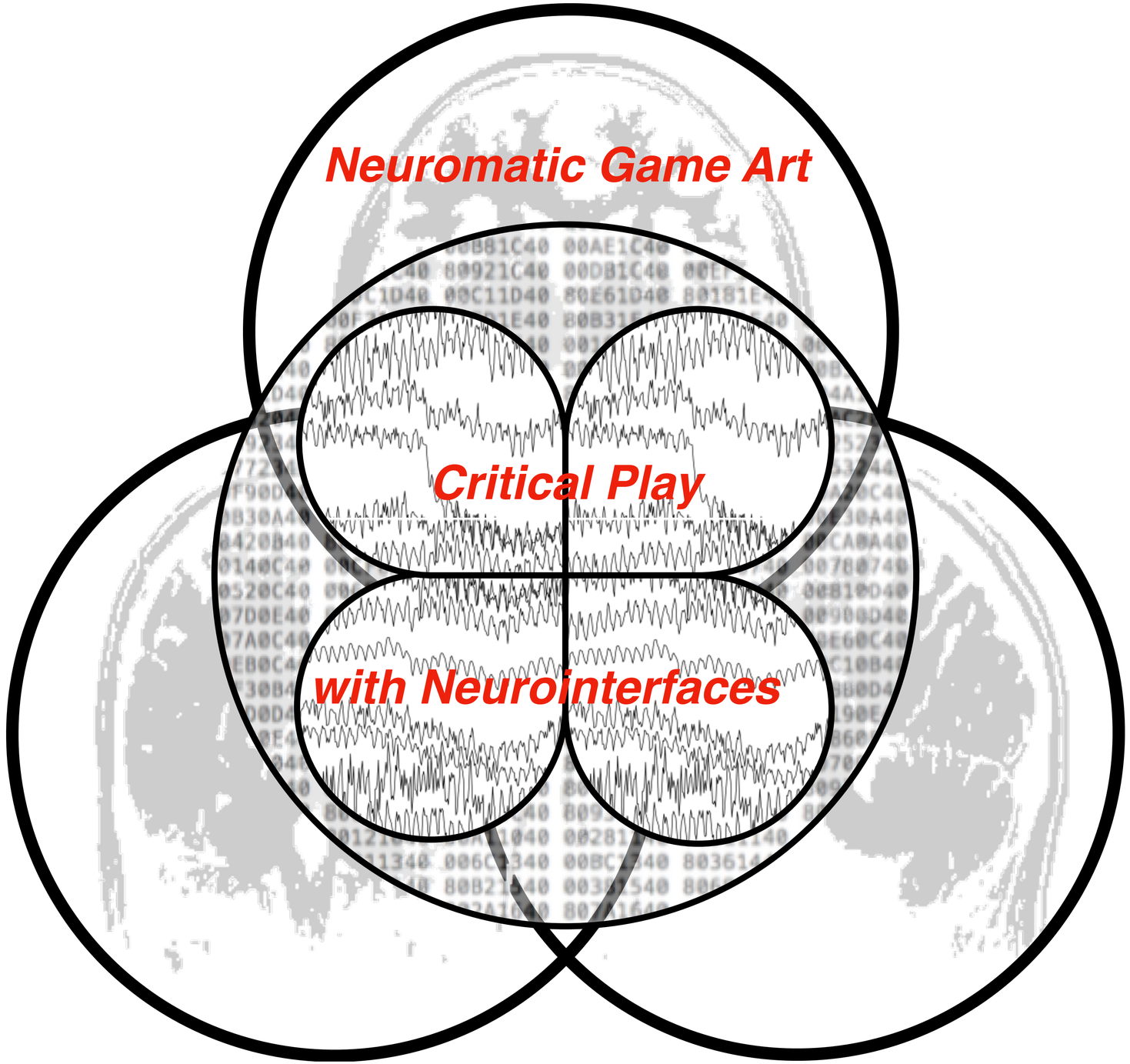
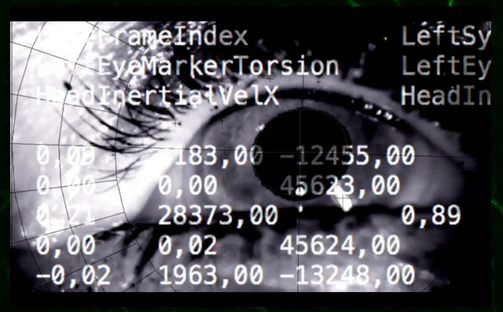

Neuromatic Game Art
Critical Play
with Neurointerfaces

- epistemic objects
- artistic research
- ludic experiments
- neurophilosophy
- neuroflow games



- Introspection- made public!

Neuromatic Game Art: Critical play with neurointerfaces

Wider arts-based research context / theoretical framework

Game Art currently undergoes a rush of presence and importance in the context of artistic research, as it informs methods of insight and experiments. This happens at the same moment as new mobile interfaces linking body, brain, and electronic networks become available in a subtly gamified world. Ludic Theory, the concept of Flow, and the transformative potential of play will serve as theoretical frameworks for a series of publicly performed artistic experiments evolving around neurointerfaces.

Hypotheses / research questions / objectives

According to our hypothesis the everyday availability of neurointerfaces will create new dimensions of social and ethical questions reaching from of privacy and surveillance to self-optimization, but will also carry the potential for new forms of creativity and interaction. As arts-based research question we take up the challenge to critically evaluate neurointerfaces as technological devices of potential everyday use. Our research objective is the creation of a new form of experimental game art – the neuromatic one – to contribute new knowledge, awareness, and resilience, and to elucidate ethical questions, possibilities and limitations of technologies that intrude the individual brain and to ultimately change self-optimization into self-expression.

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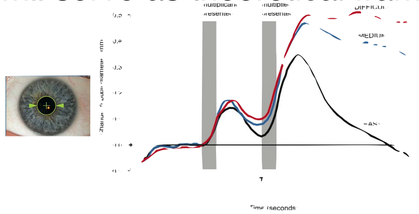

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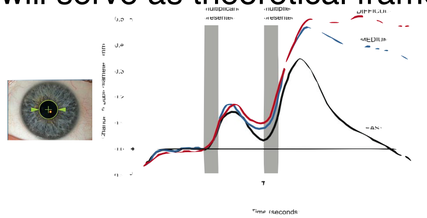

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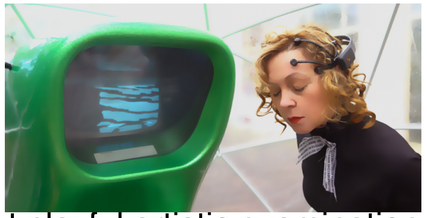
Approach / methods

In a series of staged and performed artworks informed by Game art, concepts of Flow and play, we will create a hybrid interplay and inquiry of questions around personal data and brain measurement informed by the neuroscientific research and techno-philosophical discourse that accompanies the project. By artistic re-engineering neurointerfaces will be transformed from intrusive measurement devices into participative and creative tools.



Level of originality / innovation

The present project constitutes a unique, original, and urgently needed critical but playful artistic examination of an emerging technology. The prototypes and artefacts of our research, a new innovative form of modified playful neuromatic devices, will be the seed for further artistic and philosophical use.

Primary staff involved in the project

The highly transdisciplinary project is carried out by five experienced researchers from complementary fields. The leading roles are held by artistic researchers. Margarete Jahrmann is an experienced artist, professor in the artistic research PhD program at Angewandte Vienna and in Game Arts at the Zurich University of the Arts. Ruth Schnell is a leading media artist and holds the chair for Digital Arts, Angewandte Vienna. The techno-philosophical research line is led by Mark Coeckelbergh (University of Vienna). Stefan Glasauer (Brandenburg University of Technology Cottbus-Senftenberg) guides the neuroscientific research. The group will be complemented by several young emerging artists and researchers.

