

# Creative Computing DESIGN ART MUSIC COMPUTATIONAL THINKING TINKERING



Daniel Spikol: Kickstart 2025



# Datalogisk Institut

- Founded 1970 by Peter Naur
- Computer science has been practised in Denmark under Peter Naur's term “datalogy”, the science of data processes.
- Naur won the 2005 Association for Computing Machinery (ACM) A.M. Turing Award for his work on defining the programming language ALGOL 60.
- He is best remembered as a contributor, with John Backus, to the Backus–Naur form (BNF) notation used in describing the syntax for most programming languages.



# Research Sections of DIKU

- Algorithms and Complexity (AC)
- Human-Centered Computing (HCC)
- Image Analysis, Computational Modelling and Geometry (IMAGE)
- Machine Learning (ML)
- Natural Language Processing (NLP)
- Programming Languages and Theory of Computing (PLTC)
- Software, Data, People and Society (SDPS)
- AI Pioneer Center (Joint with DTU, AU, ITU, AAU)

# DIKU Research



HCC Courageous Collaborative Science -  
understanding how we cooperate and collaborate in groups



ML Prediction from our Brains : Reading our Thoughts



IMAGE together with Cerebriu, and  
Danish hospitals, The research project Stroke will deliver the  
world's first solution to improve MRI-based stroke  
treatment and clinical workflow efficiency.

# DIKU Research



NLP Training sets for Machine Learning are normally created in English. This introduces cultural bias. A new image-grounded benchmark developed by researchers from the University of Copenhagen enables a more diverse approach.



PLTC Two young researchers from the University of Copenhagen and Aarhus University are working together to add so-called effect systems to programming languages, which makes it easier to maintain programs and detect vulnerabilities.



ARTIFICIAL INTELLIGENCE algorithm can predict when narwhals hunt – a task once nearly impossible to gain insight into. Mathematicians and computer scientists at the University of Copenhagen, together with marine biologists in Greenland

# Some DIKU facts

- In 2021, DIKU had just under 200 employees, of whom approximately 160 are in academic positions (including assistant lecturers, external examiners and external lecturers) and 34 in administrative positions
- Just under 1200 students are enrolled in DIKU's three study programmes – Computer Science (Bachelor's programme and Master's programme), Computer Science and economy (Bachelor's programme), as well as Machine learning and data science (Bachelor's programme)
- In practice, the Department teaches even more students, as DIKU also contributes to the study programmes Health Informatics, Communication and IT, and Cognition and Data Science.
- 120 PhD students



# Context



Papert's Turle 1976





A wide-angle photograph of a suspension bridge, likely the Verrazano-Narrows Bridge, at sunset. The sky is a warm orange and yellow. In the foreground, there's a body of water with some ripples. On the left, a white cargo ship is docked at a pier. The pier itself has several industrial buildings, including a prominent orange one. A large green support tower of the bridge stands in the middle ground. The bridge's cables and towers extend across the frame.

Meanwhile in Brooklyn  
NYC



Ventilation Shaft

Score: 0/0

**HIBERNATED 2**

A Science Fiction Story by Stefan Vogt  
(Type "about" for game information.)  
Release 1 / Serial number 200702 /  
PunyInform v1.0 / Inform v6.34

**Ventilation Shaft**

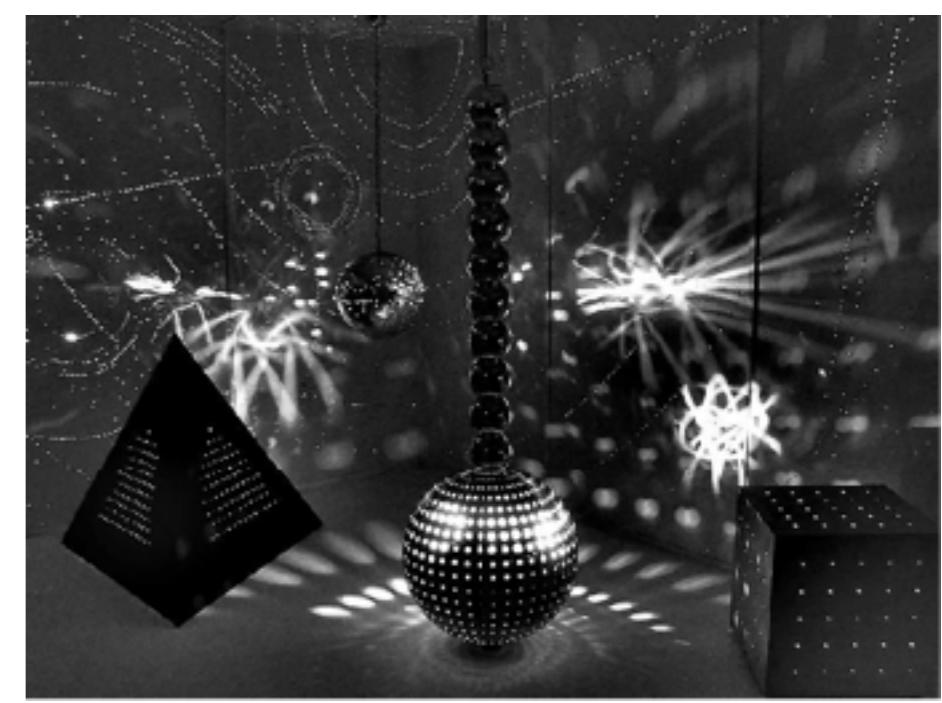
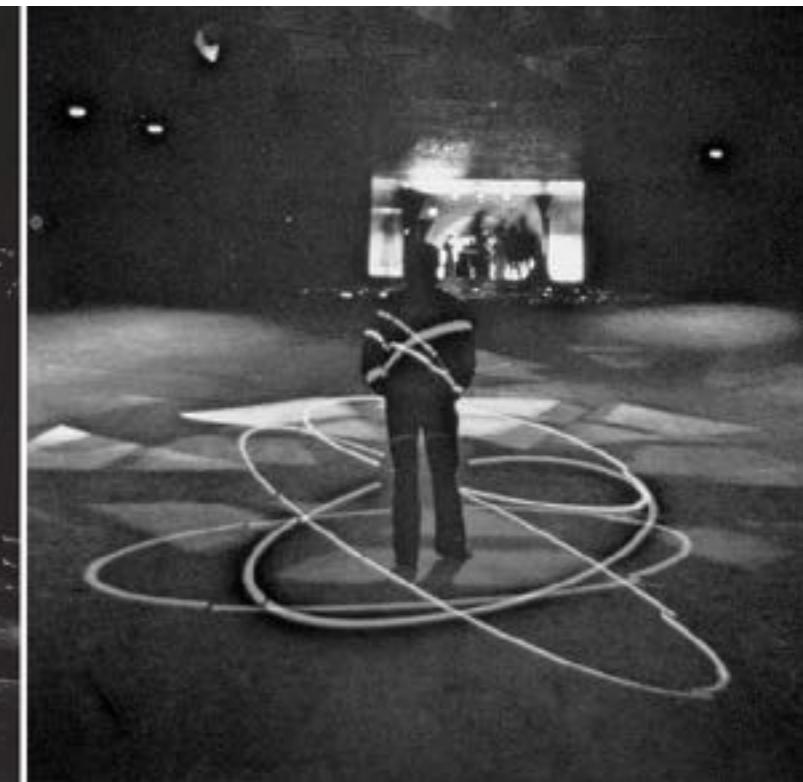
It takes a moment before you realize that you must have missed your destination. Instead you find yourself in a narrow shaft, lying on your stomach, because there is not enough room to stand or turn around. Solid, impenetrable metal surrounds you. An object is preventing you from going backwards, you can feel it, but you cannot see what it is.

