

## Reconstructing Network Dynamics from Data: Applications to Neuroscience and Beyond

### Monday August 29, 2022

- 8:00–8:55 *Check-In/Breakfast (Hosted by IPAM)*
- 8:55–9:00 *Welcome & Opening Remarks: Dean Miguel García-Garibay (Dean of Physical Sciences, UCLA) and Dima Shlyakhtenko (Director, IPAM)*
- 9:00 *Session Chair: Sebastian van Strien (Imperial College)*
- 9:00–9:45 **Klaus Lehnertz** (University of Bonn)  
*Virtual Talk: From local to global: correspondences between structural and functional networks*
- 9:55–10:10 *Break*
- 10:10–11:00 **Tiago Pereira** (University of São Paulo (USP))  
*Ergodic basis pursuit induces robust network reconstruction*
- 11:10–11:25 *Break*
- 11:25–12:15 **Heather Shappell** (Wake Forest University)  
*Improved state change estimation in dynamic functional connectivity using hidden semi-Markov models*
- 12:25–2:00 *Lunch (on your own)*
- 2:00–2:50 **Matteo Tanzi** (New York University)  
*Self-consistent transfer operators for high-dimensional expanding coupled maps*
- 3:00–3:15 *Break*
- 3:15–4:05 *Panel #1 (Pereira, Shappell, Tanzi)*
- 4:15–4:30 *Lightning Poster Presentations*
- 4:30–6:00 *Poster Session & Reception (Hosted by IPAM)*

### Tuesday August 30, 2022

- 8:00–9:00 *Check-In/Breakfast (Hosted by IPAM)*
- 9:00 *Session Chair: Tiago Pereira (University of São Paulo)*
- 9:00–9:45 **Peter Tass** (Stanford University)  
*Virtual Talk: Using Maths and Physics to Treat Parkinson's With a Vibrating Glove*
- 9:55–10:10 *Break*

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- 10:10–11:00 **Erik Bollt** (Clarkson University)  
*Identifying Interactions in Complex Networked Dynamical Systems through Causation Entropy*
- 11:10–11:25 *Break*
- 11:25–12:15 **Gary Froyland** (University of New South Wales)  
*Extracting cycles from spatiotemporal data and coherent sets across multiple dynamic regimes*
- 12:25–2:00 *Lunch (on your own)*
- 2:00–2:50 **Arkady Pikovsky** (Universität Potsdam)  
*Inferring coupled oscillatory dynamics from data*
- 3:00–3:15 *Break*
- 3:15–4:05 *Panel #2 (Bollt, Froyland, Pikovsky)*

### Wednesday August 31, 2022

- 8:00–9:00 *Check-In/Breakfast (Hosted by IPAM)*
- 9:00 *Session Chair: Erik Bollt (Clarkson University)*
- 9:00–9:45 **Ernesto Estrada** (University of the Balearic Islands (Illes Balears))  
*Virtual Talk: Network bypasses sustain complexity*
- 9:55–10:10 *Break*
- 10:10–11:00 **Aneta Stefanovska** (Lancaster University)  
*Time: How it matters?*
- 11:10–11:25 *Break*
- 11:25–12:15 **Maxime Lucas** (CENTAI (Center for Artificial Intelligence))  
*Synchronisation of oscillators with group interactions*
- 12:25–2:00 *Lunch (on your own)*
- 2:00–2:50 **Andrey Shilnikov** (Georgia State University)  
*Reconstructed rhythm-generation by neural circuits in two sea slugs*
- 3:00–3:15 *Break*
- 3:15–4:05 **Maria D'Orsogna** (California State University, Northridge (CSU Northridge))  
*A mathematical model of reward-mediated learning in drug addiction*

## Thursday September 1, 2022

- 8:00–9:00 *Check-In/Breakfast (Hosted by IPAM)*
- 9:00 *Session Chair: Aneta Stefanovska (Lancaster Univ.)*
- 9:00–9:45 **Danielle Bassett** (University of Pennsylvania)  
*Virtual Talk: Probing the costly dynamics of cognitive effort*
- 9:55–10:10 *Break*
- 10:10–11:00 **Sandro Vaienti** (Université de Toulon et du Var)  
*Thermodynamic formalism for open random dynamical systems.*
- 11:10–11:25 *Break*
- 11:25–12:15 **Deniz Eroglu** (Kadir Has University)  
*Emergent hypernetworks in weakly coupled oscillators*
- 12:25–2:00 *Lunch (on your own)*
- 2:00 *Session Chair: Sebastian van Strien (Imperial College)*
- 2:00–2:50 **Jeroen Lamb** (Imperial College London)  
*Towards a bifurcation theory of random dynamical systems.*
- 3:00–3:15 *Break*
- 3:15–4:05 *Panel #4 (Eroglu, Lamb, Vaienti, Stefanovska, Lucas, Shilnikov, D'Orsogna)*

## Friday September 2, 2022

- 8:00–9:00 *Check-In/Breakfast (Hosted by IPAM)*
- 9:00 *Session Chair: Matteo Tanzi (NYU)*
- 9:00–9:45 **Ginestra Bianconi** (Queen Mary, University of London)  
*Virtual Talk: The dynamics of higher-order networks: the effect of topology and triadic interactions*
- 9:55–10:10 *Break*
- 10:10–11:00 **Sarah Muldoon** (SUNY Buffalo)  
*Characterizing differences in structural network changes resulting from traumatic brain injury*
- 11:10–11:25 *Break*

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- 11:25–12:15 **Serhiy Yanchuk** (Humboldt-Universität)  
*Adaptive dynamical networks: from multiclusters to recurrent synchronization*
- 12:25–2:00 *Lunch (on your own)*
- 2:00–2:50 **Tomislav Stankovski** (Cyril and Methodius University of Skopje)  
*Neural Cross-frequency Coupling Functions: delta-alpha coupling in resting state, anesthesia and sleep*
- 3:00–3:15 *Break*
- 3:15–4:05 *Panel #5 (Muldoon, Stankovski, Yanchuk)*
- 4:15 *Conclusion*

