The Danish National Research Foundation's
Center for Music in the Brain
Aarhus University & The Royal Academy of Music Aarhus/Aalborg

Poster Blitz Copenhagen 2023

UiO : RITMO Centre for Interdisciplinary Studies in Rhythm, Time and Motion
University of Oslo

Norwegian Centre of Excellence
The Research Council of Norway

Please add only **one** slide with information about yourself and your research interests.

No animations, you should think of it as a static “poster” that you present in front of.

Tip: you don’t need to add so much information, instead, think about what could make people remember you later.

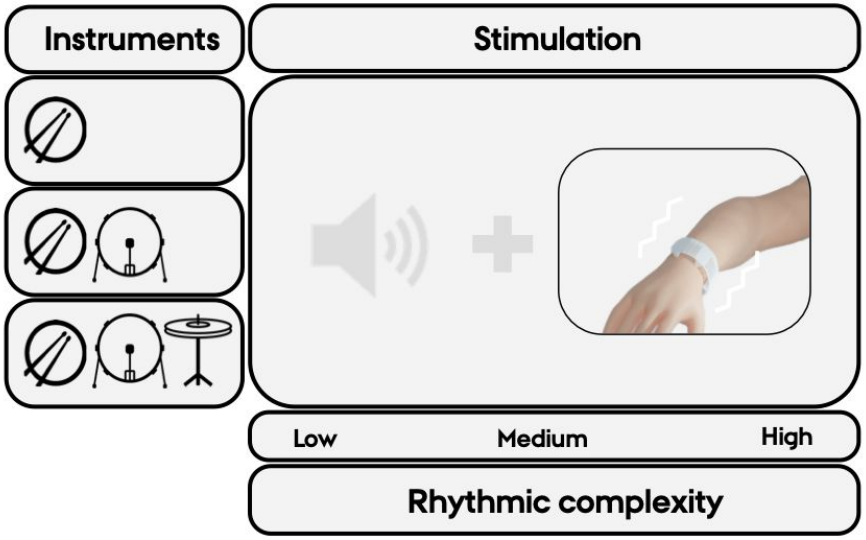
Place your slide in alphabetical order after your **first** name.

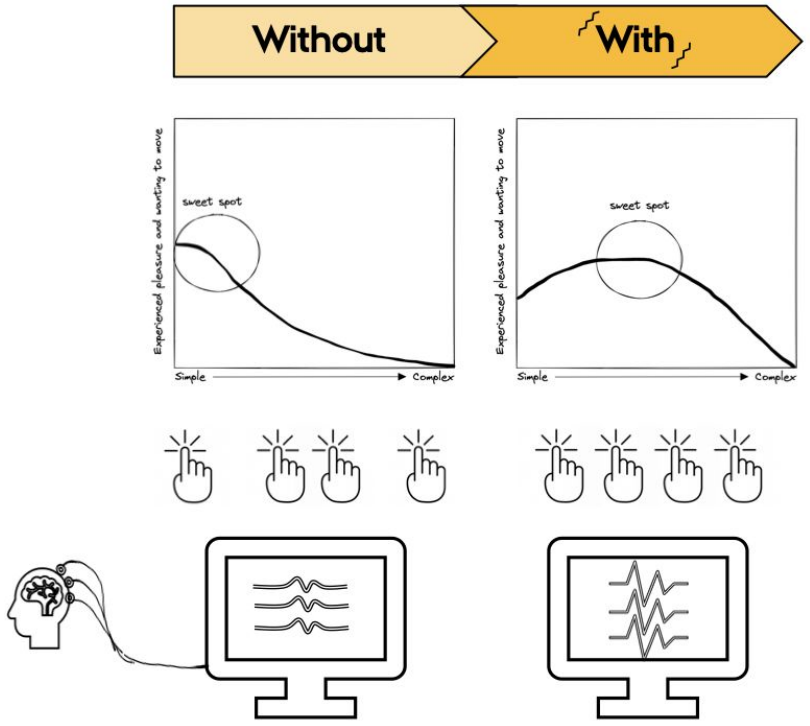
A picture of yourself that is related to your research may help!

FEEL THE BEAT AND IMPROVE THE GROOVE

MULTIMODAL RHYTHM PERCEPTION IN COCHLEAR IMPLANT USERS

Alberte B. Seeberg, PhD student
Main supervisor: Bjørn Petersen; Co-supervisors: Peter Vuust, Andreas Højlund

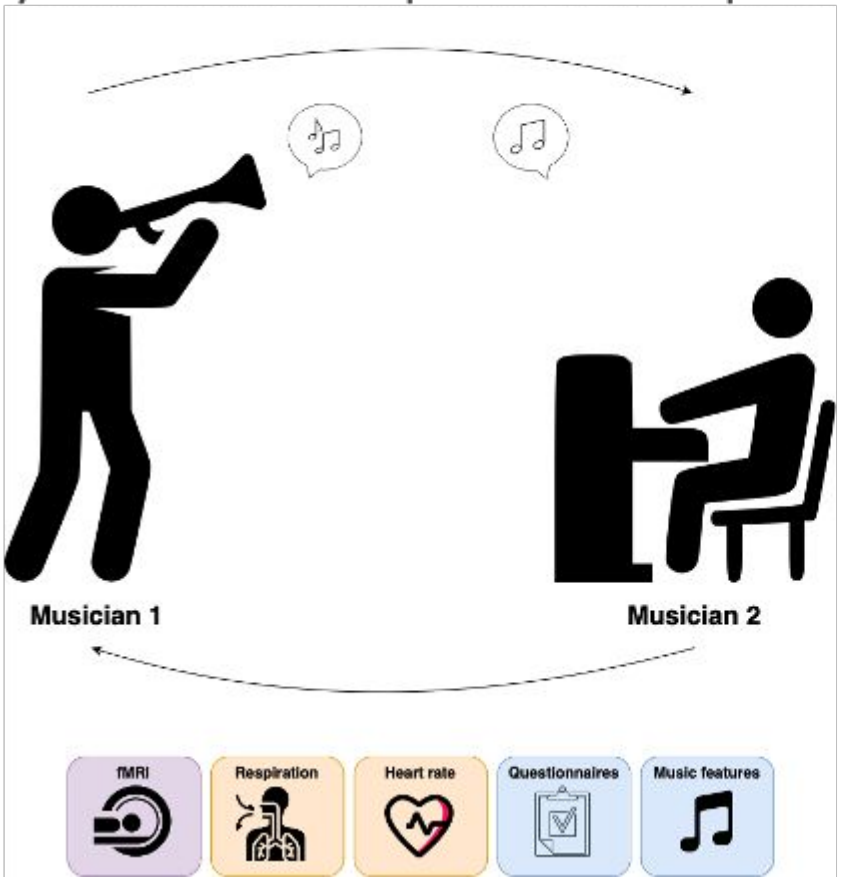




AARHUS
UNIVERSITY
DEPARTMENT OF CLINICAL MEDICINE

Dyadic jazz improvisation

A study on how musicians perceive and respond to improvised solos



Participants

40 duos (1 M1 + 40 M2)