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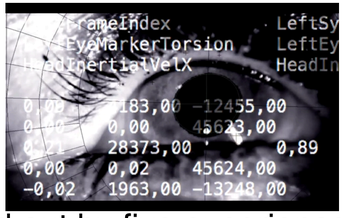

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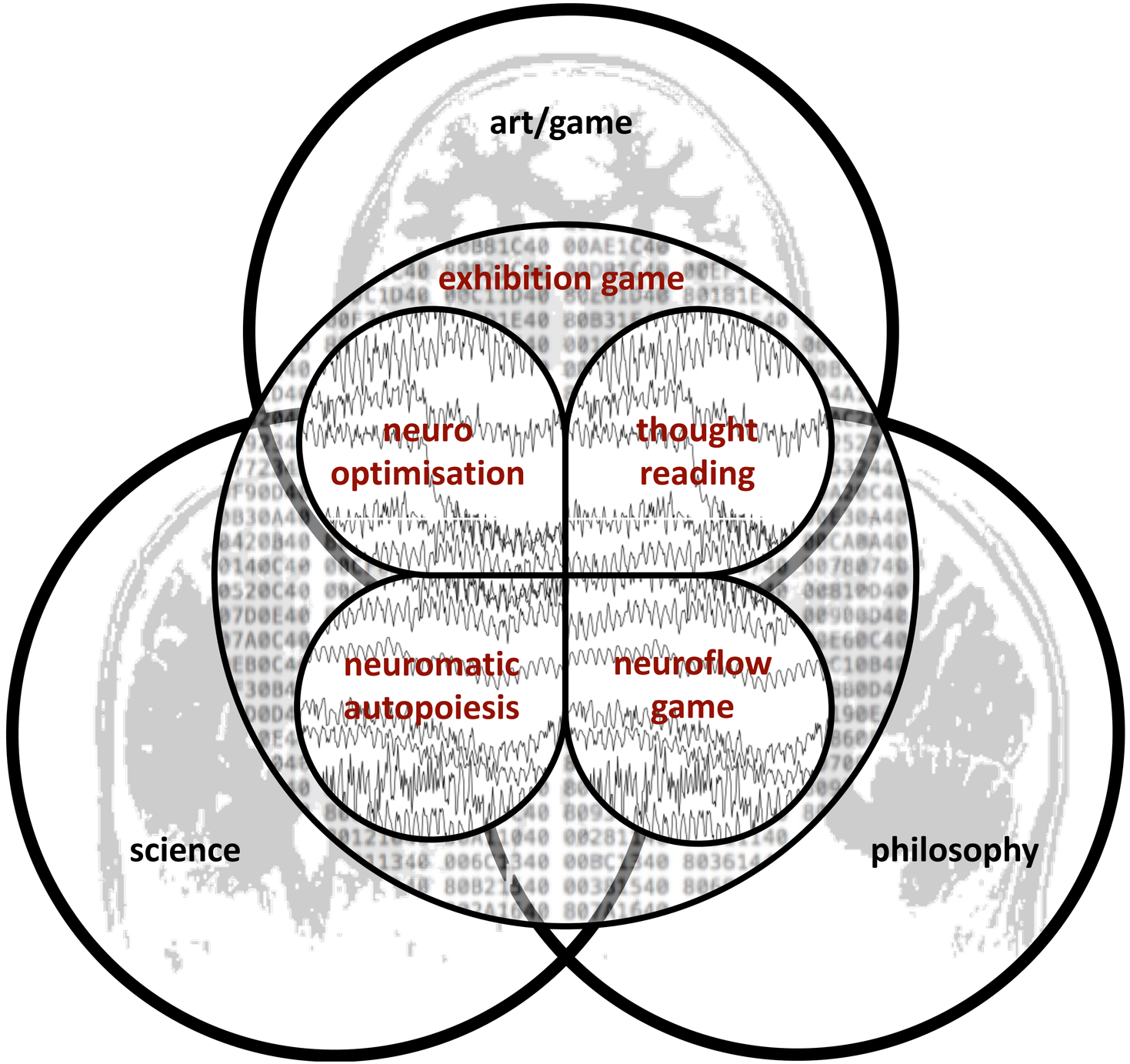
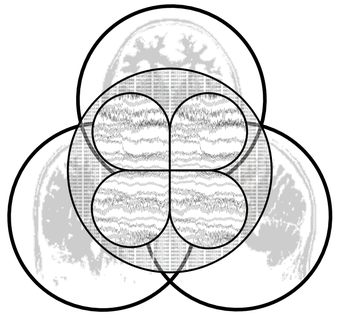
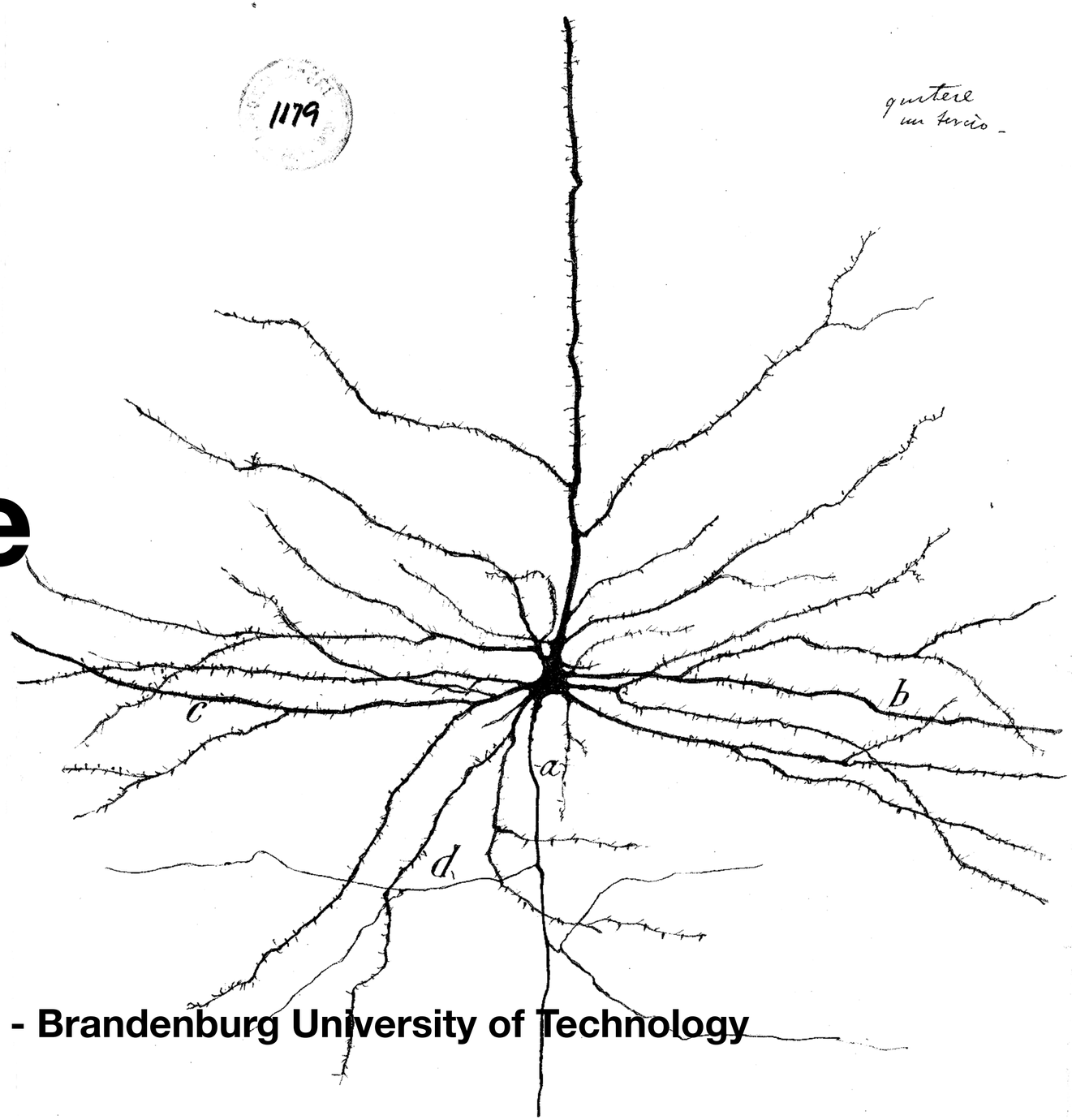

art/game
exhibition game
neuro optimisation
thought reading
neuromatic autopoiesis
neuroflow game
science
philosophy



