



UNIVERSITY  
OF OSLO

RITMO Centre for Interdisciplinary Studies in Rhythm, Time and Motion



27 October 2023

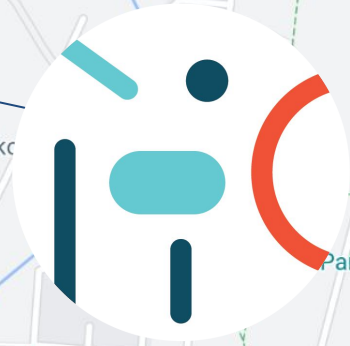
RITMO aims to expand our understanding of **rhythm** as a fundamental property of human life.

1

Psychology



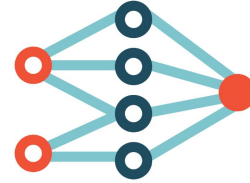
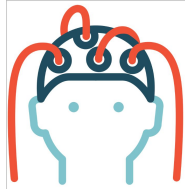
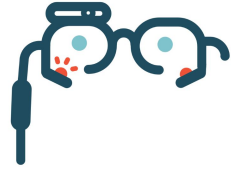
Informatics



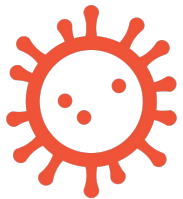
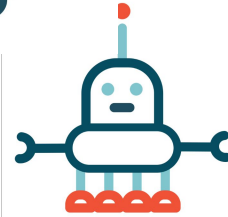
Musicology







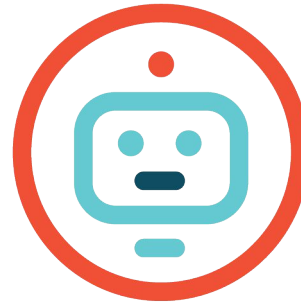
Rhythm



**Interaction &  
Pleasure**



**Interaction &  
Robotics**

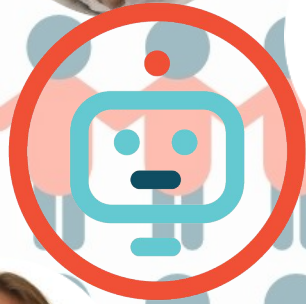


**Structure &  
Aesthetics**



**Structure &  
Cognition**









Do musicians synchronize  
their heartbeats?

What Make Rap  
Flows Dope?





Do the pupils  
reveal how  
much you  
want to move  
to the beat?