Imitation vs **Improvisation**

30 seconds

✓ General Linear Models

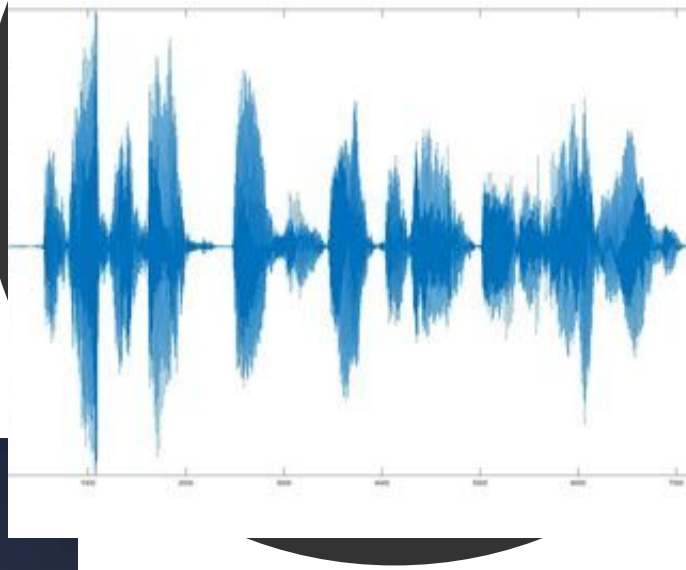
✓ Whole-brain modelling

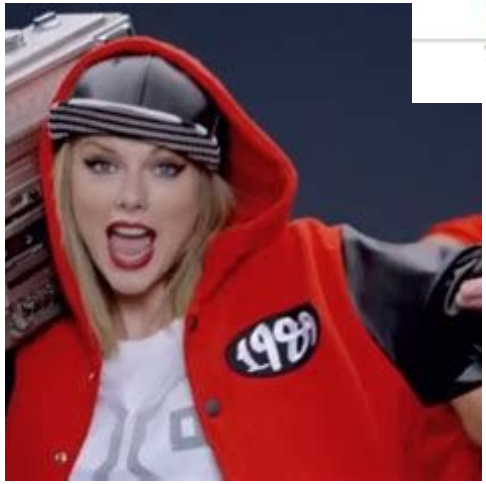
Ana Teresa Queiroga

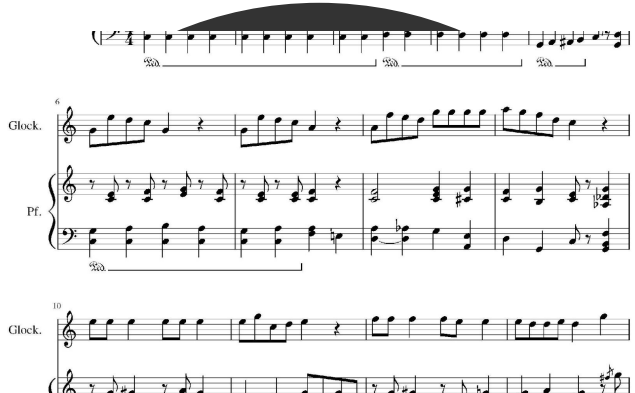
Machine Learning for Multimodal MIR

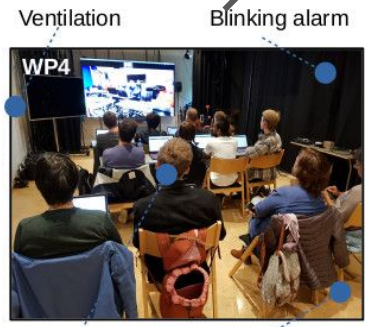
Anna-Maria Christodoulou

- Audio
- Image
- Text
- Video
- Symbolic representations
- Motion capture data
- Physiological measurements









Ventilation
Blinking alarm
People moving
Clock ticking

Visual
Audio
Spatial

Deep Learning encoders
Deep Learning encoders
Deep Learning encoders

Body Movements
Body Movements

Human Interaction
Human Interaction

Environmental Rhythm
Environmental Rhythm

Telematic Communication

Deep Learning decoders
Deep Learning decoders
Deep Learning decoders

Visual
Audio
Spatial

AMBIENT: Bodily Entrainment to Audiovisual Rhythms

Arthur Guo
jinyue.guo@imv.uio.no

EXPERIENCE OF FLOW IN FLAMENCO IMPROVISATION

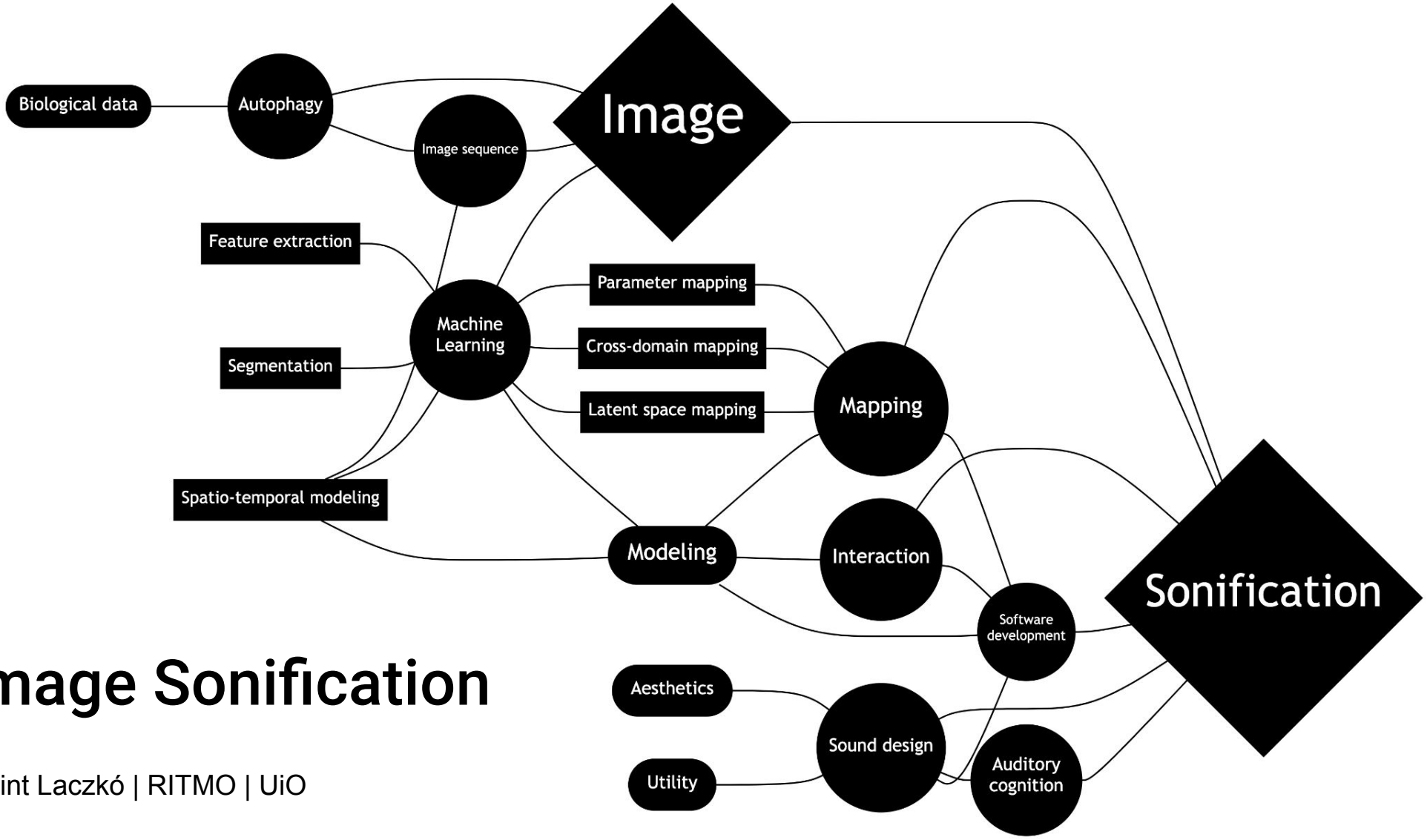
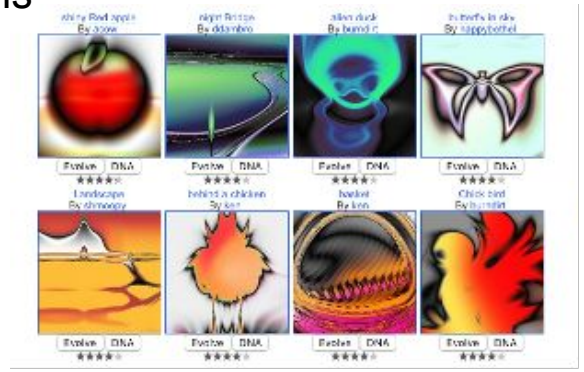


