

# Rim-to-Rim Wearables At The Canyon for Health (R2R WATCH)

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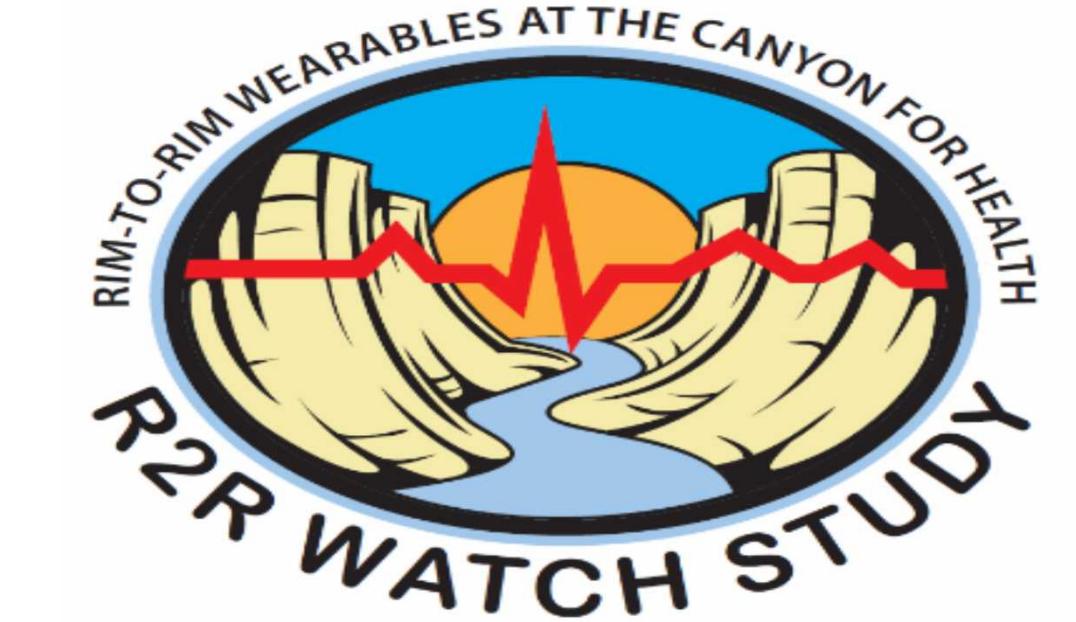
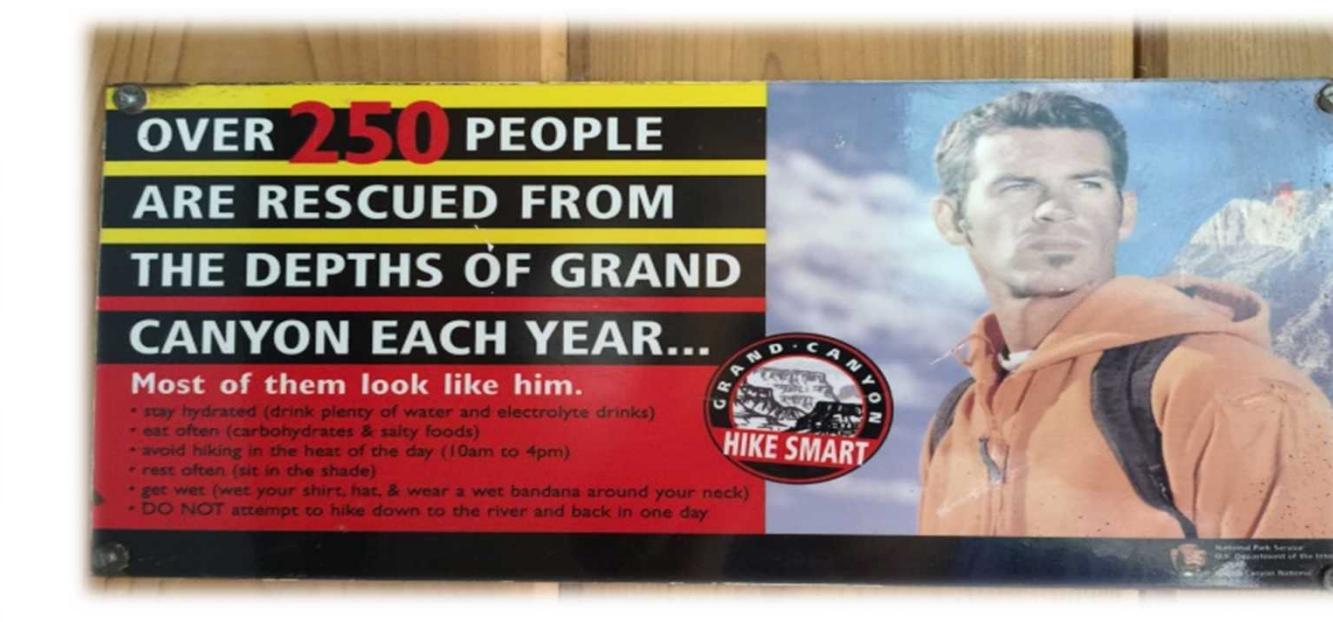
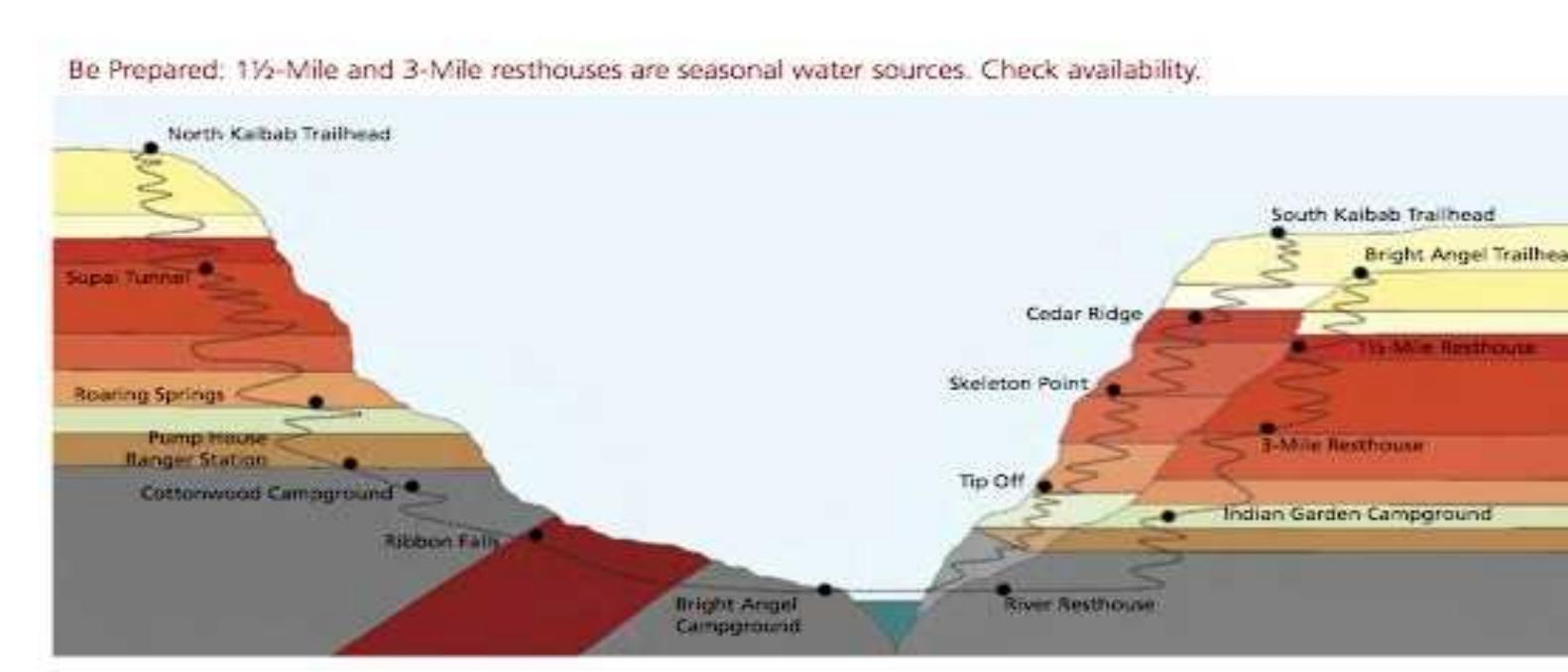
Jon Femling, Emily Pearce, Lucie Jelinkova, *The University of New Mexico*

## Project Objectives

- 1. Markers for Health:**  
Identify physiological, cognitive markers most related to health and task performance