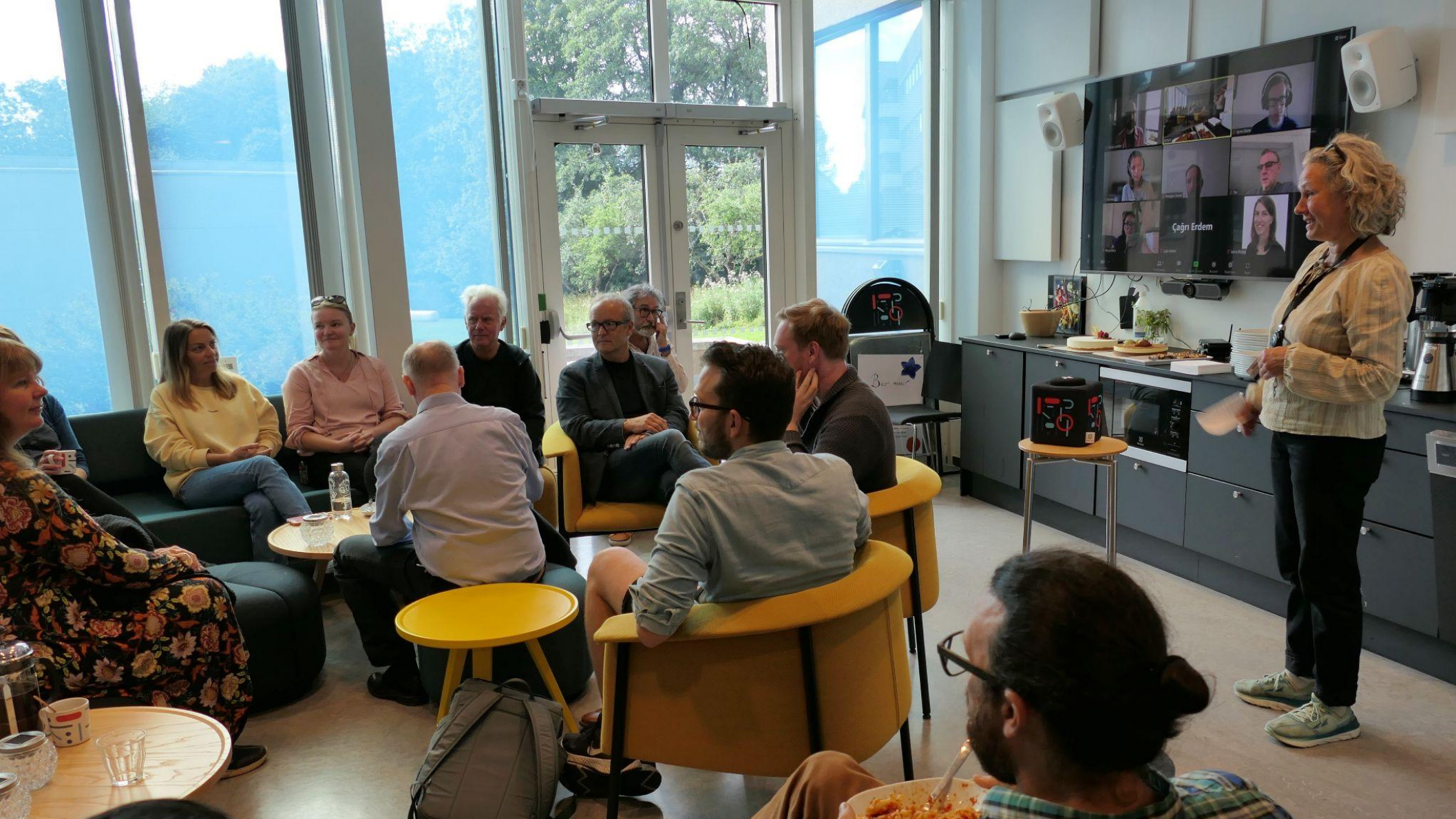


Can robots be moved  
by music?



**Dagliglivet**

























# WHAT MAKES THE SHIT DOPE?

Investigating the rhythmic techniques of rap flows



Kjell Andreas Oddekalv

UIO University of Oslo







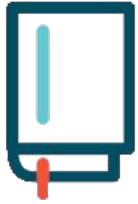




# Resultater



**2018-2022**



**6 books**



**151 journal articles**



**69 artistic outputs**



**112 book chapters**



**197 media appearances**



**13 innovations**



**474 conference presentations**

ARTICLES

<https://doi.org/10.1038/s42256-021-00320-3>

nature  
machine intelligence

Real-world embodied morphologically

Tønnes F. Nygaard<sup>1,2,5</sup>, Charles

Robots are traditionally bound by a fixed control strategies. Here we present the conditions in outdoor, unstructured environment (1) a robot that permits in situ morphological energy-efficient morphologies on the basis morphology affects performance on self allowing the robot to constantly update different morphological configurations, demonstrated benefits of real-world morphing adaptation into future robotic design

Robots inspecting the damaged Fukushima nuclear power plant were sent with a daunting task: to pass through narrow gaps to enter the area, traverse gaps between debris and over and through various types of debris and murky water. Designing a robot to work in unstructured environments is a challenging task. These challenges—chiefly multimodality and characteristic of the type of unstructured environments as a whole continue to struggle with technological limitations mean that the ever-increasingly high numbers of deployments and shape-shifting (or morphological adaptation) are attractive, albeit more technically challenging. The underlying principle is that variable morphological degrees of freedom to more strongly increase the likelihood that the robot can face of unpredictable environmental conditions. Morphologically adaptive robots are a promising technology to unlock operation to adapt to a broad range of environments and tasks on the fly, without the need to rebuild each time they face something new. We postulate that the key to developing morphologically adaptive robots may lie in a specific subfield

<sup>1</sup>Department of Informatics, University of Oslo, Oslo, Norway. <sup>2</sup>Department of Computer Science, Australian National University, Canberra, Australia. <sup>3</sup>Cyber-Physical Systems Program, CSIRO, Canberra, Australia. <sup>4</sup>email: tonnesfn@ifi.uio.no



New Directions in Philosophy and Cognitive Science

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Where Is the Beat in That Note? Effects of Attack, Duration, and Perceived Timing of Musical and Quasi-Musical

Christian Nymoen, Evan Anderson

PARODY IN THE AGE OF REMIX

MASHUP CREATIVITY VS. THE TAKEDOWN

RAGNHILD BRØVIG



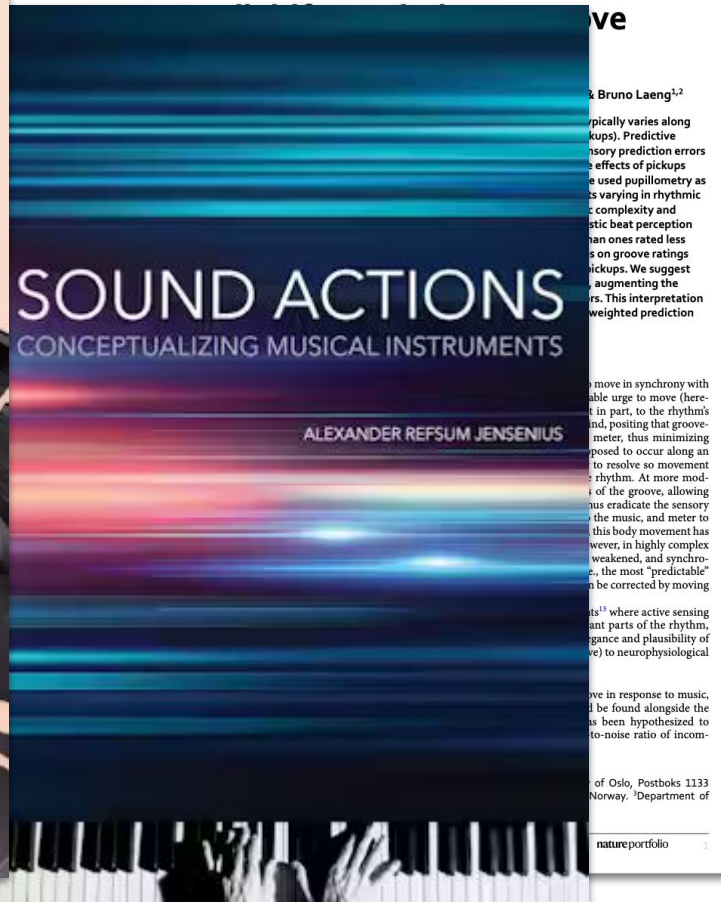
scientific reports

Check for updates

SOUND ACTIONS

CONCEPTUALIZING MUSICAL INSTRUMENTS

ALEXANDER REFSUM JENSENIUS



... Bruno Laeng<sup>1,2</sup> ... typically varies along ... (picks). Predictive ... sensory prediction errors ... effects of pickups ... used pupillometry to ... effects of pickups ... as varying in rhythmic ... complexity and ... beat perception ... than ones rated less ... on groove ratings ... picks. We suggest ... augmenting the ... rs. This interpretation ... weighted prediction

