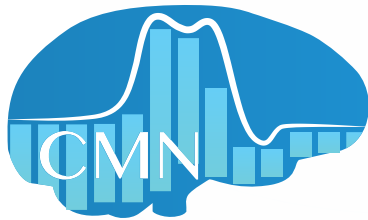


Center for Multimodal Neuroimaging

# EEG and simultaneous EEG-fMRI

fMRI Summer Course 2026

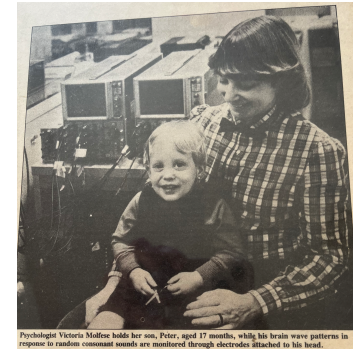


Peter J. Molfese, Ph.D. | August 18, 2026



# Overview

- Neural Origins of EEG
- Event-Related Potentials (ERPs)
- Analyzing ERP Data
- Source Analysis
- EEG / EEG-fMRI @ NIH





# EEG Turns 102

- Hans Berger's "discovery" of EEG in 1924
- Hans Berger 1873-1941
- Physician, Lecturer, Medical Chief
- Discovered the EEG in 1924
  - Eyes Open/Eyes Closed - Alpha/Beta
  - Paper published in 1929
  - Did not go over well...
  - Replications from London in 1934

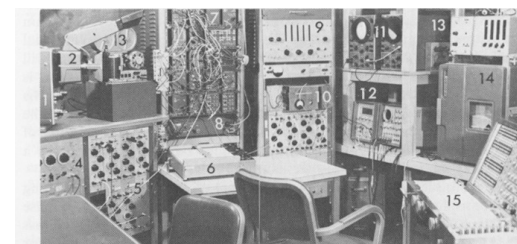
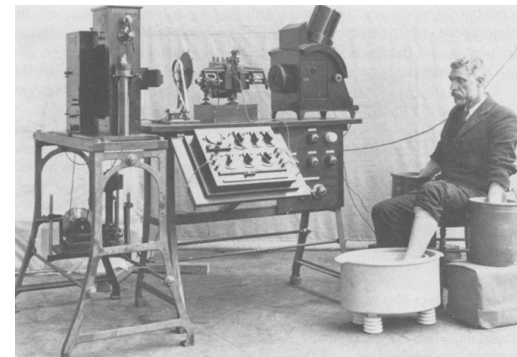
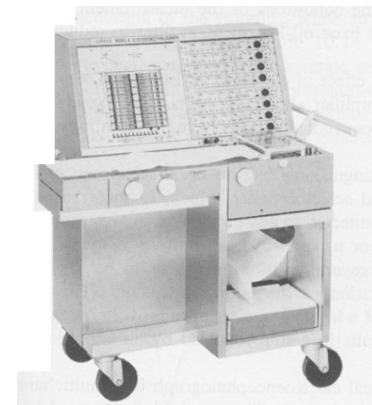
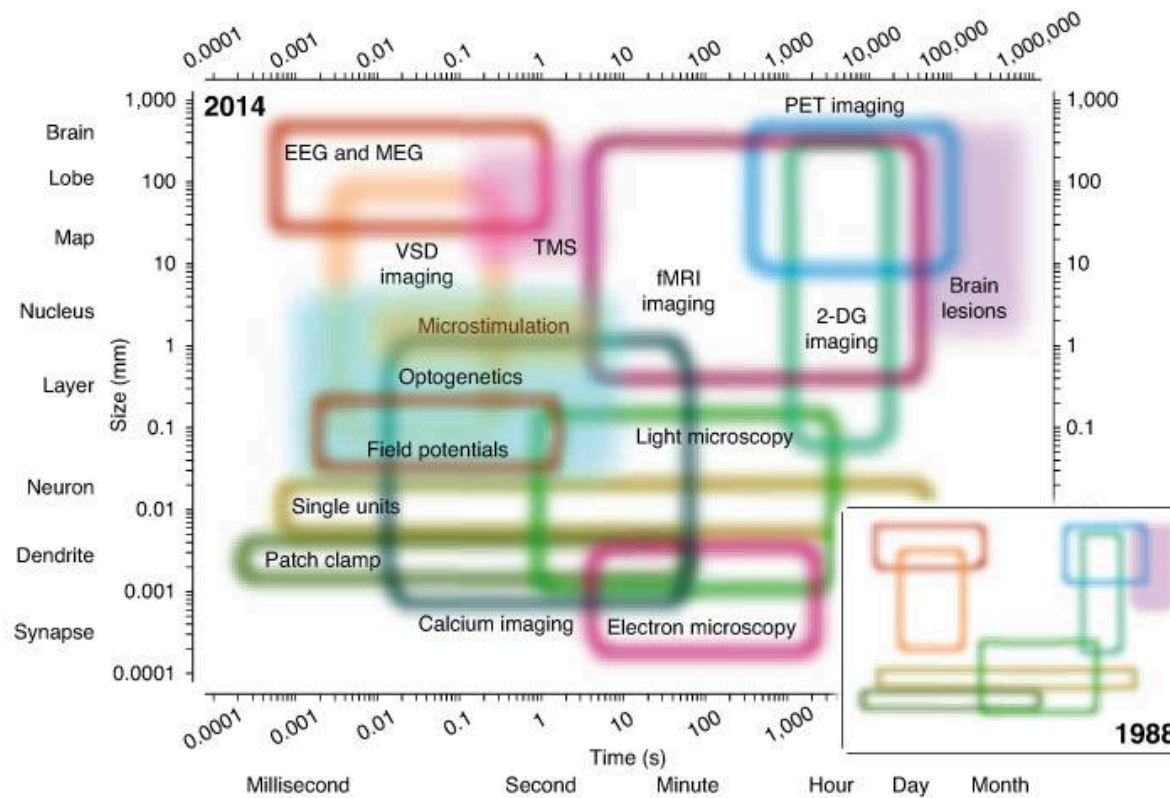


FIG. 1-21. A modern EEG and perceptual laboratory, equipped for EEG, average evoked potential, and CNV recording. 1. Tektronix 502 oscilloscope; 2. Tektronix Polaroid camera; 3. Grass Kymograph camera; 4. Grass physiological stimulators; 5. Tektronix power supply, waveform and pulse generators; 6. Moseley X-Y plotter; 7. Massey-Dickinson control and programming equipment; 8. Power supply; 9. Hewlett-Packard counter; 10. Tapereader; 11. Oscilloscope monitors; 12. Mnemotron computer of average transient (CAT) and accessories; 13. Preset controller and tape coder; 14. Ampex FR-1300 7-channel FM tape recorder; 15. Grass Model 6 8-channel EEG.

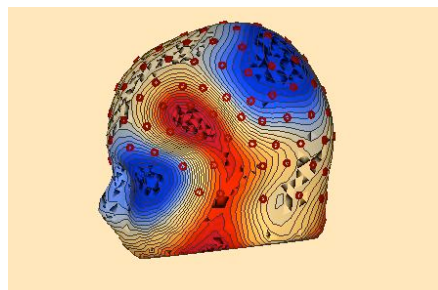
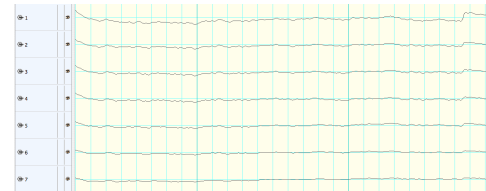
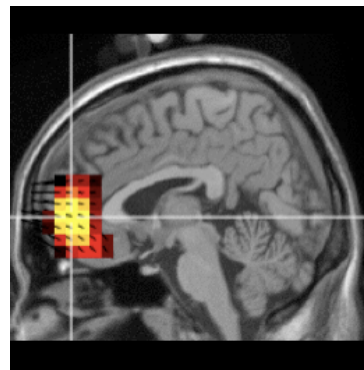


# Spatial-Temporal Trade-offs

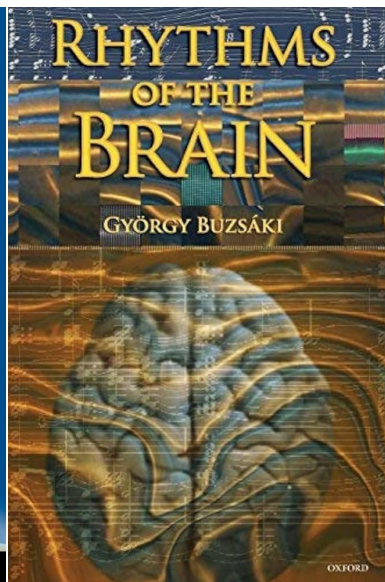
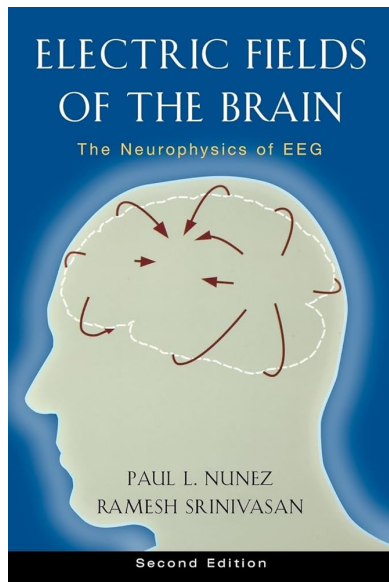


