Innovations in cognitive neurorehabilitation:

neuroimaging, neuromodulation, neural networks and virtual-reality

Organizers: Sonia Crottaz-Herbette, David Zeugin and Traian Popa

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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 in english, online and simultaneously in Lausanne. Place and 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. Evaluation will be based on the students' presentations (done by groups of 2 or 3 students) and on active participation of the student in the discussions.

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			
21/4/2026	Intro of the course, expectations and students' presentations	15 min	David Zeugin + Sonia Crottaz-Herbette
	Cognitive rehabilitation, from paper-pencil to new technology	75 min	Sonia Crottaz-Herbette
Neuroimaging in cognitive neurorehabilitation			
28/4/2026	Impact of the lesion on recovery: lesion-symptom mapping and disconnectome	45 min	David Zeugin
	Functional neuroimaging in healthy subjects	45 min	Traian Popa
5/5/2026	Functional changes and cognitive recovery	45 min	Traian Popa
	Students' research pitch & reviewers' session 1: Neurorehab	45 min	David Zeugin + Sonia Crottaz-Herbette
12/5/2026	EEG and MEG in cognitive neurorehabilitation	45 min	Sonia Crottaz-Herbette
	Students' research pitch & reviewers' session 2: Lesion, recovery and neurorehab	45 min	David Zeugin + Sonia Crottaz-Herbette
Eye movement in cognitive neurorehabilitation			
19/5/2026	Eye-tracking as a biomarker of cognitive processing and recovery	45 min	David Zeugin
	Students' research pitch & reviewers' session 3: Functional neuroimaging in neurorehab	45 min	Traian Popa and Sonia Crottaz-Herbette
Brain stimulation in cognitive neurorehabilitation			
26/5/2026	Brain stimulation	45 min	Traian Popa
	Brain stimulation in cognitive neurorehabilitation	45 min	Traian Popa
Artificial neural networks and cognitive neurorehabilitation			
2/6/2026	Lesions in silico and neurorehabilitation	45 min	David Zeugin
	Students' research pitch & reviewers' session 4: Eye tracking and machine learning in neurorehab	45 min	David Zeugin + Sonia Crottaz-Herbette
9/6/2026	Personalized cognitive interventions and computational approaches	45 min	David Zeugin
	Students' research pitch & reviewers' session 5: Brain stimulation as a neurorehab tool	45 min	Traian Popa and Sonia Crottaz-Herbette