

EXPLORING NEURAL AND PERIPHERAL PHYSIOLOGICAL CORRELATES OF SIMULATOR SICKNESS

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SCHOTTKY, STEVE GROGORICK, SUSANA CASTILLO AND MARCUS
MAGNOR



Computer Graphics
TU Braunschweig



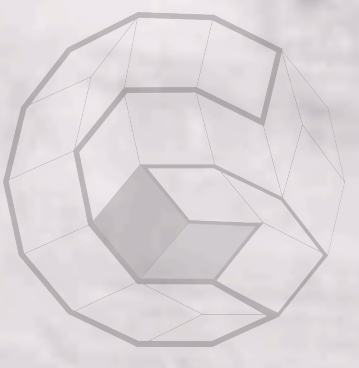
Technische
Universität
Braunschweig



 SMI
SensoMotoric Instruments



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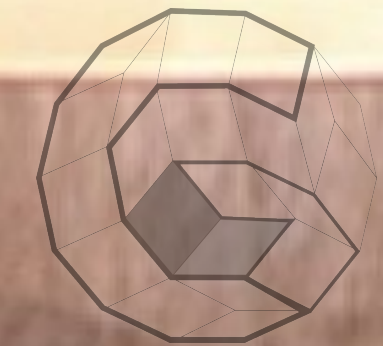
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 SMI
SensoMotoric Instruments

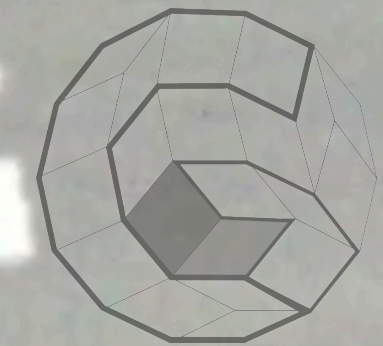


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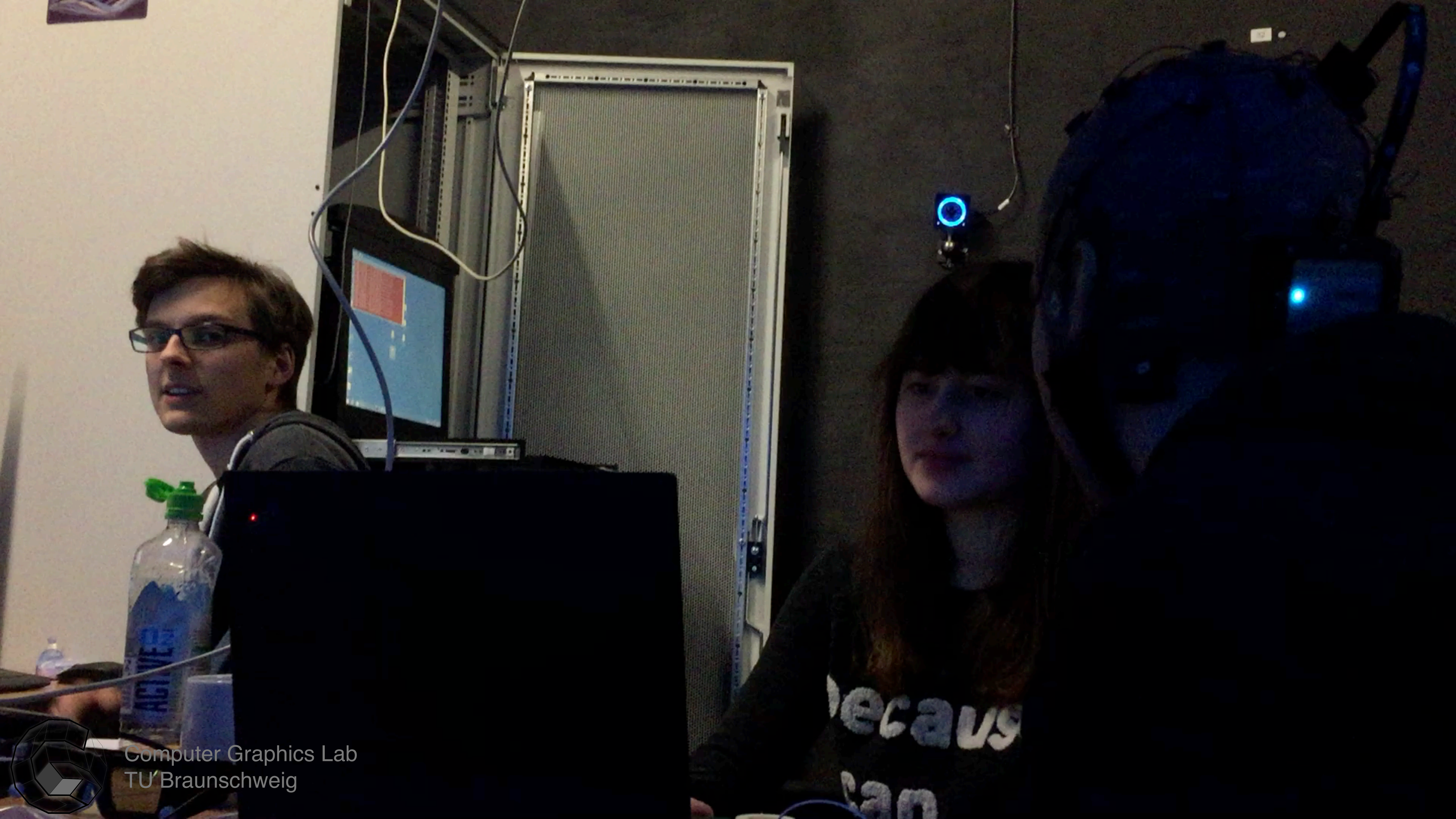


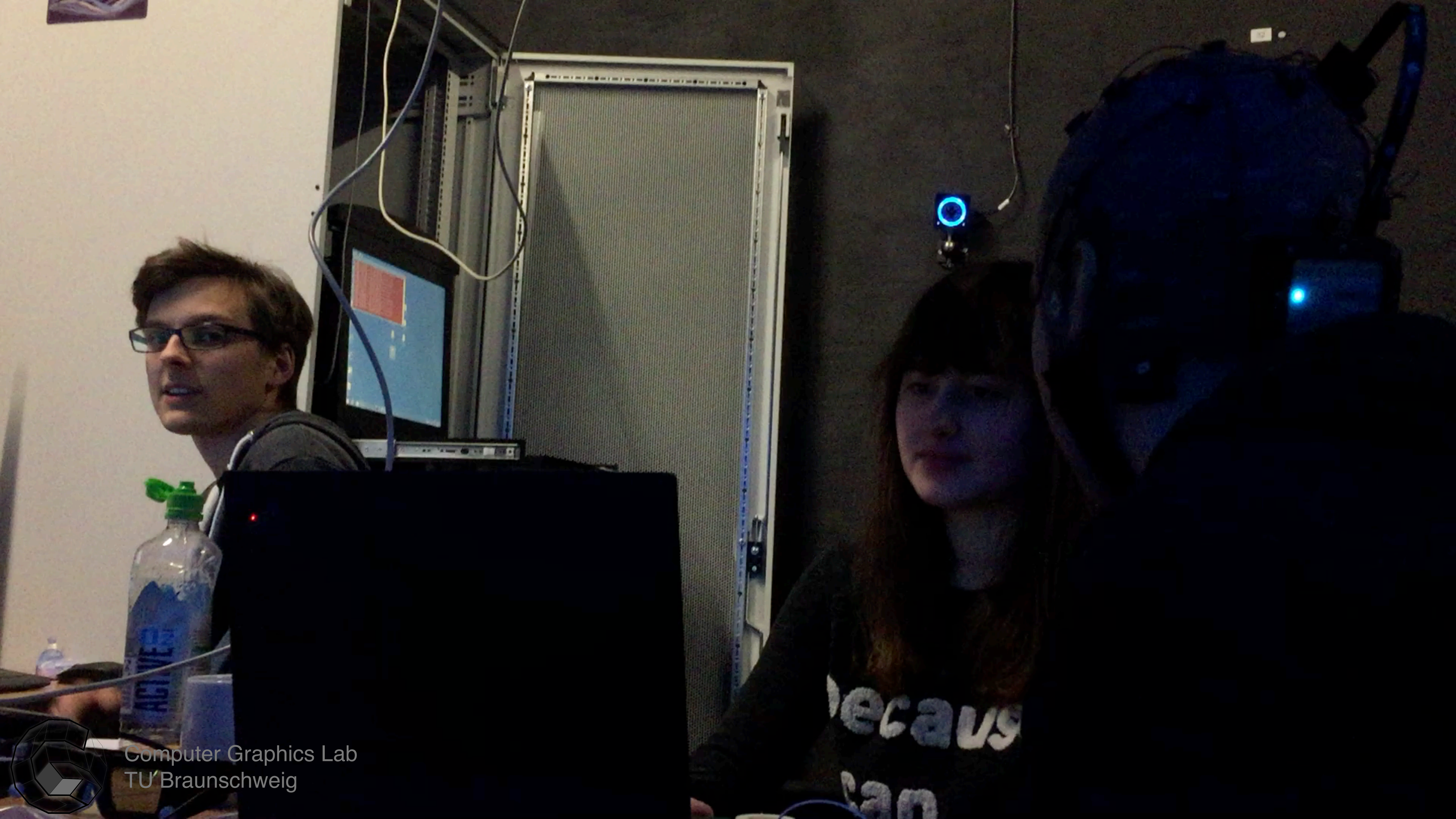
The Dome





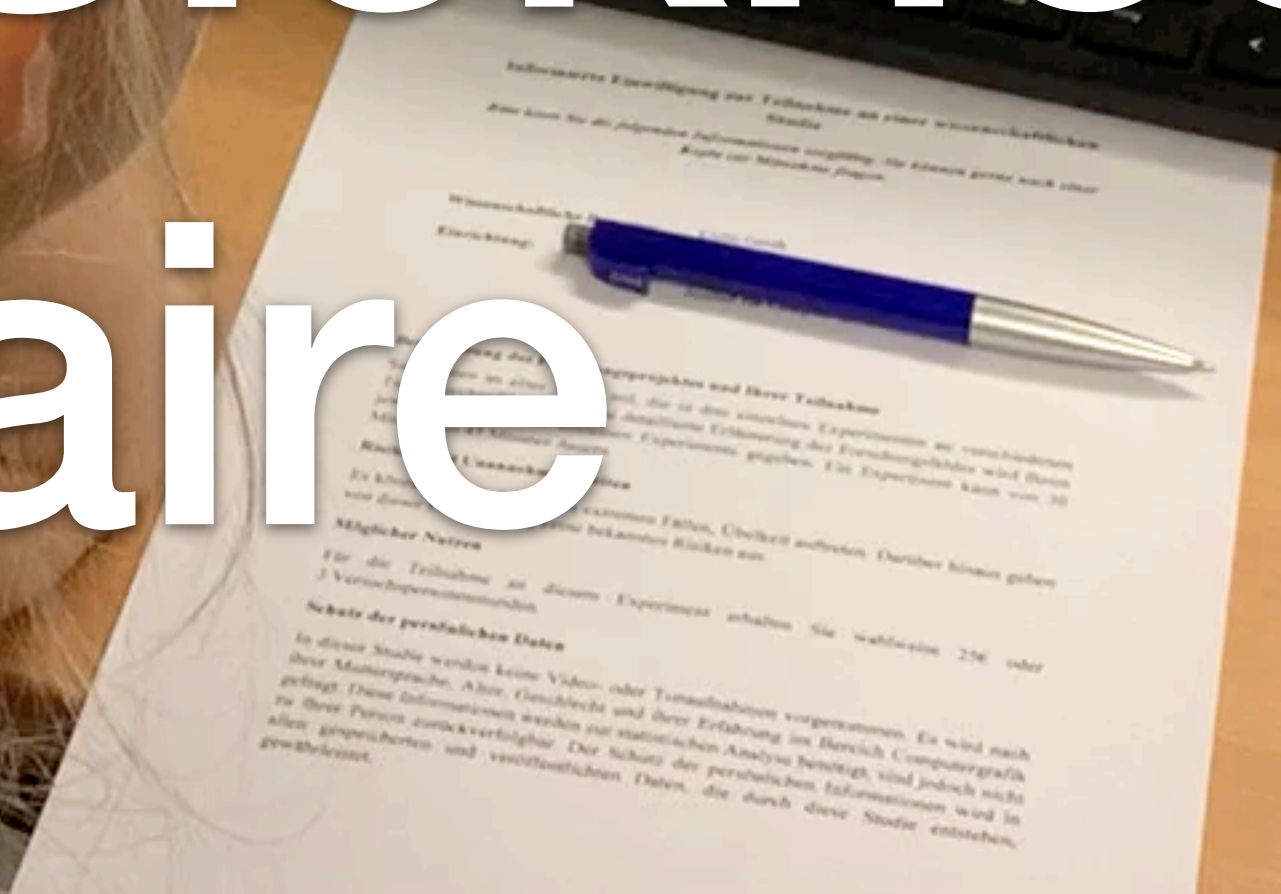
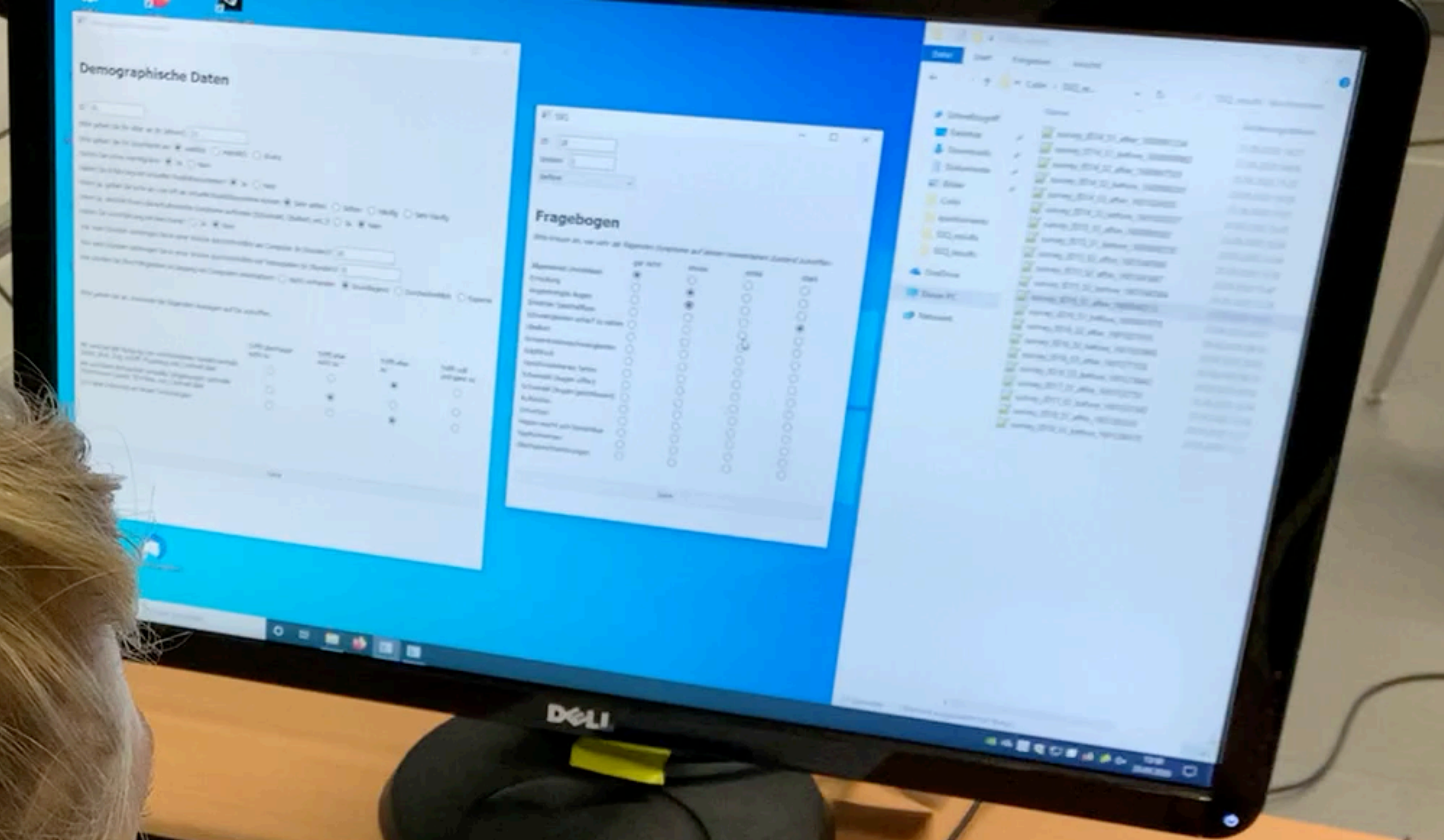
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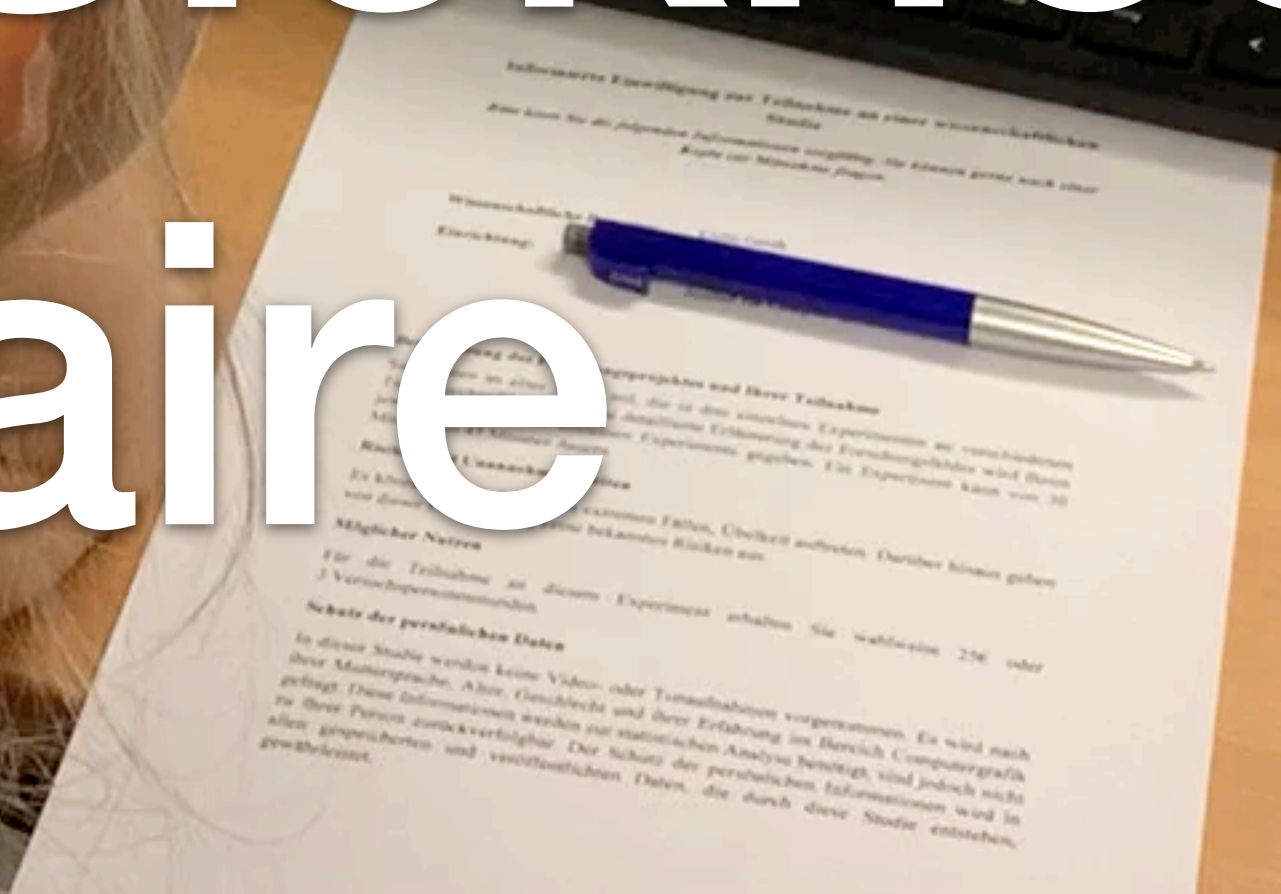
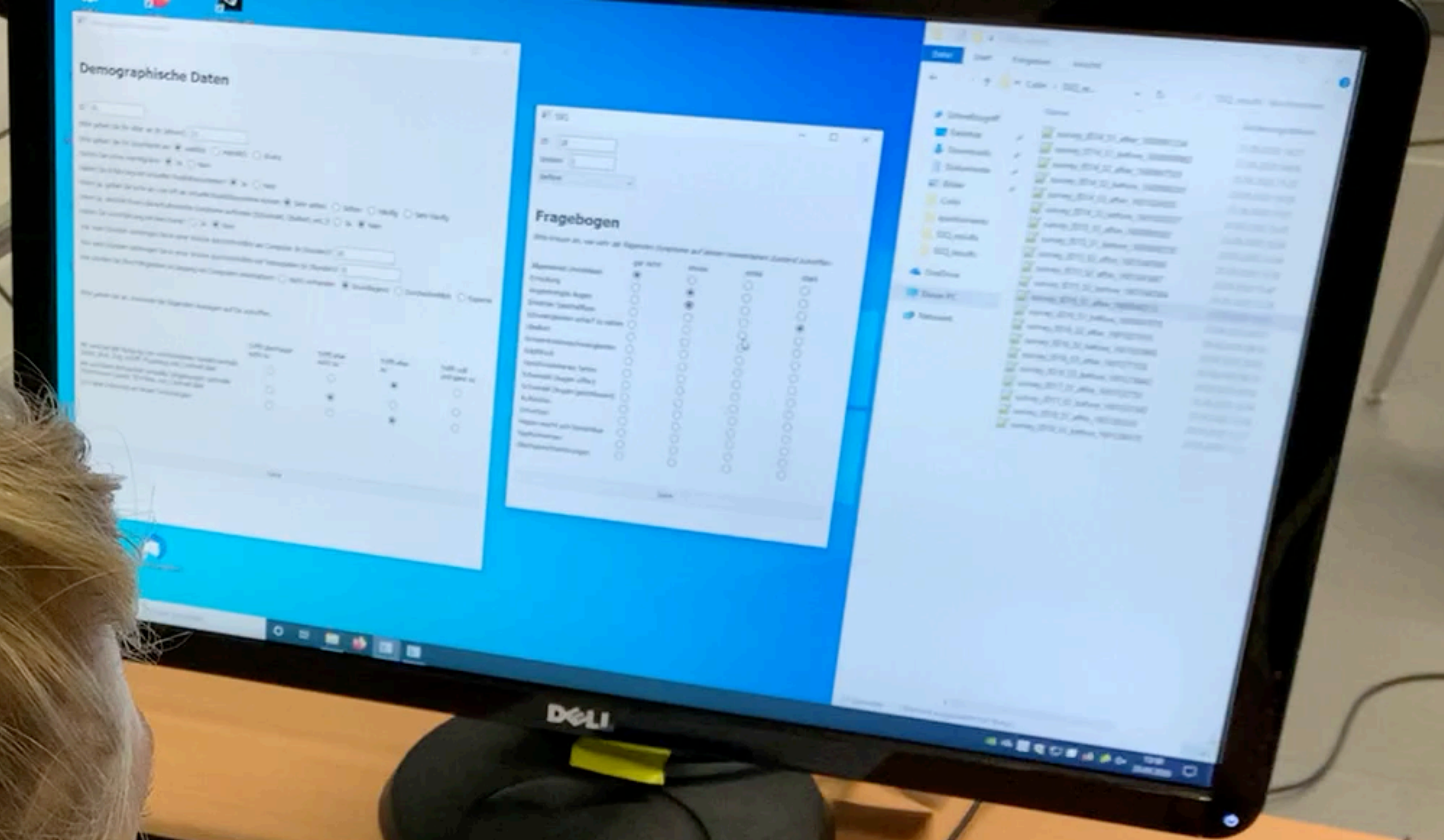
Kennedy et al. 1993

