

Press release – 29 May 2016

The Brain Forum outperforms itself in 2016

After two days of in-depth presentations, lively panel discussions and groundbreaking exhibitions, The Brain Forum 2016 closed on Friday. With more than 1'400 visitors, this year's edition has increased its attendance by a whopping 40% compared to last year.

Dr. Jamil El-Imad, CEO of The Brain Forum, is pleased with the outcome: "It has been a really fantastic two days. The Brain Forum has once again succeeded in uniting diverse stakeholders against one the biggest challenges of this era. The whole programme, delivered by scientists, engineers, clinicians, regulators, service providers, bankers and even actors, was outstanding."

Greg Corrado : «This is as much art as it is science»

The Brain Forum was divided into two themed days with the first day dedicated to Entrepreneurship and Innovation, and the second day focused on Science. The Entrepreneurship and Innovation Day began with the Keynote lecture "Practical lessons in machine learning". During this session, Greg Corrado, a Senior Research Scientist at Google Research, gave an overview of Google's current research in machine intelligence that explores virtually all aspects of machine learning, including deep learning and more classical algorithms. In the brain, each neuron is only connected to a small subset of other neurons but they learn to cooperate in order to achieve complex tasks. While not a neural simulation project and only loosely connected to human neurological research, Dr. Greg Corrado's Google Brain Team is basing their research on the same principles to build and train large scale machine neural networks.

Named "Deep Learning", this model of artificial intelligence is a monumental step forward which has allowed Google software to accomplish unprecedented feats such as creating experimental art, providing automatic answers for e-mails or beating the Go's world champion, a game requiring advanced pattern recognition capabilities. «This is as much art as it is science», Dr. Corrado explained, convincing the audience that machine learning will be a major technological cornerstone which will not only serve business opportunities but also medical ones, improvements in diagnostics in particular. Deep Learning functions are available through TensorFlow, a popular open source platform.

The Brain Forum Innovation Award: three promising winners

Once again, The Brain Forum Innovation Award offered opportunities for early-stage startups to connect with leading experts in brain research, as well as with investors interested in the solutions of the future. The six start-ups, selected out of more than 120, making the final round each had five minutes to pitch their projects to the audience and a jury representing venture capital, science and entrepreneurship.

The Audience Award went to the French start-up Rhythm: Quentin Soulet de Brugière (Co-Founder & CSO at Rhythm) and his team developed their first product called Dreem, a wearable headband that monitors brain activity using EEG and actively stimulates it to enhance the quality of deep sleep.



Its mass market release is planned for 2017. PolyNeuron won the Jury Award: the jury was impressed by this new class of immunomodulatory drug by virtue of its proprietary Antibody-Catch® technology platform. Platform-derived compounds selectively eliminate disease-causing autoantibodies in autoimmune disorders. According to Ruben Herrendorff, Co-Founder of the Swiss startup, clinical trials will start in 2018. MassChallenge, the most startup-friendly accelerator on the planet, awarded Pragma Therapeutics, a France based company developing new drugs designed to fight post-traumatic stress disorder, hearing loss and tinnitus by treating their cause directly. The new concept presented by Sylvain Celanire (CEO of Pragma Therapeutics) is linked to mGlu7 receptor allosteric inhibition that is capable of preventing or treating glutamate-induced brain and ear dysfunctions.

The world's major brain initiatives reunited again in 2016

During the Science Day, The Brain Forum welcomed back the most important global brain initiatives. The session “International Brain Initiatives: Progress, challenges and opportunities” gave an overview of the world's major brain projects, providing updates about their scope, aims and progress. Prof. Mu-ming Poo from the China Brain Science Project reminded the audience of the situation in his country. With millions suffering from neurological diseases, China is increasing its neuroscience capacity significantly in order to tackle the challenge. The “one body two wings” research policy aims to build core technologies and develop those into preventive and curative applications. While China can count on its large macaque populations and numerous breeding centres for non-human primate experimentation, Japan's Brain / MINDS initiative is using its advanced marmoset programme to support brain mapping research. As Prof. Hideyuki Okano explained, marmosets have many advantages for experimentation and have allowed his initiative to understand cerebral anatomy and function using powerful neuroinformatic tools.

