

# BRAINTRAIN Newsletter

No.7 – October 2017

*BRAINTRAIN started in November 2013 and is coordinated by Cardiff University (Professor David Linden, Wales, UK). Our consortium brings together 13 complementary partners, including 10 academic research institutions, one small medium sized enterprise, a larger industrial partner and a technology transfer/management company.*

*To achieve our objectives, BRAINTRAIN program comprises 6 complementary workpackages. WP1: Coordination and management of the consortium, has strong links to all other WPs as its objective is to ensure good management and timely implementation of the BRAINTRAIN workprogramme, communication between the different WPs via regular meetings and reports. In June 2017, the European Commission officially approved of a 12-month extension of the project, thus postponing its conclusion to October 31<sup>st</sup>, 2018.*

*So far, we have met four times: in Cardiff for the Kick-off meeting (2013) and in Maastricht (2014), Tel-Aviv (2015) and Coimbra (2016) for the annual meetings. The Next Annual meeting will be held in Leipzig, Germany on October 16<sup>th</sup>-17<sup>th</sup>, 2017. In between, we have had regular ExCom meetings, where WP leaders meet and discuss the strategic points of the project. Partners can find in the BRAINTRAIN secure intranet the main information related the contractual aspects and the meetings.*

*Each team has now been working on its work packages for over four years now. The next pages provide an overview of what we have been doing so far and a focus on some important developments.*

BRAINTRAIN will focus on 4 objectives

Objective 1

Develop new or optimize existing imaging technologies

Objective 2

Validate their application to mental disorders by integrating imaging data with complementary knowledge resulting from bioinformatics and clinical data.

Objective 3

Allow the diagnosis of mental disorders at the pre-symptomatic stage or early during development.

Objective 4

Better measure disease progression.

**Scientific Coordinator**

**Professor David Linden**

Cardiff University

Institute of Psychological Medicine and Clinical  
Neurosciences

School of Medicine

Hadyn Ellis Bldg, Maindy Road  
Cardiff CF24 4HQ United Kingdom

E-mail: [LindenD@cardiff.ac.uk](mailto:LindenD@cardiff.ac.uk)

**Project manager**

**Delphine Smagghe**

Project management assistant

Emilie Haigneré

Inserm Transfert

7 Rue Watt

75013 Paris FRANCE

E-mail: [delphine.smagghe@inserm-transfert.fr](mailto:delphine.smagghe@inserm-transfert.fr)  
[emilie.haignere@inserm-transfert.fr](mailto:emilie.haignere@inserm-transfert.fr)

## **BRAINTRAIN ANNUAL GENERAL MEETING 2017 IN LEIPZIG- OCTOBER 16<sup>TH</sup>-17<sup>TH</sup>**



**Figure 1: Panorama view of the Max Planck Institute from the back side where the Scanners area is situated**

The BRAINTRAIN Annual General Meeting (AGM) will take place from 16<sup>th</sup> to 17<sup>th</sup> October 2017 at the Max Planck Institute for Human Cognitive and Brain Sciences (MPI-CBS) in Leipzig, Germany.

The MPG (MAX-PLANCK-GESELLSCHAFT ZUR FORDERUNG DER WISSENSCHAFTEN) team is looking forward to welcoming the representatives of the BRAINTRAIN project partners and host the AGM as well as the meeting of the project's Executive Committee.

A focus of this year's AGM will be on the progress of the exploitation plan with an overview of the neurofeedback survey/template for intervention, serious game development, medical software development for TBV and Gadgetron/sequence sharing.

The progress of the clinical trials will be reviewed by the partners (WP4). Further, the progresses and action plans for methods development (WP2) and transfer technologies (WP5) will be provided by the respective partners.

MPG is organizing a local Satellite Symposium on "Plasticity" that will include the work of all four Departments at the MPI-CBS. The MPI-CBS has various research programs in this domain, leveraging the latest technology (such as the 3T Connectom (see figure2) MRI scanner, one of three world wide) and experimental approaches. This symposium aims to bring together the unique expertise of the BRAINTRAIN consortium and the MPI-CBS in studying changes in the brain and behavior.



