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EnvironMENTAL Seminar 3:

1）Title

Development and validation of biomarkers for prediction and stratification of mental illness

2）Time

Monday, 23. May 2022; 9:00 to 12:00 GMT, 10:00 to 13.00 CET time
16:00 to 19.00 Beijing time

3）Join Zoom Meeting

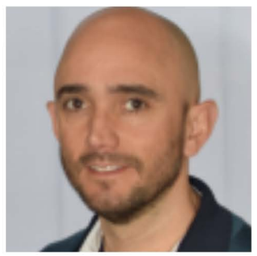
Meeting ID: 913 134 0607
Passcode: 12345
https://us02web.zoom.us/j/9131340607?pwd=ZlBOS0EvM3hxVmx0dG12QjhhYTR2QT09

4) Chair

Gunter Schumann，Fudan / Charite

5) Organiser

Andre Marquand Associate professor，Donders Institute / Radboudumc



Andre Marquand

Associate professor，Donders Institute / Radboudumc

Title

Methodological approaches for MRI data integration biomarker discovery and validation within the environmental project

Abstract

In this talk, I will give an overview of the analytical strategy we will employ for biomarker discovery in the environMENTAL project. To find generalisable biomarkers to predict and stratify mental disorders, we will need to solve many methodological challenges including how to meaningfully aligning data from heterogeneous cohorts spanning the whole lifespan, fusing data from modalities with very different characteristics, accounting for complex patterns of missing data and extracting generalisable and interpretable low dimensional representations from complex datasets.

Moreover, many of these analyses need to be performed in a decentralised and distributed manner. I will give an overview of some of the analytical techniques that we will employ to solve these challenges, including federated machine learning techniques, normative modelling, deep learning, transfer learning and classical penalised multivariate regression techniques. I will illustrate by discussing in detail how such techniques can be applied to neuroimaging data but it should be remembered that they are all more widely applicable.

演讲议程与嘉宾简介
Agenda and Speakers Introduction

Dennis van der Meer

Assistant professor at Maastricht University
and researcher at University of Oslo

Title

Making the MOSTest of genetics: multivariate approaches to variant discovery and disorder prediction

Abstract

Brain and behavioural measures related to mental illness have complex genetic architectures, involving many common polymorphisms with small individual effects, challenging psychiatric genetic research. Given the distributed nature of genetic signal across brain regions, and high levels of pleiotropy across mental disorders, joint analysis of sets of neuroimaging or mental health measures in a multivariate statistical framework provides a way to substantially enhance discovery of genetic markers with current sample sizes.

In this presentation, I will introduce the Multivariate Omnibus Statistical Test (MOSTest), with an efficient computational design enabling rapid and reliable permutation-based inference. I will provide an overview of findings from a series of studies applying MOSTest to data from tens of thousands of individuals from large population cohorts, enabling the discovery of thousands of genetic markers associated with a range of traits. I will further illustrate how the enhanced statistical power achieved through joint analysis of brain and behavioural measures can be leveraged to improve genetics-based prediction of mental disorders in clinical cohorts. As such, these multivariate approaches can significantly contribute to achieving the goals of environMENTAL.

Henrik Walter

Director of the Research Division of Mind and Brain, Deputy Medical Director (Research) of the Department of Psychiatry and Clinical Neuroscience , Charité–Universitatsmedizin Berlin, corporate member of Freie Universitat Berlin and Humboldt–Universitat zu Berlin, Berlin, Germany

Emanuel Schwarz

Group Leaper Translational Bioinformatics in Psychiatry, Central Institute of Mental Health in Mannheim, Germany

Tobias Banaschewski

Director of the Department of Child and Adolescent Psychiatry of the Central Institute of Mental Health in Mannheim, Germany

Title

Validation of putative biomarkers in clinical cohorts

演讲议程与嘉宾简介
Agenda and Speakers Introduction

Abstract

The clinical utility of biomarker candidates identified in large cohorts will critically depend on their ability to predict outcomes in relevant patient cohorts. This talk will highlight strategies to address important challenges on this translational path, using results from our labs in biomarker research as an example, with primary focus on neuroimaging.

A particularly important task regarding clinical biomarker validation is the harmonization and standard–ization of data and analytic strategies across heterogeneous cohorts. To address this, we will present innovative tools and platforms, including HalfPipe, NBS–Predict and the web platform foldercase, as well as algorithms for multi–task–learning. Finally, we will give an overview on the clinical cohorts, which will be used for clinical validation in the environMental project.

演讲议程与嘉宾简介
Agenda and Speakers Introduction

Sven Twardziok

Group leader at the Berlin Institute of Health

Title

Data management and stewardship in environMENTAL

Abstract

In this seminar we will present the technical considerations for the project wide data management., which will be the basis for the combination and analysis of the very diverse data in the project. The goal is that all data in the EnvironMental project is managed in a transparent way in compliance with the FAIR criteria. For this purpose, we will host a meta database documenting all data sets, which are produced within the project.

Furthermore, we will build a data infrastructure at BIH and provide compute and storage capacities. Here we will host the IMAGEN and STARTIFY/ESTRA cohorts data. Via a file hosting service, we will also provide additional storage capacities for any other datasets produced in the project. On top of the data storage, we will provide capacities for hosting of web applications, supporting the data analysis via dashboards and cloud workspaces. This includes the hosting of tools to provide programmatically access to data via application programing interfaces.