

Mathematical Approaches for Connectome Analysis

Monday February 12, 2024

- 8:00–8:55 *Check-in/Breakfast (hosted by IPAM)*
- 8:55–9:00 *Welcome and Opening Remarks*
- 9:00 *MODERATOR: Gwyneth Card (Columbia University)*
- 9:00–9:50 **Vivek Jayaraman** (Janelia Research Campus)
How connectomes can help us understand navigational attractor dynamics
- 10:00–10:15 *Break*
- 10:15–11:05 **Mason A. Porter** (University of California, Los Angeles (UCLA))
Setting the Stage with Networks and Network Dynamics
- 11:15–11:30 *Break*
- 11:30–12:20 **Ashok Litwin-Kumar** (Columbia University)
Constraints and uncertainty in connectome-constrained models
- 12:30–2:30 *Lunch (on your own)*
- 2:30 *MODERATOR: Marcella Noorman (Janelia Research Campus)*
- 2:30–3:20 **Moo K. Chung** (University of Wisconsin-Madison)
Tutorial: Topological Data Analysis on Dynamic Brain Networks
- 3:30–4:00 *Break*
- 4:00–4:50 **Philipp Schlegel** (University of Cambridge)
*Insights from Comparative Connectomics in *Drosophila**
- 5:00–5:15 *Lightning Poster Session*
- 5:15–6:30 *Poster Session & Reception (Hosted by IPAM)*

Tuesday February 13, 2024

- 8:00–9:00 *Check-in/Breakfast (hosted by IPAM)*
- 9:00 *MODERATOR: Ashok Litwin-Kumar (Columbia University)*
- 9:00–9:50 **Larry Abbott** (Columbia University)
Connectome-based modeling in the fly
- 10:00–10:15 *Break*

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- 10:15–11:05 **Moritz Helmstaedter** (Max Planck Institute for Brain Research)
Analysis of cortical connectomes
- 11:15–11:30 *Break*
- 11:30–12:20 **Jonathan Rubin** (University of Pittsburgh)
Using dynamics to constrain the connectivity of a neuronal population: a case study in the respiratory brainstem
- 12:30–2:30 *Lunch (on your own)*
- 2:30 *MODERATOR: Mason A. Porter (University of California, Los Angeles (UCLA))*
- 2:30–3:20 **Wei-Chung Lee** (Harvard Medical School)
Synaptic wiring motifs in posterior parietal cortex support decision-making
- 3:30–4:00 *Break*
- 4:00–4:50 **Giovanni Petri** (Northeastern University)
Informational and topological signatures of individuality and age

Wednesday February 14, 2024

- 8:00–9:00 *Check-in/Breakfast (hosted by IPAM)*
- 9:00 *MODERATOR: Vivek Jayaraman (Janelia Research Campus)*
- 9:00–9:50 **Srini Turaga** (Janelia Research Campus)
How to simulate a connectome?
- 10:00–10:15 *Break*
- 10:15–11:05 **Susanne Schreiber** (Humboldt-Universität)
Beyond classical connectivity: why to take a look at gap junctions and mitochondria
- 11:15–11:30 *Break*
- 11:30–12:20 **Gwyneth Card** (Columbia University)
- 12:30–12:40 *Group Photo*
- 12:40–2:30 *Lunch (on your own)*
- 2:30 *MODERATOR: Eli Shlizerman (University of Washington)*
- 2:30–3:20 **Sarah Muldoon** (SUNY Buffalo)
Personalized Brain Network Models Augment Individual Differences
- 3:30–4:00 *Break*
- 4:00–4:50 *Discussion*

Thursday February 15, 2024

- 8:00–9:00 *Check-in/Breakfast (hosted by IPAM)*
- 9:00 *MODERATOR: Moo K. Chung (University of Wisconsin-Madison)*
- 9:00–9:50 **Elad Schneidman** (Weizmann Institute of Science)
Building highly accurate connectomes with a small set of design principles
- 10:00–10:15 *Break*
- 10:15–11:05 **Julia Brynildsen** (University of Pennsylvania)
The cost of brain state transitions
- 11:15–11:30 *Break*
- 11:30–12:20 **Carina Curto** (Penn State University)
Architectural constraints on recurrent network dynamics
- 12:30–2:30 *Lunch (on your own)*
- 2:30 *MODERATOR: Susanne Schreiber (Humboldt-Universität)*
- 2:30–3:20 **Sung Soo Kim** (University of California, Santa Barbara (UCSB))
Visual Processing during Navigation
- 3:30–4:00 *Break*
- 4:00–4:50 **Nicole Sanderson** (Penn State University)
The ABCs of topological data analysis for matrix analysis

Friday February 16, 2024

- 8:00–9:00 *Check-in/Breakfast (hosted by IPAM)*
- 9:00 *MODERATOR: Friday AM TBA*
- 9:00–9:50 **Smita Krishnaswamy** (Yale University)
Inferring and Characterizing Neuronal Connectivity and dynamics with deep geometry and topology
- 10:00–10:15 *Break*
- 10:15–11:05 **Sara Solla** (Northwestern University Medical School)
The effect of network connectivity on population neural dynamics
- 11:15–11:30 *Break*

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- 11:30–12:20 **Yusu Wang** (University of California, San Diego (UCSD))
Discrete Morse Graph Skeletonization and Application to Analysis of Local Structures of scRNA-seq Data
- 12:30–2:30 *Lunch (on your own)*
- 2:30 *MODERATOR: Sandro Romani (Janelia Research Campus)*
- 2:30–3:20 **Eli Shlizerman** (University of Washington)
From Connectome to Dynamic Representations
- 3:30–4:00 *Break*
- 4:00–4:50 *Discussion: Building connections*

