

The Brain Conferences

Structuring Knowledge for Flexible Behaviour

18 – 21 October 2023
Rungstedgaard, Denmark

PROGRAMME

Wednesday, 18 October 2023	
From 14:00	<i>Arrival and registration</i>
14:50-15:00	Welcome address from the Conference Chairs (10')
<i>Afternoon Session: Cognitive maps and inferences</i> <i>Moderator: Athena Akrami</i>	
15:00-15:35	Helen Barron , University of Oxford, United Kingdom Building internal models during periods of rest and sleep (25' + 10' Q&A)
15:35-16:10	Joni Wallis , UC Berkeley, United States Hippocampal-orbitofrontal contributions to value-based decision-making (25' + 10' Q&A)
16:10-16:40	Coffee Break (30')
16:40-17:15	Loren Frank , UCSF, United States Everything, but not everywhere or all at once: Dynamic engagement of reliable task-related representations across frontal cortical regions (25' + 10' Q&A)
17:15-17:50	Yunzhe Liu , Beijing Normal University, China Hippocampal ripple triggered brain-wide activation underlies learning and inference (25' + 10' Q&A)
17:50-19:00	Welcome drink & speed dating (1h10')
19:00-21:30	Dinner (2h30')

Thursday, 19 October 2023

Morning Session 1: Organising Social Behaviour
Moderator: Doris Tsao

09:00-09:35	Ann Duan , University College London, United Kingdom Mice dynamically adapt to opponents in multi-player games (25' + 10' Q&A)
09:35-10:10	Matthew Rushworth , University of Oxford, United Kingdom Organizing flexible representations for social interactions (25' + 10' Q&A)
10:10-10:25	Short talk 1 Angelo Forli , UC Berkeley, United States Hippocampal Representation During Collective Spatial Behaviour in Bats (10' + 5' Q&A)
10:25-10:50	Group Picture & Coffee Break (25')

Morning Session 2: Priors and decisions
Moderator: Mackenzie Mathis

10:50-11:25	Athena Akrami , University College London, United Kingdom Learning and exploiting sensory statistics across multiple species (25' + 10' Q&A)
11:25-12:00	Tom Mrcsic Fogel , University College London, United Kingdom Decision making in the brain (25' + 10' Q&A)
12:00-12:15	Short talk 2 Jean Paul Noel , New York University, United States Context invariant beliefs in closed-action perception loops are supported by dynamic reconfiguration of single unit functional connectivity (10' + 5' Q&A)
12:15-12:30	Short talk 3 Tania Barkat , Basel University, Switzerland Neural computation underlying transfer of learning (10' + 5' Q&A)
12:30-14:00	Lunch (1h30')

Afternoon Session: Flexible learning
Moderator: Helen Barron

14:00-14:35	Reidar Riveland , University of Geneva, Switzerland A neural model of task compositionality with natural language instructions (25' + 10' Q&A)
14:35-15:10	Zeb Kurth-Nelson , DeepMind, United Kingdom Replay and symbolic reasoning (25' + 10' Q&A)

15:10-15:25	Short talk 4 Leonie Glitz , University of Oxford, United Kingdom Curriculum learning for cognitive maps (10' + 5' Q&A)
15:25-15:45	Sophie Molholm , Albert Einstein College of Medicine, United States European Journal of Neuroscience (EJN) presentation (15' + 5' Q&A)
15:45-16:15	Coffee Break (30')
16:15-16:45	Poster Spotlights I * (11 presentations, 2' each) (30')
16:45-19:15	Drinks & Poster Session I (2h30')
19:15-21:15	Dinner (2h00')

Friday, 20 October 2023	
<i>Morning Session: What's going on in the Anterior temporal lobe?</i> Moderator: Matthew Rushworth	
09:35-10:10	Kareem Zaghoul , NIH, United States Sequences of neuronal spiking activity in the human anterior temporal lobe encode information for memory formation (25' + 10' Q&A)
10:10-10:25	Short talk 5 Jerry Chen , Boston University, United States Perirhinal cortex learns a predictive map of the task environment (10' + 5' Q&A)
10:25-10:40	Short talk 6 Samuel Lipp , Columbia University, United States Statistical learning principles yield generalization and naturalistic behaviours in transitive inference (10' + 5' Q&A)
10:40-11:00	Coffee Break (20')
11:00-15:00	<i>Lunch & social programme (4h00')</i>
15:00-15:15	<i>Free time (15')</i>

<i>Afternoon Session</i> <i>Moderator: Ann Duan</i>	
15:15-15:50	Tim Behrens , University of Oxford, United Kingdom Abstracting task structure 1 (25' + 10' Q&A)
15:50-16:25	Mackenzie Mathis , Swiss Federal Institute of Technology, Switzerland Title TBC (25' + 10' Q&A)
16:25-17:00	Xiao-Jing Wang , New York University, United States Structured knowledge emerges in trained recurrent neural networks (25' + 10' Q&A)
17:00-17:15	Coffee Break (15')
17:15-17:45	Poster Spotlights II * (11 presentations, 2' each) (30')
17:45-20:15	Drinks & Poster Session II (2h30')
20:15-22:15	Dinner (2h00')

Saturday, 21 October 2023	
<i>Morning Session 1: Learning dynamics across scales</i> <i>Moderator: Xiao-Jing Wang</i>	
09:00-09:35	Peter Dayan , Max Planck Institute for Biological Cybernetics, Germany Behind the Curve: Modeling the Acquisition of Behaviour (25' + 10' Q&A)
09:35-10:10	Andrew Saxe , University College London, United Kingdom Title TBC (25' + 10' Q&A)
10:10-10:25	Short talk 7 Lucile Favero , University of Geneva, Switzerland A theoretical framework for studying sensorimotor learning during goal-directed tasks in water-restricted mice (10' + 5' Q&A)
10:25-10:40	Short talk 8 Ioanna Pandi , Institute of Molecular Biology and Biotechnology (IMBB-FORTH), Greece Investigating the Synaptic Dynamics of Adaptive Behaviour in the mouse frontal cortex (10' + 5' Q&A)
10:40-11:00	Coffee Break (20')