Sejnowski et al. (2014)

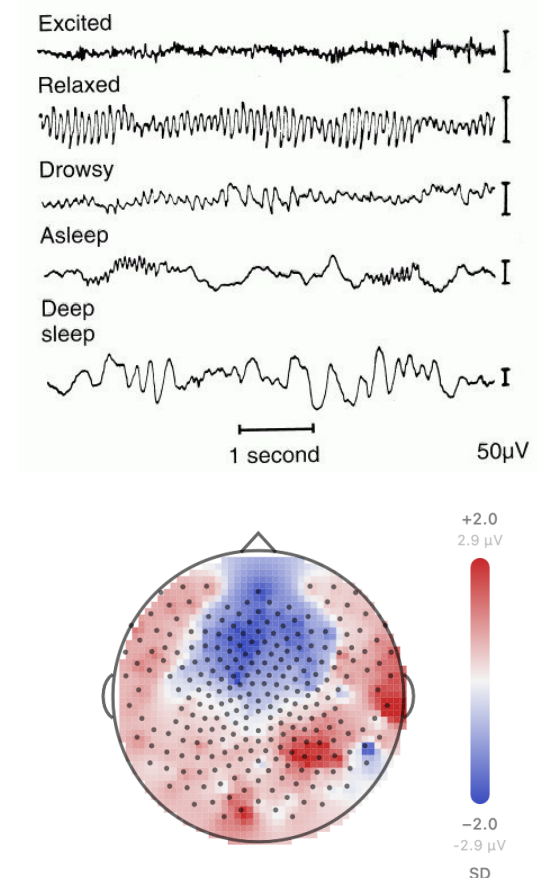
# Neural Origins of EEG



# Types of Data From EEG

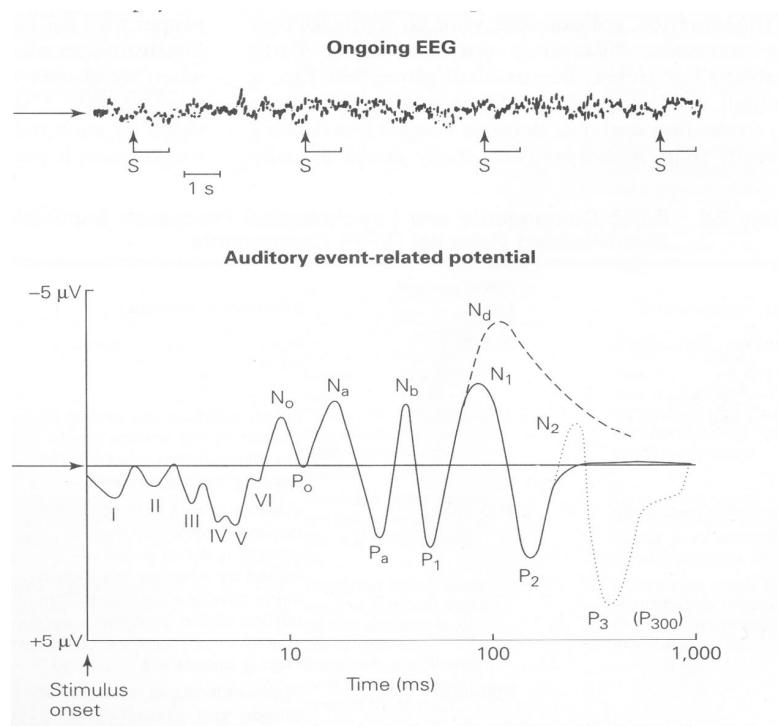


| Band         | Frequency |
|--------------|-----------|
| <b>Delta</b> | 0.5-4Hz   |
| <b>Theta</b> | 4-8Hz     |
| <b>Alpha</b> | 8-12Hz    |
| <b>Beta</b>  | 12-35Hz   |
| <b>Gamma</b> | >35Hz     |





# The Event-Related Potential



- Time/Event-locked EEG
- Event-Related Potential or ERP
  - Never “ERRRP”
- Portion of the ongoing EEG
- Time-Locked to Stimulus Onset
- Strong Temporal Information
- Comparability across the lifespan

# ERP

“Sequence of overlapping components, each perhaps representing activity of different populations of nerve cells and each sometimes standing in different, perhaps orthogonal, relations to experimental variables”

-Donchin, 1979, p24

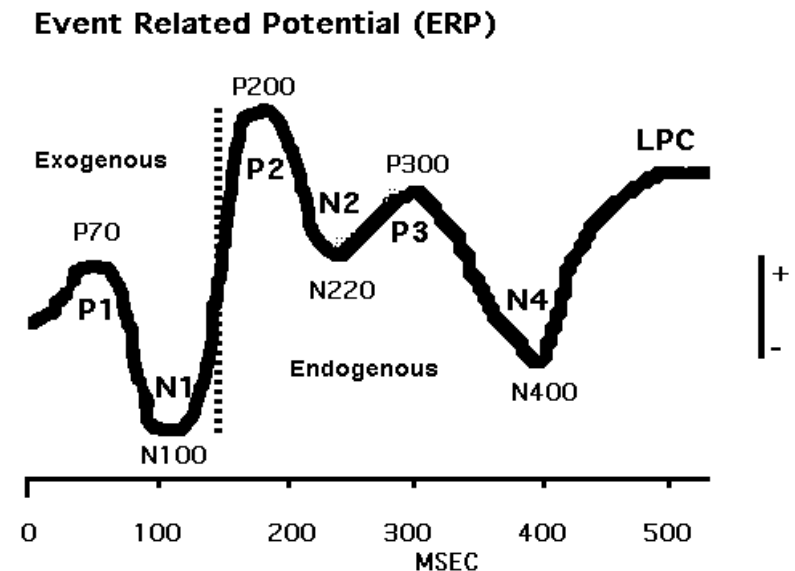


Figure courtesy  
Dennis Molfese



# ERPs are comparable across lifespan

- Predict later behavior and conditions
- Reading ability
- Accurate prediction of dyslexia as early as 1 day old infants

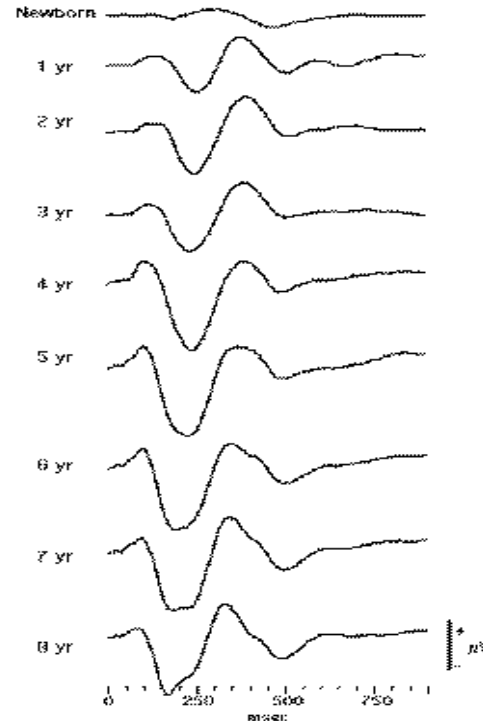


Figure courtesy  
Dennis Molfese



# Infant EEG Recording





# ERP Measures: Latency, Amplitude, Distribution

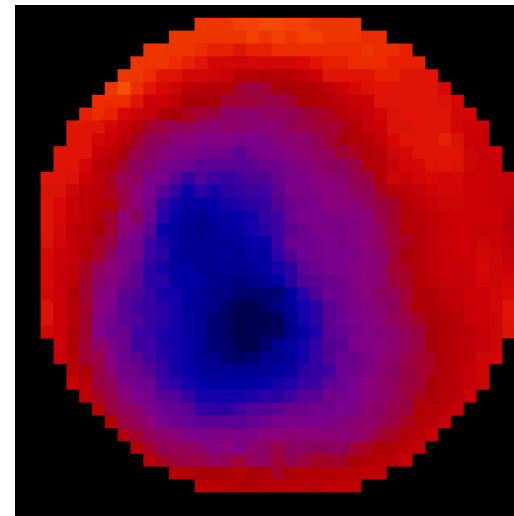
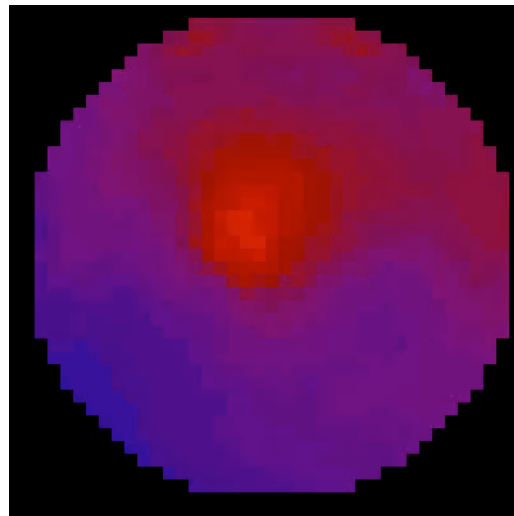
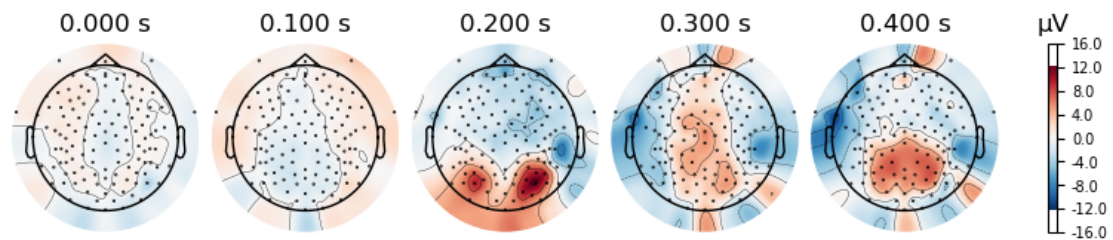
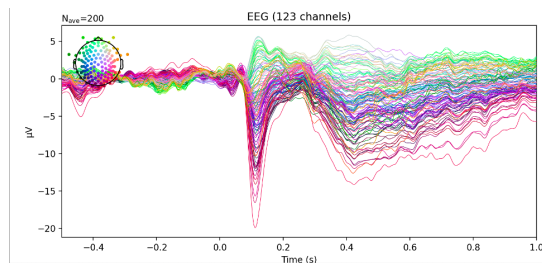