... move in synchrony with ... able urge to move (here ... in part, to the rhythm's ... and, positing that groove- ... meter, thus minimizing ... posed to occur along an ... to resolve so movement ... rhythm. At more mod ... of the groove, allowing ... us eradicate the sensory ... the music, and meter to ... this body movement has ... weaker, in highly complex ... weakened, and synchron ... the most "predictable" ... be corrected by moving

... ts<sup>13</sup> where active sensing ... ant parts of the rhythm, ... gance and plausibility of ... re) to neurophysiological

... ve in response to music, ... d be found alongside the ... s been hypothesized to ... to-noise ratio of incom-

... of Oslo, Postboks 1133 ... Norway. <sup>2</sup>Department of







# UiOs innovasjonspris 2018







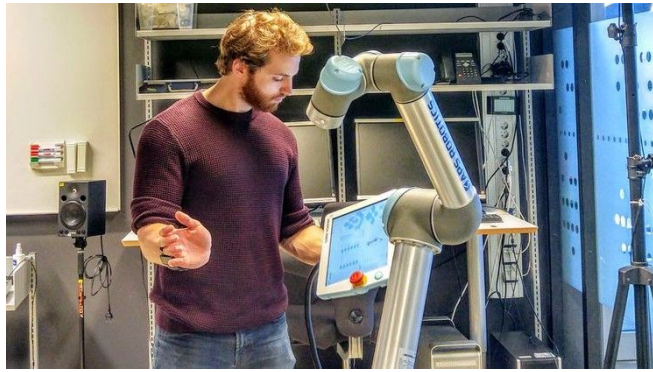
# DRs Årets begivenhet 2021



P2 Prisen 2022  
P2 Årets Begivenhet  
Årets lyd med Dan George  
BTH/Dan  
Dan George - Højsanger!







2022 IEEE Engineering in  
Medicine and Biology Prize  
Paper Award

SiFi Labs

Pre-order available soon!

Your email

GET UPDATES

A collection of various biosignal acquisition sensors, including black and red modules, arranged on a red background. The sensors are of different shapes and sizes, some with gold contacts on top.

**THE NEXT STEP  
IN BIOSIGNAL  
ACQUISITION**

SUBSCRIBE



Electromyography  
(EMG)



Electrocardiography  
(ECG)



Electrodermal Activity  
(EDA/GSR)



Photoplethysmography  
(PPG)



Actigraphy  
(IMU/MARG)



