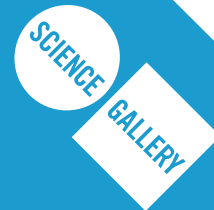
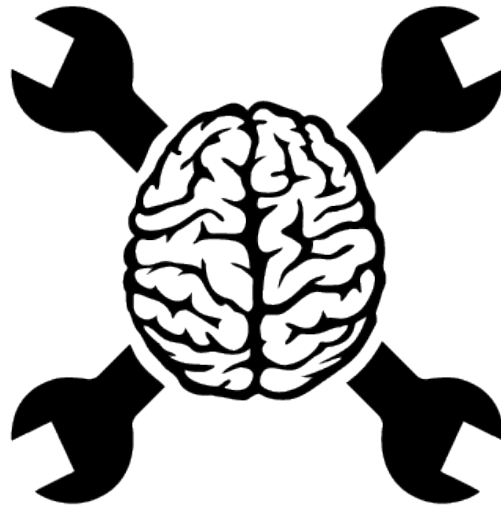


BrainHack



Links to BCI International Society Established

Workpackage 3 // Deliverable 3.2



BrainHack

DELIVERABLE

Project Acronym: BrainHack

Grant Agreement number: 686987

Project Title: BrainHack: Bringing the arts and sciences of brain and neural computer interface together

Deliverable reference number and title

D3.2 Links to BCI international society established

Revision: 1.0

Authors / contributors:

Angela Riccio (FSL) Rome

Donatella Mattia (FSL) Rome

Febo Cincotti, (FSL) Rome

Project co-funded by the European Commission within
H2020-FETOPEN-2015-CSA (Coordination and Support Activities)

Dissemination Level

P **Public** ✓

C Confidential, only for members of the consortium and the
Commission Services

Revision History

Revision	Date	Author	Organisation	Description
0.1	18/12/2017	Angela Riccio	FSL	First version
0.2	20/12/2017	Sabine Roeser	TUD	Internal Review
1.0	22/12/2017	Donatella Mattia	FSL	Final Version

Statement of originality

This deliverable contains original unpublished work except where clearly indicated otherwise. Acknowledgement of previously published material and of the work of others has been made through appropriate citation, quotation or both.

Disclaimer

'This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement **No 686987**'.

'The opinions expressed in this document reflect only the author's view and reflects in no way the European Commission's opinions. The European Commission is not responsible for any use that may be made of the information it contains.'

Table of Content

1. Executive Summary	5
2. Introduction	5
3. Links to BCI community	6
3.1 Contacts established with BCI community at major events	6
3.2 Participation to Brainhack Hackathons	8
4. Conclusion	9

1 Executive Summary

The activities reported in this deliverable pertain to Task 3.2: Link to BCI Society. Some information (regarding the first year of project) reported in section 3.1, is also reported in the Periodic Technical Report 1. The section 3.2 contains information which is also included in the Deliverables 2.1, 2.3 and 2.4 - the manifestos published after the BrainHack hackathons in Amsterdam, Prague and Dublin.

The task 3.2 was reached by following two different perspectives. Within the first perspective *-bringing BrainHack vision to BCI community-* the task was pursued by contributing at the main BCI conferences in the first (Sixth International BCI Meeting, 2016, Asilomar, California, USA) and the second (BCI4Real, 2017, Limassol, Cyprus; 7th Graz Brain-Computer Interface Conference, 2017, Graz, Austria) years of project. In this scenario BrainHack vision was introduced to BCI community.

In the context of the second perspective *-bringing BCI actors to BrainHack Hackathons-* the task was pursued by means of the BCI scientists' participation to the Brainhack Hackathons, as lecturers, mentors, jury members and team members.

2 Introduction

The deliverable reports on progress and outcomes within Work Package 3: Links to research community. The activities reported in this deliverable pertain to Task 3.2: Link to BCI Society. Below is reported the description of the task as in TA.

Reference to the Description of Action (DoA):

Task 3.2 (M4-M24) Links to BCI Society

BCI community has been reaching maturity and a number of active labs, so the currently finishing CSA BNCIH2020 (bnci-horizon-2020.eu) put together a task force to work towards creation of official BCI Society. It will be officially announced at International BCI Conference at Asilomar, USA in 2016. FSL members (Prof. Donatella Mattia) have close contacts with several key figures in this Society (Prof. Jonathan R. Wolpaw, Prof. José del R. Millán and others). An official BCI Society will make sure that the BCI field has a strong unified voice, for example, to inform the general public, interact with the media, promote BCI research, work with other societies, and lobby funding agencies. Other goals include managing finances for meetings; maintaining a website; educating people about BCIs; and creating/publishing guidelines, standards, and recommendations. If the proposal is successful, FSL will present the BrainHackproject at Asilomar and will assure the strong

links between this CSA and BCI Society working groups related to future BNCI applications including art and creative industries. Thus BrainHack shall become a part of current fresh strong stream of interest towards art-sci collaborations on BNCI area.

