The Brain Conferences

Dynamics of the brain: temporal aspects of computation

9 – 12 June 2019
Rungstedgaard, Denmark

PROGRAMME

Sunday, 9 June 2019	
From 14:00	Arrival and registration
14:30-14:40	Welcome and opening remarks from the Conference Chairs
Session Moderator: Gilles Laurent	
14:40-15:20	Stanislas Dehaene, Collège de France and INSERM-CEA, Paris France Using magneto-encephalography to decode the time course of conscious and unconscious computations
15:20-16:00	Gilles Laurent, Max Planck Institute for Brain Research, Germany Transient Dynamics: Looking for Potential Principles
16:00-16:30	Afternoon snack
16:30-17:10	Sarah Woolley, Columbia University, USA Coding Communication in Auditory Cortex
17:10-17:30	**Matthias Grabenhorst,** Max Planck Institute for Empirical Aesthetics, Germany Uncertainty parameters in temporal prediction
17:30-18:10	Michael Long, NYU School of Medicine, USA Local axonal conduction delays underlie precise timing of a neural sequence
18:10-18:50	Michael Halassa, MIT, USA Frontothalamic interactions in cognitive control and flexibility
19:00-21:30	Welcome Drink & Dinner

Monday, 10 June 2019
Morning Session Moderator: Ila Fiete
09:00-09:40 — Wolf Singer, Max Planck Institute for Brain Research, Germany Computing in high dimensional state space. The cerebral cortex as example
09:40-10:20 — Claudia Clopath, Imperial College London, UK Temporal backbone for rapid compressible learning in hippocampus
10:20-10:50 — Group Picture and Coffee Break
10:50-11:30 — Sandeep Robert Datta, Harvard University, USA Invariance and flexibility for odor representations in cortex
11:30-12:10 — Joe Paton, Champalimaud Research, Portugal Scalable population dynamics underlying cognition in the basal ganglia
12:10-12:30 — **Carl Schoonover & Andrew Fink**, Columbia University, USA Unstable odor responses in piriform cortex
12:30-14:00 — Lunch
Afternoon Session Moderator: Adrien Peyrache
14:00-14:40 — Mark Churchland, Columbia University, USA Leveraging theory to understand and predict cortical activity during movement
14:40-15:20 — Robert Gütig, Max Planck Institute for Experimental Medicine, Germany Learning across space and time in spiking neural networks
15:20-15:35 — **Poster Spotlights I * (7 presentations, 90 seconds each)**
15:35-17:35 — **Poster Session I with Afternoon Snack**
17:35-18:15 — Eve Marder, Brandeis University, USA Differential Resilience to Perturbation of Circuits with Similar Performance
18:15-18:55 — Mala Murthy, Princeton University, USA Neural Mechanisms for Dynamic Acoustic Communication
18:55-19:25 — End of the day: Group discussion
19:30-21:30 — Dinner

Tuesday, 11 June 2019	
Morning Session Moderator: Mala Murthy	
09:00-09:40	Matthew Wilson, Massachusetts Institute of Technology, USA Memory reactivation in awake and sleep states
09:40-10:20	Michael Yartsev, UC Berkeley, USA Planar Representation in the Hippocampus of Flying Bats
10:20-10:40	**Andre Longtin,** University of Ottawa, Canada Time-stamp mechanism for conversion of egocentric to allocentric spatial transformations
10:40-11:00	Coffee break
11:15-15:15	Box Lunch, outing to Louisiana Museum
15:30-16:10	Laura Colgin, The University of Texas at Austin, USA Hippocampal gamma rhythms and place cell ensemble dynamics in spatial memory
16:10-16:25	**Poster Spotlights II ** (7 presentations, 90 seconds each)**
16:25-18:25	**Poster Session II with Afternoon Snack**
Afternoon Session Moderator: Gilles Laurent	
18:25-19:05	Edvard Moser, Kavli Institute for Systems Neuroscience, Trondheim, Norway Space and time: Internal dynamics of the entorhinal cortex
19:05-19:30	End of the day: Group discussion
19:30-21:30	Dinner