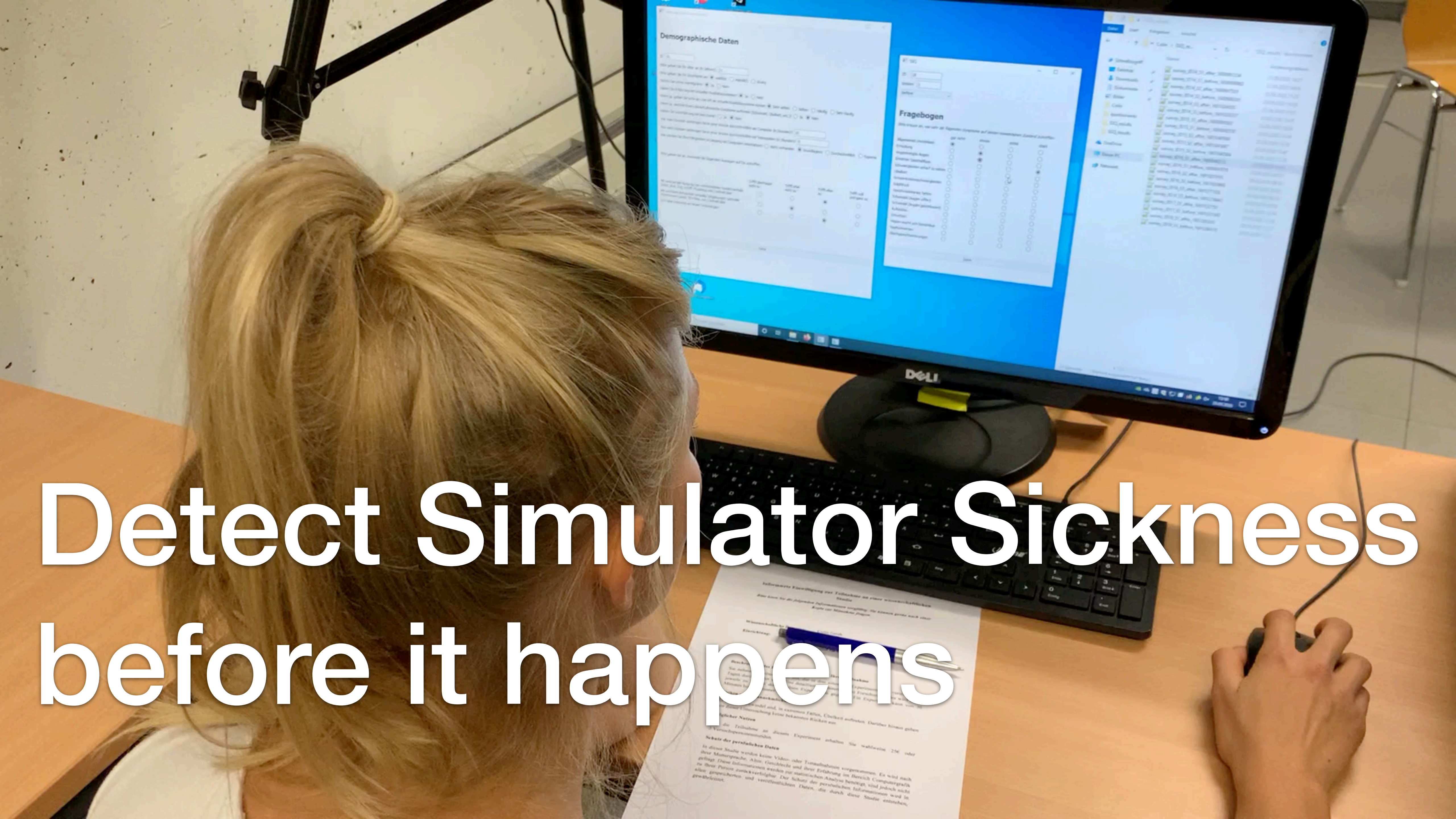
Simulator Sickness Questionnaire



Kennedy et al. 1993

Simulator Sickness Questionnaire



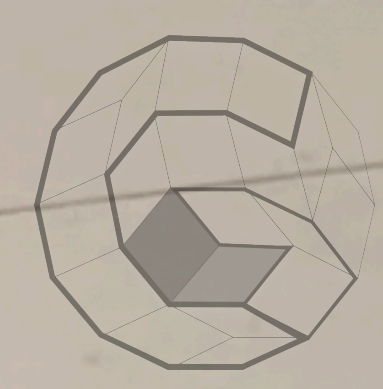


Detect Simulator Sickness
before it happens



Electro- encephalo- graphy





Peripheral Physiology



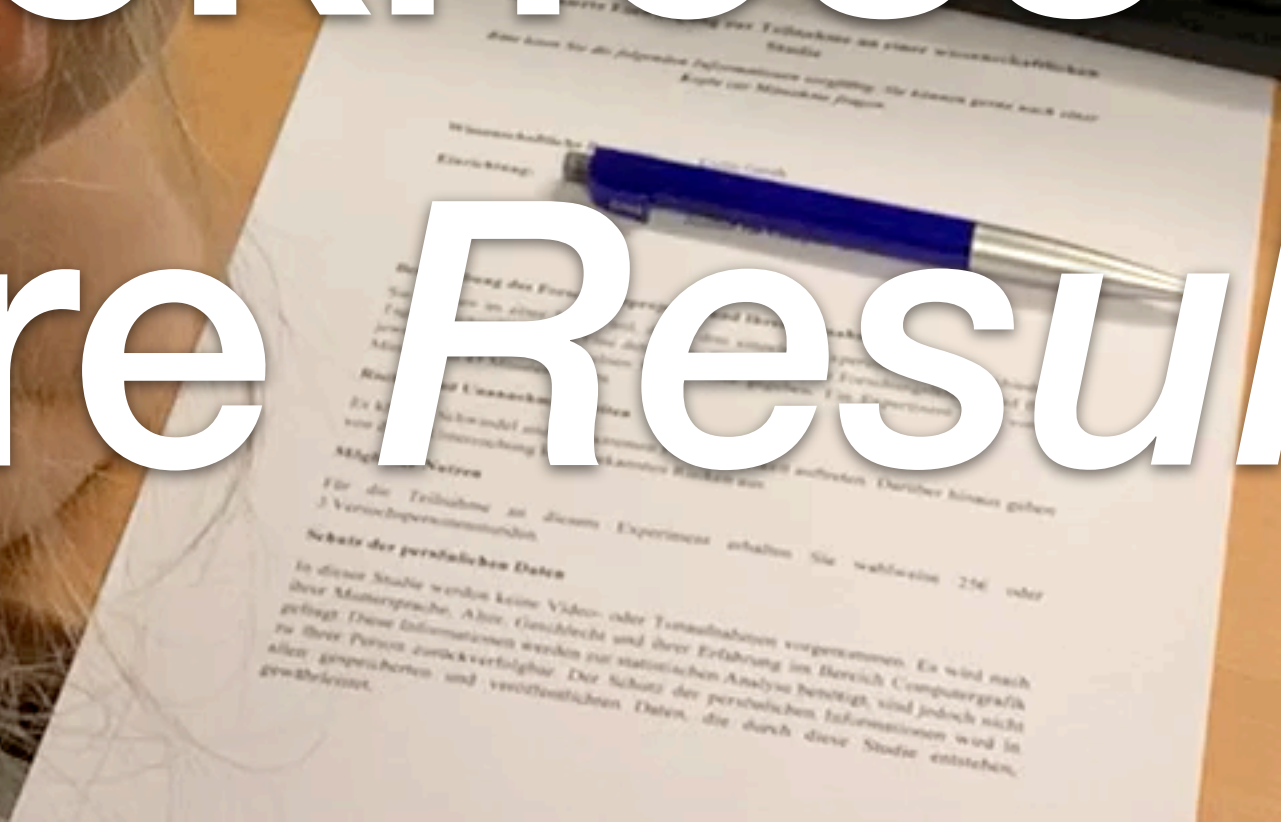
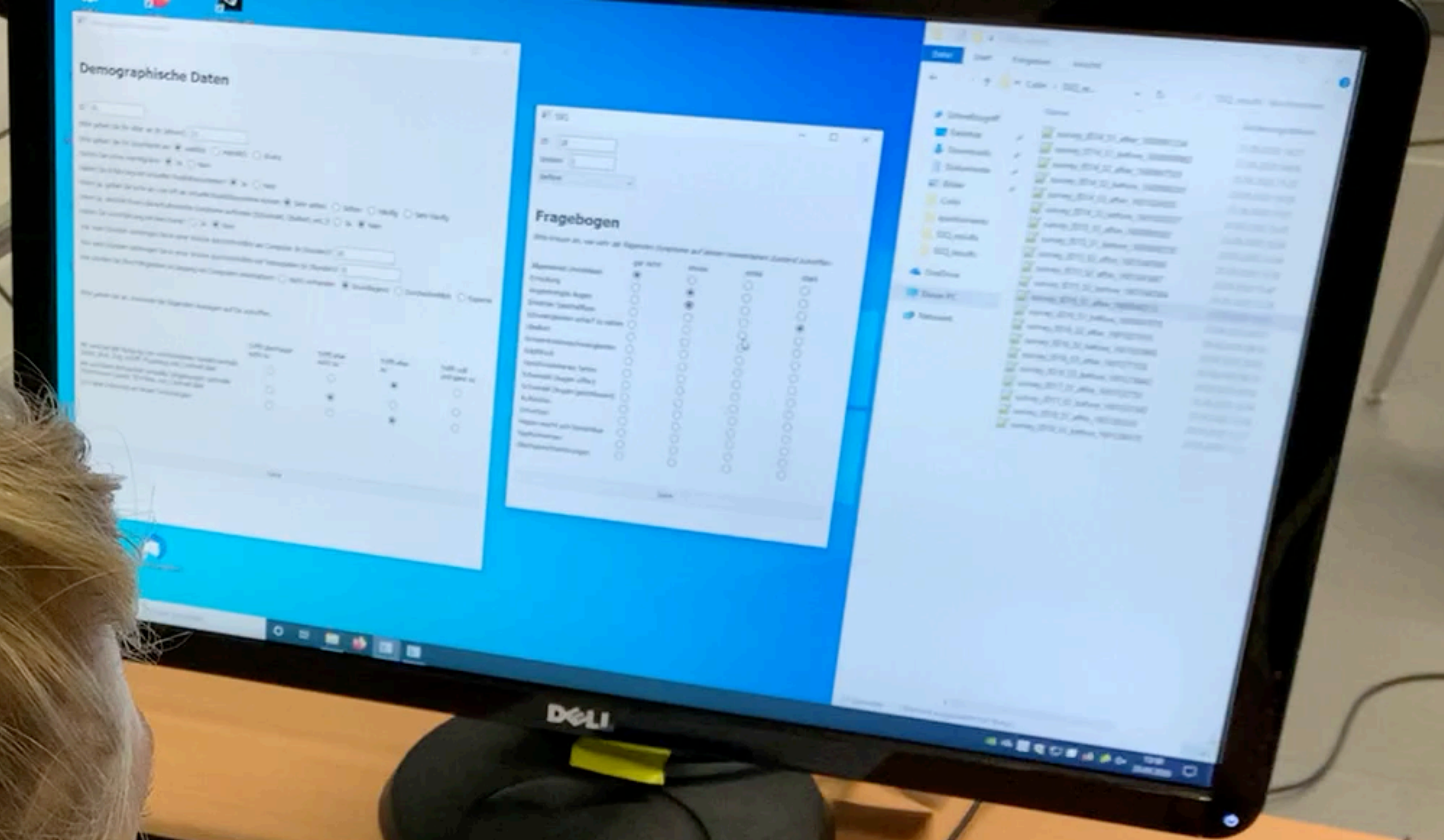