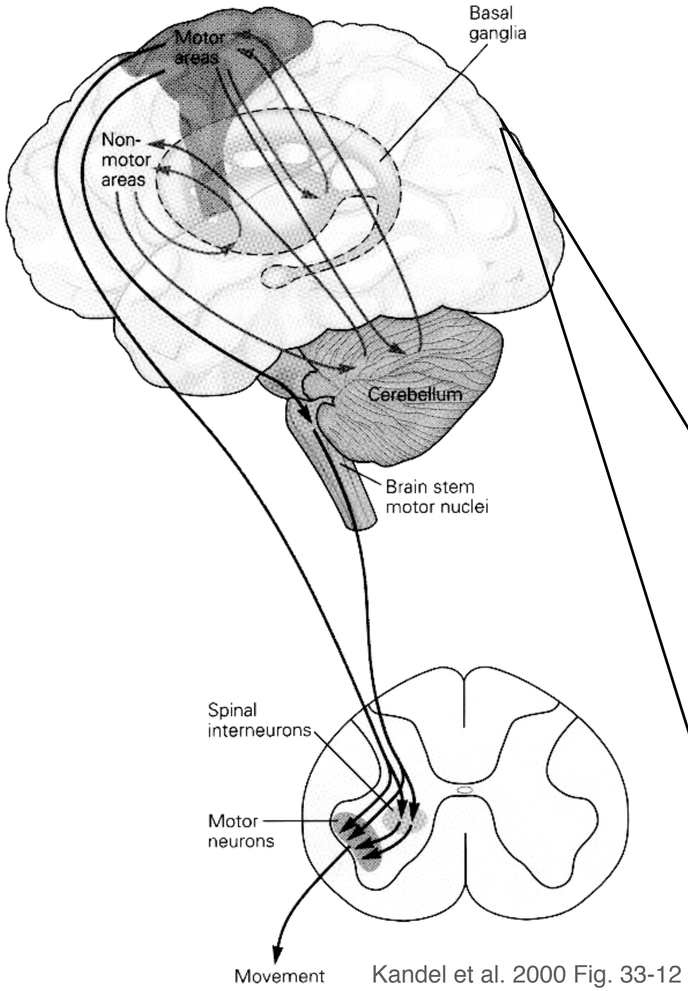
Neuro-interface

a super-short introduction



Stefan Glasauer - Computational Neuroscience - Brandenburg University of Technology

Electroencephalography (EEG)



