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# MIKHAIL LEBEDEV

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PARTICIPANT AT:

## A DIALOGUE WITH THE CEREBRAL CORTEX: CORTICAL FUNCTION AND INTERFACING

**April, 29<sup>th</sup>-30<sup>th</sup>, 2015, Barcelona**

**Mikhail Lebedev**, Senior Research Scientist, Duke University, Durham, USA

Mikhail A. Lebedev is a senior research scientist at Duke University. He received a MSci from the Moscow Institute of Physics and Technology, Moscow in 1986 and a Ph.D. from the University of Tennessee, Memphis in 1995. He worked at the Institute for the Problems of Information Transmission, Moscow, (1986–1991), the International School for Advanced Studies, Trieste (1995–1997) and the National Institute of Mental Health (1997–2002). Scientific interests include neurophysiology and brain–machine interfaces. Lebedev has authored more than 70 papers. He is also an editor in several scientific journals.

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**ABSTRACT**

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### **Brain-machine interfaces for movements, sensations and more**

Brain-machine interfaces (BMIs) hold promise to treat neurological disabilities by linking intact brain circuitry to assistive devices, such as robots that enact functionality of body parts. BMIs have experienced very rapid development in recent years, facilitated by advances in neural recordings, computer technologies and robotics. BMIs are commonly classified into three types: sensory, motor and bidirectional, which subserve motor, sensory and sensorimotor functions, respectively. Additionally, cognitive BMIs have emerged in the domain of higher brain functions. BMIs are also classified as noninvasive or invasive according to the degree of their interference with the biological tissue. Although noninvasive BMIs are safe and easy to implement, their information bandwidth is limited. Invasive BMIs hold promise to improve the bandwidth by utilizing multichannel recordings from ensembles of brain neurons. BMIs have a broad range of clinical goals, as well as the goal to enhance normal brain functions. Moreover, BMI technology in the future may be used to establish communication between individual brains.

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