

Translational Imaging Center, Bern:

Currently Available Methods and Ongoing Projects

Lecture series with speakers from Bern organized by the Translational Imaging Center @ sitem-insel in Bern on current methods and applications at our center

Towards Quantitative Diffusion MRS and Functional MRSI

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in cooperation with Sitem-Insel & IMRM, Bern

Wednesday, September 3 2025, 16:00

Quantitative Diffusion MRS: The first part of the presentation will explore dMRS. Standard methods measure the apparent diffusion coefficient (ADC) of brain metabolites, which is valuable for comparing conditions across different brain regions or pathologies. However, the ADC is an inherently qualitative measure that provides limited insight into the underlying cellular morphology. More advanced dMRS techniques will be discussed that use multi-dimensional diffusion encoding (e.g., varying diffusion times, double-diffusion encoding, or tensor encoding) to extract more quantitative features of cellular morphology.

High-Resolution Functional MRSI: The second part will turn to fMRSI, which aims to measure dynamic changes in brain metabolites—particularly neurotransmitters—during rest and stimulation. Achieving this goal requires high spatial and temporal resolution, a challenge that is becoming more tractable with modern MR scanners featuring higher field strengths and stronger gradients. Several key strategies for advancing fMRSI will be addressed, including novel techniques like non-Cartesian k-space sampling and simultaneous multi-slice acquisitions. The talk will conclude by considering how these approaches might enable the measurement of neurotransmitter dynamics, such as those of GABA and Glutamate, at ultra-high field.

The lecture will be held as in-person meeting at sitem-insel (Room O2.211) in Bern and in addition broadcast via zoom @: <https://unibe-ch.zoom.us/j/61954796127?pwd=b25nSWVlVi9PWlV4Vlp3NXpMdjRQdz09> and do spread the word to anybody potentially interested (for further info: bernd.jung@insel.ch).