The way north is blocked by a rusty grating. Artificial light from the location behind floods this place.

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# **Art, Engineering, and Technology**

# E.A.T. and C.A.V.S.



**Jump forward to 2022**

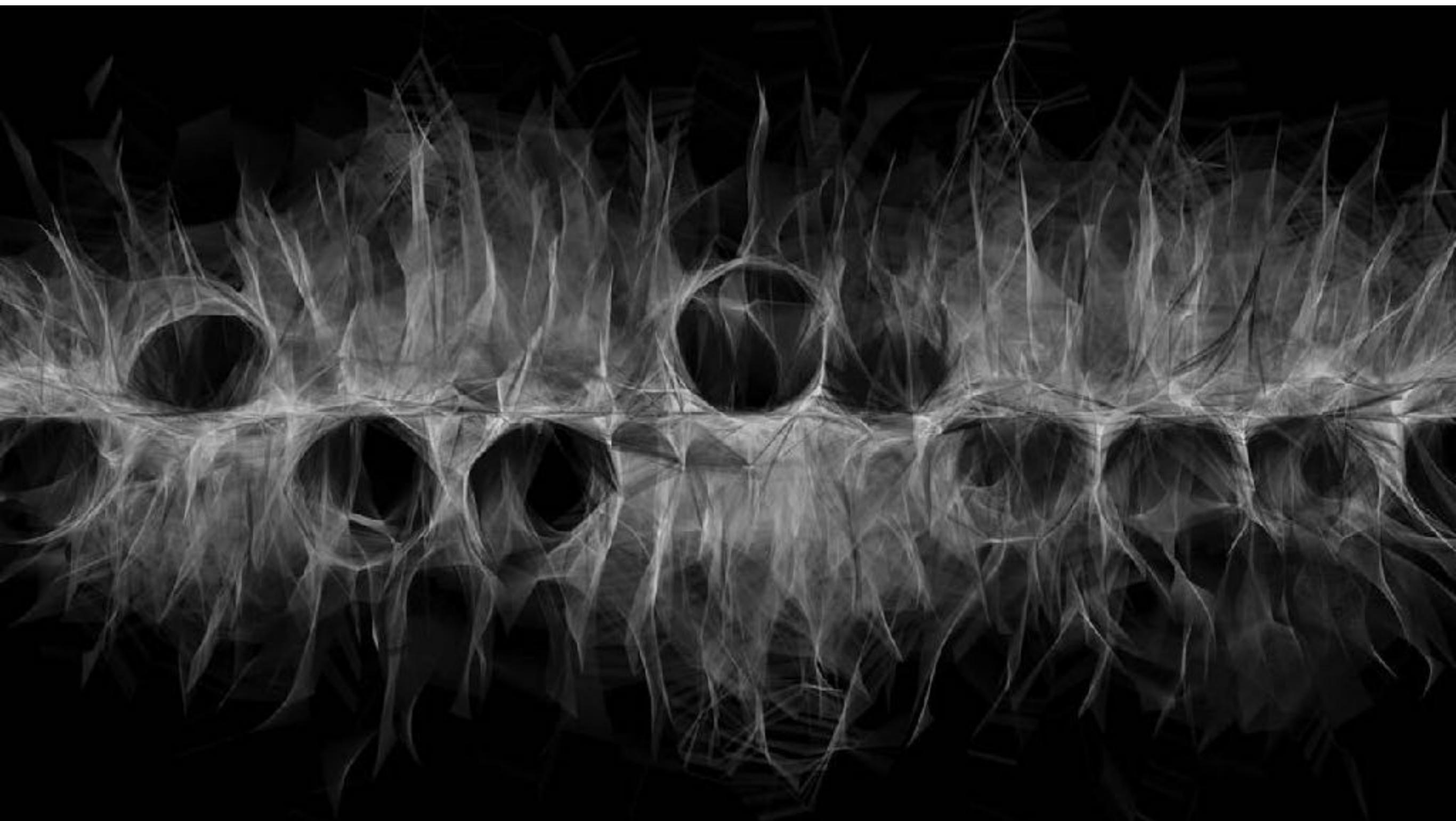
**People should be provoked in their scientific, learning, analytic, creative, playing and personal activities and pursuit.**

