# TRACK B

(Vizlab)

New EEG tools and measures

John Iversen et al.

(repeat)

**2:30 PM -- B1: Automated source classification and online ICA** - Luca Pion-Tonachini

**2:55 PM -- B2: EEG Nonstationarity and AMICA** - Shawn Hsu

**3:15 PM -- B3: MEG and Joint MEG/EEG source decomposition** - John Iversen

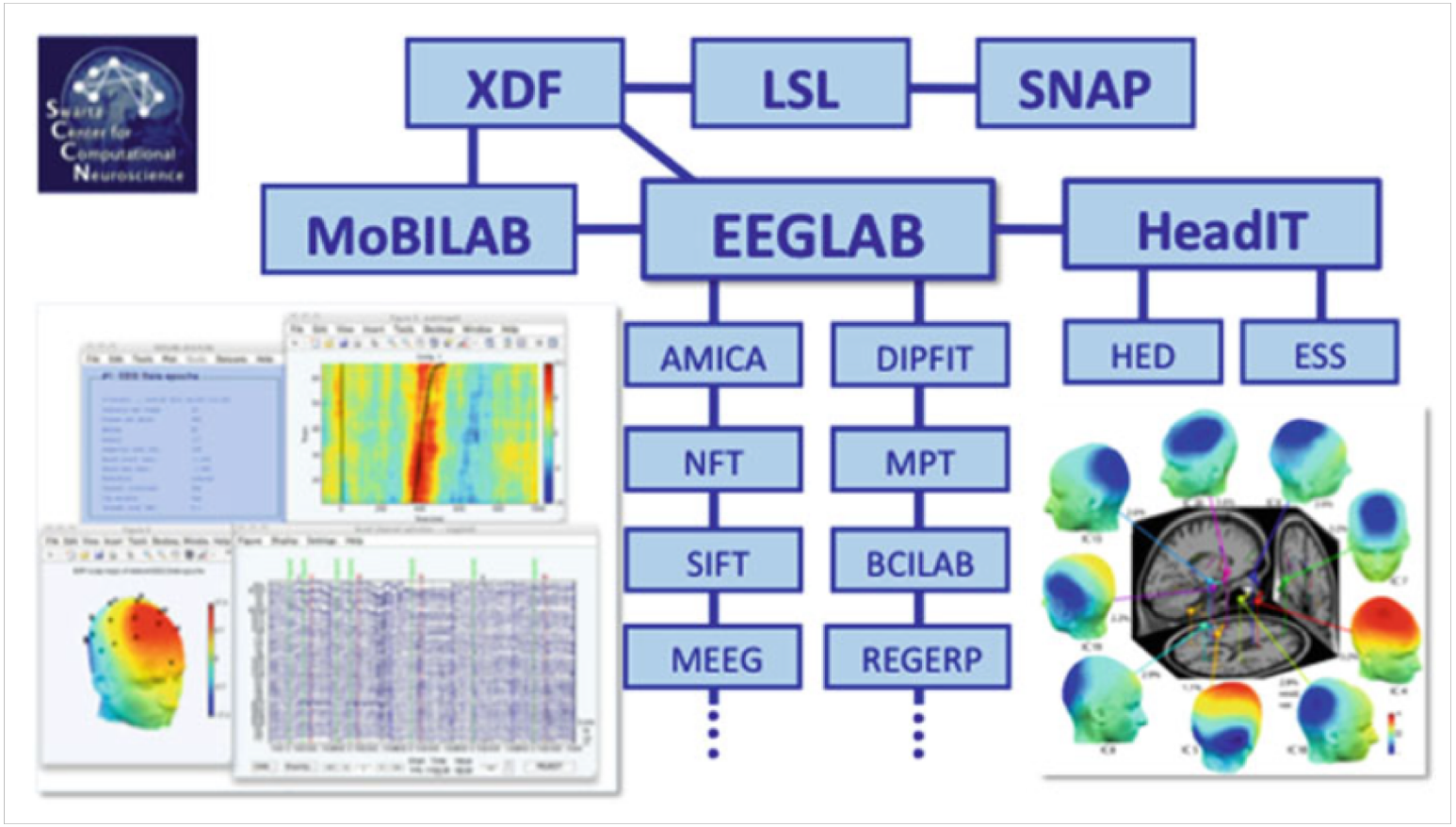
**3:30 PM** -- `Coffee break`

**3:50 PM -- B4: Phase/amplitude coupling (PAC)** - Ramon Martinez-Cancino

**4:20 PM -- B5: Neuroinformatic methods to enable large-scale EEG data analysis (BIDS, HED, and beyond)** - Nima Bigdely-Shamlo

**4:50 PM -- B6: EEGLAB and High-Performance Computing: