

# 2024 Data-Driven Causal Inference: Information Theory Meets Dynamical Systems

Organizing Committee Chair: Prof. Nan Chen  
Sponsors: Drs. Justin Koo and Robert Martin | August 22-23, 2024 | Arlington, VA

Basic Research Innovation Collaboration Center (BRICC)  
4100 N Fairfax Drive, Suite 450 | Arlington, VA 22203

## Agenda Day 1 | Thursday, August 22, 2024

Time	Topic	Speaker
8:45 – 9:00	Opening remarks	Robert Martin (ARO)
9:00 – 9:50	Identifying Interactions in Complex Networked Dynamical Systems through Causation Entropy	Erik Bollt (Clarkson)
10:00 – 10:50	Information flows in complex systems	Peter Jan van Leeuwen (Colorado State)
11:00 – 11:30	Uncertainty Quantification, Causation and Data Assimilation	Nan Chen (UW Madison)
11:30 – 1:30	LUNCH AND POSTER SESSION	
1:30 – 2:20	Detecting and eliminating indirect causation	Ying-Cheng Lai (Arizona State)
2:30 – 3:00	Influence maximization in Boolean networks	Filippo Radicchi (Indiana)
3:00 – 3:30	Iterative Learning Control of Nonlinear Dynamical Systems and its Application to Hollow Cathodes	Jack Brooks (NRL)
3:30 – 4:00	Causal pacemakers of hydroclimate systems in contiguous	Zhihua Wang (Arizona State)
4:00 – 5:00	Discussions	
5:00	MEETING ADJOURN	

### Poster session:

Tyler Diggans (AFRL) - Generalizing Geometric Partition Entropy for the Estimation of Mutual Information

Hara Ken (Stanford) - Data-driven state estimation for plasma and fluid dynamics

Jinlong Wu (UW Madison) - Conditional Gaussian Koopman Operator for Modeling Complex Systems and Data Assimilation

Honghu Liu (Virginia Tech) - Physics-informed minimum reduced-order models via causal inference

Sumanth Varambally (UCSD) - Mixture Causal Discovery

Agenda Day 2   Friday, August 23, 2024		
Time	Topic	Speaker
8:15 – 8:45	Registration (BRICC opens at 8:00, and close at 5:00)	
8:45 – 9:00	Opening remarks	Justin Koo (AFOSR)
9:00 – 9:50	On learning what to learn	Yannis Kevrekidis (DARPA/JHU)
10:00 – 10:50	Deep Learning Without Neural Networks: Fractals for Rare Event Modeling	Ishanu Chattopadhyay (U Chicago)
11:00 – 11:30	Causal Discovery in Nonlinear Dynamical Systems using Koopman Operators	Adam Rupe (PNNL)
11:30 – 1:30	LUNCH AND POSTER SESSION	
1:30 – 2:00	Entropic Methods for Causal Inference and Discovery	Murat Kocaoglu (Purdue)
2:00 – 2:30	The Impact of City Morphology on Turbulent Flows and Transport in the Lower Atmosphere	Qi Li (Cornell)
2:30 – 3:00	Data-Driven Reduced Order Modeling for Turbulent Flows	Traian Iliescu (Virginia Tech)
3:00 – 4:00	Discussions	
4:00	MEETING ADJOURN	