



EBRAINS

EBRAINS WORKSHOP BRAIN ACTIVITY ACROSS SCALES AND SPECIES (BASSES)

13–15 JUNE 2022
ROME AND ONLINE

SCIENTIFIC PROGRAMME



Human Brain Project

Co-funded by
the European Union



ABOUT THE EVENT

The study of brain rhythms and of spatio-temporal patterns of brain activation is an important test-bench for understanding connectivity and the mechanisms that determine cognitive systems in mammals.

The large variety of available experimental protocols and measurement techniques enable researchers to investigate new scientific questions. In addition, the input from experimental observations is used to design theoretical models able to emulate brain dynamics and cognitive mechanisms in in-silico experiments.

The goal of the BASSES Workshop (Brain Activity across Scales and Species: Analysis of Experiments and Simulations) is to provide an overview of the scientific topic of brain states and complexity, state transitions, and their connection with cognitive functions, and to demonstrate the achievements in this field obtained within the Human Brain Project thanks to the functionalities provided by the EBRAINS research platforms.

Lectures will showcase the latest advancements in analysis strategies and whole-brain modelling tools. Hands-on Sessions will allow the participants to be actively engaged and test the EBRAINS functionalities for data storage, curation, analysis, and modelling.

BASSES will allow people with different expertises, from experimental and theoretical neuroscientists to computer scientists, to share results and ideas and connect into a wider community.

CALL FOR SUBMISSIONS

BASSES will have renowned scientists and early-career researchers side-by-side, thus enabling for the latter the opportunity to showcase their work and results.

We invite original, high-quality submissions describing innovative research addressing the topics of brain dynamics, brain states, state transitions, complexity, cognitive functions, software solutions and analysis tools. The contributions can emphasize theoretical or empirical aspects. We particularly encourage submissions that leverage the functionalities provided by the EBRAINS research platforms or with a potential towards the integration with [EBRAINS](#).

Poster sessions at the BASSES workshop will take place in a hybrid format and will be available for all event attendees to access digitally. More information will be sent to applicants upon acceptance of their poster abstract submission.

A few abstracts will be selected to be presented in the plenary sessions.

Travel grant options can be evaluated, please contact workshop.edu@humanbrainproject.eu for further details.

Extended abstract submission deadline: 16 May 2022

REGISTRATIONS

HBP and EBRAINS invite interested scientists to join the forthcoming EBRAINS Workshop on Brain Activities across Scales and Species (BASSES).

Registration deadline: 27 May 2022

Registration for this workshop is free of charge, but mandatory.

Further information & registration:

humanbrainproject.eu/en/education/ebrains-workshops/basses

Scientific Chairs & Local hosts:

Anna Letizia Allegra Mascaro | LENS
Giulia de Bonis | INFN

Organised by:



Human Brain Project
Education Programme

Contact:

workshop.edu@humanbrainproject.eu

In cooperation with:



MONDAY 13 JUNE 2022

Please note that all times are in CEST (=GMT/UTC+2)

This programme is subject to change.

13:00 – 14:00 **Registration**

14:00 – 16:30 **PLENARY SESSION I: BRAIN STATES AND COMPLEXITY**
(Chairs: **Anna Letizia Allegra Mascaro** | LENS & **Giulia de Bonis** | INFN)

When Casualty meets Inference: complexity in neuroscience

Viktor Jirsa | Aix Marseille Université

Models for bridging scales from neural circuits to the whole brain

Alain Destexhe | CNRS

Student flash talks

Cortical Slow Waves: mechanisms, dynamics and modulation

Mavi Sanchez-Vives | IDIBAPS

Title tbc

Marcello Massimini | University of Milan

16:30 – 17:00 **Coffee break**

17:00 – 18:50 **PLENARY SESSION II: STATE TRANSITIONS AND THEIR
COGNITIVE ROLE** (Chair: **Giulia De Bonis** | INFN)

**Cognitive and energetic benefits of awake/sleep cycles during
incremental learning in multi-areal spiking neural networks**

Pier Stanislao Paolucci | INFN

A simple account of the complexity of slow wave activity

Maurizio Mattia | ISS

Student flash talks

**A comprehensive neural simulation of slow-wave sleep and highly
responsive wakefulness dynamics**

Jennifer Goldman | CNRS

18:50 – 19:30 **Informal discussions**



TUESDAY 14 JUNE 2022

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09:00 – 10:45 **PLENARY SESSION III: MULTI-SCALE APPROACHES TO INVESTIGATE THE BRAIN COMPLEXITY (I) (DATA ANALYSIS METHODS AND RESULTS)** (Chair: Mavi Sanchez-Vives | IDIBAPS)

