

# INNOVATION HUMAN BRAIN PROJECT

Newsletter

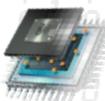
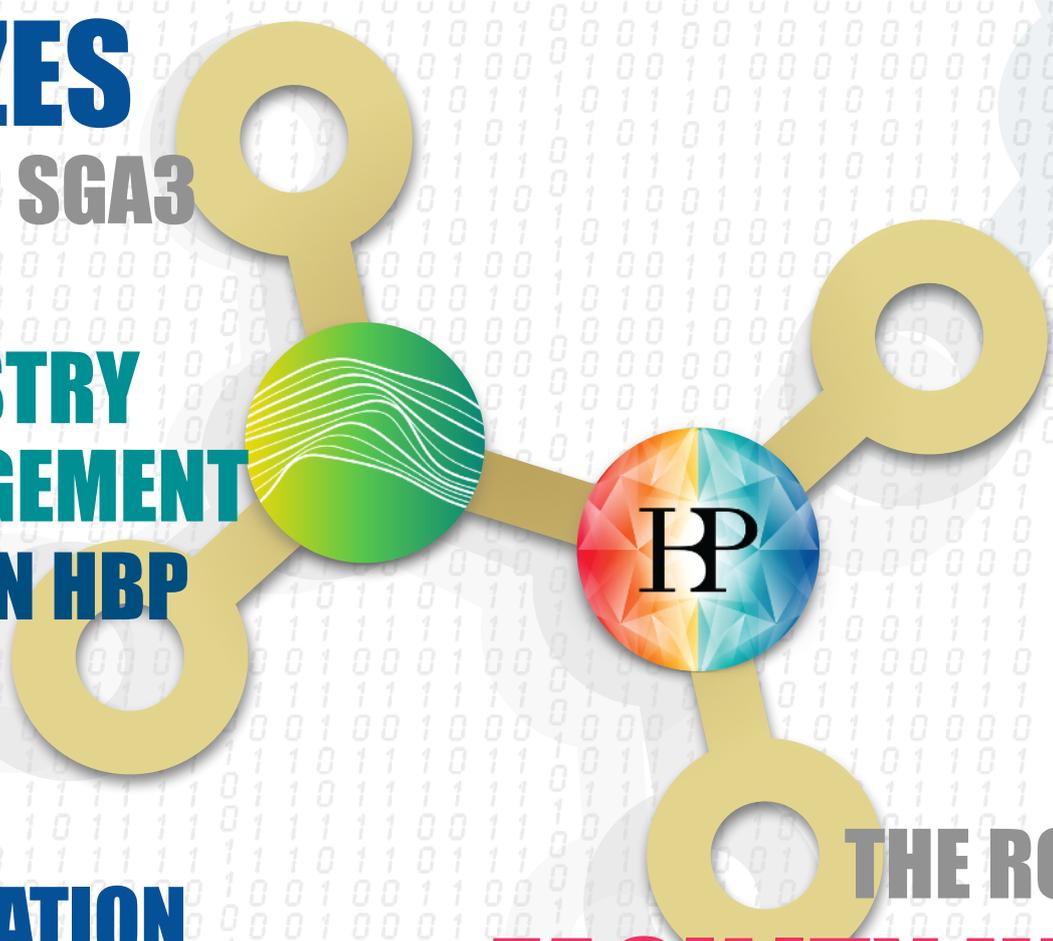
N#1 · October · 2020

**INNOVATION  
PRIZES  
IN HBP SGA3**

**INDUSTRY  
ENGAGEMENT  
CALL IN HBP**

**BRAIN  
INNOVATION  
DAYS**

**THE ROLE OF  
FACILITY HUBS  
IN EBRAINS**



Visit our  
[Innovation  
web](#)

**JOIN OUR NEXT COURSE:**  
TRL ASSESSMENT  
NOV 4-5 (ONLINE)

**READY FOR ACTION!**  
EXPLORE THE HBP  
[TECHNOLOGY CATALOGUE](#)

**FIND OUR MARKET &  
EXPLOITATION  
BREAKTHROUGHS**



Image: Human Brain Project

# CONTENTS

## HBP INNOVATION

- 2 Letter from the DG
- 3 Innovation Prizes in HBP SGA3
- 4 The role of facility hubs in EBRAINS
- 6 Industry engagement call in HBP SGA3
- 7 Announcement of the training course: TRL Assessment
- 9 Presentation of the UPM Innovation Team and T8.5/T8.6

