2nd SYMPOSIUM
ON THE CONNECTION BETWEEN PHYSICS AND METABOLISM IN BRAIN FUNCTIONS

Fanny Mochel,
Professor of Medical Genetics and Neurometabolism,
ICM & Sorbonne University, Paris

Angeles Garcìa-Cazorla,
Professor of Neuropediatrics and Neurometabolism,
SJD & University of Barcelona

NOVEMBER 7, 2025
PARIS BRAIN INSTITUTE

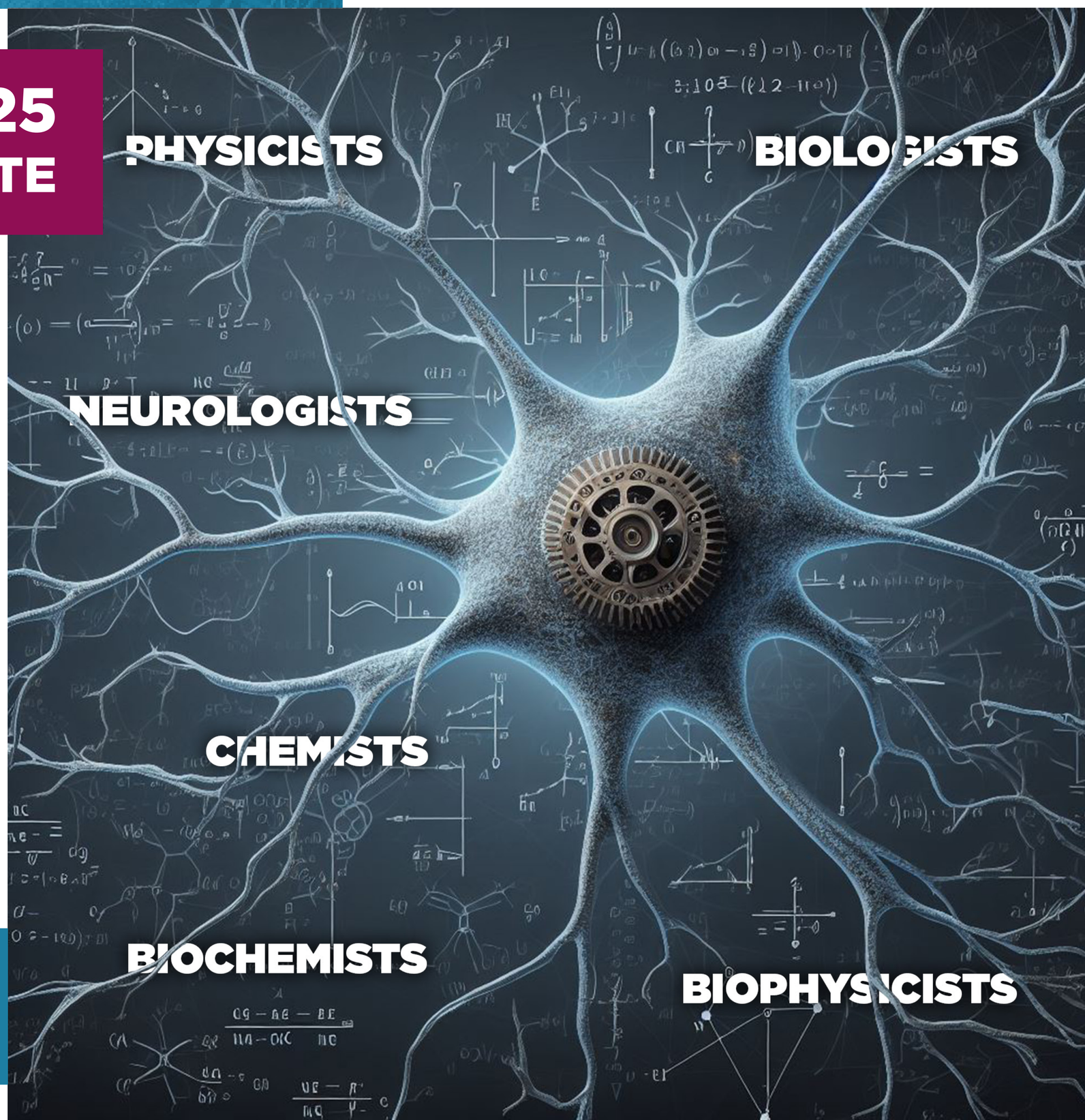
This conference will also be broadcast live to allow a large audience.