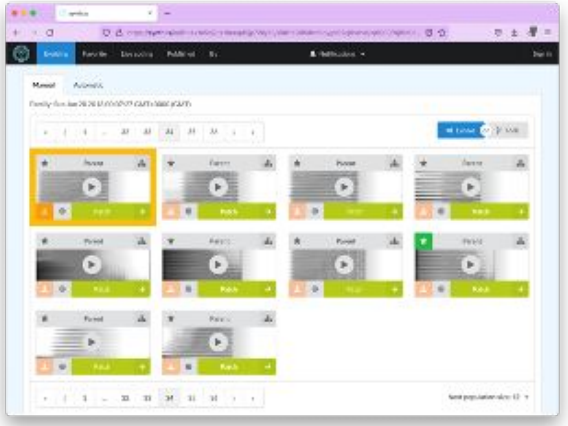
Image Sonification

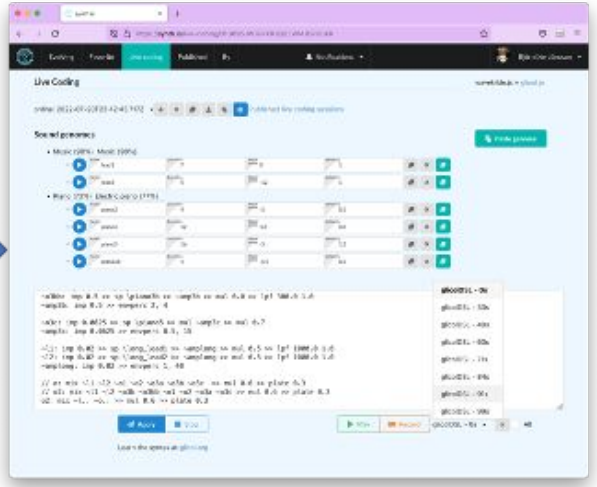
Bálint Laczkó | RITMO | UiO

Sonic design with evolutionary algorithms

Björn Þór Jónsson <bthj@uio.no>





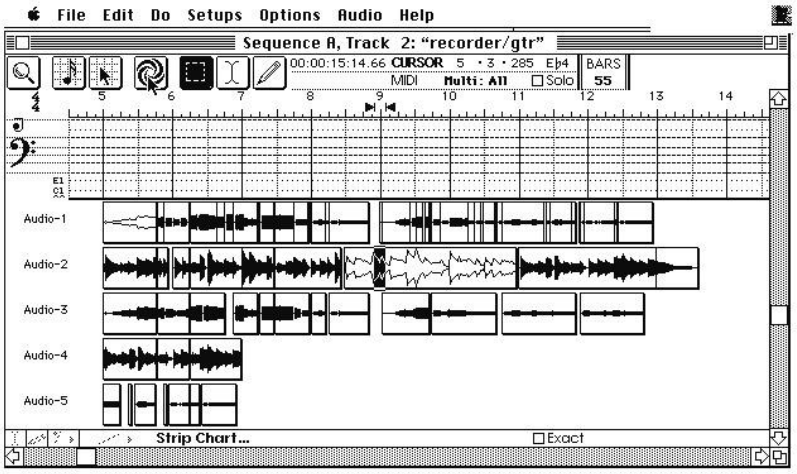


@kromosynth@sigmoid.social

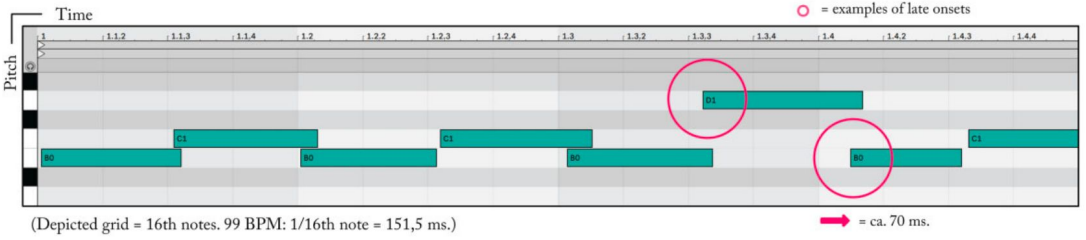
```
npm install -g kromosynth-cli
```

Time Tinkering

Bjørnar Sandvik
PhD Student at RITMO



Grids



(Depicted grid = 16th notes. 99 BPM: 1/16th note = 151,5 ms.)

Waveforms

Sidechain trigger signal (kick drum)

Plucked synth with sidechain compression

Techniques of Machine Rhythm

NIHR | Applied Research Collaboration Oxford and Thames Valley

The Usage of Creative Arts Therapies for African & Carribean Children & Adolescents with Psychiatric Disorders

Briana Applewhite, DPhil Candidate
Department of Psychiatry
Professor Morten Kringelbach
Dr Olivia Spiegler

UNIVERSITY OF OXFORD

RESEARCH QUESTION

Are creative arts therapies viable and culturally competent treatment options in Black racial minority youth suffering from psychiatric disorders?

23% of Black British people experience common mental disorders

Black adults have the lowest rate of recovery after engaging with mental health services

Black children have the highest risk of developing a mental health problem in adulthood

Phase 1

Systematic Review & Meta-analysis:
The usage of creative arts therapies for children and adolescents with symptoms of PTSD

Phase 2

Focus groups & Cross-sectional survey:
Discovering from patients, their carers, clinicians and community leaders regarding the relevancy of CATs and their usage with the target population

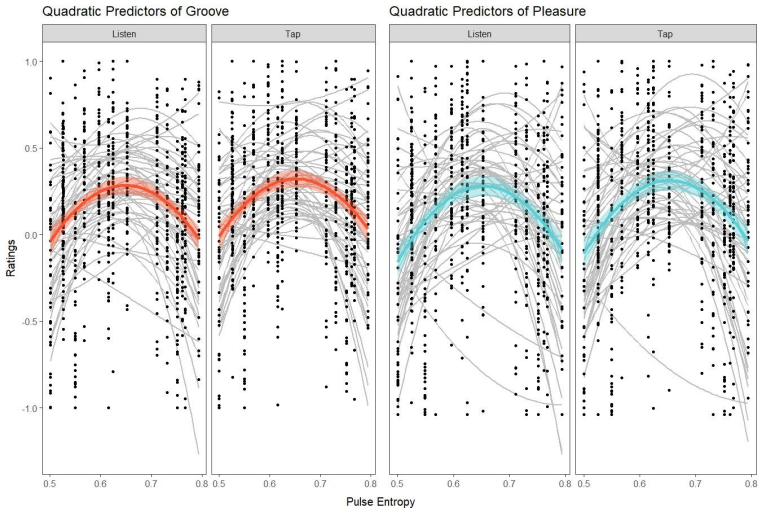
Phase 3

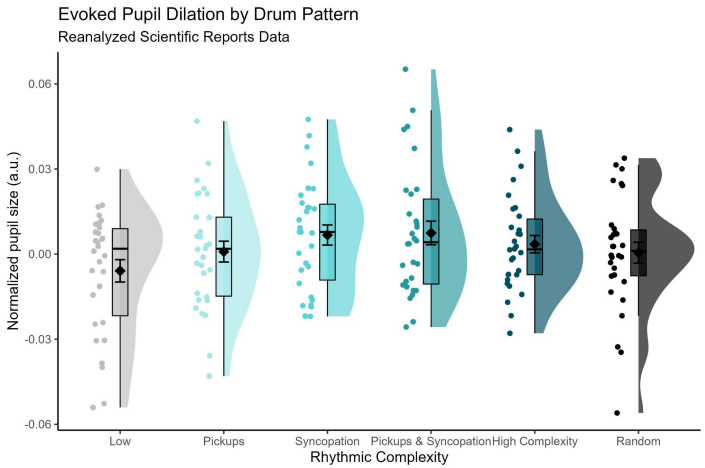
Intervention:
Utilizing music therapy and dance movement therapy with Black children and adolescents with PTSD; EEG tracing brain changes

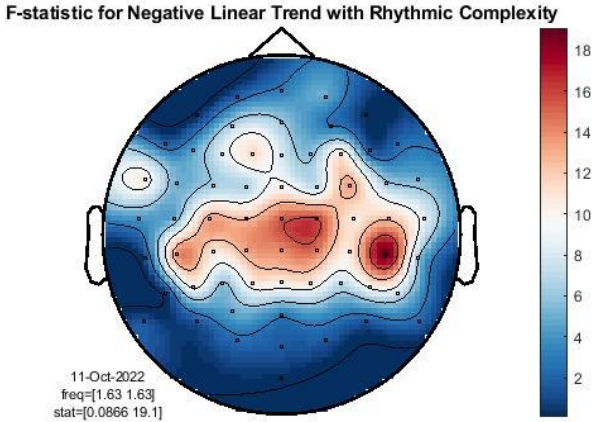
Predictive and Dynamic Mechanisms of Rhythm and Groove!

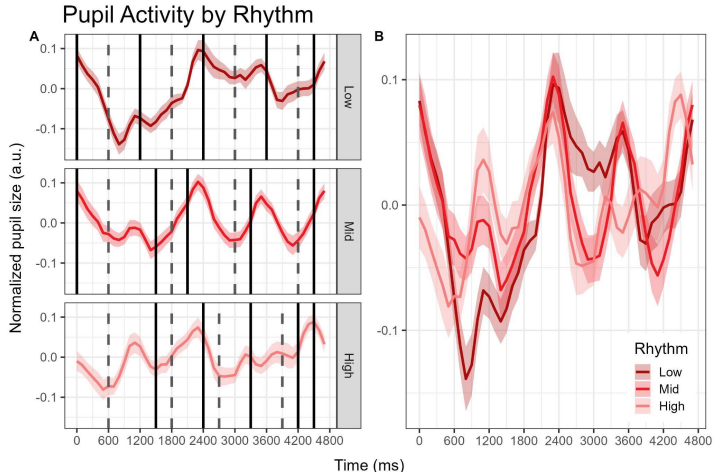
(Former) PhD Student at RITMO, current Postdoc at Concordia University