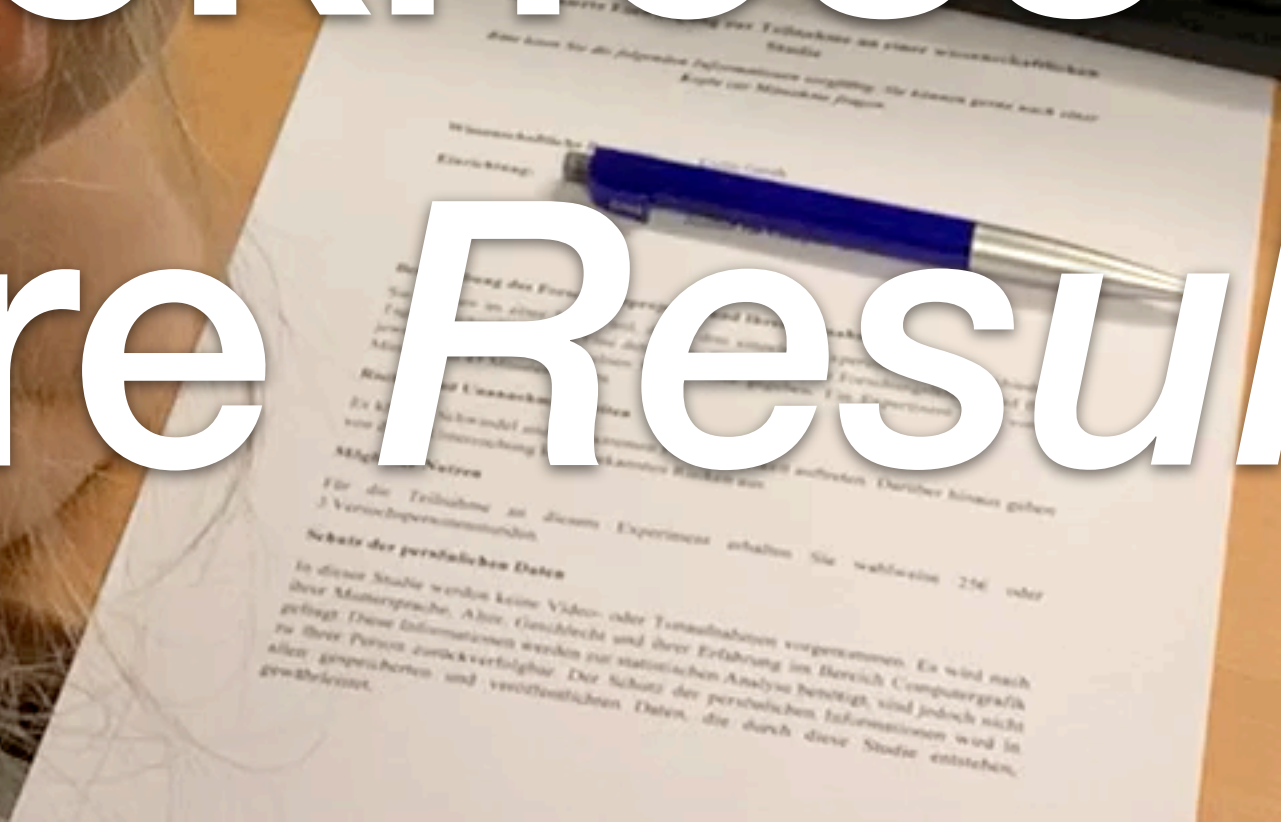
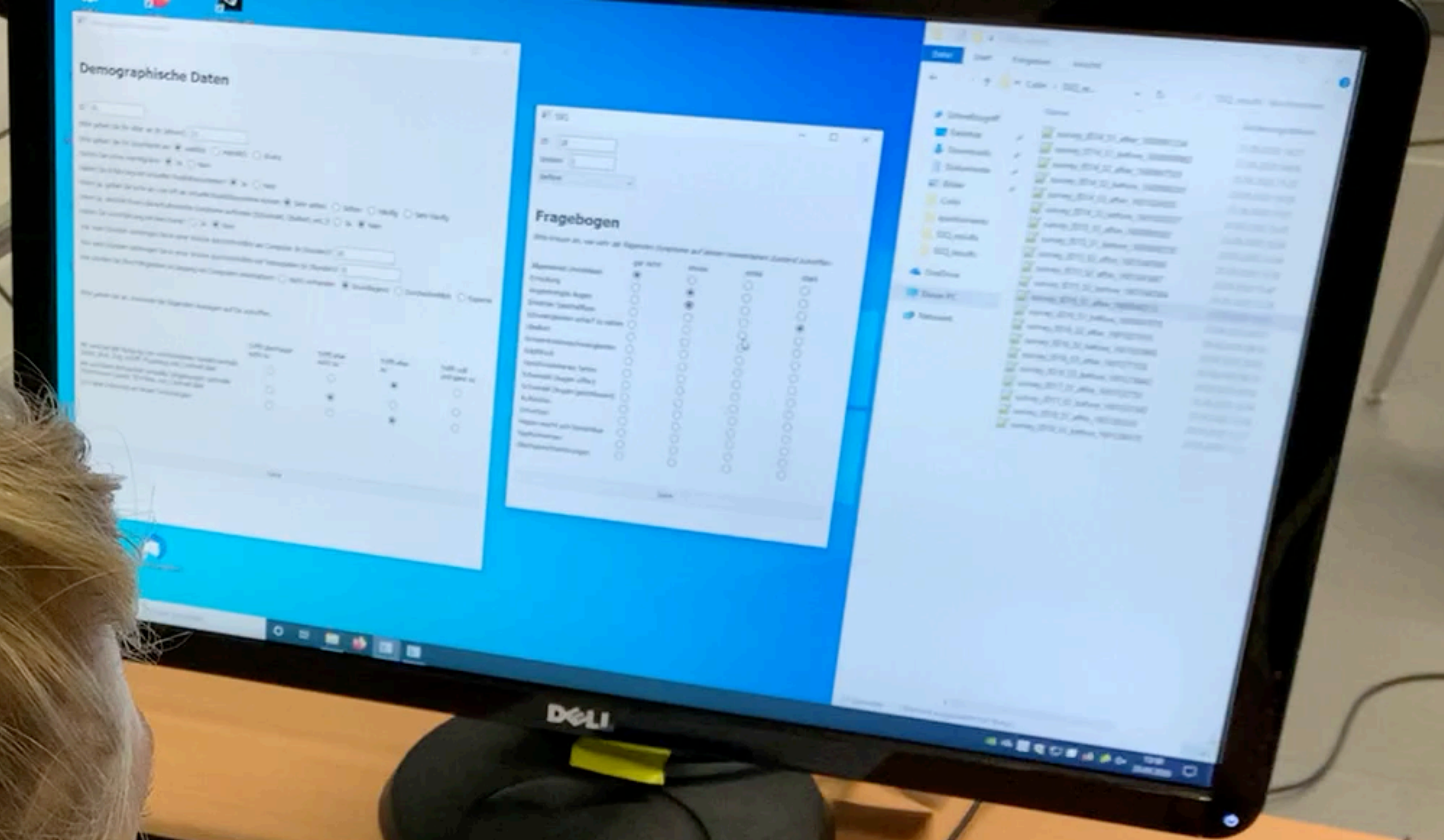
Kennedy et al. 1993