Figure courtesy  
Dennis Molfese



# Amplitude & Latency Measures

- Measure the amplitude of peak
- Postive
- Negative
- Measure the latency of peak
- Try to make search windows over the entire head
- Latency and polarity may vary or even flip

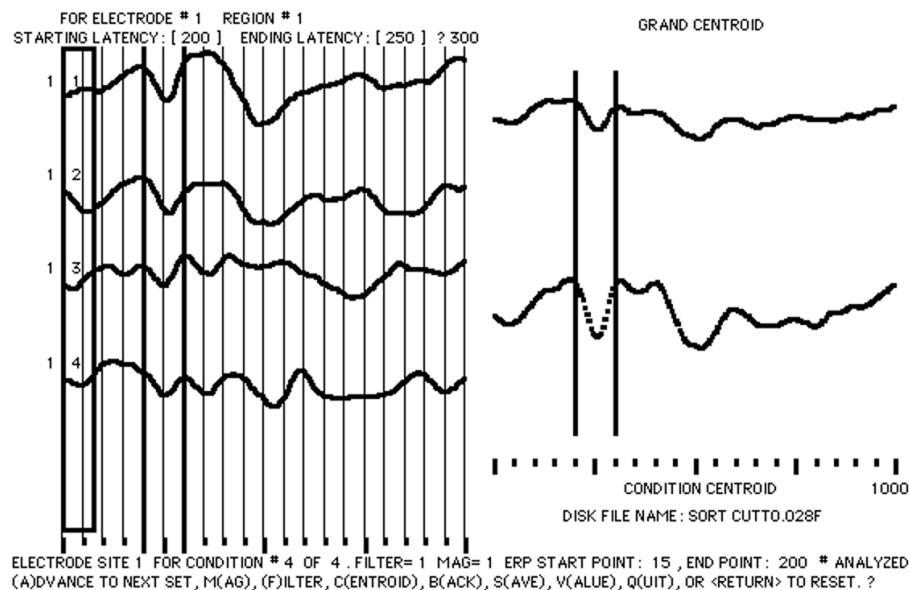


Figure courtesy  
Dennis Molfese



| Peaks | Latency (ms)     | Experiment Manipulation | Max Scalp Amplitude         | Interpretation                                                                                       | Source                                                                    |
|-------|------------------|-------------------------|-----------------------------|------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|
| P1    | 50 Auditory      | None Specific           | Anterior                    | arousal level, suppression of unattended information                                                 | primary auditory cortex, superior temporal gyres, medial frontal          |
|       | 100 Visual       |                         | Occipital                   |                                                                                                      | striate or extra-striate (posterior fusiform), posterior-parietal regions |
| N1    | 100 Auditory     | None Specific           | Temporal                    | selective filtering, basic stimulus characteristics, initial selection for later pattern recognition | Primary auditory cortex, superior temporal plane                          |
|       | 100-161 Visual   |                         | Central, Midline, Occipital |                                                                                                      | inferior occipital, occipito-temporal junction, inferior temporal lobe    |
| P2    | 150-275 Auditory | None Specific           | Central                     | selective attention, stimulus change, feature detection, short-term memory                           | primary auditory cortex, secondary auditory cortex                        |
|       | 200+ Visual      |                         | Occipital, Frontal          |                                                                                                      | inferior occipital region                                                 |

| Peaks | Latency             | Experimental Manipulation    | Max Amplitude                      | Interpretation                           | Source                                                      |
|-------|---------------------|------------------------------|------------------------------------|------------------------------------------|-------------------------------------------------------------|
| N2    | 200 ms Auditory     | None Specific                | vertex, pre-occipital, and frontal | Detect changes in attended stimuli       | supratemporal, auditory cortex                              |
|       | 156-189 ms (N170)   | Face and Object Recognition  | inferior temporal                  | Facial and Object Expertise              | Fusiform Gyrus, lateral occipital-temporal                  |
|       | 100-300 ms          | Go/No-Go                     | frontal, central                   | inhibition                               | caudal and astral anterior cingulate                        |
| MMN   | 100-250 ms Auditory | Physically different stimuli | frontal, central                   | early sensory memory                     | temporal lobe, right superior temporal gyrus and plane      |
| P3    | 300 ms              | oddball (P3b)                | occipito-parietal                  | memory updating, stimulus discrimination | thalamus, hippocampus, superior temporal gyrus and junction |
|       | 300 ms              | novel stimuli (P3a)          | frontal                            | involuntary attention, inhibition        | medial parietal lobe, left superior prefrontal cortex       |

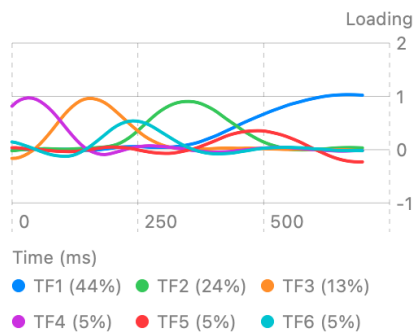
| Peaks | Latency              | Experimental Manipulation                    | Max Amplitude                | Interpretation                                           | Source                                                                                               |
|-------|----------------------|----------------------------------------------|------------------------------|----------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| N400  | 475 ms<br>Visual     | Sentence Processing with Semantic Violations | Parietal and Temporal        | Higher-Order Language Processing                         | Parahippocampal, anterior fusiform, medial temporal, hippocampus, amygdala, lateral temporal regions |
|       | 525 ms<br>Auditory   |                                              |                              |                                                          |                                                                                                      |
| P600  | 400-600 ms<br>Memory | Learned vs. Novel                            | Left Temporal, Frontocentral | Memory, Novel identification, can be cross-modal         | Prefrontal, anterior temporal lobe, anterior cingulate, hippocampus, frontal and temporal cortex     |
|       | 500 ms<br>Language   | Syntactic Violation                          | Frontocentral                | Syntactic violation, phrase structure, subcategorization | Superior Parietal, Precuneus, Posterior Cingulate, Basal Ganglia                                     |



| Peaks | Latency                                | Experimental Manipulation                 | Max Amplitude               | Interpretation                                                                | Source                                 |
|-------|----------------------------------------|-------------------------------------------|-----------------------------|-------------------------------------------------------------------------------|----------------------------------------|
| ERN   | 80–150 ms<br>(Response Locked)         | Forced Choice<br>RT/ACC<br>(e.g. Flanker) | Frontal & Central           | Intent and<br>Motivation                                                      | Anterior Cingulate<br>Cortex,<br>DLPFC |
| FRN   | 250–350 ms                             | Any reward<br>feedback                    | Anterior Frontal<br>Central | Expectation differs<br>from feedback<br><br>Feedback positive vs.<br>negative | Anterior Cingulate<br>Cortex           |
| CNV   | Pre-stimulus<br>negative<br>deflection | Go/No-Go<br>Set ITIs                      | Vertex                      | Anticipation                                                                  | Premotor (BA 6)                        |

# Multivariate Alternatives to Peak Picking

Temporal factor loadings - 6 factors - 95% variance

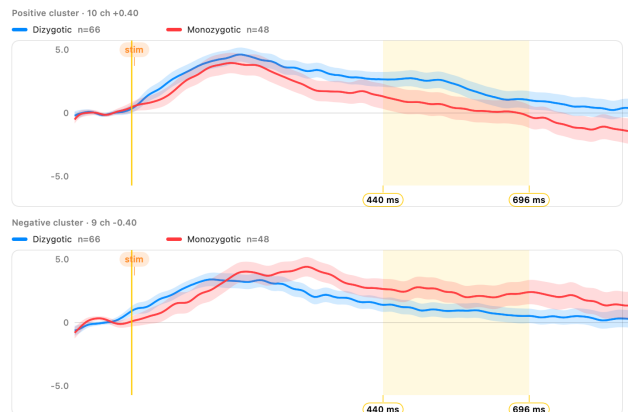
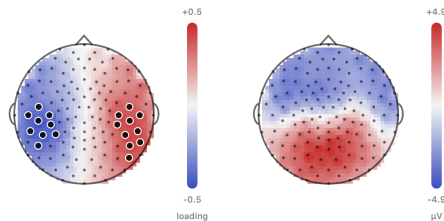