In addition, using a long-term collaborations with other BCI labs and wide network of BCI related labs that have been connected via CSA Future BNCI, and BNCI2020 and BCI conferences (e.g., Graz BCI bi-annual Conference, Workshop on affective Brain-Computer Interfaces), FSL will engage and advertize hackaton activities of BrainHack projects to attract young BCI researchers.

This task was led by Fondazione Santa Lucia (FSL): the team was involved in bringing up the project vision and progress within the BCI research community. The FSL researchers who were involved in the project are members of the BCI Society Board (Donatella Mattia) and founding members of the BCI Society (Febo Cincotti, Angela Riccio, Francesca Schettini, Floriana Pichiorri). The BCI Society (<http://bcisociety.org/>) was formally established on March, 2015, with the purpose “to foster research leading to technologies that enable people to interact with the world through brain signals.”

As described in the following, the activity of FSL concretized in funneling the contribution of BCI Society representatives to the hackathons and in raising awareness of the project achievements in the major event organized by and/or linked to BCI Society.

3 Links to BCI community

The strategy to create links between Art field and BCI field was implemented following two perspectives: i) bringing BrainHack vision to the BCI community; ii) bringing BCI actors to BrainHack Hackathons.

Following the first perspective, the BrainHack vision was introduced to BCI community by disseminating it at BCI field major events. On the other hand, following the second perspective BCI scientist participated in the main Brainhack events, the Hackathon, as lecturers, mentors jury and participants in the teams.

3.1 Contacts established with BCI community at major events

As reported in D1.5 and in the first year periodic technical report, Brainhack project was presented at the Sixth International BCI Meeting: “BCI Past, Present, and Future”, held in May 30 – June 3, 2016 at the Asilomar Conference Center in Pacific Grove, California, USA. Dr. Angela Riccio (Fondazione Santa Lucia) participated at the workshop “BCIs for Artistic

Expression” (<http://bcisociety.org/meetings/bci-meeting-2016-workshop-topics/>). The international BCI meeting, which takes place in Asilomar every three years, is a meeting point for the most eminent scientists from all around the world working in the BCI field. Furthermore it was organized by the BCI society and most of the members of the board of the BCI society joined it. The aim of the workshop “BCIs for Artistic Expression” was to look at current (research) activities in BCIs for artistic expression and to identify research areas of interest for both BCI researchers and artists/designers of BCI applications. In that scenario Dr. Angela Riccio presented the aims of Brainhack on the behalf of project consortium and of FSL, introduced the concept of a hackathon and made the participants aware of the upcoming hackathons organized by the Brainhack consortium. In the following days she was approached by some of the conference participants, asking her for further clarifications about the project approach and entering in a discussion about the meeting points between art and science. A particular interest was shown by the chair of the neurotechnology group of the [Technische Universität Berlin](#), Benjamin Blankertz. He later followed and supported the Brainhack activities, to the point of actively participating in the Dublin hackathon by investing enthusiasm, resources and by bringing instrumentation (see session 3.2)

Professor Jane Huggins (a member of the BCI society board) presented a paper in the special section of Brain-Computer Interfaces (<http://www.tandfonline.com/tbci>), entitled “Papers from the Sixth International Brain-Computer Interface Meeting.” The paper reported about the workshops presented during the Fifth International BCI meeting, and Angela Riccio has been cited in it as contributor to the Workshop on “BCIs for Artistic Expression” results.

Further links were initiated during the (Sixth International) BCI meeting between Yannick Roy, a representative of Neurotechx (<http://neurotechx.com/>) and the FSL team (Dr. Angela Riccio) to address future collaborations, with the remote support of Aleksander Valjamae, from Tallin University. Neurotechx is a non-profit organization with the aim of building a global neurotechnology community by providing resources and learning opportunities. Successive collaboration with Neurotechx had been established and carried out within the lifespan of the project by the partner Tallin University.

During the second year of the project, a contribution to the 22nd International Conference on Intelligent User Interfaces, BCI4Real, 2017, Limassol, Cyprus was presented. The contribution was titled “The BrainHack Project: Exploring Art-BCI Hackathons” (Authors: Aleksander Valjamae, Lucas Evers, Brendan Z Allison, Jurre Ongering, Angela Riccio, Irene Igaridi, David Lamas Aleksander) and summarizes the activities of the two hackathons organized in 2016, presenting the projects developed and reporting considerations for future art-BCI hackathons.

