

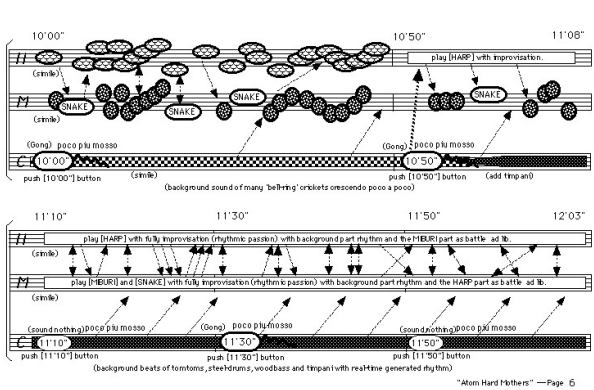
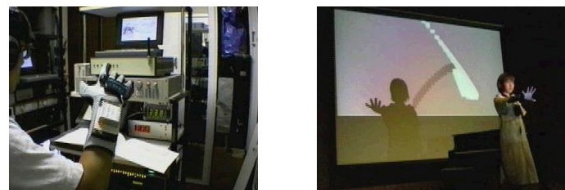
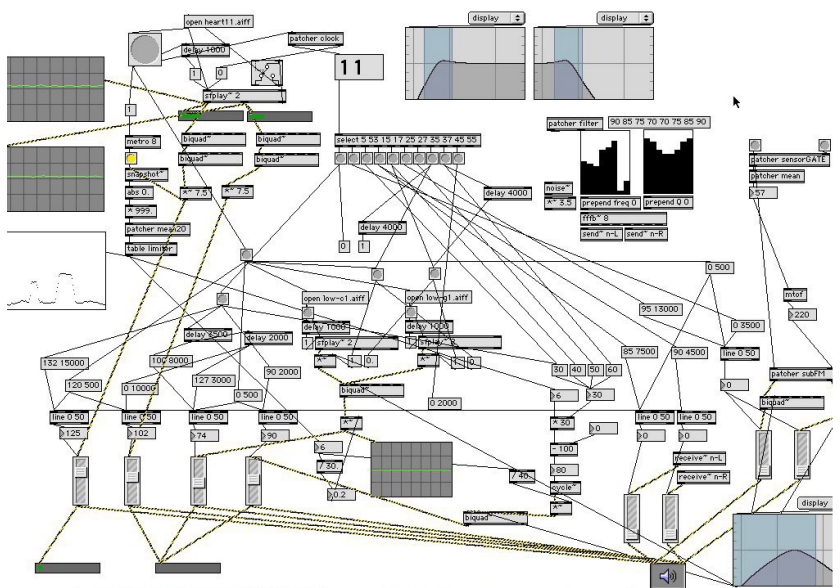
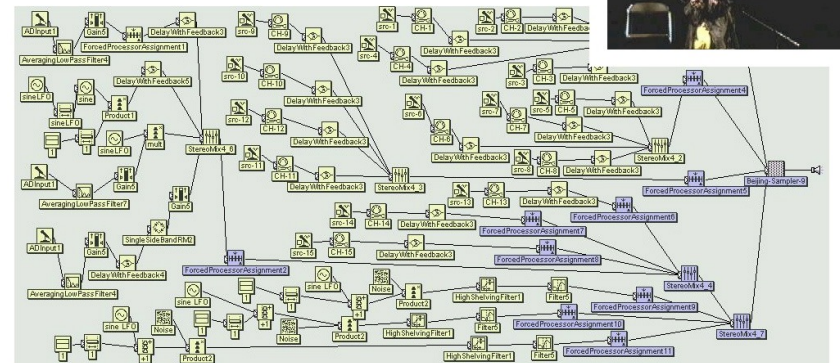
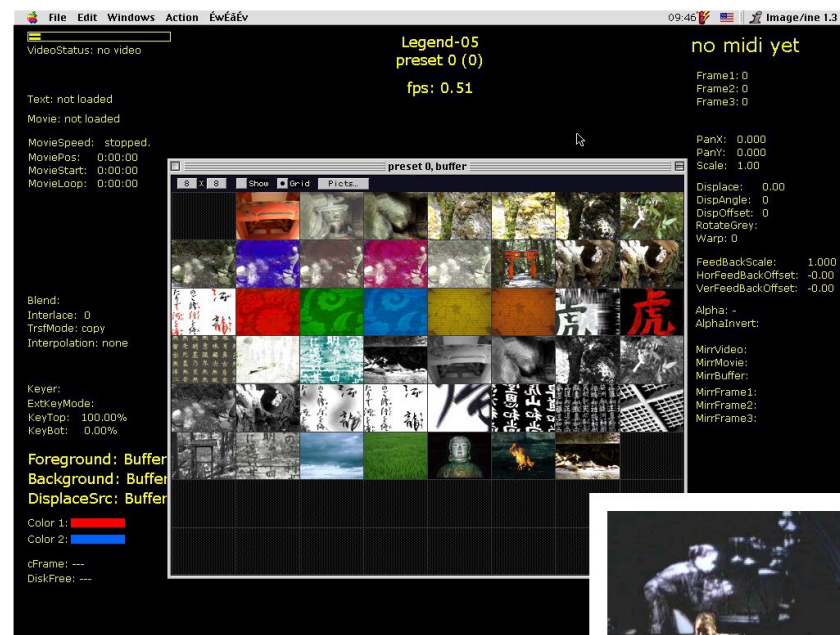
# Interactive Multimedia Generated by Rubbing/Tactile Interfaces

--- Biofeedback Effects for Wellness Entertainment ---

Yoichi Nagashima  
(ASL/SUAC)



# Yoichi Nagashima (JP)





File Edit Windows Action ÉwÉãÉv

09:46 Image/ine 1.3

VideoStatus: no video

Text: not loaded

Movie: not loaded

MovieSpeed: stopped.

MoviePos: 0:00:00

MovieStart: 0:00:00

MovieLoop: 0:00:00

Blend: Interlace: 0

TrsfMode: copy

Interpolation: none

Keyer: ExtKeyMode: KeyTop: 100.00%

KeyBot: 0.00%

Foreground: Buffer

Background: Buffer

DisplaceSrc: Buffer

Color 1: Color 2:

cFrame: ---

DiskFree: ---

Legend-05

preset 0 (0)

fps: 0.51

no midi yet

Frame1: 0

Frame2: 0

Frame3: 0

PanX: 0.000

PanY: 0.000

Scale: 1.00

Displace: 0.00

DispAngle: 0

DispOffset: 0

RotateGrey: Warp: 0

FeedBackScale: 1.000

HorFeedBackOffset: -0.00

VerFeedBackOffset: -0.00

Alpha: -

AlphaInvert:

MirrVideo:

MirrMovie:

MirrBuffer:

MirrFrame1:

MirrFrame2:

MirrFrame3:

preset 0, buffer

8 x 8 Show Grid Picts...



10'00" 10'50" 11'08"

(Gong) poco piu mosso

push [10'00"] button

(simile)

push [10'50"] button

(add timpani)

11'10" 11'30" 11'50" 12'03"

(Gong) poco piu mosso

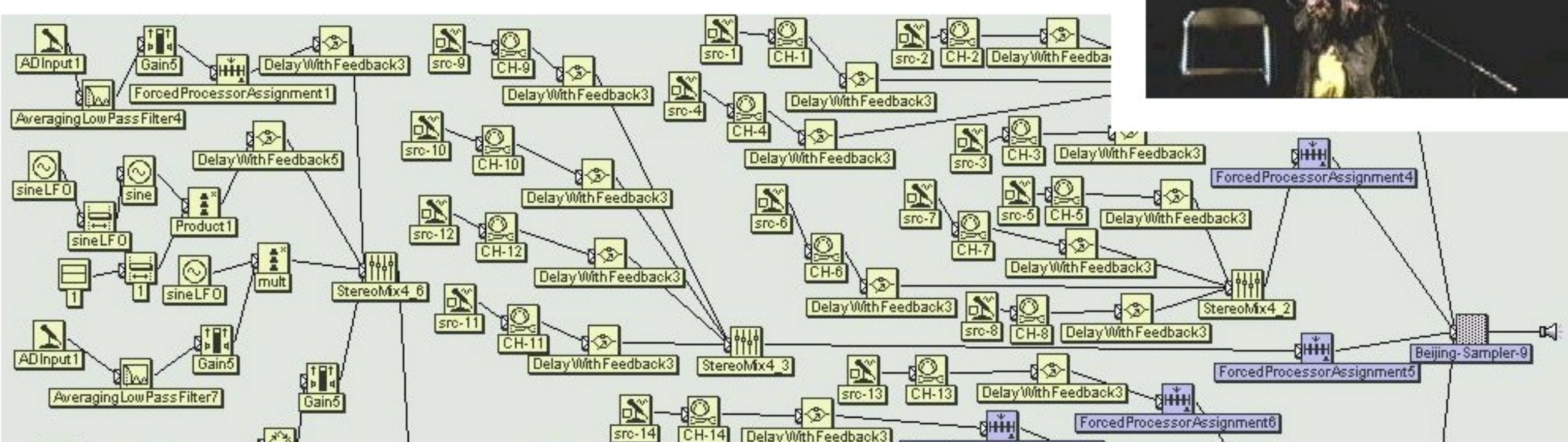
push [11'10"] button

(simile)

push [11'30"] button

(add timpani)

"Atom Hard Mothers" — Page 6



2004年11月1日 (月曜日)

小 4

新しい楽器を作る

コンピュータを使った楽器を紹介するよ！ 発想がとてもユニークなの

「今日の先生」常盤拓司—日本科学未来館 静岡文化芸術大学の長嶋洋一先生は、コンピューター・エレクトロニクス（電子コンピューター）と音楽の二つの領域にまたがって研究している、とてもめずらしい方です。コンピューター・エレクトロニクスを応用し、新しい楽器を研究しています。これまでに「関節の曲げ具合や筋肉の緊張具合を音に換える楽器」「弦を目に見えないレーザービームに置き換えたハープ型の楽器」などを発明しているんですよ。

おもしろ 研究編 -2-

つくる曲の合す。ること換んセま音をこれ



の領域にまたがって研究している、とても面白い方です。コンピュータ・エレクトロニクスを応用し、新しい楽器を研究しています。これまでに「関節の曲げ具合や筋肉の緊張具合を音に換える楽器」「弦を目に見えないレーザービームに置き換えたハープ型の楽器」などを発明しているんですよ。

おもしろ  
研究編  
-2-

これらの楽器自体は音を鳴らすことはできません。たいてい、センサーに送られます。センサーは、その命令のもとに、さまざまな音色を奏でます。レーザービームによるハープ型の楽器の場合、楽器は体の動きを感知し、その情報をコンピュータに送り、コンピュータが音を鳴らします。

# 体の動きをコンピューターが感知

演奏家は、口や手足の動きによって微妙で美しい音楽を奏で、その体から演奏家の気持ちを感知して、音楽を演奏しています。コンピュータは、私たちの入力した文字や、コンピュータの出力結果を、私たちの理解することができるようにしてくれます。

