

Researchers develop functional near-infrared spectroscopy neuroimaging device

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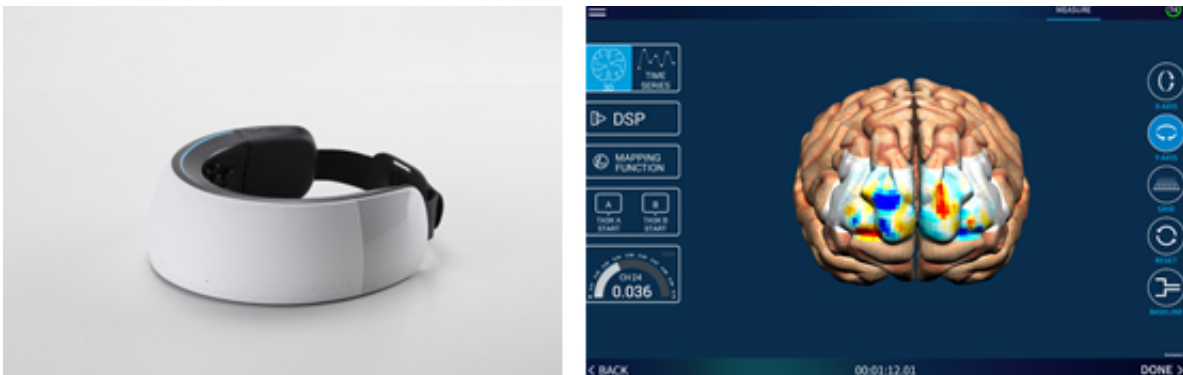
A simple, easy-to-use neuroimaging device that shows brain activation areas in the forehead like never before. Credit: KAIST

NIRSIT, a functional near-infrared spectroscopy neuroimaging device, is set to change the landscape of neuroscience research and the medical sector by offering high spatial resolution as well as high temporal resolution in a portable and wireless manner.

The Nanoscale Advanced Integrated Systems (NAIS) Lab Team at Korea Advanced Institute of Science and Technology (KAIST), led by Professor Hyeon-Min Bae of the Electrical Engineering Department and

researchers at OBELAB, a spin-off startup of NAIS Lab (hereinafter "the KAIST team"), is ready to launch its first NIRS [device](#), NIRSIT, to the neuroimaging world as early as March 2016.

NIRSIT is a device based on the [near-infrared spectroscopy](#) principle, which (a) utilizes light to detect hemodynamic changes in the cerebral blood flow and (b) visualizes brain activation regions in the prefrontal area of the brain in real time. Unlike other existing NIRS devices developed by other institutions that show a [spatial resolution](#) of 3cm x 3cm, NIRSIT has improved its spatial resolution to a maximum of 0.4cm x 0.4cm, which is comparable to that of functional MRI (which is 0.3cm x 0.3cm). Furthermore, NIRSIT is probably the one and only portable and wireless NIRS device designed to be used for brain research and clinical research purposes. A software application developed by the KAIST team allows the raw data extracted from the hemodynamic changes in the brain to be shown in real time on a tablet wirelessly connected to NIRSIT.



NIRSIT visualizes brain activation regions in the prefrontal area of the brain in real time. Credit: KAIST

Just last October, the KAIST team attended the Society for

Neuroscience Conference held in Chicago, where it performed a live demonstration of the NIRSIT operation. Participants were able to see firsthand how the device operates and appreciate the quality of results obtained from NIRSIT.

One of the promising areas of NIRSIT application is cognitive research. While functional MRI has been the leading neuroimaging device used by researchers for cognitive research, the KAIST team is confident that this will change over a short period of time from the introduction of NIRSIT. NIRSIT allows the researchers to monitor the subject's brain activation changes and analyze the results in an intuitive way, using both the 3D brain mapping images as well as the oxy-deoxy graphs covering the prefrontal area of the brain.

The KAIST TEAM is hopeful that NIRSIT will contribute to humankind by advancing brain research and accumulating [brain](#) data like never before. Thanks to its easy-to-use features and user-friendly design, both in hardware and in software, NIRSIT will surely set a new paradigm in the [brain research](#) and healthcare fields.

Provided by The Korea Advanced Institute of Science and Technology (KAIST)

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