Skin Temperature

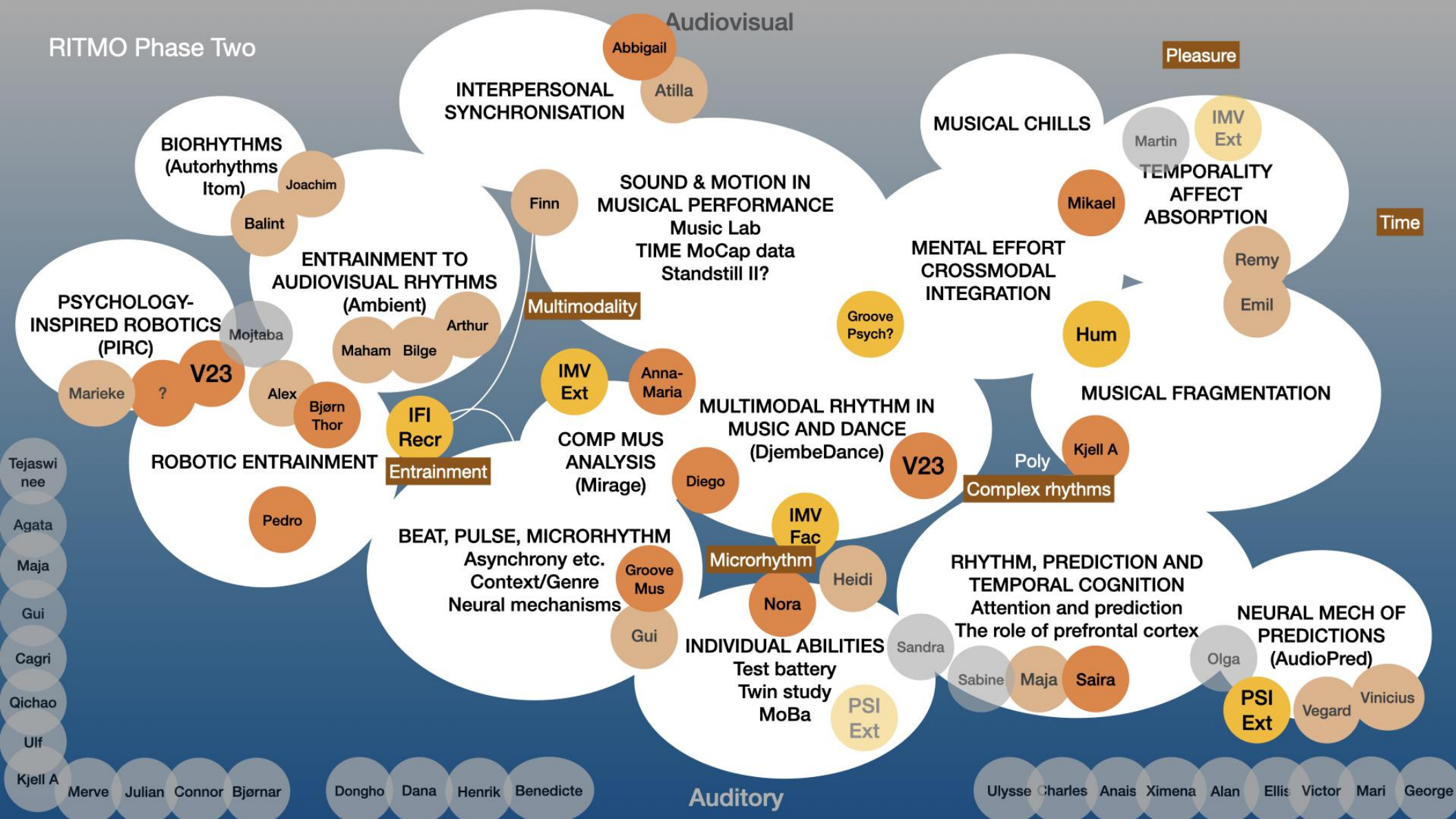




**Fase 2**



# RITMO Phase Two



**BIORHYTHMS  
(Autorhythms)**

Itom  
Joachim  
Dongho  
Balint

**PSYCHOLOGY-  
INSPIRED ROBOTICS  
(PIRC)**

Marieke  
Ulysse

**Entrainment**

**(Biological, Robotic, Ambient environments)**

ROBOTIC ENTRAINMENT

Pedro  
Julian

**INTERPERSONAL  
SYNCHRONISATION**

**Synchronisation**

**Interaction and Synchronisation**  
**(Social bonding, Musical performance)**

Multimodal rhythms

H

**Microrhythm**

**(Beat perception, Groove)**

BEAT PERCEPTION, MICRORHYTHM  
Synchronisation  
Neural mechanisms

**INDIVIDUAL ABILITIES**

Test battery  
Twin study

**Auditory**

**Audiovisual**

Dana  
Abigail  
Henrik  
Atilla

**SOUND & MOTION IN**

MUSIC PERFORMANCE  
Music Lab  
TIME MoCap data  
Standstill II?

**MUSICAL CHILLS**

**Pleasure**

**Time and Pleasure**  
**(Absorption, Fragmentation)**

**Time**

MENTAL EFFORT  
CROSSMODAL  
INTEGRATION

Martin  
Mikael

Bjerner

Emil

**Prediction and attention**

**(Complex rhythms, Neural entrainment)**

Complex rhythms

Attention and prediction  
The role of prefrontal cortex

NEURAL MECH OF  
PREDICTIONS  
(AudioPred)