## BRAIN INNOVATION NEWS AND HIGHLIGHTS

- 10 Brain Innovation Days
- 11 Nvidia, ARM acquisition
- 12 Intel, robotic arm



# LETTER FROM THE DG

---

Dear HBP Colleagues, HBP Newsletter Subscribers and Industry Representatives,



This first edition of the HBP innovation Newsletter comes to you as we are stepping up activity to bring the Human Brain Project's scientific discoveries and research to the market.

This is a natural development after several years of intensive work in the labs. As projects mature, we need to help them to have an impact in society and in industry.

When you look at the [HBP Technology Catalogue](#), it is clear there is a wealth of innovation potential within the HBP. Whether it is in medical applications, AI or neurorobotics, we have many breakthrough ideas which we are keen to engage with industry on and attract corporate interest and investment.

I am delighted to let you know that the Stakeholder Board has just appointed Steven Vermeulen as the Innovation Director of the HBP. Steven will work closely with our great [Innovation Team at Universidad Politécnica de Madrid](#), coordinated by Professor Gonzalo León, which is at your disposal to provide advice and tailor-made support.

In addition, the [EBRAINS Research Infrastructure](#) is increasingly advanced and ready to engage with innovative applications. In the months ahead, we will be focusing our attention on both bringing the HBP projects to fruition and opening up EBRAINS to different research needs and joint projects with commercial partners.

There is a fascinating period ahead of us!

*Pawel Świeboda*  
HBP Director General  
CEO of EBRAINS AISBL

# INNOVATION PRIZES

## IN HBP SGA3

Image: EBRAINS

Increasing the visibility of the efforts made in innovation by HBP research groups is a key objective in the SGA3 phase. There are many types of activities that can contribute towards this goal which were included in the work programme of HBP until 2023.

The most relevant SGA3 planned activities in close contact between the innovation team and researchers are as follows:

- To identify and assess the maturity of selected technologies developed in HBP. The most promising tools to hit the market will be presented to the European Commission Innovation Radar and, hopefully, they will obtain the maximum visibility in the context of European framework programs.
- To provide focused market analysis to understand what the context is to enter in the market and to define technology-specific roadmaps to help researchers and their institutions to make the right decisions.
- To identify and enter in contact with potential interested stakeholders, mainly industries, to present them with the features of HBP technologies by using both on-line and face-to-face events, brochures, and any type of dissemination material.

All these activities have value and they will be implemented during these three years; however, our feeling is that researchers in their role as “innovator” should have more visibility and recognition of their efforts in innovation in the context of HBP and beyond.

To reinforce this view, we have decided to implement, in close collaboration with our CEO, Pawel Świeboda, the so called “HBP innovator prizes”.

The intention is to identify every two months one researcher (or a research group) who has fulfilled some milestones in innovating his/her technology.

The selection will be proposed by the innovation team to the SIB to receive its approval and the associated recognition. We cannot, unfortunately, offer innovation winners a cash reward, but the bi-monthly HBP innovation prize does provide the winner with the opportunity to:

- Print a diploma and 3D object with the title of the innovation and name and affiliation of the winner.
- Include a description of the technology in the Innovation Newsletter, both in printed form and in the HBP web site.
- Record an interview with the main researcher where he/she can explain the motivation and interest in pursuing the innovation activities.
- Inform the European Commission, via the project officer, about the prize and to include it as relevant in the reporting procedures of innovation in HBP.
- Participate in one special session of the HBP Summit where all prized innovators will receive public recognition with the participation of the CEO, SIB Chair and EC.

We strongly believe that this “HBP Innovator Prize” initiative will help HBP to increase its relevance and visibility in society.