Rogers, Y. (2006). Moving on from weiser's vision of calm computing: Engaging ubicomp experiences. *UbiComp 2006: Ubiquitous Computing*, 4206, 404–421. Springer.



# How do you teach programming?

# Casey Reas



# Processing Show Reel - Joshua Davis +

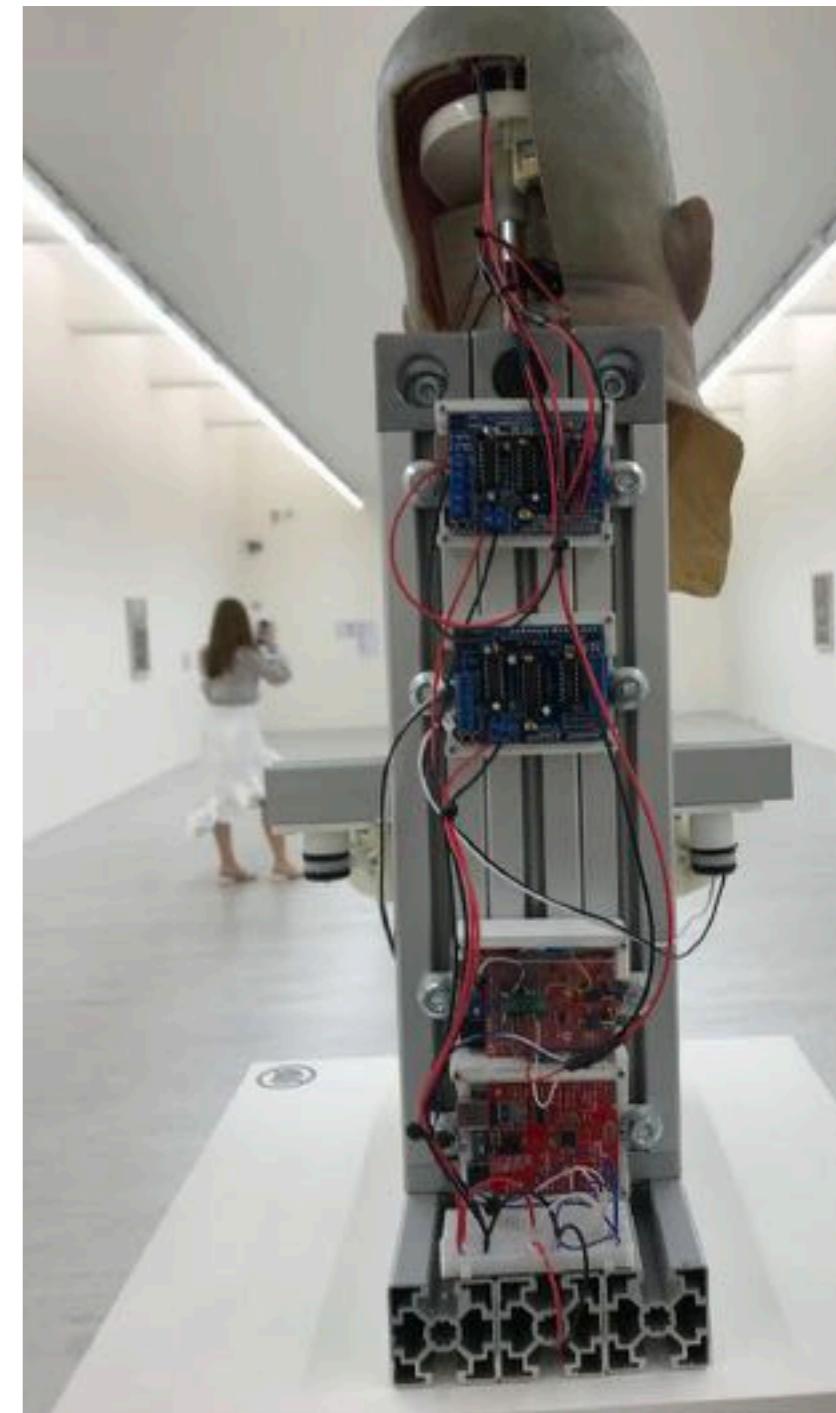


# Playful Engineering, Art, and Technology

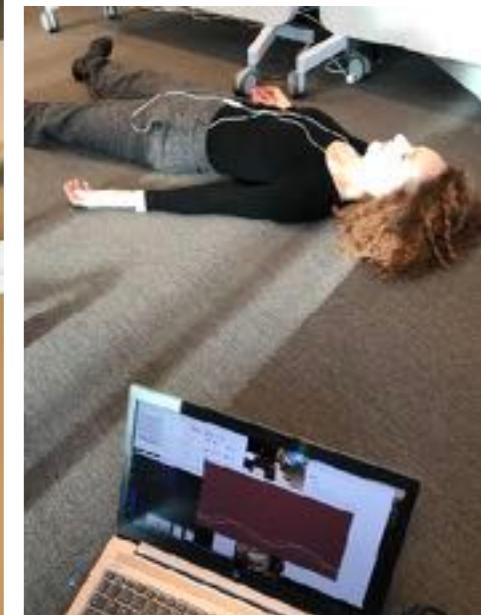