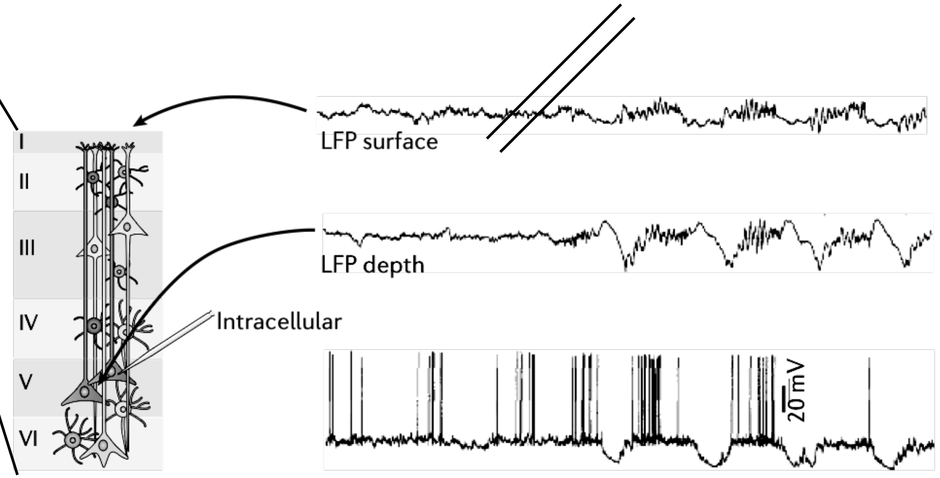
Kandel et al. 2000 Fig. 33-12

Neurosky Mindwave

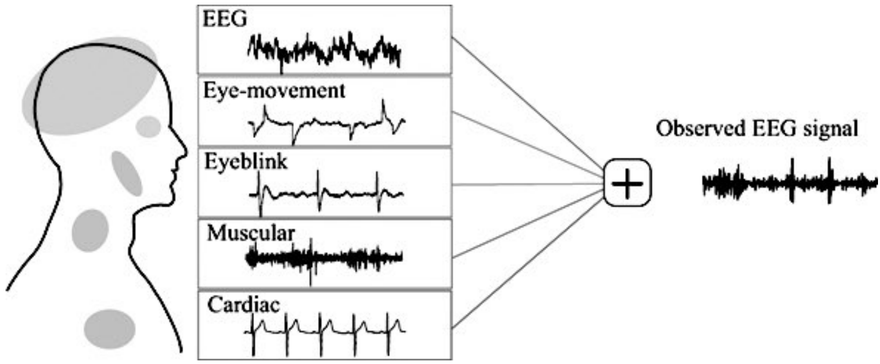
Muse 2

EMOTIV EPOC+

Brain Products actiCAP Xpress

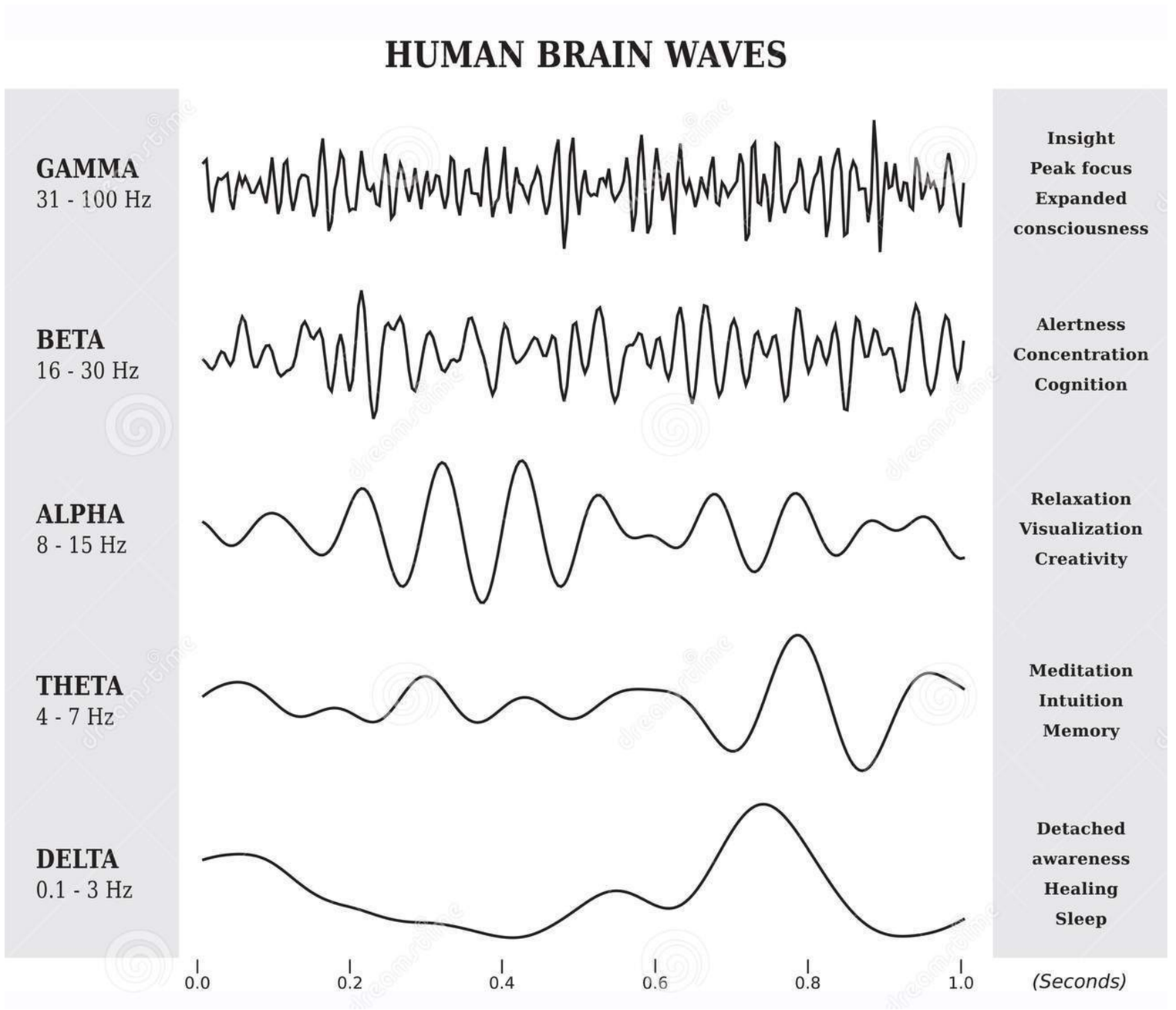


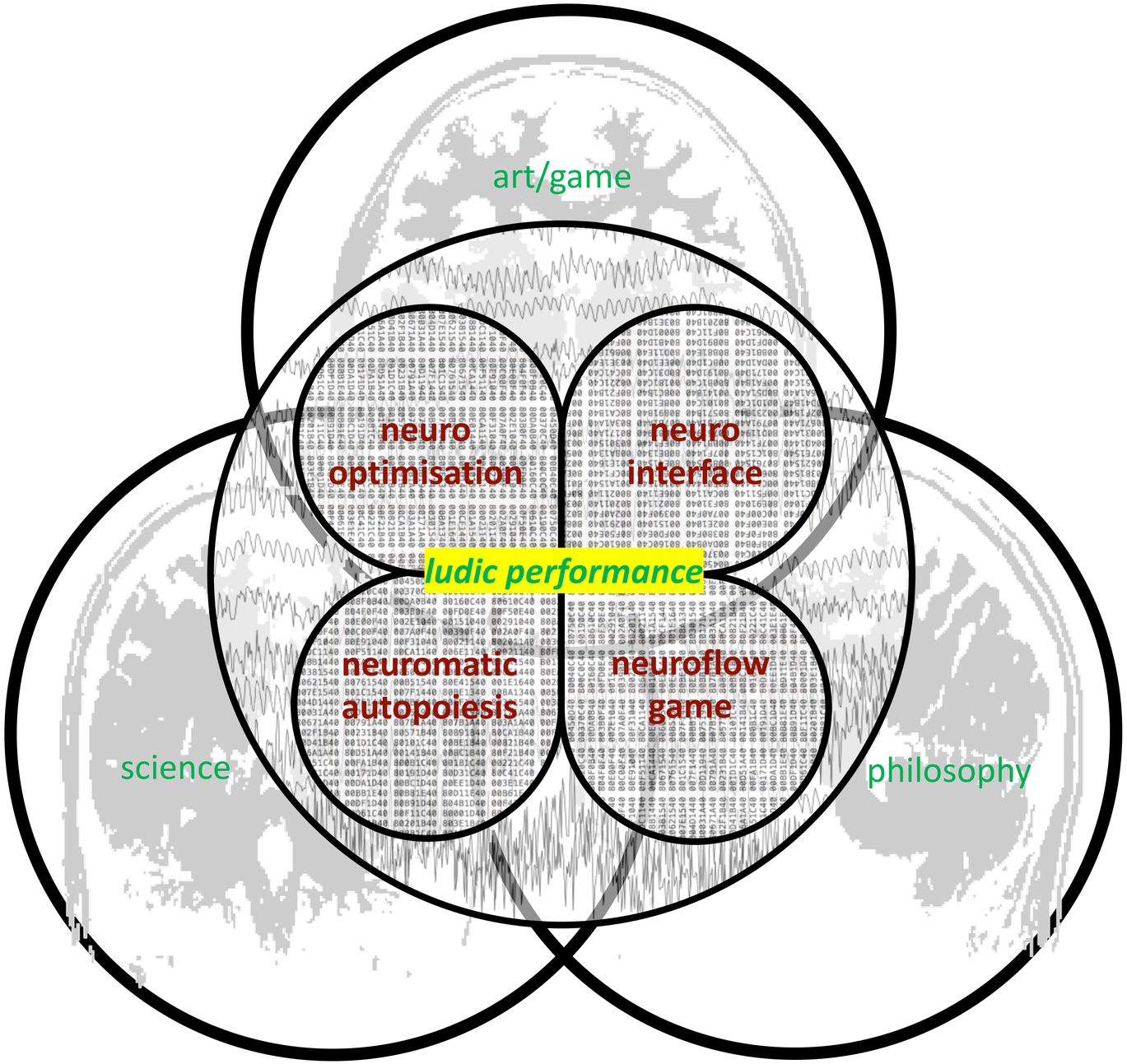
Buzsáki et al. Nat Rev Neuro 2012



Kanoga & Mitsukura 2017

Brainwaves




art/game
neuro optimisation
neuro interface
ludic performance
neuromatic autopoiesis
neuroflow game
science
philosophy

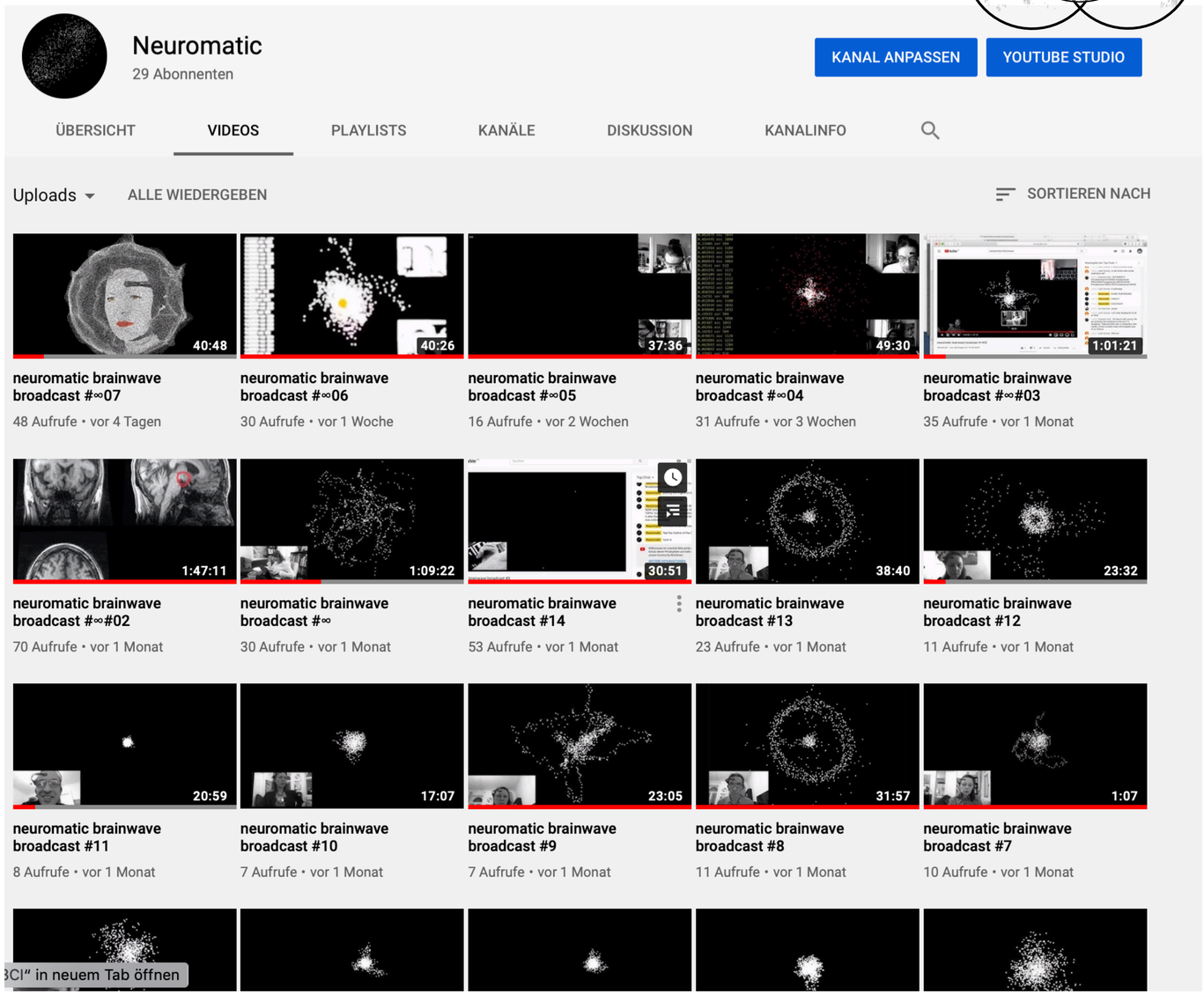
Brainwave Broadcast #Series01, March 20 - April 3
First public appearance of the FWF/ PEEK PROJECT Neuromatic Game Art: Critical game with neurointerfaces

What Zizek (2005) describes as Jouissance: Jouissance - the purposeless but autonomous object, is revealed in the brainwave broadcast.

