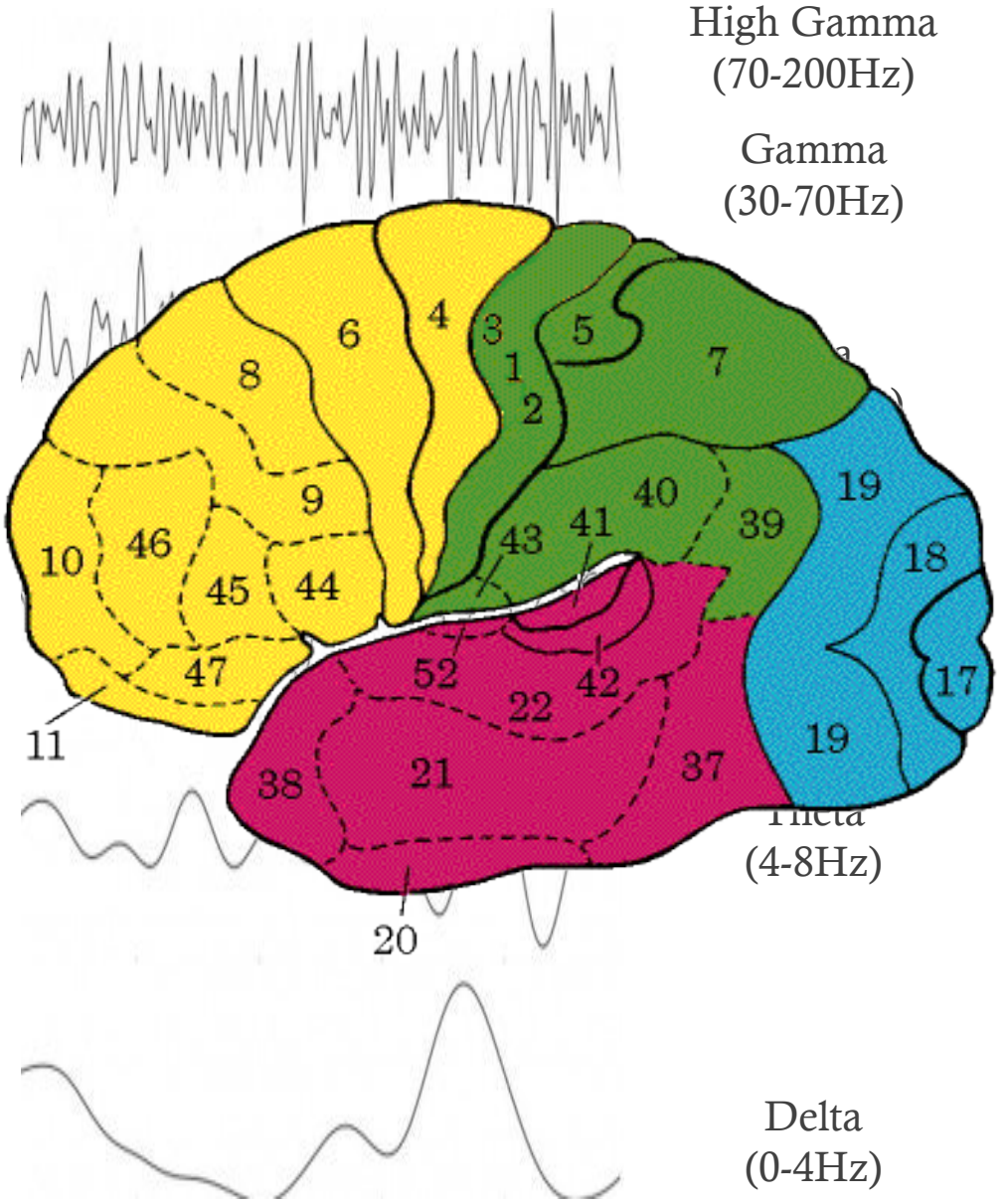
Background

- Electrocorticography (ECoG)
- Patients with intractable epilepsy
- Resting state (RS) data & task data collected

Summer project:
Case study investigation of **neurophysiological development** in the left parietal, temporal, and occipital lobes during resting state and language task, collected 1.67 yrs apart