The Open EEGLAB Portal to High Performance Computing & OpenNeuro -** Scott Makeig & Amitava Majumdar

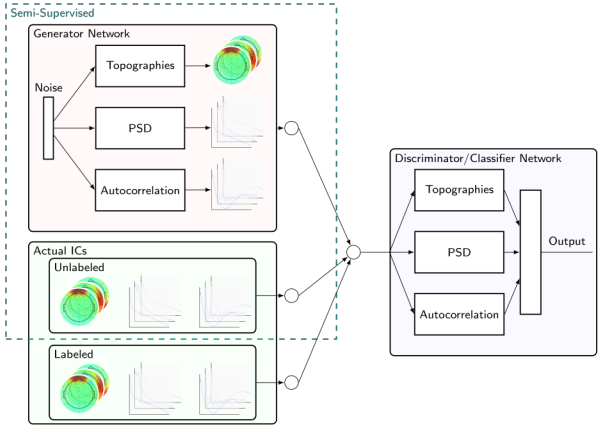
**5:20 PM -- B7: EEG Meta-Analysis Q & A -** Makeig, Bigdely-Shamlo, Majumdar

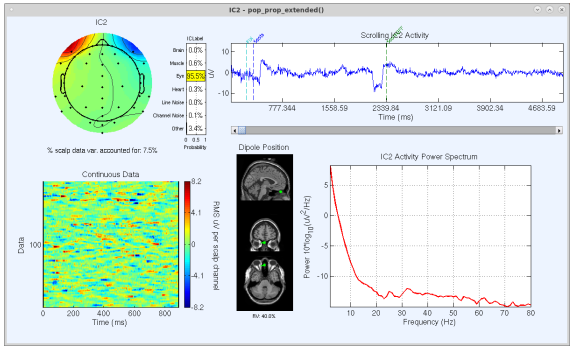

Swartz Center for Computational Neuroscience
XDF
LSL
SNAP
MoBILAB
EEGLAB
HeadIT
AMICA
DIPFIT
HED
ESS
NFT
MPT
SIFT
BCILAB
MEEG
REGERP

# Luca: Automated source classification and online ICA

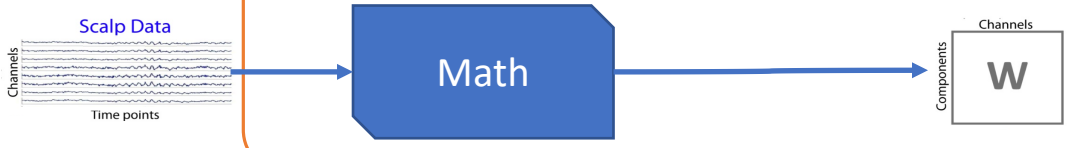
Solutions: 1) IC classification is subjective & laborious, especially for massive datasets
2) ICA computed on entire experiment assumes stationarity

