BIO
Danilo Bzdok has studied medicine between 2006 and 2012 at RWTH Aachen University, Université de Lausanne, and Harvard Medical School. From 2013 to 2015 he then pursued a PhD in computer science on machine learning working at INRIA Saclay & Neurospin near Paris and Heinrich-Heine University Düsseldorf. From 2015 to 2019 Dr. Bzdok headed the section for “Social and Affective Neuroscience” at the Department of Psychiatry, RWTH Aachen University, as an Assistant Professor. From November 2019, Dr. Bzdok is Associate Professor of the Department of Biomedical Engineering at McGill University.

ABSTRACT
Neuroimaging datasets are constantly growing in resolution, sample size, multi-modality, and meta-information complexity. The changing data reality may open the brain imaging field to a more data-guided machine-learning regime (e.g., structured sparsity, predictive phenotype modeling, multi-output learning). However, in everyday research practice analysis methods from the domain of classical statistics remain ubiquitous (e.g., ANOVA, Pearson correlation, Student’s t-test). This talk will highlight key conceptual differences between neuroscientific knowledge generation based on traditional null-hypothesis testing and cross-validated out-of-sample validation. Alternative access to answer long-standing systems neuroscience questions will then be portrayed in three large-scale studies: 1) Translating structured sparsity penalization into brain imaging to jointly identify compact brain region and distributed network patterns in high-dimensional regression. 2) Combining latent factor discovery based on autoencoder architectures and statistical gains from multi-class transfer-learning to reveal predictive dimensions from heterogeneous data sources. 3) Exploiting sparse canonical correlation analysis to simultaneously explore hidden inter-individual differences of brain-behavior variation in high-level cognition. These examples in the Human Connectome Project, the UK Biobank, and other extensive brain-imaging repositories will illustrate how the currently increasing information granularity may shape our future data analysis practices.

November 1st, 2019
1:00PM
DUFF 507-509