Maja  
Saira

Olga

Vinicius



*Rhythmic pattern of plucked synth*



*Plucked synth without sidechain compression active*



*Signal triggering the compression (kick drum)*



*Plucked synth with sidechain compression active*



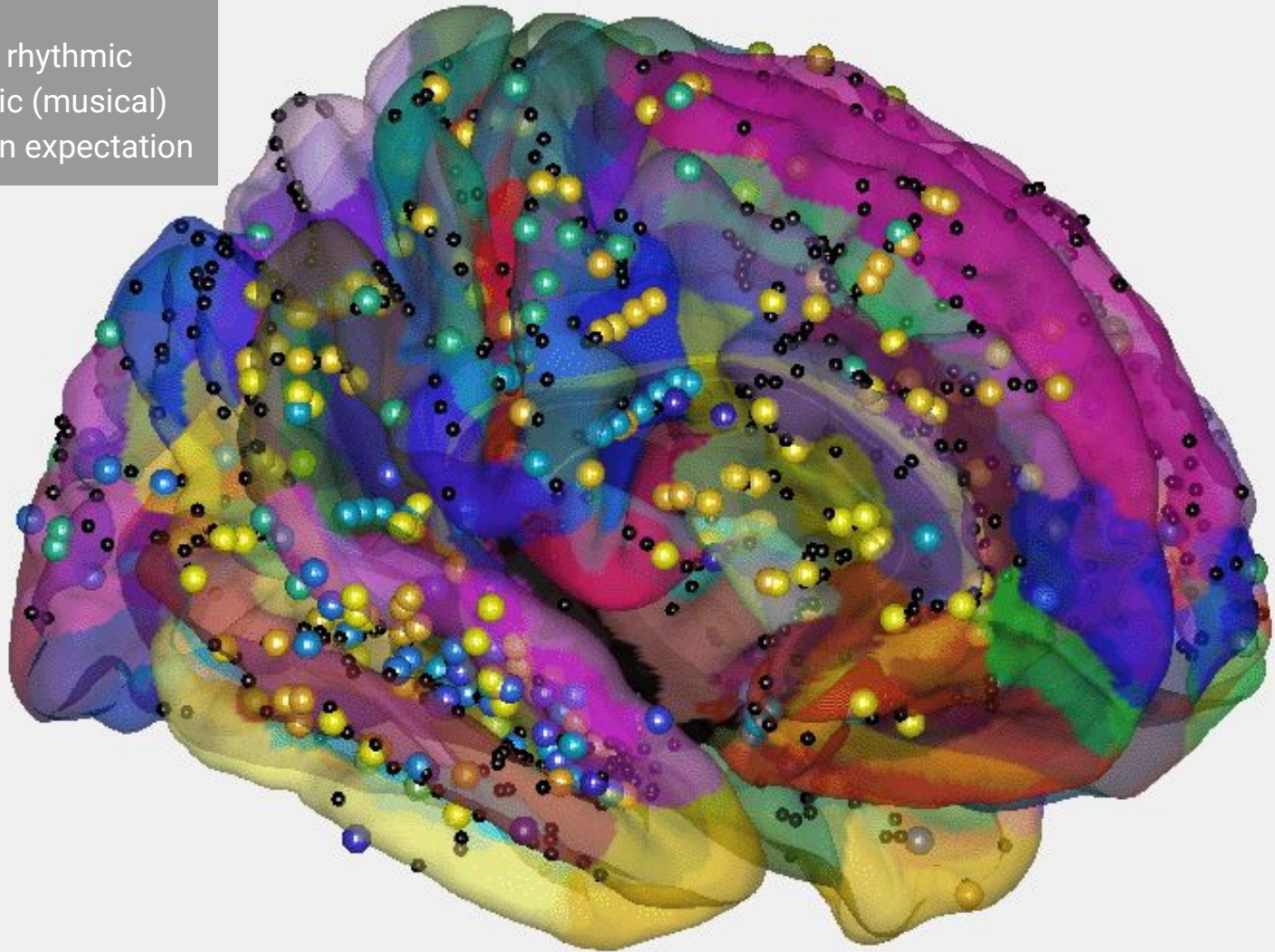
(Depicted grid = 16th notes. 102 BPM: 1/16th note = 147 ms.)

□ = reshaped attack

□ = attack cut short

## Prediction and Attention:

new focus on complex rhythmic patterns and naturalistic (musical) stimuli, music theory on expectation







**Interaction and synchronization:**

multimodal rhythmic interplay between performers in various traditions



## Time and Pleasure:

manipulation of time structures in audiovisual modes of expression (remixes, film)







**Entrainment:**

synchronization processes in biological systems and human-machine and human-environment systems

# Rekruttering

Effektive prosesser  
Fokus på kjønnsbalanse  
Tverrfaglige komiteer



# Mangfold



**Friendliness:** we are happy to share our knowledge and expertise with each other



**Diversity:** we acknowledge and respect that we have colleagues with different characteristics and backgrounds



**Time:** we value and respect people's work time and breaks



**Space:** we appreciate the differences between spaces for concentrated work, active lab areas, and lively social arenas