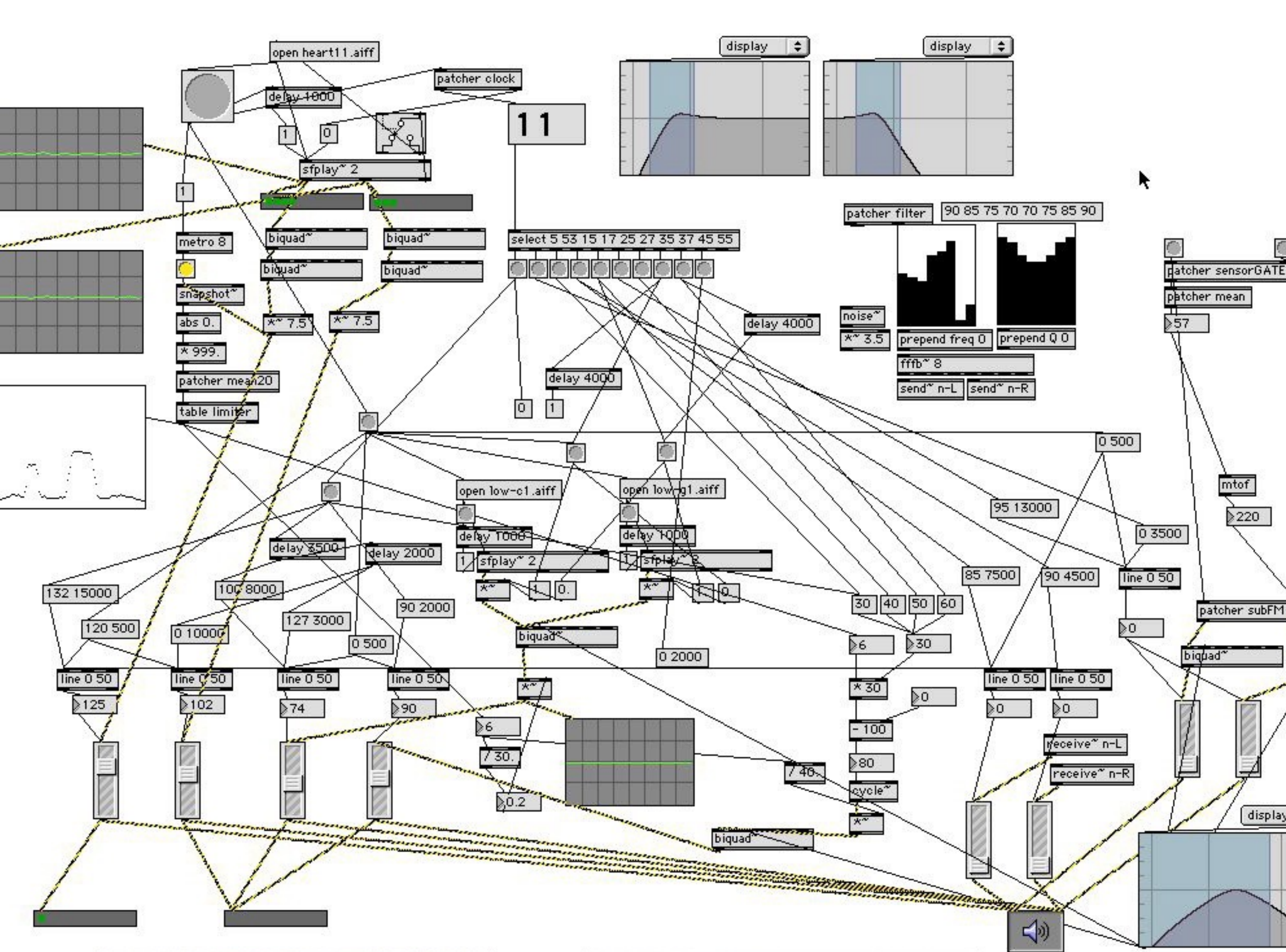
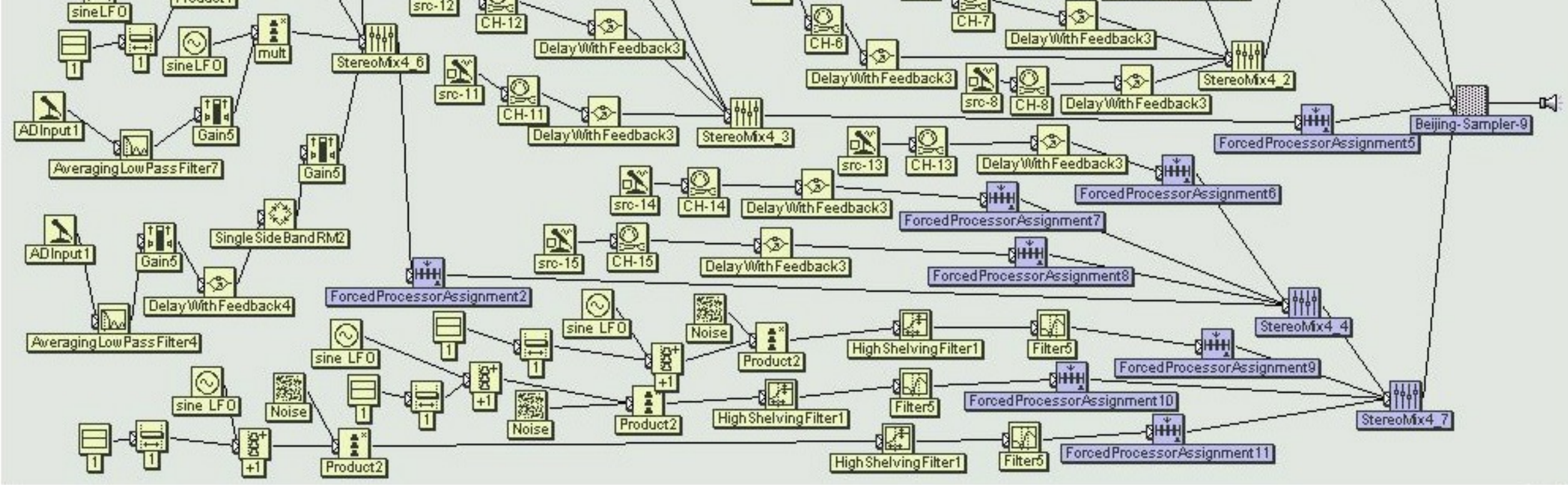
あれっ、弦はどこ？



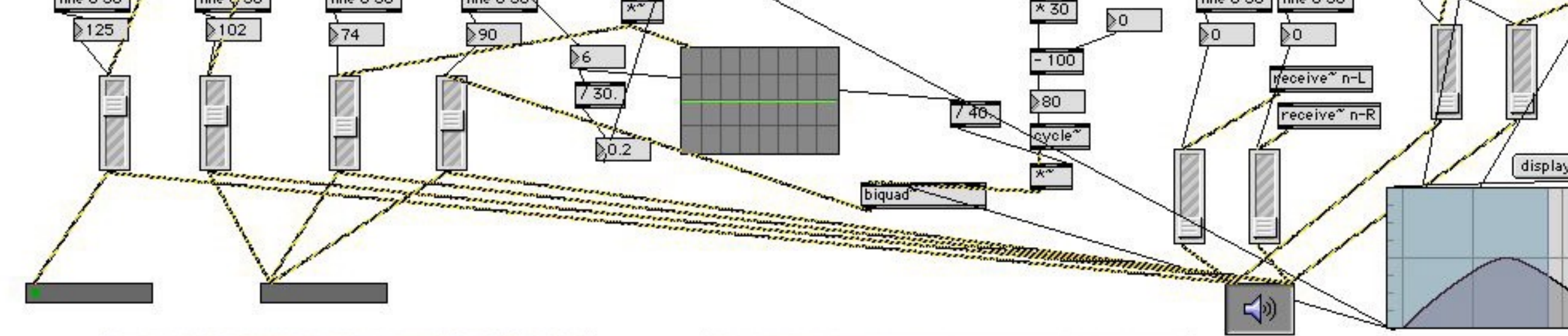
世界も注目 国際会議も開かれているよ

近年、このような観点から新しい楽器を開発することに注目が集まっています。2001年から、毎年、NIME(New Interfaces for Musical Expression)という国際会議が開催されています。この国際会議の正式名称を日本語にすると「音楽表現のための新しいインターフェイス」となります。将来、長嶋先生をはじめとするさまざまな研究者の方々の取り組みから、私たちがまだ見たことのない楽器や、それによる新しい音楽の表現が登場することでしょう。

日本科学未来館では「インターフェイス」を使った展示を行っています。ペンで描いた線が動画になる「共







nagasm.org



「人間の動作によって音を作り出すことが「楽しい」「悲しい」

と、楽器として、音楽を演奏する

「世界も注目 国際会議も開かれているよ」

近年、このような観点から新しい楽器を研究開発することに注目が高まりつつあります。2001年から、毎年、NIME(New Interfaces for Musical Expression)という国際会議が開催されています。この国際会議の正式名称を日本語にすると「音楽表現のための新しいインターフェイス」となります。将来、長嶋先生をはじめとするさまざまな研究者の方々の取り組みから、私たちがまだ見たことのない楽器や、それによる新しい音楽の表現が登場することでしょう。

日本科学未来館では「インターフェイス」を使った展示を行っています。ペンで描いた線が動画になる「共画」やいろいろなインターフェイスの特徴を比較できる「インターフェイスのいろいろ」などがあります。





# Yoichi Nagashima (JP)





# Yoichi Nagashima (JP)







191

Two staves of musical notation. The top staff is in treble clef and the bottom staff is in bass clef. The key signature has one sharp (F#) and one flat (Bb). The music consists of eighth and sixteenth notes, with some accidentals (sharps and flats) and a dynamic marking of *ff* (fortissimo) in the first measure of the top staff.

193

Two staves of musical notation. The top staff is in treble clef and the bottom staff is in bass clef. The key signature has one sharp (F#) and one flat (Bb). The music consists of eighth and sixteenth notes, with some accidentals (sharps and flats) and a dynamic marking of *ff* (fortissimo) in the first measure of the top staff.

195

Two staves of musical notation. The top staff is in treble clef and the bottom staff is in bass clef. The key signature has one sharp (F#) and one flat (Bb). The music consists of eighth and sixteenth notes, with some accidentals (sharps and flats) and a dynamic marking of *ff* (fortissimo) in the first measure of the top staff.





140

Musical score for measures 140-141. The score is written for a single melodic line on a grand staff (treble and bass clefs). The key signature has one sharp (F#). The melody consists of eighth and sixteenth notes, with some rests. The bass line is mostly whole notes and rests.

142

Musical score for measures 142-143. The score is written for a single melodic line on a grand staff (treble and bass clefs). The key signature has one sharp (F#). The melody continues with eighth and sixteenth notes. The bass line remains mostly whole notes and rests.