**Figure 2: Connectom**

MPG is looking forward to an exciting and stimulating AGM in beautiful Leipzig.

***THE OXFORD/KING'S COLLEGE TEAM OF BRAINTRAIN COMPLETED DATA  
ACQUISITION FOR A FUNCTIONAL CONNECTIVITY-NF STUDY  
IN ANXIOUS GIRLS***

The Oxford/King's College team of BRAINTRAIN completed data acquisition for a functional connectivity-NF study in anxious girls in March 2017. This study used NF to train 50 adolescent girls with varying anxiety levels to increase effective connectivity in the neural networks involved in emotion regulation abilities.

The key aim of the study was to explore whether improved information flow in these regions would positively affect emotion regulation abilities, and, in turn, reduce overall anxiety levels.



While data analyses and dissemination are still in full swing, we would like to use this opportunity to thank all Braintrain partners for their help and support during the last two years and at the various stages of this project. It was much appreciated- we couldn't have pulled this off without you!

*Kathrin Cohen Kadosh and Jennifer Lau*

## ***REAL-TIME FMRI NEUROFEEDBACK TRAINING TO ENHANCE THE ACTIVITY OF BRAIN REGIONS THAT CONTROL FOOD INTAKE***

Our Tübingen-based work group investigates whether real-time fMRI (rt-fMRI) neurofeedback training enables subjects with increased body weight to up-regulate the activity of their dorsolateral prefrontal cortex (dlPFC), a brain region mediating self-control of eating behaviour, and assesses potentially beneficial behavioural consequences of such an effect. We have previously shown that overweight persons can increase the functional connectivity between the dlPFC and the ventromedial prefrontal cortex, an area that encodes the individual valence of a (food) stimulus, but that this effect is not necessarily associated with healthier eating behaviour (Spetter et al., *Appetite* 2017; 10.1016/j.appet.2017.01.032). Therefore, in the current trial we are focusing on the dlPFC as a major hub of the cognitive control of food intake.

We hypothesize that rt-fMRI neurofeedback training compared to sham training results in increased dlPFC activity during up-regulation and leads to healthier food choices as well as reduced body weight in a follow-up session. We apply a randomized parallel design with two arms: Half of the participants learn to up-regulate dlPFC activity (neurofeedback group), while the other half receives contingent feedback from the primary visual cortex (sham group). Participants undergo a 2-hour screening followed by one two-hour neurofeedback session on the subsequent day and a follow-up investigation around four weeks later.



Figure 1.

During the neurofeedback training runs, subjects are prompted by upward arrows to volitionally increase dlPFC activity while looking at (individually pre-selected) “unhealthy” food items. Thermometer bars on each side of the picture provide the participants with online feedback on dlPFC



activation (Figure 1). The Turbo-Brain Voyager software (3.2) is used to calculate online feedback and visualize brain activation (Figure 2).



Figure 2.

In total, we have recruited 45 healthy obese individuals from the population of Tübingen and the adjacent area via e-mails and ads. We have obtained 38 valid data sets (17 participants in the neurofeedback and 21 participants in the sham group). Analyses of our results are currently ongoing.

Ralf Veit from the EKUT group gave a presentation on our BRAINTRAIN trial at the meeting of the *Society for the Study of Ingestive Behaviour (SSIB)* that took place in Montreal on 19 July 2017. His abstract was selected for an oral presentation at the session: Learned control of appetite. The title of his talk was "Self-regulation of dorsolateral prefrontal cortex activity by means of real-time fMRI neurofeedback training increases healthy food choices".

*Manfred Hallschmid and Ralf Veit (for the EKUT BRAINTRAIN group)*

## News

In June 2017, Cardiff University launched a survey on neurofeedback practices among the Consortium. It was addressed to all BRAINTRAIN PIs. This survey is part of the exploitation work being carried out for the BRAINTRAIN project.

