

GHS Non-invasive brain stimulation for basic and clinical neuroscience

Organizer: PD. Dr. med Yosuke Morishima

Time: 4th (Thu) and 5th (Fri) of November, 2021
9:00 – 12:00, 13:00 – 16:00

Location: UPD, Wirtschaftsgebäude 418
Bolligenstrasse 111, 3000 Bern

Registration and contact:

Students at University of Bern should register from the KSL systems.
All other attendee should register to
PD. Dr. med Yosuke Morishima
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Course language: English

Course description:

Non-invasive brain stimulation methods have been widely used in basic neuroscience to study causal mechanism of cognitive processes as well as to improve impaired neural systems in neurological and psychiatric disorders. The aim of this course to provide basic knowledge and clinical applications of non-invasive brain stimulation (NBS). We start from safety and ethical issues of TMS and transcranial electronic stimulation (incl. tDCS, tACS, tRNS). Then, we will cover research on neurophysiological mechanism to understand how NBS achieves neural plasticity, and clinical application in particular stroke, major depression and schizophrenia. To learn practical knowledge, we will also hold a hands on sessions and attendee will try TMS and tDCS each other. Lastly we will have a small project discussion to learn how to implement NBS to a research project.

Credit:

The Graduate School of Health Science of the University of Bern grants 1 ECTS for the entire course.

Lecturer

PD. Dr. Dario Cazzoli
Dr. Kristoffer Daniel Fehér
Dr. Matthias Grieder
PD. Dr. med. Yosuke Morishima
Prof. Dr. med. Sebastian Walther

Following topics will be included

- Safety and Ethics
- Stimulation protocols of non-invasive brain stimulation (NBS)
- Neurophysiological mechanism of NBS with multimodal neuroimaging
- Applications to basic cognitive neuroscience
- Translational applications to neurological/psychiatric disorders
- Hands-on sessions of TMS and tDCS
- Small project discussion to learn the design of a NBS study

Note:

According to the latest University's guideline, attendees need to hold the valid COVID certificate.

Suggested reading list

Safety and Ethics

Bikson, M., Grossman, P., Thomas, C., Zannou, A.L., Jiang, J., Adnan, T., Mourdoukoutas, A.P., Kronberg, G., Truong, D., Boggio, P., et al. (2016). Safety of Transcranial Direct Current Stimulation: Evidence Based Update 2016. *Brain Stimulat.* 9, 641–661.

Rossi, S., Hallett, M., Rossini, P.M., and Pascual-Leone, A. (2009). Safety, ethical considerations, and application guidelines for the use of transcranial magnetic stimulation in clinical practice and research. *Clin. Neurophysiol.* 120, 2008–2039.

Wassermann, E.M. (1998). Risk and safety of repetitive transcranial magnetic stimulation: report and suggested guidelines from the International Workshop on the Safety of Repetitive Transcranial Magnetic Stimulation, June 5-7, 1996. *Electroencephalogr. Clin. Neurophysiol.* 108, 1–16.

Basics

Rotenberg, A., Horvath, J.C., and Pascual-Leone, A. (2014). *Transcranial Magnetic Stimulation* (New York, NY: Springer).

Wagner, T., Valero-Cabre, A., and Pascual-Leone, A. (2007). Noninvasive human brain stimulation. *Annu Rev Biomed Eng* 9, 527–565.

Multimodal imaging

Farzan, F., Vernet, M., Shafi, M.M.D., Rotenberg, A., Daskalakis, Z.J., and Pascual-Leone, A. (2016). Characterizing and Modulating Brain Circuitry through Transcranial Magnetic Stimulation Combined with Electroencephalography. *Front. Neural Circuits* 10, 73.

Hallett, M., Di Iorio, R., Rossini, P.M., Park, J.E., Chen, R., Celnik, P., Strafella, A.P., Matsumoto, H., and Ugawa, Y. (2017). Contribution of transcranial magnetic stimulation to assessment of brain connectivity and networks. *Clin. Neurophysiol. Off. J. Int. Fed. Clin. Neurophysiol.* 128, 2125–2139.

Clinical applications

Lefaucheur, J.-P., André-Obadia, N., Antal, A., Ayache, S.S., Baeken, C., Benninger, D.H., Cantello, R.M., Cincotta, M., de Carvalho, M., De Ridder, D., et al. (2014). Evidence-based guidelines on the therapeutic use of repetitive transcranial magnetic stimulation (rTMS). *Clin. Neurophysiol. Off. J. Int. Fed. Clin. Neurophysiol.* 125, 2150–2206.

Lefaucheur, J.-P., Antal, A., Ayache, S.S., Benninger, D.H., Brunelin, J., Cogiamanian, F., Cotelli, M., De Ridder, D., Ferrucci, R., Langguth, B., et al. (2017). Evidence-based guidelines on the therapeutic use of transcranial direct current stimulation (tDCS). *Clin. Neurophysiol. Off. J. Int. Fed. Clin. Neurophysiol.* 128, 56–92.



Venue

Room WG418 (Basement in Wirtschaftsgebäude)

University Hospital of Psychiatry (UPD)

Bolligenstrasse 111