- 2. Data Processing:**  
Determine key methodologies for data processing from GOTS/COTS devices
- 3. BSVE Integration:**  
Integrate data into the Biosurveillance Ecosystem (BSVE)

## Grand Canyon Rim-2-Rim Hike

- Altitude and temperature change
- Extreme environment
- Physical strain
- 14.3 miles, 6,000 feet to the bottom
- 9.6 miles, 4,500 feet back to the South Rim

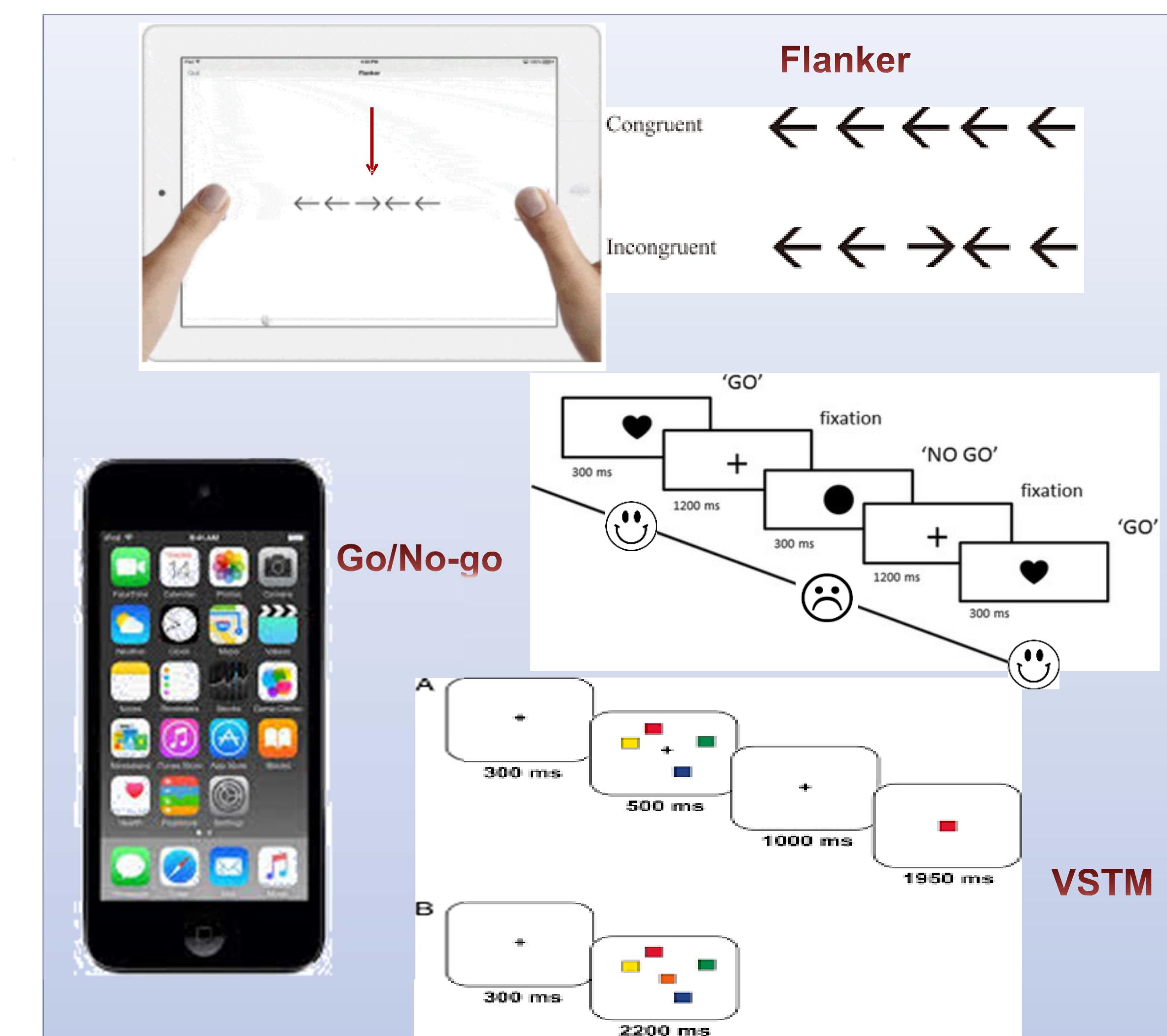


## Mobile Devices for Physiological Data

| Package    | Cognitive Tests | GPS            | Elevation       | Heart rate (ECG) | Heart rate (Wrist) | Heart rate (Forehead) | Cadence          | Cadence (Torso) | Temperature (Ambient) | Temperature (Direct Sun) | Temperature (Skin) | Humidity   | Total   | Qty |
|------------|-----------------|----------------|-----------------|------------------