Simulator Sickness Questionnaire *Results*



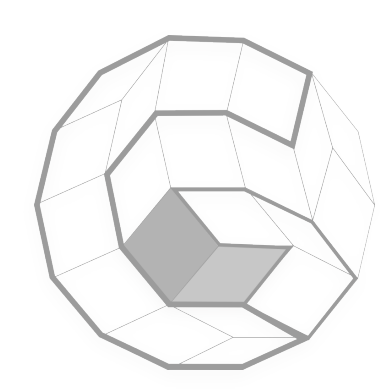
Kennedy et al. 1993

Simulator Sickness Questionnaire *Results*

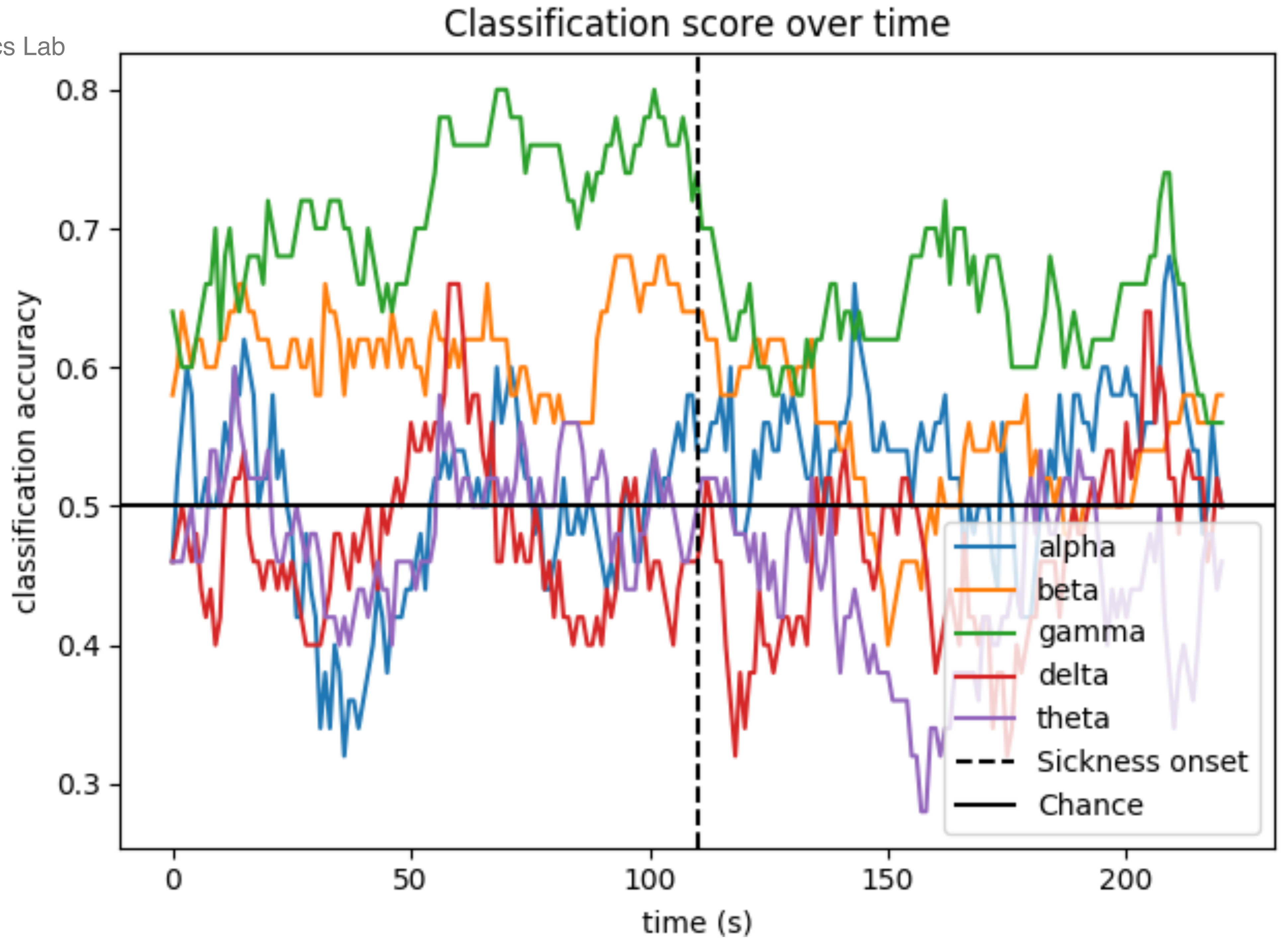


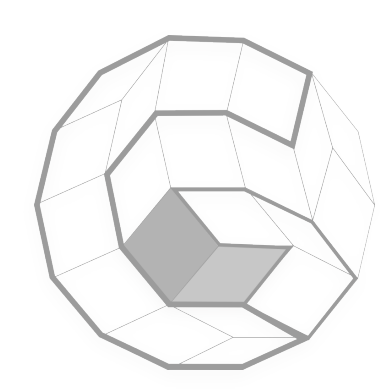
Electroencephalography Results



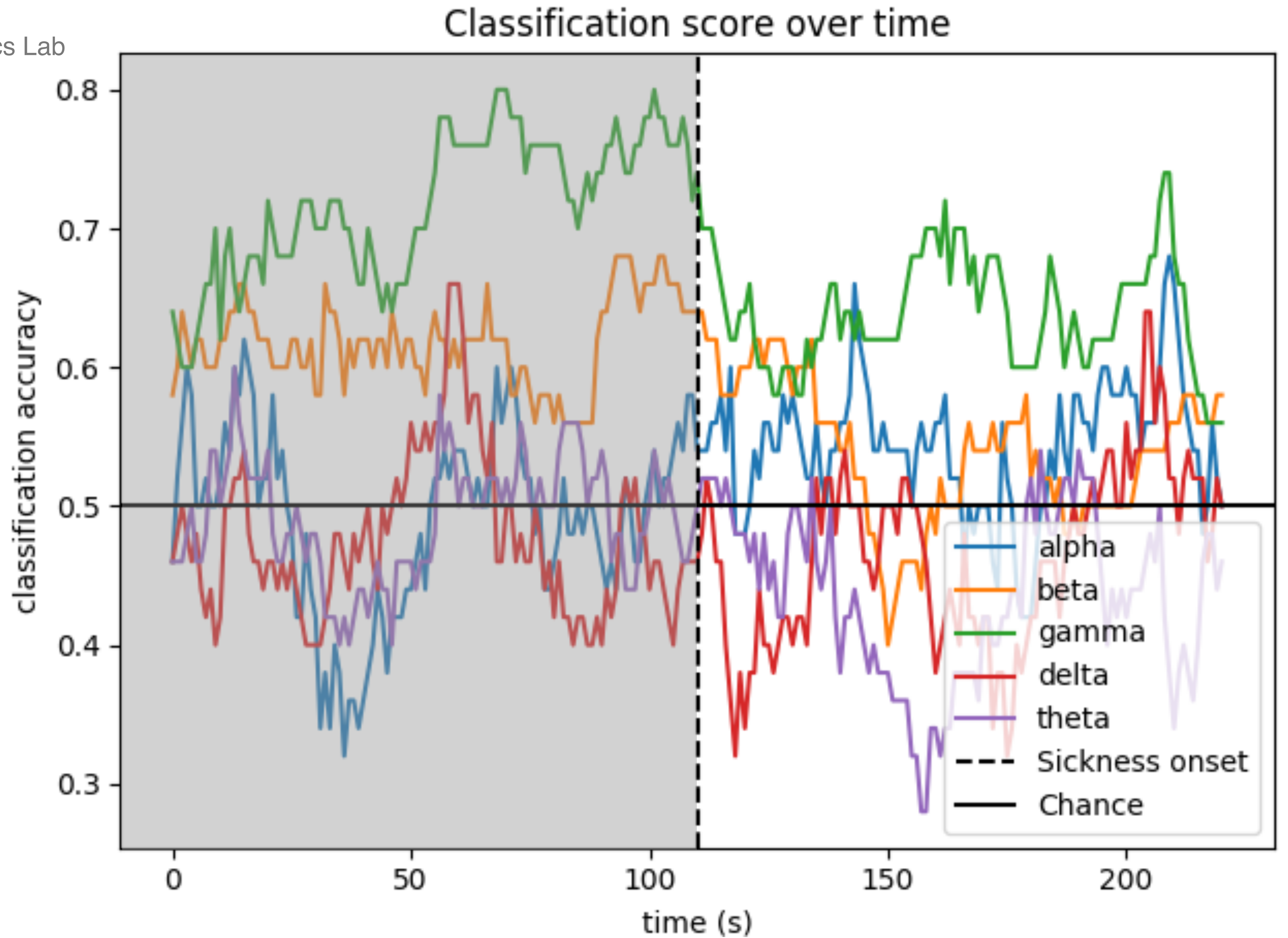


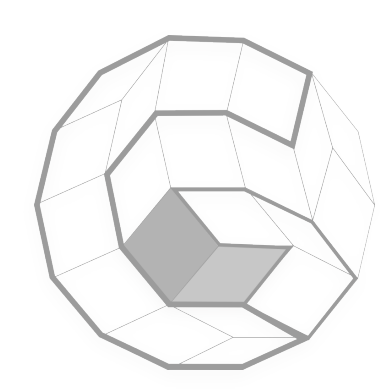
EEG Results



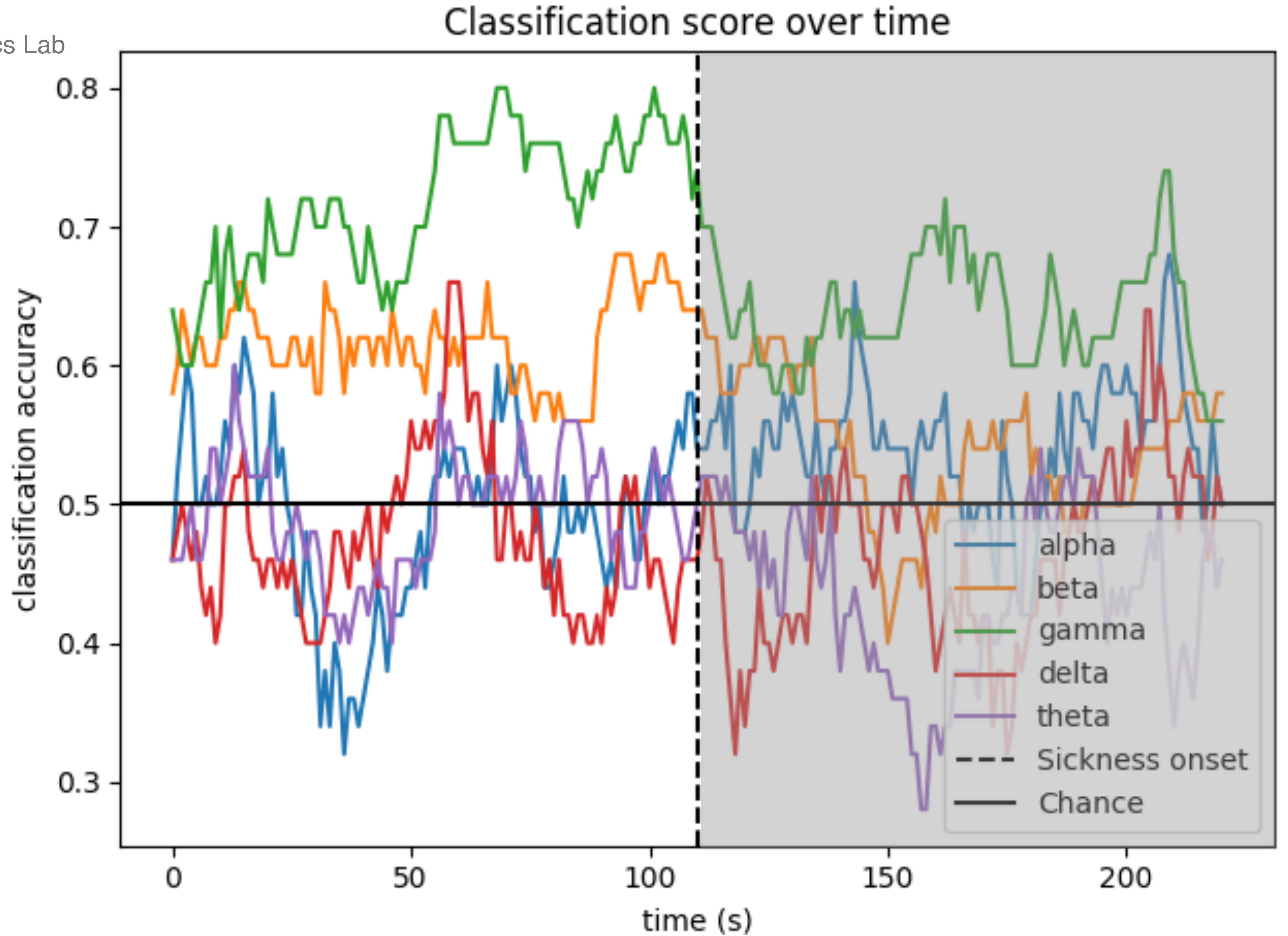


EEG Results





EEG Results



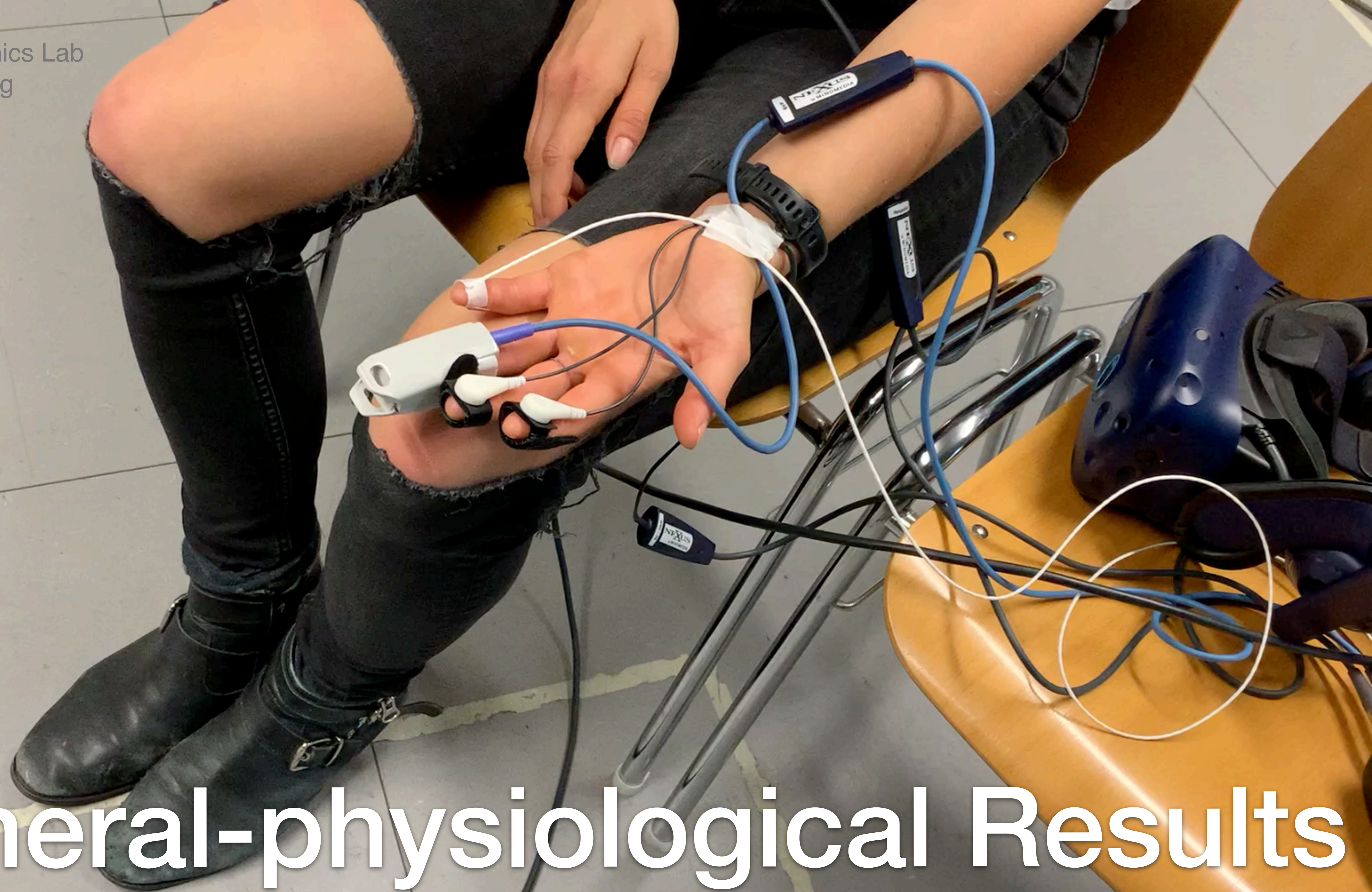
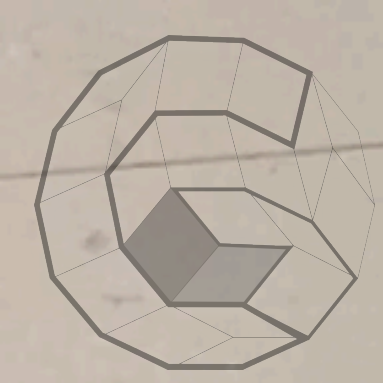
EEG Results



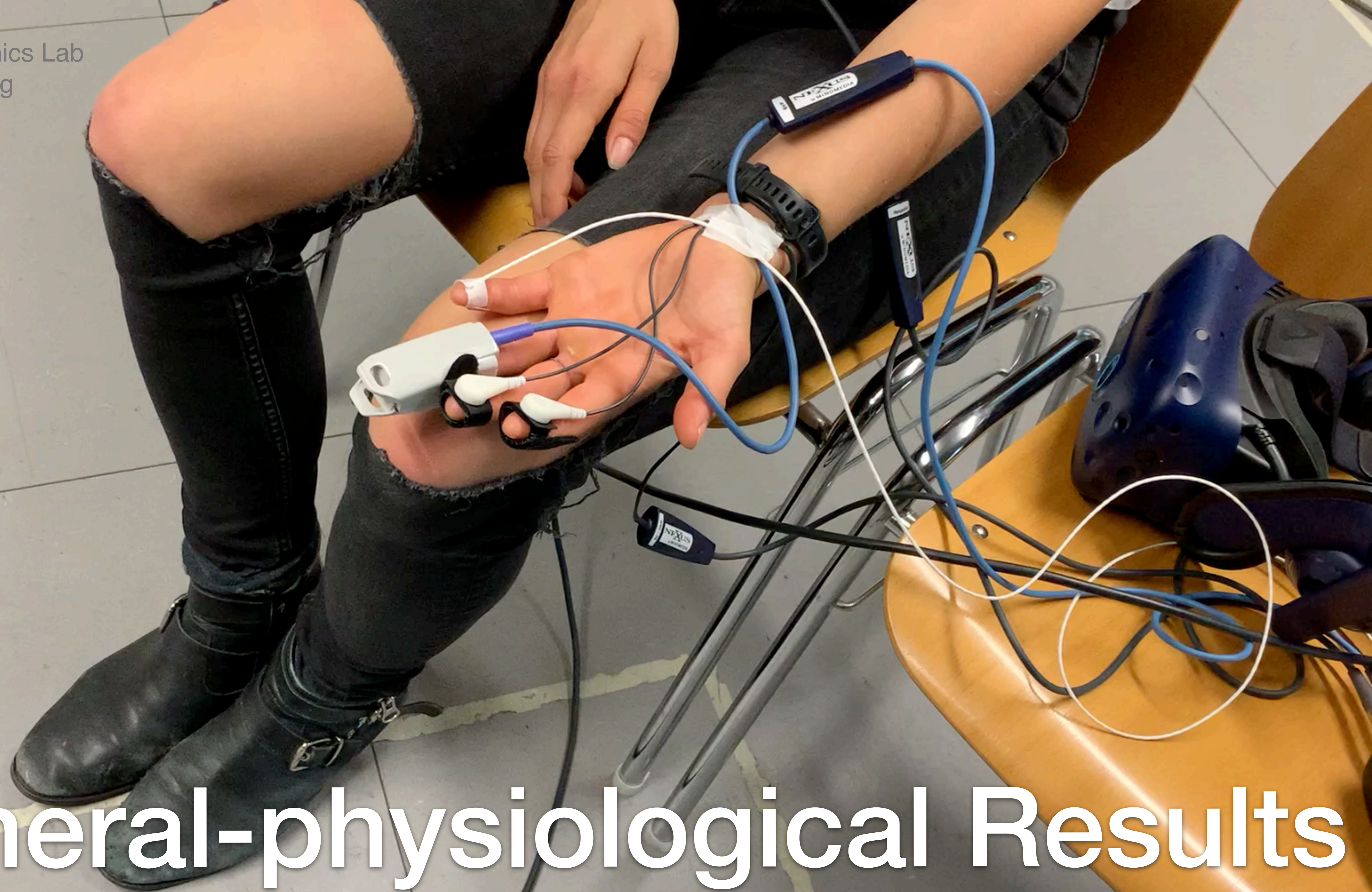
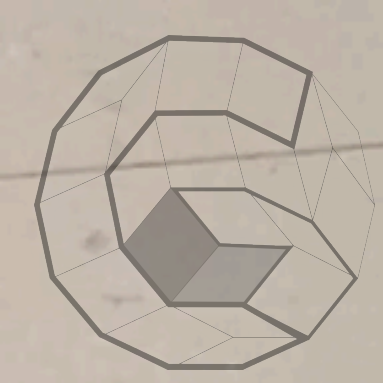
EEG Results

A man is shown from the chest up, wearing a grey EEG cap with several electrodes and wires attached. He is also wearing black VR goggles with four bright lights on the front. He is holding a black game controller with both hands. The background is a dark blue wall with some faint lines. The text 'EEG Results' is overlaid in large white letters at the top left.