### Researchers in their role of “innovator” should have more visibility and recognition of their effort in the context of HBP and beyond



Image:  
Center for Biomedical Technology- CTB

# THE ROLE OF FACILITY HUBS IN EBRAINS

The EBRAINS proposal, supported by ten countries with 90 letters of support from European scientific institutions, medical associations and industry was submitted last September 9<sup>th</sup> to be evaluated in the call issued by the European Strategy Forum on Research Infrastructures (ESFRI). The goal is to get EBRAINS included in the ESFRI roadmap in 2021 as a European research infrastructure focused on brain research.

This is a long process where the evaluation procedure implies to complete information and to answer questions in the hearing in front of ESFRI delegates planned next December. This note does is not intended to be a presentation of EBRAINS or a description of the proposal but to address a specific issue: how innovation support will be addressed in EBRAINS to increase its usefulness and success in the world of industry. The EBRAINS Memorandum is also widely available to provide the EBRAINS rationale to interested readers.

The development of “EBRAINS service categories” became a substantial part of the HBP tasks in its SGA3 phase started last April 2020 for three years. Tools, databases and services will mature during these years and they will pave the way for EBRAINS operations in the future after finishing HBP in 2023.

EBRAINS’ success will depend on the quality of services offered by the infrastructure, but also on its capability to attract the interest of many users from all types of entities to perform better, faster and more productive research activities; in other words, EBRAINS should serve as the basis for advancing the knowledge of the human brain. The dissemination of knowledge regarding the usefulness of EBRAINS tools and services for a substantial number of brain researchers working in universities, research centres, hospitals, and companies throughout the world, will constitute a key factor for EBRAINS success.

---

**EBRAINS’ success will depend on the quality of services offered by the infrastructure, but also on its capability to attract the interest of many users from all types of entities**

---

This note will refer to the way that industrial users can be attracted to EBRAINS to help them in performing innovation activities and present the mechanisms envisaged to support these activities in relation to the national innovation communities to be created in six European countries.

EBRAINS is organized as a distributed European research infrastructure with nodes located in several European countries. In some nodes, EBRAINS *facility hubs*, there will be highly specialized equipment (e.g. specialist microscopy) necessary to perform research activities where users should be physically at the hub to use equipment; in other cases, users could remotely access to facilities (e.g. access to Brain Atlases) and work from anywhere.

Despite the existence of virtual or physical nodes, they should serve as key elements to attract new EBRAINS users in the national/regional context. They could appear as single portals to interact with different types of entities located in the same city or region.

The following figure schematically depicts the proposed structure for a facility hub. Each hub will focus on some core services (with or without associated equipment); other complementary services could offer an added value for users and a valid interface for getting the support of local stakeholders.

This structure should also provide the basis for interacting with the **national innovation community (NIC)** (set of companies, industry associations and hospitals) of the country where the facility hub is located. The intention is threefold:

- To support members of the NIC in the use of EBRAINS services (including training in tools and methods, if needed).
- To cooperate in specific research activities with HBP partners and to facilitate the exploitation of HBP results toward industrial users.
- To increase the number of industrial users by organising a set of events in the site of facility hubs where potential users can find a better understanding of EBRAINS possibilities.

The implementation of these activities will require forging a close relationship between the innovation team and the person responsible for each EBRAINS facility hub. This approach could provide “**HBP innovation**” with higher visibility in SGA3 activities and a way to increase the added value to the neuroscience community.

