



Encuentros Cajal Italy

Neuroscience-inspired Next Generation AI

Rome, 26 November 2024

To commemorate the 90th anniversary of the death of the Spanish neuroscientist Santiago Ramón y Cajal, the Embassy of Spain in Italy and the European Brain Research Institute 'Rita Levi-Montalcini' (EBRI) are co-organizing the 'Encuentros Cajal Italy'. The event is being held in the framework of the Spanish 2024 'Encuentros Cajal' initiative, which pays tribute to the Nobel Laureate and will continue in other countries until May 2025. The project has a dual purpose: on the one hand, it seeks to foster encounters and collaboration between scientists and researchers, so as to create synergies and build a knowledge sharing network; on the other hand, it aims to promote "open science", with outreach and dissemination activities available to the general public. The Roma event will explore the bidirectional interactions between the fields of Artificial Intelligence and Neurosciences. Neuroscience has been a critical driver of progress in AI, however the current pace of dramatic developments in the two fields makes communication and collaboration between the two fields more difficult but also more urgent. We shall discuss the role of brain understanding in accelerating AI research, and, reciprocally, the symmetric role of Neuroscience-inspired ideas that will lead to the next generation of AI technologies. What can Neuroscience teach AI? How can AI increase the basic principles of brain functions? The exchange of ideas between AI and Neuroscience will create a cross-talk "virtuous cycle" at the intersection of both fields, advancing the knowledge in unforeseen directions – but only if there is a large enough community of scholars and researchers fluent in both domains. We must train a new generation of AI researchers who are equally at home in engineering/computational science and Neuroscience. And vice versa.

PROGRAMME

10:00

WELCOME ADDRESSES

Maria Chiara Carrozza (President, Italian National Research Council)

Miguel Fernández-Palacios M. (Ambassador of Spain in Italy)

Antonino Cattaneo (President, European Brain Research Institute 'Rita Levi-Montalcini')

Roberta Angelilli (Vice President, Lazio Region)

10:20

KEYNOTE LECTURES

CHAIRS: IVAN ARISI AND MARA D'ONOFRIO

Mavi Sanchez-Vives (Institut d'Investigacions Biomèdiques August Pi i Sunyer, Barcelona)
From Cajal's cerebral cortex to current cortical dynamics: a living legacy

Hannah Monyer (European Brain Research Institute 'Rita Levi-Montalcini'; German Cancer Research Center, DKFZ) *Neuronal network modeling - essential tools and their limitations*

Alfonso Renart (Champalimaud Centre for the Unknown, Lisbon) *Multiplexed decision strategies in the brain can be inferred from mouse facial expressions*

Marcello Massimini (Università degli Studi di Milano) *A new perspective on the consequences of brain injury*

13:00 End of session

14:30 **ROUNDTABLE: CHALLENGES IN CONNECTING AI AND NEUROSCIENCE**

CHAIR: ANTONINO CATTANEO

Catalina Curceanu (Istituto Nazionale di Fisica Nucleare, Frascati)

Giovanni Felici (Istituto di Analisi dei Sistemi ed Informatica "A. Ruberti", CNR, Rome)

Stefano Ferraina (Sapienza Università di Roma)

Marcello Massimini (Università degli Studi di Milano)

Maurizio Mattia (Istituto Superiore di Sanità, Rome)

Hannah Monyer (European Brain Research Institute 'Rita Levi-Montalcini'; German Cancer Research Center, DKFZ)

Pier Stanislao Paolucci (Istituto Nazionale di Fisica Nucleare, Frascati)

Alfonso Renart (Champalimaud Centre for the Unknown, Lisbon)

Mavi Sanchez-Vives (Institut d'Investigacions Biomèdiques August Pi i Sunyer, Barcelona)

- 16:30 Presentation of the Italian translation of Ramón y Cajal's book "Reglas y consejos sobre investigación científica: los tónicos de la voluntad" ("Regole e consigli sulla ricerca scientifica: i tonici della volontà") by Angelo Sidoni and Marco Paone
- 16:45 **Conclusions: Pietro Calissano**, (Co-Founder of the European Brain Research Institute 'Rita Levi-Montalcini')

MEETING VENUE

Sala Convegni - Consiglio Nazionale delle Ricerche (CNR) - Via dei Marrucini, Rome

MEETING SECRETARIAT : scientific.assist@ebri.it

Even more appealing than virgin forest was the jungle lying before me at that moment: the nervous system, with its billions of cells gathered in populations each different from the other and all locked into the apparently inextricable nets of the nervous circuits which intersect in all directions along the cerebrospinal axis. The pleasure I was already savoring in anticipation was enhanced by the prospect of carrying out the project under the conditions contingent on the prohibitive racial laws. If Ramón y Cajal, with his giant's step and exceptional intuition, had dared foray into that jungle, why should I not venture along the path he had opened for me?"

Levi-Montalcini, R. 1988. In Praise of Imperfection. Basic Books, New York, p. 90