# Arduino and Art



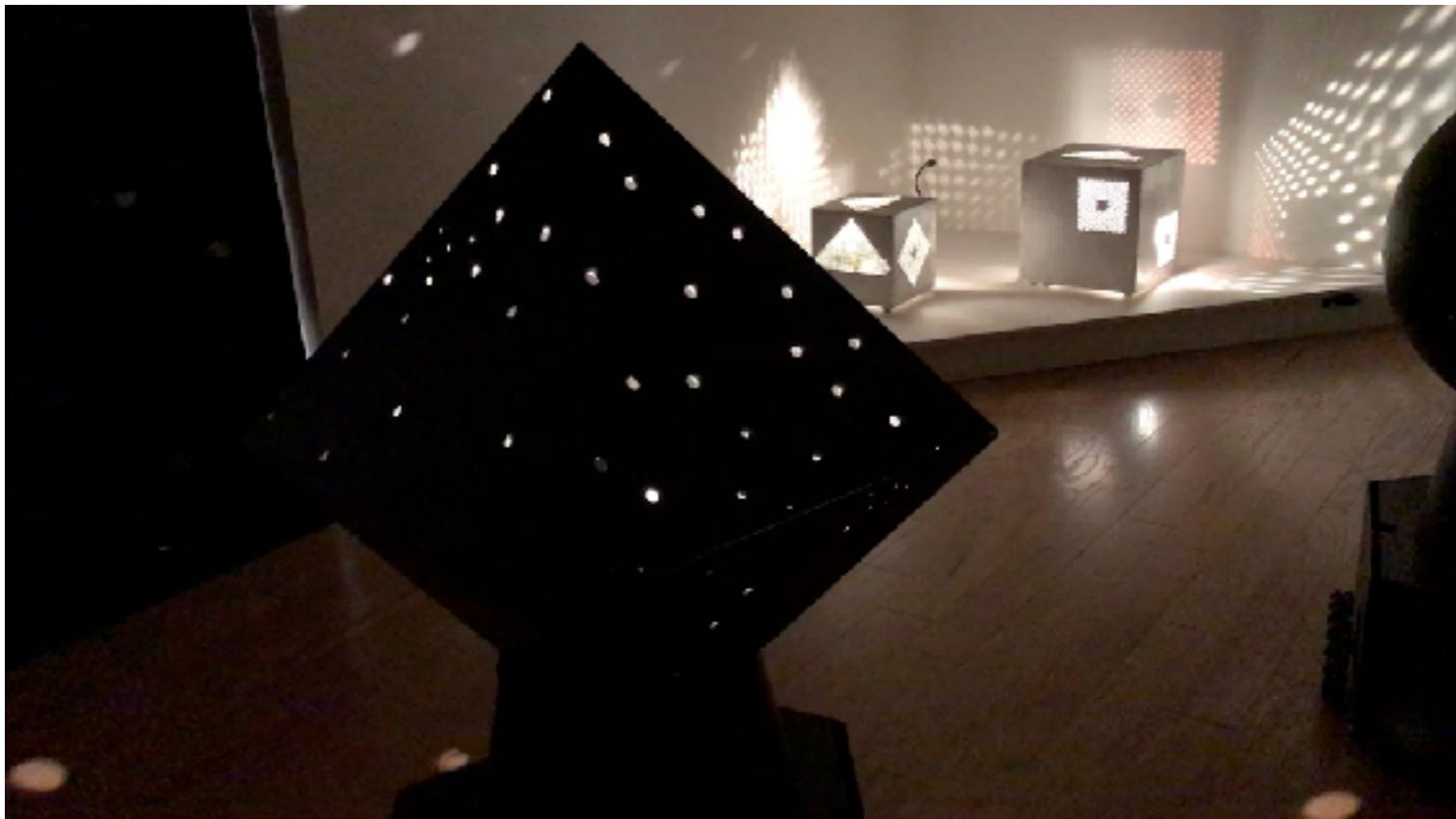
# Chang Ting Tong



# Recent Projects

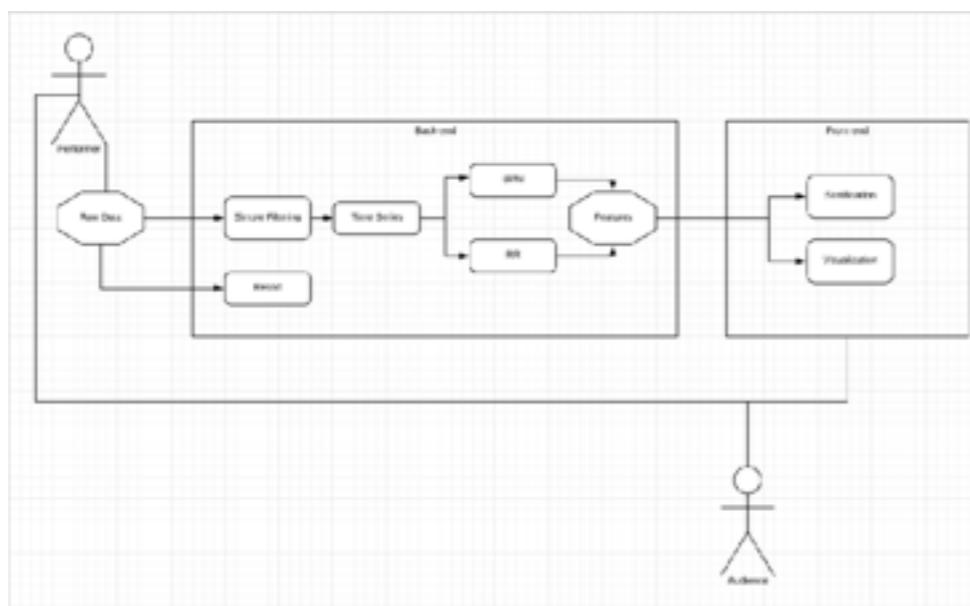
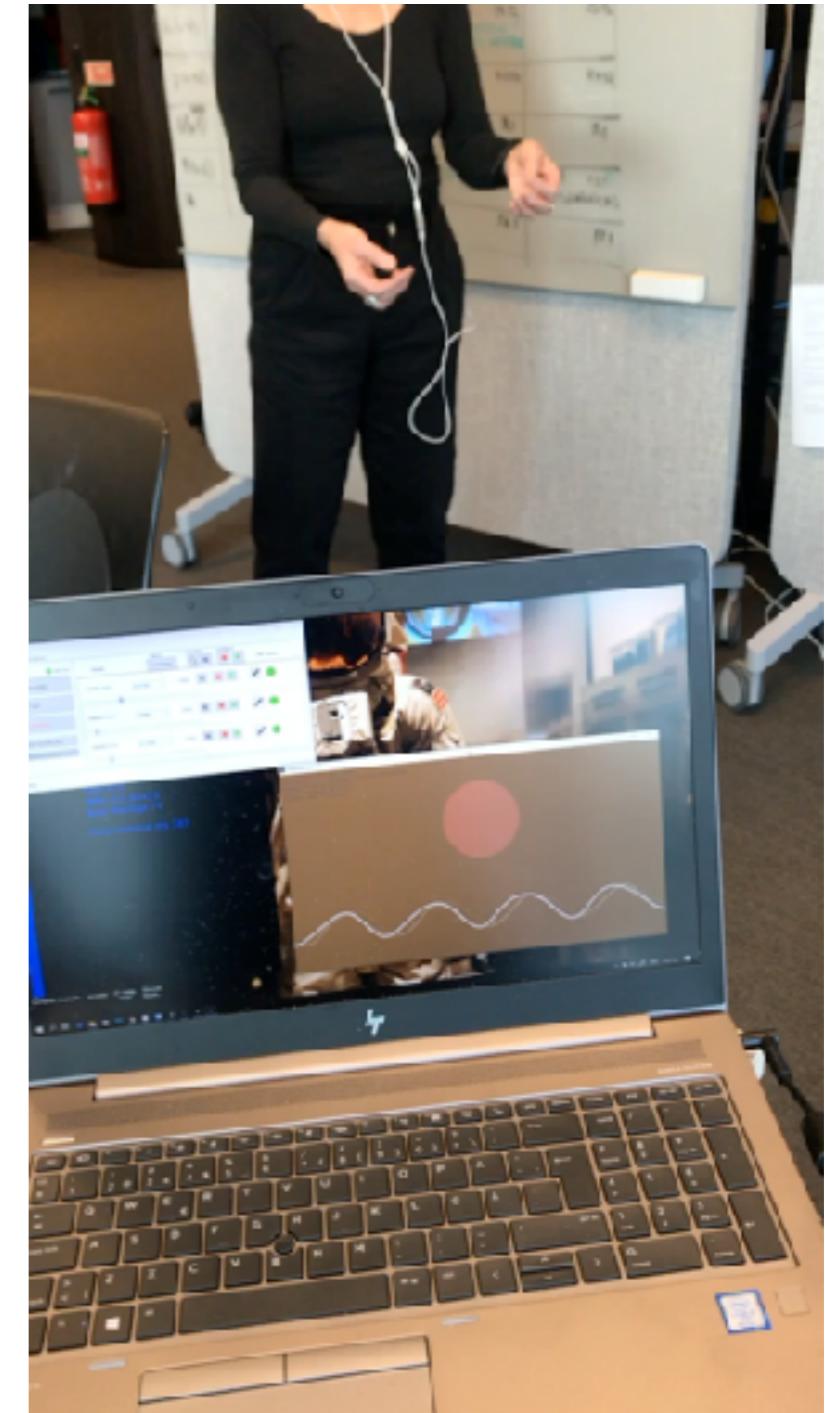
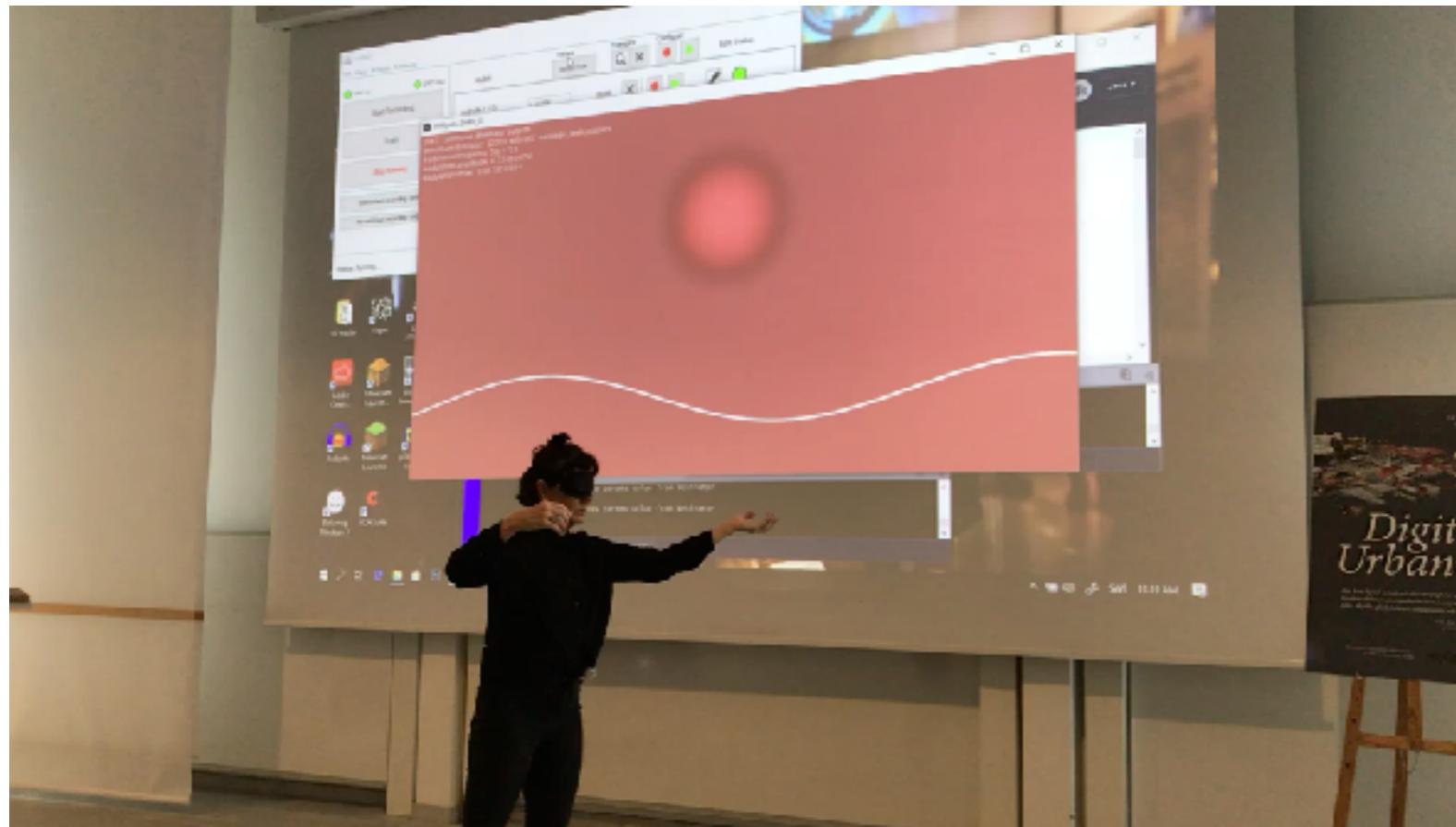