Not significant *but indication*



Peripheral-physiological Results



Peripheral-physiological Results

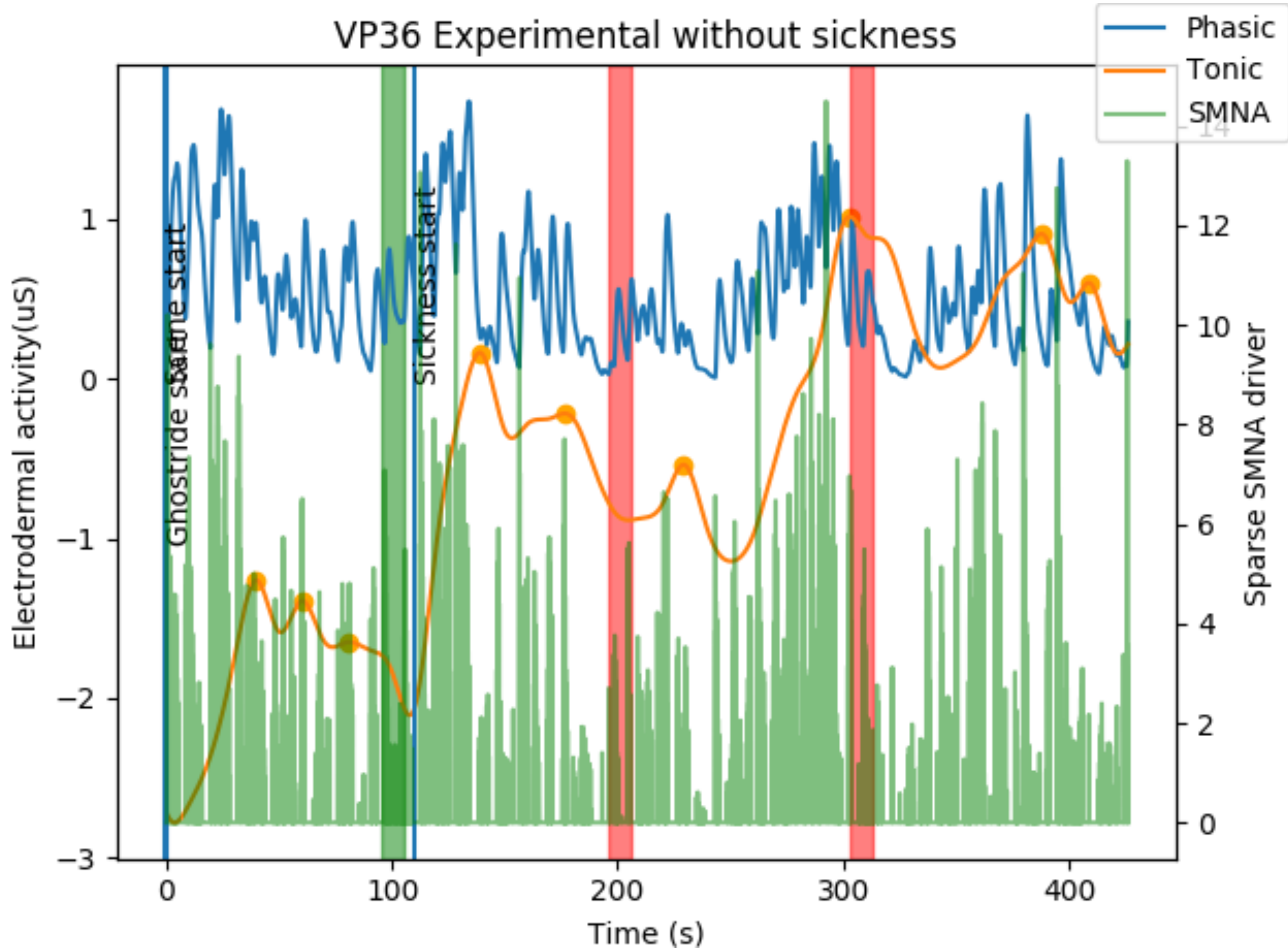


Electro-Dermal Activity

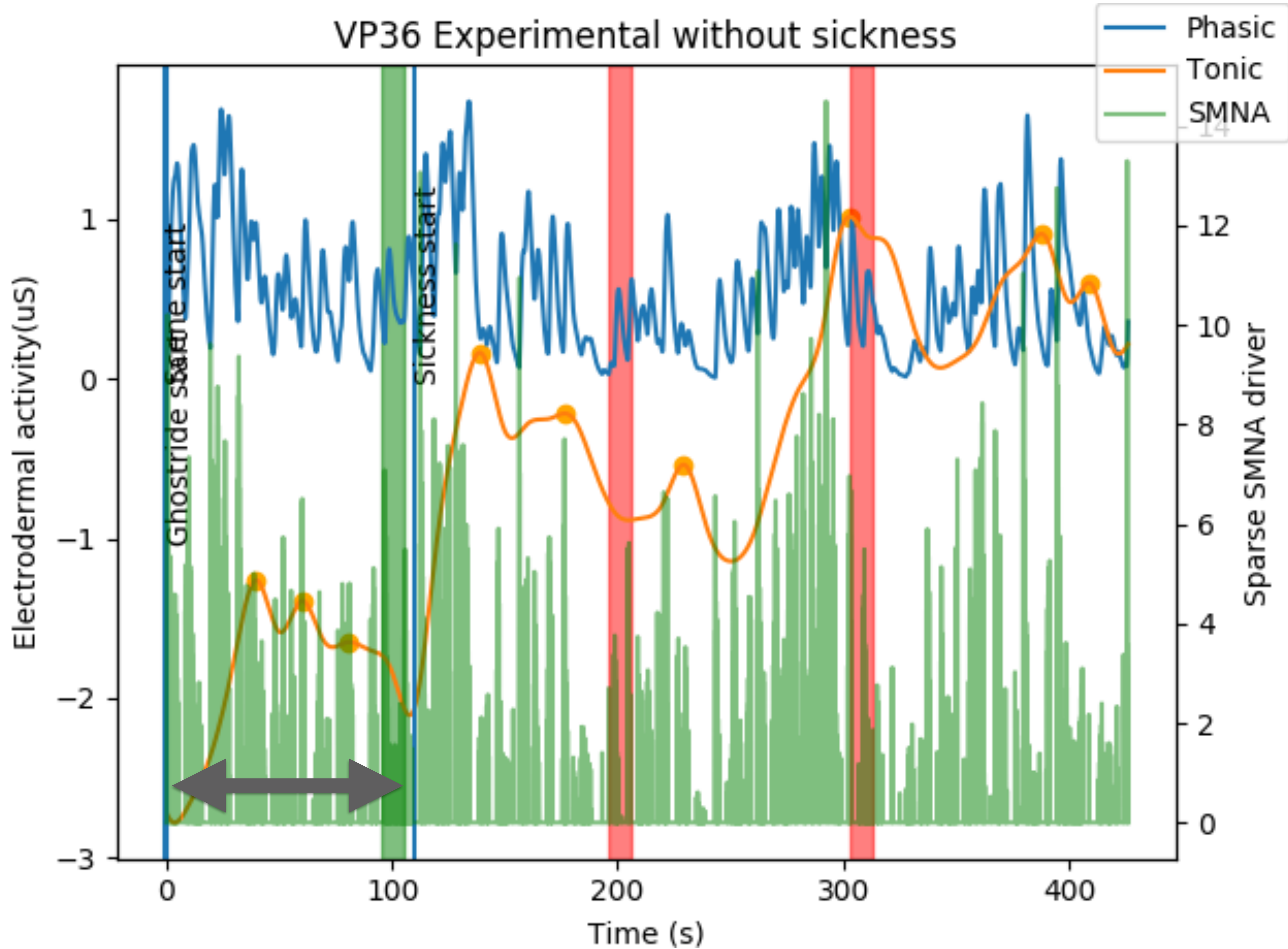


Electro-Dermal Activity

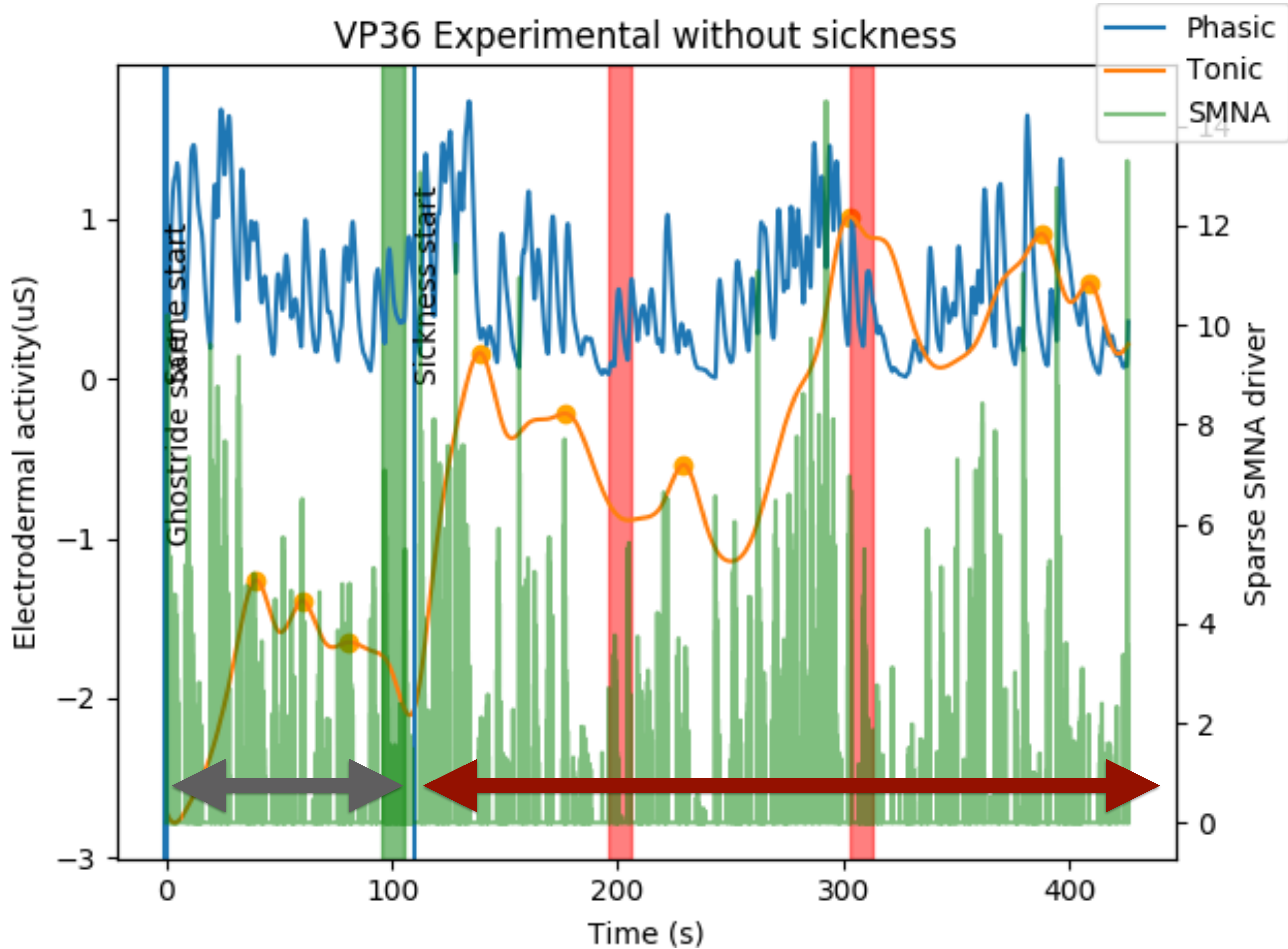
EDA Results



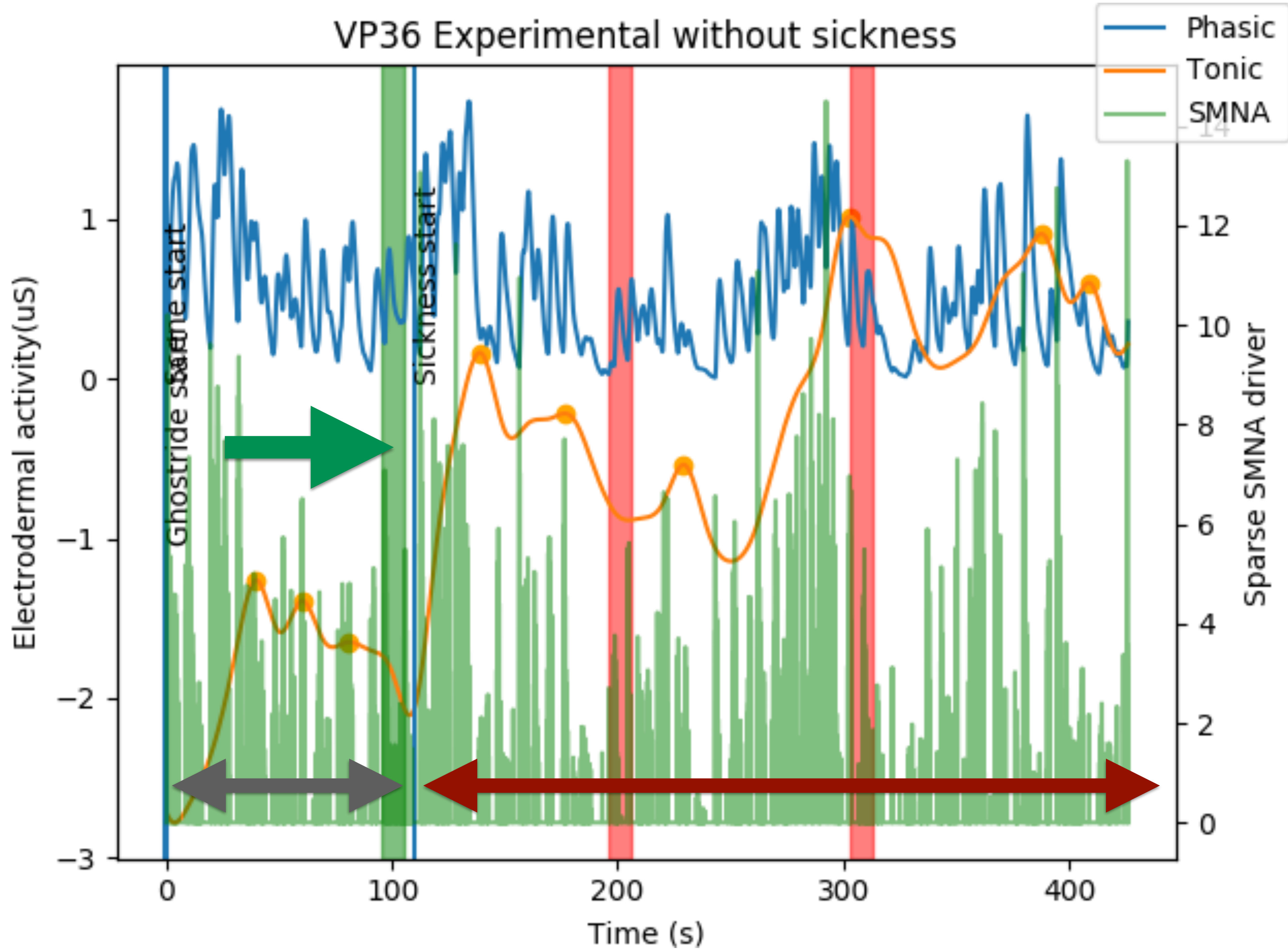
EDA Results



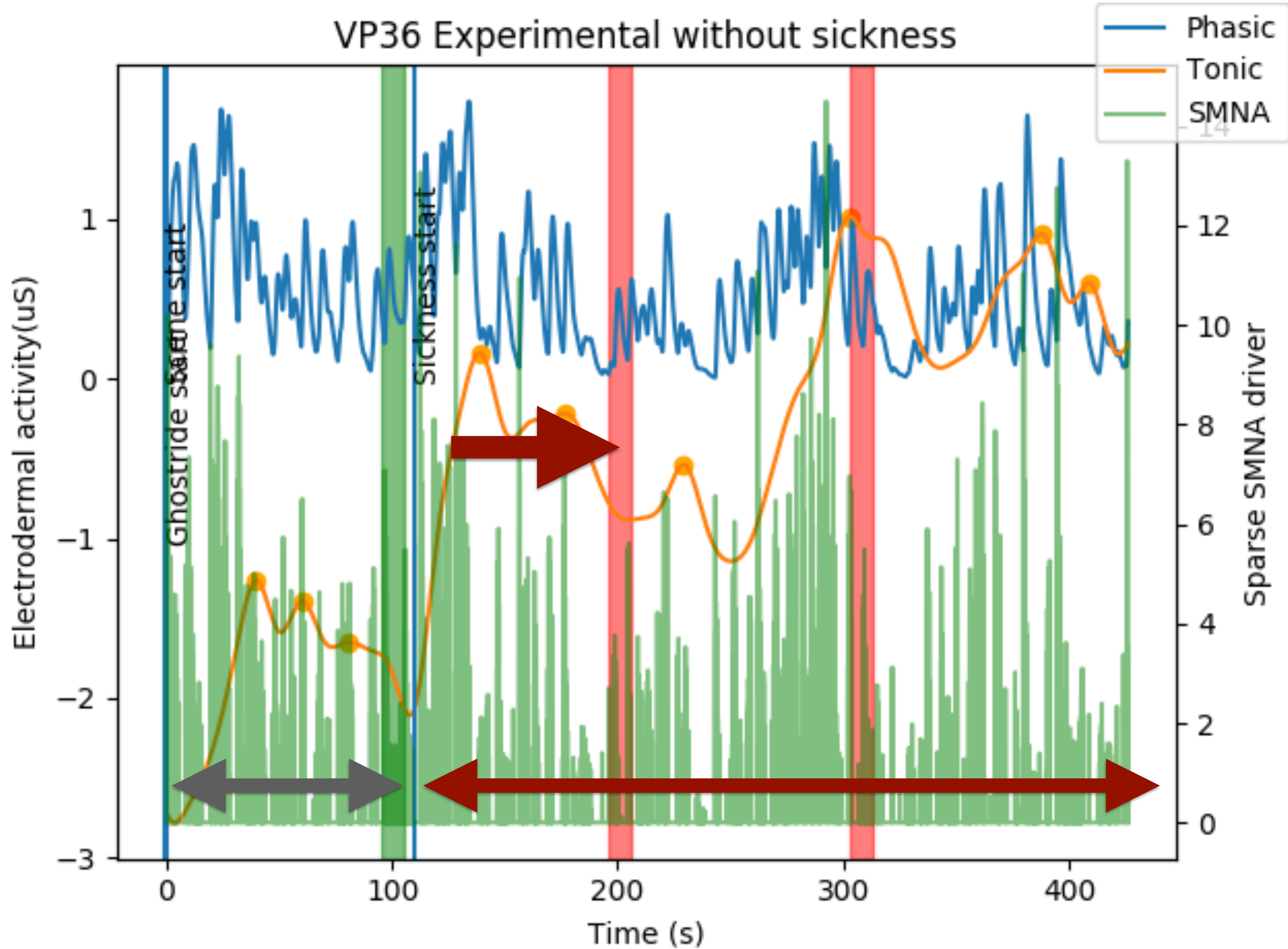
EDA Results



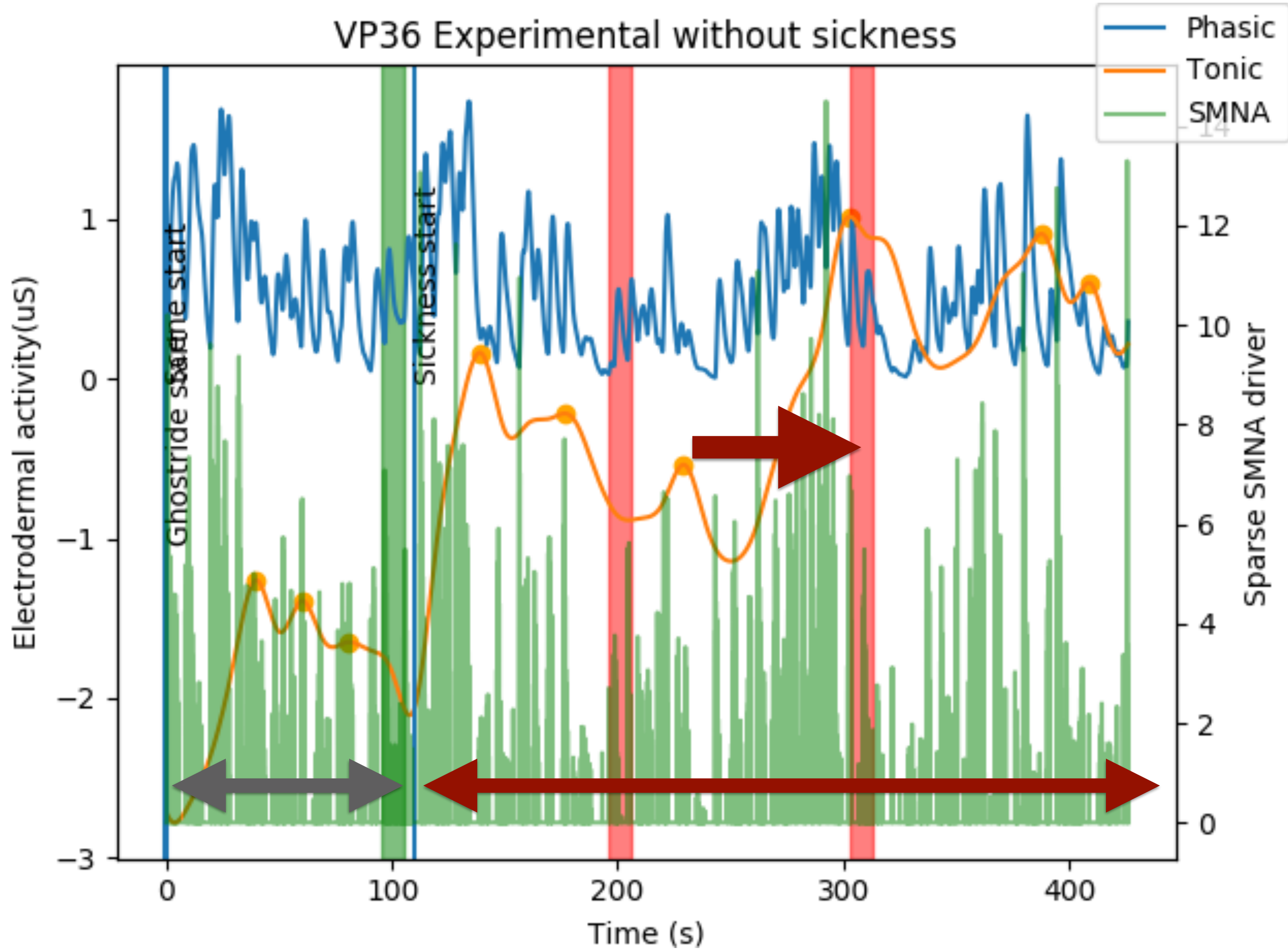
EDA Results



EDA Results



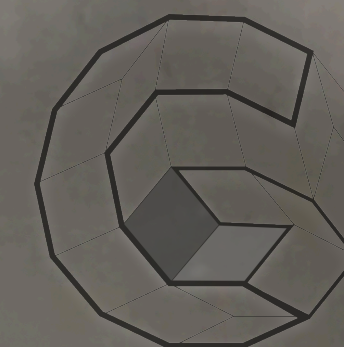
