Gatsby Tri-Center annual meeting 2022

May 30th – June 1st, 2022

The Edmond and Lily Safra Center for Brain Sciences (ELSC) at the Hebrew University of Jerusalem, Israel

Monday, May 30th

08:00   Pick up from hotels

08:30-09:00 Gathering

09:00-09:15 Greetings

09:15-11:00 Session I

- **Yoram Burak** (ELSC) - Is it possible to embed multiple continuous attractors in a single recurrent network?

- **Will Dorrell** (UCL) - Structured Neural Representations: A normative theory of Grid Cells

- **Samuel Muscinelli** (Columbia) - Optimal routing to cerebellum-like structures

11:00-11:30 *Coffee break*

11:30-13:15 Session II

- **Dan Biderman** (Columbia) - Lightning Pose: Better, faster, and stronger pose estimation via semi-supervised learning

- **Arthur Gretton** (UCL) - Causal modelling with kernels: treatment effects, counterfactuals, mediation, and proxies

- **Tomer Barak** (ELSC) - Naive artificial intelligence

13:15-14:30 *Lunch*

14:30-15:40 Session III

- **Stefano Sarao Mannelli** (UCL) - Towards a fundamental understanding of curriculum learning

- **Lilach Avitan** (ELSC) - Behavioral consequences of a developing neural code

15:40-17:00 Poster Session at the Goodman building courtyard and refreshments

17:00-18:15 **Ari Folman** (Israeli film director, screenwriter, animator, and movie-score composer)

   Freedom of imagination – The mind process of film making

18:30   Ride back to hotels

20:30   Social meeting at the 'Mike's Place'

Tuesday, May 31st

08:00   Pick up from hotels

08:30-09:00 Gathering

09:00-10:45 Session IV

- **Peter Orbanz** (UCL) - Statistical implications of group invariance of distributions

- **Uri Cohen** (ELSC) - Soft-margin classification of object manifolds

- **Ching Fang** (Columbia) - Neural learning rules for generating flexible predictions and their application in food caching birds

10:45-11:15 *Coffee break*

11:15-13:00 Session V

- **Laureline Logiaco** (Columbia) - Thalamic control of cortical dynamics in a model of flexible motor sequencing
- **Franziska Broker** (UCL) - Human semi-supervised learning
- **David Beniaguev** (ELSC) - Multiple synaptic contacts Combined with dendritic filtering enhance spatiotemporal Pattern recognition of single neurons

13:00-14:20 *Lunch*

14:20-15:10 *Building tour*

15:10-16:20 Session VI

- **Alessando Sanzeni** (Columbia) - Mechanisms underlying reshuffling of visual responses by optogenetic stimulation in mice and monkeys
- **Merav Ahissar** (ELSC) - Slow update of motor programs in autism

16:20-16:50 *Coffee break*

16:50-18:00 Session VII

- **Andrew Saxe** (UCL) -The Neural Race Reduction: Dynamics of nonlinear feature learning in deep architectures
- **Valeria Fascianelli** (Columbia) - Representational geometry correlates with behavioral differences across two monkeys

18:20   Ride back to hotels

Wednesday, June 1st

08:00   Pick up from hotels

08:30-09:00 Gathering

09:00-10:10 Session

- **Lorenzo Posani** (Columbia) - The representational geometry of social recognition memory in the hippocampus
- **Eli Nelken** (ELSC) - Reading the rat mind using the information bottleneck principle

10:10-10:30 Winning posters announcement

10:30-11:00 *Coffee break*

11:00-12:00 **Discussion: The future of theory in neuroscience**

12:00-12:10 Closing words and farewells

12:30   Live concert at The *Isaac and Luba Becker Auditorium*: **Amernet String Quartet**

14:00   Ride back to hotels

General information

- All lectures are in classroom 2004, on the ground floor of the Goodman Guiding.

- Lunch will be served in the building, across the courtyard from the classroom.