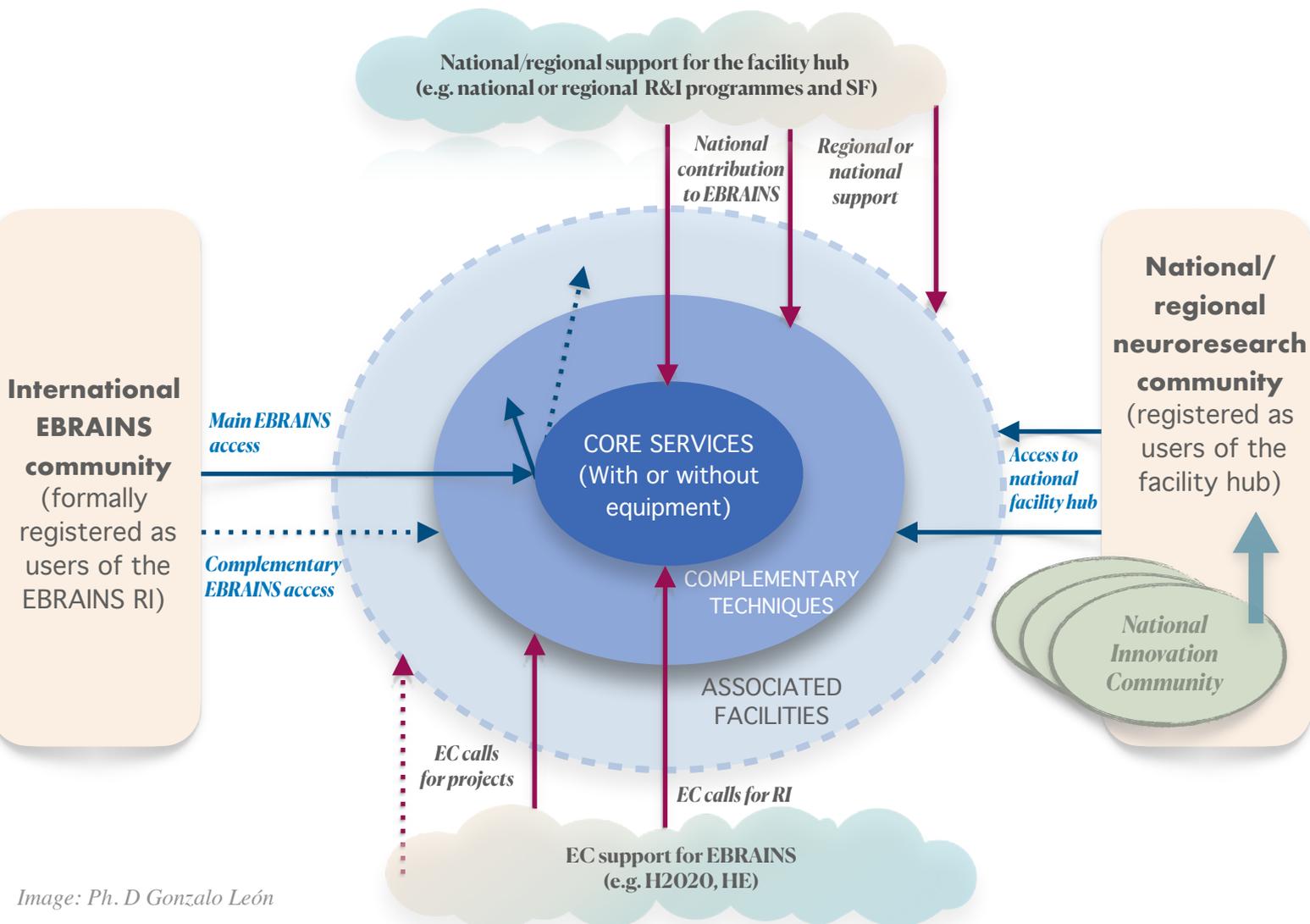


Image: Ph. D Gonzalo León

# Industry engagement call in HBP SGA3

Image: Unsplash - Umby

One of the most relevant objectives in SGA3 phase is to increase the engagement of industries in the project, today composed of academic partners. One of the new type of activities included in this phase of HBP will complement the existing “*vouchers programme*” with a specific call focused on industries. This action also complements the launching of national innovation communities in several European countries.

Then, HBP has therefore launched an **open call for industry engagement** with a total funding of 1 MEUR that has been designed to involve companies in the development of EBRAINS tools and services. Winners will become full members of the HBP consortium.

This Call for Expression of Interest on Industry Engagement has been designed by the Human Brain Project to involve companies in the development of tools and services for the shared EBRAINS digital brain Research Infrastructure (RI). This Call targets companies, most notably SMEs and technology-based start-ups, operating in the field of digital neurosciences.

We offer participation in the following aspects of EBRAINS RI tools and services, in cooperation with Partners of the HBP Consortium:

- Development and exploitation.
- Integration of new tools and services of interest to the HBP communities.
- Scaling-up maturity processes.
- Acceleration of commercial and non-commercial utilisation by scientific and industrial communities.