EDA Results

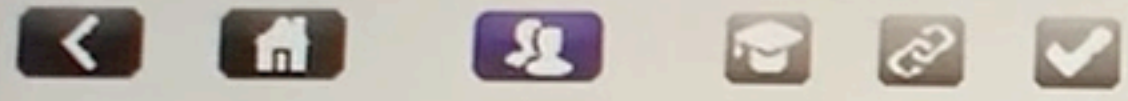


EDA Classification Results

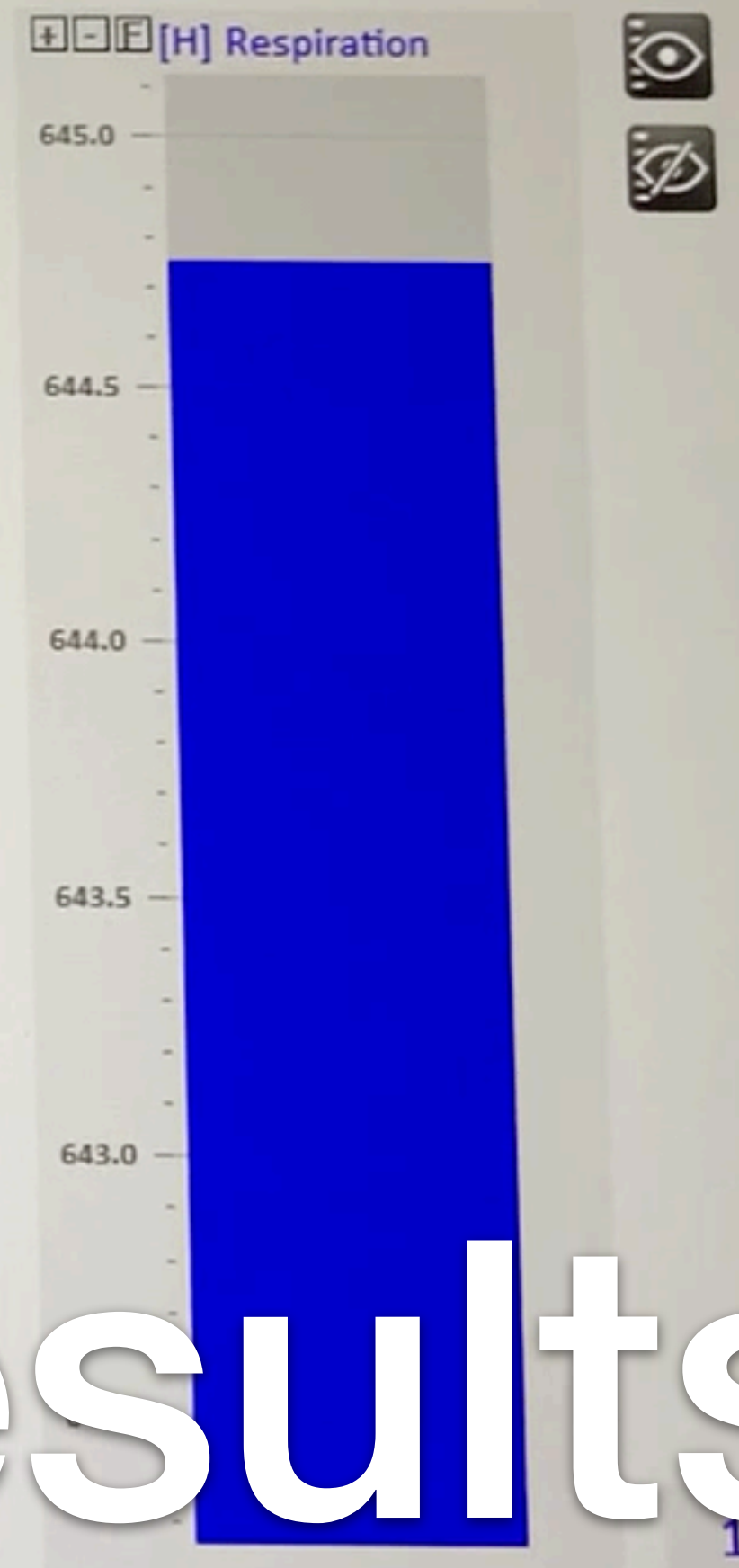
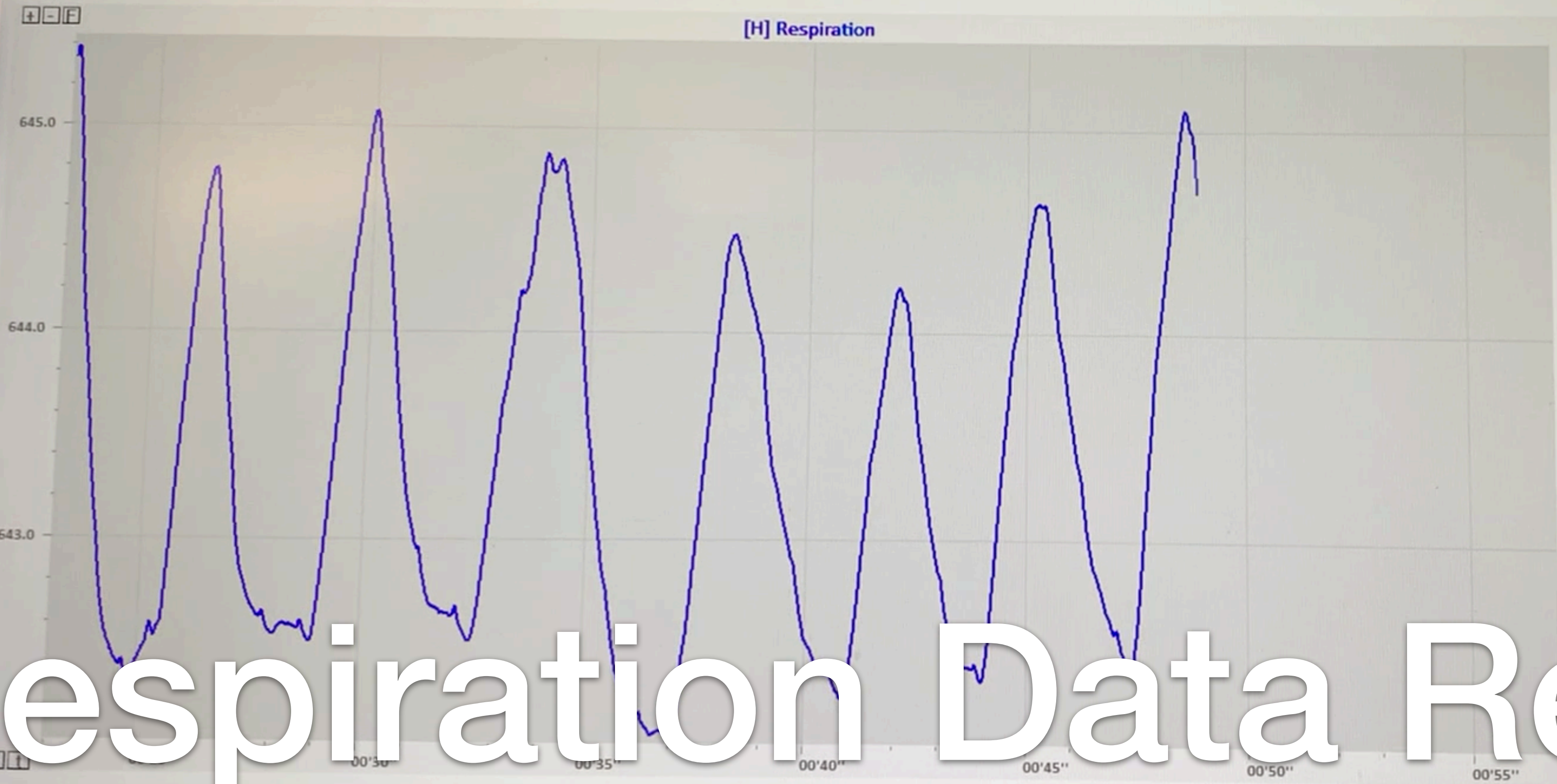
Phasic 93.3 %

Tonic 90 %

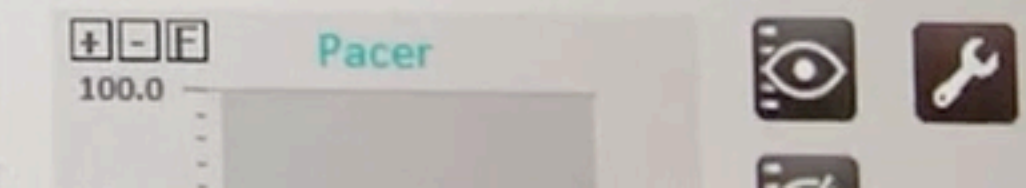
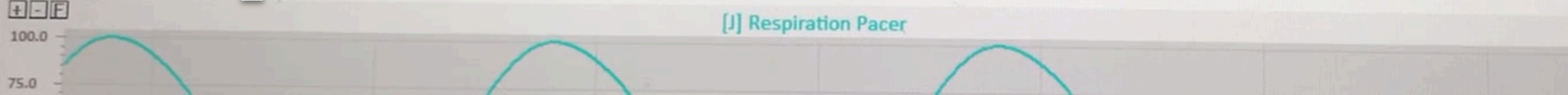


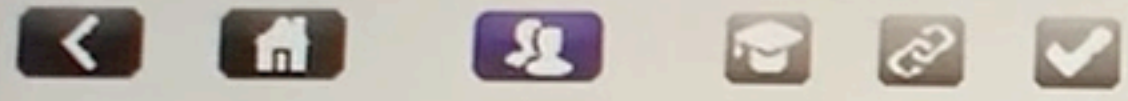


Basic - Respiration

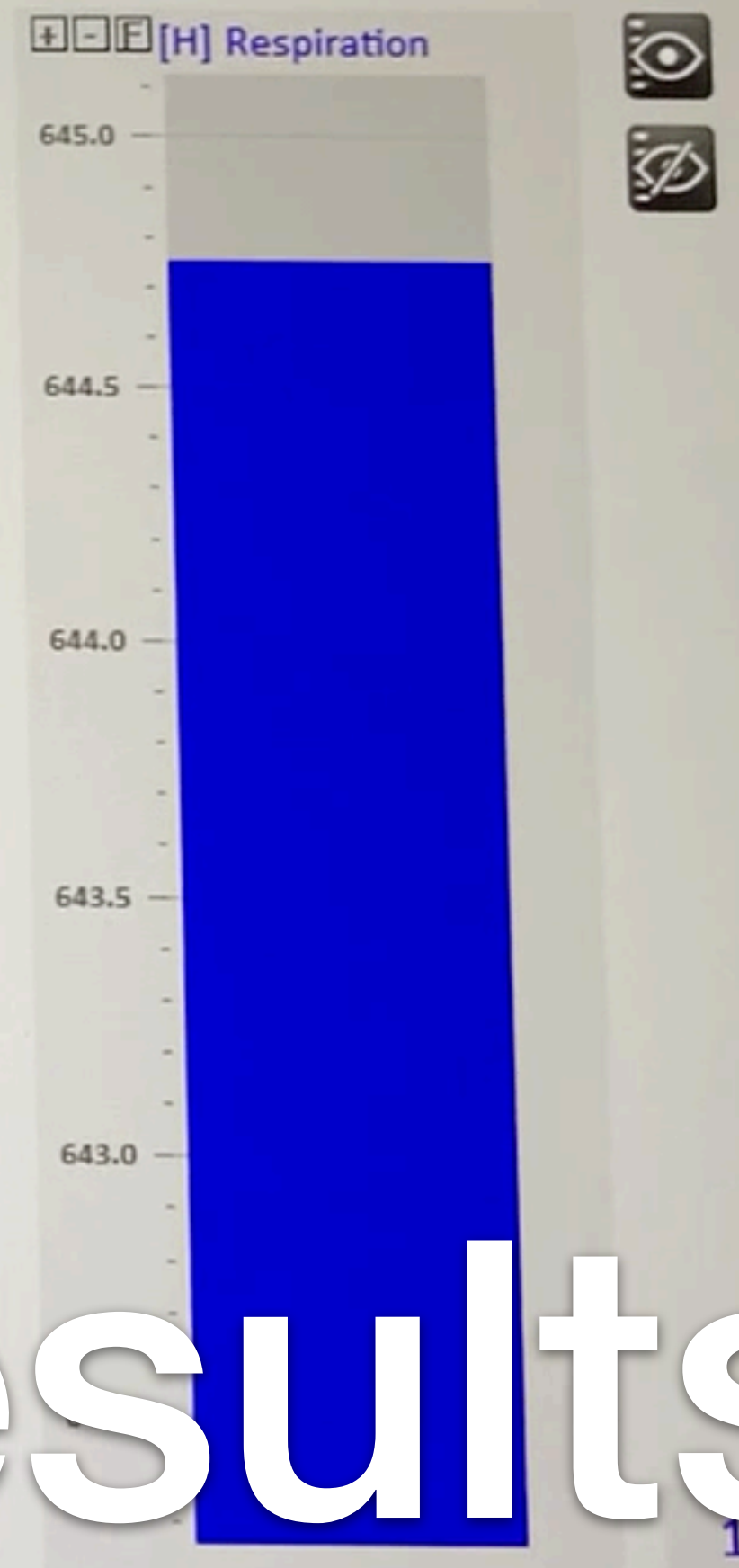
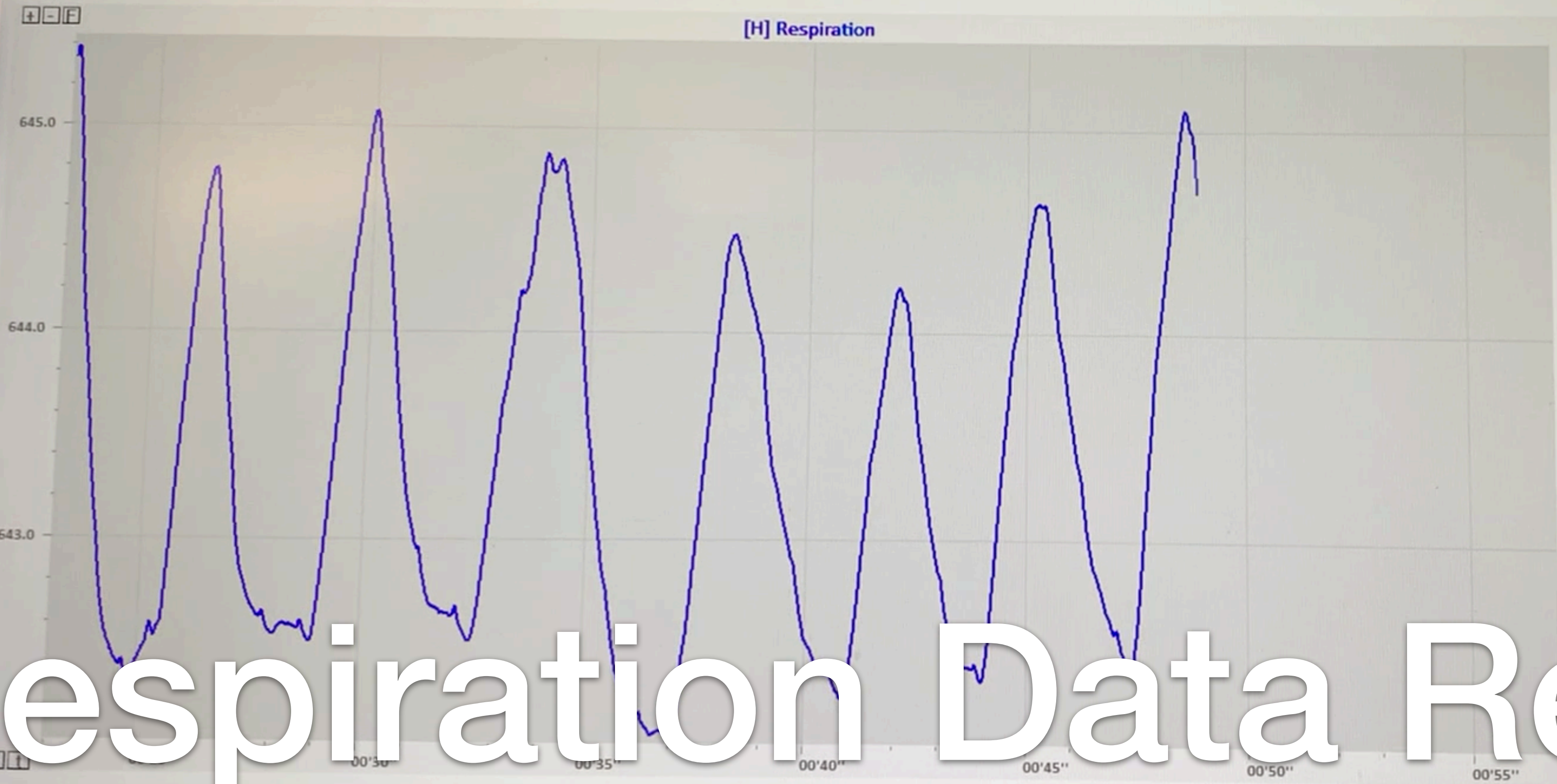


Respiration Data Results

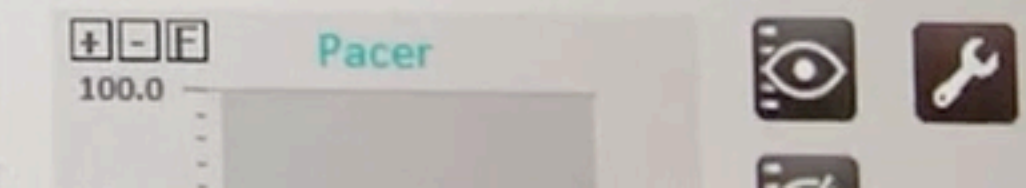
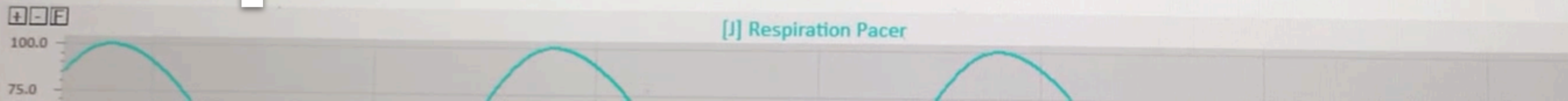


