Turkey in Horizon 2020 Phase II Focused Group Training 14 on Horizon Europe Twinning Call

BrainTwin Project Presentation

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This project has received funding from the European Union's Horizon 2020 programme for coordination and support action under grant agreement No 952378.

Project Overview

BrainTwin
Development of a World-Level Neuroengineering Research Centre by European Twinning
WIDESPREAD-05-2020: Twinning

Scope: Twinning aims at significantly strengthening a defined field of research (neuro-engineering) in a university (Technical University Gheorghe Asachi from Iasi - TUIASI) or research organisation from a Widening country (Romania) by linking it with at least two internationally-leading research institutions from two different Member States or Associated Countries (Fraunhofer from Germany and Salamanca University from Spain).

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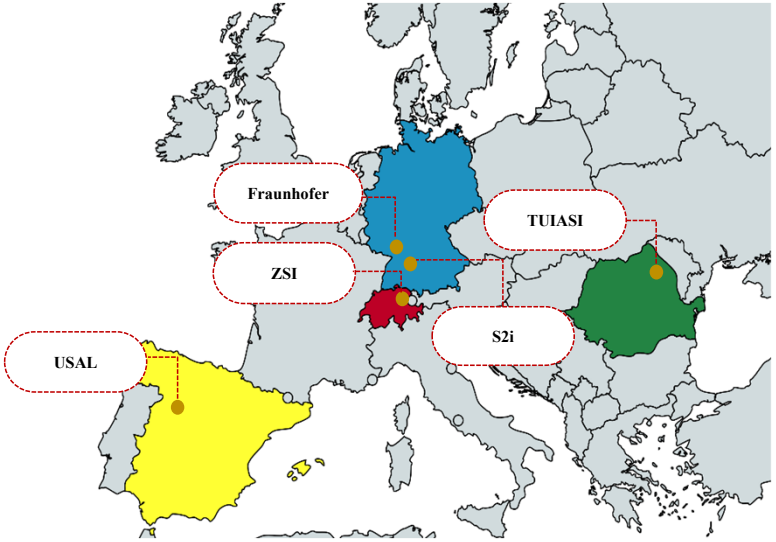
Project Overview

PROJECT CONSORTIUM

- Technical University Gheorghe Asachi from Iasi (Romania) – Coordinator
- Project Group for Automation in Medicine and Biotechnology PAMB from Fraunhofer IPA (Germany)
- The Institute of Neurosciences of Castilla y Leon from the University of Salamanca (Spain)
- Steinbeis 2i (Germany)
- Centre for Social Innovation (Austria)



PROJECT DURATION

- 36 months

PROJECT BUDGET

- 900.000 €

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What we have today

- Technical University Gheorghe Asachi from Iasi (TUIASI) is among the oldest and most renowned public higher education institutions in Romania. Within TUIASI there are 11 faculties with a technical profile. TUIASI is the most important technical university in the North-East Region
- TUIASI is a member of North East Regional Innovative Cluster for Structural and Molecular Imaging (Imago-Mol) - the only medical imaging cluster in Romania
- TUIASI represents the most important regional vector of technological research, focused on the creation and transfer of knowledge, especially in the multidisciplinary areas of high-tech engineering, including Neuroengineering
- TUIASI was involved as a partner (not as a coordinator) in only two Horizon 2020 projects

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Why we need to change

- **Personal/motivational barriers**
  - Lack of interest in the topics addressed in the R&D calls, mainly due to lack of insight into applications and methods used in Neuroengineering research done in European institutions;
  - Lack of attractiveness of Horizon 2020 funding in comparison to ESIF funding and, when available, to other national or bilateral schemes.

- **Structural barriers**
  - Geographical disadvantages;
  - Instability of national funding mechanism for universities;
  - Limited national R&D budget, and low private investment in R&D;
  - Less excellent researchers in Romania than in EU15 due to brain drain and weak presence of foreign researchers.