<i>Morning Session 2: Human flexibility</i> <i>Moderator: Yunzhe Liu</i>	
11:00-11:35	Nuttida Rungratsameetaweemana , Columbia University, United States Top-down signalling dynamically mediates flexible behaviour (25' + 10' Q&A)
11:35-12:10	Sameer Sheth , Baylor College of Medicine, United States Title TBC (25' + 10' Q&A)
12:10-12:25	Short talk 9 Mariana Lomeli Fernandez , University of Nottingham, United Kingdom Prefrontal Cortex and Hippocampus jointly guide Flexible Working Memory (10' + 5' Q&A)
12:25-12:40	Short talk 10 Conor Robinson , QIMR Berghofer, Australia Using representations to bypass complexity constraints in cognitive reasoning (10' + 5' Q&A)
12:40-14:15	Lunch (1h35')
<i>Afternoon Session: Title TBC</i> <i>Moderator: Joni Wallis</i>	
14:15-14:50	Alla Karpova , HHMI Janelia Research Campus, United States Abstracting task structure 2 (25' + 10' Q&A)
14:50-15:25	Thomas Akam , University of Oxford, United Kingdom Efficient coding of a complex goal-directed behaviour in mouse medial-frontal cortex (25' + 10' Q&A)
15:25-15:40	Short talk 11 Alison Comrie , University of California San Francisco (UCSF), United States Dynamic engagement of non-local spatial representations in the hippocampus during value-guided foraging decisions (10' + 5' Q&A)
15:40-15:55	Short talk 12 Qianli Yang , Institute of Neuroscience, Chinese Academy of Sciences, China Language of Problem-Solving: Uncovering the Structure and Hierarchy in Sequential Decision Making (10' + 5' Q&A)
15:55-16:15	Coffee Break (20')
16:15-18:15	Debate (2hr00')
18:15-18:30	Closing Remarks (15')
18:30-19:30	<i>Free time (1h00')</i>

19:30-22:00	Gala Dinner (2h30')
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Sunday, 22 October 2023
Breakfast & departure

Poster Spotlights I *

Thursday, 19 October 2023
16:15-16:45

11 presentations, 2' each:

Lorena Andreoli, Okinawa Institute of Science and Technology, Japan

Availability of allocentric cues influence the learning of different navigational strategies, but not the preferred strategy in a dual solution plus-maze

Dan Bang, Aarhus University, Denmark

Sub-second dopamine and serotonin signalling in human striatum during perceptual decision-making

Daniel Dobolyi, University College London, United Kingdom

Neural computations underlying the generalization of information for adaptive behaviour

Christoffer Gahnstrom, University of Pennsylvania, United States

Predictive representation utilizing episodic reactivations explain human behavior in a complex multigoal environment

Giuseppe Pietro Gava, University of Oxford, United Kingdom

Organizing the coactivity structure of the hippocampus from robust to flexible memory

Yoav Ger, Tel Aviv University, Israel

Harnessing the flexibility of neural networks to predict dynamic theoretical parameters underlying human choice behavior

Mikael Novén, University of Copenhagen, Denmark

A language of movements: grammar learning in a serial reaction time test

Pablo Tano, University of Geneva, Switzerland

Adaptive Behavior through Predictive Representations of Compositional Syllables

Anna Shpektor, University of Oxford, United Kingdom

A hierarchical representation of sequences in human entorhinal cortex

Charlie Wilson, Stem Cell & Brain Research Institute, INSERM U1208, France

Learning to learn about feedback and about uncertain feedback

Xiaochen Zheng, Donders Institute for Brain, Cognition and Behaviour, Netherlands

The neural architecture of compositional generalization: how do we infer the meaning of "un-reject-able-ish"

Poster Spotlights II **

Friday, 20 October 2023

17:15-17:45

11 presentations, 2' each:

Joanna Aloor, University College London, United Kingdom

Behavioural and neural mechanisms for learning mixed strategies in a multi-agent environment

Prashanti Ganesh, Freie Universität Berlin, Germany

Uncertainty-driven integration of visual and reward information for economic decision making and reward learning

Morio Hamada, Sainsbury Wellcome Centre, United Kingdom

Neural implementation of dynamic behavioural rule switching

Balazs Hangya, Institute of Experimental Medicine, Budapest, Hungary

Neuromodulatory signals in flexible learning paradigms

Mattias Horan, University College London, United Kingdom

Flexible representations of spatial connectivity in the hippocampal-entorhinal circuit of mice navigating virtual 2D environments

Ruchella Kock, Leiden University, Netherlands

Neural states and state transitions accompanying real-world behavior

Elena Mainetto, Donders Institute for Brain, Cognition and Behaviour, Netherlands

Quantifying the flexibility of knowledge structures in language

Mathias Sablé-Meyer, University College London, United Kingdom

Two neural mechanisms of geometric shape perception in humans

Beatriz Simoes Godinho, University of Oxford, United Kingdom

Hippocampal representations in a complex route planning task

Jiali Zhang, University of Oxford, United Kingdom

Hierarchical replay in the anterior temporal lobe reflects different information layers in an episodic memory

Mona Garvert, Julius-Maximilians-University Würzburg, Germany

Hippocampal spatio-predictive cognitive maps adaptively guide reward generalization