## DISSEMINATION

The objective of WP6 is to insure an effective dissemination using different tools. A brochure was distributed to the partners, a logo for BRAINTRAIN was created and we have a public website which is updated regularly. In parallel, partners are very active presenting neurofeedback research at national and international conferences and invited seminar talks. We can list the following:

### Presentations



#### Dissemination season for Oxford's team!

On October 11<sup>th</sup> 2017 **Kathrin Cohen Kadosh** gave a talk on Using neurofeedback to train emotion-regulation networks in high-anxious adolescents at the **World Congress of Psychiatry**, Berlin, Germany.

**Miles Cox and Talma Hendler** also spoke at the **World Congress of Psychiatry**, contributing to a symposium on "Functional Imaging Neurofeedback in Psychotherapy".

After giving a presentation on *Adolescent anxiety: measuring and modifying emotion regulation strategies*, during the Lincoln Psychology department seminar on 11th Oct, **Jennifer Lau** will be very active throughout October and November:

- 25th Oct: *Adolescent anxiety and pain: measuring and modifying emotion regulation strategies*, **Southampton Psychology department seminar**
- 15th Nov: *Adolescent anxiety: measuring and modifying emotion regulation strategies*, Regional child psychiatry meeting, **Wolfson College, Oxford**
- 17th Nov: *Adolescent anxiety and pain: the role of appraisal biases*,

#### Association of Behavioural and Cognitive Therapists, San Diego, US

On Nov. 29-Dec. 1st 2017, **Catharina Zich** will present a poster titled *Dynamic fMRI-based neurofeedback under the microscope – evidence from the developing brain at the Real-time functional imaging and neurofeedback* at the conference rtfin, in Nara, Japan.



#### T. Hendler (Tel-Aviv University)

**Prof. Hendler** has represented the BRAINTRAIN project in several seminars including her recent symposium presentation at the **WPA World Congress of Psychiatry** in Berlin entitled *EEG/fMRI Neurofeedback for treating stress related disorders*. She, along with partners from the Central Institute of Mental Health in Mannheim Germany, has also organized and led a private workshop on neurofeedback called **Advancing mechanism-driven neurofeedback for therapy: methodology, processes and potential applications** that included approximately 40 participants.

In November Prof. Hendler will be travelling to the **Real-time Functional Imaging and Neurofeedback Conference** in Nara, Japan where she will be giving a talk entitled "Harnessing the Brain to Heal Itself".

## Publications

**Sousa T, Amaral C, Andrade J, Pires G, Nunes UJ, Castelo-Branco M.** *Pure visual imagery as a potential approach to achieve three classes of control for implementation of BCI in non-motor disorders.* J Neural Eng. 2017 May 3;14(4):046026. <https://www.ncbi.nlm.nih.gov/pubmed/28466825>

**Amaral CP, Simões MA, Mouga S, Andrade J, Castelo-Branco M.** *A novel Brain Computer Interface for classification of social joint attention in autism and comparison of 3 experimental setups: A feasibility study.* J Neurosci Methods. 2017 Jul 29;290:105-115. doi: 10.1016/j.jneumeth.2017.07.029. [Epub ahead of print] PubMed PMID: 28760486.

**Andrade J, Cecílio J, Simões M, Sales F, Castelo-Branco M.** *Separability of motor imagery of the self from interpretation of motor intentions of others at the single trial level: an EEG study.* J Neuroeng Rehabil. 2017 Jun 26;14(1):63. doi: 10.1186/s12984-017-0276-4. PubMed PMID: 28651628; PubMed Central PMCID: PMC5485711.



BRAINTRAIN team members (Oct.2016).

- ✓ The BRAINTRAIN website is available at the address:  
[www.braintrainproject.eu](http://www.braintrainproject.eu)
- ✓ The extranet where you can find all the important documents regarding the agreement, the meetings and the dissemination is available at this address (access to BRAINTRAIN partners only):  
<https://extranet-braintrain.atreal.fr/>