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CHIST-ERA Projects Seminar 2023
*Advanced Brain-Computer Interfaces
for Novel Interactions (BCI)*

April 04, 2023

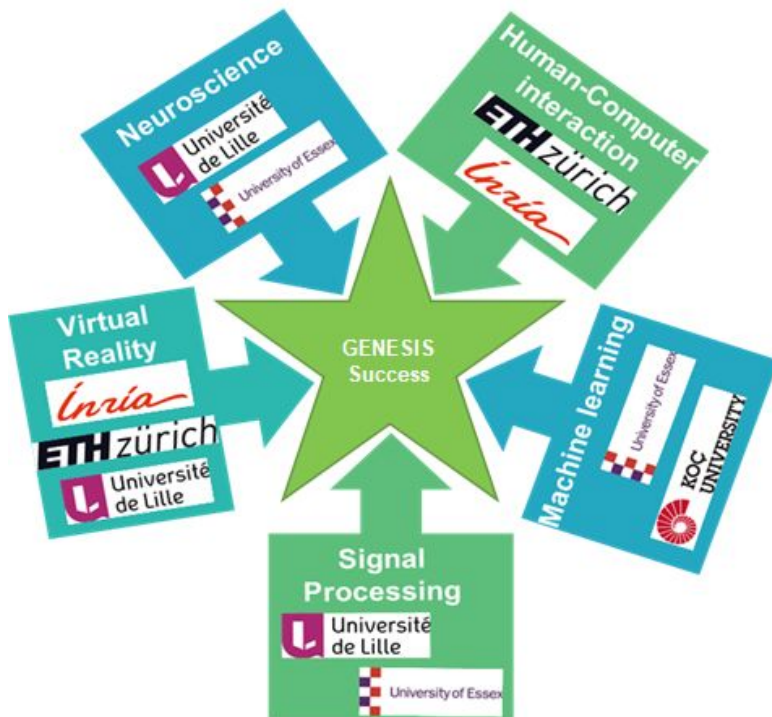


Programme co-funded by the
EUROPEAN UNION



GENESIS

Leveraging neuro-markers for Next-gen immersive Systems



- ❖ Create a new generation of immersive systems embedding neurophysiological sensing



BITSCOPE – Brain Integrated Tagging for Socially Curated Online Personalised Experiences

Targets the development of a **passive hybrid BCI** (phBCI) capable of operating **“in the wild”** and capable of monitoring user attention, memorability and curiosity.



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BITSCOPE



ReHaB – Towards an ecologically valid symbiosis of BCI and head-mounted VR displays: focus on collaborative post-stroke neurorehabilitation

- ❖ The development of a low-power wearable compact BCI-HMD system for collaborative VR neurorehabilitation of motor and cognitive impairments