Project Introduction

- ECoG data from left parietal, temporal, occipital lobe
- Analysis broken down into six frequency bands
- Measure differences in activity & connectivity by Brodmann Areas for 1st and 2nd visit



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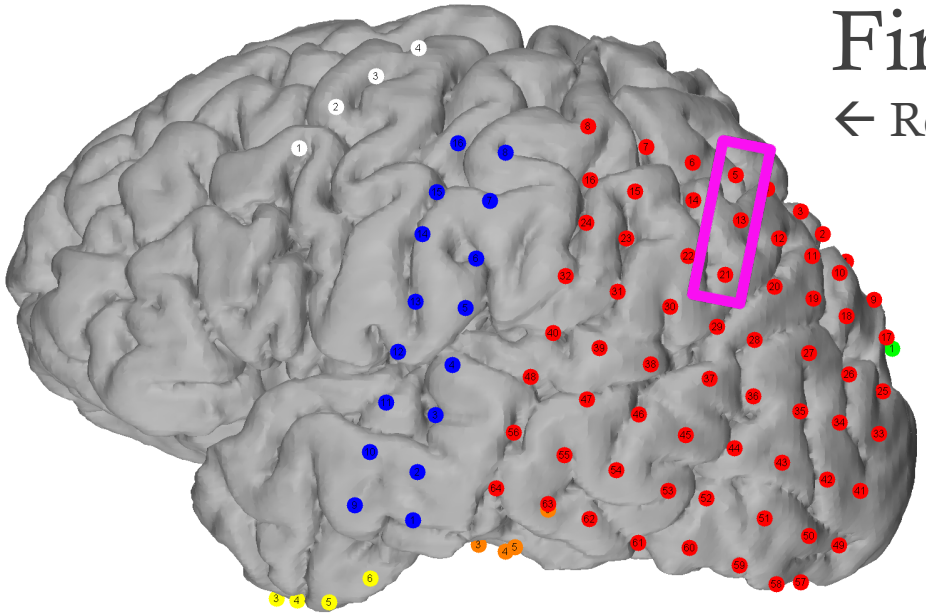
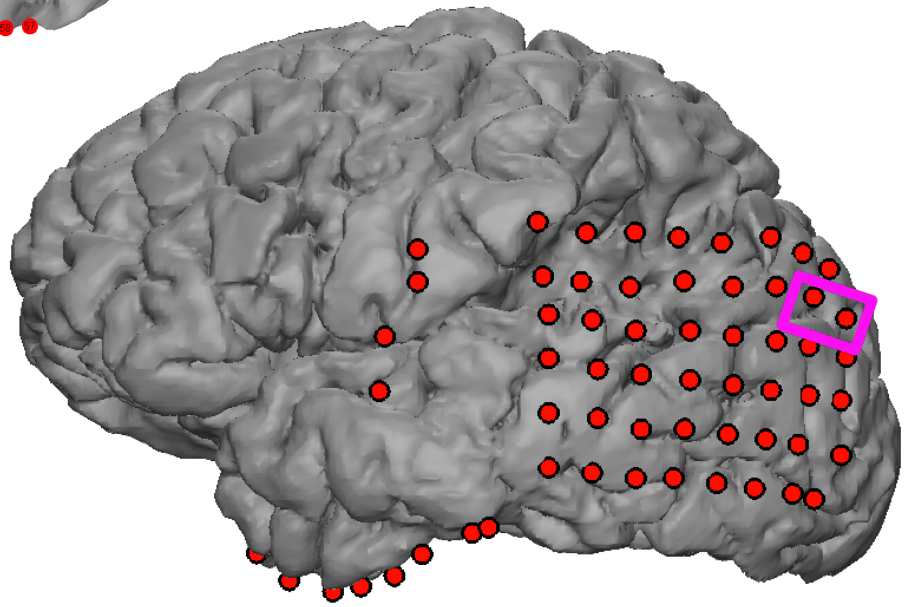