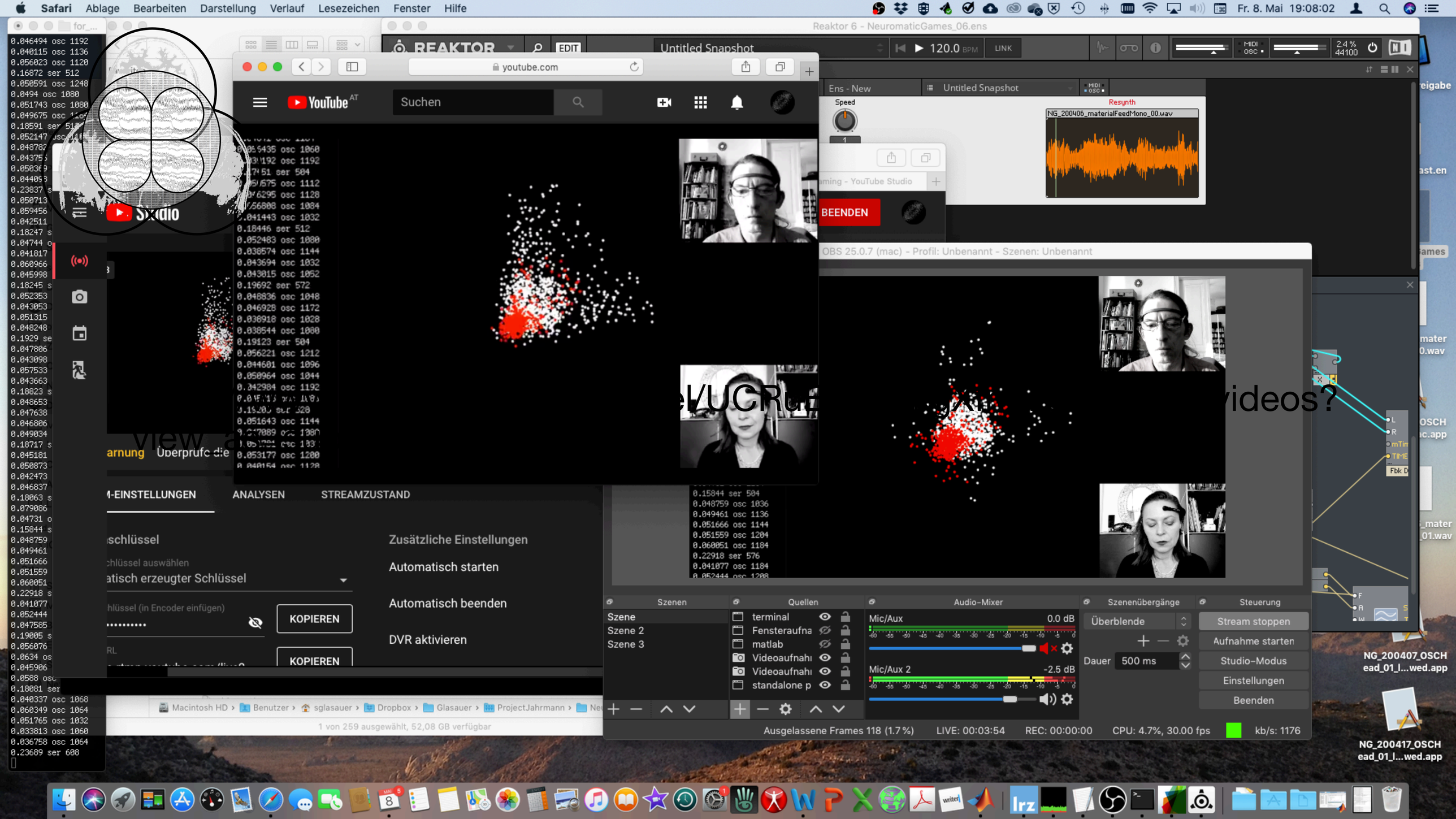
Brain Chat (over 14 days of Covid)
As an artistic statement in the 2 weeks of quarantine - metaphorically direct communication is made. Non-verbal communication is stimulated by artifacts from the brainwave spectrum and transmitted online.

The creative expressive potential of the bandwidth spectrum is interpreted in a way comparable to the performances of musicians. Participants can communicate bidirectionally via the chat. Analogous to a video phone call, a brainwave exchange can be forced. It is about the metaphors cognitive functions, perception and non-verbal communication.

The broadcast series is the first emanation of the artistic PEEK research project Neuromatic Game Art, which focuses on a critical evaluation of neurointerfaces originally developed for scientific and medical purposes. Phenomena of technological social constraints for self-optimization are artistically illuminated and interpreted in playful experiments and artistically researching experimental facilities.



https://www.youtube.com/channel/UCRuETt9HjkgXfn17ao8pCRg/videos?view_as=subscriber