**Efficiency:** we aim to have enough meetings (not too many, not too long), with clear agendas, and in suitable formats



**Ethics:** we adhere to high ethical standards in our research activities and our daily lives

# Career Development Programme



Alternative career paths;  
careers outside academia



Team and collaboration skills; ethics  
at the workplace



Project management



Obtaining funding



Time management and Career  
planning



Dissemination and presentation  
skills



# Utfordringer



Korona



HF

IMV

RITMO-IMV

SV

PSI

RITMO-PSI

MN

IFI

RITMO-IFI



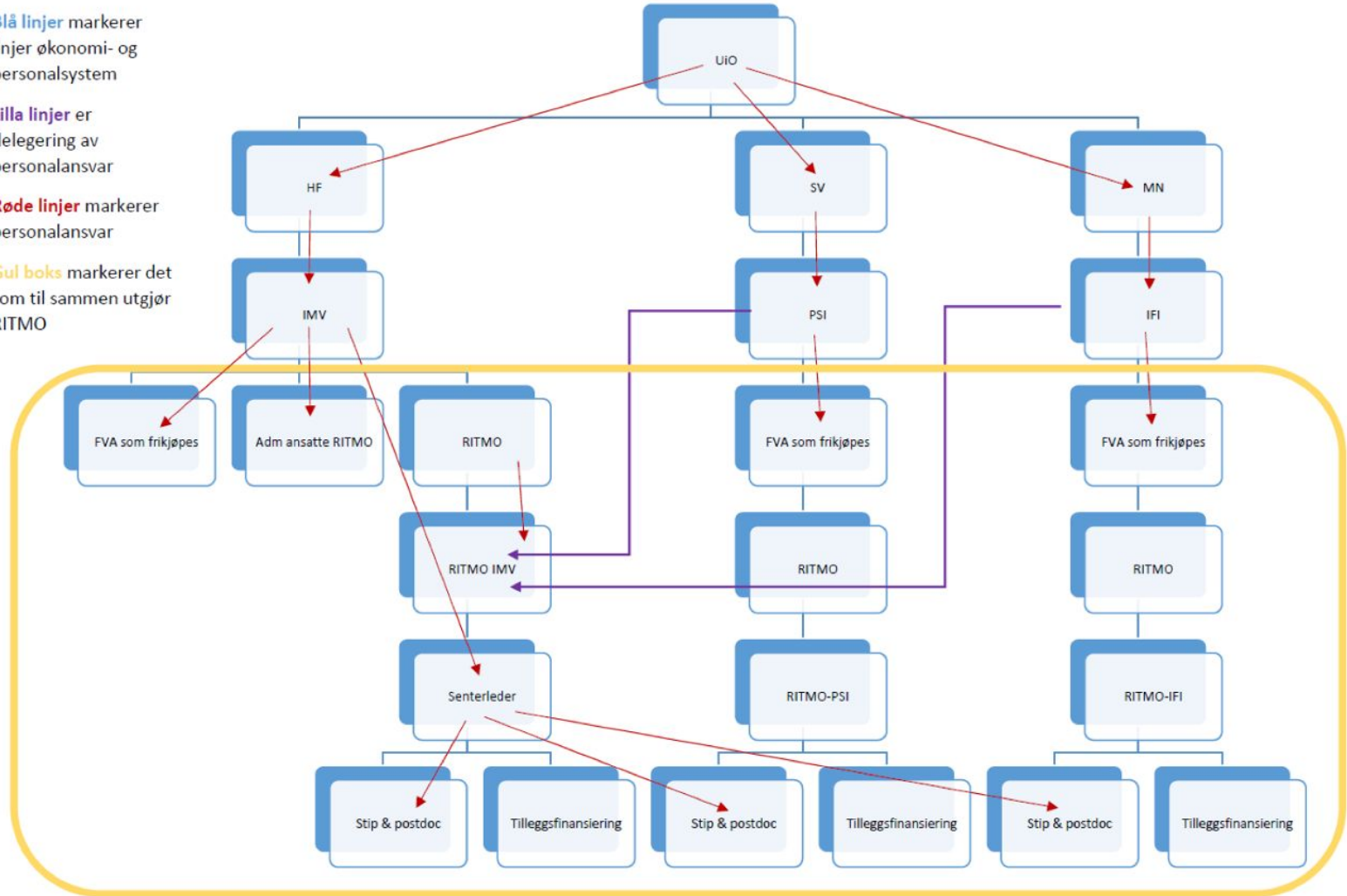
# RITMO i UiOs organisasjon, og UiOs økonomi- og personalsystem

**Blå linjer** markerer linjer økonomi- og personalsystem

**Lilla linjer** er delegering av personalansvar

**Røde linjer** markerer personalansvar

**Gul boks** markerer det som til sammen utgjør RITMO

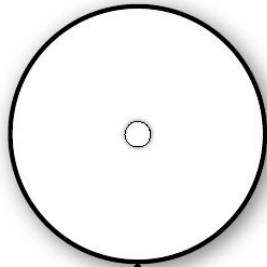




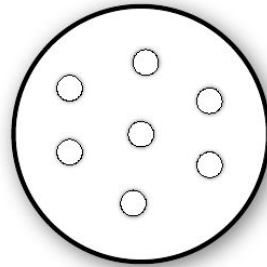
## Tverrfaglig samarbeid



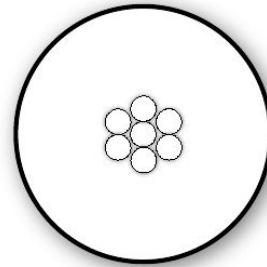
Intra-  
disciplinary



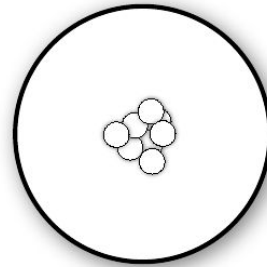
Cross-  
disciplinary



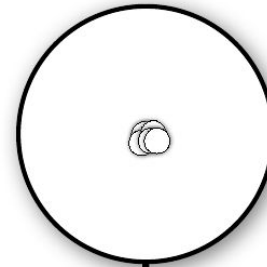
Multi-  
disciplinary



Inter-  
disciplinary



Trans-  
disciplinary





IFI

IMV

PSI

RITMO 1

RITMO 2

?

- SFF-ordningen gir Norges fremste vitenskapelige miljøer muligheten til å organisere seg i sentre for å nå ambisiøse vitenskapelige mål gjennom samarbeid og med langsiktig grunnfinansiering.
- Forskningen ved sentrene skal være **nyskapende og ha stort potensial for grensesprengende resultater som flytter den internasjonale forskningsfronten.**
- Sentrene arbeider med ambisiøse ideer og komplekse problemer der samordnet og langsiktig forskningsinnsats innenfor, eller på tvers av, fagområder, er viktig for å nå målene.

## UNIVERSITETET I OSLO

“Fra et institusjonelt ståsted er det, ikke minst fordi institusjonene totalt sett dekker mer enn halvdelen av finansieringen, en tydelig forventning om at sentrene skal gi varige institusjonelle effekter. Dette betyr i sum at sentrene ikke nødvendigvis integreres i institusjonen som permanente enheter, men at sentrene og instituttene benytter de store ressursene de tildeles fra Norges forskningsråd og vertsinstitusjonen til å **utvikle varige, sterke miljøer som gir tydelige ringvirkninger i institusjonen.**”

(Politikk for eksternfinansierte sentre ved UiO (Universitetsstyret 3/2019))



