Starstim fNIRS

Combined wearable & wireless fNIRS - tDCS - EEG in one single headcap

- Combine transcranial current stimulation (tCS: tDCS, tACS, tRNS) & electroencephalography (EEG) with fNIRS in one single headcap.
- Optimal solution for brain stimulation and imaging.
- Includes Neuroelectrics® Starstim (tCS and EEG) & Artinis Brite / Brite Lite, both non-invasive and wearable technologies.

Applications:

The Starstim fNIRS kit allows clinicians and researchers to measure resting-state and task-related cortical activity (EEG) and/or hemodynamics (fNIRS) before, during and after transcranial electrical stimulation in real-world settings.

www.artinis.com

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Starstim fNIRS
research package

Relevant publications

Figeys M, Loucks TM, Leung AWS, Kim ES (2023). Transcranial direct current stimulation over the right dorsolateral prefrontal cortex increases oxyhemoglobin concentration and cognitive performance dependent on cognitive load. Behav Brain Res. 2023 Apr 12;443:114343.

Arora Y, Dutta A (2022). Human-in-the-Loop Optimization of Transcranial Electrical Stimulation at the Point of Care: A Computational Perspective. Brain Sci. 2022 Sep 26;12(10):1294.

Patel R, Dawidziuk A, Darzi A, Singh H, Leff DR (2020). Systematic review of combined functional near-infrared spectroscopy and transcranial direct-current stimulation studies. Neurophotonics. 2020 Apr;7(2):020901.

Vergotte G, Perrey S, Muthuraman M, Janaqi S, Torre K (2018). Concurrent Changes of Brain Functional Connectivity and Motor Variability When Adapting to Task Constraints. Front Physiol. 2018 Jul 10;9:909.

Cabibel V, Muthalib M, Teo WP, Perrey S (2018). High-definition transcranial direct-current stimulation of the right M1 further facilitates left M1 excitability during crossed facilitation. J Neurophysiol. 2018 Apr 1;119(4):1266-1272.

Jor'dan AJ, Bernad-Elazari H, Mirelman A, Gouskova NA, Lo OY, Hausdorff JM, Manor B (2022). Transcranial Direct Current Stimulation May Reduce Prefrontal Recruitment During Dual Task Walking in Functionally Limited Older Adults - A Pilot Study. Front Aging Neurosci. 2022 Mar 11;14:843122.

Starstim fNIRS package

The Starstim fNIRS kit is the most modern wireless solution for brain stimulation and imaging that combines transcranial current stimulation (tCS: tDCS, tACS, tRNS) with electroencephalography (EEG) and functional near-infrared spectroscopy (fNIRS) neuroimaging in one single headset. The Starstim fNIRS kit includes a Neuroelectrics Starstim (tCS and EEG) and an Artinis Brite / Brite Lite (fNIRS) systems, all non-invasive, lightweight, and head-wearable technologies.

In addition to the equipment provided, the Starstim fNIRS kit package includes kick-start training/support by Silverline Research on how to integrate these two state-of-the-art devices (single headcap and software synchronisation) through every step as well as 1-year online support to optimise your experimental design, methods and analysis at no additional cost.

Silverline Research expertise can also provide specialised online and/or on-site training to work more closely with your research team to integrate tCS with neuroimaging (EEG and fNIRS) as well as other neurophysiological techniques (TMS, fMRI) and applications (cognition, motor control, sports and virtual reality) into your experimental design, methods, and analysis.

NIRS functionality

NUMBER OF CHANNELS	Up to 27 channels for the Brite, or up to 10 channels for the Brite Lite
SAMPLING RATE	50 Hz
LIGHT SOURCE	LED (2x wavelengths per transmitter)
WAVELENGTHS	760, 850 nm
OPTODE DISTANCE	10 to 55 mm
SHORT SEPARATION CHANNELS	Optionally available, at 10 mm with multipower gain control

EEG functionality

NUMBER OF CHANNELS	8, 20, or 32 channels
SAMPLING RATE	500 Hz
BANDWIDTH	0 to 125Hz (DC coupled)
RESOLUTION	24 bits – 0,05 µV resolution
NOISE	< 1 µV RMS
CMRR	-115 dB
INPUT IMPEDANCE	1 GΩ

Stimulation functionality

NUMBER OF CHANNELS	8, 20, or 32 channels
SAMPLING RATE	1000 Hz
FREQUENCY RANGE	0 to 250 Hz (tACS) and 0 to 500 Hz (tRNS)
STIMULATION TYPES	tDCS, tACS and tRNS
MAXIMUM CURRENT PER-CHANNEL	± 2mA
CURRENT ACCURACY	1%
CURRENT RESOLUTION	1 µA
VOLTAGE	± 15 V per electrode (30 V potential difference)

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The Starstim fNIRS package is delivered in a plug-and-play package that includes everything you need to start your research.