Safari Ablage Bearbeiten Darstellung Verlauf Lesezeichen Fenster Hilfe
Fr. 8. Mai 19:08:02
Reaktor 6 - NeuromaticGames_06.ens
REAKTOR
EDIT
Untitled Snapshot
120.0 BPM
LINK
youtube.com
YouTube AT
Suchen
Ens - New
Untitled Snapshot
Speed
Resynth
NG_200406_materialFeedMono_00.wav
BEENDEN
OBS 25.0.7 (mac) - Profil: Unbenannt - Szenen: Unbenannt
ANALYSEN
STREAMZUSTAND
Zusätzliche Einstellungen
Automatisch starten
Automatisch beenden
DVR aktivieren
KOPIEREN
KOPIEREN
Szenen
Szene
Szene 2
Szene 3
Quellen
terminal
Fensteraufna
matlab
Videoaufnahı
Videoaufnahı
standalone p
Audio-Mixer
Mic/Aux
0.0 dB
Mic/Aux 2
-2.5 dB
Szenenübergänge
Überblende
Dauer
500 ms
Steuerung
Stream stoppen
Aufnahme starten
Studio-Modus
Einstellungen
Beenden
Ausgelassene Frames 118 (1.7 %)
LIVE: 00:03:54
REC: 00:00:00
CPU: 4.7%, 30.00 fps
kb/s: 1176
Macintosh HD › Benutzer › sglasauer › Dropbox › Glasauer › ProjectJahrmann
1 von 259 ausgewählt, 52,08 GB verfügbar
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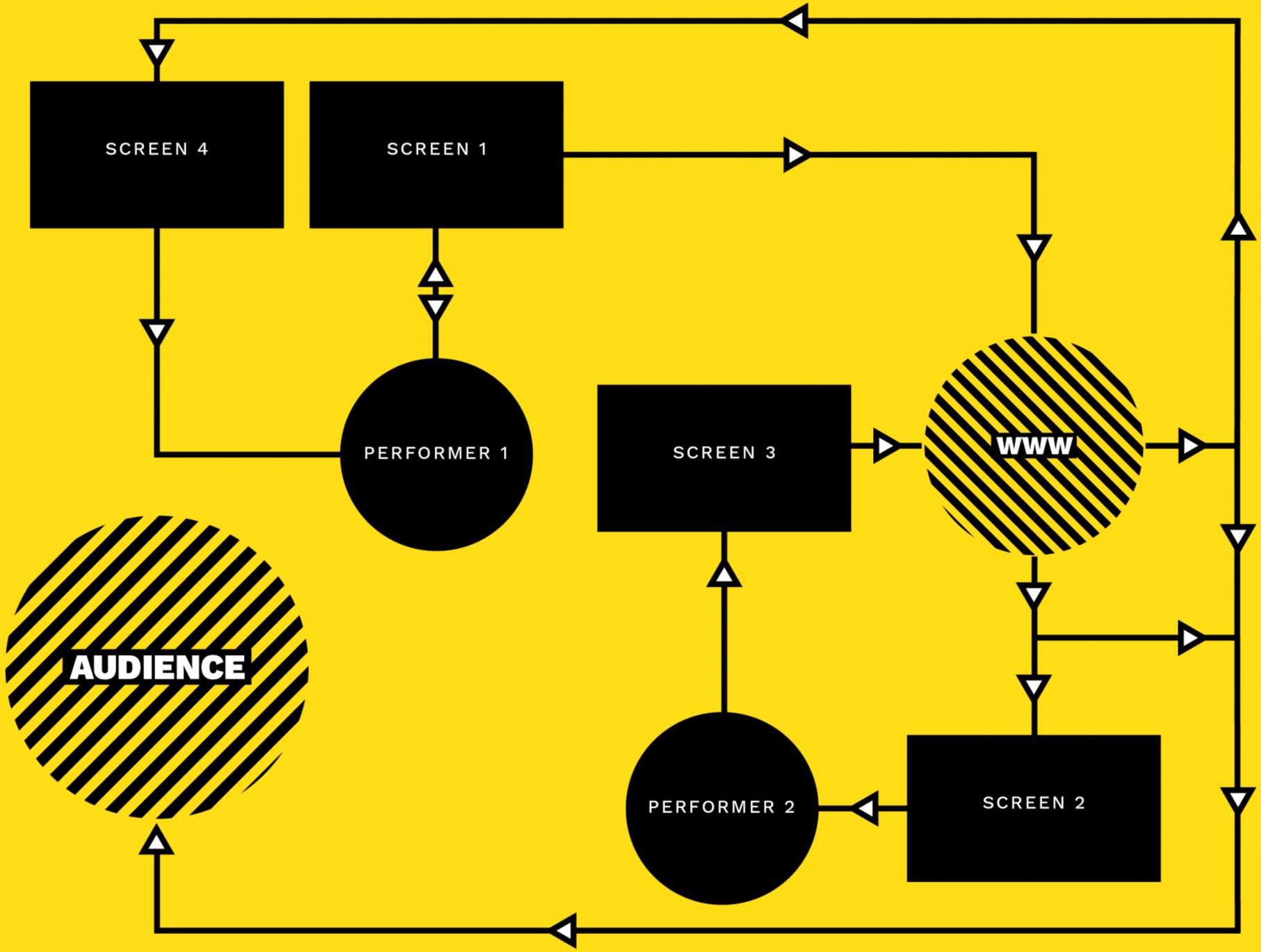
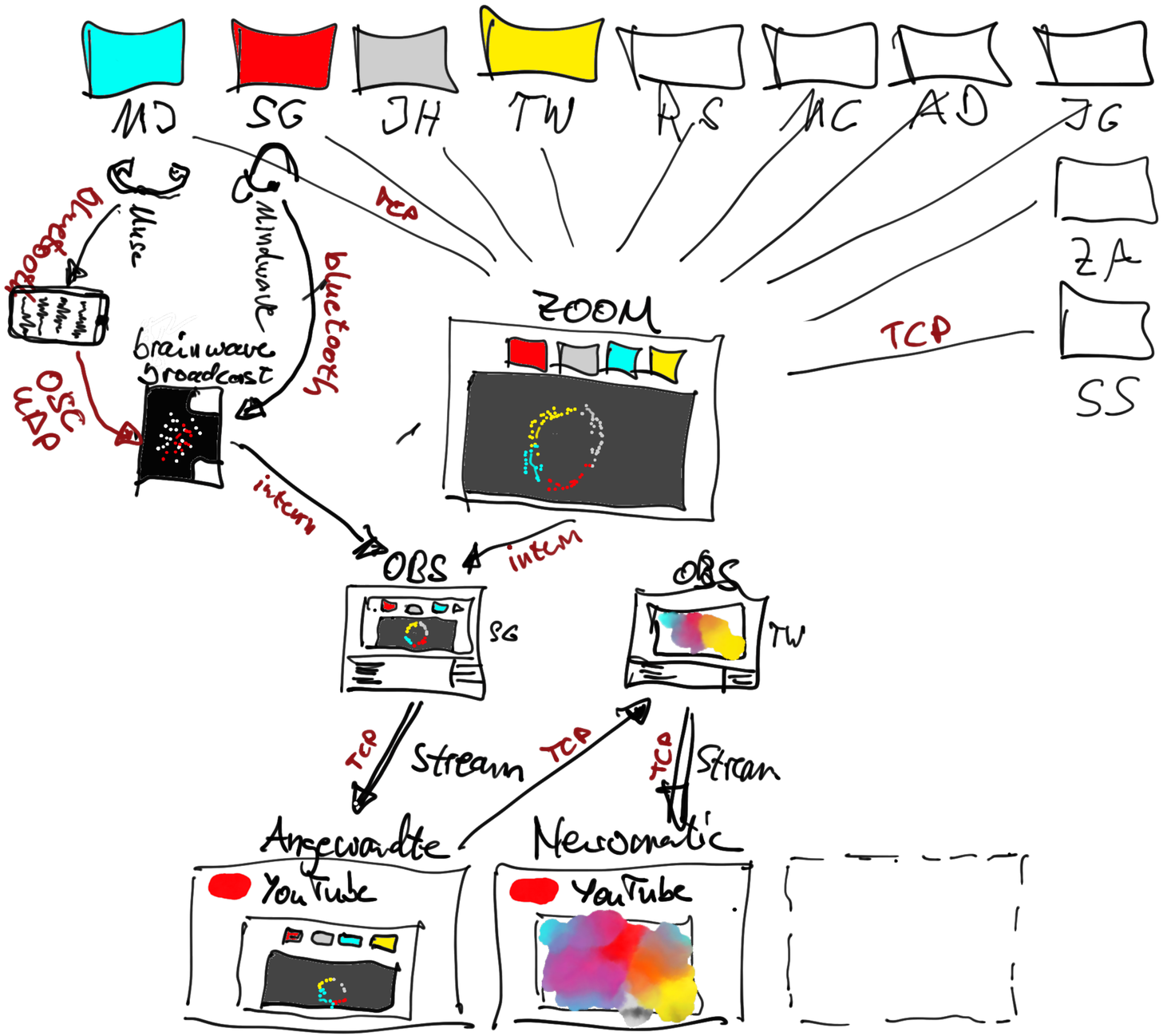

SCREEN 4
SCREEN 1
PERFORMER 1
SCREEN 3
WWW
AUDIENCE
PERFORMER 2
SCREEN 2


MJ
SG
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TW
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ZA
SS
Muse
Muse book
Mindwave
bluetooth
brainwave broadcast
OSC UDP
TCP
ZOOM
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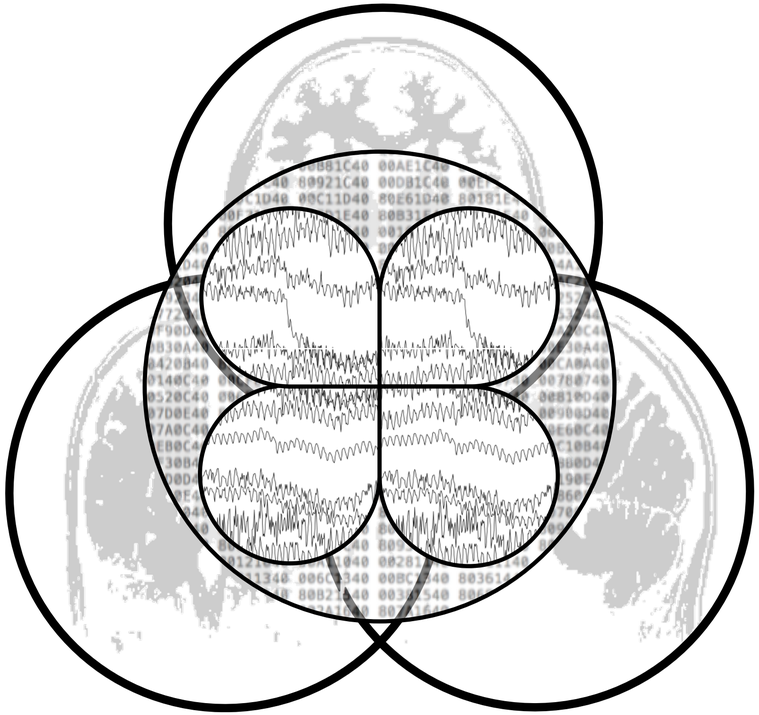
Neuromatic
YouTube

Neuromatic Game Art



KICKOFF Experiments:

1. *Neuromatic Brainwave Broadcast*
2. *Neuronetwork FLOWer*
3. *Synaptic ActionPotential Shooter*

Künstlerisches Spiel mit Gehirnströmen

Neurointerfaces, die Gehirnströme auslesen, werden zu Gadgets, die Daten an Lern- oder Meditationsapps schicken. Medienkünstler widmen sich in einem neuen Projekt den Implikationen dieser neuen Technologie.

