### Systems Integrated Oximetry for Multifunction Brain Monitor

#### Medical Need
No point-of-care devices exist for traumatic brain injury (TBI) monitoring.

#### Design Need
Implement the Infrascanner oximetry module from measurement to user interface display.

#### Approach
Design oximetry module for an existing system to link absorption measurement to tissue oxygenation.

#### Solution
- **Wavelet Filter**
  
  Wavelet filter reduces gaussian white noise significantly
  
  \[ A = \log_{10} \left( \frac{I_{in}}{I_{out}} \right) \approx OD_\lambda = \epsilon_\lambda \cdot c \cdot d \cdot DPF \]

- **Calculate Oxygen**

- **User Interface**

  Improve pre-hospital TBI care options in emergency, military, and sports medicine.

#### Results
- Wavelet filter reduces gaussian white noise significantly
  - p-value: \(2.47 \times 10^{-12}\)
  - Calculated range of oxygenation spanning from 0 to 100%
  - Reduced user interface average walkthrough time from 3 minutes to 48.6 seconds

#### Impact
Enable healthcare providers and field clinicians to quickly and effectively evaluate cerebral oxygenation at point-of-care.