- Bewegungslust (gr
- Pupillometry
- EEG/MEG
- TMS
- GVS

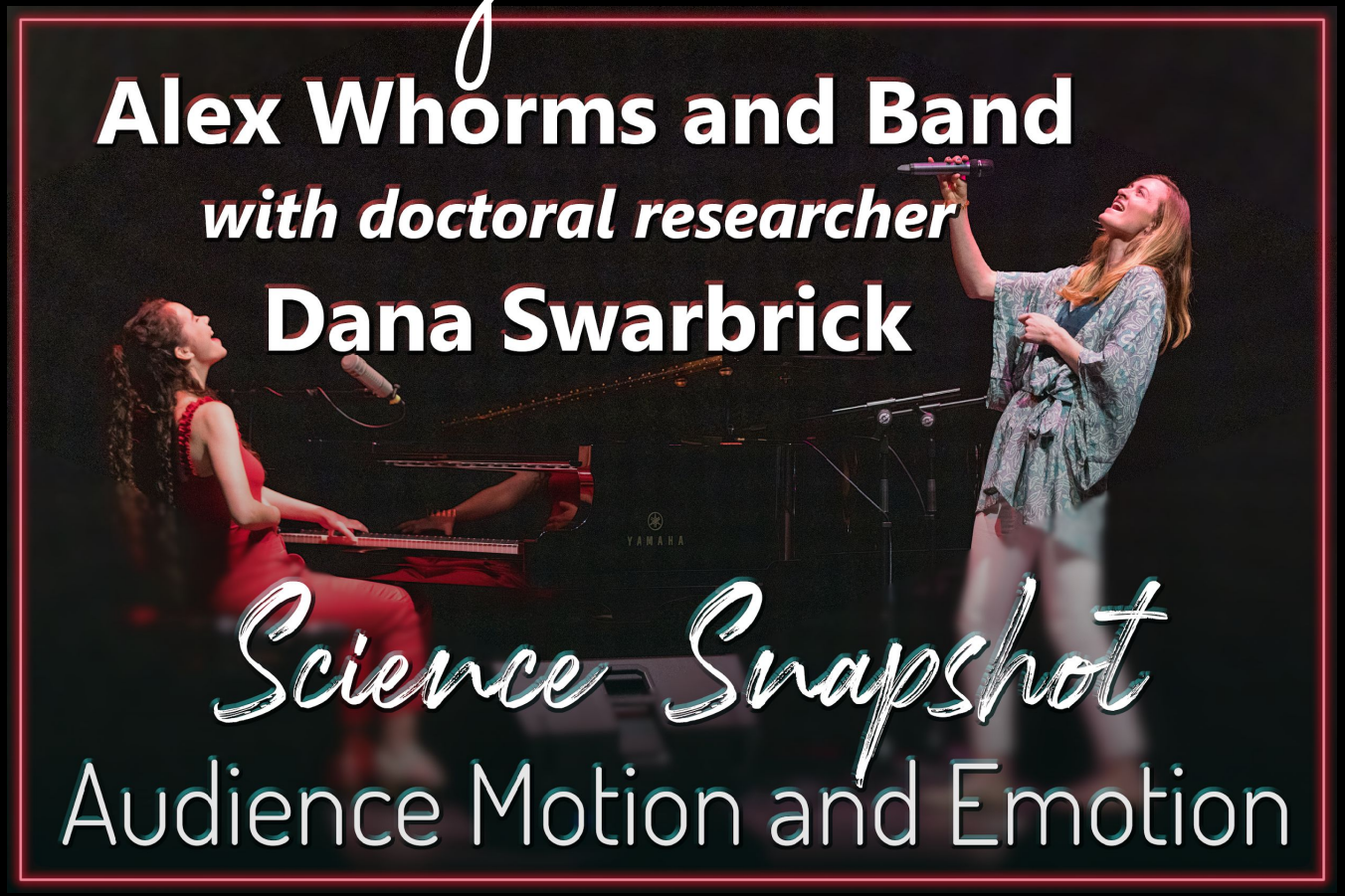






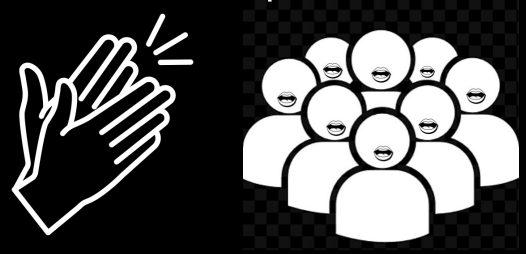


Being in Concert

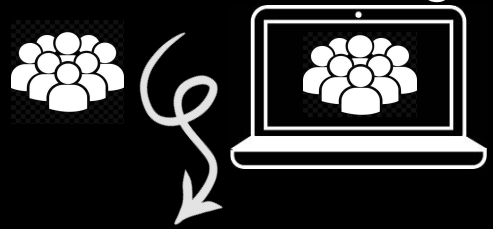


@DanaSwarbrick

Participation



Live vs. livestreaming



↑ Engagement

↑ Connectedness

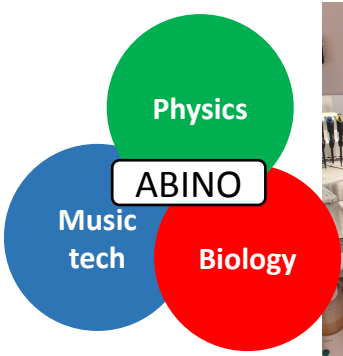
To musicians (both groups)
To audience (only live audience)

? Motion

Music for cells?

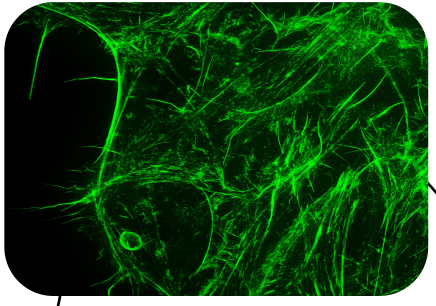
Dongho Kwak
PhD candidate
RITMO

Rhythmic mechanical stimulations of cell cultures



Signal generation/manipulation

Microscopic image acquisition



Mechanical stimulation

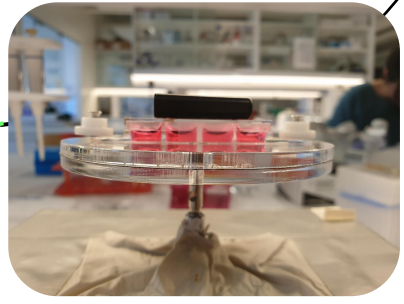
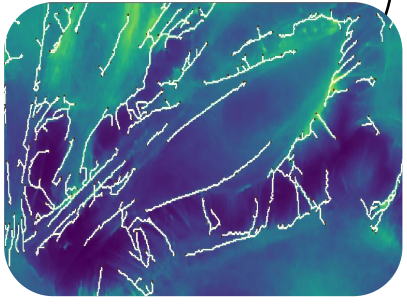
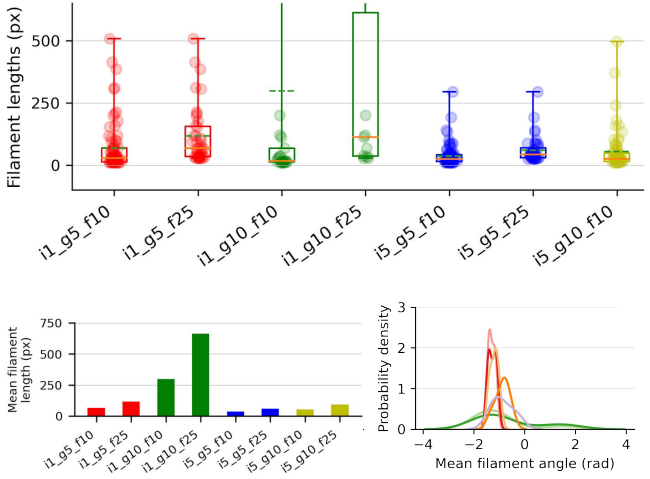


Image quantification



Data analysis / stats



Neural mechanisms underlying long-term encoding of musical sequences

Gemma Fernández-Rubio, PhD student

Main supervisor: Prof. Elvira Brattico; Co-supervisors: Dr. Leonardo Bonetti, Prof. Peter Vuust

communications biology

ARTICLE

https://doi.org/10.1038/s42003-022-04217-8 OPEN

Magnetoencephalography recordings reveal the spatiotemporal dynamics of recognition memory for complex versus simple auditory sequences

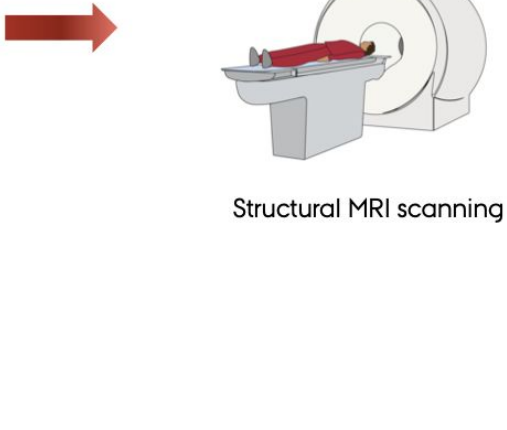
Gemma Fernández-Rubio[1,2✉], Elvira Brattico[1,3], Sonja A. Kotz[2], Morten L. Kringelbach[1,4,5], Peter Vuust[1] & Leonardo Bonetti[1,4,5]

