

## 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*

*(Wednesday schedule continued on next page)*



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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)*