First visit

← Resection under electrodes 5, 13, 21



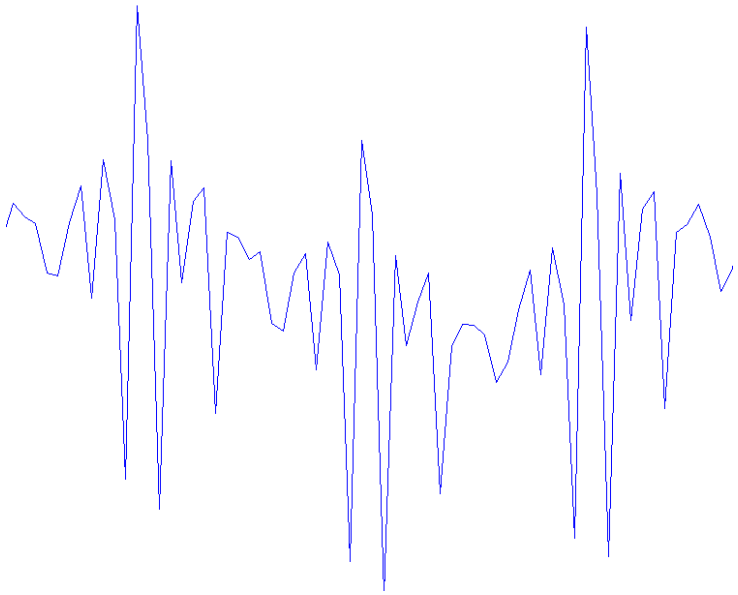
Second visit (1.67yrs later)