PNAS nexus

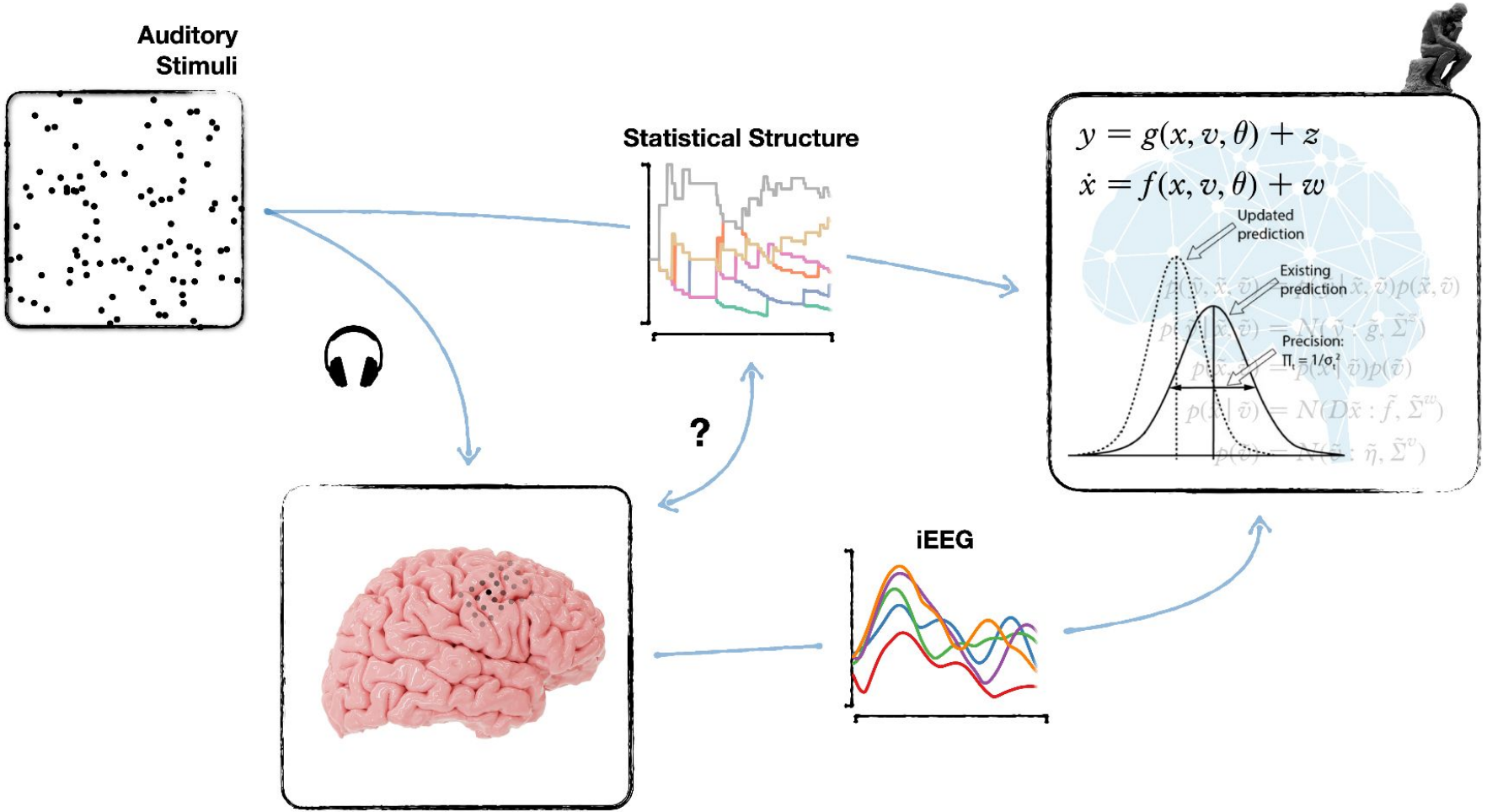
PNAS Nexus, 2022, 1, 1–10
https://doi.org/10.1093/pnasnexus/pgac216
Advance access publication date: 28 September 2022
Research Report

Associations between abstract working memory abilities and brain activity underlying long-term recognition of auditory sequences

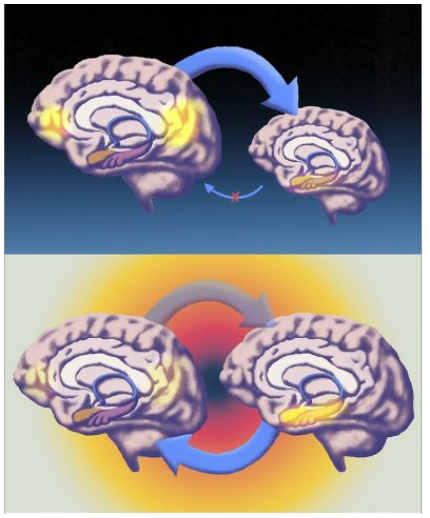
Gemma Fernández-Rubio[a,*,1], Francesco Carlomagno[a,b,1], Peter Vuust[a], Morten L. Kringelbach[a,c,d] and Leonardo Bonetti[a,c,d]

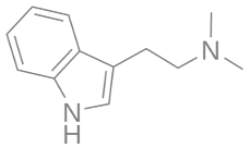


gemmafr@clin.au.dk Gemma Fernández Rubio @gemmaferu



Dr. Julian Fuhrer





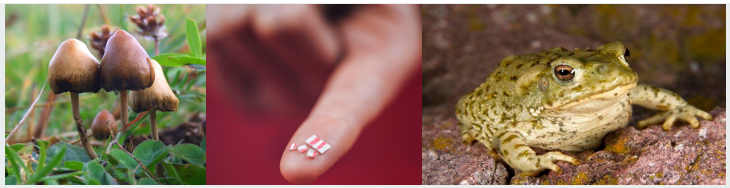
Effects of Ayahuasca Ingestion on Changes in Hierarchy of Brain Dynamics among Santo Daime

Katarina Jerotic

UNIVERSITY OF OXFORD

Kenneth Shinozuka PhD student (2nd year), Centre for Eudaimonia and Human Flourishing, Oxford

Psychedelics



- General question: How do psychedelics affect the brain and consciousness?

- More specific questions:
  - How do psychedelics perturb and shed light on the relationship between pharmacology, neuroimaging, and phenomenology (conscious experience)?
    - Meta-analysis in collaboration with Kat Jerotic
  - How do psychedelics make temporal sequences of brain activity more ordered or disordered?
    - INSIDEOUT project
      - Temporal irreversibility of MEG signals
      - Entropy production (part of thermodynamics of mind framework developed at our centre)

Maham Riaz

TOWARDS NOVELTY:

Perceiving and engaging with unfamiliar contexts within a strange Virtual Reality environment

Phenomenological Interviews

Consensus categories: clustering & intersubjective validation

Experiential Structure:

- from disorientation to familiarity
- dynamic cycle of 'affect'
- mediating action potentials & 'real' affordances
- curiosity & play
- the embodied self

WILLIAM LATHAM, STEPHEN TODD, LANCE PUTNAM AND PETER TODD: **MUTATOR VR.VORTEX (2017)**

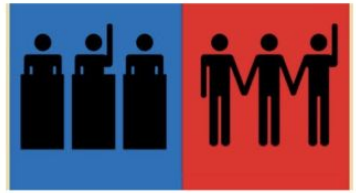
Norwegian Centre of Excellence
The Research Council of Norway

Martin Pleiß | @playnary
martin.pleiss@imv.uio.no

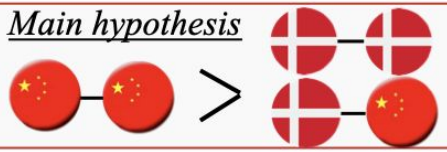
To coordinate or not to coordinate:
Social bias effects on musical communication

Background:
- Music is essentially a means of communication *(Cross, 2014)*
- Successful communication requires **coordination** *(LaCroix, 2020)*

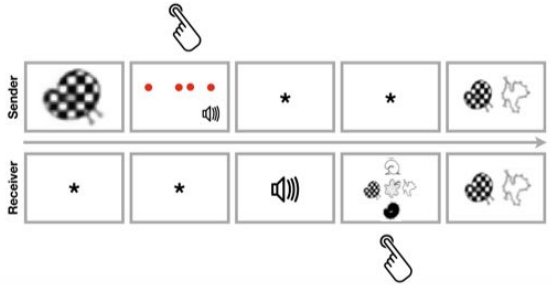
Research question:
- How does **cultural structures** (*collectivism* vs *individualism*) effect music coordination / communication?