## Cluster ERP - TF1SF3

Spatial threshold (loading)  $\geq 0.40$   
Observed voltage: Peak - 664 ms - 2 visible cells -  $n=114$

Factor loading  
Cluster definition - dimensionless

Observed voltage  
Peak - 664 ms



Journal of Neuroscience Methods  
Volume 187, Issue 1, 15 March 2010, Pages 138-145



## The ERP PCA Toolkit: An open source program for advanced statistical analysis of event-related potential data

Joseph Dien

Differentiating neural responses to emotional pictures: Evidence from temporal-spatial PCA  
D Foti, G Hajcak, J Dien  
Psychophysiology 46 (3), 521-530

654 2009

The ERP PCA Toolkit: An open source program for advanced statistical analysis of event-related potential data  
J Dien  
Journal of neuroscience methods 187 (1), 138-145

592 2010

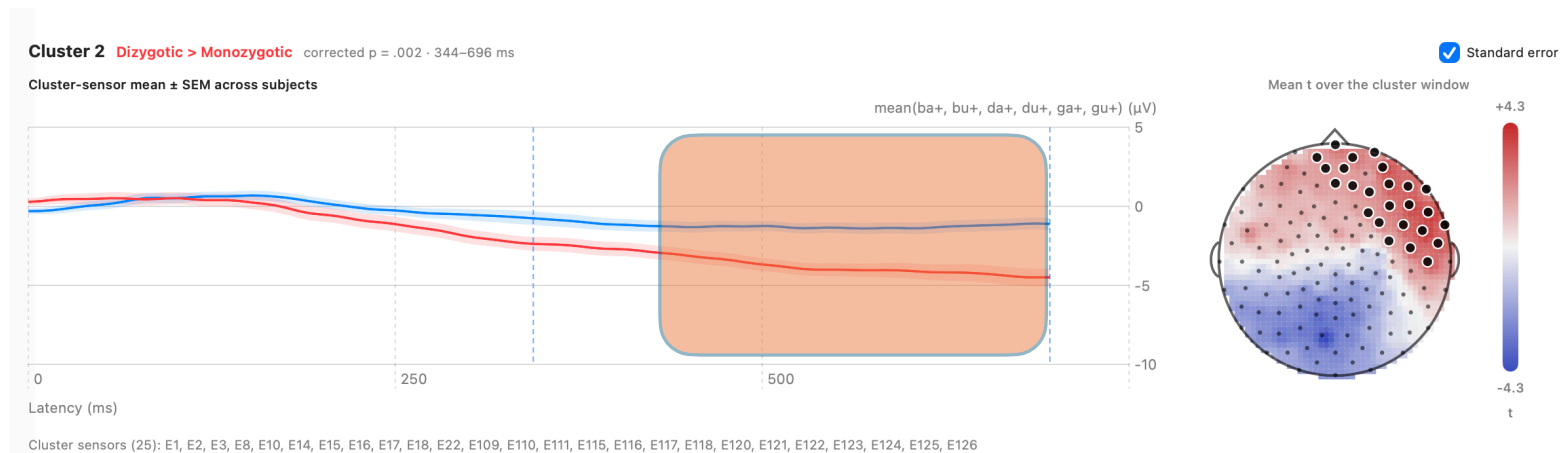
Spatiotemporal analysis of the late ERP responses to deviant stimuli  
KM Spencer, J Dien, E Donchin  
Psychophysiology 38 (2), 343-358



507 2001

PCA (Donchin, 1968; 1969)  
PCA - discriminate function (Chapman, 1979)  
PCA - ANOVA (Molfese, 1975; 1976)  
PCA - MANOVA (Samar, 1986)  
PCA - ANOVA - REGRESSION (Molfese & Molfese, 1986)  
PCA - ANOVA - Canonical Correlation (Molfese & Molfese, 1979)  
Growth curves (Molfese, Espy & Molfese)

# Multivariate Alternatives to Peak Picking



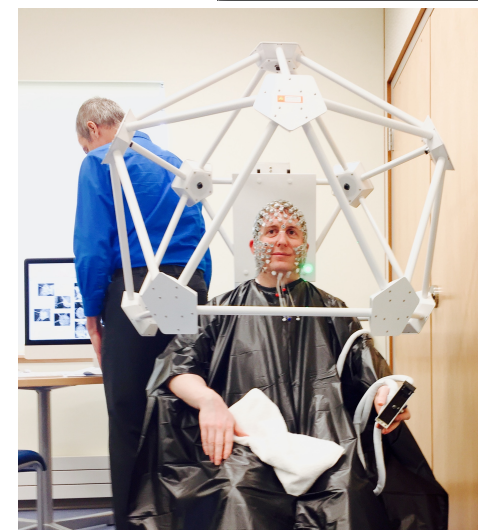
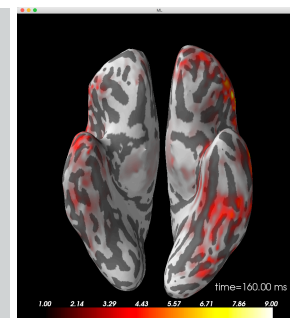
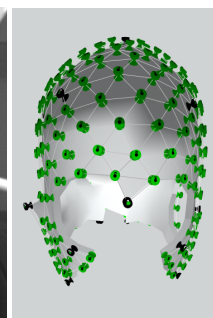
- Cluster correction for t-statistics and/or F-statistics
- Similar to fMRI in using TFCE and permutations

# Source Analysis

- Adequate Number of Sensors
- Know the Geometry of Head & Sensors
- Know Conductivity of the head
- Brain segmentation
- Choose a inverse solution model

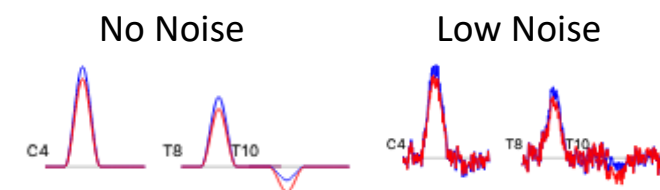
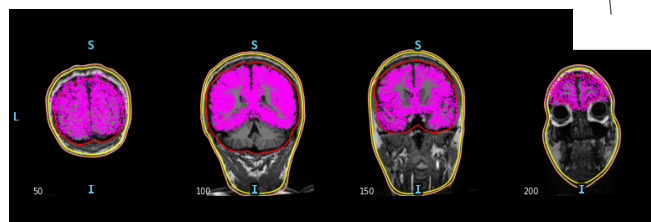
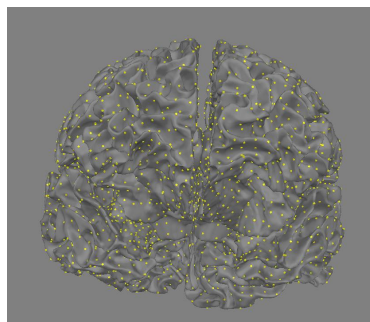
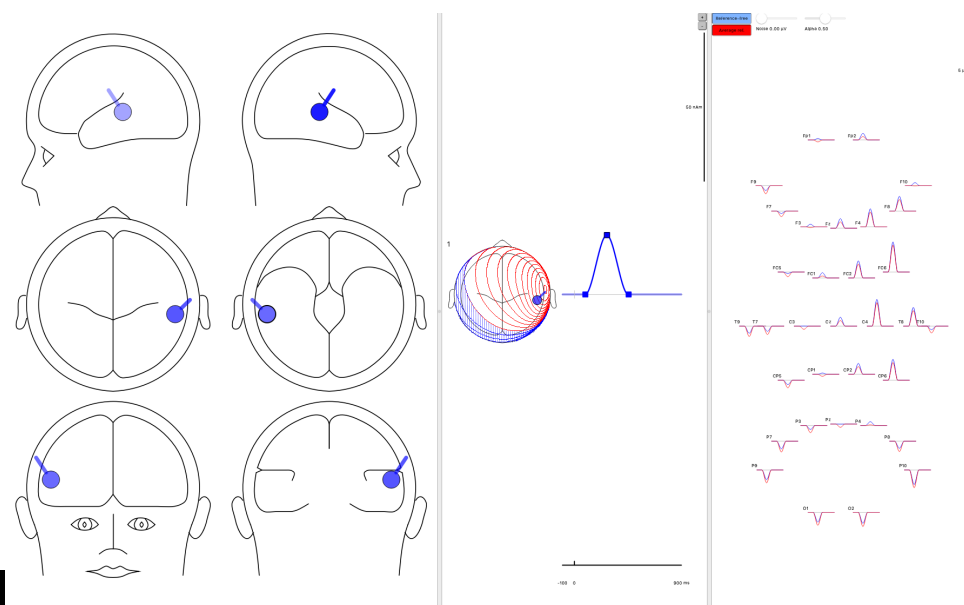


Head model



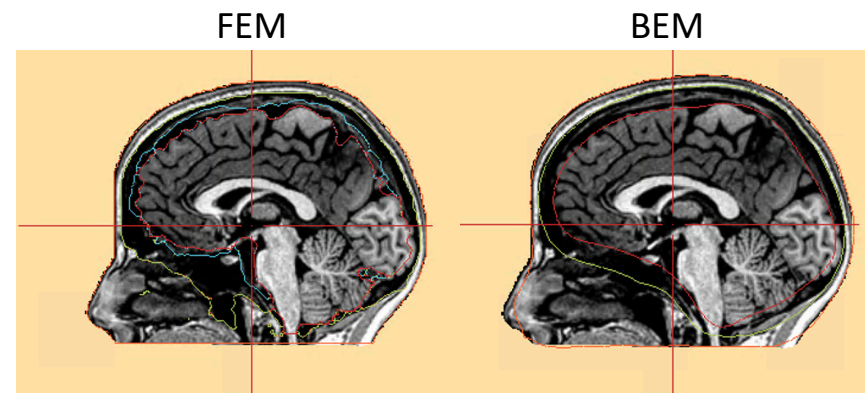
# Source Analysis Details

- Forward Problem: Given the sources and a propagation model, what does the scalp topography look like?
- Inverse Problem: Given scalp topography and propagation model, what are the generators?