The Swiss-funded Blue Brain project works on digital reconstruction and simulation of the brain. Prof. Henry Markram stated that such a feat is possible because the brain is “exquisitely organised” and via the interdependencies of its various parts, the entire system can be rebuilt. The Blue Brain project has developed virtual brain matter in which sleep, activity, asynchronous and spontaneous behaviours can be observed without altering the model. Simulations of a complete mouse brain have been created along with a corresponding digital robotics platform for experiments. It is important for the Blue Brain project to provide both research and tools to the community to help international collaboration. Dr. Christof Koch represented the Allen Institute for Brain Science and championed their philosophy of “Big, team and open science” that promotes making the results of large, multi-disciplinary projects available to the public. The Allen Institute's research has yielded reliable research platforms and an impressive amount of data used by other initiatives and is available at brain-map.org.

Dr. Catherine Berens from DG Research and Innovation at the European Commission gave an account on how funding and collaborative research is handled on a continental scale. International cooperation is paramount to developing and delivering new generations of treatments to patients faster and more reliably. The CENTER-TBI Project was represented by Prof. David Menon who detailed the global and enduring impact of traumatic brain injuries (TBI). Neurotrauma is and will remain the most important cause of neurodisability and even mild TBI can have prolonged symptoms. CENTER-TBI strives for better characterisation of initial disease severity and



effectiveness of care. It will recruit data on 25'000 TBI patients to further its research. Rounding up the session, Prof. Terry Sejnowski spoke of the BRAIN 2025 Project, part of the United States BRAIN Initiative. BRAIN 2025 has a particular focus on studying genetics, physiology, anatomy, behaviour, theoretical modeling, computational statistics and data sharing. Prof. Sejnowski has great hopes for machine learning to further rapid progress in neurosciences.

The intricate relation between sex and violence

During the session “The Neural Circuitry of Sex and Violence”, Prof. David Anderson (California Institute of Technology) showed how he has isolated mating and aggression mechanisms in the brain of mice and fruit flies. Oestrogen-neuron receptors are active during these specific periods and molecular genetic technology allowed him to manipulate these hypothalamic attack (Esr I+) neurons. In subjects in which these neurons were made light sensitive, the result were clear: optically activating these cells triggers immediate and relentless attacks. Intensity of the stimulation was also a key factor, leading Prof. Anderson to identify several subsets of oestrogen-activated neurons with various thresholds for activation. From initiating sex to attack, multiple behavioural changes were possible with this technology, including inhibition of aggressive behavior.

The genetic identification of hypothalamic attack neurons and their manipulations open new translational approaches to treat aggressiveness. Prof. Anderson reminded the audience that in the United States alone, six billion dollars are spent each year to maintain thousands of violent prisoners in solitary confinement.

Dr. El-Imad concludes “The future of brain science lies in collaborative research. During the two days of The Brain Forum 2016 I have had and overheard some very intriguing conversations. I'm looking forward to seeing how they transpire and what they will bring to The Brain Forum 2017.”

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About The Brain Forum – brainforum.org

The Brain Forum, first launched in 2013, brings together novel thinkers and pioneers in brain research, technology, healthcare and the economy. Researchers, engineers, healthcare professionals, entrepreneurs, industrialists, investors, funding agencies and policy makers will meet at The Brain Forum 2016, to advance our understanding of how the brain works and to accelerate the application and value of this knowledge in society and the economy.

About EPFL – epfl.ch

Ecole polytechnique fédérale de Lausanne, in Switzerland, is one of the most international higher education institutions in Europe. It counts among its ranks roughly 10,000 students and 5,000 employees representing more than 120 nationalities. Education and research are organized into five schools and two colleges, with a strong emphasis on interdisciplinary work. In 2013, the European



Commission selected the Human Brain Project, an international effort at understanding the human brain, led by EPFL, as a “FET Flagship initiative”. The EPFL is also home to the Brain Mind Institute, which aims to understand the fundamental principles of brain function in health and disease, by using and developing unique experimental, theoretical, technological and computational approaches.

