Taking Connectivity to a Skeptical Future: Challenges, Tools and Techniques

Organizers:
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The neuroimaging network paradigm has gained a lot of traction in recent years as a framework for understanding cognition. However the existing tools such as correlation matrices, graph analysis methods and time-varying connectivity have bumped into their limits. Consequently the network paradigm is a very long way from achieving its potential. In particular, currently, there are no mature answers to basic questions of: biomarker development ; reliable individual network construction (crucial for the development of imaging based personalised medicine); construction and validity of time-varying networks and relating information across modalities.

Thus now is a perfect moment time to present to junior scholars, a selection of major emerging techniques that go beyond the current limits. In each case a domain expert will explain the basics of the new methods, illustrate with preliminary results and outline challenges for the future.

Course Schedule:

13:00-13:25
Reliable Individual Functional Networks and their Relationship to Behavior
Emily Finn, Yale University, New Haven, CT, United States

13:25-13:50
Estimating Functional Connectomes: Sparsity's Strength and Limitations
Gael Varoquaux, INRIA, Palaiseau, France

13:50-14:15
Time-varying Connectivity
Steven Petersen, PhD, Washington University, St. Louis, WA, United States

14:15-14:40
Multimodal Static and Dynamic Connectomes
Mark Woolrich, OHBA, University of Oxford, Oxford, United Kingdom

14:40-15:00
Break

15:00-15:25
Community Structure in Networks: Static, Dynamic, and Multimodal Approaches
*Danielle Bassett, Department of Bioengineering, University of Pennsylvania, Philadelphia, PA, United State*s

15:25-15:50
Multivariate Modeling and Inference for Brain Networks: ERGMs and Mixed Models
Sean Simpson, PhD, Wake Forest School of Medicine, Winston-Salem, NC, United States

15:50-16:15
The Future Shape of Neuroimaging with Persistent Homology
Ben Cassidy, PhD, Columbia University, New York, NY, United States

16:20-16:30
Questions and Answer