# Forward Solution

- BEM - Boundary Element Model
  - Typically uses a simple three-layer model (scalp, skull, brain) with isotropic conductivity
- FEM - Finite Element Model
  - Divide head volume into small elements (tetrahedral or hexahedral) with specific conductivity properties (e.g. brain, skull, scalp, CSF)
  - Allows for complex geometries to exist and be modeled & currents to vary by direction of flow (e.g. white matter tracts)



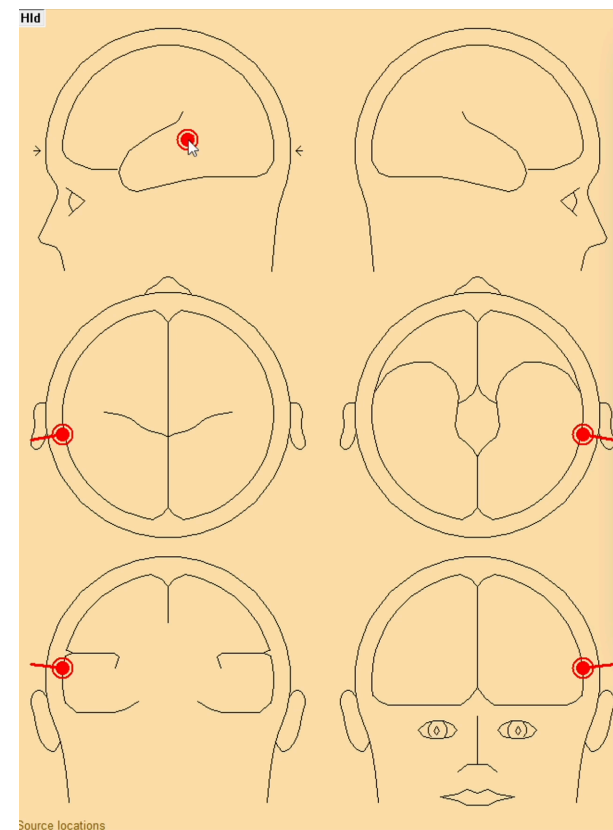


# Inverse Models

- Single Dipoles
- Distributed Source Models
  - Minimum Norm Estimates (MNE)
- Beamforming

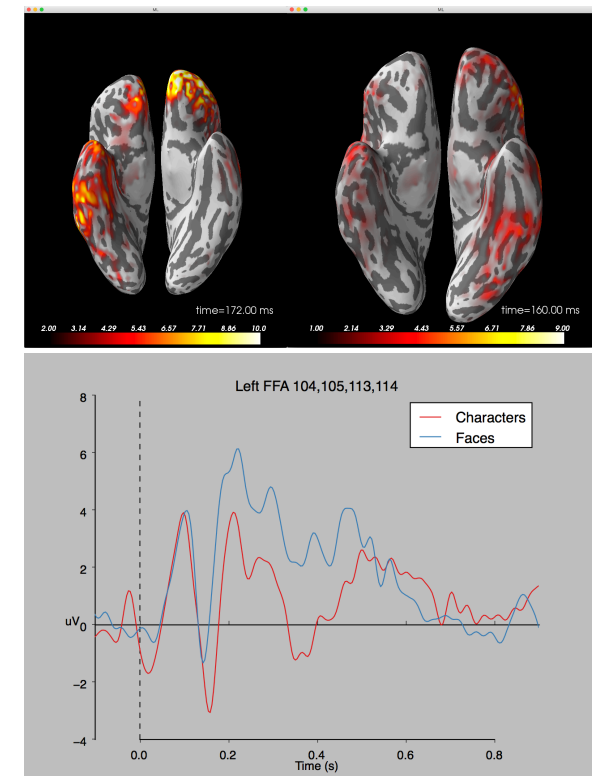
# Single Current Dipoles

- Assume EEG signals are generated by a single equivalent current dipole source in the brain.
- Specifies location (XYZ), orientation, and strength
- The quality of the fit is assessed using measures like residual variance or goodness of fit
- Particularly useful for focal sources:
- Early sensory evoked potentials or Epileptic spikes
- May not be appropriate for more complex or distributed brain activity patterns



# Minimum Norm / Distributed

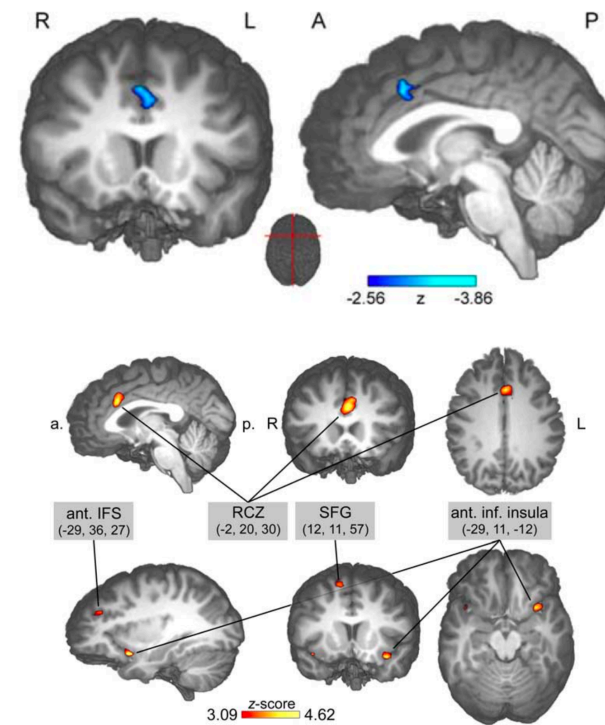
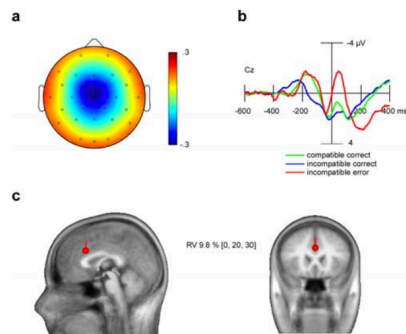
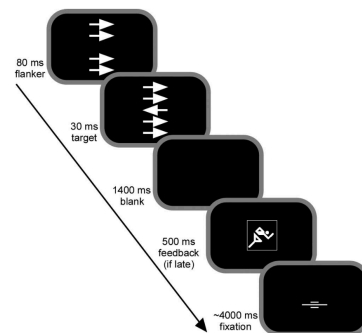
- Best fit of the sensor data while minimizing the overall amplitude of brain activity
  - Variants: sLORETA, dSPM
- Pros
  - Computationally efficient, even for large datasets
  - Can handle complex source configurations
- Limitations
  - Tends to produce spatially smeared results (requires some regularization)
  - May have difficulty with deep sources



# Combined EEG-fMRI

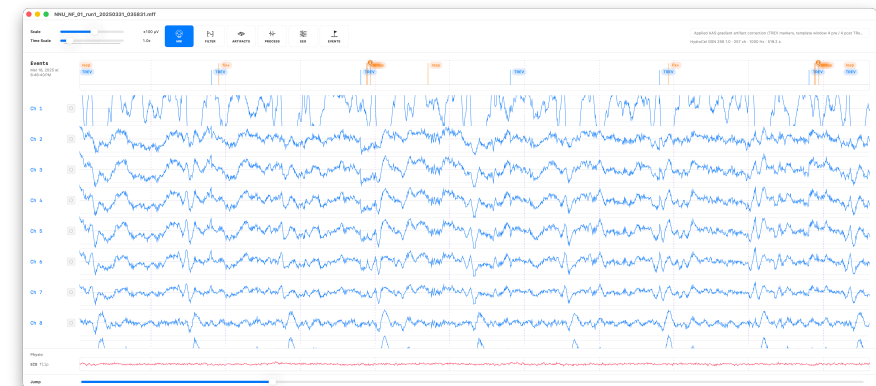
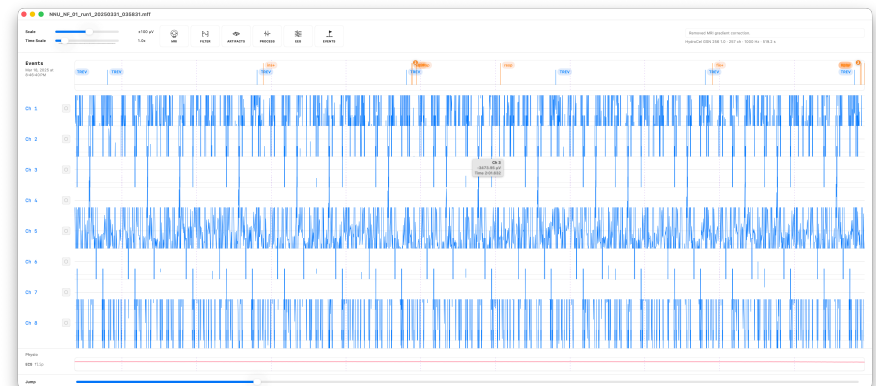
- Can record EEG during an fMRI session
- Pros
  - Same stimuli, same subjects, same response
- Cons
  - Added noise in EEG recording