Der Standard · 6 Mai 2020 · Alois Pumhösel

Im Bild der Liveübertragung auf der Videoplattform Youtube erscheint eine Punktewolke. Sie hat annähernd Sternform. Doch die Struktur der Wolke verändert sich. Die Sternform verschwimmt, fällt auf eine kreisförmige Häufung zusammen, expandiert wieder, gebiert neue Ausläufer, wird zum komplexen, vielarmigen Gebilde.

Die Punktewolke kommt aus dem Kopf von Margarete Jahrmann. Die Medienkünstlerin und Kunsttheoretikerin an der Universität für angewandte Kunst Wien erscheint in einem Bildfenster neben der Punktewolke. Als „Testsubjekt“ trägt sie ein handelsübliches

https://www.derstandard.at/story/2000117296435/kuenstlerisches-spiel-mit-gehirnstroemen

NeuroFLOWER

- Muse data

EEG raw data-value overall spawn

Alpha - makes intensity noise pattern

Gyroscope - influence particles

Acceleration - is frequency noise

Betawaves - for overall set

- Neurosky data

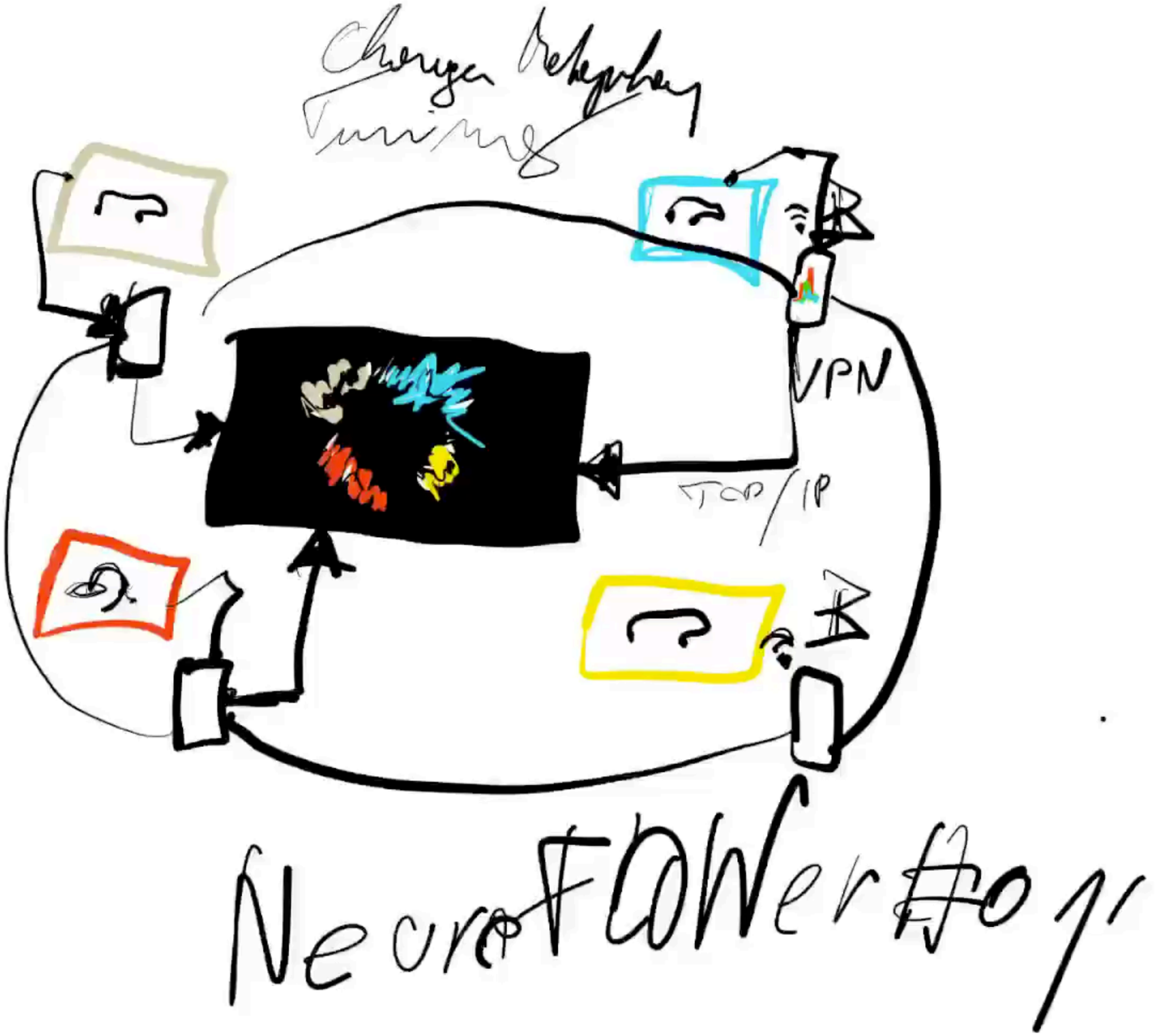
EEG raw data-value overall spawn

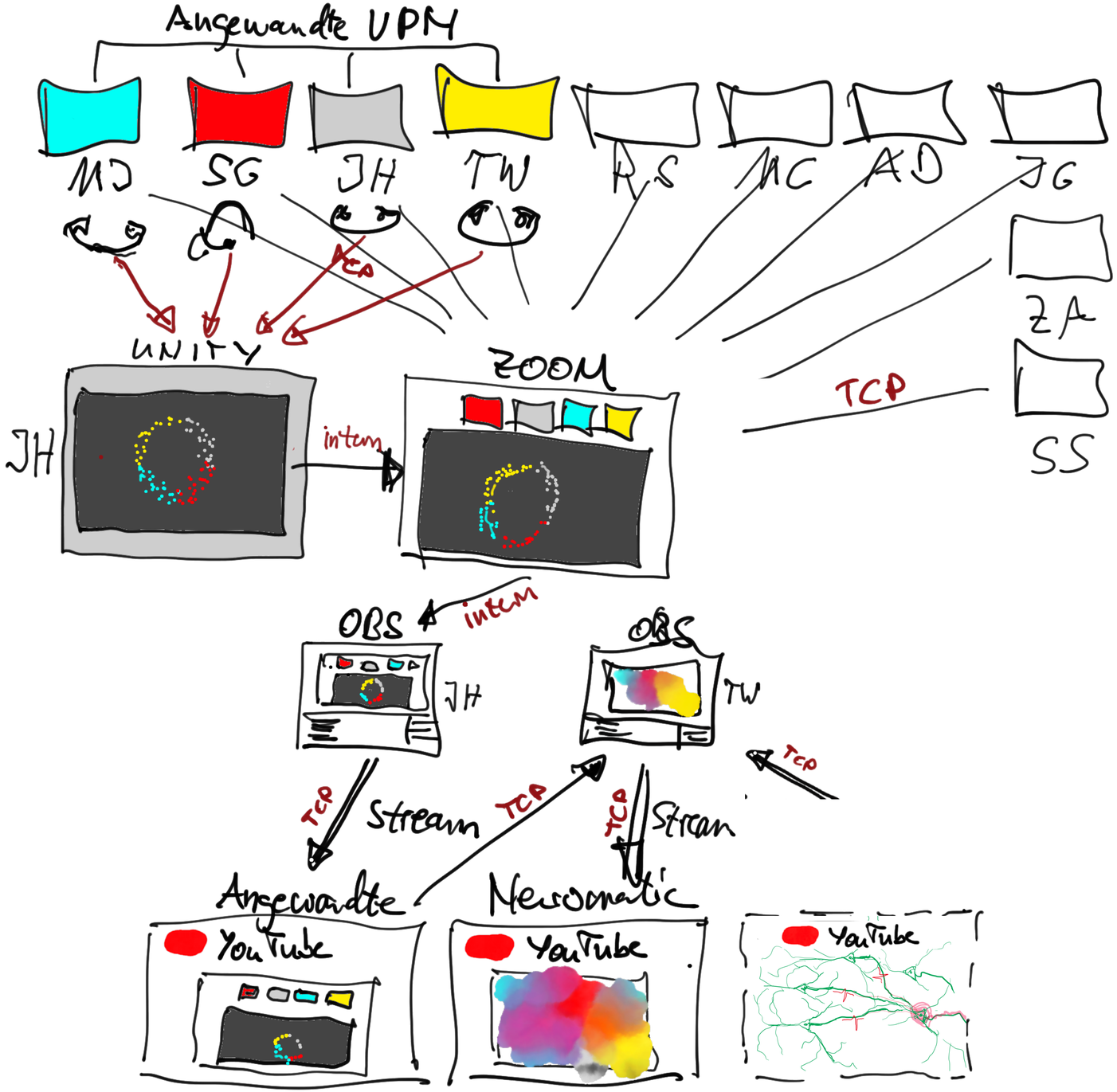
Alpha - makes intensity noise pattern

Betawaves - for overall set

‚meditation' - is frequency noise

‚attention' - influence particles




Angewandte UPM
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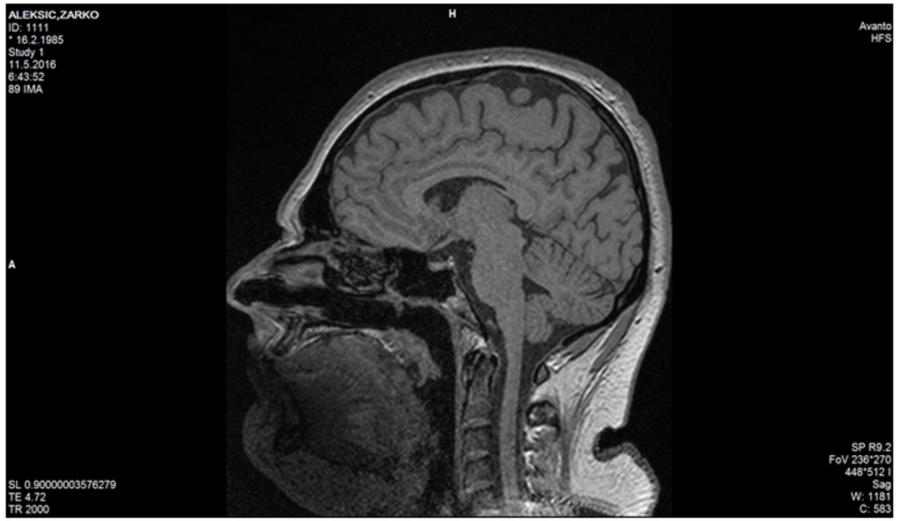
Neuromatic
YouTube
YouTube

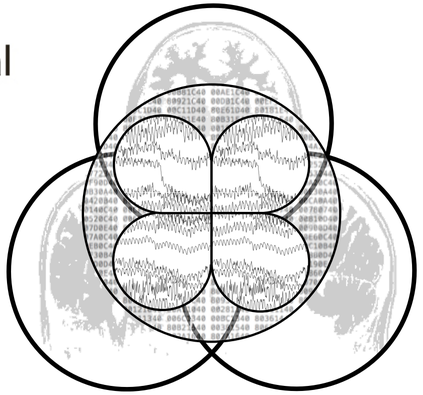


Brain Pictures Project, 2016
relation between imagination and perception

Dreams Of Reality, 2017
dream decodings

Swimming Against The Stream Of Consciousness, 2018