144

Musical score for measures 144-145. The score is written for a single melodic line on a grand staff (treble and bass clefs). The key signature changes to one flat (Bb). The melody continues with eighth and sixteenth notes. The bass line has some movement in measure 145, including a half note and a quarter note.



108

111

114

This image shows a musical score for a three-part instrumental piece, likely for a Korean ensemble. The score is written in treble clef with a key signature of one flat (B-flat). It consists of three staves, each with a treble clef. The first staff begins at measure 108, the second at measure 111, and the third at measure 114. The music is characterized by rapid sixteenth-note passages and complex rhythmic patterns, typical of traditional Korean music. The notation includes various note values, rests, and dynamic markings.





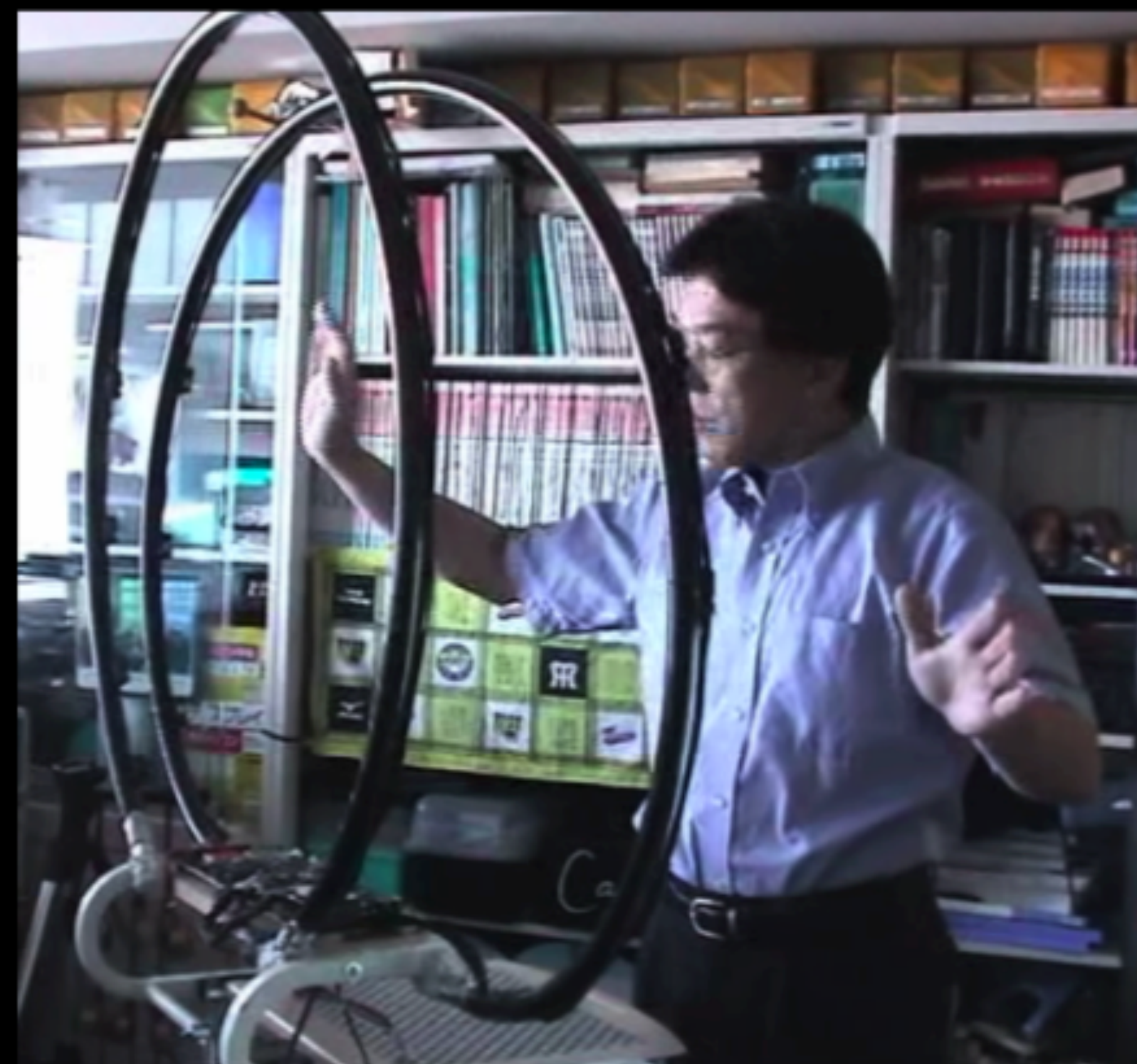
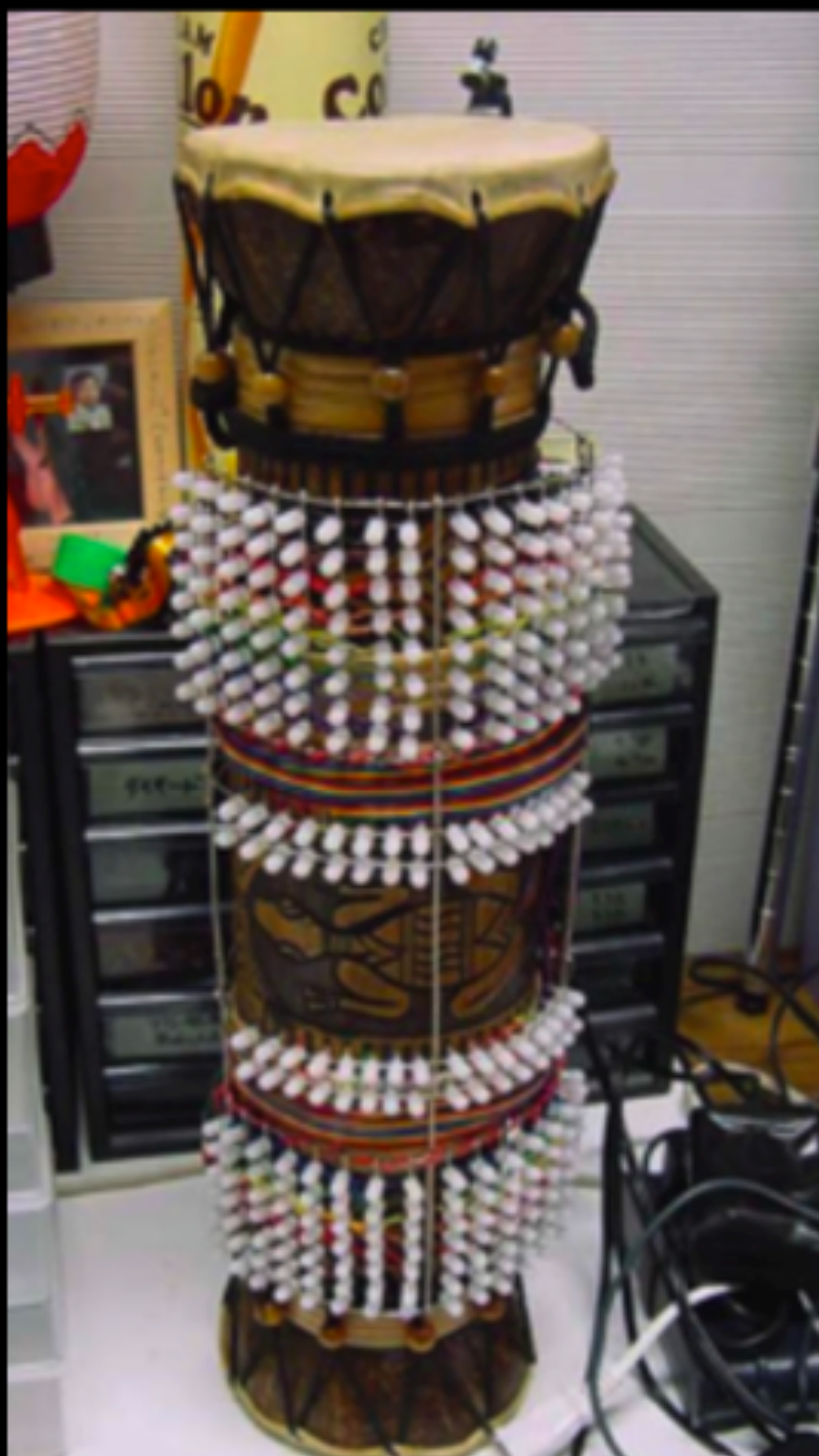




# Yoichi Nagashima (JP)





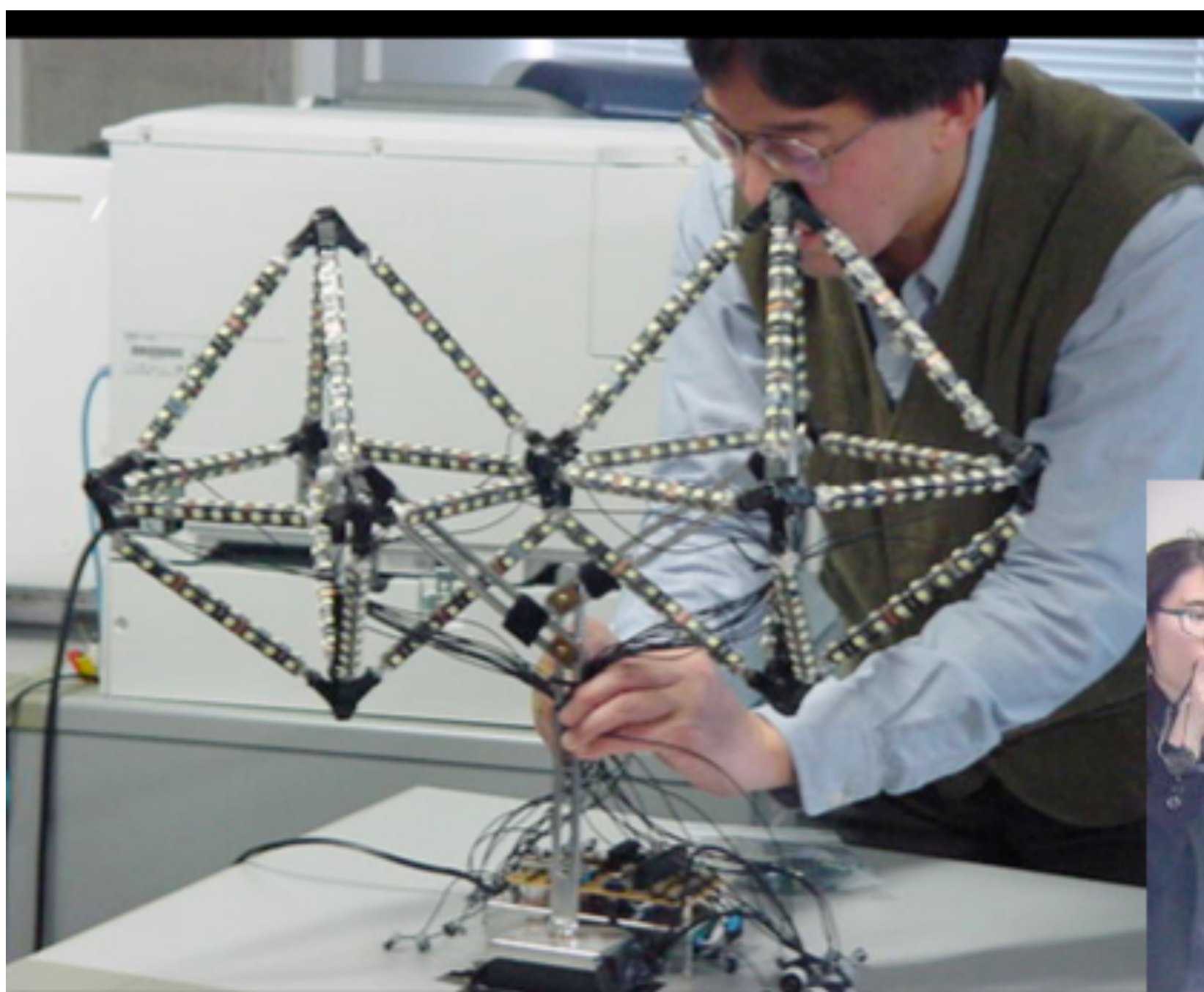






NIME2007  
(NYU)



