Northeast Regional Conference on Complex Systems (NERCCS 2022)

Date: March 30 - April 1, 2022
Location: **Buffalo, NY**
Webpage: https://nerccs2022.github.io/

Registered participants can choose to join virtually via Zoom or in person at UB or at a satellite location. Please leave your Zoom microphone off. After each talk, there will be time for questions.

Thursday, March 31

Time [EDT]	Event	Zoom Link
	Morning Session — room: UB Student Union (SU) 330	Zoom link
9:00 – 9:15	Welcome remarks	
9:15 – 9:45	Invited talk 1– **Daniel Abrams**	
	Bactrian states: the emergence of bimodality in oscillator systems and elsewhere	
9:45 – 10:45	Keynote 1 – **Peter J. Mucha**	
	Community Detection in Networks: Pruning and Picking Parameters	
10:45 – 11:00	Break	
11:00 – 12:20	Parallel contributed talks 1 (each 4x20 min talks)	
	1A. **Network Dynamics** - room: UB SU 330	Zoom link
	1B. **Data Science** - room: UB SU 222	Zoom link
12:20 – 1:30	Lunch break	
	Afternoon Session — room: UB SU 330	Zoom link
1:30 – 2:00	Invited talk 2 – **Yingjie Hu**	
	GeoAI: Integrating Geospatial Data and AI Models for Social Good	
2:00 – 2:30	Invited talk 3 – **Francesca Bernardi**	
	The complex systems of Wikipedia	
2:30 – 3:00	Invited talk 4 – **Abigail Jacobs**	
	Complex & responsible social/technical infrastructures	
3:00 – 3:15	Break	
3:15 – 4:35	Parallel contributed talks 2 (each 4x20 min talks)	
	2A. **Network Theory** - room: UB SU 330	Zoom link
	2B. **Complex Models** - room: UB SU 222	Zoom link
5:00 – 6:30	Poster Session	Schedule and Links

Friday, April 1

Time [EDT]	Event	Zoom Link
	Morning Session — room: UB SU 330	Zoom link
9:00 – 9:15	Announcements	
9:15 – 9:45	Invited talk 5 – **Eleni Katifori**	
	My Dynamics and learning in complex vascular networks	
9:45 – 10:45	Keynote 2 – **Dora Biro**	
	Scaling up from individual to collective cognition in bird flocks	
10:45 – 11:00	Break	
11:00 – 12:20	Parallel contributed talks 3 (each 4x20 min talks)	
	3A. **Higher-order Networks** - room: UB SU 330	Zoom link
	3B. **Models of Life** - room: UB SU 222	Zoom link
12:20 – 1:30	Lunch break	
	Afternoon Session — room: UB SU 330	Zoom link
1:30 – 2:00	Invited talk 6 – **Jean-Gabriel Young**	
	Uncertain network science: estimation techniques and applications	
2:00 – 2:30	Invited talk 7 – **Caitlin Hult**	
	Neutrophil dynamics affect Mycobacterium tuberculosis granuloma outcomes and dissemination	
2:30 – 3:00	Invited talk 8 – **Scott Rich**	
	Multistability and bifurcations in epileptogenic neural circuits	
3:00 – 3:20	Break	
3:15 – 4:35	Parallel contributed talks 4 (each 4x20 min talks)	
	4A. **Network Analysis** - room: UB SU 145C+D	Zoom link
	4B. **Neuronal Systems** - room: UB SU 222	Zoom link
4:35 – 4:45	Break	
4:45 – 5:00	Closing remarks and awards	Zoom link

Contributed Talks on Thursday March 31

(1A) Network Dynamics – 11:00am–12:20am (room: UB Student Union 330)

1A-1. **Guillaume St-Onge, Laurent Hébert-Dufresne and Antoine Allard**. Nonlinear infection rate to compress mechanistic epidemic models

1A-2. **Ruodan Liu, Masaki Ogura, Elohim Fonseca Dos Reis and Naoki Masuda**. Impacts of concurrency on epidemic spreading in Markovian temporal networks

1A-3. **Nicholas Landry and Juan G. Restrepo**. Community structure in hypergraphs and the emergence of polarization

1A-4. **Maisha Islam Sejunti, Naoki Masuda and Dane Taylor**. Floquet Theory for Spreading Dynamics over Periodically Switching Networks

(1B) Data Science – 11:00am–12:20pm (room: UB Student Union 222)

1B-1. **Ulya Bayram, William Lee, Daniel Santel, Ali Minai, Peggy Clark, Tracy Glauser and John Pestian**. Toward Suicidal Ideation Detection with Lexical Network Features and Machine Learning

1B-2. **Mei Fukuda, Kazuyuki Shudo and Hiroki Sayama**. Detecting and Forecasting Local Collective Sentiment Using Emojis

1B-3. **Tuan Pham, Jan Korbel, Rudolf Hanel and Stefan Thurner**. Empirical social triad statistics can be explained with dyadic homophylic interactions