language and poetry

- My multidisciplinary artistic practice is based on examination of consciousness, mental processes and AI, in relation to socio-political issues of cognitive capitalism by using the knowlegde produced within cognitive science.
- The relation between these two approaches is reflected in the interconnectedness between psychological and economic states, with synapses as main currency.
- Examination of personal phenomenology in relation to the already widely availabe devices for cognitive enhancement.



(conceptual);
instructions;
choreographic;
contingency;
inner time;
2;
test;
test;
test;
() consciousness;
automation;
bias;
optimise;
uncertainty;
[[misusing error formats and gadgets]]

research choreography; charlotta ruth

Game
Neurospace Harmony

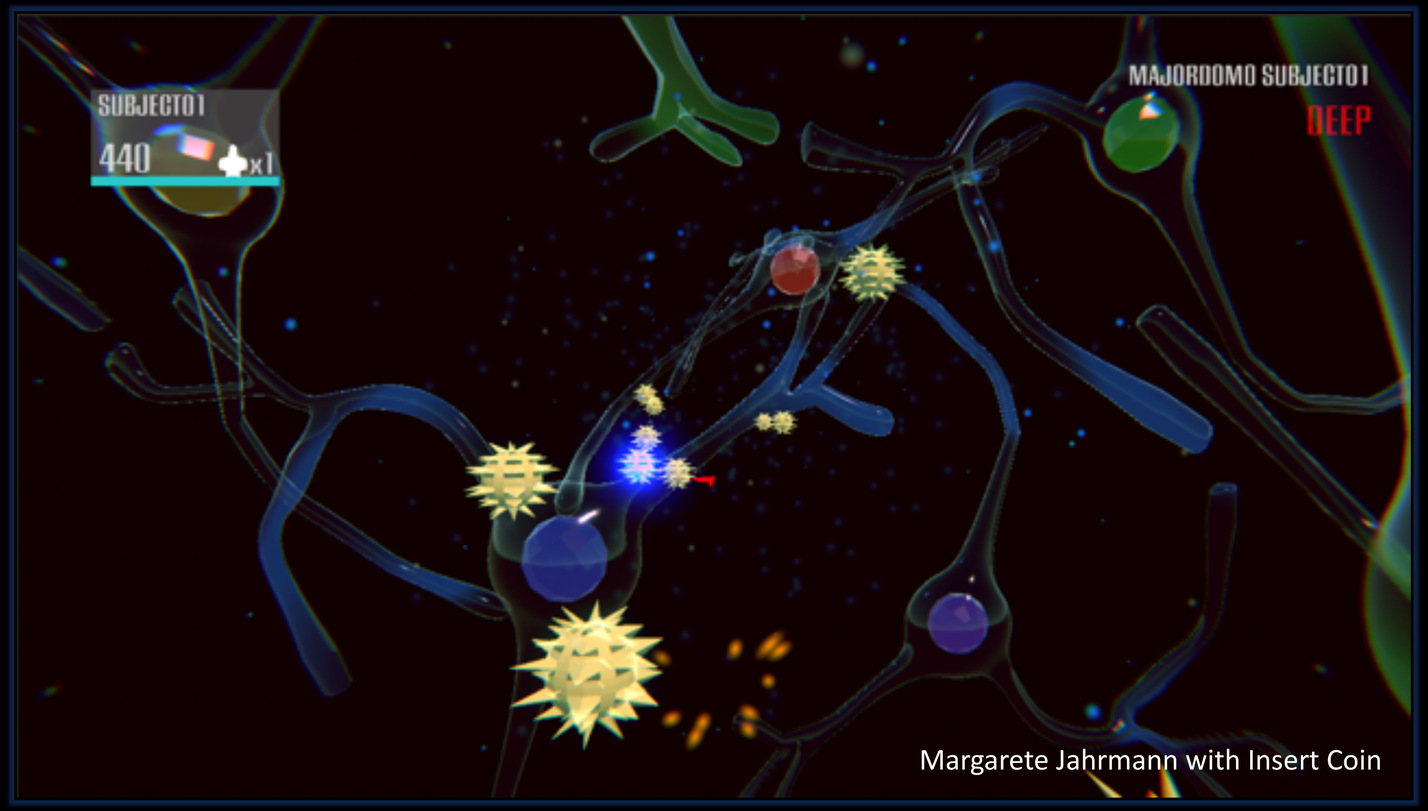
Neurospace Harmony is a game for one to five players. Players play using their EEG headbands only. Each player controls one research vessel which can release *action potentials* at the *barriers* which the game releases upon the players. It is their coal too clear the barriers from the game world and bring it to a state of *harmony.*

Players take turns in becoming the *majordomo.* Neuromatic Harmony uses this players signals (wavebands & eeg data) to control the game world.

Players: 1-4

Controls: Muse EEG Headbands

Signals used: alpha-, beta-, gamma-, delta- & theta- wavebands, accelerometer, signals for blinks, raw eeg signals.



Margarete Jahrmann with Insert Coin

research game; Zurich/Vienna2020