- **Please note**: On Sunday, May 29, Israel marks *Jerusalem Day*. During the day and the evening, there may be civil disorders in some locations. We advise everyone to refrain from visiting the old city on Sunday, particularly Damascus gate and its surroundings. We do not expect problems or unusual traffic near the hotels or the University.

Invited keynote

On the afternoon of the first day, we will have a guest lecture and a discussion with [Ari Folman](#), an Israeli director, screenwriter, animator, and screen-score composer. Ari has created internationally accredited films that combine live-action and animation. His film [*Waltz with Bashir* (2008)](#) has won the Golden Globe award for best foreign-language film, the Writers Guild of America award, and was nominated for an Oscar. His film [*The Congress* (2013)](#) has won the Tokyo Anime Award. *The Congress* portrays a dystopian future. The protagonist, the actress Robin Wright as a fictionalized version of herself, sells a production studio the rights over her own essence to be used in computer-generated films. Ari will talk about his creative approach. We will discuss the possibility that artwork, and movies, in particular, can be generated by intelligent machines. *The Congress* is available on Amazon Prime for those who can and are interested in watching it before the meeting.

Panel discussion

On the last day, we will hold a panel discussion on the future of theory in Neuroscience. The panelists, Larry Abbot, Maneesh Sahani, and Haim Sompolinsky will lead the discussion and answer questions.

We will explore the central questions in the field. In particular, we will discuss the role of theory in light of rapid advancement in machine learning (ML) and whether and how theory can bridge biology and ML applications.

We encourage young researchers to ask questions that could guide them in planning their career and scientific path.

You can ask questions in the panel or [propose questions in advance](#) (optionally anonymous).

Social

On Monday evening, we will gather at [*Mike's Place*](#) starting 20:30. First drink and snacks on us.

Address: Jaffa 33 Rd. (Next to Zion sq.)

Hotels

- [Miskanot Sha'ananim guesthouse](#) – Yamin Moshe 0, Mishkanot Shaananim, Jerusalem

  Pickup in the morning will be from the top of the parking driveway.

- [Prima Kings Hotel](#) - 60 King George St. Jerusalem

  Pickup in the morning will be from hotel's main entrance.

Poster list

1. **Ivan Andres Davidovich** (ELSC) - Uncovering functional connectivity in continuous attractor network models

2. **Elom Amematsro** (Columbia) - Complexity and high-dimensionality of motor cortex activity during a simple task

3. **David G Clark** (Columbia) - A Theory of Coupled Neuronal-Synaptic Dynamics

4. S**alomon Z Muller** (Columbia) - How does the brain make prediction neurons?

5. **Sharon J Su** (Columbia) - Multimodal Integration of Chromatic Contrast and Skylight Polarization in the Drosophila Central Complex.

6. **William Walker** (UCL) - Unsupervised representational learning with recognition-parametrised probabilistic models

7. **Heishiro Kanagawa** (UCL) - a relative goodness-of-fit test for comparing latent variable models

8. **Toviah Moldwin** (ELSC) - The Calcitron

9. **Rhea Chowers** (HUJI) - Why do CNNs Learn Consistent Representations in their First Layer Independent of Labels and Architecture?

10. **Mousa Karyanni** (ELSC) - Learning and Exploration in Complex Environments

11. **Georg Chechelnizki** (ELSC) - A noise-robust recurrent spiking neural network with attractor dynamics

12. **Ana Polterovich** (ELSC) - Auditory cortex in real life

13. **Yoav Rubinstein** (ELSC) - Extracting motor commands from natural behavior: a control theory approach

14. **Serafima Dubnov** (ELSC) - Genie in a Bottle: Information Bottleneck Algorithm as a tool to identify the optimal marker genes for robust cell type classification

15. **Gabrielle Marmur** (ELSC) - Timing decisions under latent state uncertainty

16. **Lucas Simões** (UCL) - Optimal reward-rate in multi-task environments and its consequences for behavior