

Mathematics of Collective Intelligence

Tuesday February 15, 2022

- 8:00 *SESSION CHAIR: Jacob Foster (UCLA)*
- 8:00–8:55 *Check-In/Light 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)*
- 9:00–9:25 **L Mahadevan** (Harvard University)
Virtual Talk: Physical intelligence in insect and robot societies
- 9:35–10:00 **Melanie Mitchell** (Santa Fe Institute)
Virtual Talk: Abstraction and Analogy in Artificial Intelligence
- 10:10–10:25 *Break*
- 10:25–10:50 **Josh Tenenbaum** (Massachusetts Institute of Technology)
Virtual Talk: Cognitive and computational foundations for collective human intelligence
- 11:00–11:25 **Jessica Flack** (Santa Fe Institute)
Virtual Talk: Collective intelligence as collective computation: Future directions
- 11:35–11:50 *Break*
- 11:50–12:15 **Lillian Ratliff** (University of Washington)
Virtual Talk:
- 1:00–3:00 *Lunch (Hosted by IPAM)*
- 3:00–5:00 *In-Person Collaborative Discussions*

Wednesday February 16, 2022

- 8:00 *SESSION CHAIR: Rishi Sonthalia (UCLA)*
- 8:00–9:00 *Check-In/Light Breakfast (Hosted by IPAM)*
- 9:00–9:25 **John Baez** (University of California, Riverside (UC Riverside))
Categories: the Mathematics of Connection
- 9:35–10:00 **Elchanan Mossel** (Massachusetts Institute of Technology)
Virtual Talk: Some mathematical theorems on agreement and learning in networks
- 10:10–10:25 *Break*

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- 10:25–10:50 **Lisa Lee** (Google Brain)
Learning to Explore with Scalable Supervision
- 11:00–11:25 **Max Kleiman-Weiner** (Common Sense Machines)
Virtual Talk: Multi-Agent Common Sense
- 11:35–11:50 *Break*
- 11:50–12:50 *Moderated Discussions*
- 1:00–3:00 *Lunch (Hosted by IPAM)*
- 3:00–5:00 *In-Person Collaborative Discussions*

Thursday February 17, 2022

- 8:00 *SESSION CHAIR: Pranab Das (Elon University)*
- 8:00–9:00 *Check-In/Light Breakfast (Hosted by IPAM)*
- 9:00–9:25 **Orit Peleg** (University of Colorado Boulder)
Virtual Talk: Physical Computation in Insect Swarms
- 9:35–10:00 **David Ha** (Google AI)
Virtual Talk: Collective Intelligence for Deep Learning: A Survey of Recent Developments
- 10:10–10:25 *Break*
- 10:25–10:50 **Michael Levin** (Tufts University)
Virtual Talk: Structural and functional plasticity without genetic change: from bioelectric embryos to synthetic proto-organisms
- 11:00–11:25 **Josh Bongard** (University of Vermont)
Virtual Talk: A xither of xenobots: demolishing dichotomous thinking with synthetic proto-organisms
- 11:35–11:50 *Break*
- 11:50–12:15 **Robert Batterman** (University of Pittsburgh)
Explaining Autonomy: Mesoscale Models and Many-Body Systems
- 12:25–12:50 **Ali Jadbabaie** (Massachusetts Institute of Technology)
Virtual Talk: Persuasion, news sharing, and cascades on social networks
- 1:00–3:00 *Lunch (Hosted by IPAM)*
- 3:00–5:00 *In-Person Collaborative Discussions*

Friday February 18, 2022

- 8:00–9:00 *Check-In/Light Breakfast (Hosted by IPAM)*
- 9:00–9:25 **Michael Muthukrishna** (London School of Economics and Political Science)
Virtual Talk: Paradox of diversity in the collective brain
- 9:35–10:00 **Nika Haghtalab** (University of California, Berkeley (UC Berkeley))
Virtual Talk: Learning and Persuading with Anecdotes
- 10:10–10:25 *Break*
- 10:25–10:50 **Patrick Shafto** (Rutgers University-Newark)
Cooperative communication as Belief Transport
- 11:00–11:25 **Pranab Das** (Elon University)
Broadening the reach of mathematical approaches to the study of intelligences.
- 11:35–12:35 *Moderated Discussions*
- 1:00–3:00 *Lunch (Hosted by IPAM)*
- 3:00–5:00 *In-Person Collaborative Discussions*

Saturday February 19, 2022

- 8:00 *SESSION CHAIR: Harlin Lee (UCLA)*
- 8:00–9:00 *Check-In/Light Breakfast (Hosted by IPAM)*
- 9:00–9:25 **Jacob Foster** (University of California, Los Angeles (UCLA))
Institutions, innovation, and the social production of collective (un)intelligence
- 9:35–10:00 **Fei Fang** (Carnegie Mellon University)
Virtual Talk: Machine Learning and Game Theory for Social Impact
- 10:10–10:25 *Break*
- 10:25–10:50 **David Spivak** (Topos Institute)
Sense-making: accounting for intelligibility
- 11:00–11:25 **Natasha Jaques** (Google AI)
Social Reinforcement Learning
- 11:30–12:00 *Lunch (Hosted by IPAM)*

