

# Workshop on *SBA*: Synergising the Human Brain and Artificial Neural Networks

## Background:

Understanding how the neuronal mechanisms support human cognition is a longstanding and challenging question. Inspired by human neural networks, artificial neural networks (ANNs) have shown remarkable progress across various fields. Recent studies have started to investigate the links between ANNs and the human brain, for visual processing. Likewise, human brain data is expected to inspire new developments in ANNs. In the longer term, we believe the investigation of this topic will provide a better understanding of how the human brain processes visual information. This knowledge could be instrumental in addressing differences in visual processing associated with neurodiversity such as dyslexia and ADHD. Furthermore, this could also contribute to the ongoing debate about what distinguishes the human brain from AI, for instance in the context of appreciating aesthetics.

## Aim:

The workshop will bring together experts from both neuroscience and computer science to discuss the latest developments and challenges in data processing and learning between the human brain and ANNs and develop a roadmap for advancing the science and applications.

## Programme:

Date: Friday 26th April 2024, 10 AM – 5 PM BST

Venue: [The Elm House](#), and Online

Book to attend in person: <https://buytickets.at/sbaworkshop/1197097>



Links for joining the online Zoom meeting:

<https://bham-ac-uk.zoom.us/j/84163821995?pwd=ZEtReloyRmxhMzB0K1pUMGhMNys0UT09>

Meeting ID: 841 6382 1995

Passcode: 917203

## Morning Session: 09:30 – 12:00

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| 09:30 – 10:00 | Arrival and Registration  |
| 10:00 – 10:05 | Opening Remarks by Ole Jensen   |
| 10:10 – 10:40 | <b>Invited Talk</b> – <a href="#">Rhodri Cusack</a> , Trinity College Dublin, Ireland<br>Title: <i>Can Infant Learning Guide the Development of Foundation Models?</i>                      |
| 10:45 – 11:15 | <b>Invited Talk</b> – <a href="#">Piotr Mirowski</a> , Google DeepMind, UK ( <a href="#">remote</a> )<br>Title: <i>Co-creating with Artificial Intelligence in Live Theatre Performance</i> |
| 11:15 – 11:30 | <b>Coffee Break + Networking</b>  |
| 11:30 – 12:00 | <b>Invited Talk</b> – <a href="#">Yuki M. Asano</a> , University of Amsterdam, Netherlands<br>Title: <i>Self-Supervised Learning from Images and Videos</i>                                 |
| 12:00 – 13:00 | <b>Lunch + Networking</b> (Ground floor room G05)   |

## Afternoon Session: 13:00 – 17:00

- 13:00 – 13:30 **Invited Talk** – [Katharina Duecker](#), Brown University, USA ([remote](#))  
Title: *Oscillations in an Artificial Neural Network Convert Competing Inputs into a Temporal Code*
- 13:30 – 14:00 **Invited Talk** – [Catrina Hacker](#), University of Pennsylvania, USA ([remote](#))  
Title: *Identifying the Neural Correlates of Contextual Influences on Image Memorability*
- 14:00 – 14:30 **Coffee Break + Art Show** [[Alex Billingham](#)] + Networking
- 14:30 – 15:00 **Invited Talk** – [Cai Wingfield](#) and [Daniel MacSwayne](#), University of Birmingham, UK  
Title: *Visual Dynamics in Human Brain and Artificial Neural Network*
- 15:00 – 16:00 **Towards the RoadMap: Retrospective and Prospective**  
(Rooms 214/215, 213, 205, 207, 108)  
The participants will discuss and propose the roadmap for synergising human brains and ANNs, to improve the understanding of the human brain, and also integrate inspirations from the human brain to help ANN design. Specifically, example topics could be discussed including:
- How can the development of ANN benefit from insights from human neuroscience?
  - How can human neuroscience benefit from ANN developments?
  - What are the challenges and opportunities of ANN+Brain?
- 16:00 – 16:15 **Coffee Break**
- 16:15 – 16:30 **Wrap-Up and Closing Remarks**
- 16:30 – 17:00 **Networking and Close of Event**

Workshop Organisers: [Jianbo Jiao](#), [Ole Jensen](#)

Acknowledgement: Daniel MacSwayne, Cai Wingfield, Rebecca Ward, Rebecca Wycherley, Jessica Mylchreest, Emma J Robinson, et al.



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Directions to the Elm House (venue) from the University Station:



And from the Edgbaston Park Hotel:



If you are driving, the main car park is the University of Birmingham [North East car park \(B15 2SA\)](#)  
[Direction](#) to the venue