## ICLabel – classify ICs automatically

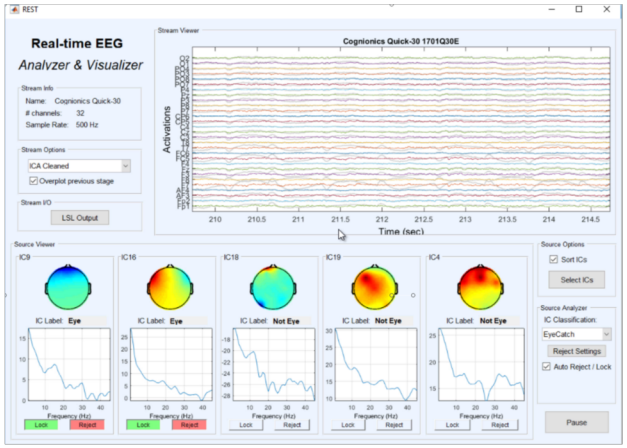


## ORICA – real-time ICA




## REST

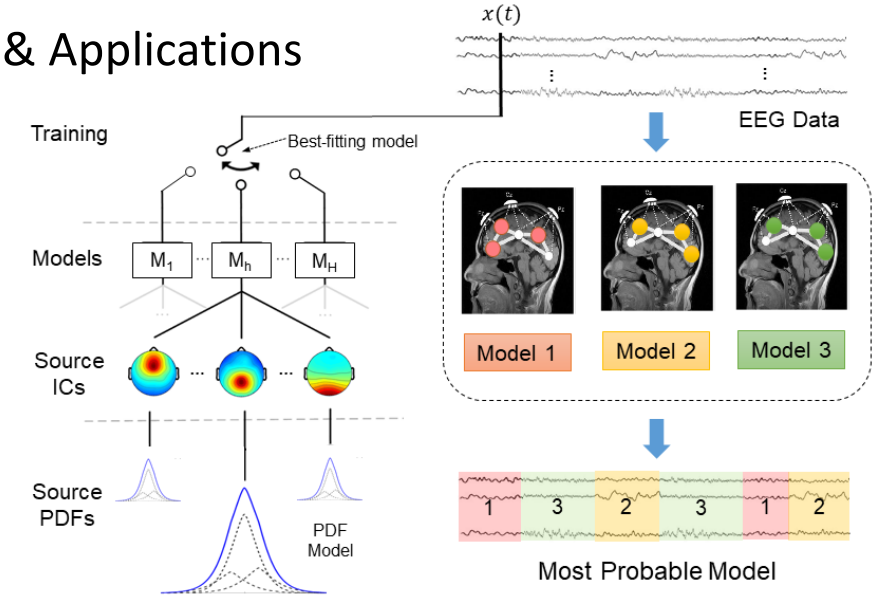


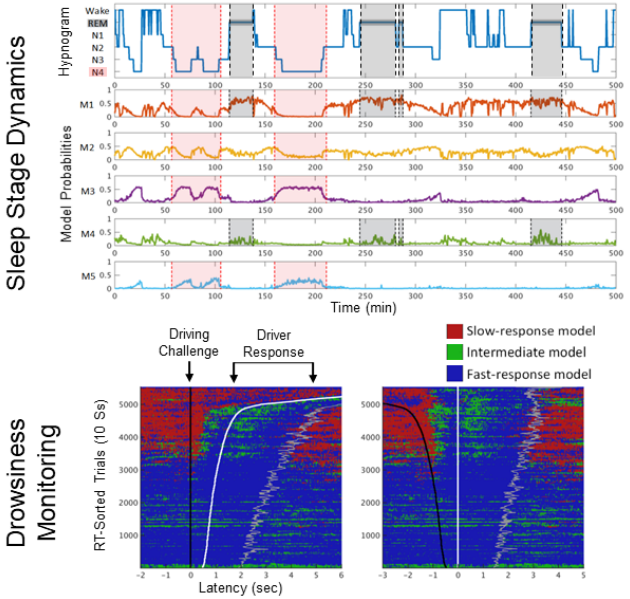

Clean streaming data
in near-real-time

# **Shawn**: EEG Nonstationarity and AMICA

- Why AMICA?
  1. Better IC decomposition than Infomax ICA
  2. Model EEG non-stationarity & brain-state changes

