



# ARTIFICIAL & BIOLOGICAL COGNITION

## 7<sup>th</sup> Cambridge Neuroscience Symposium

12<sup>th</sup>-13<sup>th</sup> September 2019 - Cambridge, UK

### Symposium Day One: Thursday 12th September 2019

08:00-09:00 Registration and coffee

#### Opening of the Symposium:

Welcome by **Professor Ole Paulsen**

09:00-09:10 Opening address from **Professor Andy Neely**  
Pro-Vice-Chancellor for Enterprise & Business Relations

#### Session One: Reinforcement Learning

Chair: **Professor Matt Botvinick**, DeepMind

09:10-09:40 **Professor Wolfram Schultz**  
Department of Physiology, Development & Neuroscience, Cambridge  
*Reward neuroeconomics*

09:40-10:10 **Professor Satinder Singh**  
DeepMind, London  
*Where do Rewards come from?*

10:10-10:40 Refreshments

#### Session One continued: Reinforcement Learning

10:40-11:10 **Professor Geoffrey Schoenbaum**  
National Institute of Drug Abuse  
*Dopamine transient: prediction or prediction error?*

11:10-11:40 **Dr Carl Edward Rasmussen**  
Department of Engineering, University of Cambridge  
*TBC*

11:40-12:10 **Early Career Data Blitz**  
Convened by Dr Kirstie Whitaker, Department of Psychiatry

12:10-13:40 Lunch, Poster Session and Trade Exhibition

#### Session Two: Navigation

Chair: **Dr Stephen Eglen**, Department of Applied Maths and Theoretical Physics

13:40-14:10 **Dr Andrea Banino**  
DeepMind, London  
*Understanding spatial navigation: An intersection of brain science and artificial intelligence*

14:10-14:40 **Dr Julija Krpic**  
Department of Physiology, Development & Neuroscience, Cambridge  
*Deformations of the hippocampal cognitive map in large irregular spaces*

14:40-15:10 **Professor Nachum Ulanovsky**  
Department of Neurobiology, Weizmann Institute of Science, Israel  
*Neural codes for natural navigation in the bat hippocampus*

15:10-15:40 Refreshments

#### Session Three: Robotics

Chair: **Dr Adrian Weller**, Department of Engineering

15:40-16:10 **Professor Leslie Kaelbling**  
Computer Science and Artificial Intelligence Laboratory, MIT  
*Doing for our robots what nature did for us*

16:10-16:40 **Professor Barbara Webb**  
Institute for Perception, Action and Behaviour, University of Edinburgh  
*Robot models of insect navigation*

16:40-17:10 **Dr Lola Cañamero**  
Department of Computer Science, University of Hertfordshire  
*Affective cognition in autonomous robots*

17:20-18:00 **The Alan Hodgkin Plenary Lecture**  
Introduced by **Dr Paula Buttery**, Department of Computer Science & Technology  
**Dr Demis Hassabis**, DeepMind  
*The power of self-learning systems*

18:30-22:00 Reception & conference dinner at Trinity College, Cambridge



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#ABC2019

## Symposium Day Two: Friday 13th September 2019

09:00-09:30 Registration and coffee

### Session Four: Vision

Chair: **Professor Zoe Kourtzi**, Department of Psychology

09:30-10:00 **Professor Anthony Movshon**

Center for Neural Science, New York University  
*Brain mechanisms of visual form perception*

10:00-10:30 **Dr Andrew Welchman**

Department of Psychology, University of Cambridge/Wellcome Trust  
*Can we learn anything useful about the brain from AI?*

10:30-11:00 **Dr Jasper Poort**

Department of Psychology, University of Cambridge  
*Neuronal circuits for learning and attentional task-switching in mouse visual cortex*

11:00-11:30 **Professor Anya Hurlbert**

Institute of Neuroscience, Newcastle University  
*Seeing colour and light*

11:30-12:00 Refreshments

### Session Five: Communication

Chair: **Professor Barry Everitt**, Department of Psychology

12:00-12:30 **Dr Marco Baroni**

Facebook Research  
*Formal neural network linguistics*

12:30-13:00 **Professor Lorraine Tyler**

Department of Psychology, University of Cambridge  
*DNNs as explanatory models? Vision and Language*

13:00-13:40 **The Andrew Huxley Plenary Lecture**

**Professor Catherine Dulac**

Department of Molecular and Cellular Biology, Harvard University  
*Neurobiology of social behaviours*

13:40-15:00 Lunch, Poster Session and Trade Exhibition

### Session Six: Mental Health

Chair: **Professor Ed Bullmore**, Department of Psychiatry

15:00-15:30 **Professor Michael Browning**

Department of Psychiatry, University of Oxford  
*Computationally defined treatment targets in depression*

15:30-16:00 **Dr Hannah Clarke**

Department of Physiology, Development & Neuroscience, Cambridge  
*Schizophrenia, perineuronal nets, and the hippocampal-prefrontal pathway*

16:00-16:30 **Professor Paul Fletcher**

Department of Psychiatry, University of Cambridge  
*How do computational models of perception and inference help the psychiatrist?*

16:30-17:00 Refreshments

### Session Seven: Neuroethics of Artificial Intelligence in Neuroscience (open to public)

Convenor: **Professor Barbara Sahakian**, Department of Psychiatry

17:00-18:30 Panel members:

**Mr Tom Feilden**

Science & Environment Editor, Today Programme, BBC Radio 4

**Professor Ann Copestake**

Department of Computer Science & Technology, University of Cambridge

**Dr Karina Vold**

Leverhulme Centre for the Future of Intelligence, University of Cambridge

**Dr Fumiya Iida**

Department of Engineering, University of Cambridge

18:30-19:30 Drinks reception, Foyer West Road Concert Hall