Main hypothesis



- In-group bias (social bias)
- Interaction strategies
- Cross-modal integration



Methods (signalling game):
- Behavioural
- Magnetoencephalography (MEG)

Metrics:
- **Coordination** & asymmetry
- Convergence speed

Crossmodal Perception of Time and Rhythm in Film

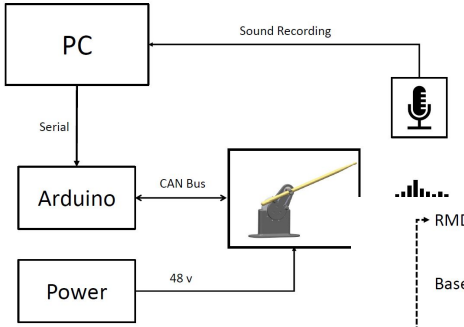
I will investigate crossmodal integration of **audiovisual rhythms** in relation to

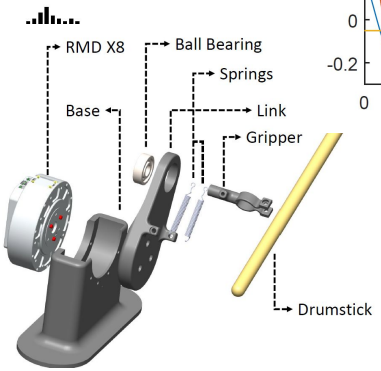
- Time perception
- Attention
- Absorption

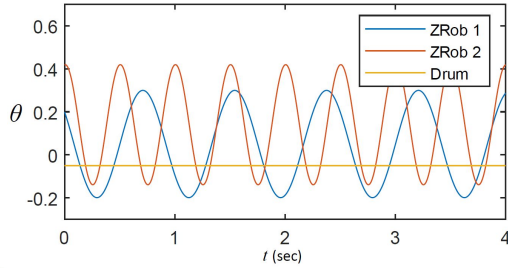
- Self-composed music
- Film scenes
- Virtual Reality

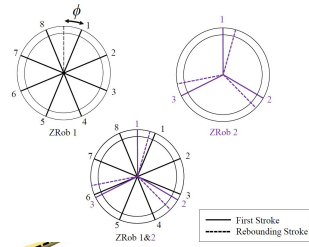
- Eye tracking
- Pupillometry
- Behavioural responses

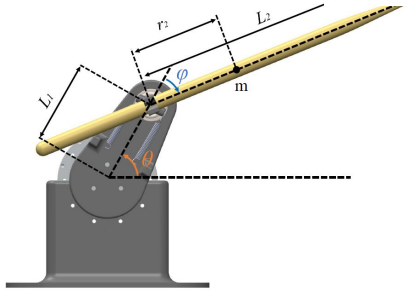
MIKAEL HOPE - PhD Student
mikael.hope@imv.uio.no





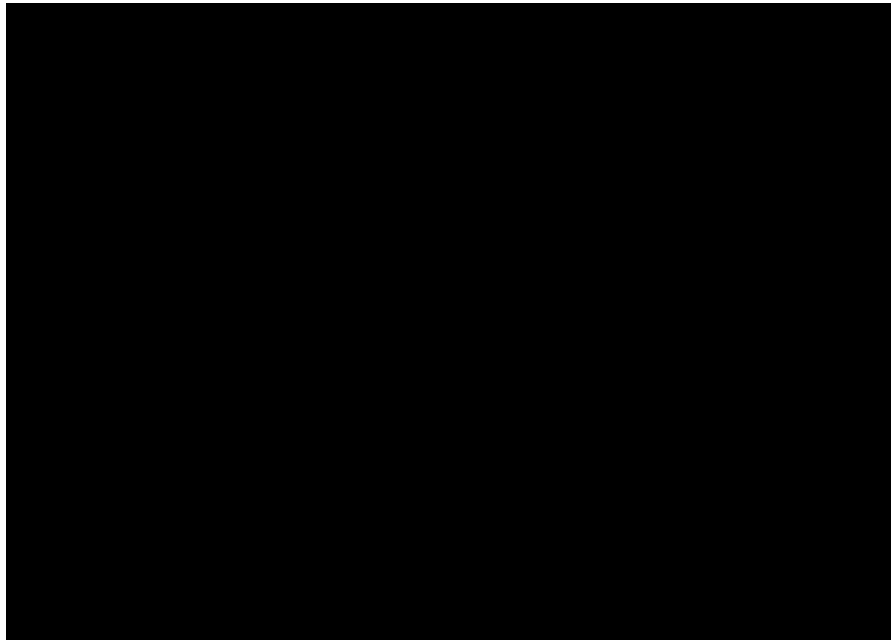






ZRob; The Drumming Robot

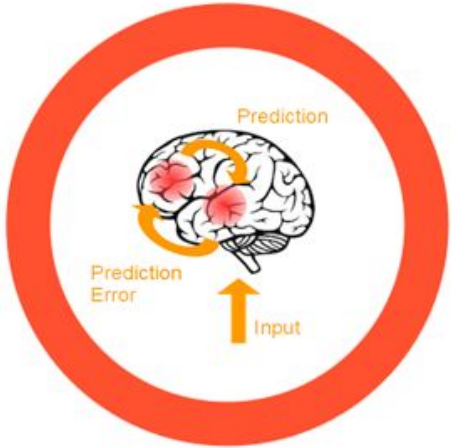
Mojtaba Karbasi
RITMO
Department of Informatics
mojtabak@ifi.uio.no