## A. Theory & Applications



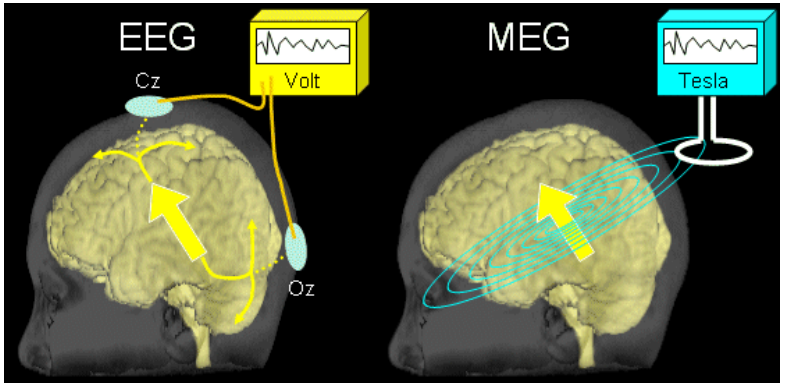



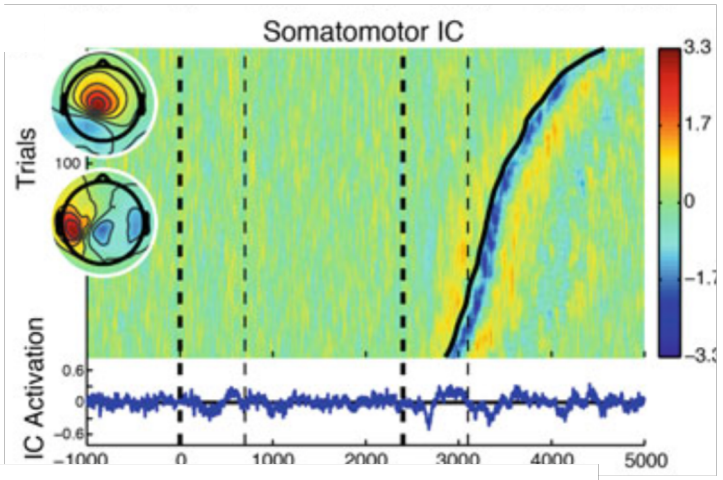

Hsu et al, NeuroImage, 2018

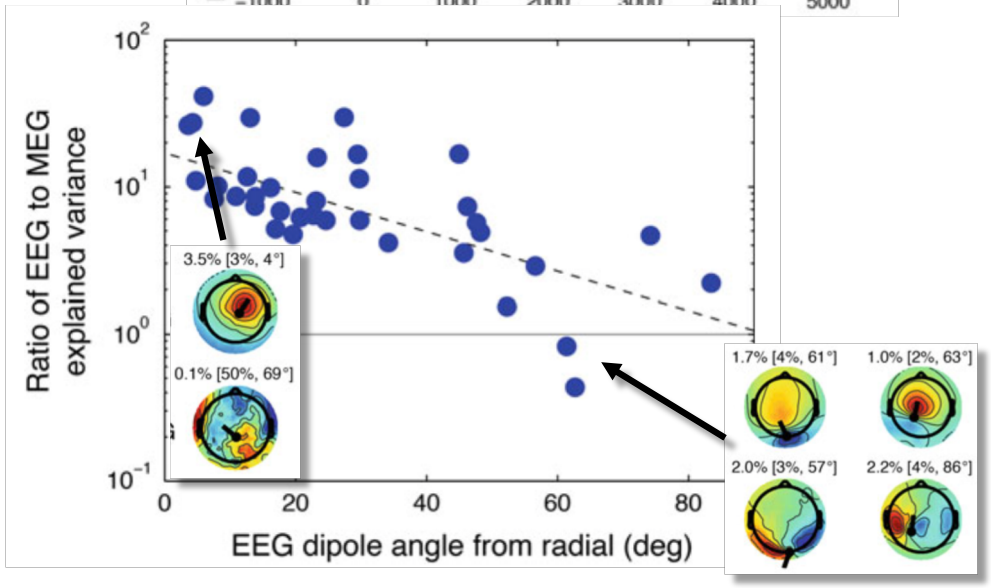
## B. Practicum

2 plugins (AMICA & postAmicaUtility) + run on Neuroscience Gateway (NSG)