Resection under electrodes 9, 10 →

Experimental Analysis

Activity

- Power = (Amplitude)^2

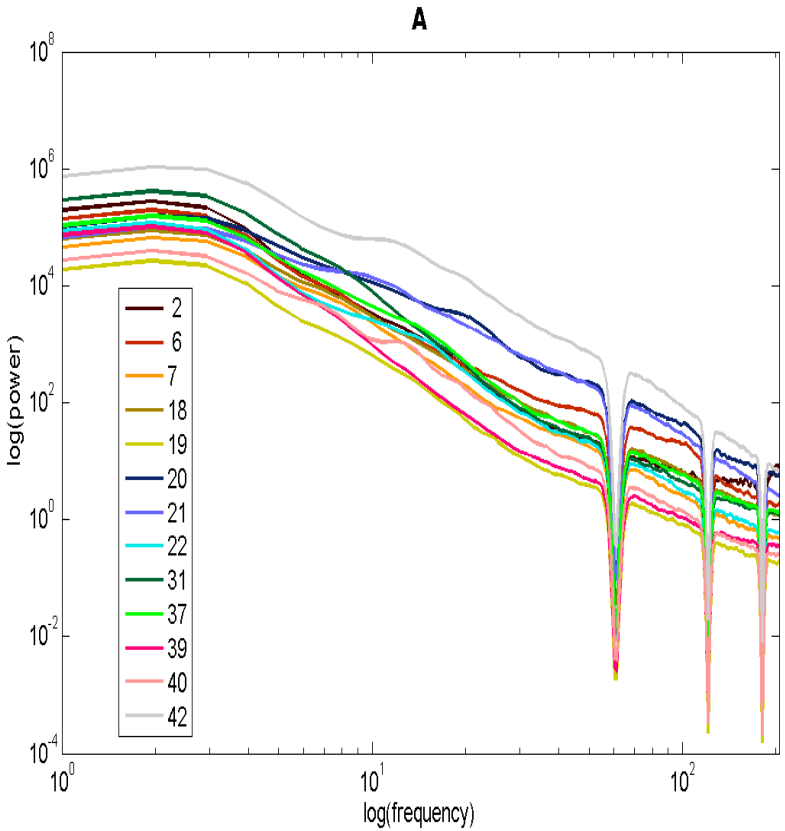


Connectivity

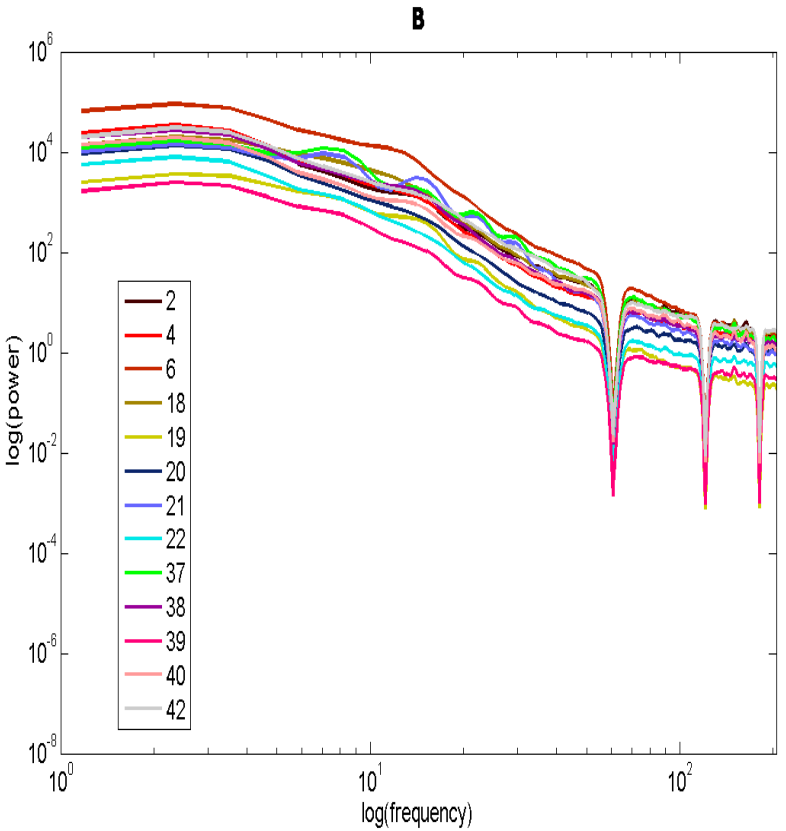
- Pearson's Correlation
  - Relationship for amplitude & phase of a signal
- Phase-Locking Value (PLV; Lachaux et al. 1999)
  - Relationship for phase of a signal

Resting State Power Spectra

For 1st and 2nd Visit



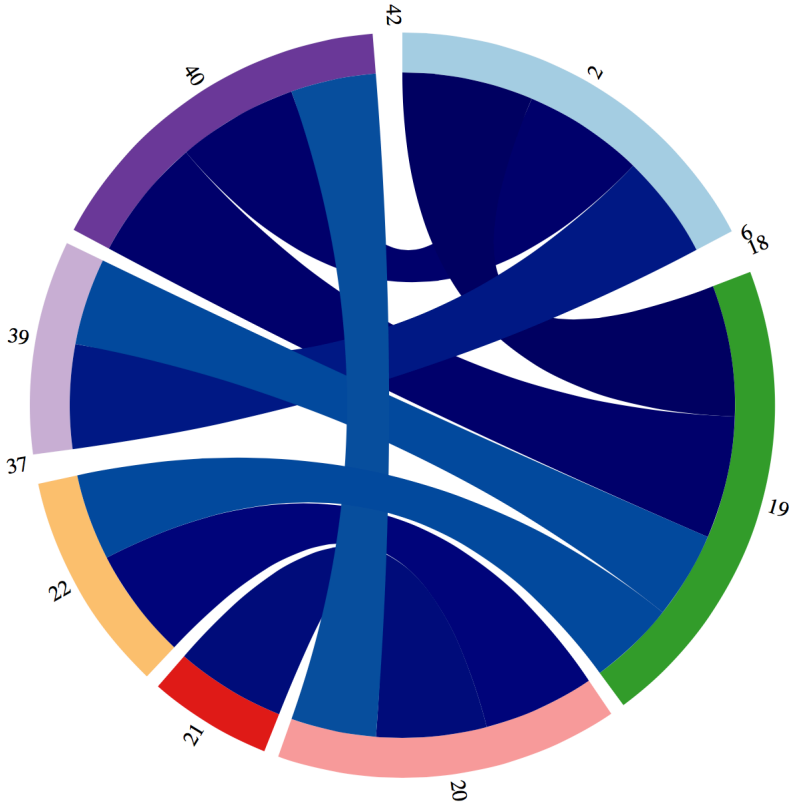
Middle temporal gyrus (21)
& inferior temporal gyrus (20)