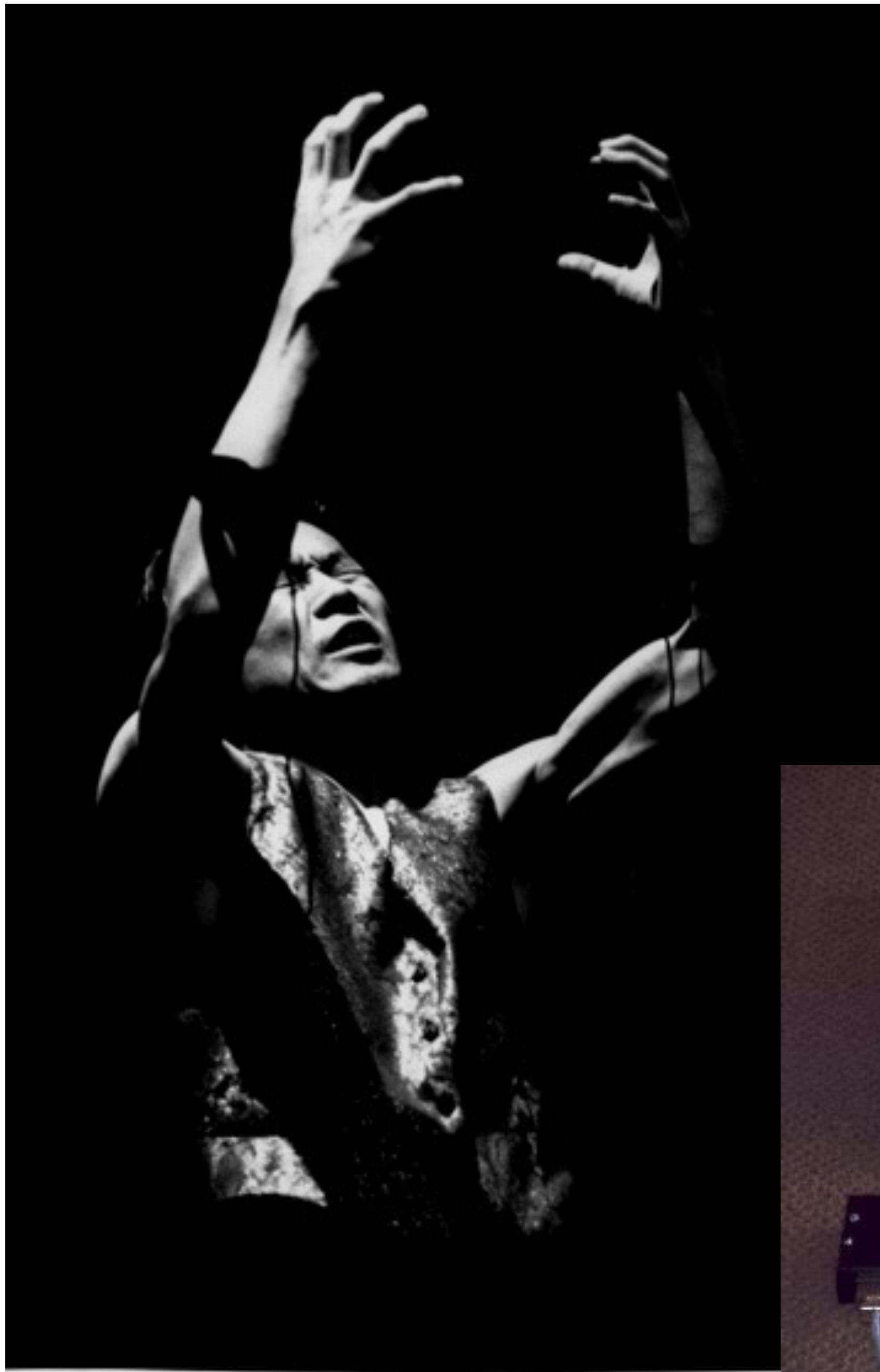






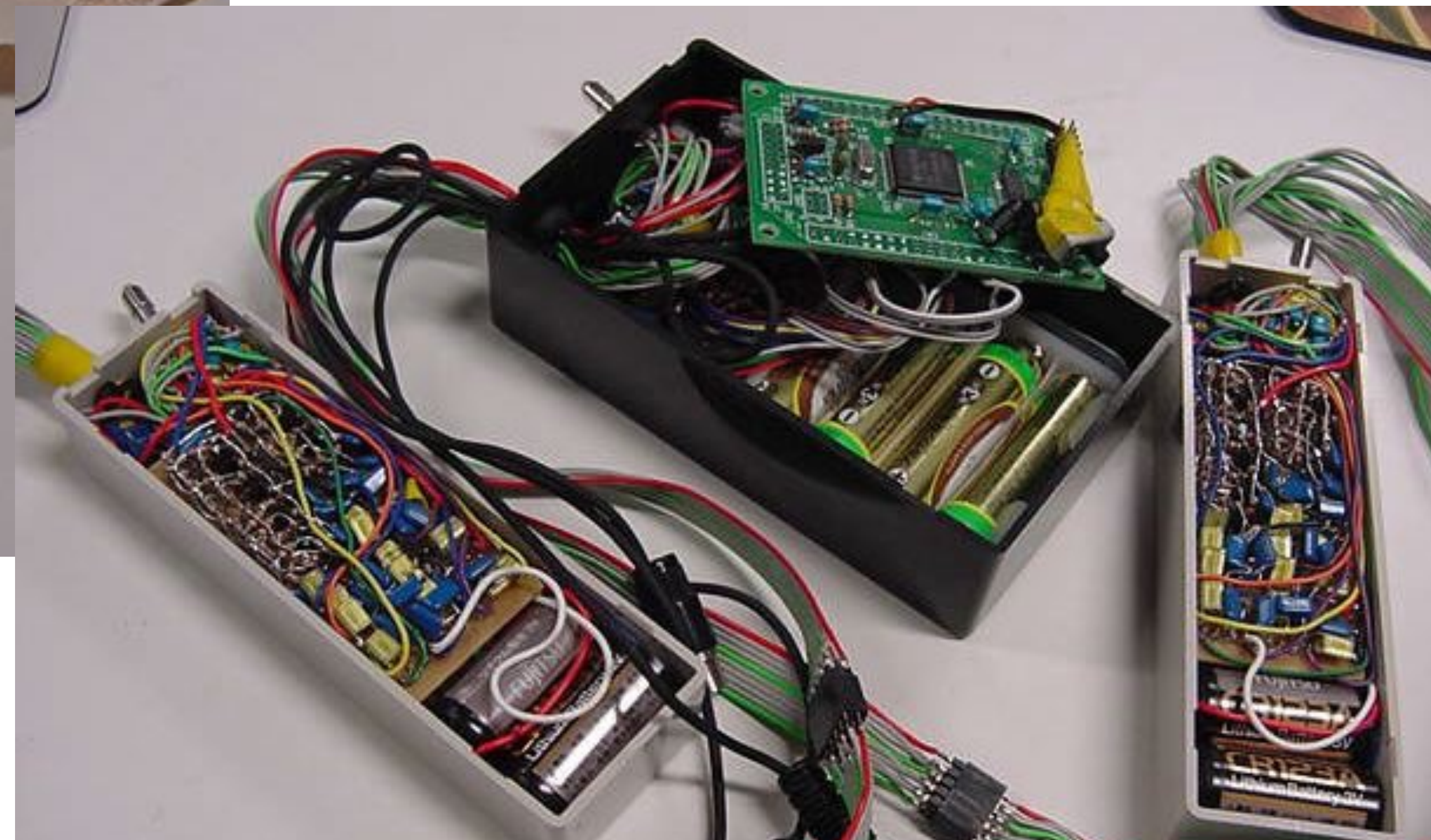
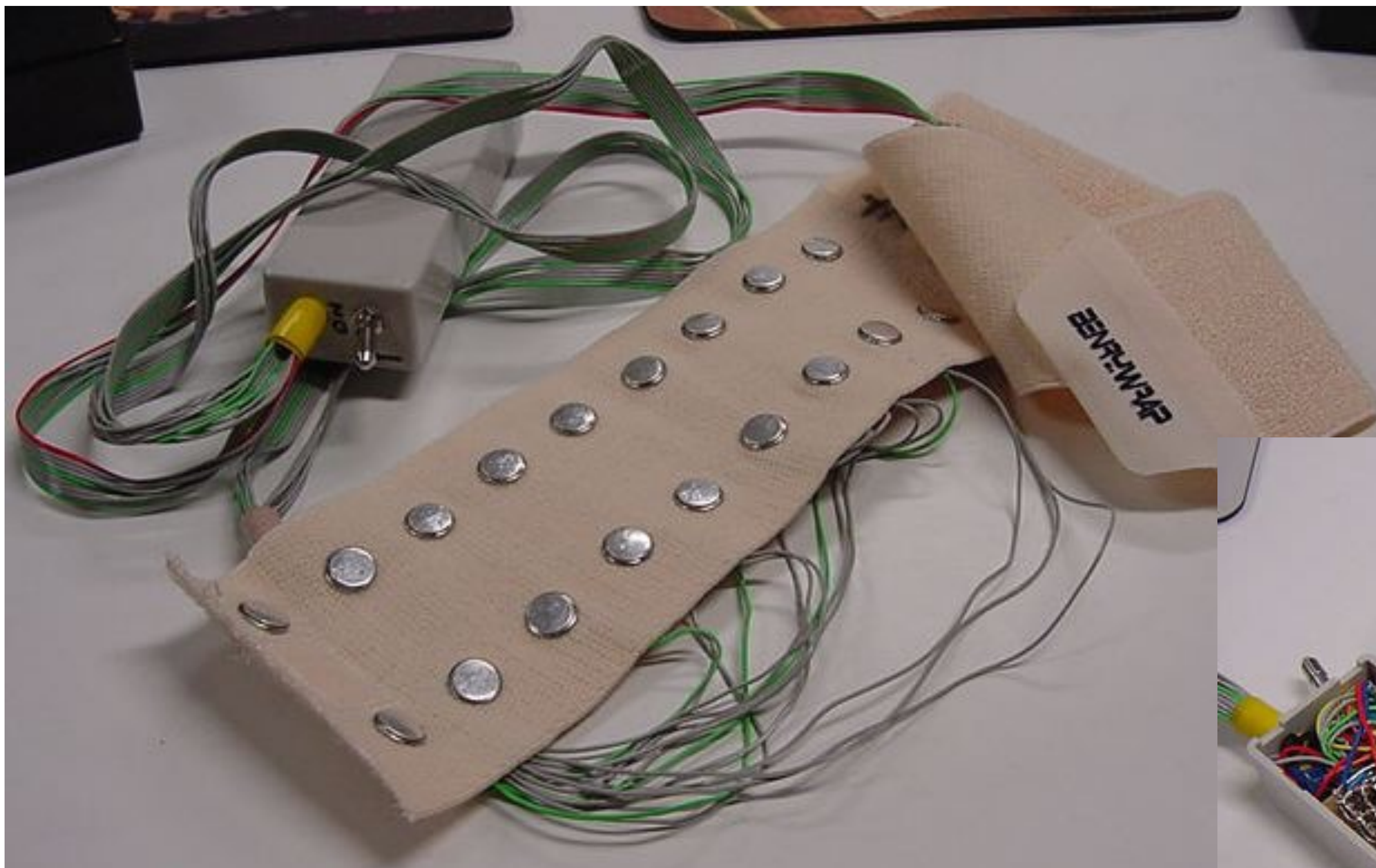