# **John:** MEEG Analysis in EEGLAB

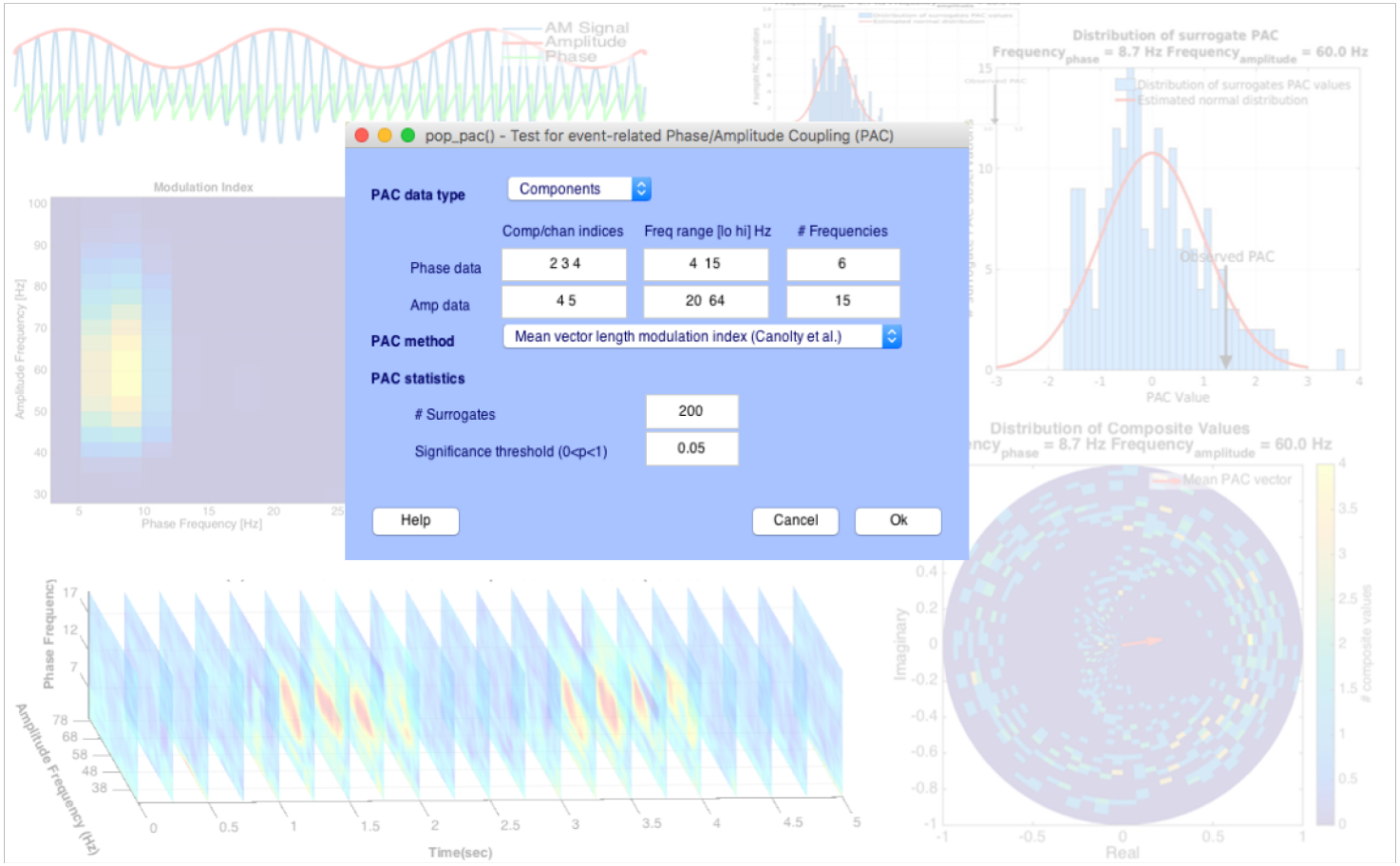


# **Ramón**: Phase Amplitude Coupling (PAC)

Solution: Adding advanced measures of cross-frequency analysis to EEGLAB through plugins



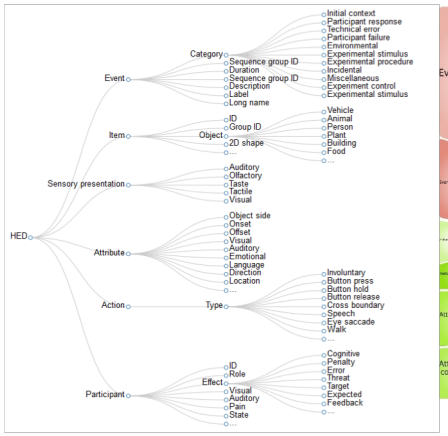
Nima:

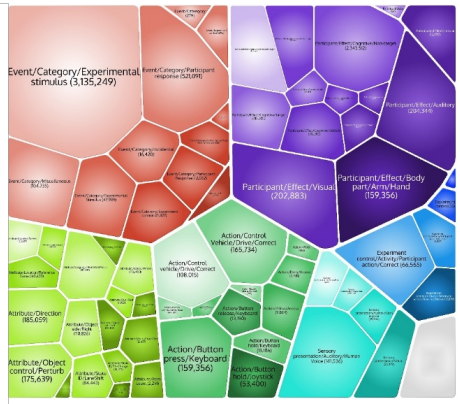
# Neuroinformatic methods to enable large-scale EEG data analysis (BIDS, HED and beyond)

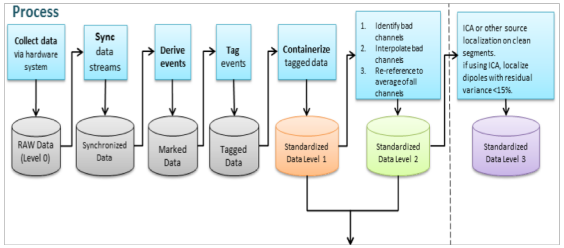
This presentation will cover several enabling neuroinformatics technologies, including Hierarchical Event Descriptors (HED) and EEG Study Schema (ESS), for automated large-scale EEG analysis. HEDTools EEGLAB plugin for event tagging and epoching will also be introduced.