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- **Organizational barriers**
    - Very limited infrastructure and HR to support potential applicants both at national and at TUIASI level;
    - Weak capacity of drafting good proposals, to transform ideas in research projects; cost of paying a consultant is often prohibitive;
    - Insufficient training possibilities for early stage researchers in comparison to European standards;
    - Difficulty to maximize information and experience to better influence and address the participation to the working committees;
    - Difficulty to join existing excellence consortia (low visibility of research results and of TUIASI excellence teams on the EU map);
    - No willingness/enthusiasm for taking the responsibility of the administrative management of a H2020 project participation, project leadership;
    - Weak involvement in European networks which often play a role in generating ideas for projects and facilitating partnerships between peers.

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Actions and Measures

- Knowledge exchange and mutually beneficial collaborative research
- Increasing visibility of Romanian Neuroengineering research results and of TUIASI excellence team on the EU map
- Improving TUIASI international projects participation, proposal preparation and project management/administration skills
- Improving TUIASI researchers innovation capacity and technology transfer skills
- Implementing new communication approaches with stakeholders and policy makers in order to increase public and private funding

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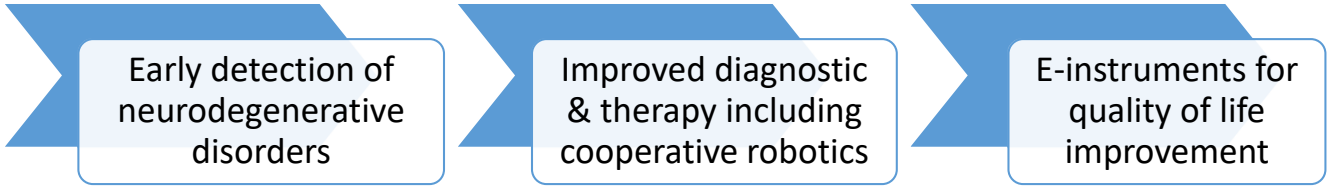
Project main objective

The main objective of BrainTwin is to address the preparatory tasks necessary to establish a new world-level centre for research and education in the field of Neuroengineering. It will focus on three main challenges in the patient medical care process:

- early detection of progressive neurodegenerative disorders,
- cooperative robotic diagnostic and therapeutic procedures like surgery
- e-instruments for life quality improvement of the patients



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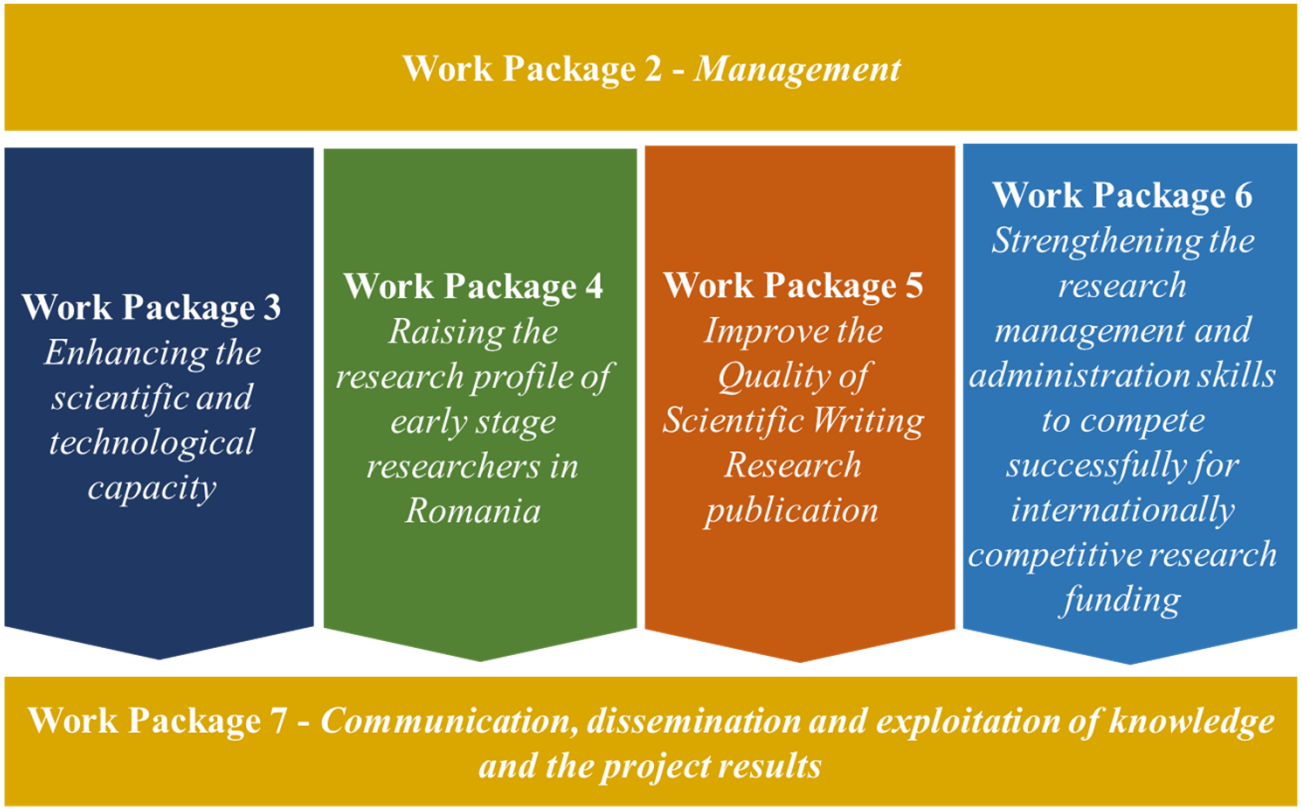
Project methodology