# BioMuse (Atau Tanaka)





# MiniBioMuse-III (1999)





Kassel, Germany 2001



Montreal, Canada 2003





Amsterdam, Netherlands 2004



Paris, France 2004





Vancouver, Canada 2005



Taipei, Taiwan 2007





Yekaterinburg, Russia 2010



Oslo, Norway 2011





MaxFileEditViewObjectArrangeOptionsDebugWindowExtrasHelp

receive\_test03

Movie Recording

00:00:000.0 MB

MuseIO\_UDP\_03

75%

udpreceive 7788

route /muse/acc

unpack ffff

-15.625025

scale -900. 800. -1. 1.

1015.626587

scale 400. 1700. -1. 1.

15.625025

scale -700. 800. -1. 1.

route /muse/eeg

unpack ffff

491.849121

scale -100. 1800. -1. 1.

p AGC

998.503052

scale -300. 2000. -1. 1.

p AGC

843.874939

scale -100. 1800. -1. 1.

p AGC

840.584961

scale -100. 1800. -1. 1.

p AGC

OpenBCI\_04

	Size	Date...dified
1.maxpat	182 KB	2017/10/13
3.maxpat	123 KB	2017/10/13
2.maxpat	107 KB	2017/10/12
macosx	198.5 MB	2017/10/10
1.maxpat	43 KB	2017/04/25
...sing-master	33.7 MB	2017/01/30
...thon-master	99 KB	2017/01/30
...00_MACOSX	555.1 MB	2017/01/30
ata	6 KB	2017/10/10
CI_GUI.app	555.1 MB	2017/01/13
axpat	371 KB	2016/06/15
05.maxpat	88 KB	2015/10/26

udpreceiver • binding to port 7780

udpreceiver • binding to port 7778

udpreceiver • binding to port 7778

udpreceiver • binding to port 7788

serial • bsd\_path: /dev/cu.Muse-30CB-RN-IAP

serial • port a: Bluetooth-Incoming-Port

serial • port b: Muse-30CB-RN-IAP

serial • port c: usbmodem1

serial • port d: usbserial-DQ007TPD

nagasm — Muse\_set\_60Hz.txt — muse-io • -bas

Muse Bootloader: 7.2.5

Build No: 56

BT Mac Address: 0006667030CB

BT Firmware: Ver 5.45 IAP 10

Serial: 1180-7ZBW-30CB

Preset: 14

Filters Enabled: true

- Notch Frequency: 60Hz

Accelerometer Enabled: true

EEG Sample Frequency: 3520Hz

EEG Output Frequency: 220Hz

EEG Samples Bitwidth: 10

EEG Channel Count: 4

EEG Channel Layout: TP9 FP1 FP2 TP10

Downsampling: 16

Output Mode: SEROUT\_COMPRESS

=====

JSC error 61: No osc.tcp://[host]:[port] end-point to connect

TCP connection failure. Please start a listening process.

bits/second: 7746 receiving at: 220.00Hz

Battery: [==] 14% voltage: 3.61mV

Noise: [ 0.8% 60.7% 0.8% 0.8% ]

Show Bluetooth is ready

Advanced

sad.aiff

surprise.aiff

voice01.aiff



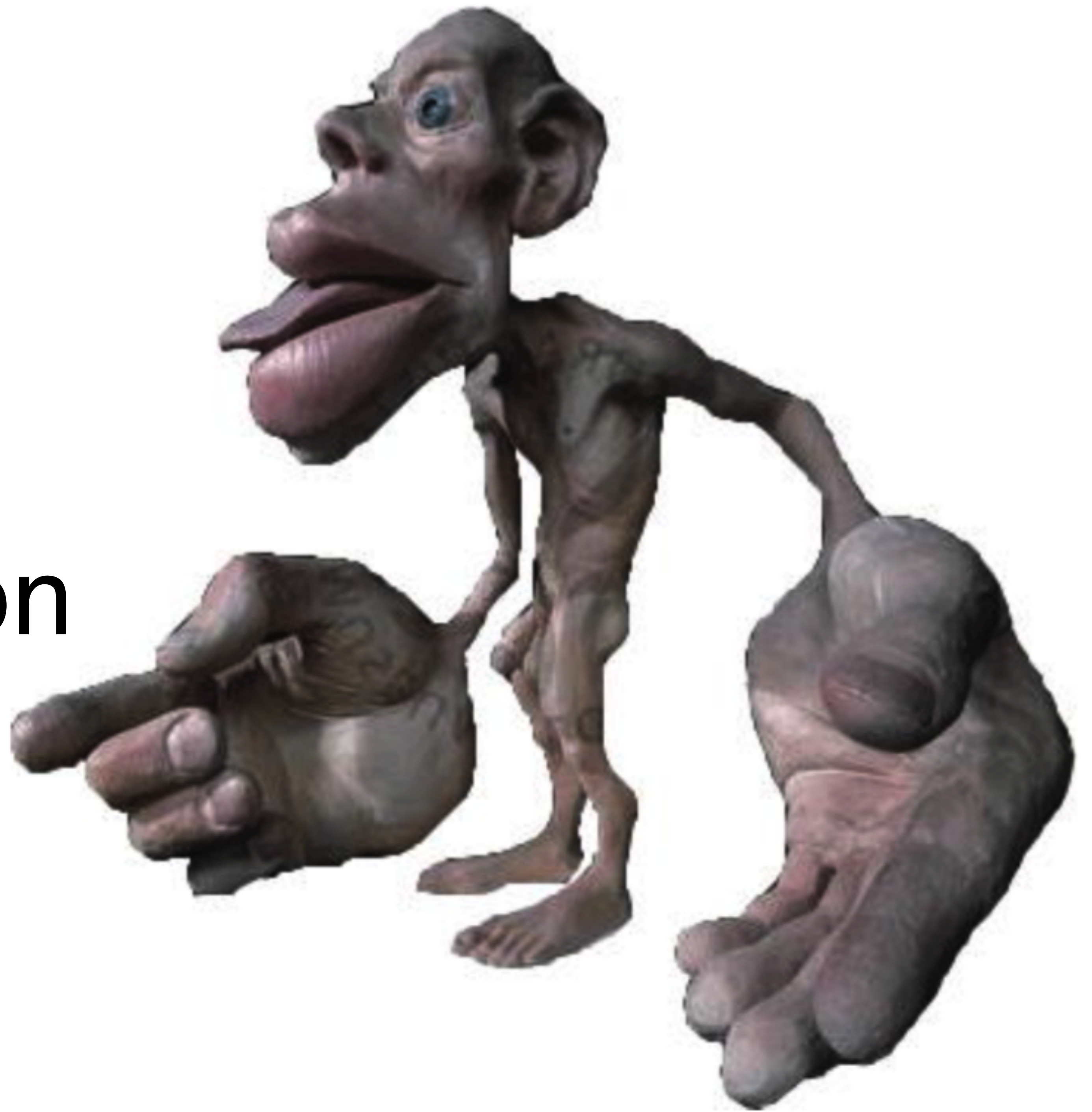








# Tactile Interaction





This research aims the **Wellness  
Entertainment** with biofeedback  
especially **tactile** interfaces.

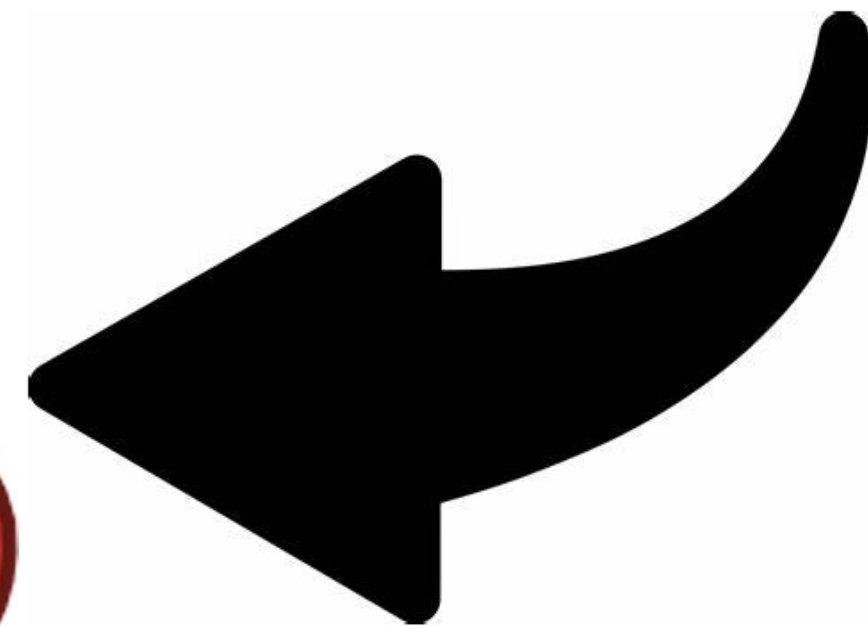
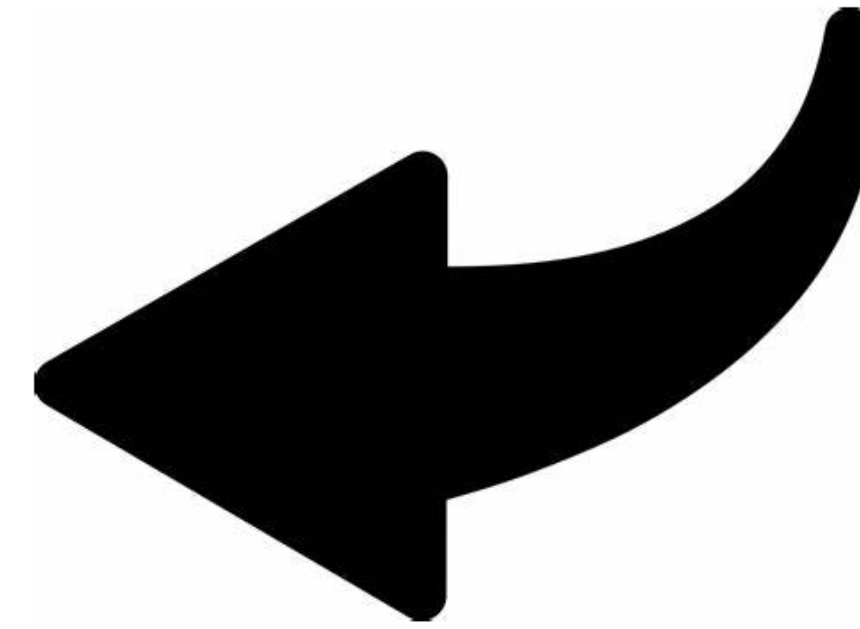