# Combined EEG-fMRI



# MR Artifact Removal / Reduction

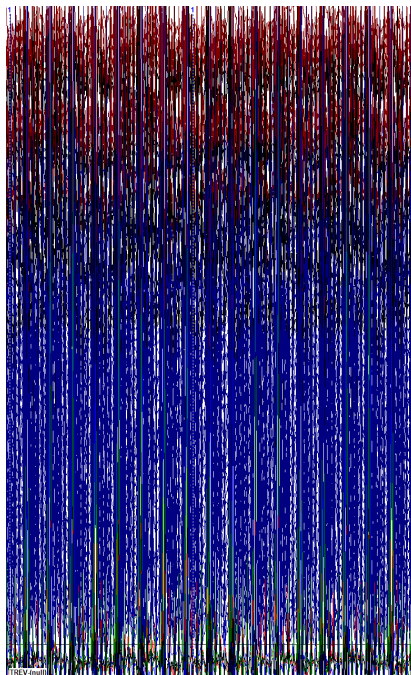
- AAS (Allen et al. 2000)
  - Average Artifact Subtraction
  - Possible problems if you have movement in scanner
- OBS (Mossmann et al. 2009)
  - Optimal Basis Sets to potentially model artifact
  - More flexible to changes in artifact over time
  - More complex, possible overfitting?



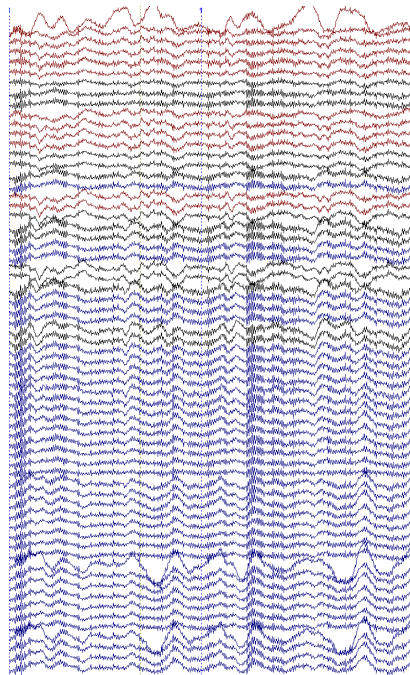


# Subduing fMRI Artifacts

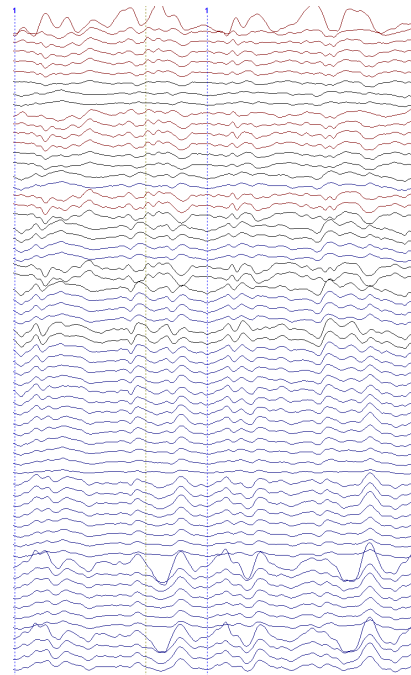
RAW Data



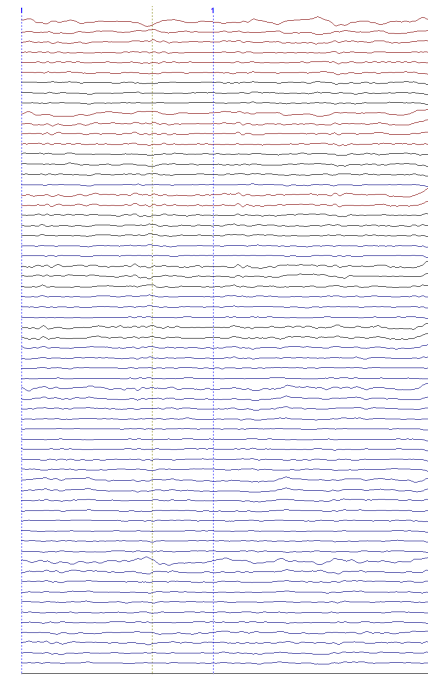
MR Data Removed



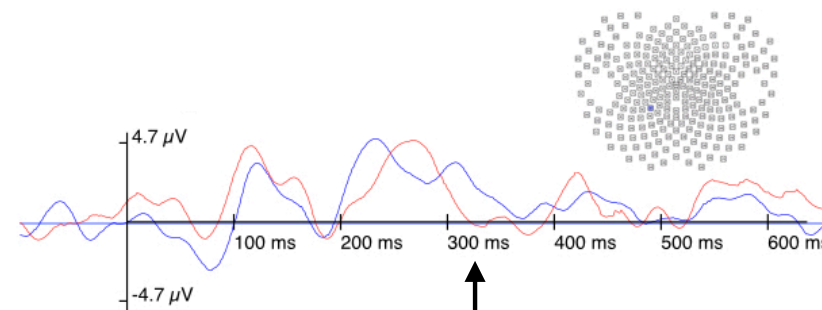
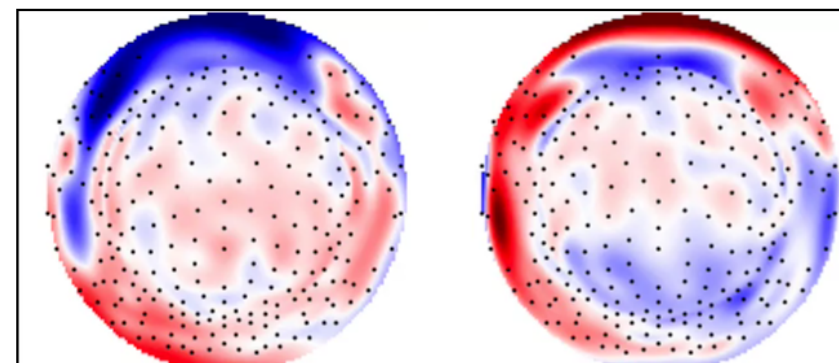
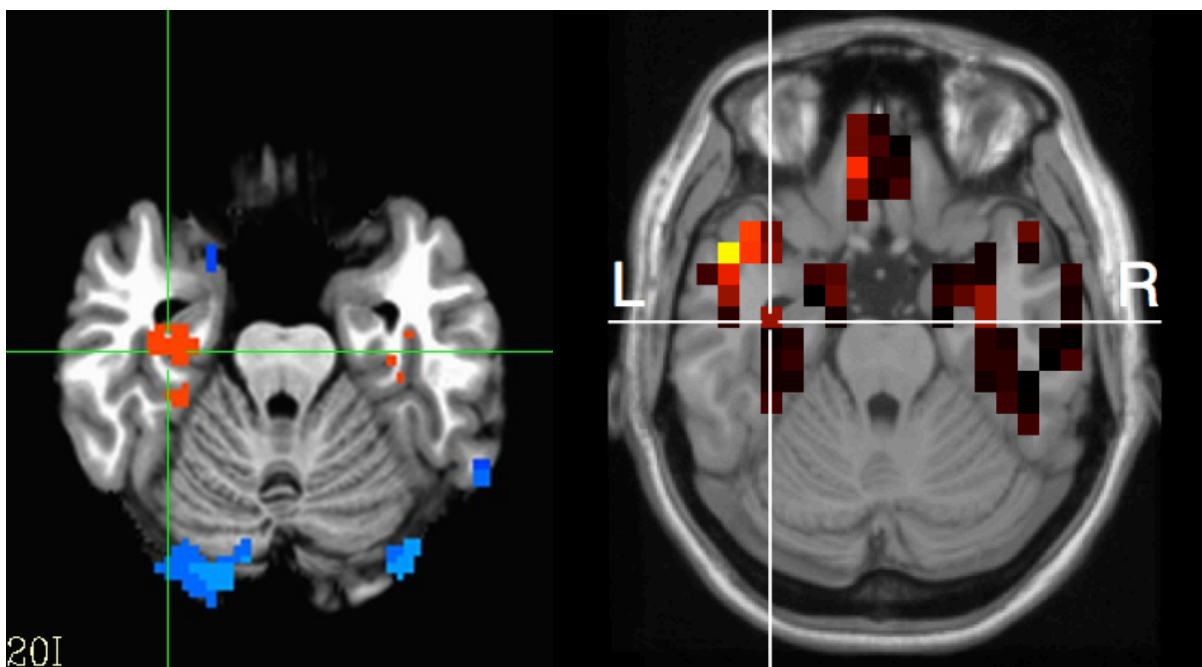
Filtered



