

TIC International Seminar

Wednesday, August 19th, 16:00



Location: Felix Frey Auditorium, sitem-insel, Freiburgstrasse 3, Bern

Broadcast on zoom: <https://unibe-ch.zoom.us/j/61079804322>

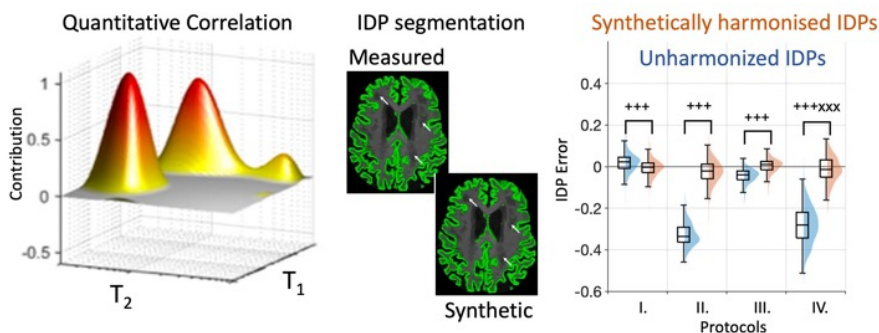
The seminar is followed by an Apéro to continue discussions

Overcoming technical and physical limits of neuro MRI from multi-site harmonization to 7T safety

Prof. Dr. Aaron Hess

[Centre for Integrative Neuroimaging, Oxford University, UK](#)

Large-scale population neuroimaging studies, such as the UK Biobank, extract thousands of imaging-derived phenotypes (IDPs) that have deepened our understanding of neurodegeneration and lifestyle effects on the brain. However, IDPs are sensitive to both underlying biology and scanner variability, creating challenges for clinical reproducibility. In the first part of this talk, I will investigate whether physics-informed image synthesis using Bloch and Extended Phase Graph (EPG) simulations can disentangle biological signals from scanner effects. Initial synthetic harmonization using T1, proton density, and B1 maps shows promise in predicting protocol-induced variations, while also highlighting the need for biological representations beyond mono-exponential relaxometry. I will present our recent work on T1 by T2 relaxation correlation spectral mapping to better characterize tissue complexity and its interaction with the scanner environment. In the second part, I will turn to operational constraints at 7T MRI. Despite superior spatial resolution and signal-to-noise ratio, clinical translation at 7T remains limited by elevated radiofrequency power deposition and the scarcity of 7T-cleared passive implants (~4%). I will present our work assessing how individual brain morphometry and tissue composition alter SAR distributions, alongside preliminary findings comparing implant-induced RF heating at 3T and 7T.



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