Deep Learning and the Brain  
January 20-22, 2019  
Becker Auditorium, Goodman Brain Sciences Building  
Edmond J. Safra Campus, The Hebrew University, Jerusalem

Program

Sunday, January 20th:

9:00-9:30 – OPENING REMARKS

Session 1: Perceptual Representations

9:30-10:15 – Daniel Yamins, Stanford University – Broadening and deepening the role of Artificial Intelligence in Computational Neuroscience

10:15-11:00 – Daphna Weinshall, The Hebrew University – Old new frontiers in visual object recognition using deep learning: curriculum learning

11:00-11:30 – COFFEE BREAK

11:30-12:15 – Kalanit Grill-Spector, Stanford University – The functional neuroanatomy of face perception: from brain measurements to deep neural networks

12:15-13:00 – Adi Mizrahi, The Hebrew University – Perceptual learning in a mouse model: a progress report

13:00-14:00 – LUNCH BREAK

Session 2: Theory

14:00-14:45 – Shai Shalev-Shwartz, The Hebrew University – Decoupling gating from linearity

14:45-15:30 – Andrew Saxe, University of Oxford – High-dimensional dynamics of generalization error in neural networks: implications for experience replay

15:30-16:00 – COFFEE BREAK

16:00-16:45 – Naftali Tishby, The Hebrew University – The computational benefit of the hidden layers in Deep Neural Networks

16:45-17:30 – Tomaso Poggio, MIT – Three puzzles in the theory of deep learning

17:30-18:00 – Panel discussion

Monday, January 21st:

Session 3: Inference, Reasoning, and Memory

9:00-9:45 – Anna Schapiro, Harvard Medical School – Empirical and neural network modeling approaches to understanding human memory and consolidation

9:45-10:30 – Yael Niv, Princeton University – Representation learning in rats and men

10:30-11:00 – COFFEE BREAK

11:00-11:45 – Inbal Goshen, The Hebrew University – The Star Cells of Learning: Astrocytes modulate local neuronal activity to affect global behavior
11:45-12:30 – Aaron Courville, University of Montreal – Learning and generalization in visual question answering

Session 4: Architectures
14:15-15:00 – Daniel Soudry, Technion – Theoretical and empirical investigation of several common practices in Deep Learning

12:30-13:30 – LUNCH BREAK

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15:00-15:30 – COFFEE BREAK

15:30-16:15 – Yair Weiss, The Hebrew University – Why do deep convolutional networks generalize so poorly to small image transformations?

16:15-17:00 – Rob Fergus, New York University – Unsupervised learning via video prediction

17:00-17:30 – Panel discussion

Tuesday, January 22nd:
Session 5: Deep Learning and Neuroscience
9:00-9:45 – Andreas Tolias, Baylor College of Medicine – A less artificial Intelligence
9:45-10:30 – Matthias Bethge, University of Tübingen – Less-artificial vision with artificial neural networks

10:30-11:00 – COFFEE BREAK

11:00-11:45 – Srinivas Turaga, HHMI Janelia Research Campus – Connecting the structure and function of neural circuits
11:45-12:30 – Surya Ganguli, Stanford University – Neural networks and the brain: from the retina to semantic cognition, and beyond

12:30-13:30 – LUNCH BREAK

Session 6: Brain Learning Algorithms
13:30-14:15 – Timothy Lillicrap, DeepMind – Assessing the scalability of biologically-motivated deep learning algorithms and architectures
14:15-15:00 – Yonatan Loewenstein, The Hebrew University – Bounded learning: biological constraints of cortical learning
15:00-15:45 – Byron Yu, Carnegie Mellon University – Neural constraints on learning

15:45-16:15 – COFFEE BREAK

16:15-17:00 – Sophie Denève, École Normale Supérieure – The Brain as a hierarchical adaptive learner
17:00-17:45 – Michale Fee, MIT – Building a state space for song learning

17:45-18:00 – CLOSING REMARKS