# Otto Piene

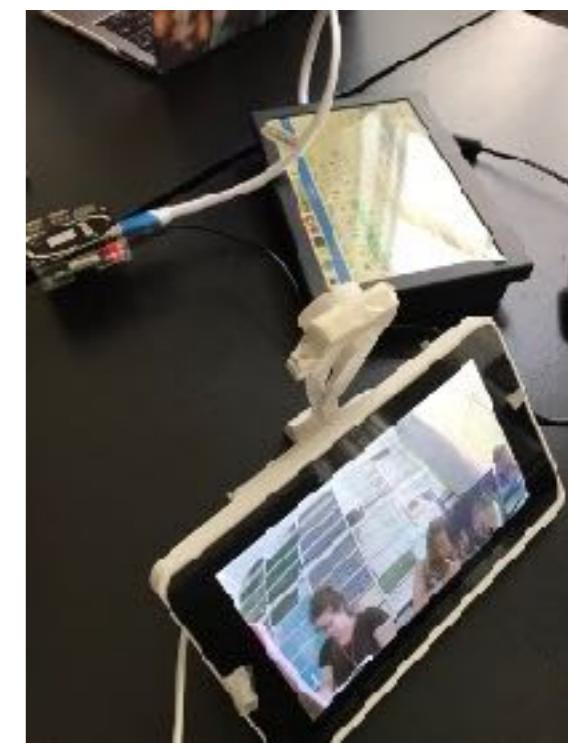
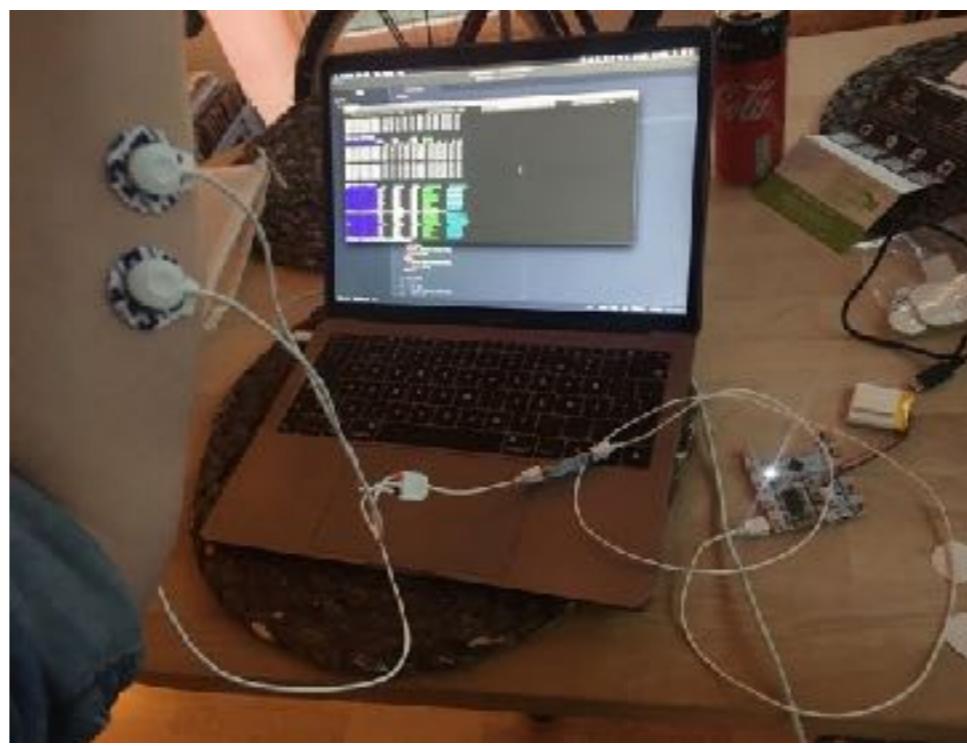