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WP1 Ethics Requirements - WP Leader TUIASI

To provide description of the technical and organisational measures that will be implemented essential for compliance of activities of this project with ethical requirements related to the guidelines of Horizon 2020 projects, mainly to safeguard the rights and freedoms of the data subjects/research participants

WP2 Project Management - WP Leader TUIASI

Achieving an efficient and appropriate coordination of the project & To set up communication structures for a coherent and efficient collaboration within the consortium

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WP3 Enhancing the scientific and technological capacity - WP Leader Fraunhofer

1) To train researchers, especially early stage researchers from TUIASI, to scientific approaches including a wide range of multidisciplinary state-of-the-art methods in neuro-engineering;
2) To improve the staff skills in writing protocols to formalize methods and approaches, making good presentations and establishing successful scientific collaborations
3) To train research staff members, through expert visits and attendance of scientific meetings, in specifying and focusing their scientific tasks, thereby improving S&T and innovation capacity of TUIASI and linked institutions.

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1st Capacity building workshop

Aims:

1) Meet each other;
2) Exchange research interests;
3) Identify mutual interest topics;
4) Identify possible project ideas;
5) Identify topics for Ph. D. students visits.

12 Universities and Research Institutes

23 Research Teams

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1st Capacity building workshop

PARTICIPANT TEAMS

ROMANIA

- Technical University Gheorghe Asachi from Iasi
    - Automatic Control and Computer Engineering Faculty
    - Electronics, Telecommunications & Information Technology Faculty
    - Electrical Engineering Faculty
    - Industrial Design and Business Management Faculty
    - Mechanical Engineering Faculty
    - Chemical Engineering & Environmental Protection Faculty
- "Grigore T. Popa" University of Medicine and Pharmacy Iasi
    - Advanced Center for Research and Development in Experimental Medicine CEMEX
    - Faculty of Medical Bioengineering

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1st Capacity building workshop

PARTICIPANT TEAMS

GERMANY

- Fraunhofer Institute for Manufacturing Engineering and Automation IPA
    - Project Group for Automation in Medicine and Biotechnology PAMB (Mannheim)
- Fraunhofer Institute for Computer Graphics Research IGD (Darmstadt)
- Fraunhofer Institute for Integrated Circuits IIS (Nürnberg)
- Fraunhofer Institute for Algorithms and Scientific Computing SCAI (Sankt Augustin)
- Central Institute of Mental Health (ZI-Mannheim)