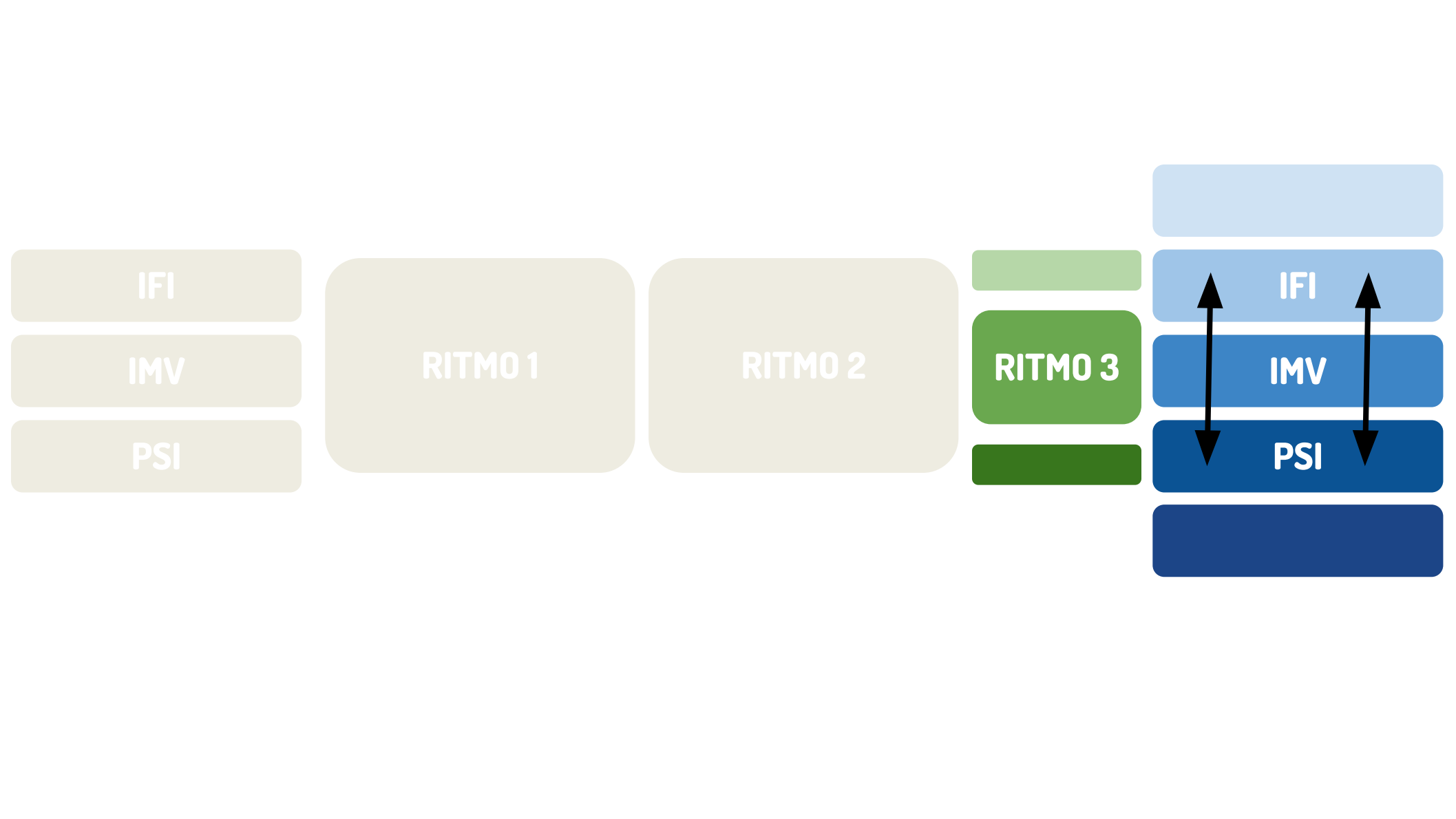
- For å sikre senterledelsen og de ansatte i senteret forutsigbarhet for perioden etter at Forskningsrådets støtte avsluttes, skal vertsinstitusjonen utarbeide planer for sin eventuelle **støtte til senteret for de første 3 årene** etter at Forskningsrådets senterstøtte avsluttes.
- Planen skal bl.a. inneholde en eventuell **økning av antall faste stillinger** på senterets forskningsområde og planer for videreføring av den beste forskningen.
- Planen skal foreligge til, og inngå i, midtveisevalueringen.

(Vedlegg til utlysningen for SFF V, 30.6.21)

## UNIVERSITETET I OSLO

- Senteret forventes å benytte senterperioden til å bygge opp ekstern finansiert aktivitet som det viktigste elementet i videreføringen av senteret.
- De involverte institutter styrker fagområdene involvert ved at **en eller flere (dog definert) faste vitenskapelige stillinger** lyses ut i senterets virkeperiode. Stillingene dekkes av senteret i senterets levetid. Deretter dekkes dette av instituttet.
- Fakultet bør vurdere **tildeling av driftsmidler i en periode etter utløp av senterperioden**, for å sikre en gradvis overgang til eksternt finansiert drift av senteret

(Politikk for eksternfinansierte sentre ved UiO  
(Universitetsstyret 3/2019))