# Jeannette Ginslov

## Deep Flow



# Student Projects



X

## BOOMERANGS



**“As formal teaching and training grow in extent, there is the danger of creating an undesirable split between the experience gained in more direct associations and what is acquired in school. This danger was never greater than at the present time, on account of the rapid growth in the last few centuries of knowledge and technical modes of skill.”**

**— John Dewey, Democracy and Education: An Introduction to the Philosophy of Education**



Scandinavian By Design  
Scandinavian By Design

SCANDINAVIAN  
MARS

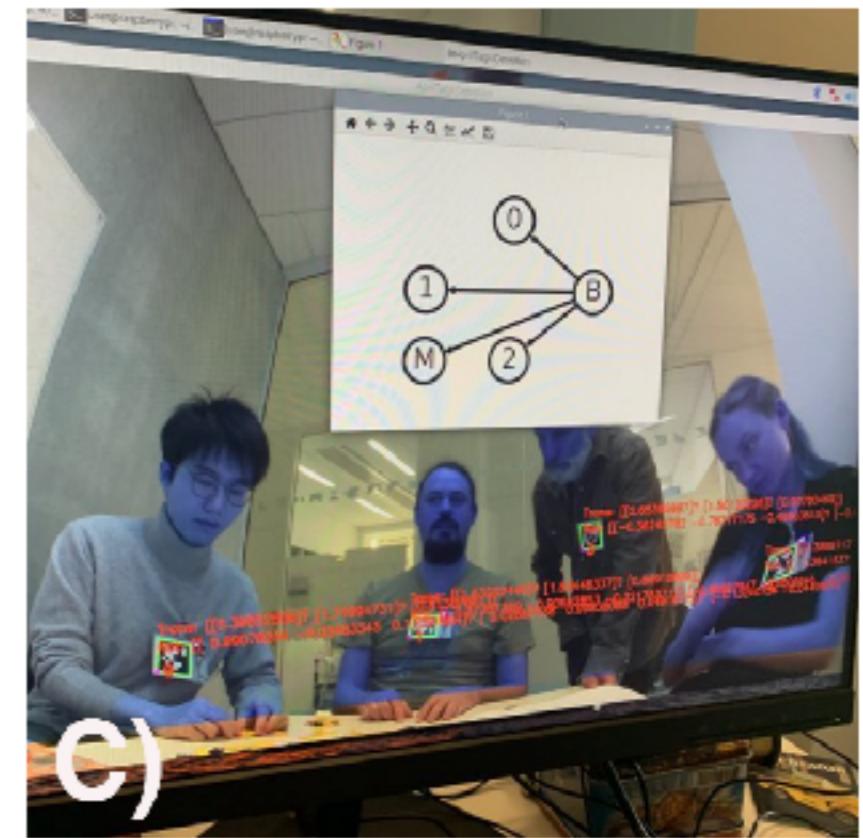
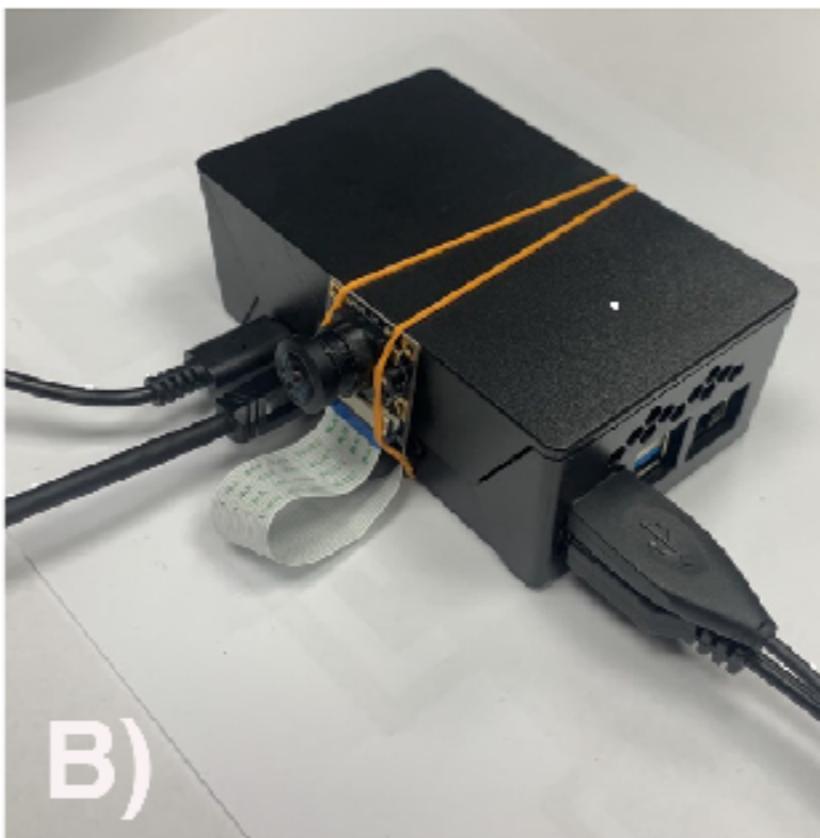
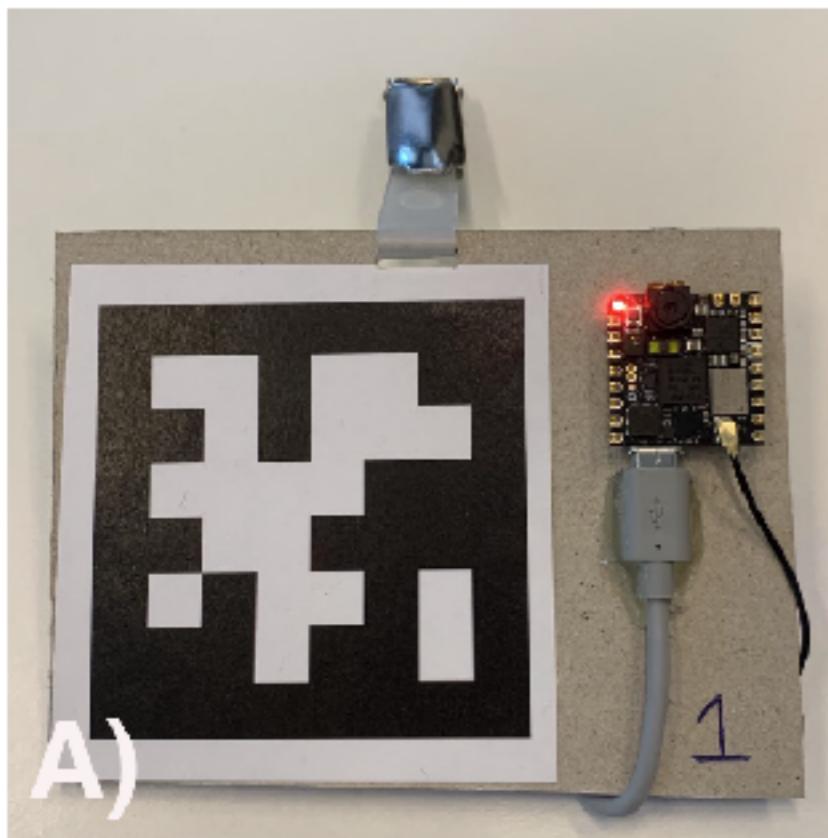
# Shared Reflective Persistence

