

Dedicated
Near-Infrared Spectroscopy



# Your Comprehensive Toolbox for Processing NIRS - Neuroimaging Data



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# nirsLAB™

Provides users a feature-rich statistical parametric mapping environment designed to meet the most demanding neuroimaging study. Whether your study involves child or adult subjects, or mobile or hyperscanning environments, nirsLAB™'s GUI-based toolboxes provide the resources to easily edit and explore the many neuro-response features accessible by NIRS imaging technology from NIRx. Equipped with individual and group-level (MNI) atlases, single and multisubject findings can be quantitavely evaluated and mapped in a variety of display formats.

#### **Optode Registration**



- Montage 10-20 viewing template
- Digital Registration (Polhemus Patriot)
- Graphical specification of sensor layout
- 2D and Head Surface Optode Displays

#### Event and Data Editor GUIs



- Graphical-field entry editing
- Multiple conditions viewer
- Artifact correction/deletion
- Frequency filtering

#### Data Viewing and Mapping



- Time series display of raw or processed data
- Montage view of block-averaged responses
- 2D, scalp, cortical, glass view displays of
- Hb signals
- Metadata viewer

# Homepage GUI

- Event and data editing
- Artifact removal/correction
- Anatomical optode registration
- Movies of Hb signal
- GLM-based statistical parametic mapping

| Experimental Data and Co                       | nditions                          | Data Viewer                |  |
|--|-----------------------------------|----------------------------|--|
| Load data                                      | raw data/config file (exper 💌     | Plot Time series data      |  |
| Imager   | NIRScout / NIR 💌                  | Map Hemodynamic All states |  |
| Load probes                                    | probelnfo file                    | View Data processing       |  |
| Set markers                                    | load / edit even 🔻                | Load nirsInfo              |  |
| Data Preprocessing                             |                                   | Data Analysis              |  |
| Truncate<br>Remove                             | Time series<br>Discontinuiti      | SPM Level 1                |  |
| Remove<br>Apply                                | Spike artifacts<br>Frequency      | SPM Level 2                |  |
| Hemodynamic States                             |                                   | Utilities                  |  |
| Compute  | Hemodynamic states Set parameters | Run Setup probes 💌         |  |
| Running Status                                 |                                   |                            |  |
| Welcome to nirsLab !<br>Please load raw data o | r nirslnfo file !                 | - Help                     |  |

Statistical Parametric Mapping Level 1 (within-subject)

MirsLAB: SPM (Level 1)

| Load                    | ***_nirsInfo.mat |  |  |  |
|-------------------------|------------------|--|--|--|
| Hemoglobin data oxyHb 💌 |                  |  |  |  |
| .M analysis             |                  |  |  |  |
| Estimate                | GLM coefficients |  |  |  |
|                         | Set Parameters   |  |  |  |
| M result visualizatio   | n                |  |  |  |
| View                    | SPM results      |  |  |  |

#### Statistical Parametric Mapping GUI

- Multi-condition GLM coefficient estimation
- t-, F-test analysis
- Subject, group-level analysis
- Anatomical parametric mapping

#### GLM Parameter Specification GUI

- Specification of Design Matrix
- HRF basis function toolbox
- Filtering toolbox

|   | Sampling Rate   | Frames (Scans)              | Nirs Channel No.       |  |  |
|---|---|-----------------------------|------------------------|--|--|
| OxyHb   | 7.81  | 2150                        | 20                     |  |  |
| IRS data saved in:  | C:WserslAdminiGoogle_DriveWRx_LAIPresentationsl/Customer_Presentationsl/20140829_Wisconsin/2014 |                             |                        |  |  |
| LM result saved in:   | ed In: D:Users\Admin/Desktop  |                             |                        |  |  |
|   |   |                             |                        |  |  |
| specification   |   |                             |                        |  |  |
| pecify unit for design:   | () frames () seconds  | BF Parameter Specificati    |                        |  |  |
| pecify basis function:  | none  | 6 16 1 1 6 0 30             | View BF                |  |  |
|   |   |                             |                        |  |  |
| pecify (multiple) conditi   | ons: none   | Vie                         | w Convolution Model(s) |  |  |
|   |   |                             |                        |  |  |
| emporal filtering:  | none Tigh   | pass period cutoff (s): 128 | View DCT Set           |  |  |
| re-coloring: none   | • Gaussian  | FWHM (5): 4                 | View Filter Matrix     |  |  |
|   |   |                             |                        |  |  |
| and a state in the second s | 06  |                             | View Filter Matrix (W) |  |  |
| re-whitening: no  |   |                             |                        |  |  |



## Anatomical Mapping of Parametric Analysis

- Multi-condition GLM coefficient estimation
- t-test or F-test analysis
- Subject-subject or group-level analysis
- Anatomical parametric mapping





Dedicated Near-Infrared Spectroscopy

#### **Processing Environment:**

Standalone or MATLAB 2009a - 2014a

### **Required toolboxes:**

Basic MATLAB, Image Processing Toolbox, Signal Processing Toolbox, Statistics Toolbox

## **Operating System:**

Windows XP, Windows 7 or Windows 8

#### **Processing Environment:**

- Memory:  $\geq$  4 GB
- Intel i5 processor or equivalent
- Storage: 200 GB
- 14" Monitor
- 1 USB2.0 port for imager

NIRx instrument systems and software are not FDA approved and not intended to support clinical diagnostic-treatment decisions. Instead, our products are designed to support scientific investigative studies that have been IRB approved.

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