|--------------------|-----------------------|------------------|-----------------|-----------------------|--------------------------|--------------------|------------|---------|-----|
| Advanced 1 | iPod Touch 6    | Fenix 3 HR     | Fenix 3 HR      | Wahoo TickrX     | Fenix 3 HR         | LifeBeam SmartHat     | Fenix 3 HR       | Wahoo TickrX    | SensorPush            | SensorPush               | Tempe              | SensorPush | \$1,115 | 10  |
| Advanced 2 | iPod Touch 6    | Spartan Ultra  | Spartan Ultra   | Smart Sensor     | (None)             | LifeBeam SmartHat     | Spartan Ultra    | (None)          | SensorPush            | SensorPush               | (None)             | SensorPush | \$1,165 | 10  |
| Basic 1    | iPod Touch 6    | Vivoactive     | Vivoactive      | HR               | (None)             | Vivoactive HR         | (None)           | Vivoactive HR   | (None)                | SensorPush               | (None)             | SensorPush | \$515   | 35  |
| Basic 2    | iPod Touch 6    | eTrex 10 + 2AA | (None - floors) | (None)           | Fitbit Charge HR   | (None)                | Fitbit Charge HR | (None)          | SensorPush            | (None)                   | SensorPush         | \$485      | 15      |     |