As a further action a paper reporting the state of art of the link between BCI and Arts, together with the major achievements of Brainhack projects was accepted to the 7th Graz Brain-Computer Interface Conference 2017 (From Vision to Reality) held in September 18th – 22nd, 2017 in Graz, Austria (<https://www.tugraz.at/institute/ine/graz-bci-conferences/graz-bci-conference-2017/>). The Graz BCI conference is the biggest BCI event in Europe, taking place every 3 years and brings together the biggest European BCI groups and multidisciplinary expertise in the neuroscience field. The paper was titled “The Brainhack project: arts meeting BCI technology” and authored by Angela Riccio, Aleksander Våljamäe, Jurre Ongerling, Lucas Evers, Veronica Alfano, Sabine Roeser, Pavel Smetana, Mairead Hurley, Marc Boonstra, Irene Ingardi, Donatella Mattia and Febo Cincotti. Dr. Angela Riccio and FSL team, joined the conference and Dr. Riccio presented (on the behalf of Brainhack project), the project vision and the aims and methods of each spinal project selected during the three hackathons, underlying their potentialities in the future of BCI and art and allowing for Brainhack contacts to be established (website, facebook page, Twitter, Vimeo and Github).

3.2 Participation to Brainhack Hackathons

The intense activity of networking and establishing links with the BCI community was put forward to ground on a solid link the involvement of BCI research community representatives in the main events of the project (ie, the hackathons) - that is to ensure the maximum exploitation of the concomitant presence of art, neuroscience and BCI technology actors.

BCI scientists and BCI groups actively participated in the three hackathons giving lectures over viewing on BCI methods and applications, being either part of the teams contributing to the development of the projects, or part of the jury/advisory board.

During the first year of project, already at the first BrainHack Hackathon, which was held in Amsterdam, the current president of the BCI society, Prof. Nick Ramsey gave a talk about the state of the art of invasive BCI for communication. Another member of the BCI society board (Brendan Allison) is member of the BrainHack Internal Advisory Board and participated at the Prague hackathon, where he gave a speech about “Emerging Directions in BCI Research”. Brendan Allison was part of the Hackathon jury and during and after the event contributed at the joined paper mentioned above (between Tallin University, WAAG, FSL) reporting about the BrainHack project and the hackathons, submitted and accepted to the workshop BCIforReal (see session 3.1).

The G.tec medical engineering, whose chief executive officer (CEO) is, in turn, a member of the BCI society board, actively participated in the three hackathons organized by the

Brainhack consortium (Amsterdam, Prague Dublin), making available G.tec technology for the hackathon participants and supporting the participants in using those.

After participating the Brainhack hackathons, the G.tec company organized a series of hackathon in 2017 (the BR41N.IO- Brain-Computer Interface Designers Hackathon- <http://www.br41n.io/>) in Linz, Graz, Valencia and Banff. The initiative will continue in 2018 with the organization of hackathons in Warsaw, Asilomar, Honolulu, Linz and Miyazaki.

During the second year of project, another company, Brain Product (<http://www.brainproducts.com/>) involved in BCI research, participated at the third Hackathon, held in Dublin.

BCI scientists were also part of the jury during all the three hackathons. In the first year Professor Anton Nijholt from the University of Twente (Internal Advisory Board member), Prof. Febo Cincotti (Fondazione Santa Lucia), Prof. Jason Farquhar (Donders Instituut for Brain, Cognition and Behaviour) participated at the Amsterdam hackathon Jury. Dott. Brendan Allison was part of the Jury of the Prague Hackathon. In the second year Stephen Dunne, from Starlab Barcelona SL (part of the Advisory board) and Angela Riccio from Fondazione Santa Lucia were part of the Dublin Hackathon.

The second hackathon, organized during the second year of project was put in the list of events on the Fabien Lotte website event page (<https://sites.google.com/site/fabienlotte/conferences>). It is one of the most up-to-date available and therefore the event page most frequently visited by most researchers. Furthermore the [Technische Universität Berlin](#) (neurotechnology group) actively participated in the Dublin hackathon. Benjamin Blankertz and three phd students traveled to Dublin, bringing with them instrumentation including a NIRS (Near Infrared Spectroscopy). The chair of the group (Benjamin Blankertz) gave a lecture about the neurophysiological modulations exploited in the BCI practice, and all the members of the group worked together with participants from the Art field, being part of two different teams.

4. Conclusion

The link between BrainHack and the International BCI community was reached by bringing BrainHack vision to BCI community and BCI scientists to BrainHack Hackathons. BCI conferences are an important environment where BCI scientists meet, exchange their ideas and become aware of pioneering projects and point of views. On the other hand the hackathon scenario turned out to be a functional way to attract attention of the BCI community members working on non-clinical application of BCI and to arouse enthusiasm of researchers involved in BCI field.

www.hackthebrainhub.com



<https://github.com/hackthebrain>



<https://twitter.com/HackTheBrainHub>



<https://vimeo.com/hackthebrainhub>



https://www.youtube.com/channel/UCKIak_GxRqYMRYefHgApuDw/featuredwww.vim



<https://www.facebook.com/hackthebrainhubproject/>



"This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 686987"