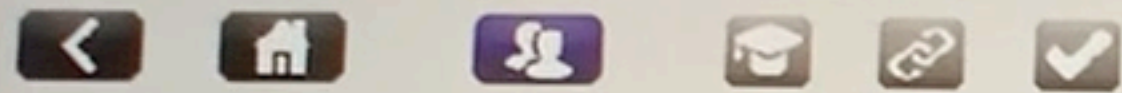


Basic - Respiration

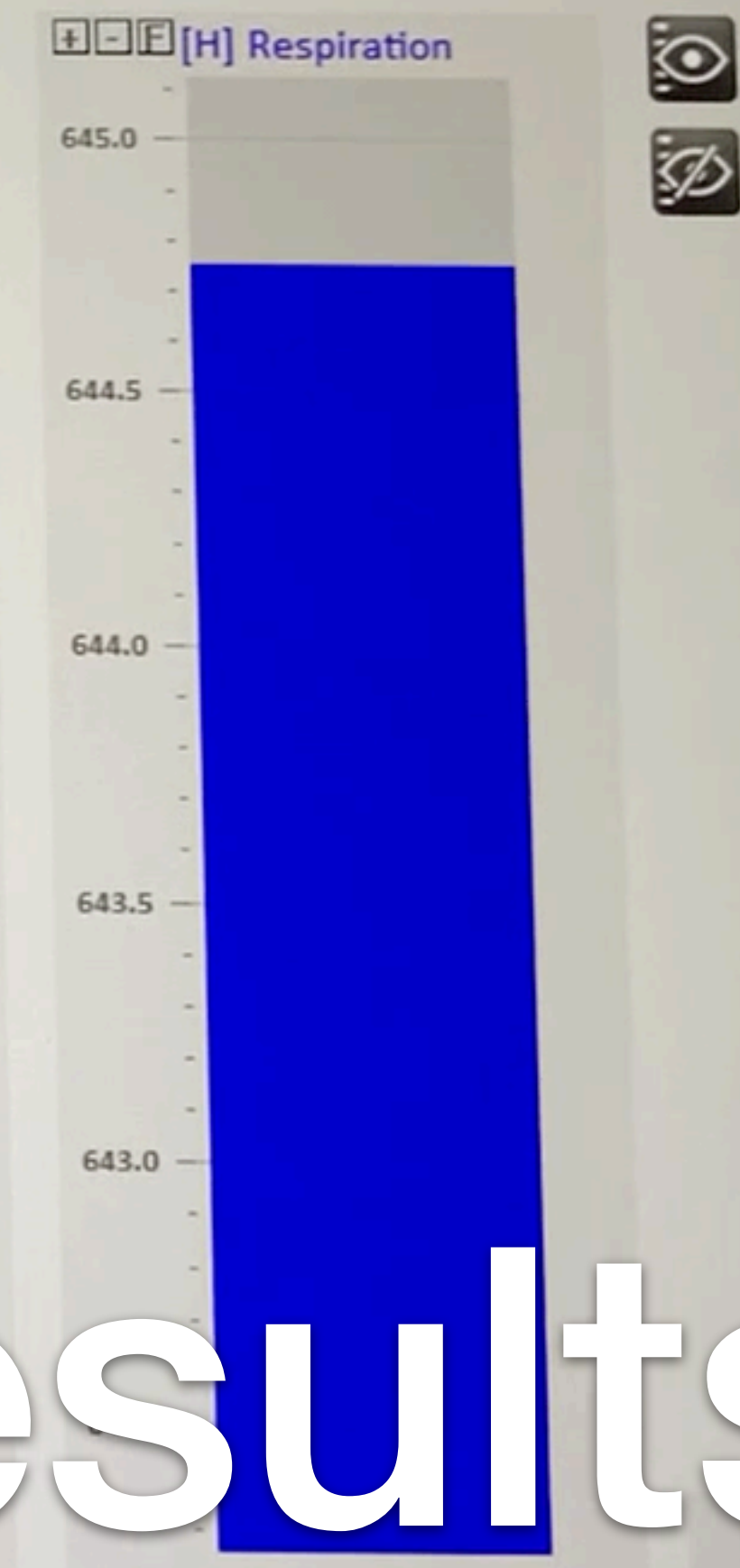
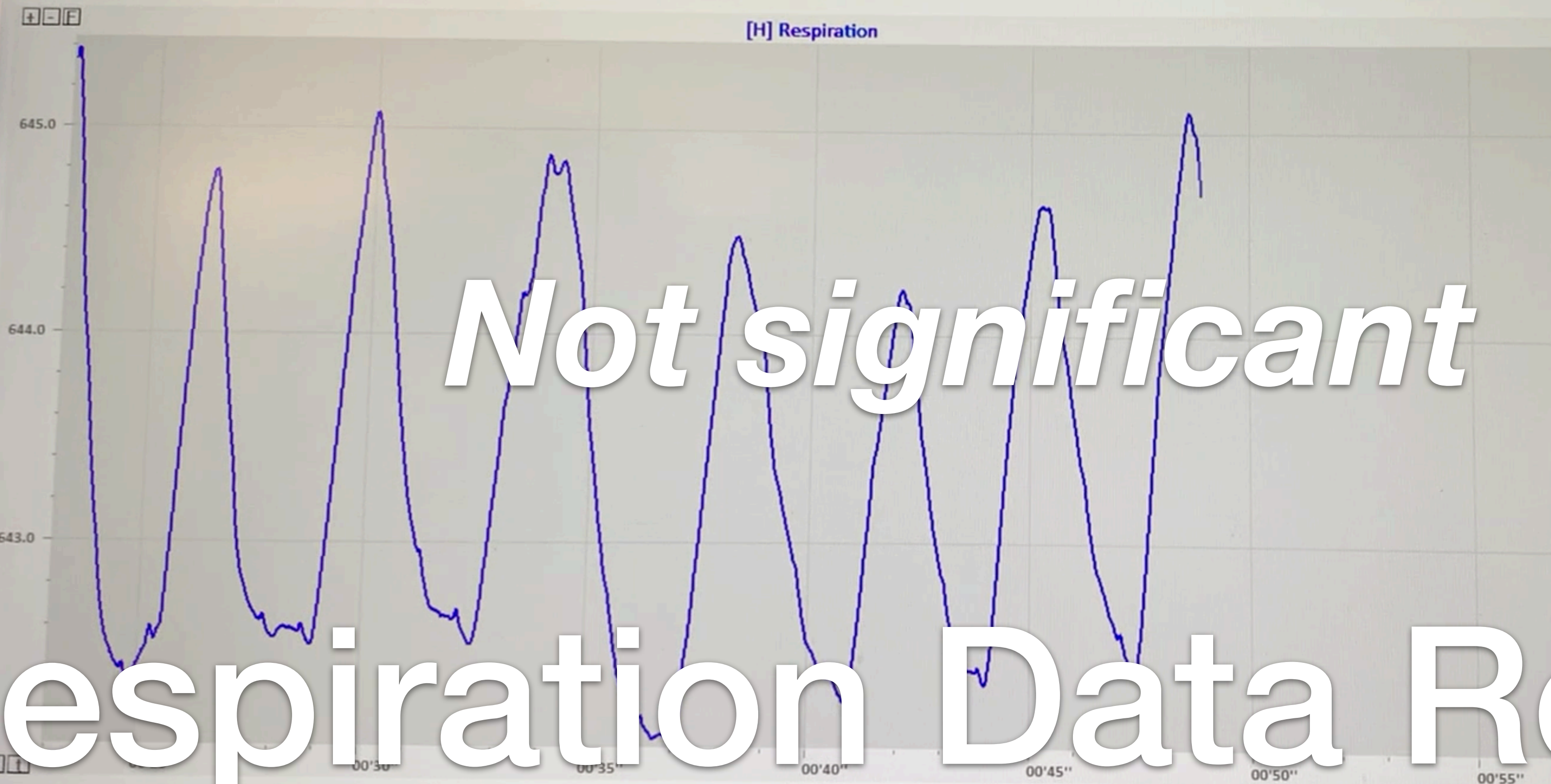


Respiration Data Results



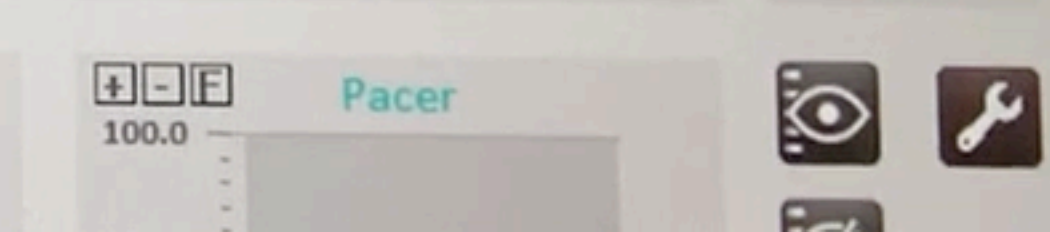
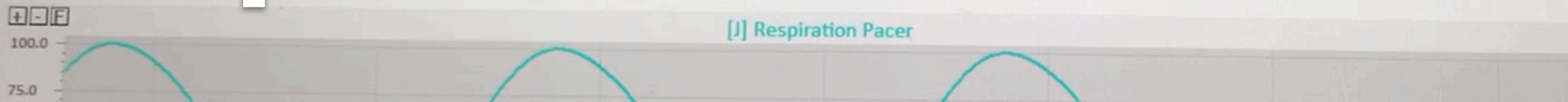


Basic - Respiration



Not significant

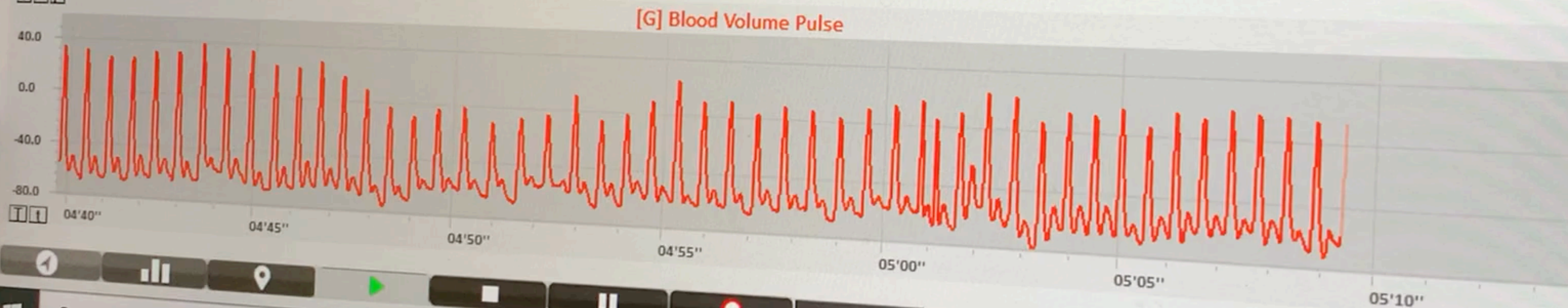
Respiration Data Results



Heart Results



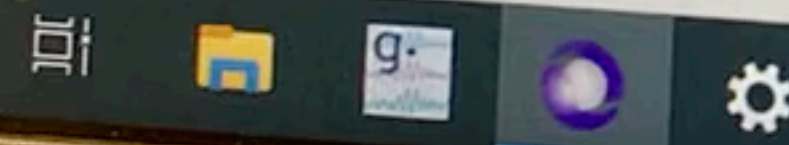
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Navigation and playback controls including a search bar, a play button, a stop button, a pause button, a red indicator light, and a time display showing 05:09:375.

Type here to search

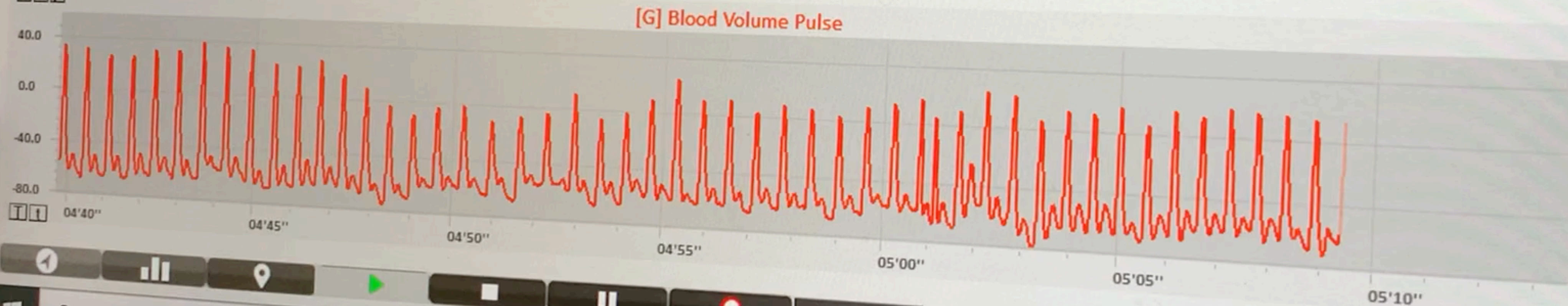
05:09:375



Heart Results



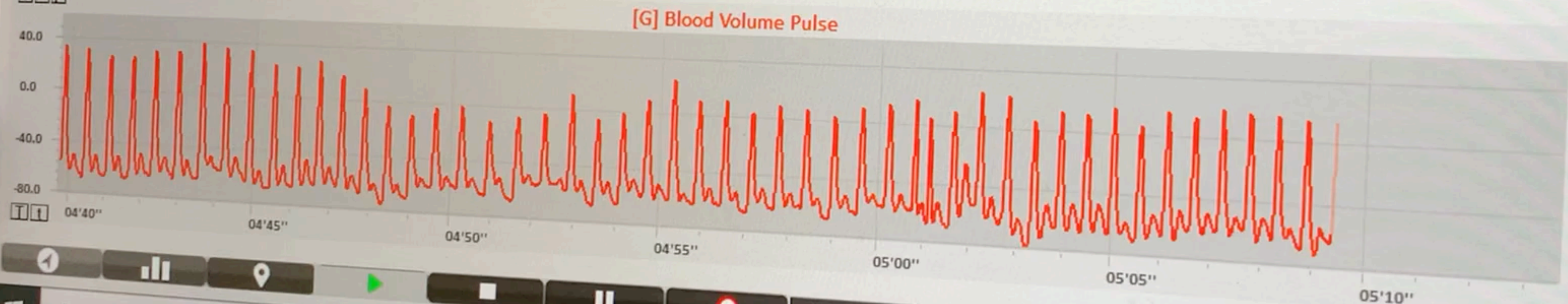
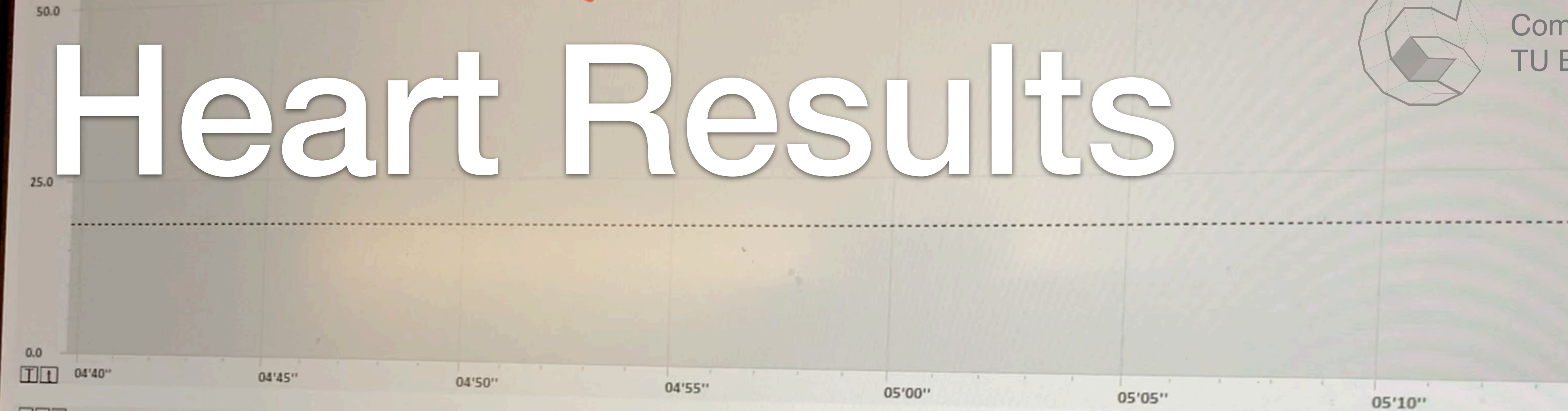
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Windows taskbar and application controls. Includes a search bar with the text "Type here to search", taskbar icons for File Explorer, Google, and Settings, and a media control bar with play, stop, and pause buttons. A timestamp "05:09"375" is visible in the media control bar.



