The NeuroArt Lounge

OVERVIEW: The NeuroArt Lounge is an interdisciplinary, interactive biotech art installation project and social experience. Earlier versions were introduced at the Purdue Conference of the Future (2020), SLSA Conference (2022), and Chulalongkorn University, Thailand (2022). For the BGR, we are proposing an enhanced version adequate for broader audience participation and spectators' viewing enjoyment. The NeuroArt Lounge consists of two interactive stations equipped with a computer running proprietary neurofeedback apps, CALM and FOCUS, a portable EEG device (electroencephalogram), and displays (projectors or screens). We hope to show the work outdoors in the evening to attract students passing nearby. Additionally, as in previous editions, we will engage several Purdue student volunteers in various aspects of the project and running the NeuroArt Lounge.

SCOPE, SAFETY & PRIVACY: The NeuroArt lounge is a part of the ever-growing field of Neuroarts. Participants have the opportunity to play with EEG and neurofeedback technologies in a non-traditional setting while testing their abilities to Calm and Focus. The FOCUS app shows a dot moving around the screen, and when it is centered, the user has achieved focus. The CALM app shows color gradients, and as the user relaxes, the colors transition from red to blue (warm to cool). The project transforms a neurofeedback system into a playful gamification experience. Users wear a safe, non-invasive portable EEG headband (MUSE headband), and signals from their brains are sent to an app that artistically displays brain activities. For privacy, no data is stored by the system.

FRAMEWORK and IMPACT: According to the NeuroArts Blueprint written by Johns Hopkins University and the Aspen Institute, "Neuroarts is the transdisciplinary study of how the arts and aesthetic experiences measurably change the body, brain, and behavior and (...)." The CALM and FOCUS games are based on the concept of self-regulation of the nervous system and promote awareness of important cognitive skills to enhance wellness, intellectual growth, and even academic success.

EXECUTION: The current system has limitations when presenting to a broader audience, but through this grant, we plan to make improvements to the setup and the code to make it simpler and more effective. 1) The current setup requires a smartphone and wifi router to carry the brainwave signals from the headband to the laptop for analysis and display. Based on recently developed software, our new approach will be to have the headband communicate directly with the laptop via Bluetooth. 2) The current system uses keyboard commands to trigger different functions. We will incorporate UI design principles and use the Stream Deck keypad to simplify the operator's interactions with the NeuroArt Lounge software. 3) For BGR, we also plan to include aspects of scenography to attract visitors and to set the atmosphere for audience participation and enjoyment (e.g., the use of a tent and LED light sources).

FUTURE PLANS: MULTIPLAYER GAME

The Neuroarts Blueprint also states how "the arts in all of their modalities can improve our physical and mental health(...)." We hope to translate the personal neurofeedback experience into a multiplayer game by combining brain signals from teammates, making it more competitive and cooperative; interactional gaming experiences can create intimate bonds among students. For this future phase, we are considering approaching NIH, NSF, and/or the National Endowment for the Arts for further funding.

Faculty/Principle Investigators

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Student Volunteers and Workers

CLA Students
Computer Science Students
CGT Students

Budget

Equipments & Supplies

2 EEGs (Muse 2)	500
Projection System 3000L	400 + in-kind
2 vinyl screens	130
2 Stream Deck units	280
Sanitizing pads	in-kind
Apple Laptop Computers	in-kind

Staging

6-7 Branded T-shirts	110
https://www.customink.com/prices	
Poster + display holder	in-kind
2 “lounge” chairs	in-kind
Tent	in-kind
Power extension	in-kind
2 LED lights (neuro theme)	80 + in-kind

Development & Design

SME consulting fees +	
Stipend for student work	1000
TOTAL	2500