

## Event location

Max Planck Institute for Brain Research  
Max-von-Laue-Str. 4  
60438 Frankfurt am Main | Germany

## Registration

Please register for participation until 26 April 2024 at:  
[www.leopoldina.org/en/brain-research-and-language-models/](http://www.leopoldina.org/en/brain-research-and-language-models/)

You can find detailed instructions on how to get there at:  
[www.brain.mpg.de/81234/how-to-get-here/](http://www.brain.mpg.de/81234/how-to-get-here/)

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The Leopoldina champions the freedom and appreciation of science. It promotes a scientifically enlightened society and the responsible application of scientific insight for the benefit of humankind and the natural world. In its interdisciplinary discourse, the Academy transcends thematic, political and cultural boundaries. It is also an advocate of human rights.



# Brain Science and Large Language Models

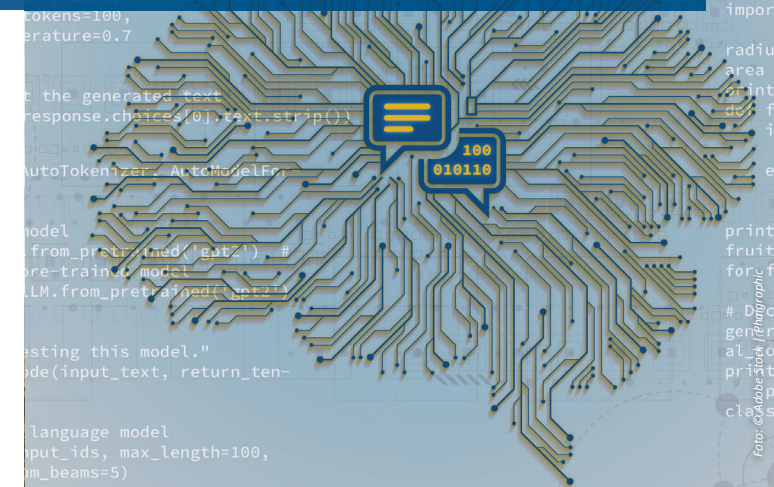
Symposium by Leopoldina and Max Planck Institute for Brain Research

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13-14 May 2024

Max Planck Institute for Brain Research  
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# Brain Science and Large Language Models: has a quantum leap occurred?

Recent advances in artificial intelligence (AI) have spurred both enthusiasm about the capabilities of the latest large language models (LLMs) and warnings about their ability to match or even surpass human intelligence. But do comparisons to the human brain hold when addressed from the perspective of neuroscience?

This symposium co-hosted by Leopoldina and MPI for Brain Research will bring together experts from computer science and neuroscience to discuss what has and has not been achieved with latest advances in AI. What are and how can we judge the capabilities of artificial systems compared to human intelligence? Which aspects of LLMs are similar and decisively dissimilar from the way the human brain works? By which tools can we inspect, measure and analyze the representation and capabilities of LLMs? Have LLMs learned a representation of language that shows similarities to the one generated by our human brains? How can LLMs inspire advances in brain science? Conversely, what aspects might be missing and could be used to improve current LLMs (and what does “improve” mean, in the first place)?

## Day 1 – 13 May 2024

01:00 pm | Registration

### 01:30 – 01:40 pm

#### Opening remarks

Prof. Dr. Moritz Helmstaedter  
*Max Planck Institute for Brain Research*  
Prof. Dr. Thomas Lengauer ML  
*Max Planck Institute for Informatics*

### 01:40 – 02:30 pm

#### Neural Representations of Vision and Language in AI Models and the Brain

Prof. Haim Sompolinsky  
*Hebrew University/Harvard University*

### 02:30 – 03:20 pm

#### Deep language models as a cognitive model for natural language processing in the human brain

Prof. Uri Hasson  
*Princeton University*

### 03:20 – 04:10 pm

#### Validating and improving LLMs as model organisms for human language processing

Prof. Dr. Mariya Toneva  
*Max Planck Institute for Software Systems*

04:10 – 05:00 pm | Coffee break

### 05:00 – 05:50 pm

#### The Debate Over “Understanding” in AI’s Large Language Models

Prof. Melanie Mitchell (zoom)  
*Santa Fe Institute*

06:00 – 07:00 pm | Fingerfood buffet

### 07:00 – 08:30 pm

#### Panel discussion: preliminary synthesis

Discussants:  
Prof. Alison Gopnik (zoom)  
*University of California, Berkeley*  
Prof. Uri Hasson  
*Princeton University*  
Prof. Dr. Thomas Hofmann  
*ETH Zurich*  
Prof. Melanie Mitchell (zoom)  
*Santa Fe Institute*  
Prof. Haim Sompolinsky  
*Hebrew University/Harvard University*  
Moderator: Prof. Dr. Moritz Helmstaedter

## Day 2 – 14 May 2024

### 09:00 – 09:50 am

#### Neuroscience & (Generative) AI: The Long Road from Motivation to Maturation

Prof. Dr. Björn Ommer  
*Ludwig Maximilian University of Munich*

### 09:50 – 10:40 am

#### Transmission versus truth, imitation versus innovation: What children can do that large language and language-and-vision models cannot (yet)

Eunice Yiu  
*University of California, Berkeley*

10:40 – 11:00 am | Coffee break + Group photo

### 11:00 – 11:50 am

#### To be or not to be? On Emergent Abilities in Large Language Models

Prof. Dr. Iryna Gurevych ML  
*Technical University of Darmstadt*

11:50 am – end | Snacks & drinks

### 12:00 – 13:30 pm

#### Final panel discussion: implications and perspectives

Discussants:  
Prof. Dr. Iryna Gurevych ML  
*Technical University of Darmstadt*  
Prof. Dr. Kristian Kersting  
*Technical University of Darmstadt*  
Prof. Dr. Klaus-Robert Müller ML  
*Technical University Berlin*  
Prof. Dr. Björn Ommer  
*Ludwig Maximilian University of Munich*  
Prof. Dr. Viola Priesemann  
*Max Planck Institute for Dynamics and Self-Organization*  
Prof. Dr. Gemma Roig  
*Goethe University Frankfurt*  
Dr. Wanja Wiese  
*Ruhr University Bochum*  
Moderator: Prof. Dr. Thomas Lengauer ML