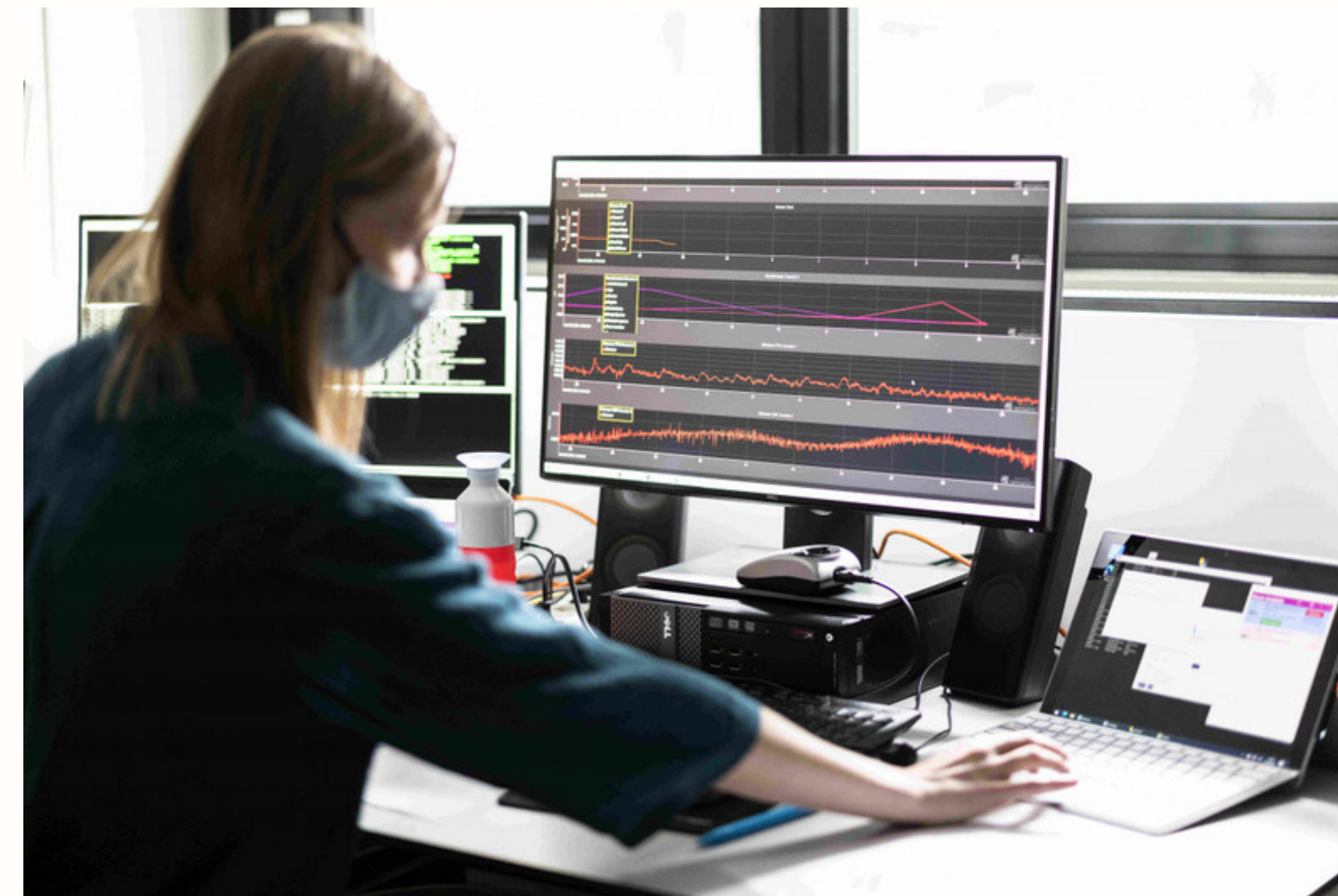# BRAIN-COMPUTER INTERFACES (BCI's)

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PHOTO BY: RIKKERT HARINK

BCI testbed

The BCI testbed is an academic playground for applied brain computer interface (BCI) projects with a non-medical focus. In this interdisciplinary project colleagues from DMB (EEMCS) and BMS are working closely together with industrial partners VidiNexus, Noldus, Artinis and Thales.

Measuring psychological constructs

At the technical university we understand that technology will only become more present in people's lives and work in the coming years. In some work environments, machines might become equal team members to human team members. In order to work effectively together with your team, it is important to understand the mental state of each of your team members. For example, if your colleague is clearly mentally overloaded, you might want to relieve them from some of their tasks. Human-machine teaming will be improved if machines are also able to 'feel' those mental states of their human team members. At the BCI testbed we study how we can measure mental states such as mental workload and trust with the use of physiological sensors (e.g. EEG, fNIRS, galvanic skin response, heart rate, eye-tracking).

Trust of Faces and Devices

Trust is a psychological construct that is usually measured subjectively. In my study I explore if you can predict trust and memory of faces and devices when you measure the brain activity of participants during the first encounter of the stimuli. For this study I conducted 25 EEG experiments where participants had to label faces and devices on trustworthiness. Later they were asked which images they had seen in the first part of the experiment and which were new.

BCI's in museums

A different field in which we study the use of BCI's is art. Partner VidiNexus delivers software for big interactive screens that are placed in conference halls and museums. Their interest was to study how BCI's can make a museum visit more interactive for visitors. We supervised three students of the program Creative Technology who worked with this topic for their graduation project. They inspired VidiNexus with a personalized audiotour (based on eyetracking), an interactive quiz (augmented with EEG) and an educative screen interaction which gave visitors the illusion of being surrounded by dinosaurs (AR).

Teaching at BMS

Apart from my job at DMB at the BCI testbed, I work as a parttime teacher in psychology. I am involved in courses and workshops to make the program more technical. For example, we teach second year psychology students to program with Python and we gave introduction workshops for first year students about artificial intelligence and virtual reality.