Metabolism and cellular mechanics are closely intertwined. Following the success of the 1st international symposium connecting physics and metabolism in brain functions (Barcelona, July 2024), we are pleased to welcome you in Paris for this 2nd edition. This event will bring together world experts in physics, chemistry, neurobiology, and philosophy with the aim of fostering new collaborations and promoting the so-called “night science”, an interdisciplinary approach by which new ideas arise and questions/ hypotheses are generated. Join us and interact with prestigious speakers who will discuss the physics of cellular trafficking, neurotransmission, sensory systems, and beyond. The symposium will also integrate musical pieces to deepen our quest for understanding the living.

REGISTRATION FEES

20€ (online) - **30€** (in-person)
for the one-day symposium

Link to the registration



PHYSICS AND METABOLISM IN BRAIN FUNCTIONS

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Moderators: Fanny Mochel, Angeles García-Cazorla, Adrien Hallou

Artist coordination: Maya Tchikviladze

Meeting facilitator: Juliana Ribeiro Constante

↘ Session 1 – Introductory talks

9:00-9:15 am.
Welcome and opening remarks

Stéphanie Debette (ICM executive director)

Anne-Geneviève Marcelin (Vice-dean of research, Sorbonne University)

9:15-9:45 am.
What did we learn from the 1st Symposium (July 5th, 2024 – Barcelona)?

Fanny Mochel (Sorbonne University and Paris Brain Institute, Paris, France)

Angeles Garcia-Cazorla (Universitat de Barcelona and Sant Joan de Déu Hospital, Barcelona, Spain)

9:45-10.30 am.
From the primordial universe to the human mind

Sylvie Vauclair (Astrophysicist at the Midi-Pyrénées observatory, Professor at the Paul-Sabatier University of Toulouse and member of the Institut universitaire de France)

COFFEE BREAK 10:30–11:00 AM

↘ Session 2 - Physics of cellular trafficking and membrane biology

11:00-11:30 am.
Progression of glioblastoma involves alterations of the mechanobiology of extracellular matrix fibers

Viola Vogel (Department of Health Sciences and Technology and Head of the Applied Mechanobiology Laboratory, Zürich, Switzerland)

11:30 am-12:00 pm.
Membrane chemical biology - Spotlight on lipids

Andre Nadler (Max Planck Institute of Molecular Cell Biology and Genetics, Dresden, Germany)

12:00-12:30 pm.
How mechanotransduction regulates mitochondrial functions?

Sirio Dupont (Department of Molecular Medicine, University of Padova, Padova, Italy)

12:30-12:45 pm.
Clinical flash – TANGO2 deficiency:

connection between energy metabolism, membrane dynamics and exocytosis

LUNCH 12.45– 2.00 PM

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↘ Session 3 - Physics of neurotransmission

2:00 -2.30 pm.
What do we know regarding biophysics of dopamine production?

Aurora Martinez (Department of Biomedicine, University of Bergen, Norway)

2.30-3:00 pm.
How can biophysics help us bridge neurotransmission systems?

Laurent Groc (Head of the Team Developmental Brain Physiology and Pathology, Director of the Interdisciplinary Institute for Neuroscience, Bordeaux, France)

3:00-3:15 pm.
Clinical flash – How clinical observations can help us bridge neurotransmission systems?

COFFEE BREAK 3:30–4:00 PM

↘ Session 4 - Physics of sensory systems

4:00-4:30 pm.
How mechanotransduction of somatosensory circuits drive brain development?

Guillermina Lopez-Bendito (Instituto de Neurociencias de Alicante, Universidad Miguel Hernández-Consejo Superior de Investigaciones Científicas (UMH-CSIC), Sant Joan d'Alacant, Spain)

4:30-5:00 pm.
How mechanotransduction of spinal sensory circuits drive locomotion?

Claire Wyart (Paris Brain Institute, Paris, France)

5:00-5.15 pm.
Clinical flash – Connection between sensory systems and autism

Closing lecture

5.15-5.45 pm.
Reduction, Emergence and the Physics of the Brain: A Philosophical Perspective

Stephan Hartmann (Munich Center for Mathematical Philosophy, Munich, Germany)

CHAMPAGNE COCKTAIL

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