The role of Orbitofrontal Cortex in Auditory Predictive Processing

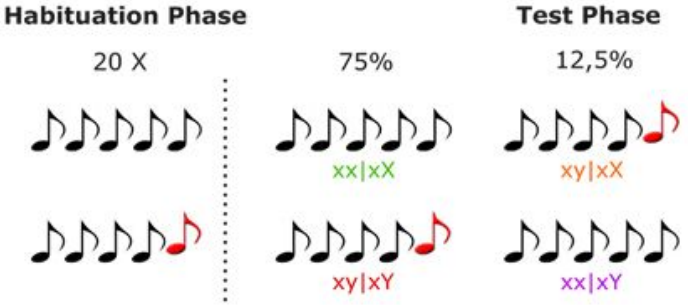
Olgerta Asko, PhD Candidate

Background



Procedure

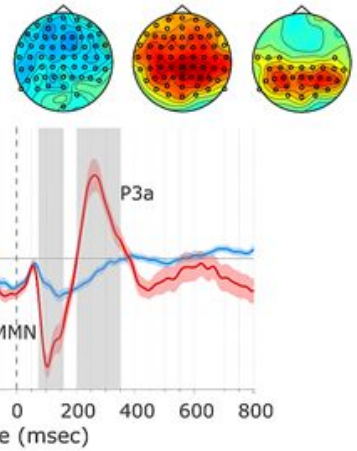
Local-Global auditory paradigm



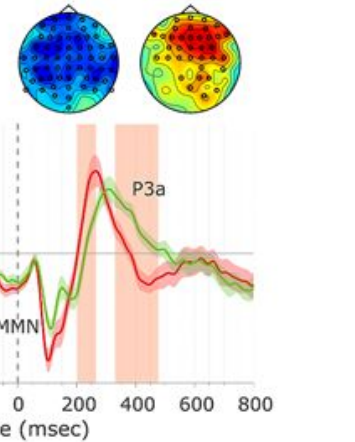
Scalp EEG

Results

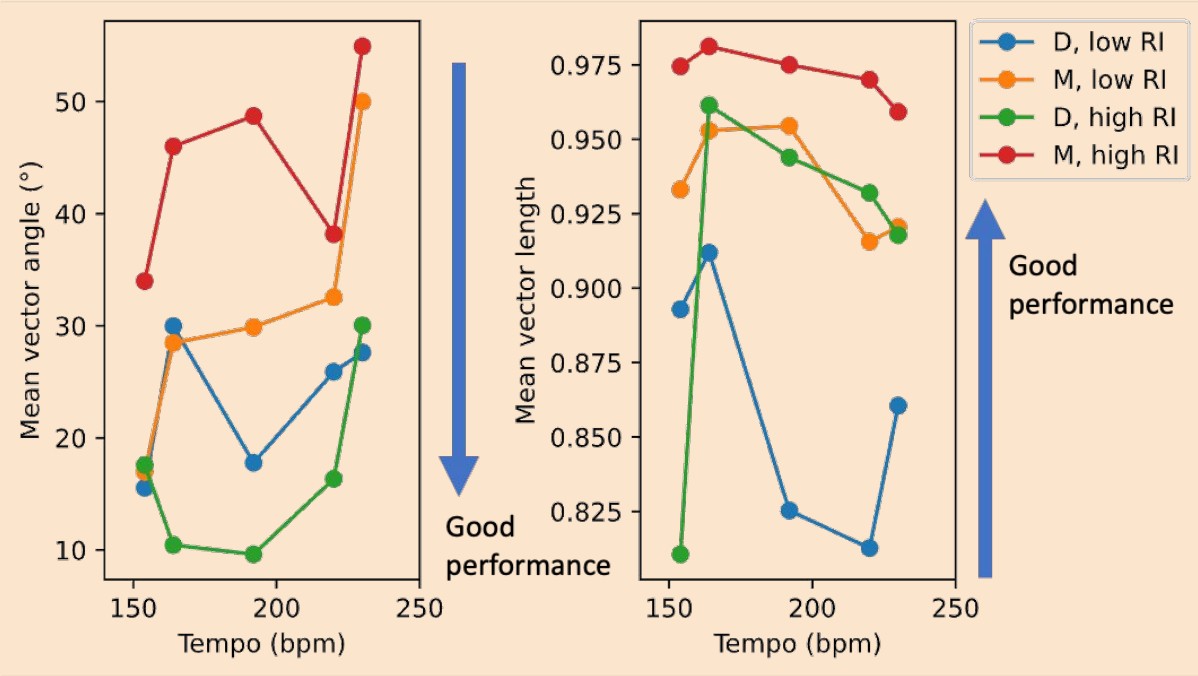
ERPs Healthy controls



ERPs OFC patients

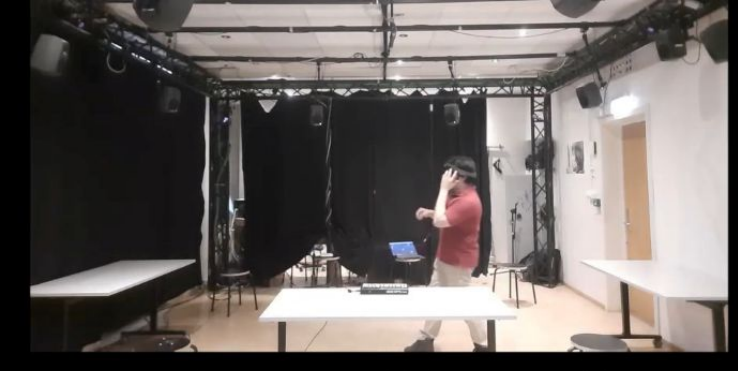


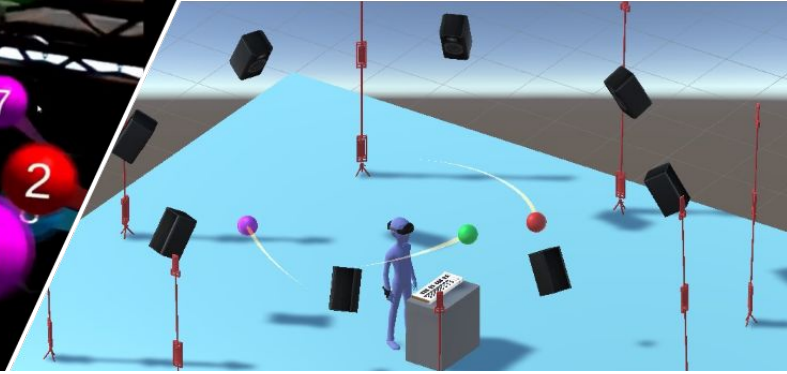
Tapping to Salsa Rhythms: Preliminary Pilot Findings



Mean vector angle (left, denotes inverse tapping accuracy) and length (right, denotes inverse tapping variability) for musicians (M) and Salsa dancers (D) for low rhythmic information (RI) and high RI stimuli at different tempi.

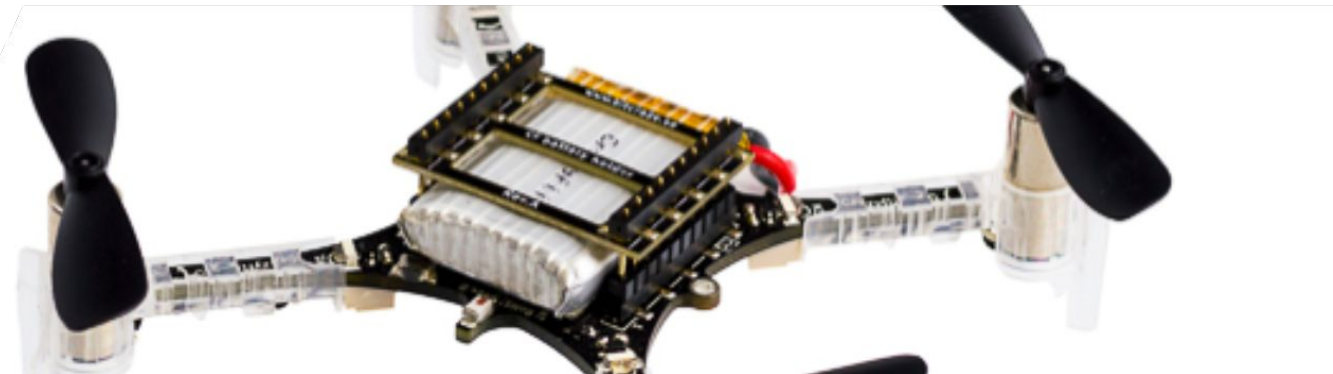
- Experienced dancers seem to have better accuracy than musicians at most tempi for low and high RI.
- Musician's variability is low at all tempi for low and high RI. Experienced dancers have higher variability for stimuli with low RI, and with high RI and low tempo.





Automatic Tempo Synchronization for Human-Machine Interactive Music Systems based on Autonomous Agents

Pedro Lucas
PhD Student



PELLE DE DECKERE – MIB PHD STUDENT
MAIN SUPERVISORS: PETER VUUST & MORTEN L. KRINGELBACH
TOMAS MATTHEWS, VICTOR PANDO NAUDE, JAN STUPACHER, LENE VASE

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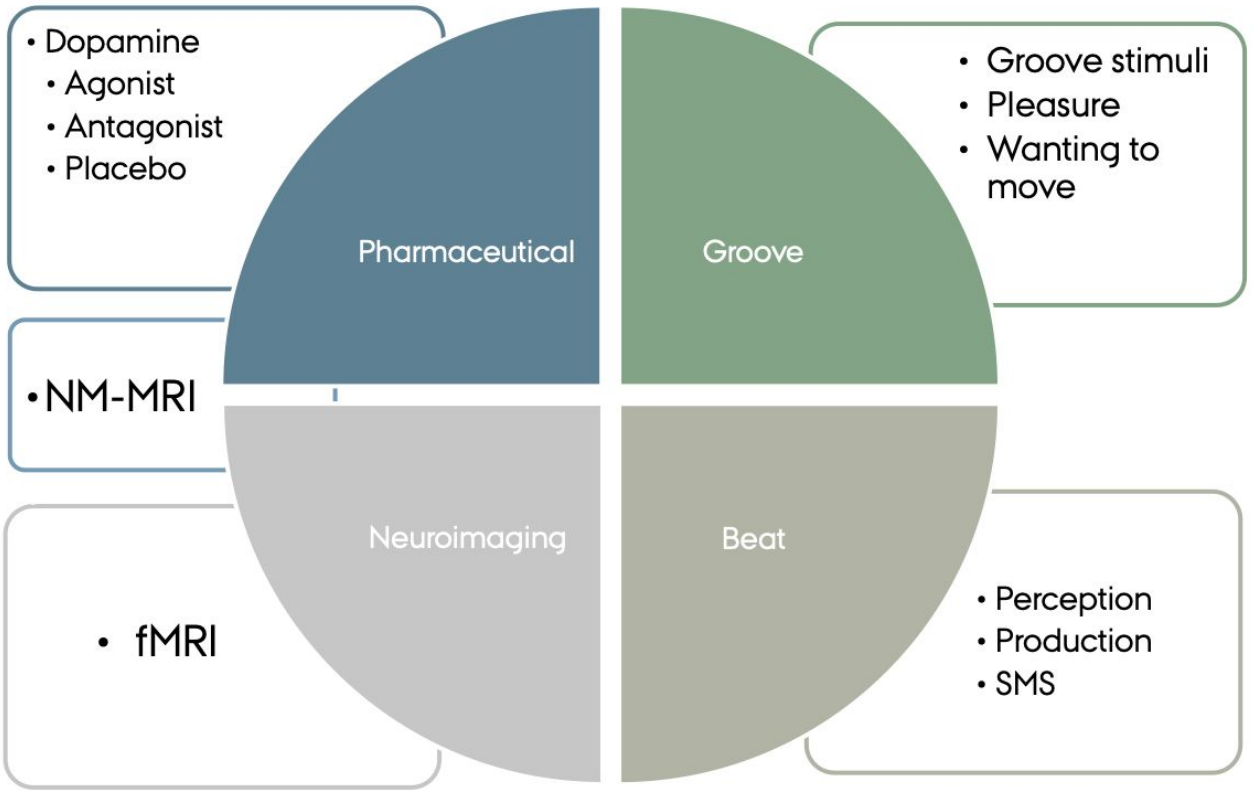
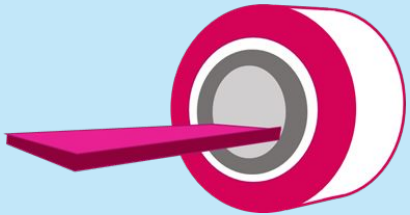


Music and Relaxation

Rebecca Scarratt



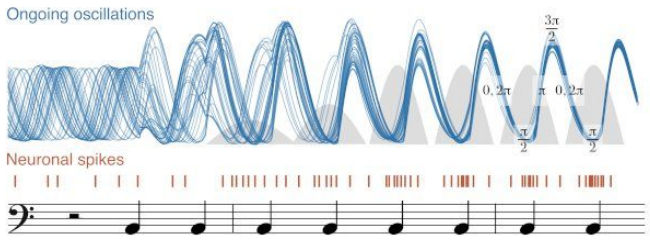
Sandra Solli

PhD Fellow

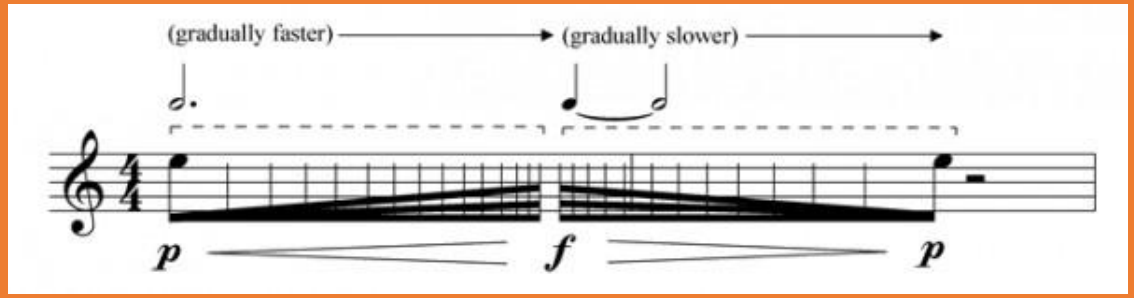
Auditory temporal predictions based on aperiodic rhythms