Title tbc

Johan Storm | University of Oslo

Title tbc

Francesco Pavone | LENS

Loss of differentiation and complexity in the sleeping human brain: a multi-scale analysis

Andrea Pigorini | University of Milan

Multiscale dynamical characterization of cortical brain states: integrating experimental and computational research in EBRAINS

Arnau Manasanch Berengué | IDIBAPS

10:45 - 11:15

Coffee break

11:15 – 12:40

**PLENARY SESSION IV:
INTRODUCTION TO EBRAINS RESOURCES** (Chair: Pier Stanislao Paolucci | INFN)

The transformative impact of the EBRAINS research infrastructure on research on brain structure, activity and cognitive function:

Why - What - How

Jan Bjaalie | University of Oslo

Title tbc

Michele Migliore | CNR

Student flash talks

12:40 – 13:40

Lunch



TUESDAY 14 JUNE 2022

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13:40 – 15:20 **PLENARY SESSION V: MULTI-SCALE APPROACHES TO INVESTIGATE THE BRAIN COMPLEXITY (II) (DATA ANALYSIS METHODS AND RESULTS)** (Chair: **Arnau Manasanch Berengué** | IDIBAPS)

State-dependent cortex-wide broadcasting of sensory information

Elena Montagni | LENS

Title tbc

Eric Landsness | Washington University

Blocks instead of puzzles pieces - analyzing cortical wave activity across scales in an adaptable framework

Robin Gutzen | Forschungszentrum Juelich

Student flash talks

15:20 – 15:50 **Coffee break**

15:50 – 17:20 **Hands-on Session 1: Handling EBRAINS Data**

Lyuba Zehl | Forschungszentrum Juelich

17:20 – 18:50 **Hands-on Session 2: Running analysis in EBRAINS**

Michael Denker, Robin Gutzen, Moritz Kern | Forschungszentrum Juelich



WEDNESDAY 15 JUNE 2022

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09:00 – 11:15

PLENARY SESSION VI: FROM DATA TO MODELS AND SIMULATION:

A. MEAN FIELD SIMULATION (Chair: **Jennifer Goldman** | CNRS)

Computational approaches to study cortical dynamics at multiple scales

Alessandra Camassa | IDIBAPS

A general theory of cortical columns from first principle: out-of-equilibrium dynamics

Gianni Valerio Vinci | ISS

Simulations Approaching Data: Cortical Slow Waves in Inferred Models of the Whole Hemisphere of Mouse

Chiara de Luca | INFN

Burst-dependent plasticity and dendritic amplification support target-based learning and hierarchical imitation learning

Cristiano Capone | INFN

Title tbc

Thierry Nieuw | University of Milan

11:15 – 11:45

Coffee break

11:45 – 13:30

PLENARY SESSION VII: MODELS AND SIMULATION: B. SPIKING SIMULATIONS (Chair: **Cristiano Capone** | INFN)

High resolution wide-field spiking simulations of mouse cortical hemisphere

Elena Pastorelli | INFN

Student Flash Talks

Multi-area full-density spiking network models of monkey and human cortices: from anatomy to resting-state dynamics

Sacha van Albada | Forschungszentrum Juelich

Simulation of large-scale spiking network models on GPU systems: recent advances

Bruno Golosio | University of Cagliari

Student Flash Talks



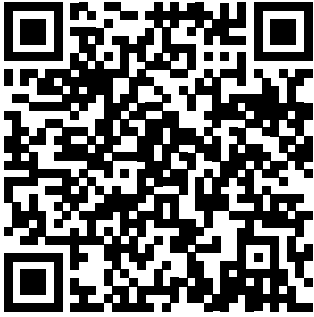
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- 13:30 – 14:30** **Lunch**
- 14:30 – 15:30** **Hands-on Session 3: Simulating spatially organised networks with NEST**
Johanna Senk & Jasper Albers | Forschungszentrum Juelich
- 15:30 – 16:30** **Hands-on Session 4: Validating models against data in EBRAINS**
Andrew Davison & Shailesh Appukuttan | CNRS
- 16:30 – 17:00** **Closing remarks**





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humanbrainproject.eu/education

