

UK-Europe collaboration leads to AI and Quantum successes

'Virtual lab' technology enables a major breakthrough in Bionanoelectronics

We're one step closer to being able to replace dysfunctional parts of the brain with AI chips, thanks to collaboration between a UKRI-funded researcher in England and EU-funded researchers in Italy and Switzerland.

The work was led by Professor Themis Prodromakis at the University of Southampton, who was funded by the Engineering and Physical Sciences Research Council (EPSRC) which is part of UKRI. He worked with colleagues in Padova and Zürich.

They enabled brain neurons and artificial neurons to communicate with one another over the internet through a hub of artificial synapses made using cutting-edge nanotechnology.

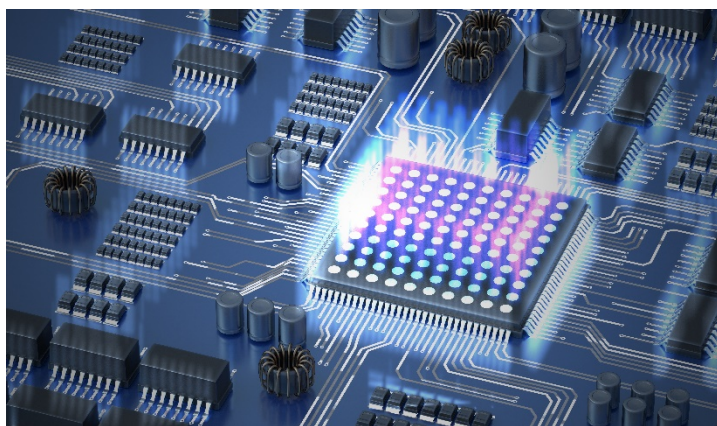
To do this, they integrated for the first time three key emerging technologies (brain-computer interfaces, artificial neural networks and advanced memory technologies) by creating a virtual lab and using an innovative electronic testing platform developed by Professor Prodromakis with earlier EPSRC funding and commercialised by ArC Instruments.

The breakthrough lays the foundations for the Internet of Neuro-electronics and neuroprosthetic technologies that could replace dysfunctional parts of the brain with AI chips.

Major step towards large-scale quantum technologies

Researchers at the University of Bristol in the UK have developed the first integrated photon source - a major step toward large-scale quantum technologies - working with colleagues at the University of Trento in Italy.

Professor Anthony Laing's group in Bristol were able to resolve challenges previously limiting the ability to scale-up integrated quantum photonics, including the lack of on-chip sources able to generate high-



enough quality single photons. The innovation was demonstrated recently in a Nature Communications article. The development of quantum technologies promises to have a profound impact across science, engineering and society. Quantum computers will be able to solve problems that current supercomputers are not able to, enabling revolutionary applications such as the creation of new drugs and materials. The research was funded by the Engineering and Physical

Sciences Research Council (EPSRC) which is part of UKRI, and the European Research Council.

