



CBMM, NSF STC » KNOWLEDGE TRANSFER » WORKSHOPS, CONFERENCES, & SYMPOSIA » LIMITATIONS OF DEEP LEARNING WORKSHOP

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Limitations of Deep Learning Workshop in Sestri Levante, Italy, June 25-27, 2019

The Center for Brains, Minds and Machines and The Hebrew University of Jerusalem, with generous support from the Haar family, are organizing a workshop on advances in and limitations of deep learning on June 25-27, 2019 in Sestri Levante, Italy. For three days we will bring together computer scientists, cognitive scientists, and neuroscientists to share and discuss recent



advances in deep learning, with particular attention to its current limitations and how they might be overcome to develop intelligent systems and models of the human mind.

Organizers: Josh McDermott (MIT), Yair Weiss (Hebrew University)

Location: Fondazione Mediaterraneo, 14 Via Portobello, Sestri Levante, GE 16039

CBMM Mission:

The mission of CBMM is to make progress on the greatest problem in science — human intelligence. A new field is emerging dedicated to developing a computationally centered understanding of human intelligence and to establishing an engineering practice based on that understanding. CBMM's long-term goals are to uncover basic principles of intelligence, both natural and artificial, and the mechanisms that can be used to implement intelligent systems, both by brains and in silicon. For the past several years, the Center for Brains, Minds, and Machines has been pursuing this goal and is now bringing the discussion to the European research community.

As robots develop further and our lives are increasingly intertwined with machines and algorithms, understanding intelligence is becoming a crucial problem. Without this understanding, machines won't be able to adapt to new problems, recover from errors, and learn similarly to the way humans do. But the brain is too complex to simply inspect it and understand how it works. We have to develop hypotheses and test them, and this requires models of intelligence which can benefit tremendously from machines that solve similar tasks. Neuroscience and engineering are tied together by new developments in cognitive

science that characterize the concepts and algorithms that humans use. By promoting close collaborations between these domains of research, we will significantly advance our understanding of brains, minds, and machines.

Preliminary Schedule

Day 1	Tuesday, June 25
9:30	<i>Coffee & Welcome</i>
	including: Alessandro Verri, University of Genoa, Machine Learning Group
10:00	Tommy Poggio
	“Solving 3 theory puzzles about Deep Learning”
10:45	Tali Tishby
	“The information theory of deep learning and the surprising computational benefits of hidden layers”
11:30	<i>Coffee</i>
12:00	Lorenzo Rosasco
	“Implicit regularization: a guided tour”
12:45	<i>Lunch</i>
14:45	Amnon Shashua
	“Deep networks meet quantum physics”
15:30	Jim DiCarlo
	“Reverse engineering human visual intelligence”
16:15	<i>Coffee</i>
16:45	Daphna Weinshall
	“All deep networks are created equal”
17:30	Boris Katz
	“ObjectNet: Understanding the performance of Vision Systems”
18:15	Shai Shalev-Shwartz

	"Is deeper better only when shallow is good?"
	<i>Dinner on own</i>
	Day 2 Wednesday, June 26
10:00	Philip Isola
	"A case for structured objectives"
10:45	Yedid Hoshen
	"Non-adversarial deep learning"
11:30	<i>Coffee</i>
12:00	Josh McDermott
	"Metamers of deep neural networks"
12:45	<i>Lunch</i>
14:45	Yair Weiss
	"Adversarial examples as optimal percepts"
15:30	Katharina Dobs
	"Face representations in deep neural networks"
16:15	<i>Coffee</i>
16:45	Haim Sompolinsky
	"Deep perceptual learning"
17:30	Merav Ahissar
	"The dynamics of forming perceptual priors and its importance to skill acquisition"
19:00	Workshop Dinner
	Day 3 Thursday, June 27

9:00	Shmuel Peleg
	“Benefits and limitations using audio-visual analysis”
9:45	Gabriel Kreiman
	“Finding any Waldo: zero-shot invariant and efficient visual search”
10:30	<i>Coffee</i>
11:00	Shimon Ullman
	“Combining bottom-up and top-down processing in scene understanding”
11:45	Michael Werman
	“Learning with small memory”
13:00	<i>Lunch</i>

Participants:

Merav Ahissar, The Hebrew University of Jerusalem

Jim DiCarlo, Massachusetts Institute of Technology

Katharina Dobs, Massachusetts Institute of Technology

Yedid Hoshen, The Hebrew University of Jerusalem

Philip Isola, Massachusetts Institute of Technology

Boris Katz, Massachusetts Institute of Technology

Gabriel Kreiman, Children's Hospital Boston, Harvard Medical School

Josh McDermott, Massachusetts Institute of Technology

Shmuel Peleg, The Hebrew University of Jerusalem

Tomaso Poggio, Massachusetts Institute of Technology

Lorenzo Rosasco, Istituto Italiano di Tecnologia, Università degli Studi di Genova

Shai Shalev Shwartz, The Hebrew University of Jerusalem

Amnon Shashua, The Hebrew University of Jerusalem

Haim Sompolinsky, Harvard University; The Hebrew University of Jerusalem

Naftali Tishby, The Hebrew University of Jerusalem

Shimon Ullman, MIT, Weizmann Institute of Science

Daphna Weinshall, The Hebrew University of Jerusalem

Yair Weiss, The Hebrew University of Jerusalem

Michael Werman, The Hebrew University of Jerusalem

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