The results of the *Call for Expression of Interest on Industry Engagement* were very encouraging with 24 pre-proposals received from 13 countries:

**Spain (7), UK (3), Germany (2), Italy (2), Switzerland (2), Sweden (1), Slovenia (1), The Netherlands (1), Austria (1), Ukraine (1), Israel (1), Belgium (1) and Romania (1).**

The next step is to provide a complete proposal by October 23, 2020 to start the selection process with an external panel. We expect to select up to four proposals. The results will be communicated before the end of the year to start the negotiation process to include these new entities in the HBP consortium.

For further information:

<https://www.humanbrainproject.eu/en/collaborate/innovation/open-call-for-industry-engagement/>



## EBRAINS Research Infrastructure Voucher Programme Call 2020

The HBP is providing its expertise and skills to non-HBP researchers from academic and non-academic research (including hospitals), industry and pharma (SMEs and companies). In addition, the Innovation Team is responsible for evaluating potential innovation proposals.

Submission deadline: November 2020

JOIN THE PROGRAMME

# TRL ASSESSMENT 2020



## OBJECTIVES

Training to support the exploitation of HBP results was included in the SGA3 T8.5. Then, a training programme has been designed to support researchers in the exploitation of results. This course on Technology Readiness Level (TRL) assessment is the first one scheduled in SGA3.

This training course has been designed to offer participants a hands-on experience in the Technology Readiness Level (TRL) assessment of technologies, products, data bases, models and software packages developed in the context of HBP.

## PROGRAMME

The programme of the TRL assessment course has been prepared for **2.5 hours during two consecutive days** by using a digital platform (Zoom). After finishing the course, the innovation team could solve specific questions related to TRL assessment of the results of participants.



### CONTACT POINT:

Barbara Gasset  
barbara.gasset@upm.es

## REQUIREMENTS FOR PARTICIPANTS

Up to 30 participants could be accepted. They need to fulfil the following requirements:

- ✓ Belong to one of the HBP partners in SGA3.
- ✓ Participation in the development or marketing of a HBP technology.
- ✓ Commitment to apply TRL assessment for their own technologies.

FREE  
TRL GUIDE



## REGISTRATION

Per-email to:  
barbara.gasset@upm.es

Deadline for registration:  
**30th October 17:00 CET**

Participants will be accepted based in their registration date until reaching the maximum of 30.

# PROGRAMME

## DAY 1: 4<sup>TH</sup> NOVEMBER

DURATION	CONTENTS	GOAL AND COMPETENCES
45 min	<p>Introduction: What is TRL.</p> <p>Origin, different approaches.</p> <p>Relevance and implications of TRL assessment.</p> <p>Relation to Exploitation.</p>	The participant will obtain a sound knowledge about the rationale and relevance of TRL assessment.
15 min	Questions.	
60 min	<p>TRL in H2020</p> <p>TRL assessment in the HBP context.</p> <p>The HBP TRL assessment guide.</p> <p>Relevance for the Innovation Radar (IR) website of the European Commission.</p>	<p>TRL is being requested by the European Commission as a tool to understand the maturity of project results. It is also used as a basis for selecting technologies into the innovation radar. HBP must use it</p> <p>Participants will know how to apply a checklist to know the maturity of the result depending on each type (HW, SW, data sets, models, etc.)</p>
30 min	Questions.	

## DAY 2: 5<sup>TH</sup> NOVEMBER

60 min	<p>TRL application in the HBP context for different types of results:</p> <ul style="list-style-type: none"> <li>- Hardware</li> <li>- Software</li> <li>- Services</li> <li>- Database</li> <li>- Models</li> </ul>	<p>This is a practical session where participants should apply the TRL assessment tool and to solve doubts in the assessment process.</p> <p>Participants will focus on the type of result they were interested.</p>
15 min	Questions.	
45 min	<p>Practical examples of TRL assessment of several HBP results available in the IR:</p> <ul style="list-style-type: none"> <li>- Virtual Epileptic Patient (VEP).</li> <li>- Neuromorphic chip.</li> <li>- Brain Atlas.</li> </ul>	The last part of the course will describe the maturity level of some significant results fo HBP with the participation of some researchers involved in their development.
30 min	Questions.	