BCG Reduced  
Using OBS



# Struggles of Combining Data

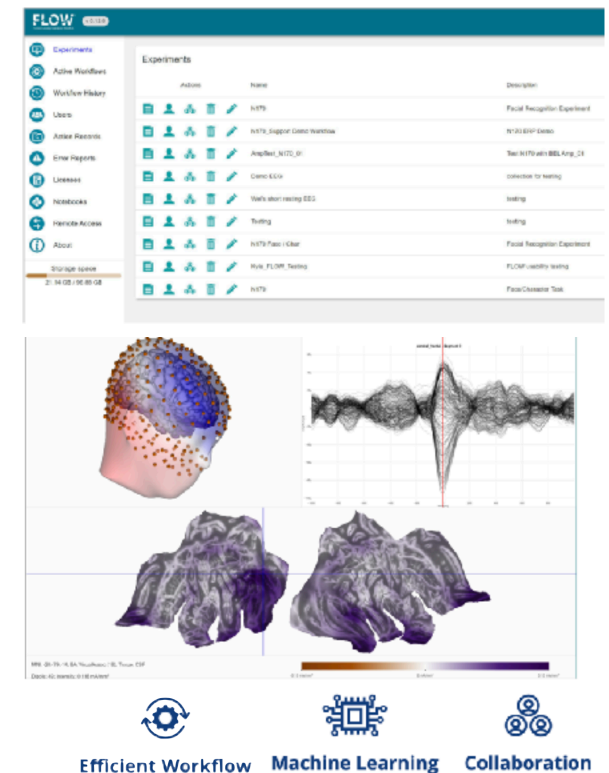


Parahippocampal Activation to P300

# EEG / EEG-fMRI @ NIH

- 2x EGI MR-Conditional 256-Channel EEG Systems
- 1x EGI GTEN “Neuromodulation” 256-Channel EEG System
  - tACS/tDCS/tRNS
  - Can record EEG continuously
- GeoScan NDI Sensor for Electrode Triangulation
- Data Storage Node





# Experimental Control

- Write your experiment with
  - E-PRIME
  - PsychoPy
  - CMN (Josh & Pete) wrote the Python package to communicate between PsychoPy and EGI's Net Station.

```
ns = NetStation(IP_NETSTATION, ECI_PORT)

# EGI 2: connect. send_event() is non-blocking -- it captures the
# timestamp and hands the socket write to a background thread -- which
# is what makes it safe to call from a flip callback.
#
# Drift correction and background drift sampling are both on by
# default; they are spelled out here so it is obvious what the
# experiment is relying on. With auto_drift_background=True the
# package samples NTP on its own thread, so the trial loop below never
# has to ask for a sample.
ns.connect(
    ntp_ip=IP_AMP,
    drift_correction=True,
    auto_drift=True,
    auto_drift_background=True,
    auto_drift_interval=15.0,
)
```



# Learn how to use the system

- Net applications
  - Training offered 1-2 times a year
  - Ideal for when new folks join the lab
- Also learn how to hook system into MRI
  - Proper patient/subject prep
  - Recording good quality data
  - Cleaning / sanitizing

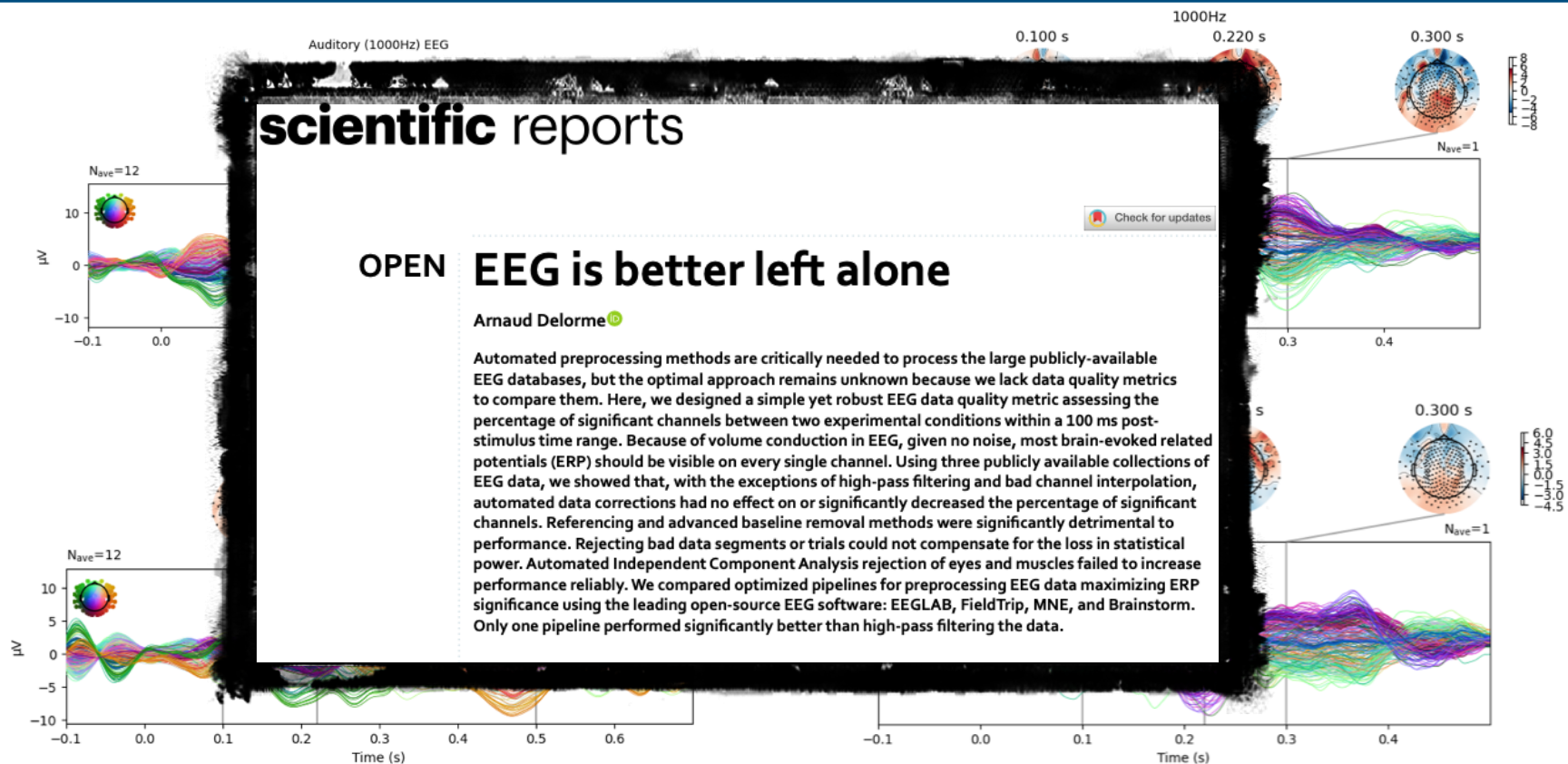


# Learn to Analyze Data

- Python notebooks available
- Processing nodes for Commercial Programs
- Guidance on analysis trajectory
- If you don't mind being a beta tester, I write my own Mac apps for analyzing EEG, EEG-fMRI

|                    |                                                                                       |                                                                                       |
|--------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>Commercial</b>  |    |    |
| <b>Python</b>      |    |                                                                                       |
| <b>Matlab</b>      |   |   |
| <b>Pete's Apps</b> |  |  |