Ben-Gurion University
of the Negev



INSTITUTE OF
ELECTRONICS AND
COMPUTER SCIENCE

ETH zürich

 **SENSOMEDICAL**



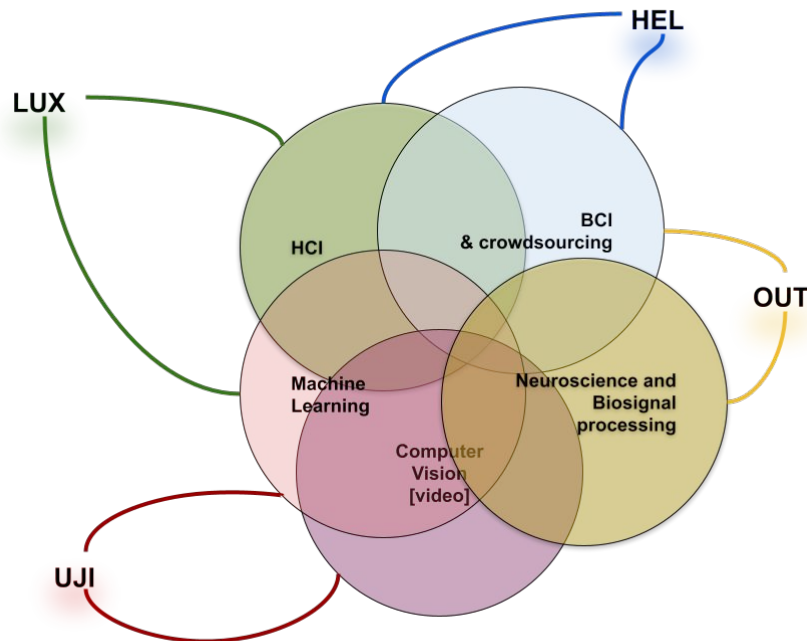
**UNIVERSITY
OF LODZ**



**TECHNICAL UNIVERSITY
OF KOŠICE**



Brainsourcing for Affective Attention Estimation



- ❖ Using physiological signals, as measured directly from the human brain, to also infer affect.



GENESIS, BITSCOPE, ReHaB and BANANA:

- ❖ **Developed open-source drivers for GSR, cardiac signals integrated into Openvibe (BITSCOPE)**
- ❖ **Designed experimental virtual environments and assets (BITSCOPE and ReHaB)**
- ❖ **Preliminary tests using the GLIMPSE metric (<https://www.mdpi.com/1424-8220/21/9/3099>) (BANANA)**
- ❖ **Designed and developed stimuli application (BANANA)**
- ❖ **Produced state-of-the-arts and literature reviews about:**
 - ✓ EEG markers of Neuroaesthetics (BITSCOPE)
 - ✓ Cybersickness (GENESIS)
- ❖ **Gathered preliminary neurophysiological data of:**
 - ✓ Vection in VR (GENESIS)
 - ✓ EEG data in VR of post-stroke patients (ReHaB)
 - ✓ Several artifact datasets recorded (BITSCOPE)



GENESIS, BITSCOPE, ReHaB and BANANA:

- ❖ New signal processing methods
 - ❖ Larger open datasets
 - ❖ Reliable neuromarkers of user experience
 - ❖ Increased BCI acceptability
 - ❖ Hybrid/multimodal approach in terms of both methods and equipment.
- **Getting BCI finally outside of the lab.**



Possible Roadmap

- ❖ Encouraging cross-project publications and collaborations led by early-stage researchers.
- ❖ Planning site visits to cross-pollinate ideas and build on each others' outcomes.
- ❖ Mutualizing experimental protocols by cross-sharing questionnaires.



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Role of the CHIST-ERA Support





- ❖ Chist-ERA has created the opportunity to initiate new collaborations between various countries/institutions.
- ❖ Gathering all of the funded projects within the same call into yearly seminars helps us to imagine future collaborations and brainstorm ideas => Collaboration over competition.
- ❖ Dedicate smaller funds to support coordination actions across the projects.



- ❖ The specific/dedicated nature of the topics in the Chist-ERA calls.
- ❖ An excellent on-ramp to EIC fundings.



- ❖ **Integration of RRI practices in the projects (related to the 6 dimensions of RRI)**
 - ✓ Promoting open science (open publication and open data bases and open source).

- ❖ **Major hurdles to RRI implementation in the projects (in general and/or for particular dimensions)**
 - ✓ Lack of females in IT/Tech/STEM, gender imbalance.
 - ✓ Only 2% of the budget of OA makes the publications less accessible for general public.



Open Science

- ❖ Open Science practices within the projects (DMP, publications in OA, open data sharing, data repositories used, etc.).
- ❖ Obstacles to cope with good OS practices:
 - ✓ Limited funding for OA publication fees (besides FWF - Austrian Science Fund).
- ❖ Costs and time of implementing the OS practices.



Technology Transfer

- ❖ We (ALL) would like to commercialize our technology in the future, but it's still in progress.
- ❖ More opportunities similar to Chist-ERA would definitely help...





Questions ?