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1st Capacity building workshop

PARTICIPANT TEAMS

SPAIN

- University of Salamanca
    - Institute of Neuroscience of Castilla y León INCYL
    - Bioinformatics, Intelligent Systems and Educational Technology Group BISITE
    - Group of Robotics and Society GROUSAL
    - Department of Surgery and Anesthesiology
- University Hospital of Salamanca
    - Clinical Neurophysiology Department
    - Rehabilitation Department
- National Hospital for Paraplegics
    - Biomechanics and Technical Aids Department
    - Functional Exploration and Neuromodulation of the CNS Department
- University of Navarra
    - Center for Applied Medical Research CIMA
- Miguel Hernández University
    - Systems Engineering and Automation Department

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1st Capacity building workshop

3 RESEARCH PILLARS, 9 RESEARCH AREAS, 12 ROOMS

Research Pillar	Research Area	ROOMS	ATTENDANCE
Early Diagnostic Tools	Biomedical Sensors	Wearable sensors and electromyography	29
		Advanced trans-cranial magnetic stimulation, disposable electrodes for EEG and muscle biosensors	10
	Biomarkers	Development of specific biomarkers / antibodies	14
	AI for Medical Data Analysis	Deep learning techniques for healthcare. Intelligent Data Analysis	26
		Brain Functional Network Extraction and Analysis	15
		Comprehensive analysis of medical imaging data	20
Improved diagnostic & therapy including cooperative robotics	Biomedical Innovative Techniques	Olfaction in neurosciences and GC-IMS	16
		Separation, purification and detection of bacteria with magnetic beads	8
	Innovative systems for minimally invasive interventions	Design and mathematical modelling of innovative systems for minimally invasive interventions	17
	Cooperative robotics	Human-robot interaction and simulation	21
Quality of life improvement	E-instruments for Innovative Rehabilitation Methods	Rehabilitation devices	19
	E-instruments for Improved Communication	E-instruments for improved communication	19

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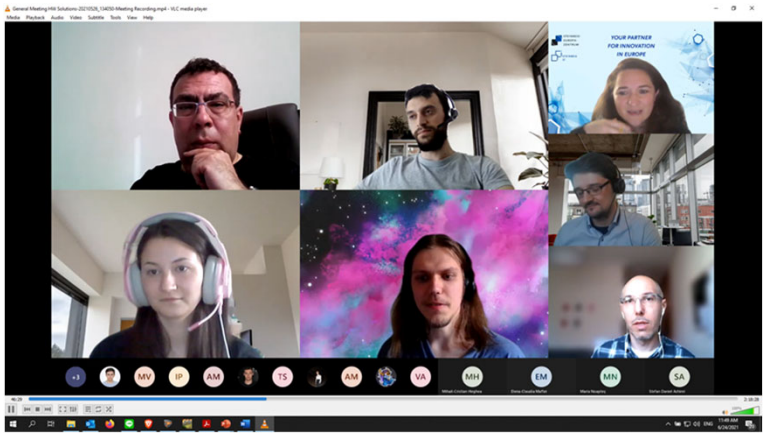
WP4 Raising the research profile of early stage researchers in Romania (TUIASI) - WP Leader Fraunhofer

The main objective of WP4 is to improve scientific excellence of early stage researchers including BSc, MSc and PhD students at TUIASI and other universities in Romania

1st Students BarCamp

Quality of Life Improvement for Patients with Neurodegenerative Disorders



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1st Students BarCamp

Quality of Life Improvement for Patients with Neurodegenerative Disorders

Aims:

1) Meet each other;
2) Develop interest for neuroengineering;
3) Identify ideas for solutions to QoL Improvement for Patients with Neurodegenerative Disorders;
4) Identify possible project ideas;
5) Identify topics for further activities.