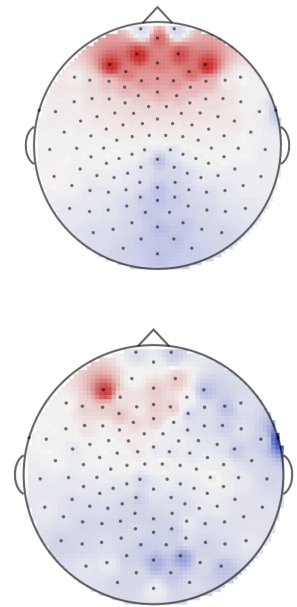
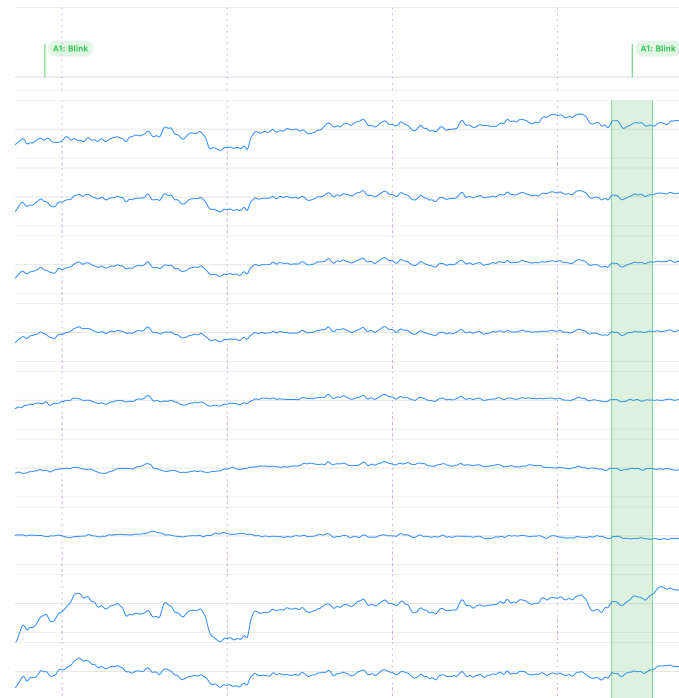
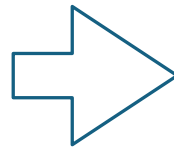
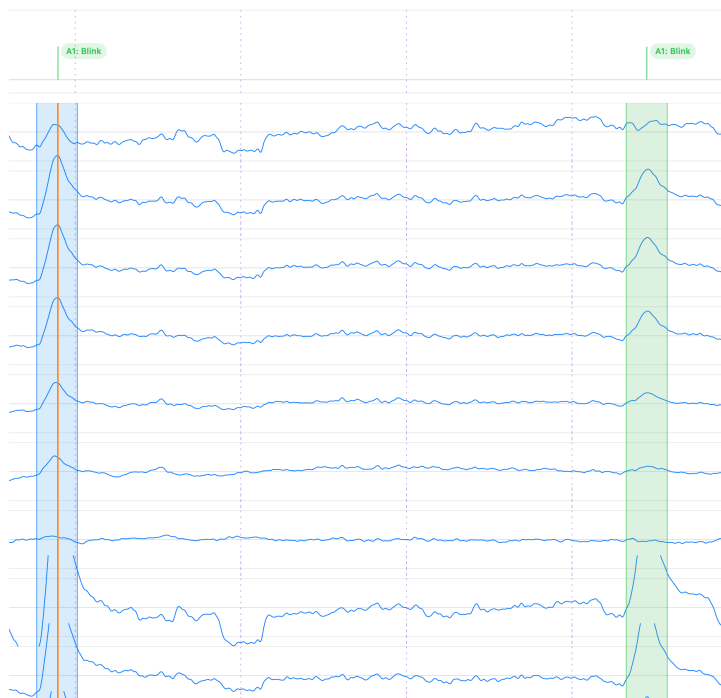




| Criterion                       | MNE-Python         | EEGLAB                            | ERPLAB                       | FieldTrip          | Brainstorm                     |
|---------------------------------|--------------------|-----------------------------------|------------------------------|--------------------|--------------------------------|
| Primary environment             | Python, code-first | MATLAB, GUI + scripts             | EEGLAB/MATLAB, GUI + scripts | MATLAB, code-first | GUI; MATLAB or free standalone |
| Beginner accessibility          | ★★                 | ★★★★                              | ★★★★                         | ★                  | ★★★★                           |
| Reproducible scripted pipelines | ★★★★               | ★★                                | ★★                           | ★★★★               | ★★                             |
| Traditional ERP analysis        | ★★★★               | ★★                                | ★★★★                         | ★★★★               | ★★                             |
| ICA-based artifact cleaning     | ★★                 | ★★★★                              | Uses EEGLAB                  | ★★                 | ★★                             |
| Time–frequency analysis         | ★★★★               | ★★★★                              | ★                            | ★★★★               | ★★★★                           |
| Source localization             | ★★★★               | ★★ via plugins                    | ★                            | ★★★★               | ★★★★                           |
| Connectivity                    | ★★★★               | ★★★★ via plugins                  | ★                            | ★★★★               | ★★★★                           |
| Cluster/permutation statistics  | ★★★★               | ★★                                | ERP-focused tools            | ★★★★               | ★★                             |
| Decoding/machine learning       | ★★★★               | ★★ via plugins                    | ★                            | ★★                 | ★★                             |
| Interactive visualization       | ★★                 | ★★★★                              | ★★★★                         | ★★                 | ★★★★                           |
| Plugin ecosystem                | ★★                 | ★★★★                              | EEGLAB ecosystem             | ★★                 | ★★                             |
| EEG + MEG/multimodal work       | ★★★★               | Primarily EEG                     | Primarily EEG/ERP            | ★★★★               | ★★★★                           |
| Commercial license avoidable?   | Yes                | Usually MATLAB-first <sup>1</sup> | Usually MATLAB-first         | No—MATLAB required | Yes, standalone available      |
| Typical learning curve          | Moderate           | Low–moderate                      | Low for ERP users            | High               | Low–moderate                   |

| Criterion                       | BESA                              | BrainVision Analyzer     | EGI Net Station             | BrainVoyager             | CURRY                                 |
|---------------------------------|-----------------------------------|--------------------------|-----------------------------|--------------------------|---------------------------------------|
| EEG acquisition                 | —                                 | — <sup>1</sup>           | ★★★★ EGI systems            | —                        | ★★★★ <sup>+</sup> Compumedics systems |
| Routine preprocessing/ERP       | ★★★★                              | ★★★★                     | ★★★★                        | ★★                       | ★★★★                                  |
| ICA/artifact correction         | ★★                                | ★★★★                     | ★                           | ★★ via plugin            | ★★★★                                  |
| EEG–fMRI artifact correction    | ★★                                | ★★★★                     | ★★★★                        | ★★                       | ★★★★                                  |
| Time–frequency analysis         | ★★★★                              | ★★★★                     | ★★                          | ★★                       | ★★★★                                  |
| Source localization             | ★★★★                              | ★ LORETA                 | ★★ <sup>+</sup> GeoSource   | ★★★★ <sup>+</sup> EMEG   | ★★★★                                  |
| Individual MRI/head models      | ★★★★ <sup>+</sup> BESA MRI        | ★                        | ★★★★ <sup>+</sup> GeoSource | ★★★★                     | ★★★★                                  |
| Connectivity                    | ★★★★ <sup>+</sup>                 | ★★                       | ★                           | ★★                       | ★★★★                                  |
| Group-level statistics          | ★★★★ <sup>+</sup> BESA Statistics | ★★                       | ★                           | ★★★★ <sup>2</sup>        | ★★                                    |
| Scripting/batch automation      | ★★                                | ★★ History Templates     | ★★ tools/scripts            | ★★★★                     | ★★ macros/batch                       |
| Ease for non-programmers        | ★★★★                              | ★★★★                     | ★★★★                        | ★★                       | ★★                                    |
| Multimodal MRI/CT integration   | ★★★★ <sup>+</sup>                 | ★                        | ★★ <sup>+</sup>             | ★★★★                     | ★★★★                                  |
| MEG support                     | ★★★★                              | Primarily EEG            | —                           | ★★★★                     | ★★★★                                  |
| Intracranial/epilepsy workflows | ★★★★                              | ★                        | ★★ clinical review          | ★★                       | ★★★★                                  |
| Hardware-vendor independence    | ★★★★                              | ★★★★                     | ★ EGI-centered              | ★★★★                     | ★★                                    |
| Typical platform orientation    | Windows                           | Windows-centered         | macOS                       | Windows/macOS/Linux      | Windows                               |
| Commercial structure            | Modular suite                     | One-time license/add-ons | Part of EGI system/add-ons  | Product editions/modules | Highly modular suite                  |

# Artifact Identification / Removal



# Scheduling

- Scheduler can be accessed from our website

- fmrif.nimh.nih.gov

- First come, first serve

- “Pre-wired” on most 3T scanners

- 3Tb

- 3Td

- NIAAA 3T Prisma

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Internal Resources

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- Training request form
- FMRIF Manual
- Scanner Rooms
- Download Data
- Mailing Lists
- 3T Scanlog

Scanner: FMRIF EEG system - A # Days: 5 Show Researcher? ☒ [edit](#) | [view](#) | [previous](#) | [next](#) | [Printable Version](#)

| Template | Monday<br>04/08/24<br>EEG Schedule               | Tuesday<br>04/09/24<br>EEG Schedule              | Wednesday<br>04/10/24<br>EEG Schedule            | Thursday<br>04/11/24<br>EEG Schedule             | Friday<br>04/12/24<br>EEG Schedule               |
|----------|--------------------------------------------------|--------------------------------------------------|--------------------------------------------------|--------------------------------------------------|--------------------------------------------------|
| 7am      | <input checked="" type="checkbox"/> (unassigned) | <input checked="" type="checkbox"/> (unassigned) | <input checked="" type="checkbox"/> (unassigned) | <input checked="" type="checkbox"/> (unassigned) | <input checked="" type="checkbox"/> (unassigned) |
| 8am      | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> ETPB         | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> (posted)     |
| 9am      | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> ETPB         | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> (posted)     |
| 10am     | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> ETPB         | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> (posted)     |
| 11am     | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> ETPB         | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> (posted)     |
| Noon     | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> SCN          | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> (posted)     |
| 1pm      | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> SCN          | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> (posted)     |
| 2pm      | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> SCN          | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> (posted)     |
| 3pm      | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> SCN          | <input checked="" type="checkbox"/> SCN          | <input checked="" type="checkbox"/> (posted)     |
| 4pm      | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> SCN          | <input checked="" type="checkbox"/> (posted)     |
| 5pm      | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> SCN          | <input checked="" type="checkbox"/> (posted)     |
| 6pm      | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> (posted)     |
| 7pm      | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> (posted)     |
| 8pm      | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> (posted)     |
| 9pm      | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> (posted)     |
| 10pm     | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> (posted)     | <input checked="" type="checkbox"/> (posted)     |

☒ time used ☒ time not used ☒ unknown

# Come Collect Data!