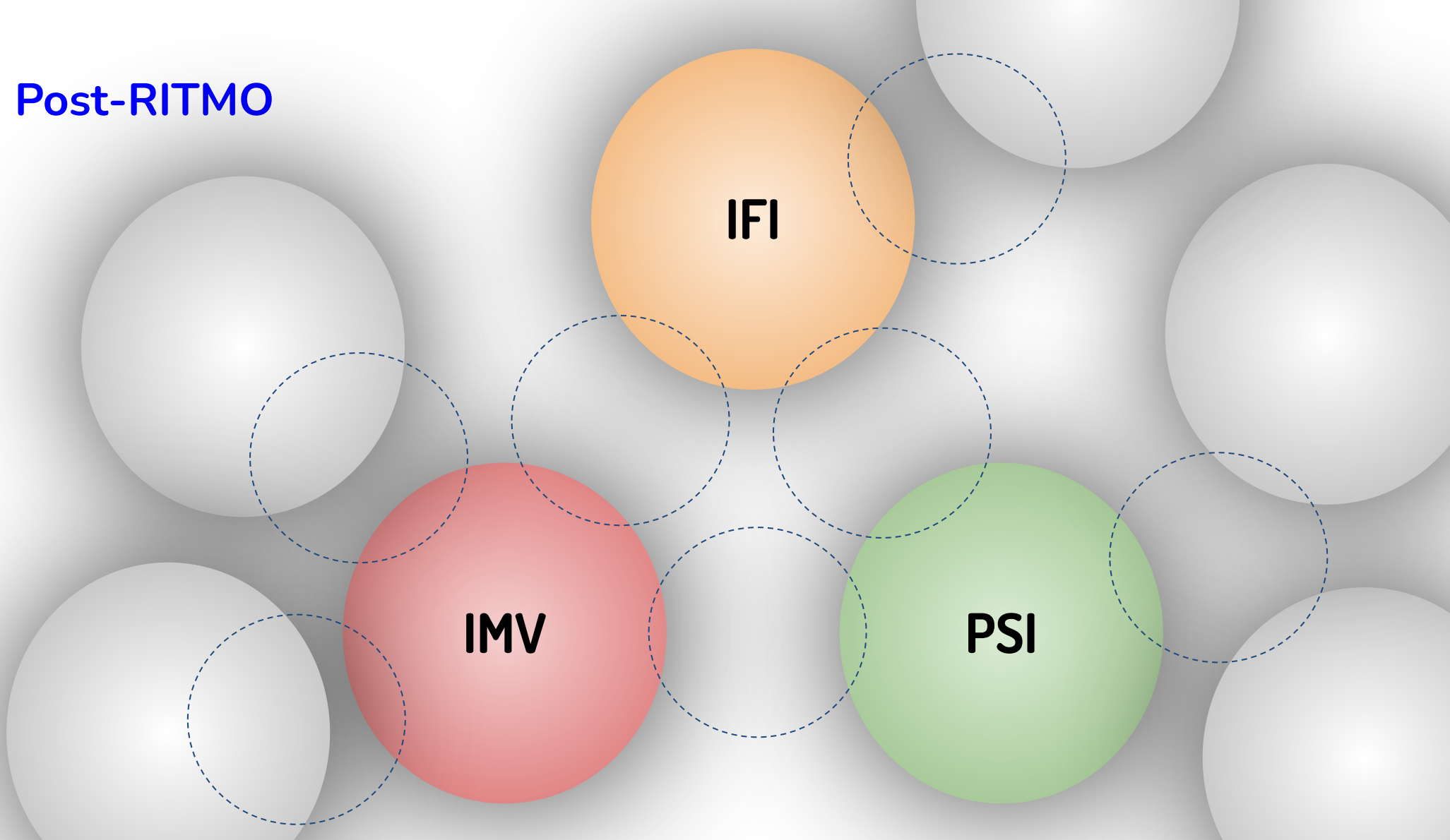


# Post-RITMO

**IFI**

**IMV**

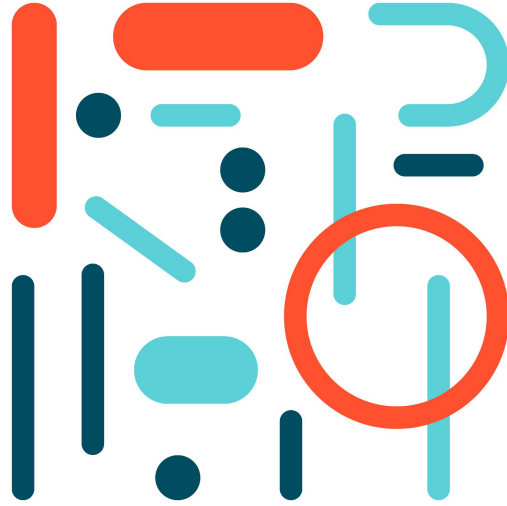
**PSI**



# Mange løse tråder

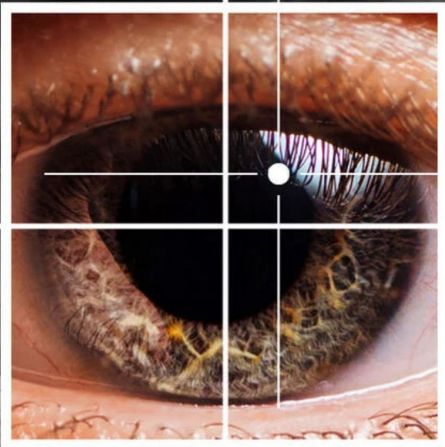
- Administrativ støtte og ledelse i overgangsperioden
- Finansiering av fellesaktiviteter i en nettverksmodell
- Rekruttering av FVA
- RITMOs plass i utdanningene
- Arkivering av nettsider, m.m.
- Konservering av “merkevaren”
- Plassering og organisering av lab'er og utstyr







# Pupillometry

The eye as a window into the mind



 UNIVERSITY OF OSLO

 Future Learn