# Tactile Interaction

Smile (Emotion)

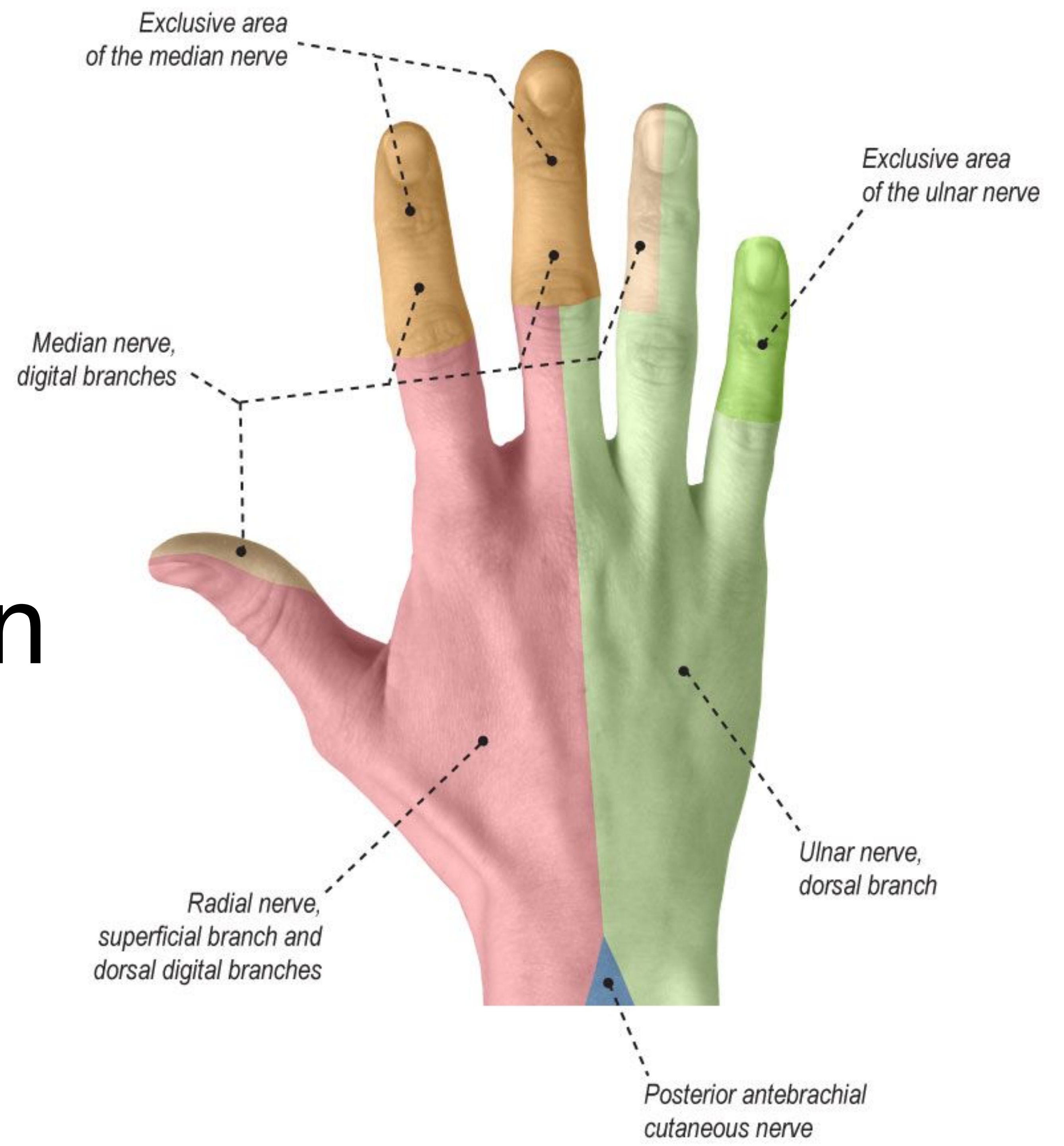


Wellness



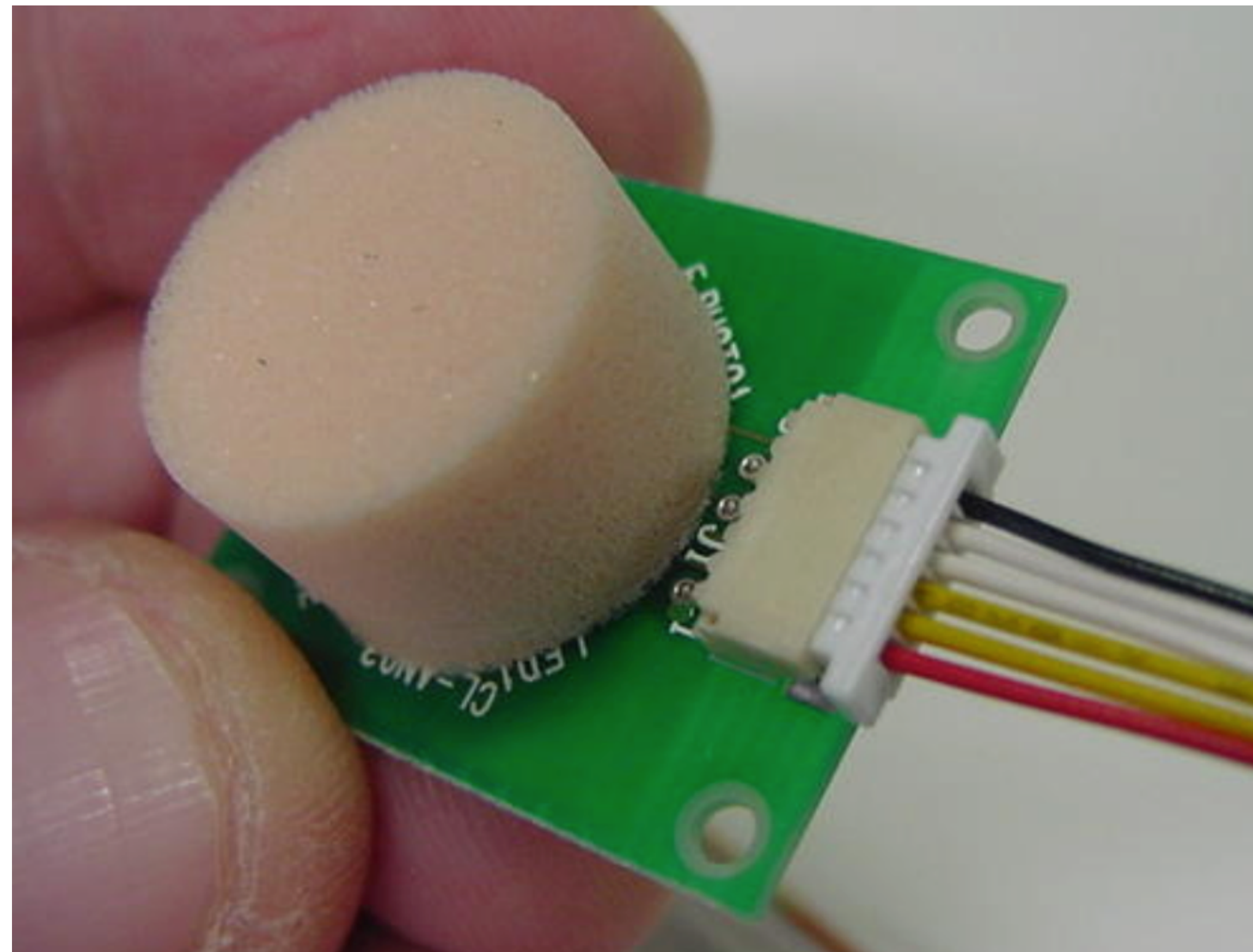


# Tactile Interaction



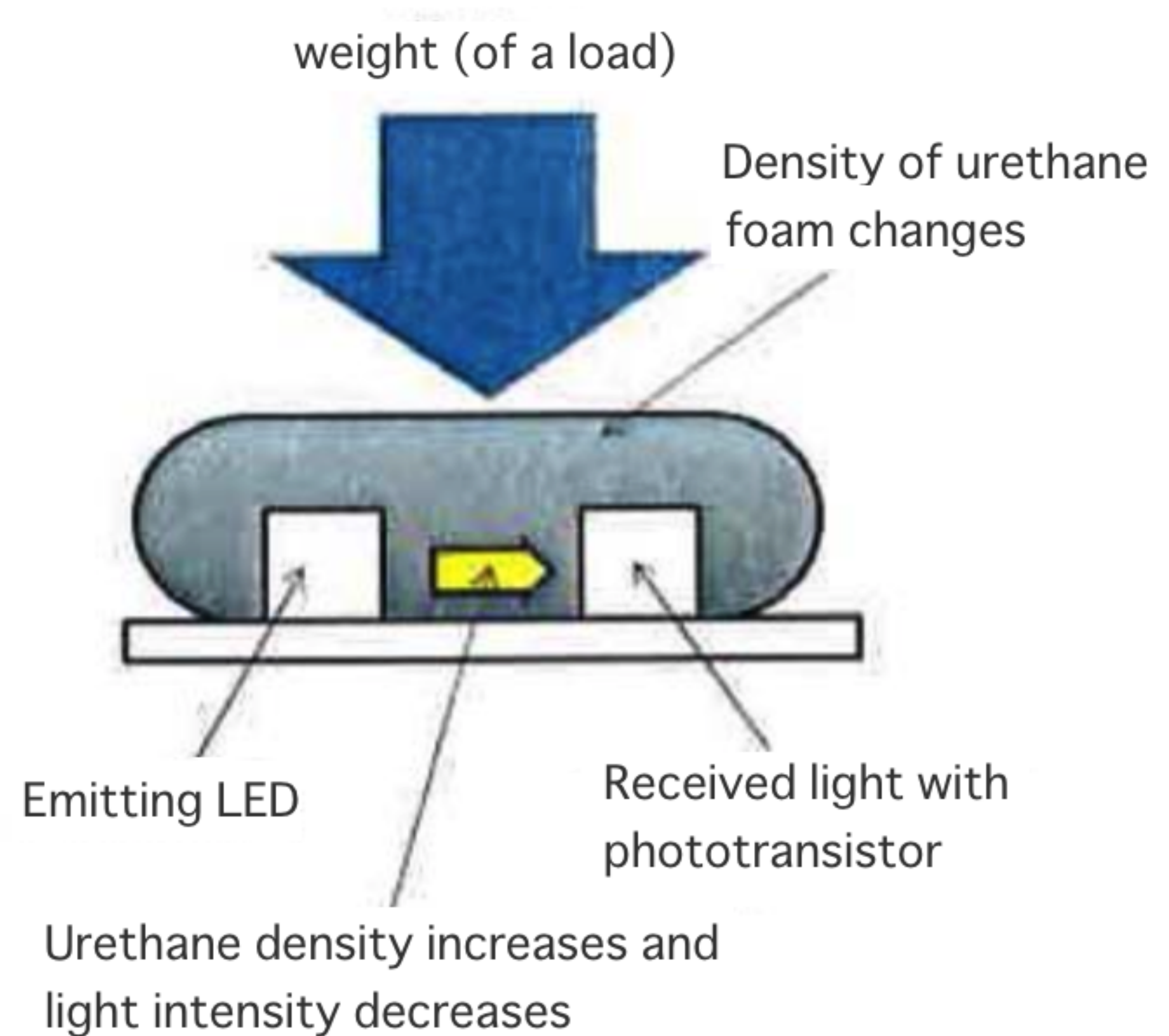
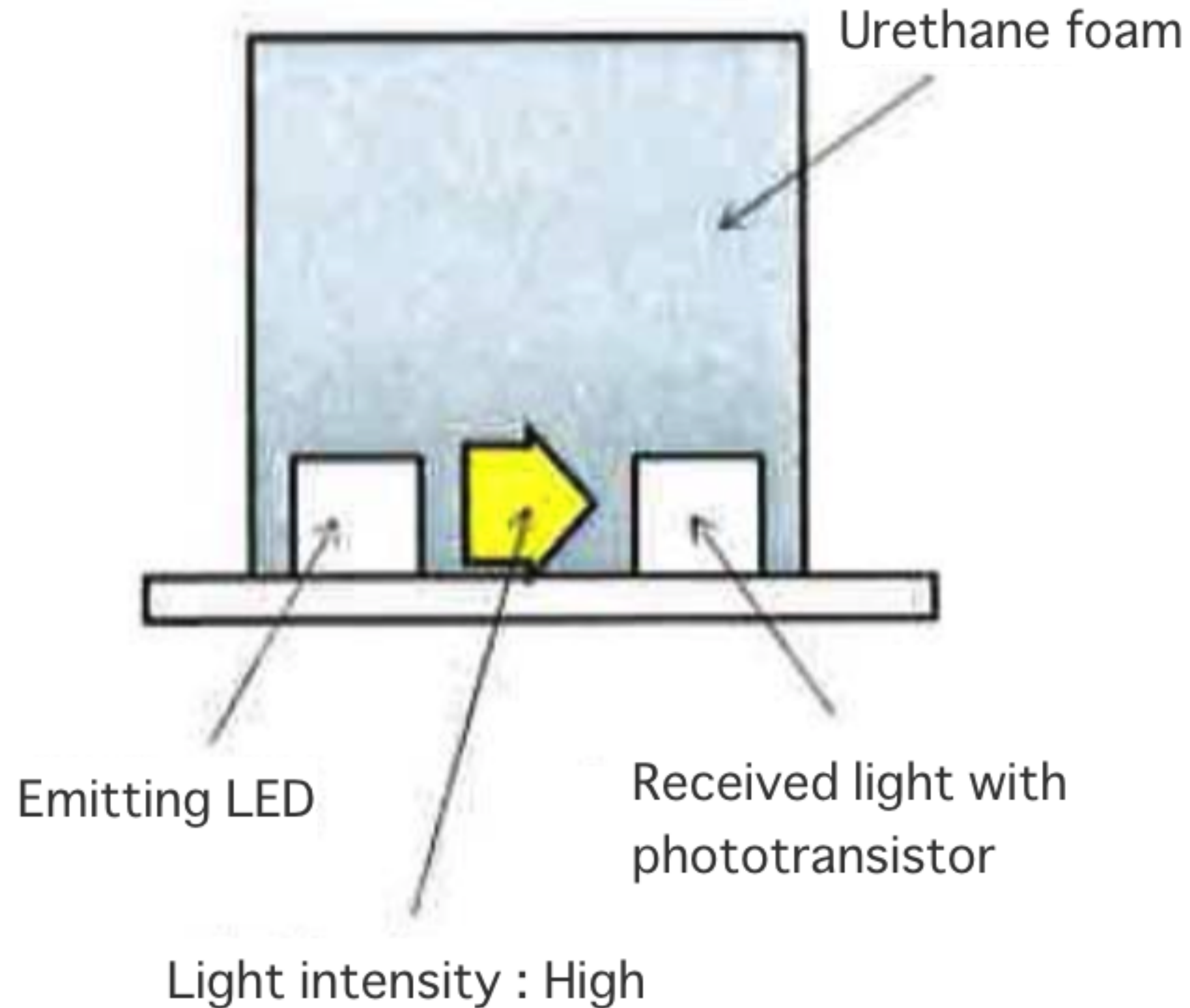


A Japanese company "RT"  
developed the small "PAW sensor".