# UPM Innovation Team: Your team!

We are at your service to help HBP researchers to facilitate the commercial and non-commercial exploitation of the HBP research results

The activities in SGA3 are included in two tasks of WP8:

T8.5 Exploitation of EBRAINS (UPM (72), TAU (12), M01 - M36):

- Monitor and update the Exploitation Plan
- Develop market analysis and roadmaps of SCs results and other HBP exploitable technologies
- Training courses for HBP researchers and managers
- Match HBP results with market needs

T8.6 Industrial Engagement (UPM (36), M01 - M36):

- Consolidate six HBP National Innovation Communities in Europe
- Coordination of the Call for Industry engagement

These tasks are only possible with close relationship with many other HBP teams. Our main goal is to increase the interaction with other members of the consortium and to join forces to get better and more mature results for a large community of users worldwide.

The Innovation team is also managing the “innovation page” in the HBP web site.

Visit it to get additional information:  
<https://www.humanbrainproject.eu/en/collaborate/innovation/>

The UPM innovation team is multidisciplinary and in SGA3 is composed of the following persons:



*Prof. Gonzalo León*  
Innovation Team  
Coordinator



*Prof. Bryan Strange*



*Dr. Guillermo Velasco*



*Dr. Roman Kyreev*  
(to start 1<sup>st</sup> November)



*MSc. Barbara Gasset*



*MSc. Bulut Durmaz*



*MSc. Teris Duran*

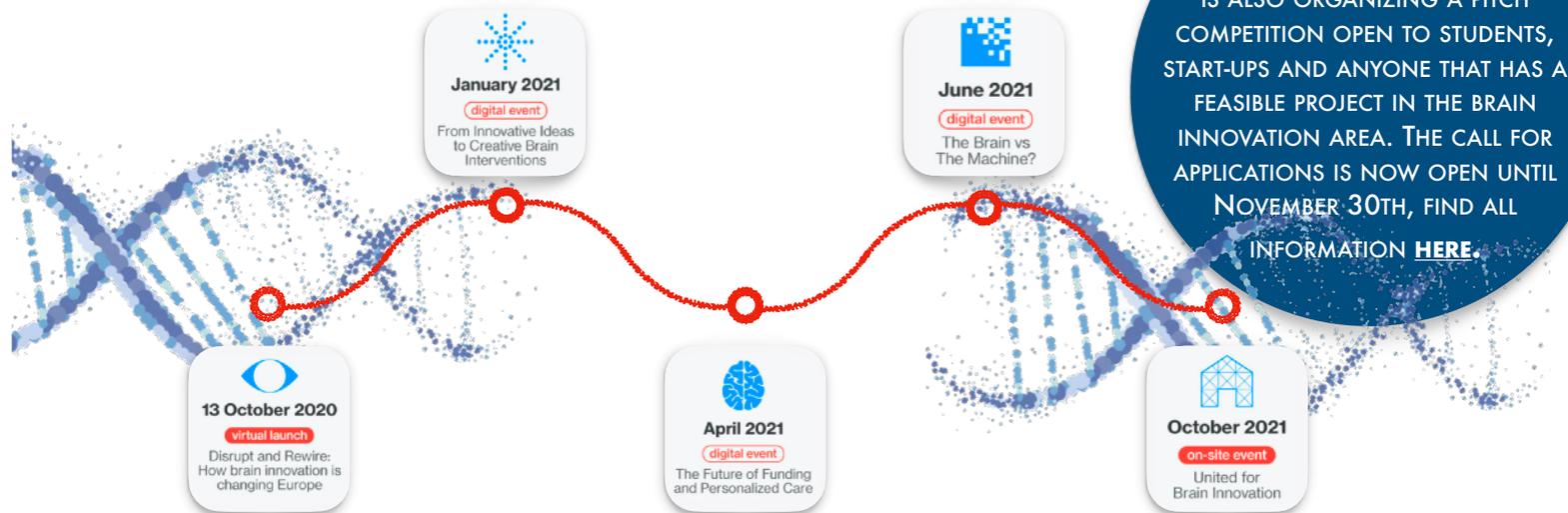
# BRAIN INNOVATION DAYS

Background: Pexels - Lucky Cingwa

The Brain Innovation Days is an initiative of the European Brain Council and beLean.net that aims to bring together key opinion leaders and stakeholders from the brain innovation ecosystem to foster dialogue, exchange knowledge, accelerate investment in research and innovation, facilitate business development and showcase on-going work.

