Brainstorming in Athens at the Human Brain Project

The 7th Human Brain Project Summit opened in Athens on 3 February 2020 for a week of mind-blowing information on research into the most complex organ in the body. CORDIS was in attendance.

Whether we are aware of it or not, consciously or subconsciously, the brain is working to fine-control every bodily function, from the basic like breathing to the most elaborate motor functions imaginable during athletic activities. Some 86 billion brain cells known as neurons, each with an average of 7 000 connections to other neurons, (synapses), maintain life and our existence as we know it.

Welcoming the delegates to the proceedings from ‘the cradle of democracy’ and promising bright blue sunny skies, Yannis Ioannidis, Professor of Informatics & Telecom, University of Athens, and General Director, Athena Research Center, set the stage for a venue packed with cutting-edge research on the brain. From an overview of the Human Brain Project (HBP) and EBRAINS to tackling neurodegenerative diseases and epilepsy, the first day covered worldwide brain initiatives, development of language, and the differences between musicians’ brains compared with mere mortals’ who just listen and enjoy.

The Human Brain Project

The HBP is one of the largest brain science projects worldwide and, as a Future & Emerging Technologies (FET) Flagship project, it is amongst the biggest projects ever funded by the EU. Katrin Amunts, Professor at the Cecile and Oscar Vogt Institute of Brain Research, Heinrich Heine University Düsseldorf, gave a rousing account of the achievements of the project, now nearly at the close of its second Specific Grant Agreement (SGA).

At its core, the HBP envelopes 131 institutions across 19 countries and has 40 partnering projects. It is developing EBRAINS, the world’s first integrated ICT infrastructure for brain research and development. For the third SGA, there will be a transformation from the subproject structure to that of work packages to enable tighter links between neuroscience and technology.

The HBP has also studied that elusive notion of consciousness in humans, animals, intelligent machines and organoids, miniature self-organised 3D tissue cultures derived from stem cells. A window into disease and brain development, brain organoids could revolutionise the study of parts of the organ or the structure as a whole. Along with the exploration of consciousness using organoids, however, also come ethical issues and questions on how consciousness is assessed.

Big Data, big responsibility, big rewards
Fuelling the HBP initiative is Big Data and open science. Big Data, because solving the enigma of consciousness, for example, requires literally a huge amount of information. Natalia Manola, OpenAIRE Managing Director at Athena Research and Innovation Center, University of Athens, explained the role of open science. Scientists with the open science school of thought, Manola outlined, are lashing back at the coronavirus and are unravelling the virus’s genetics in the face of a global public health emergency at an astonishing speed with openness.

The afternoon session finished with a focus on ‘Big Data & Computational Neuroscience’. Gobbling up huge amounts of data, computational modelling has, for example, explained the function of dendrites, the branches of a nerve cell that communicate with other neurons.

Ultimately, the use of Big Data can be used to identify how each and every one of us is individual. The HBP promises to shed light on exactly how the individual brain is a marriage of genes, non-genetic biological influences, individual experience and cultural influence. The outcome of the first research thrust is impressive to say the least. All neurobiology researchers are looking to the next phase with eager anticipation.