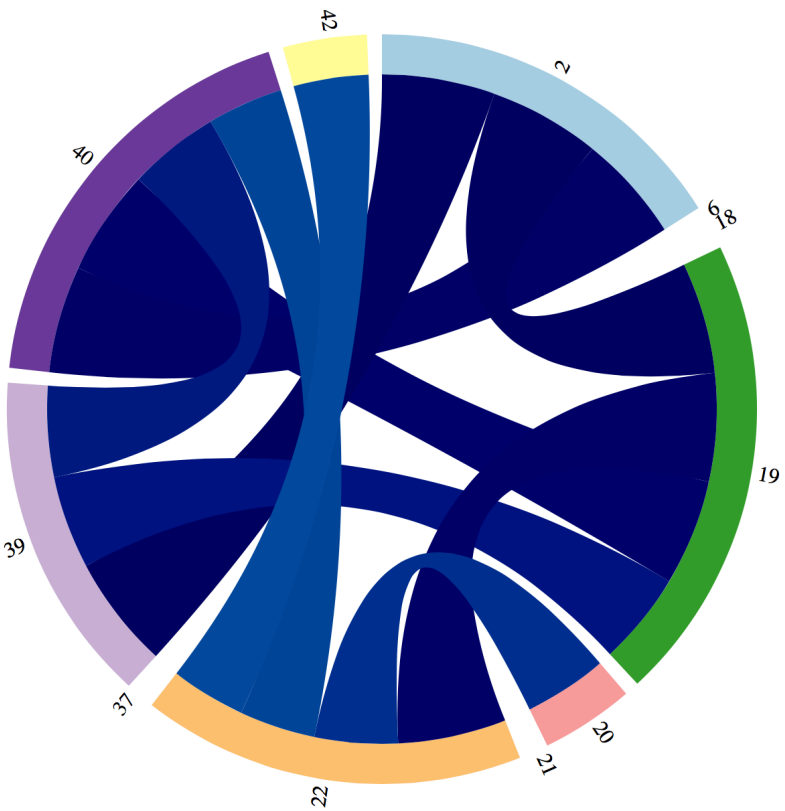
Middle temporal gyrus (21)
& fusiform gyrus (27)

Resting State Correlation Plot

Difference between 1st and 2nd Visit



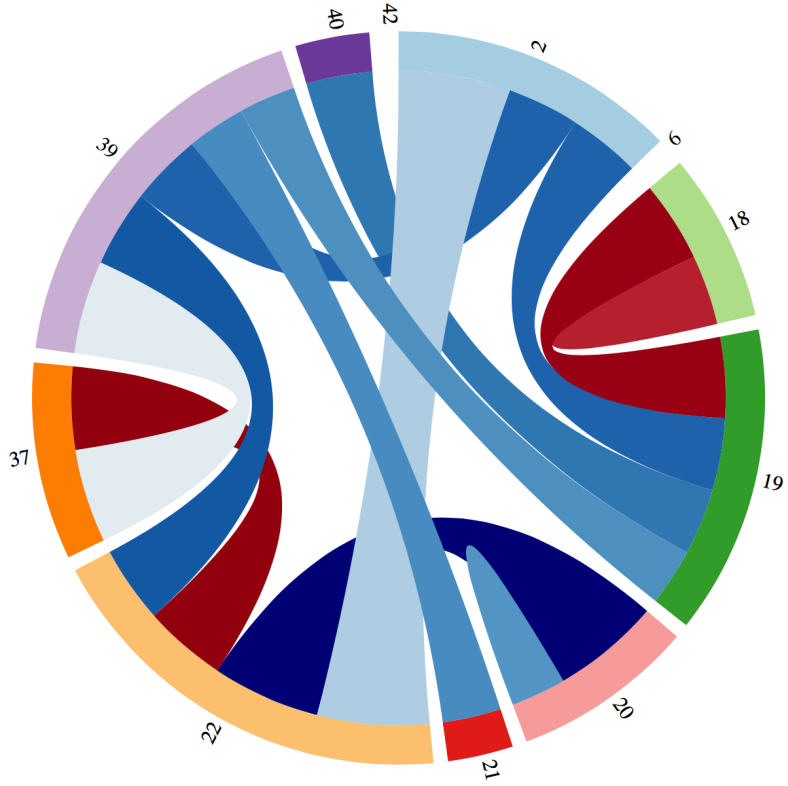
Gamma (30-70Hz)