Heart Results



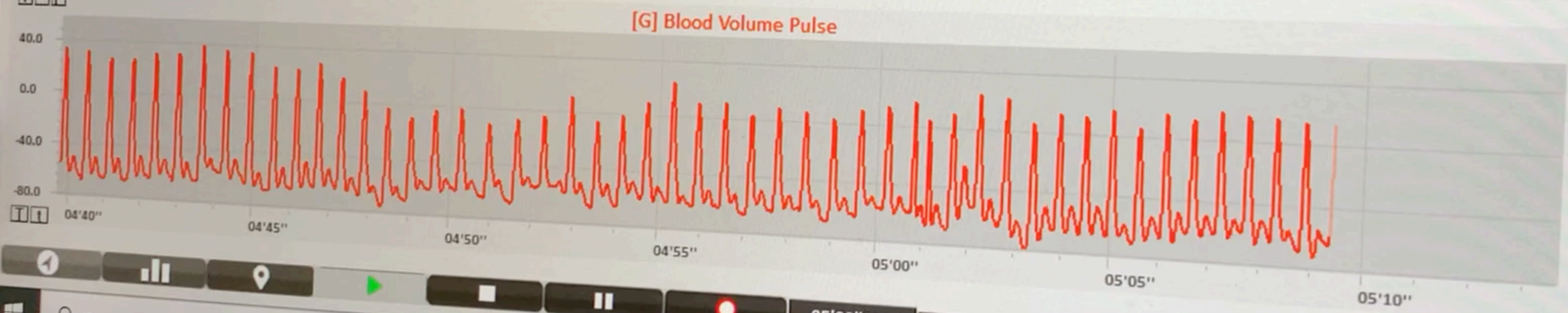
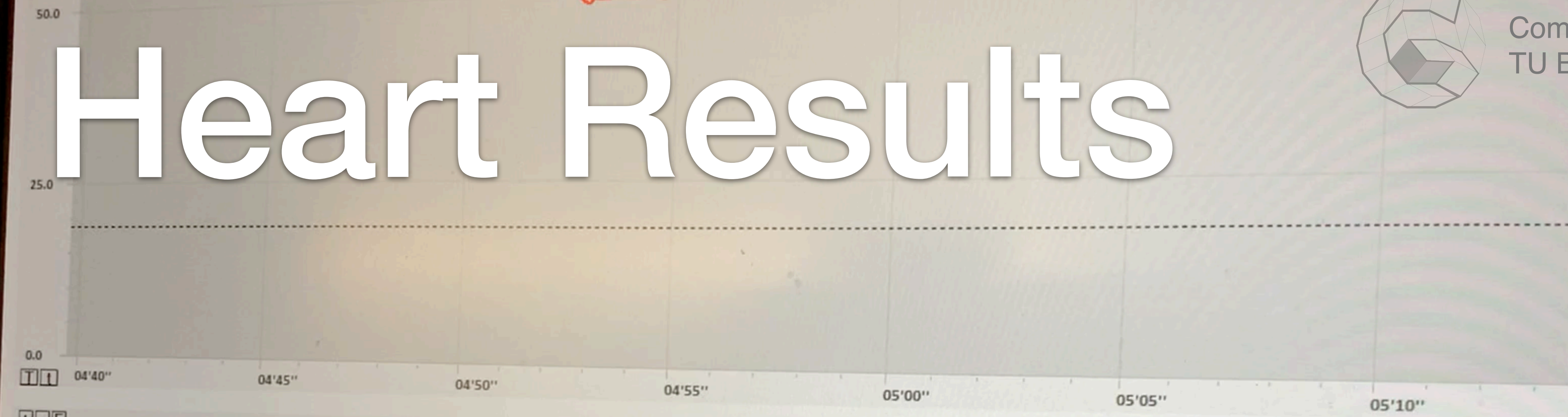
Navigation and control interface for the data visualization software, including a search bar with the text 'Type here to search', a play button, a stop button, a pause button, a red indicator light, and a time display showing '05:09''375'.

Heart Rate Variability

Not significant but indication



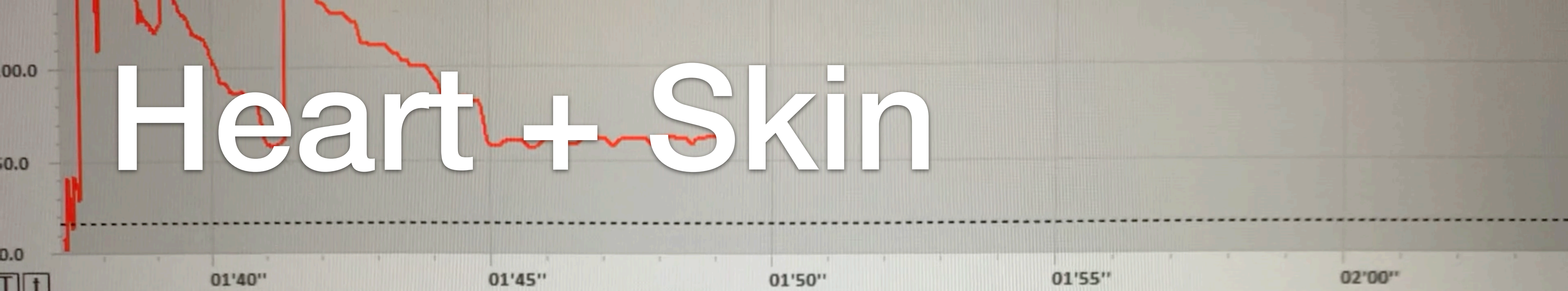
Heart Results



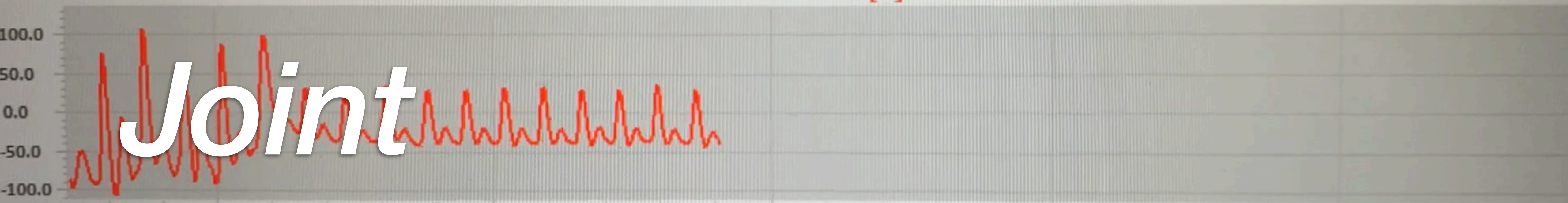
Navigation controls including a search bar with the text 'Type here to search', a play button, a stop button, a pause button, a red indicator light, and a time display showing '05:09''375'.

Blood Volume Pulse 90 %

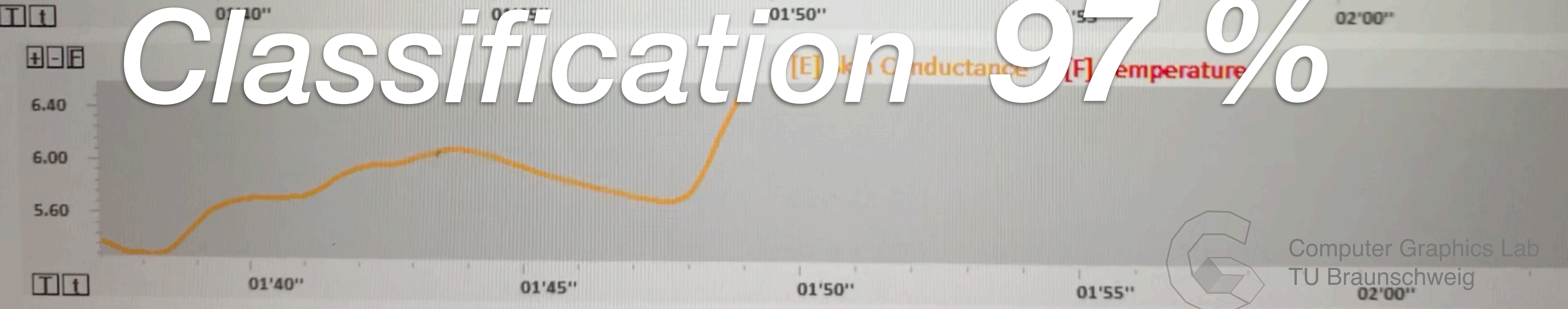
Heart + Skin



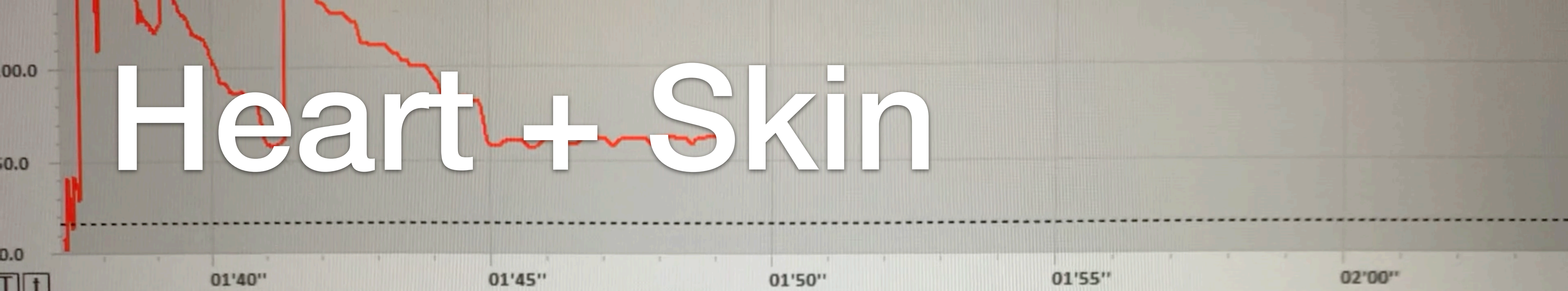
Joint



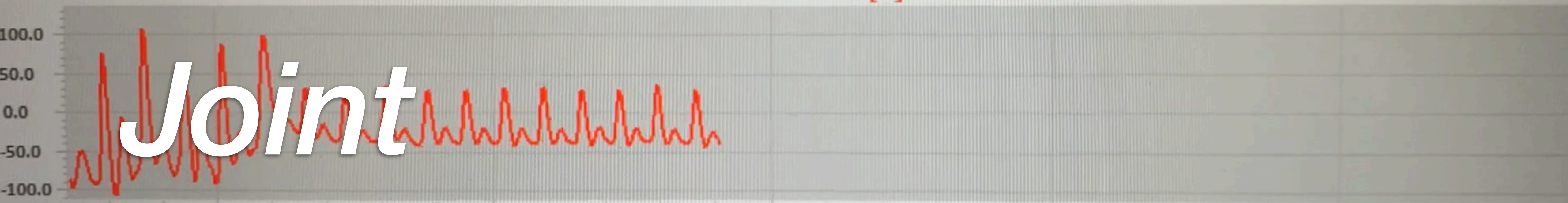
Classification 97%



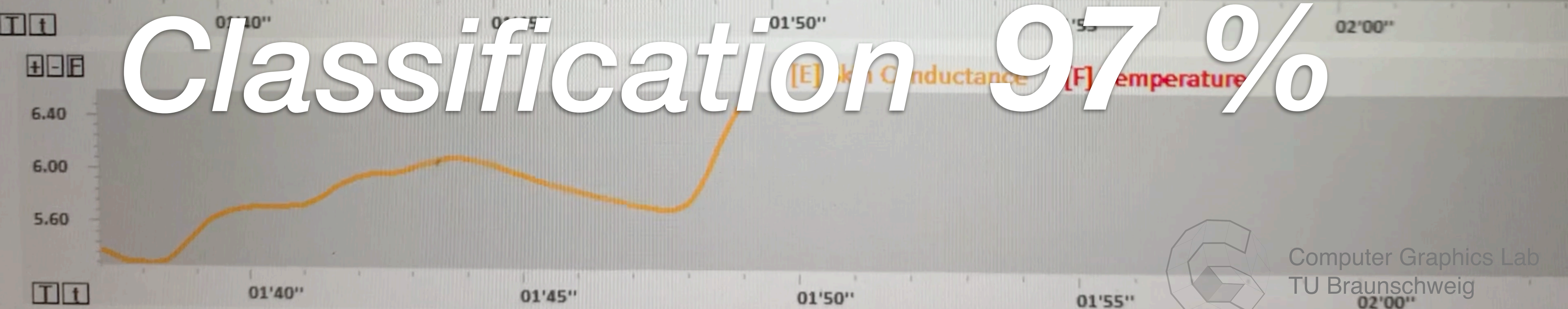
Heart + Skin



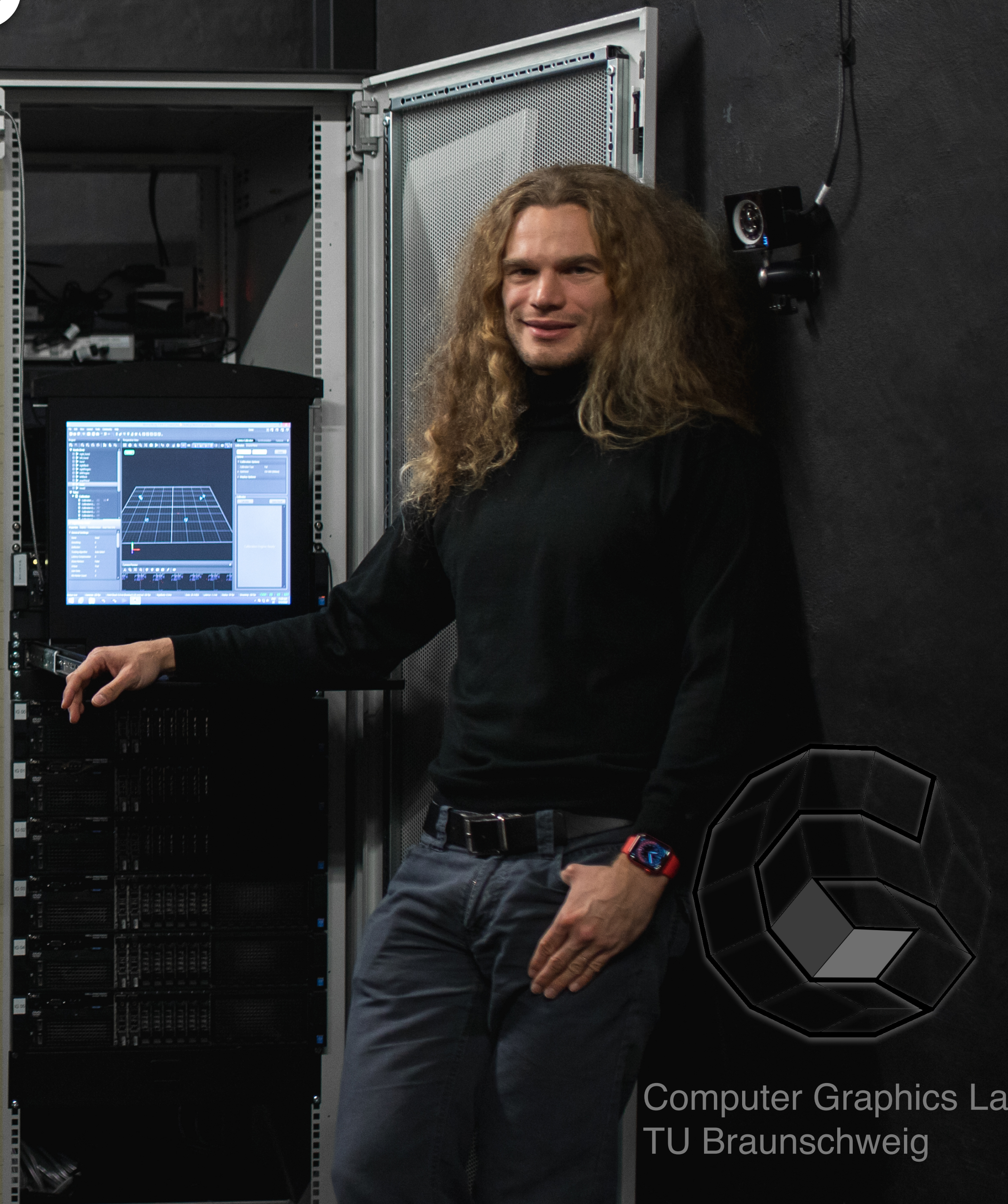
Joint



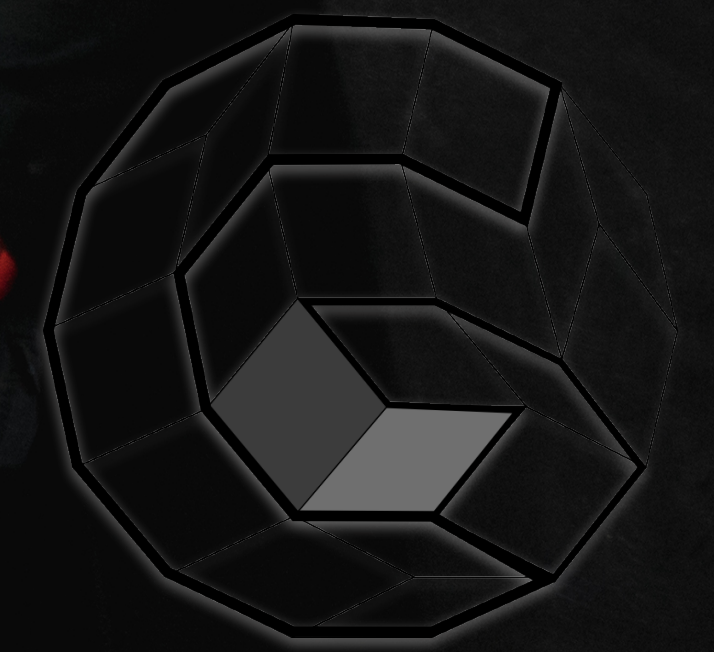
Classification 97%



How to Measure Simulator Sickness



How to Measure Simulator Sickness (EEG)



How to Measure Simulator Sickness

(EEG)

BVP + EDA



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