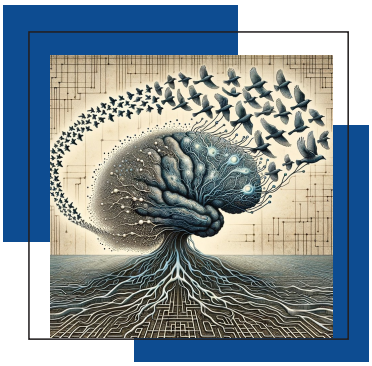
institute for pure & applied mathematics

Workshop I: Analyzing High-dimensional Traces of Intelligent Behavior

September 23 - 27, 2024



Scientific Overview

The study of biological intelligences has been transformed by breakthroughs in experimental and observational methods. New data have expanded our appreciation of the sophisticated behaviors exhibited by human and non-human animals across a range of taxa. Traces of intelligent behavior are typically high-dimensional, with complex structure in space and time. They often involve multiple data streams: for example, positional information from individual members of a bird flock, as well as "point-of-view" recordings showing what birds are looking at, moment by moment; or electrocorticographic recordings of human brain activity, as well as detailed traces of motor behavior. These traces are often buried beneath complex noise environments: individual animal movements must be pulled out of extensive visual clutter; whale song must be isolated from ocean noise.

This complex, high-dimensional data requires entirely new approaches to data representation, integration, and analysis. This workshop will focus on the challenges raised by high-throughput, high-dimensional studies of intelligent behavior. It will bring together experts in animal cognition, computational neuroscience, and cognitive science with mathematicians and computer scientists focused on relevant methods in machine learning, network science, high-dimensional statistics, and information theory.

Participation

Additional information about this workshop including links to register and to apply for funding, can be found on the webpage listed below. Encouraging the careers of women and minority mathematicians and scientists is an important component of IPAM's mission, and we welcome their applications.

Organizers

Vijay Balasubramanian (University of Pennsylvania), Dora Biro (Rochester Institute of Technology), Jacob Foster (University of California, Los Angeles), Max Kleiman-Weiner (University of Washington), Deanna Needell (University of California, Los Angeles)

Speakers

Kelsey Allen (DeepMind)
Richard Baraniuk (Rice University)
Dora Biro (Rochester Institute of Technology)
Judy Fan (Stanford University)
Jacob Foster (University of California, Los Angeles)
Simon Garnier (New Jersey Institute of Technology)
Tobias Gersternberg (Stanford University)
Robert Hawkins (Princeton University)
Max Kleiman-Weiner (University of Washington)
Joel Leibo (DeepMind)
Daniel McNamee (Champalimaud Foundation)
Maynak Mehta (University of California, Los Angeles)
Ida Momennejad (Microsoft Research)
Michael Murray (University of California, Los Angeles)
Deanna Needell (University of California, Los Angeles)
Natalia Velez (Princeton University)
Xuexin Wei (University of Texas at Austin)
Dan Yamins (Stanford University)
Ilker Yildirim (Yale University)

NSF UCLA

For more information, visit the program webpage:
www.ipam.ucla.edu/MOIWS1