



BIOPAC Systems, Inc. offers new functional near infrared (fNIR) optical imaging systems from fNIR Devices to measure oxygen level changes in the prefrontal cortex of human subjects.

The fNIR system provides researchers with real-time monitoring of tissue oxygenation in the brain as subjects take tests, perform tasks, or receive stimulation. It allows researchers to quantitatively assess brain functions—such as attention, memory, planning, and problem solving—while individuals perform cognitive tasks.

fNIR is a powerful near-infrared spectroscopy imaging tool for in-lab cognitive tests. This technique measures NIR light absorbance in blood of hemoglobin with and without oxygen and provides information about ongoing brain activity similar to functional MRI studies. It eliminates many of the drawbacks of fMRI and provides a safe, affordable, noninvasive solution for cognitive function assessment. fNIR results have been tested to agree with fMRI results.

The technology empowers researchers by providing greater flexibility for study design, including working within complex lab environments and operating in non-traditional lab locations for field studies. It provides continuous NIR spectroscopy to obtain neurovascular coupling data while keeping subjects comfortable and free to move around.

fNIR data combines with physiological signals acquired through BIOPAC's data acquisition and analysis systems such as ECG, respiration, cardiac output, blood pressure, electrodermal activity and stimulus response markers; *AcqKnowledge* software provides automated analysis tools for event related potentials and ensemble averaging. The system interfaces with most stimulus presentation systems (such as E-Prime or SuperLab) and BIOPAC's range of Virtual Reality systems.

The fNIR100 is suitable for a wide range of applications:

- Human Performance Assessment—use physiological measures based on fNIR to predict changes in cognitive workload during a complex cognitive task
- Pain Assessment—Chronic pain, Response to pain medication
- Brain Computer Interface—ALS, Spinal Cord Injury, Paralysis
- Neurorehabilitation—Quantitative measure to assess cognitive impairments of brain injury subjects in their everyday life activities
- Virtual Reality—manipulate and control objects by thought
- Autism—understand the neurobiological deficits underlying autism as they relate to early predictors of the disorder as well as optimal treatment options
- Credibility Assessment

For more information

- review fNIR- Optical Brain Imaging online at [www.biopac.com](http://www.biopac.com)
- Request a demo

**New fNIR systems to study brain activity**



Components

**fNIR100 System**

**fNIR200 System**

**fNIR300 System**

<b>fNIR100 control unit</b>	✓	✓	✓
<b>16 channel sensor</b>	✓	✓	✓
<b>Headband</b>	✓	✓	✓
<b>Computer</b>		✓	✓
<b>System pre-configured</b>		✓	✓
<b>Caddy</b>		✓	
<b>Pole rack</b>			✓
<b>Stimuli Computer</b>			✓

The fNIR device provides relative change in hemoglobin levels, calculated using a modified Beer-Lambert law.

- Oxygenated hemoglobin change:  $\Delta \text{O}_2\text{Hb}$  ( $\mu\text{mol/L}$ )
- Deoxygenated hemoglobin change:  $\Delta \text{HHb}$  ( $\mu\text{mol/L}$ )
- Total hemoglobin change:  $\Delta \text{cHb}$  ( $\mu\text{mol/L}$ )

Continuous wave NIR spectroscopy (NIRS) control box

- 40 pin connector (20 channels)
- 2 x 14-pin connectors (8 channels each)
- USB Cable
- Switching medical grade power supply (+12, +5, -5)
- foldable front legs

16 Channel sensor

- 4 sources
- 10 detectors
- 2 wavelengths
- 2 x 6" cables with 14-pin connectors

COBI Studio data collection software suite

- Configurable number of channels
- Built-in artifact removal
- Requires 1 GB free disk space to run efficiently under Windows

Headband

- screen the ambient light and keep the sensor in place

Contact BIOPAC for a demo!