- The role of dynamic attending and the motor system

Entrainment models / Dynamic Attending Theory

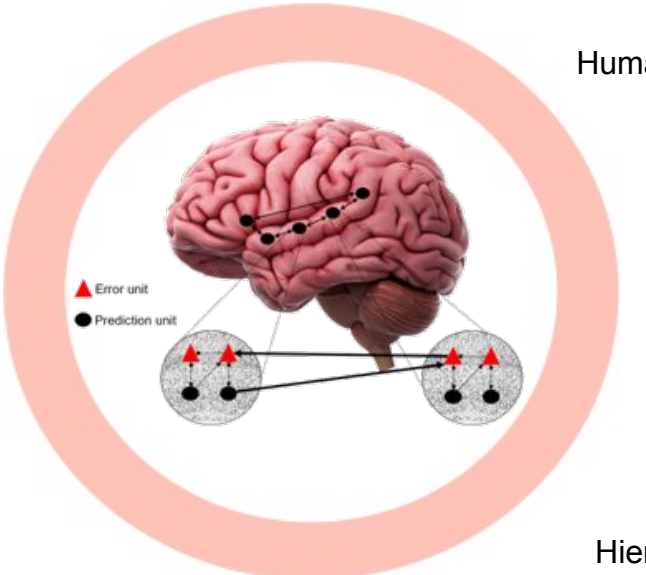


Sensorimotor Synchronization

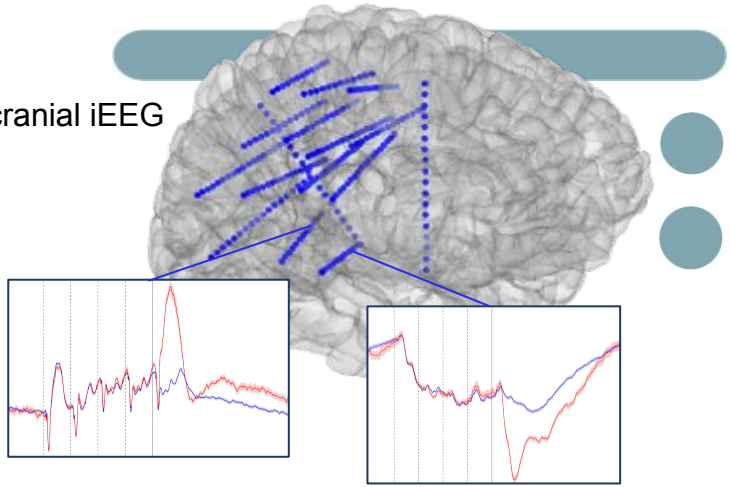


Neurophysiology of Hierarchical Auditory Predictive Processing

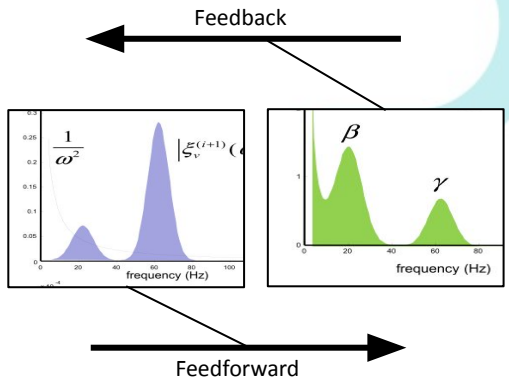
Vegard Volehaugen, PhD Candidate



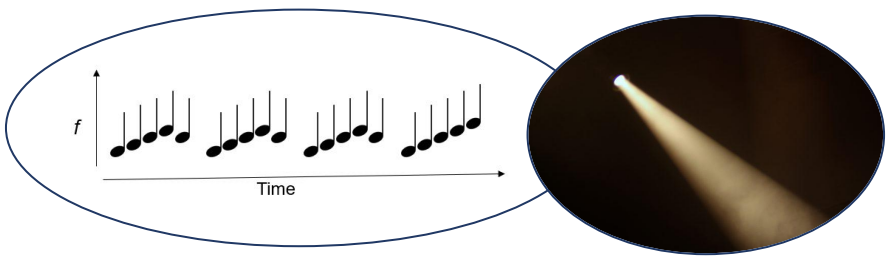
Human intracranial iEEG



Frequency-specific connectivity



Hierarchical mismatch paradigms



Manipulation of **selective attention**

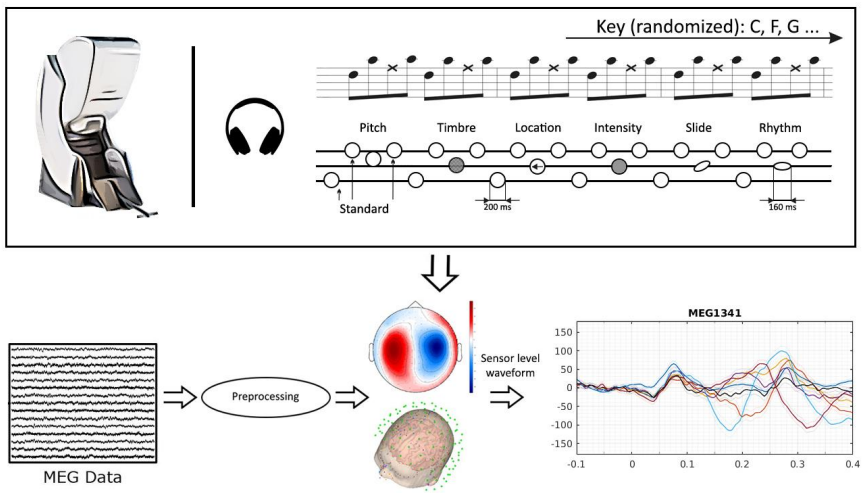
AudioPred

Fluid intelligence and auditory predictive processing: associations between MMN parameters and performance scores

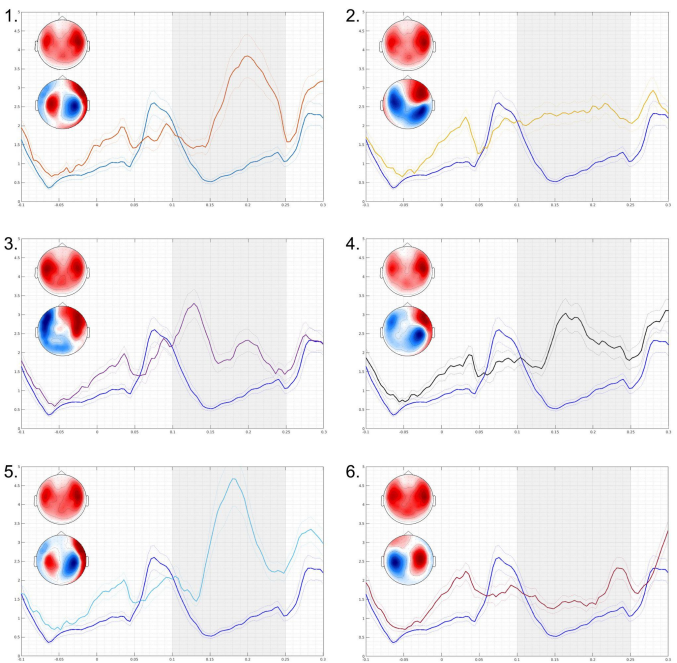
Campo, F. F., Carlomagno, F., Vuust, P., Haumann, N. T., Bonetti, L., Grube, M., Brattico, E.

Methods:

- **Aim of the study** → replicate and extend previous findings (Bonetti et al., 2018), and to investigate whether MMN is also related to gF.
- MEG data of **29 participants** were recorded while listening to the musical **multi-feature paradigm** → four-tone pattern played with piano tones, including a randomized **feature deviant** at the 3rd position;
- **Behavioural** measures of **intelligence** were assessed using the **WAIS-IV**.



- The analysis was performed on **combined gradiometers** for both frontal and temporal ROIs as in Bonetti et al. (2018).
- We performed then two RM-**ANOVAs**.



Results

We found a **significant relationship** between MMN and the Digit Span subscale on frontal and temporal ROIs, closely *replicating and extending* the previous results (Bonetti et al.; 2018).

Results suggest that intelligence is *related* to predictive processes occurring at a pre-attentive sensorial level.

Systematic review & meta-analysis: non-verbal auditory memory in the brain

Campo et al., 2023. *In progress*

The Danish National Research Foundation's
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Aarhus University & The Royal Academy of Music Aarhus/Aalborg

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Poster Blitz Copenhagen 2023