Anatomy and Its Impact on Structural and Functional Imaging

Organizers:
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Results of neuroimaging studies cannot be understood without knowing the anatomy of the brain, and the way how brain structure influences the interpretation of the results through interaction with image acquisition, processing and analysis. The course will provide an introduction and critical overview of classical and modern approaches for studying the anatomy of the brain using neuroimaging techniques and anatomical methods. It is aimed at a multidisciplinary audience, and will provide an introduction to gross anatomical landmarks, the microstructural organization of the brain including cortical segregation and its intersubject variability, the representation of auditory and language functions as well as brain development as assessed by MR techniques. Neuroimaging methods will be discussed with respect to their advantages, disadvantages and potential pitfalls as it concerns anatomy. The relevance of anatomical knowledge for the interpretation of structural and/or functional imaging data will be made explicit. Part one will consist of talks introducing general anatomical concepts and developmental aspects and shows, how MRI contributes. Part two will focus on organizational principles of the brain's microstructure (cyto-, receptor- and myeloarchitecture), and critically reflects the perspectives and limits of MR imaging with respect to brain organization. Part 3 will demonstrate the complex relationships between neuroimaging and the anatomical and microscopical structure using the auditory and language systems as concrete examples. Aim of this part is to provide an integrated view of the anatomy and functions of these systems based on neuroimaging, anatomical and physiological methods.

Course Schedule

8:00-8:30
Development of the cerebral cortex
David Van Essen, Washington University, St. Louis, MO, United States

8:30-9:00
Cortical folds: landmarks and plasticity
Svenja Caspers,Institute of Neuroscience and Medicine, INM-1, Research Centre Juelich
Juelich, Germany

9:00-9:30
MRI and cortical thickness: What does it mean?
Alan Evans, McGill Centre for Integrative Neuroscience, Montreal, Canada

9:30-10:00
High resolution imaging and anatomy
Noam Harel, University of Minnesota, Minneapolis, MN, United States

10:00-10:30
Break

10:30-11:00
Cytoarchitecture of the human cerebral cortex
Katrin Amunts, *Research Centre Juelich, Juelich, Germany*

11:00-11:30
Receptorarchitecture and neural systems
Karl Zilles, Research Centre Juelich, Juelich, Germany

11:30-12:00
Cortical diffusion imaging
Alard Roebroeck, Maastricht University, Maastricht, Netherlands

12:00-13:00
Lunch

13:00-13:30
High-resolution functional imaging and tonotopy of the auditory pathway and cortex
Elia Formisano, Maastricht University, Maastricht, Netherlands

13:30-14:00
Clinical anatomy of auditory cortex
Stephanie Clarke, University Lausanne, Lausanne, Switzerland

14:00-14:30
Functional anatomy and physiology of auditory cortex
Josef Rauschecker, Georgetown University, Washington, DC

14:30-15:00
Fiber tracts relevant for auditory and language processing
Stephanie Forkel, King's College London, London, United Kingdom

15:00-15:30
Break

15:30-16:00
Functional anatomy of the language system
Angela Friederici, Max Planck Institute, Leipzig, Germany

16:00-16:30
Wrap Up and Discussion