
Development of a 7T MRI compatible robot to investigate bodily awareness

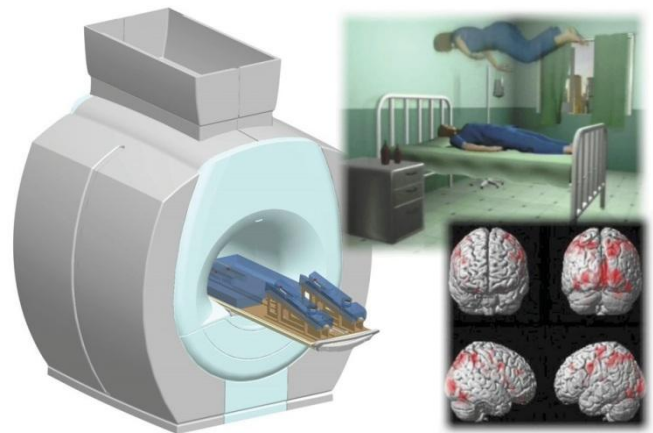
Background :

Where am I in space? From where do I perceive the world?

These questions, trivial for most of us, can be very difficult for neurological patients suffering from the so called out-of-body after a brain damage.

Responsible for the answers to the above questions, is *self-location*, the experience of feeling the self as localized within our body. This key aspect of bodily self-consciousness can be experimentally investigated in healthy subjects by exposing individuals to conflicting multisensory input.

At the same time, its underlying neural mechanisms can be investigated by exploiting brain imaging tools such as electroencephalography and functional magnetic resonance imaging (fMRI).



Project Goal:

The goal of this project is to design, develop and test a MR compatible device to be used in the 7Tesla fMRI - one of the most powerful fMRI facilities for human research - available at EPFL.

More specifically, the robot will be an adaptation of a 3T MR compatible robotic device developed between the ReLab and our laboratory (Ionta et al. '11, Duenas et al.'11).

Similar to this previous device, the robot will be used to stimulate the back of the subject inside the scanner in order to introduce specific multisensory conflicts and thus, interfere with the subjective self-location.

The use of this robot in the 7T scanner, thanks to its ultra-high spatial resolution, will allow a more accurate investigation of the brain regions involved in bodily self-consciousness.

Following hardware development and characterization in the fMRI environment, neuroscientific experiment will be carried out on human subjects.

Type : Master Project

Availability : Immediately. The project will be carried at the Ecole Polytechnique Fédérale de Lausanne (EPFL), between the Laboratory of Robotic System ([LSRO](#)) and the Laboratory of Cognitive Neuroscience ([LNCO](#)).

Prerequisites : Interest in engineering design and electronics.

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