Innovations in cognitive neurorehabilitation: neuroimaging, neuromodulation, neural networks and virtual-reality

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1 ECTS

This doctoral course offers a progressive exploration of cognitive neurorehabilitation, moving from foundational principles to advanced, future-oriented approaches. It begins with an introduction to the core concepts of cognitive rehabilitation, including how rehabilitation strategies differ depending on whether the brain damage affects the right or left hemisphere, and how new technologies contribute to treatment innovation. The program then shifts to anatomo-clinical perspectives, examining how brain lesions shape recovery, with sessions devoted to lesion-symptom and disconnectome mapping, followed by journal-club discussions to deepen critical thinking. Building on this, the course explores functional imaging, first in healthy individuals and then in the context of cognitive recovery, again paired with a journal club. Subsequent classes focus on eye movements as markers of cognitive processing and their applications in rehabilitation. The curriculum then covers brain stimulation, from its general principles to its use in cognitive rehabilitation, accompanied by another journal-club session. The course concludes with forward-looking classes on personalized and computational approaches to cognitive rehabilitation, ending with a final journal club that integrates the concepts covered throughout the program

The course will be given online, and in English. Remote connection details will be sent to registered participants.

Course timing
Tuesdays from 13h-14h30 between April 21 - June 09, 2026.
Please see the table below for session details.

Evaluation
Students must attend at least 80% of the course. Final evaluation will be based on the article presentations (done by groups of 2 or 3 students) and on active participation of the student in the discussions.

Course registration
The course is limited to 15 participants. Register before April 1 by writing a mail to lndscourses@gmail.com (with your supervisor in copy) and stating the course title as subject.

Course materials will be stored in Moodle
- go to "https://moodle2.unil.ch"
- log in with your institutional address (unil, chuv, epfl)
- click on "Faculté de Biologie et de Médecine" > "Ecole doctorale / doctoral school" > "Lemanic Neuroscience Doctoral School"
- course materials and papers will be stored under "Innovations in cognitive neurorehabilitation"

Intro Cognitive neurorehabilitation				
1	21.04.2026	What is cognitive neurorehabilitation	45 min	Sonia Crottaz-Herbette
2		Cognitive rehabilitation and new technology	45 min	Sonia Crottaz-Herbette
3	28.04.2026	Impact of the lesion on recovery: lesion-symptom mapping	45 min	David Zeugin
4		Lesion-symptom and disconnectome mapping	45 min	David Zeugin
Neuroimaging in cognitive neurorehabilitation				
4	05.05.2026	Functional neuroimaging in healthy subjects	45 min	Traian Popa
5		Functional changes and cognitive recovery	45 min	Traian Popa
6	12.05.2026	EEG and MEG in cognitive neurorehabilitation	30 min	Sonia Crottaz-Herbette
7		Articles presentation-discussion 1-2	60 min	David + Sonia
Eye movement in cognitive neurorehabilitation				
7	19.05.2026	Eye-tracking as a biomarker of cognitive processing and recovery	60 min	Sonia Crottaz-Herbette
8		Articles presentation-discussion 3	30 min	David + Sonia
Artifical neural networks and cognitive neurorehabilitation				
9	26.05.2026	Lesions in silico and neurorehabiltiation	45 min	David Zeugin
10		Artificial neural networks in neurorehabilitation	45 min	David Zeugin
Brain stimulation in cognitive neurorehabilitation				
11	02.06.2026	Brain stimulation	45 min	Traian Popa
12		Brain stimulation in cognitive neurorehabilitation	45 min	Traian Popa
13	09.06.2026	Personalized cognitive interventions and computational approaches	30 min	David Zeugin
14		Articles presentation-discussion 4-5	60 min	David + Sonia