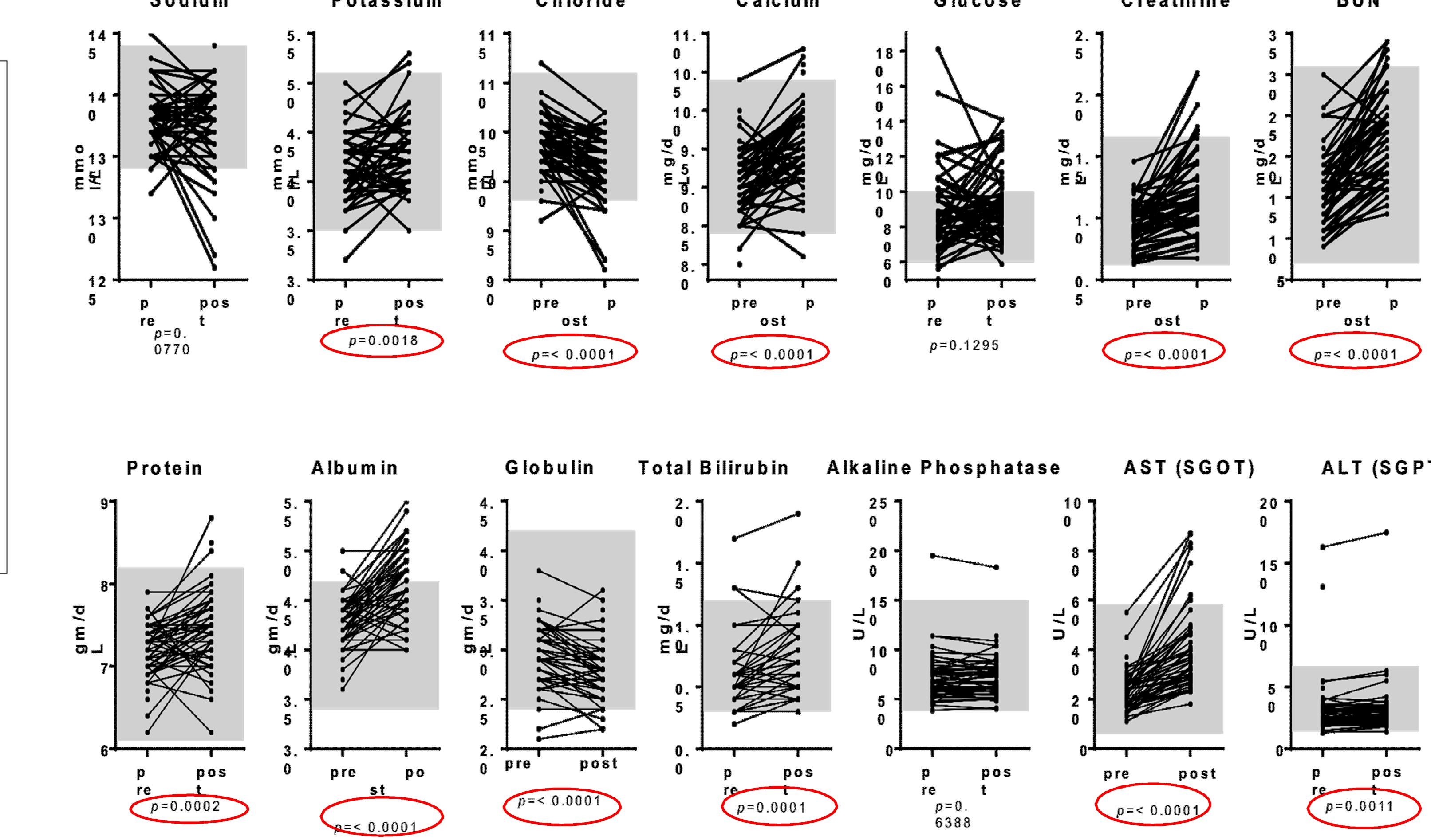
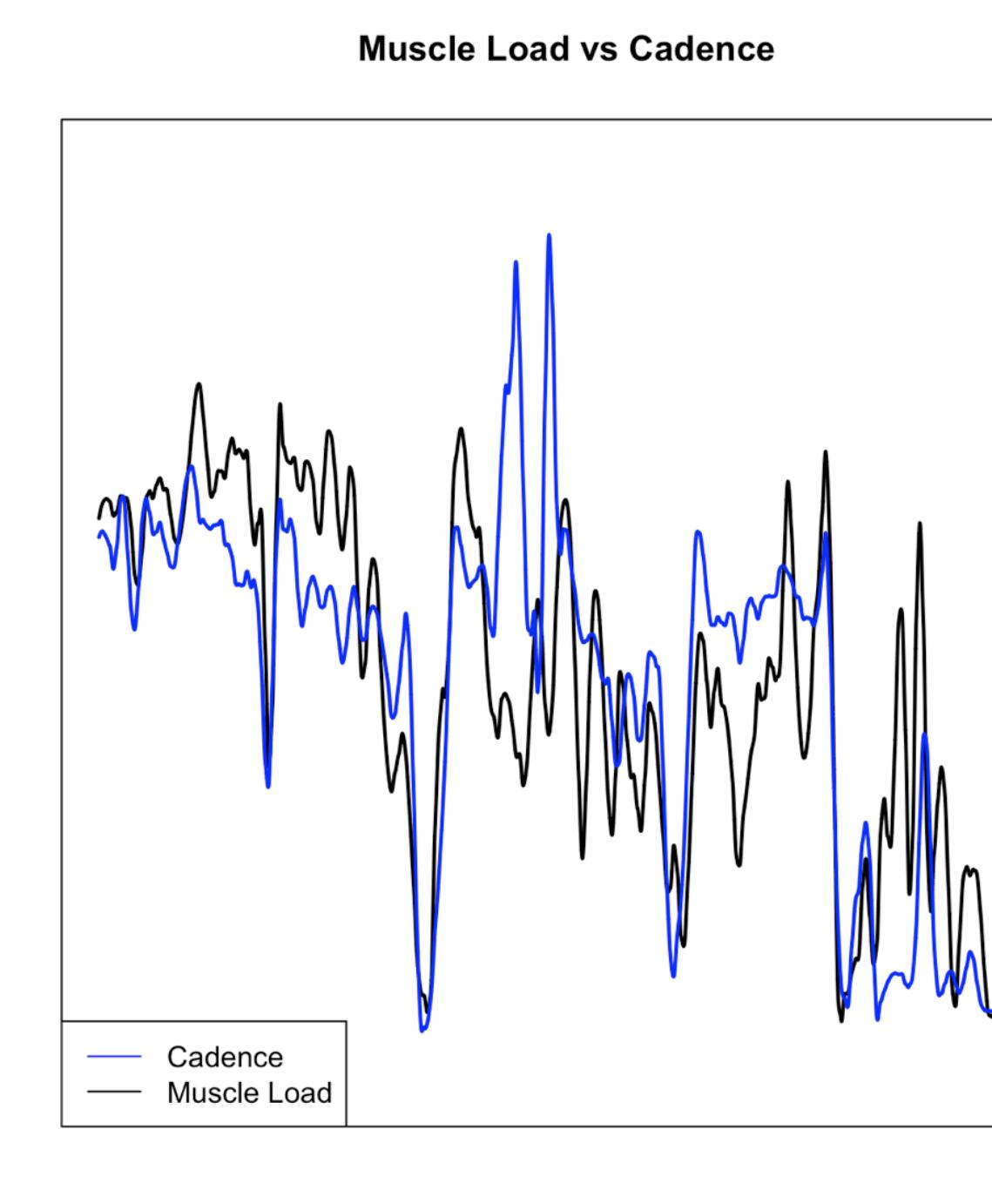
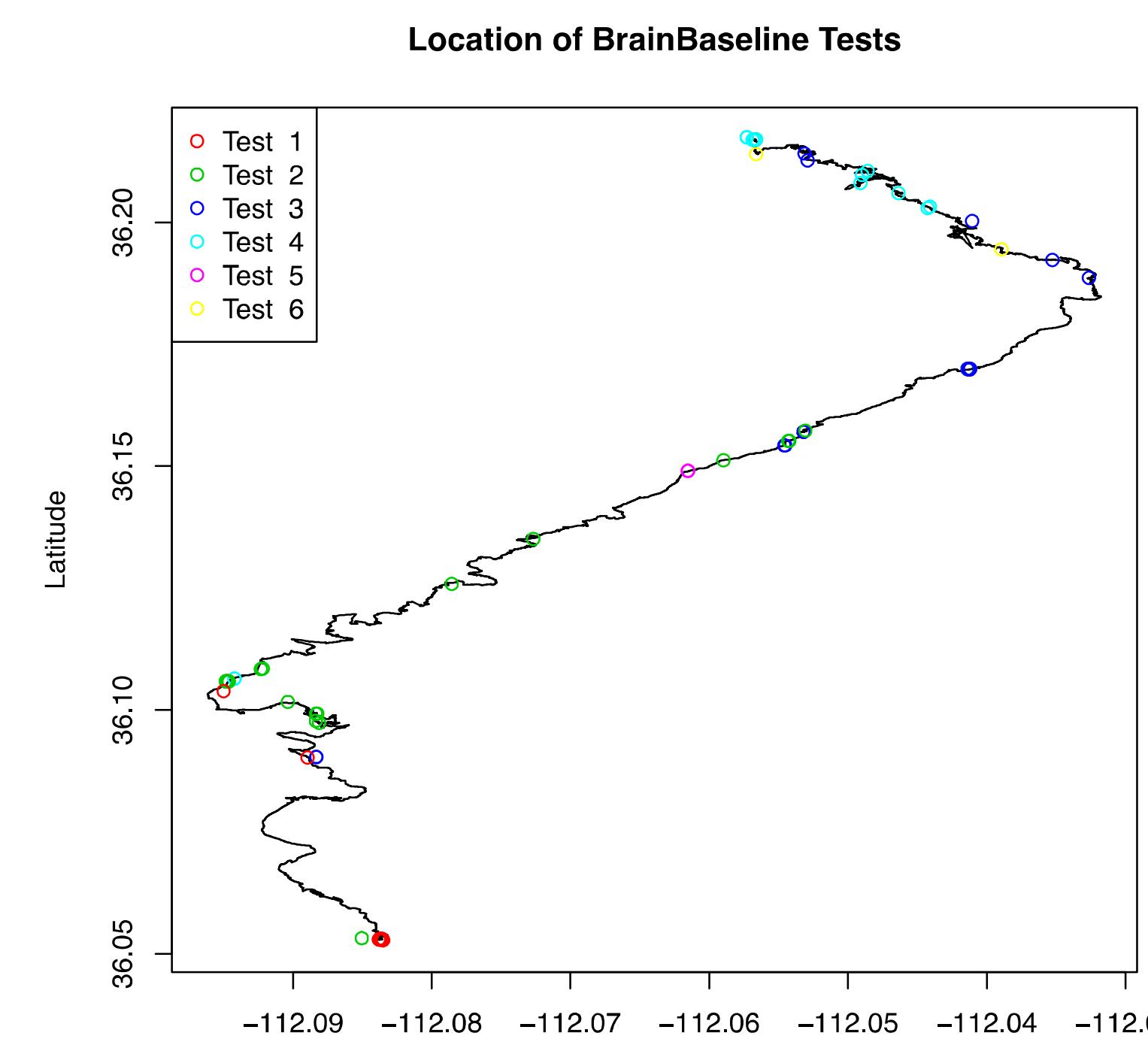
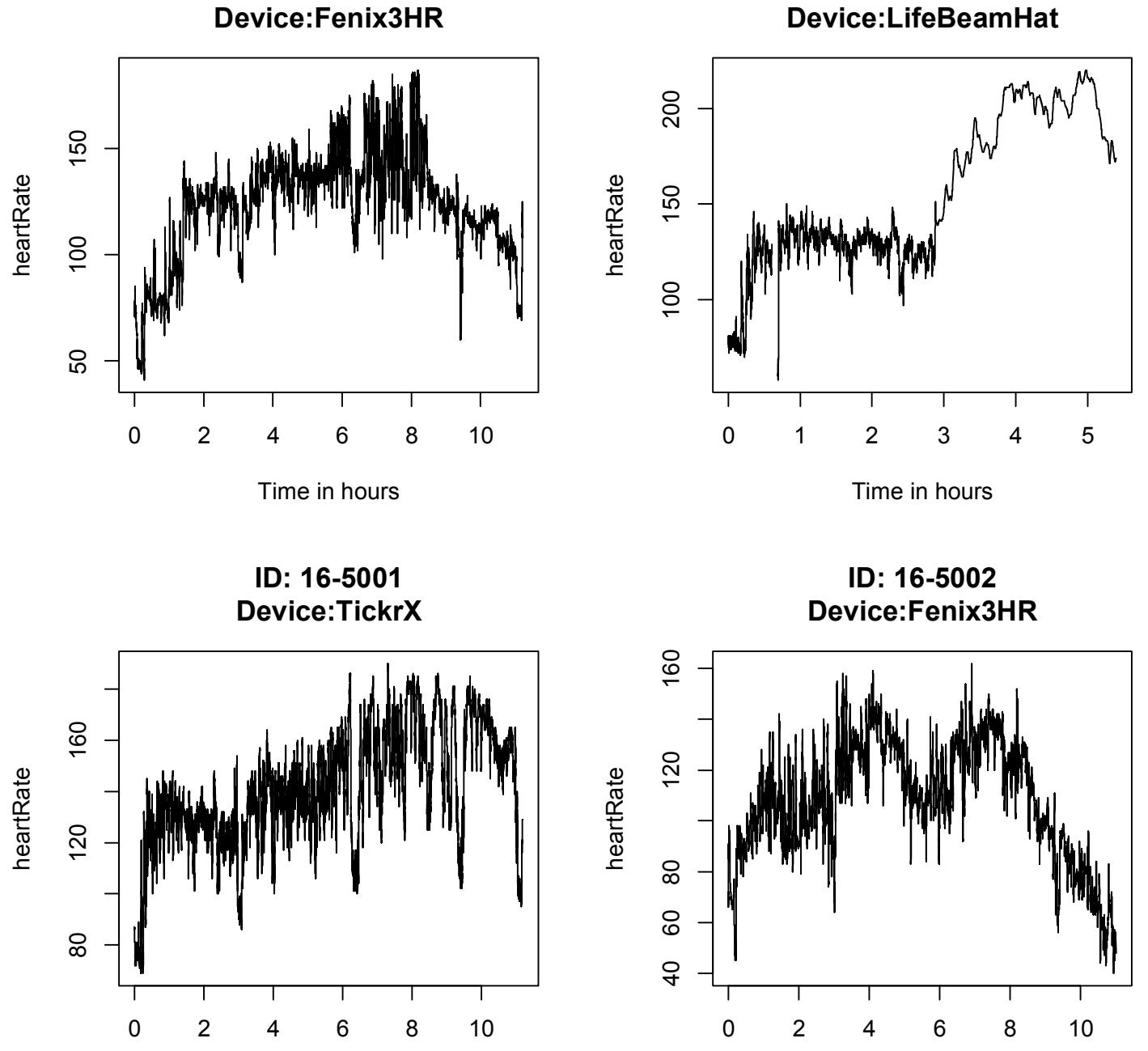


## Measuring Cognitive Ability



| Brain Baseline                  |
|---------------------------------|
| ACEDF Attentional Blink         |
| 938245 Digit Span               |
| 9 2 2 Digit Symbol Substitution |
| - - - Flanker                   |
| ABM N-Back                      |
| Go/No-Go                        |
| Posner Cueing                   |
| Speed                           |
| Spatial Working Memory          |
| GREEN Stroop                    |
| HIGH Task Switching             |
| Trails A & B                    |
| Visual Search                   |
| Visual Short-Term Memory        |

## Mobile Device Data Samples



## Effects on Cognitive Scores