Wednesday, 12 June 2019	
Morning Session Moderator: Julijana Gjorgjieva	
09:00-09:40	Ila Fiete, Massachusetts Institute of Technology, USA Emergence of grid cells from a simple optimization function
09:40-10:20	Adrien Peyrache, McGill University, Canada A link between dynamics and function in the thalamus
10:20-10:50	Coffee Break
10:50-11:30	Jonathan Pillow, Princeton University, USA Latent variable models for identifying neural dynamics within and across brain areas
11:30-12:10	Julijana Gjorgjieva, Max Planck Institute for Brain Research, Germany Emergence of computation during cortical circuit development
12:10-13:30	Lunch
Afternoon Session Moderator: Jonathan Pillow	
13:30-14:10	Angela Langdon, Princeton University, USA Dynamic expectations: What and when computations during reward prediction
14:10-14:50	**Jennifer Li & Drew Robson**, Harvard University, USA A nonlinear oscillator coordinates brain-wide motivational state during foraging **Shruti Naik**, Neurospin Paris, France Functional Dynamics of the Infant Brain
14:50-15:30	Wolfgang Maass, Technische Universität Graz, Austria Biologically inspired alternatives to deep learning for recurrent neural networks
15:30-16:00	Coffee Break
16:00-16:40	**Giulio Bondanelli**, École Normale Supérieure, France Coding with transient trajectories in recurrent neural networks **Tal Tamir**, Weizmann Institute of Science, Israel Dynamics of social representation in the population code of the mouse prefrontal cortex
16:40-17:20	Michale Fee, Massachusetts Institute of Technology, USA Building a temporal state space for song learning
17:20-17:50	Tying it all together: Group Discussion & Closing Remarks **Co-chairs**
19:00-22:00	Farewell Dinner & Poster Awards

Poster Spotlights I *

Monday, 10 June 2019

15:20-15:35

7 presentations, 90'each:

Ekaterina Morozova, Brandeis University, USA

Effect of temperature on half-center oscillator networks

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Henrique Fernandes, Aarhus University, Denmark

The dynamics of the improvising brain: a study of musical creativity

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Lorenz Fenk, Max Planck Institute for Brain Research, Germany

Sleeping dragons and claustro-cortical interactions

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Svenja Nierwetberg, Sainsbury Wellcome Centre, UK

Effect of sub-anesthetic ketamine on cortical dendritic activity and perceptual behavior in mice

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Mingyu Yang, Max Planck Institute for Biological Cybernetics, Germany

The Locus Coeruleus activity during hippocampal-cortical communication

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Yael Bitterman, FMI, Switzerland

Hierarchical amygdala network dynamics reflect learning of behavioral schemes

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Lukas Schmitt, Massachusetts Institute of Technology, USA

Thalamic coordination of cortical dynamics stabilizes short-term perceptual representations

Tuesday, 11 June 2019

16:10-16:25

6 presentations, 90'each:

Nils Baas, NTNU, Norway

Decoding of neural data using topological data analysis

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Max Nolte, École Polytechnique Fédérale de Lausanne, Switzerland

Neocortical circuitry supports spike-time reliability amidst cellular noise and chaos

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Rafi Haddad, Bar Ilan University, Israel

Evidence for Weak Contribution of Temporal Coding in Human Olfaction

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Yiling Yang, Ernst Strüngmann Institute (ESI) for Neuroscience in Cooperation with Max Planck Society, Germany

Unpacking the transient: intensity-ramping natural stimuli result in sequential responses in area V4

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Joan Rué Queralt, Lausanne University Hospital, Switzerland

Intrinsic spatiotemporal dynamics of the human sleep cycle revealed using novel temporal manifold harmonics method

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Kevin Franks, Duke University, United States

Recurrent circuitry provides the substrate for pattern completion in olfactory cortex