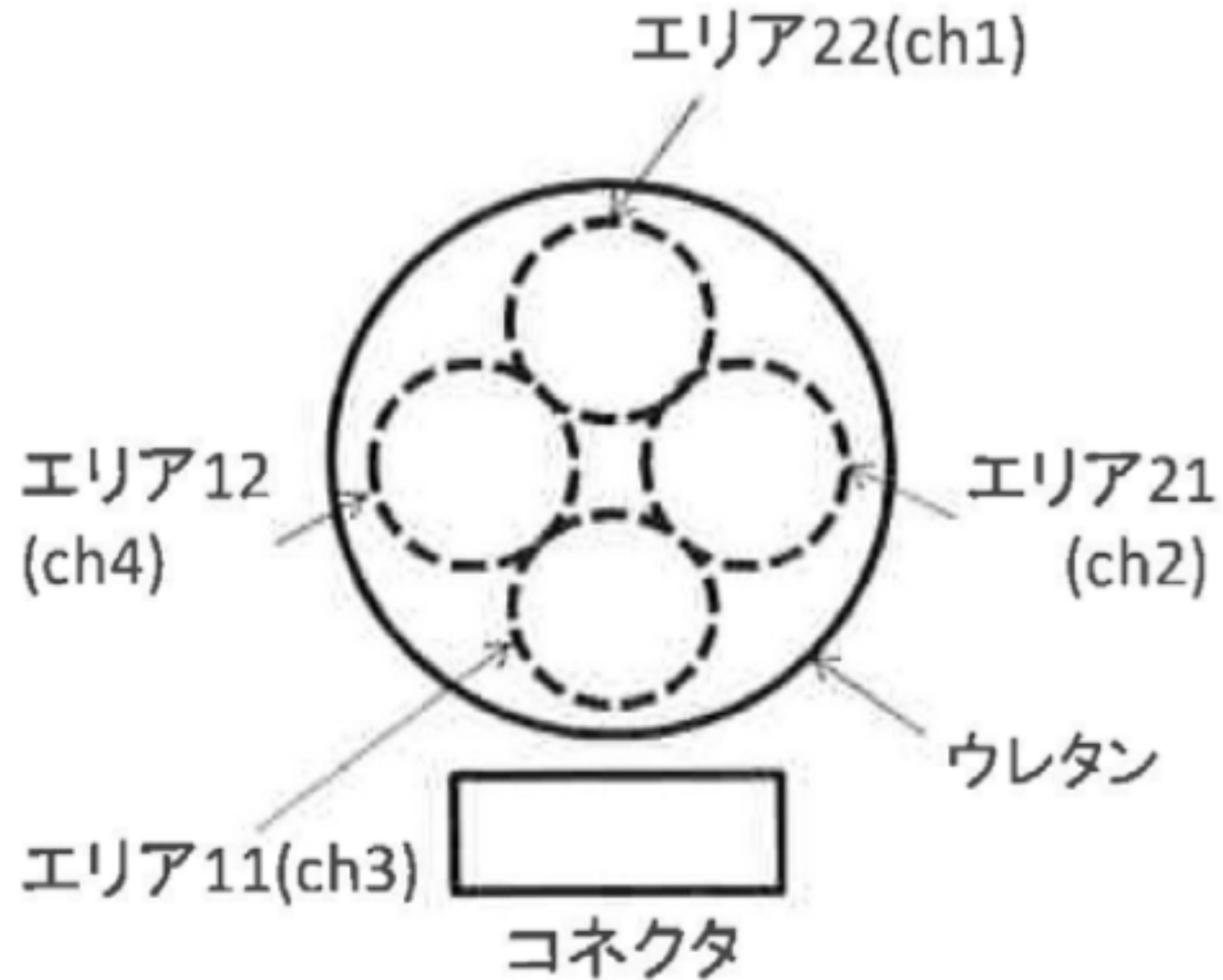


# "PAW sensor"





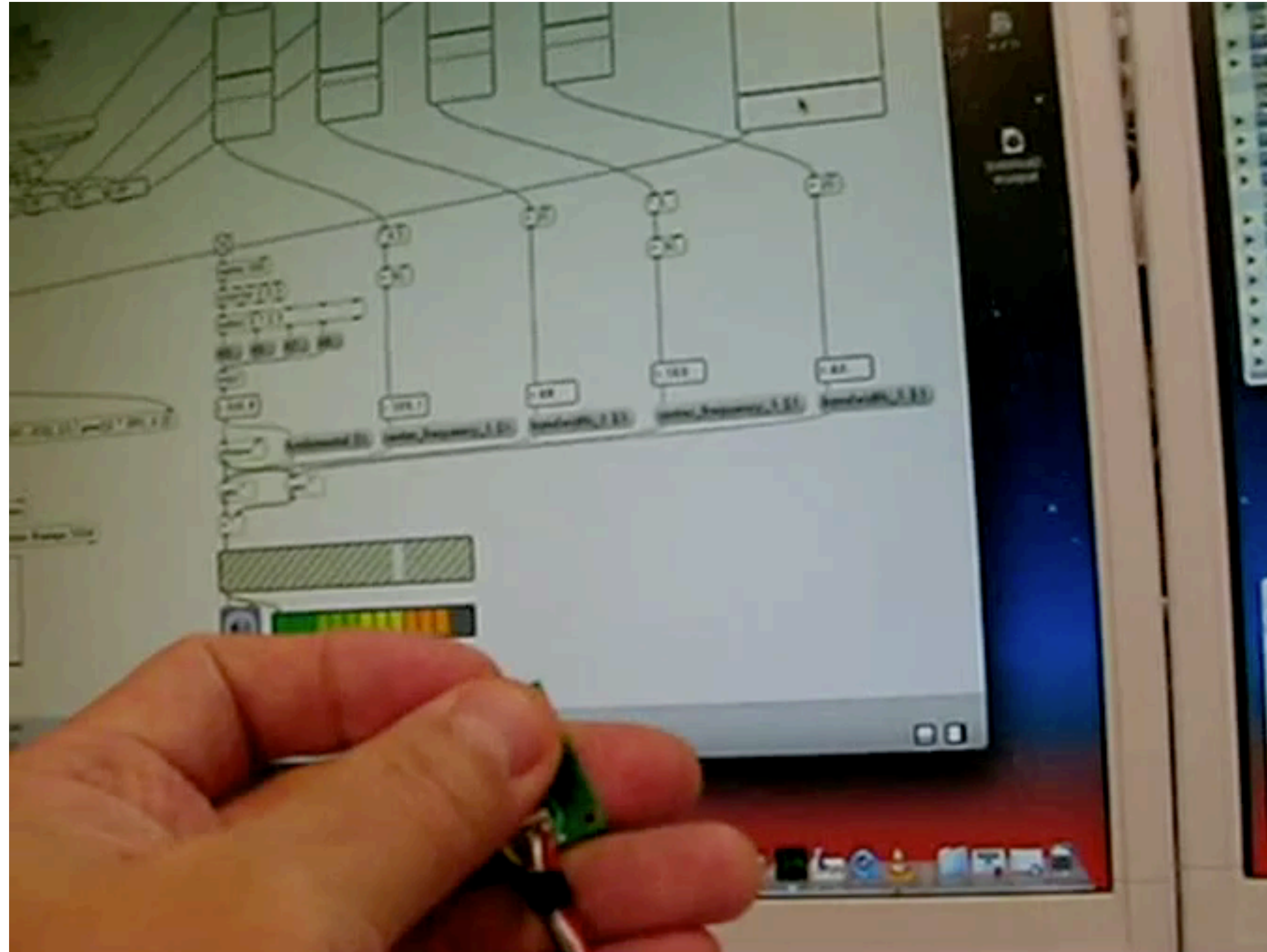
# "PAW sensor"



Ch	エリア	見方
1	22	LED2 を点灯させた時のフ ォトトランジスタ 2 の電位
2	21	LED2 を点灯させた時のフ ォトトランジスタ 1 の電位
3	11	LED1 を点灯させた時のフ ォトトランジスタ 1 の電位
4	12	LED1 を点灯させた時のフ ォトトランジスタ 2 の電位



# The 1st test of PAW sensor



movie  
uniuni.mp4

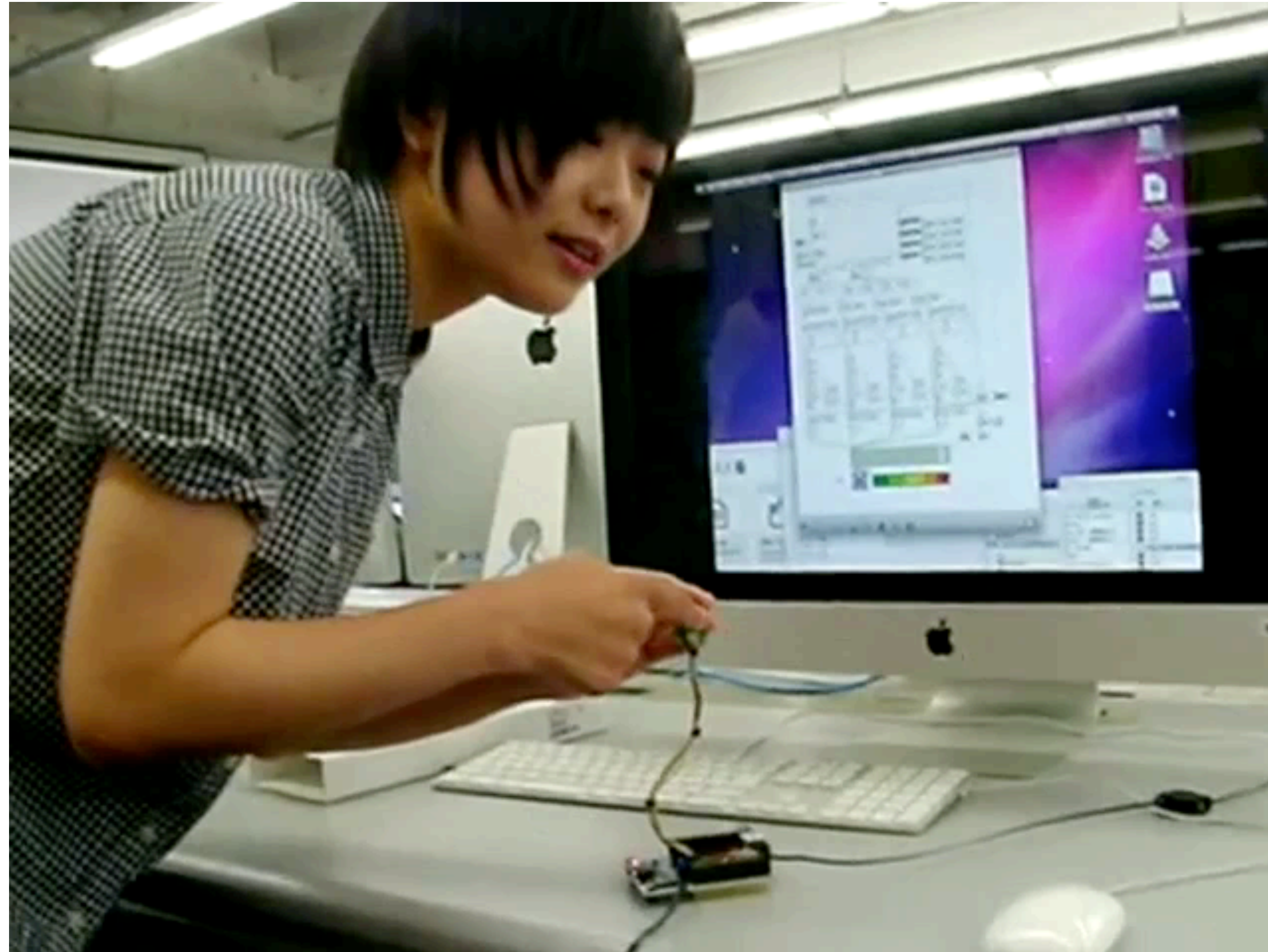


# "PAW sensor"

- covered with Urethane Foam
- detects 4-ch individual values
- rubbing controls by fingers