The initiative was launched on October 13th with a digital session opened by the Director General of Research and Innovation of the European Commission, including video messages from the community, talks from renowned researchers and a panel discussion. From HBP, Petra Ritter presented 'The Virtual Brain Cloud' and showed how mapping large patterns of brain has already yielded extraordinary results on making personal health data actionable.

The Innovation team has prepared and submitted a proposal - recently accepted - to participate in the session "The Brain vs the machine?". This participation will enable HBP research groups - *Graz University of Technology, the University of Manchester, and Heidelberg University* - to provide novel insights on Neuromorphic Computing, a challenging and complex field that is gradually shortening the distance between brain-inspired machines and human thinking. The session will introduce the HBP Research infrastructure and offer brief but exciting descriptions of the most recent advances in the area, with varied references, links to the methodologies, and results of the evidence.



More at:  
[www.braininnovationdays.eu](http://www.braininnovationdays.eu)

During 2021 four events will follow, three digital and one on-site. The topics that will be addressed are:

- The Brain vs The Machine?
- United for Brain Innovation
- The Future of Funding and Personalised Care
- From Innovation Ideas to Creative Brain Interventions
- Societal and (Neuro) Ethical responsibilities

Some of the most promising and innovative areas of work within HBP are actually related to the needs of our emerging AI-based society, whose machines and applications demand research and developments focused on the utilization of deep neural networks and AI accelerators. The exponential increase of data-size and processing requires innovative and powerful solutions that overcome the limits of the architectures of traditional systems. In this sense, Spiking Neural Networks and Neuromorphic Computing are being part of a trend of cutting-edge technologies that will contribute to overcome these limitations and enable the exploration of the learning structures of the human brain.



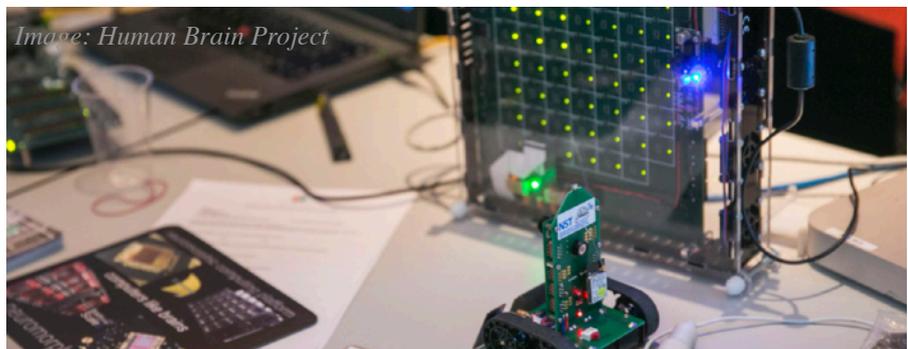
# NVIDIA

# ARM ACQUISITION

Nvidia has taken a big leap forward recently, acquiring well-known chip designer ARM Limited from SoftBank Group for \$ 40 billion. While Nvidia is currently the dominant hardware company in artificial intelligence, it has also closed its weak part with this acquisition. Originally designed by Steve Furber, ARM architecture, has a big market share from cloud to smartphones, PC or any IoT devices. The realization of this acquisition in the age of artificial intelligence will enable Nvidia to continue to be dominant in the IoT market by developing its own system-on-chips without the need for third-party involvement. Besides, Apple's abandonment of Intel chips, and shifting to fully arm-based processors as of the past year is also an extra market for Nvidia.