1B-4. **Neil Maclaren, Siobhán Mattison and Naoki Masuda**. A Maximum Entropy Approach to the Multivariate "Space" of Social Networks

(2A) Network Theory – 3:15pm–4:35pm (room: UB Student Union 330)

2A-1. **Jason Niu and A. Erdem Sarıyüce**. Balanced and Dense Subgraphs in Signed Networks

2A-2. **Jeremy Kazimer, Dane Taylor, Peter Mucha and Manlio de Domenico**. Timescale determines the entropic importance of edges in complex networks

2A-3. **Golshan Madraki, Seyedamirabbas Mousavian and Yasamin Salmani**. A theoretical framework to accelerate scheduling improvement heuristics using a new longest path algorithm in perturbed DAGs

2A-4. **Minh Le and Dane Taylor**. Persistent Homology of Convection Cycles in Network Flows

(2B) Complex Models – 3:15am–4:35pm (room: UB Student Union 222)

2B-1. **Christian Koertje and Hiroki Sayama**. Stability of opinion formation PDE model based on expanded non-local perceptual kernels

2B-2. **Daniel Cooney, Fernando Rossine, Dylan Morris and Simon Levin**. A PDE Model for the Origin of Chromosomes via Multilevel Selection

2B-3. **Hiroki Sayama**. Representing and Analyzing the Dynamics of an Agent-Based Adaptive Social Network Model with Partial Integro-Differential Equations

2B-4. **Alfredo Salinas Martínez, Jennifer Pérez Oregon, Alejandro Muñoz-Diosdado and Fernando Angulo-Brown**. Reproducing Utsu's Law for earthquakes in a spring-block cellular automaton

Contributed Talks on Friday April 1

(3A) Higher-order Networks – 11:00am–12:20pm (room: UB Student Union 330)

3A-1. **Vincent Thibeault, Antoine Allard and Patrick Desrosiers**. The low-dimension hypothesis implies higher-order interactions in complex systems

3A-2. **Thomas Varley, Maria Pope, Joshua Faskowitz and Olaf Sporns**. Discovering Higher-Order Interactions via Multivariate Entropy Decomposition

3A-3. **Cameron Ziegler, Per Sebastian Skardal, Haimonti Dutta and Dane Taylor**. Balanced Hodge Laplacians Optimize Consensus Dynamics over Simplicial Complexes

3A-4. **Kazuki Nakajima, Kazuyuki Shudo and Naoki Masuda**. Higher-order rich-club phenomenon in research funding

(3B) Models of Life – 11:00am–12:20pm (room: UB Student Union 222)

3B-1. **Daniel Strömbom, Stephanie Nickerson, Catherine Futterman, Alyssa DiFazio, Cameron Costello and Kolbjørn Tunstrøm.** Bistability and switching behavior in moving animal groups

3B-2. **Chris Zosh, Andreas Pape, Brooke Foucault Welles, William Rand, Jeremy Blackburn, Pamela Mischen, Carl Lipo, Robert DiNapoli, Hiroki Sayama and Barret Brenton**. An Agent-Based Model of the Collective Action Dynamics of Goal-Driven Groups

3B-3. **Elohim Fonseca dos Reis and Naoki Masuda**. Emergent non-Poissonian statistics of interevent times from metapopulation models

3B-4. **Austin Marcus and Hiroki Sayama**. Spatial Complexity of Particle Dynamics by Potential Energy Function

(4A) Network Analysis – 3:15am–4:35pm (room: UB Student Union 145C+D)

4A-1. **Pitambar Khanra, Subrata Ghosh, Karin Alfaro-Bittner, Prosenjit Kundu, Stefano Boccaletti, Chittaranjan Hens and Pinaki Pal**. Identifying clusters in complex networks using eigenvector centrality

4A-2. **Mateusz Wilinski and Andrey Lokhov** . Network Reconstruction from Noisy and Incomplete Spreading Dynamics

4A-3. **Huiyu Huang, Miaolin Fan and Chun-An Chou**. A Multi-Modal Physiological Network Analysis in Emotion Recognition

4A-4. **Lisa Shahin and Matthew Hamilton**. Applying Network Science Tools and Perspectives to Assess Systems Thinking about Climate Change

(4B) Neuronal Systems – 3:15pm–4:35pm (room: UB Student Union 222)

4B-1. **Ulgen Kilic and Dane Taylor**. Simplicial cascades are orchestrated by the multidimensional geometry of neuronal complexes

4B-2. **Abid Haque, Jason Graham, Subash Ray, Gregory Weber and Simon Garnier**. Problem solving behaviors in a brainless organism (Physarum polycephalum) can emerge from self-organized physical interactions within a single cell.

4B-3. **Tong Wu, David Poulsen and Sarah Muldoon**. Pass-through brain networks reveal lesion related disturbances in traumatic brain injury

4B-4. **Lu Bin Liu, Attila Losonczy and Zhenrui Liao.** Use the FORCE: A Python package for training chaotic RNNs