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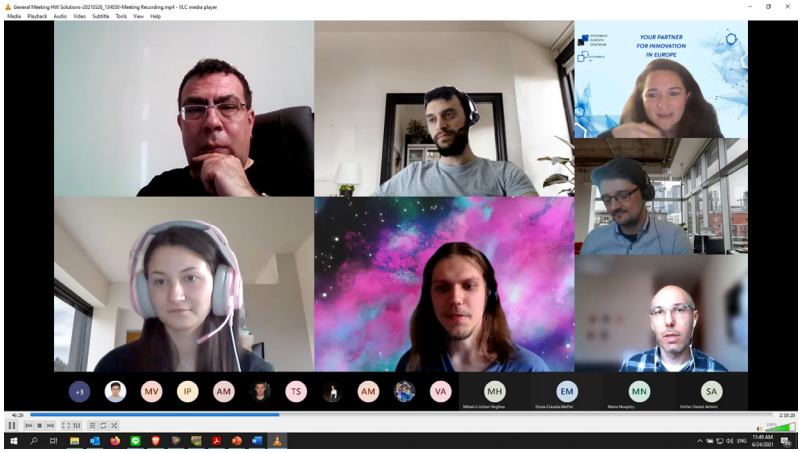
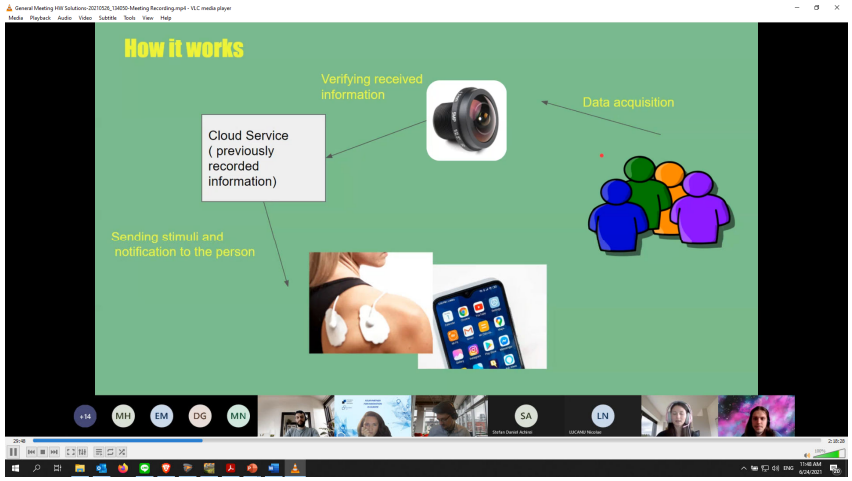
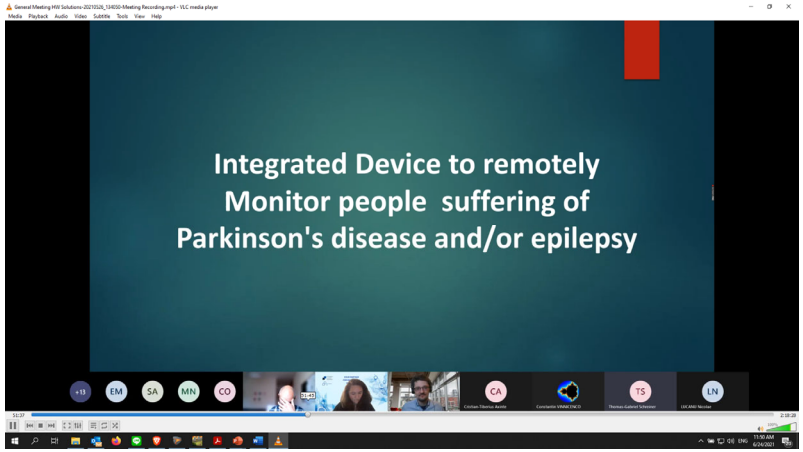
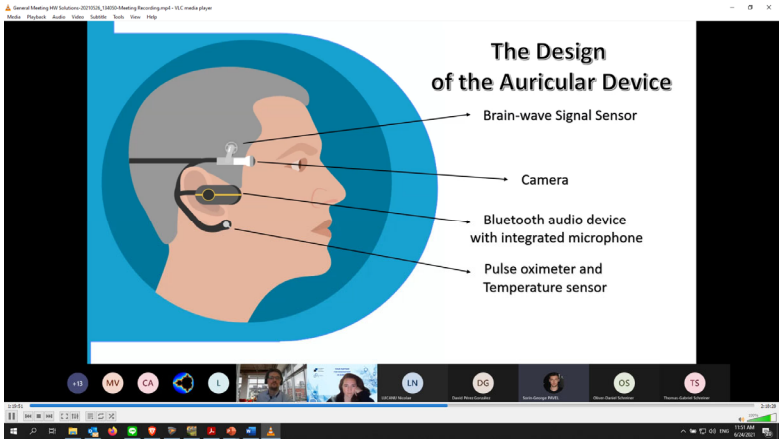
1st Students BarCamp