Intel and Nvidia are competing in the sector of AI with the initiatives from Intel with investing in various energy-efficient and effective designs. This new environment will lead eventually to another level competition between Intel and the Nvidia. They must now compete on an all-in-one system on chip designs too. However, in the aspect of next-generation, in-memory non-Von Neumann designs, Nvidia still does not have any visible steps. Intel has designed the brain-inspired neuromorphic chip Loihi and tries to enlarge the community. Maybe, after this acquisition, Nvidia starts a new collaboration by using the relation of Steve Furber and ARM Limited (completely unknown).

The combination of Nvidia and ARM will not leave on the hardware level, another important aspect is that Nvidia will benefit from the experienced Arm talents. Moreover, at Cambridge University, a new AI Research center will be created to attract the most talented people around the world.



### FENS 2020 Virtual Forums

If there is one thing we love at HBP, it is about collaborating and sharing new knowledge, so we leave you a list of the best presentations from scientists around the world and their activities. Look at them [here](#).



Background: Pexels- Visit Greenland

## Intel ROBOTIC ARM

One of the promising features of neuromorphic computing is its energy efficiency with AI application since the circuits of the chip are inspired by the brain which can handle 10<sup>15</sup> operations/10 watts. However, the current market is dominated by GPUs and the industry needs a “killer app” that can demonstrate the competitive advantage of the neuromorphic chips over GPUs to switch and increase the fund on future research.

For this object, the Intel Neuromorphic Research Community (INRC), led by Intel and hosting 75 research groups, including some universities from HBP collaborators (Intel Labs, 2020), continues to accelerate research and puts effort to enable commercial applications of neuromorphic chips.

Mike Davies -the head of Intel Neuromorphic Research-, believes that robotics can be a potential candidate for the “killer app”, with its essential requirement of autonomous decision and eagerness for energy consumption. Therefore, the National University of Singapore (NUS) developed a robot that can feel visually with touch sensing capabilities using Intel’s Loihi chip.

Two researchers from the INRC members of the NUS combined their event-based tactile sensor NeuTouch -which can detect touches 1000 faster than the human nervous system and can identify the shape, texture, and hardness of objects ten times faster than the blinking of an eye- (NusNews, 2019). with the event-based camera from Prophesee to give a robot the sense of the feeling (Taunyazov et al., 2020).

The Visio-Tactile perception for robots gives the capability to handle more complex tasks such as object exploration, recognition, and classification. Since the nature of these sensors and the neuromorphic chips are both based on spiking, they have processed these asynchronous data from these two event-based sensors with the Loihi chip to have energy-efficient, accurate decisions. The new system increased the performing capabilities of their previous tactile-only system with 10 percent better accuracy in object classification.

To draft a meaningful conclusion, they have also implemented the system on a GPU to compare the energy consumption and processing capabilities with the Loihi. The results are exciting and Loihi managed to perform 21 percent faster and consumed 45 times less energy than GPU.

With the success of this project, Intel recently announced another robotic arm project with the collaboration of the University of Israel - with the funding support of Accenture and the experience support from Applied Brain Research-. The robotic arm will assist the patients with neuromuscular or spinal cord injuries on their basic tasks. Real-time learning capabilities combined with accurate object reaching, grasping and manipulating capabilities will be expected to improve the quality of life of patients (Intel Newsroom, 2020).

#### References

- Intel Labs. (2020). Intel Neuromorphic Research Community. Retrieved September 28, 2020, from <https://www.intel.com/content/www/us/en/research/neuromorphic-community.html>
- Intel Newsroom. (2020). Intel and Accenture Support Neuromorphic Research Project to Assist Wheelchair-Bound Pediatric Patients. Retrieved September 28, 2020, from <https://newsroom.intel.com/news/intel-accenture-neuromorphic-research-wheelchair-bound-pediatric-patients/>
- NusNews. (2019). Exceptional sense of touch for robots and prosthetics. Retrieved September 28, 2020, from <https://news.nus.edu.sg/research/exceptional-touch-robots-prosthetics>
- Taunyazov, T., Sng, W., Lim, B., See, H. H., Kuan, J., Ansari, A. F., Soh, H. (2020). Event-Driven Visual-Tactile Sensing and Learning for Robots. Robotics: Science and Systems XVI. doi:10.15607/rss.2020.xvi.020.



# HUMAN BRAIN PROJECT