Project description

Magneto-ionic metaplastic synapses

Artificial neural networks are algorithms designed to mimic the human brain and recognise patterns. Despite their great potential, current artificial neural networks are suffering a massive shortcoming: unlike humans, they are unable to learn multiple tasks sequentially. Funded by the European Innovation Council, the METASPIN project aims to develop radically new low-power artificial synapse technology based on spintronics and ionics that will prevent catastrophic forgetting. The envisioned neuromorphic hardware will use voltage-controlled ionics to control magnetic properties in nanodevices, known as magneto-ionics, to support artificial synaptic metaplasticity. Inspired by the human brain, the proposed concept assigns a hidden value to artificial synapse states to encode their importance. This will render it easier or harder to reconfigure the synaptic state upon learning a new task, giving a
hierarchy to previously learned information, thereby preventing catastrophic forgetting.

Fields of science

natural sciences > computer and information sciences > artificial intelligence
natural sciences > physical sciences > electromagnetism and electronics > spintronics

Keywords

Artificial synapse  magneto-ionics  artificial neural network
binarised neural network  spintronics  metaplasticity

Programme(s)

HORIZON.3.1 - The European Innovation Council (EIC)  MAIN PROGRAMME

Topic(s)

HORIZON-EIC-2022-PATHFINDEROPEN-01-01 - EIC Pathfinder Open 2022

Call for proposal

HORIZON-EIC-2022-PATHFINDEROPEN-01

See other projects for this call

Funding Scheme

EIC - EIC

Coordinator

UNIVERSITE PARIS SACLAY
UNIVERSITE PARIS-SACLAY

Net EU contribution
€ 620 145,00

Address
Batiment breguet - 3 rue joliot curie
91190 Gif-sur-yvette
France

Region
Ile-de-France > Ile-de-France > Essonne

Links
Contact the organisation
Participation in EU R&I programmes
HORIZON collaboration network

Other funding
€ 0,00

Participants (7)

CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE CNRS

France

Net EU contribution
€ 169 605,00

Address
Rue michel ange 3
75794 Paris

Region
Ile-de-France > Ile-de-France > Paris

Links
Contact the organisation
Website
Participation in EU R&I programmes
HORIZON collaboration network

Other funding
€ 0,00
CONSIGLIO NAZIONALE DELLE RICERCHE

Italy
Net EU contribution
€ 425 000,00

Address
Piazzale aldo moro 7
00185 Roma

Region
Centro (IT) > Lazio > Roma

Links
Contact the organisation  Website  Participation in EU R&I programmes  HORIZON collaboration network

Other funding
€ 0,00

Singulus Technologies AG

Germany
Net EU contribution
€ 300 625,00

Address
Hanauer landstrasse 103
63796 Kahl am main

Region
Bayern > Unterfranken > Aschaffenburg, Landkreis

Activity type
Private for-profit entities (excluding Higher or Secondary Education Establishments)

Links
Contact the organisation  Website  Participation in EU R&I programmes  HORIZON collaboration network

Other funding
€ 0,00
**SPIN-ION TECHNOLOGIES**

France

Net EU contribution

€ 403 125,00

Address

10 boulevard thomas gobert
91120 Palaiseau

SME

Yes

Region

Ile-de-France > Ile-de-France > Essonne

Activity type

Private for-profit entities (excluding Higher or Secondary Education Establishments)

Links

Contact the organisation

Participation in EU R&I programmes

HORIZON collaboration network

Other funding

€ 0,00

---

**HAWAI.TECH**

France

Net EU contribution

€ 218 500,00

Address

3 parvis louis neel cime nanoteh
38016 Grenoble

SME

Yes

Region

Auvergne-Rhône-Alpes > Rhône-Alpes > Isère

Activity type

Private for-profit entities (excluding Higher or Secondary Education Establishments)

Links

Contact the organisation

Participation in EU R&I programmes
VYSOKE UCENI TECHNICKE V BRNE
Czechia
Net EU contribution
€ 462 125,00
Address
Antoninska 548/1
601 90 Brno stred
Region
Česko > Jihovýchod > Jihomoravský kraj
Activity type
Higher or Secondary Education Establishments
Links
Contact the organisation  
Website  
Participation in EU R&I programmes  
HORIZON collaboration network
Other funding
€ 0,00

FORSCHUNGSZENTRUM JULICH GMBH
Germany
Net EU contribution
€ 400 625,00
Address
Wilhelm johnen strasse
52428 Julich
Region
Nordrhein-Westfalen > Köln > Düren
Links
Contact the organisation  
Website  
Participation in EU R&I programmes
Partners (1)

UNIVERSITAT ZURICH

Net EU contribution
€ 0,00

Address
Ramistrasse 71
8006 Zurich

Region
Schweiz/Suisse/Svizzera > Zürich > Zürich

Activity type
Higher or Secondary Education Establishments

Links
Contact the organisation  
Website  
Participation in EU R&I programmes  
HORIZON collaboration network

Other funding
€ 0,00

EC signature date 9 December 2022
Last update: 24 May 2023

Permalink: https://cordis.europa.eu/project/id/101098651

European Union, 2023