HED

ESS

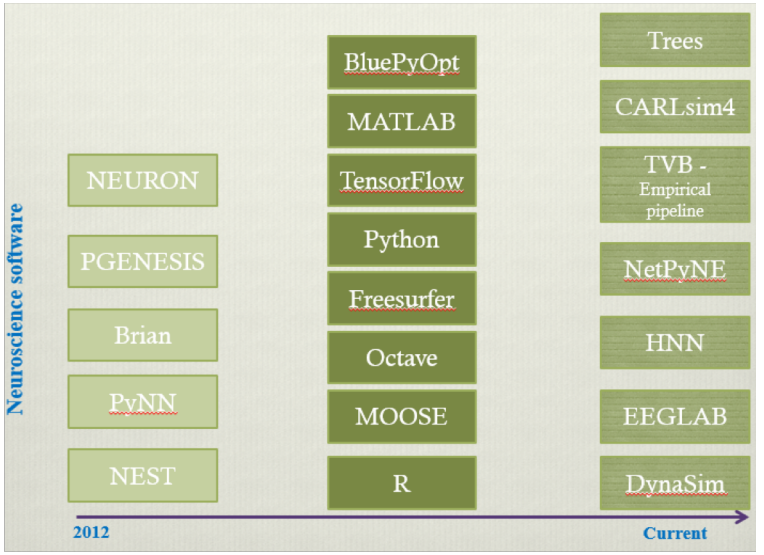


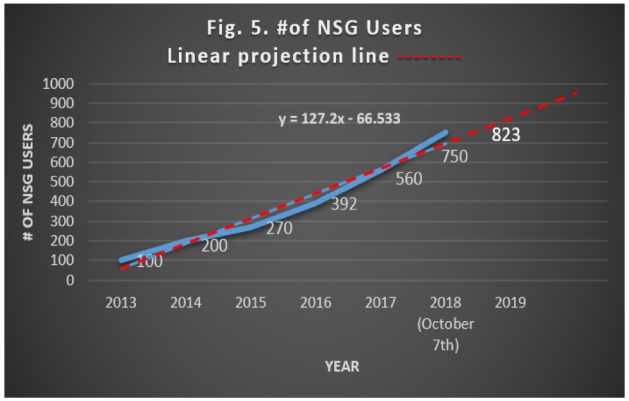



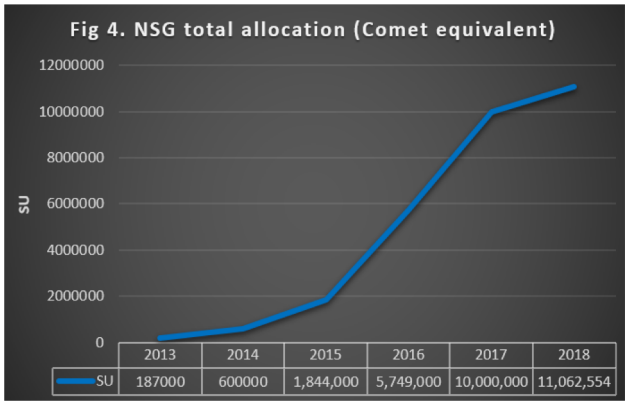



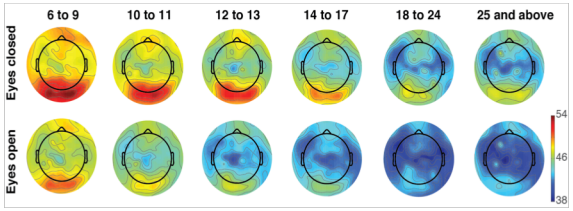
# Amit: NSG NEUROSCIENCE GATEWAY A Portal for Computational Neuroscience Neuroscience Gateway

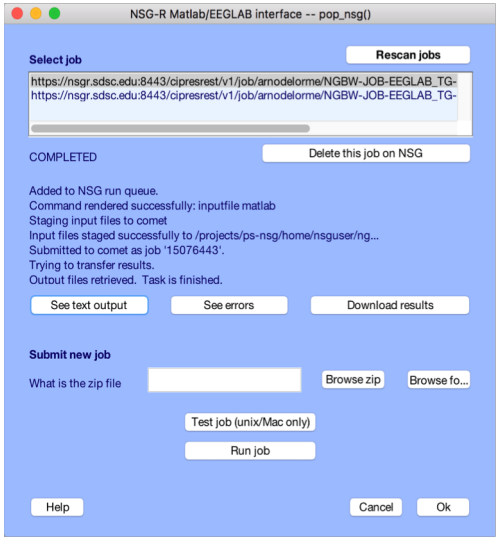
- Providing access to neuroscience tools and software
- Tools and software optimally installed on various high performance, high throughput and academic cloud resources
- Neuroscientists can easily – via an easy to use web interface – use these tools and software on supercomputing resources free of charge
- Programmatic access also available
- Used for large scale modeling and data processing




Results of processing 87 128-channel EEG data sets from the Child Mind Institute data base. Alpha power decreases with age (age groups in years shown in columns) in both eyes open and closed conditions (rows).