How do we build machines that understand groups of people?

- Through the combination of multimodal data streams, ethnography, and psychometrics
- We understand the qualities of group work in science education.
- We focus on the students' ability to persist despite meeting difficulties – and refer to this group capacity as shared reflective persistence (SRP).

# Sketch Technology

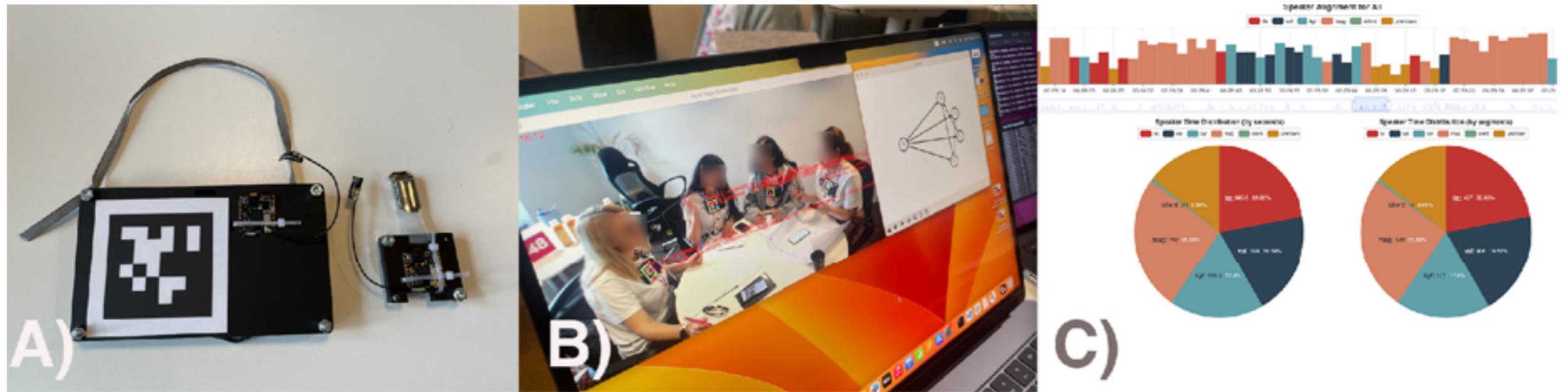
## Social Wearables



# Create experiences



# Build more technology



# Open MMLA system

