

Open PhD position in Technodelics to induce altered states of self-consciousness by merging virtual reality, psychedelics, and robotics.

The Laboratory of Cognitive Neuroscience (Olaf Blanke: <https://www.epfl.ch/labs/lncn>) opens a new PhD position on altered states of self-consciousness, in particular out-of-body experiences (OBXs), using technologies such as virtual reality (VR), robotics, and a human motion platform, in combination with psychedelics and high-density EEG recordings to unravel the contribution of attentional and social brain mechanisms to hallucinations. The project is part of major research efforts of our Lab in Technodelics, a new neurotechnological approach to induce highly specific and finely titrated altered states of consciousness.

Project description:

Recently, there has been a revival of research on altered states of consciousness induced by psychedelic drugs such as psilocybin, including altered states of self-consciousness (i.e., ego-dissolution) and therapeutic effects. The Blanke Lab has pioneered the use of new technologies for the experimental induction of altered states of self-consciousness, ego-dissolution and related mental states such as out-of-body experiences (OBXs), in particular with brain stimulation (Blanke et al., *Nature* 2002), immersive virtual reality (Lenggenhager et al., *Science* 2007; Aspell et al., *Psychological Science* 2013; Noel et al., *Cognition* 2015), robotics (Ionta et al., *Neuron* 2011; Blanke et al., *Neuron* 2015), as well as vestibular stimulation on a motion platform (Wu et al., *iScience* 2024). This approach has been called technodelics and, as we recently argued, has several advantages compared to the pharmacology-based classical psychedelic approach for research on altered states of self-consciousness (Bernasconi et al., *Nature Protocols* 2022).

The PhD project will aim at combining psychedelics with technodelics by investigating the effects of psychopharmacological interventions under controlled experimental conditions provided through immersion in rich VR scenarios with precisely administered robotic and/or vestibular stimulation, so as to induce well-controlled and fine-grained altered states of self-consciousness (OBXs, ego-dissolution, and related mental states). New behavioral (psychophysics, cognitive psychology) as well as neural measures (high-density EEG) will be developed. Possibilities of enriching the project with technological innovations in machine learning and large language models will also be investigated, for example by integrating our recently developed fully automatized AI-based chatbot interviewer system.

Requirements:

The ideal candidate should have a Master degree (or equivalent) in engineering, computer science, neuroscience or psychology, and be strongly motivated with a keen interest in cognitive-systems neuroscience, neuroimaging and electrophysiology. Previous work in virtual reality development and experimentation, applied machine learning and/or in non-invasive brain stimulation are a plus.

Working environment:

The successful applicant will join the EPFL Chair in Cognitive Neuroprosthetics led by Prof. Olaf Blanke. The Lab is part of Geneva's thriving Neuroscience community, based at the beautiful Campus Biotech,

bordering Lake Geneva in the middle of the city. The Ph.D. candidate will be enrolled in the EPFL Ph.D. program Neuroscience (EDNE).

Start of position:

Spring 2025

Application procedure:

Interested candidates must submit their application to the EDNE doctoral school (<https://www.epfl.ch/education/phd/edne-neuroscience/edne-how-to-apply/>)