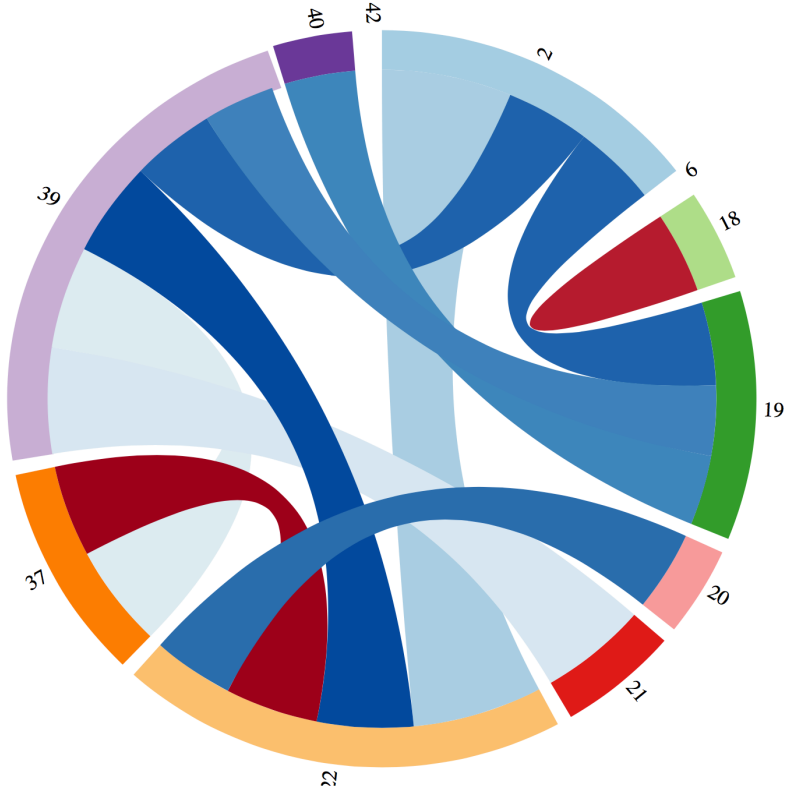
High Gamma (70-200Hz)

Resting State PLV Plot

Difference between 1st and 2nd Visit



Gamma (30-70Hz)



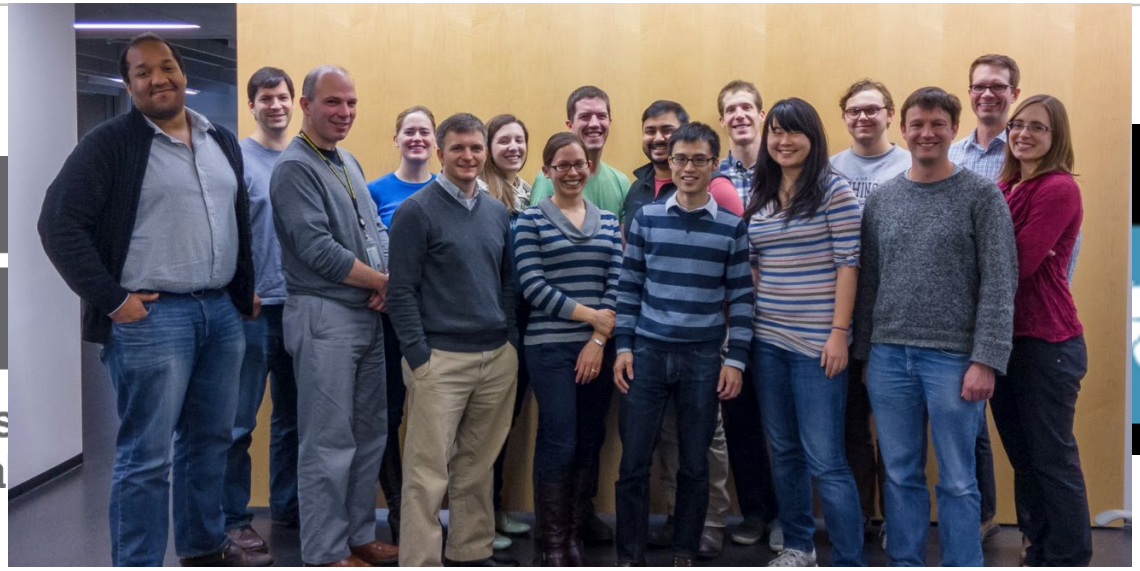
High Gamma (70-200Hz)

