

## 1st HBP Curriculum workshop series - Cognitive systems for non-specialists

13-15 March 2018, Technical University Munich

<https://education.humanbrainproject.eu/web/cognitive-systems-workshop>

### Description

Cognitive systems are devices that are designed to mimic cognitive skills of higher developed biological organisms at varying levels of complexity and performance. Models of these skills can be either abstract functional descriptions from the vast field of cognitive science or detailed simulations of brain circuits from neuroscience.

Novel hardware designs and the steadily increasing availability of cheap computing resources have recently yielded remarkable results especially with the latter models.

The goal of this course is to provide a definitive introduction to the theory of cognitive systems. Drawing from advances in brain research, the topic is approached from a computational-neuroscientific perspective rather than an abstract-psychological one, bridging the gap between the physical structure of the brain and the logical organization of its cognitive capabilities. Special focus is put on the role of robotics as a means to ground cognitive function in bodies that physically interact within different types of environments.

### Workshop Structure

Lectures

Discussion sessions

German Museum visit

Lab visit

Social evening

Experiments

### Application

This workshop is open to the whole student community and early post-docs upon application.

Applications from young female investigators are highly encouraged.

Application is required as space may be limited.

Applicants selected for participation will be informed within two weeks after the application deadline.

Seven travel grants will be available upon request (European students only). Accommodation can be provided for 30 students (first come, first served).

### Scientific Director

Alois Knoll | TUM

Florian Walter | TUM

### Organised by

HBP Education Programme Office | MUI

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### Upcoming Deadlines

Application deadline: 17 January 2018

## Contact

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## Lectures

Alois Knoll, TUM

*Welcome and Introduction*

*Introduction to Neurorobotics*

Lars Muckli, UGLA

*Internal models and counterfactual cognition predicting our environment*

Cyriel Pennartz, UvA

*Structure and Function of the brain*

Hans-Ekkehard Plesser, NMBU

*Introduction to Spiking Neural Network Simulation*

*Spiking Neural Network Simulation: Case Studies*

Tony Prescott, USFD

*tbc*

Ron Sun, Rensselaer Polytechnic Institute

*Computational Cognitive Architectures and Human Creativity*

Florian Walter, TUM

*Learning and Development*

## The Venue

The university was founded in 1868 to provide the state of Bavaria with a center of learning dedicated to the natural sciences. The university played a vital role in Bavaria's transition from an agricultural to an industrial state – and accelerated the pace of technological advancement across Europe. Now the Technical University of Munich is one of Europe's top universities. It is committed to excellence in research and teaching, interdisciplinary education and the active promotion of promising young scientists. The university also forges strong links with companies and scientific institutions across the world. TUM was one of the first universities in Germany to be named a University of Excellence. Moreover, TUM regularly ranks among the best European universities in international rankings.

## Keywords

Cognitive systems, counterfactual cognition, spiking neural network simulation, biological organisms, brain circuits, neuroscience