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WP5 Improving the quality of Scientific Writing Research Publications - WP Leader USAL

The main objectives of WP5 are:

- **To improve the quality of scientific papers and presentations from TUIASI;**
- **To increase the number of papers published by TUIASI in high impact journals;**
- **To raise a total citation index of papers published by TUIASI researchers.**

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WP6 Strengthening the research management and administration skills to compete successfully for internationally competitive research funding - WP Leader S2I

- to promote the knowledge and experience of the TUIASI scientists in writing winning applications,
- to maximise TUIASI organisation's chance of grant success,
- to increase competitiveness of the TUIASI researchers in fundraising from international grant bodies and from national and international business organizations,
- to improve TUIASI innovation capacity through infrastructural and training measures,
- to enhance the networks and increase the potentials of TUIASI researchers to compete in European projects in order to facilitate their cooperation in Horizon 2020 (and preparing for Horizon EUROPE).

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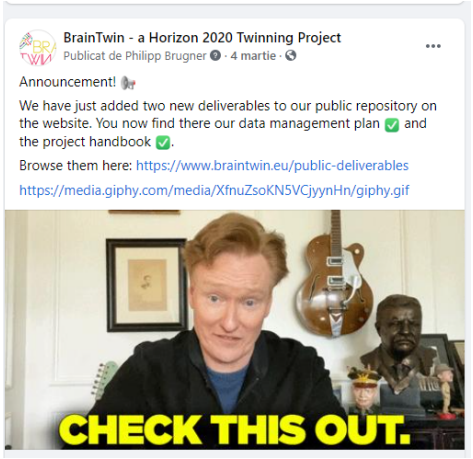
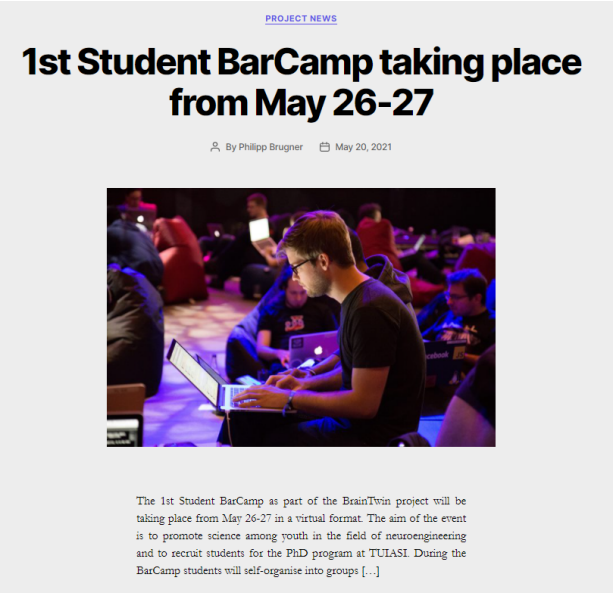
WP7 Communication, dissemination and exploitation of knowledge and the project results - WP Leader ZSI

Managing the project's public appearance and the dissemination of its results, including the sharing of scientific knowledge





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