Future Analysis

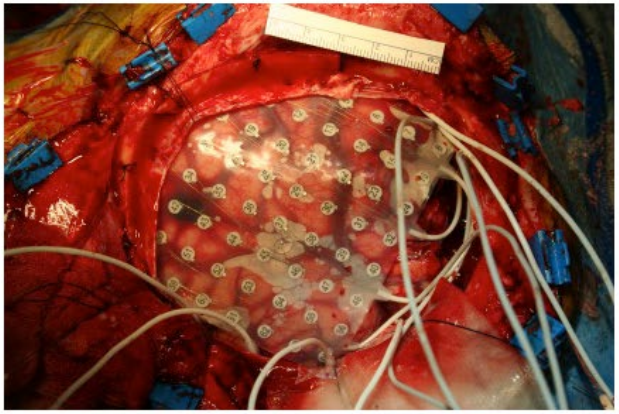
- Connectivity plots for Task data
  - Difference between Brodmann Area connectivity for six frequency bands
- Bar plots & T-tests
  - To explore significance of differences between 1st and 2nd visit Task data

Acknowledgements

NIH: Summer Research Experience in Translational Neuroscience & Neurosurgery
University of Washington Department of Neurosurgery
Center for Sensorimotor Neural Engineering
Grid Lab



a.



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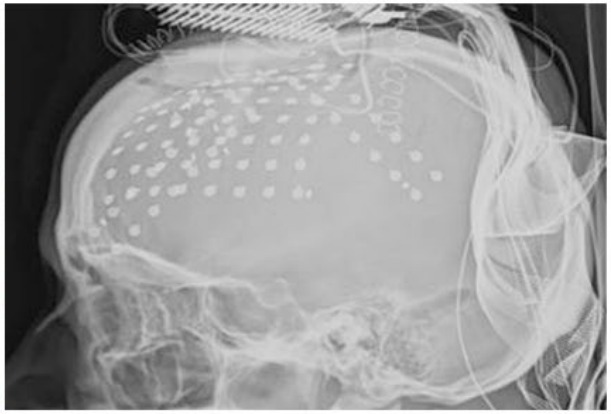
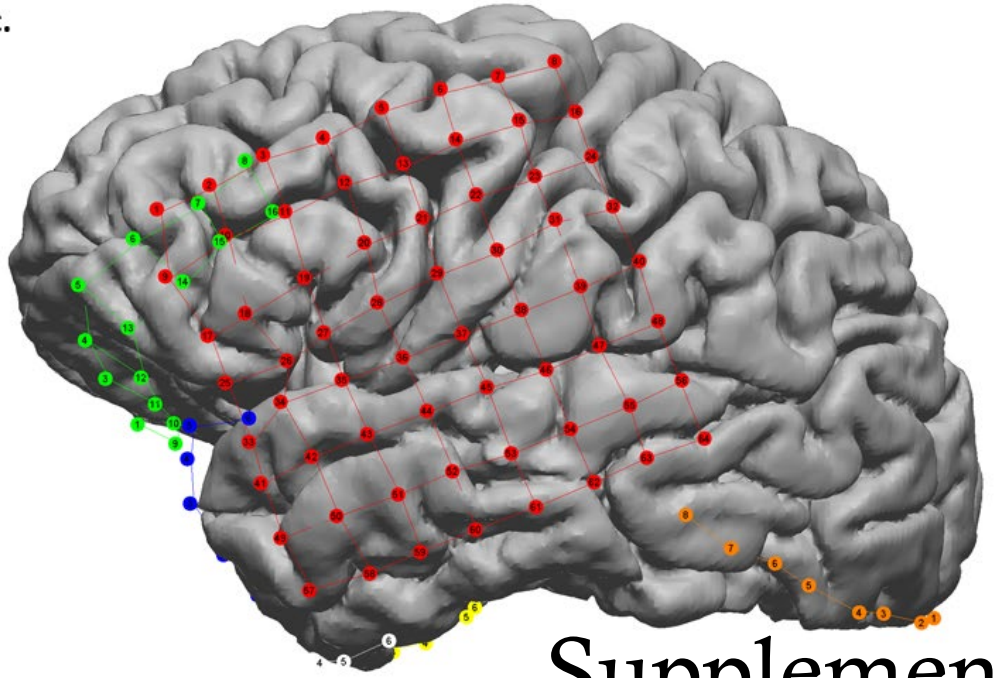


c.



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