- reacts natural elastic repulsions



# Student's work using PAW sensor



movie

Miyamoto.mp4



Almost sensors/interfaces **miss** the **soft feel** and sensation of **gentle** manipulation. The pressure sensor or strain gauge detects the "maximum" value like a physical fitness test. Of course the **"CV"** sensors have no physical reaction.

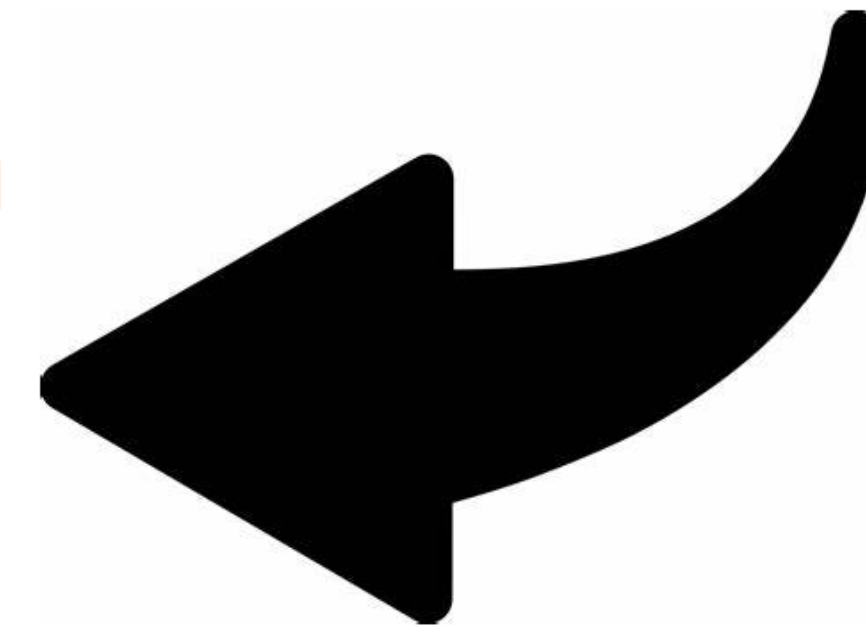


# Tactile Interaction

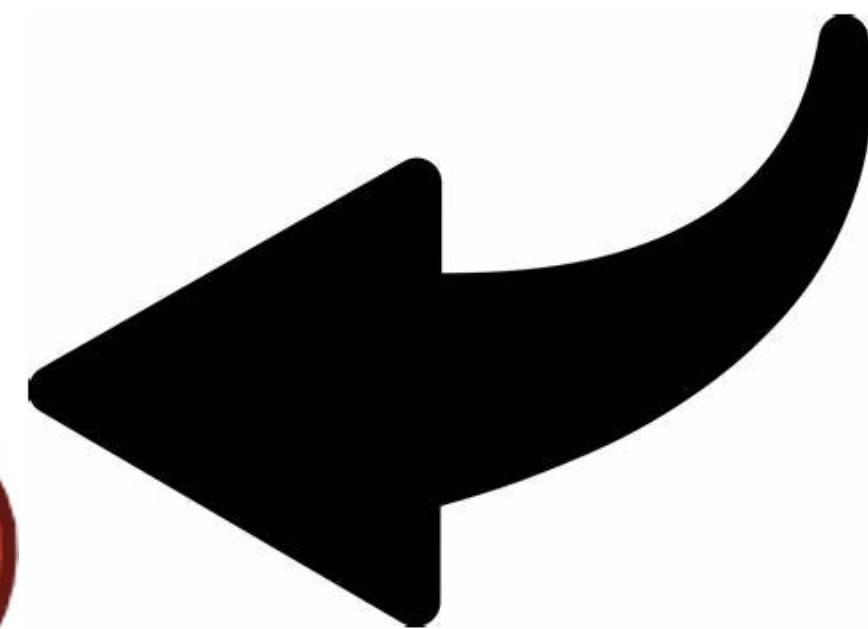
Smile (Emotion)



Wellness

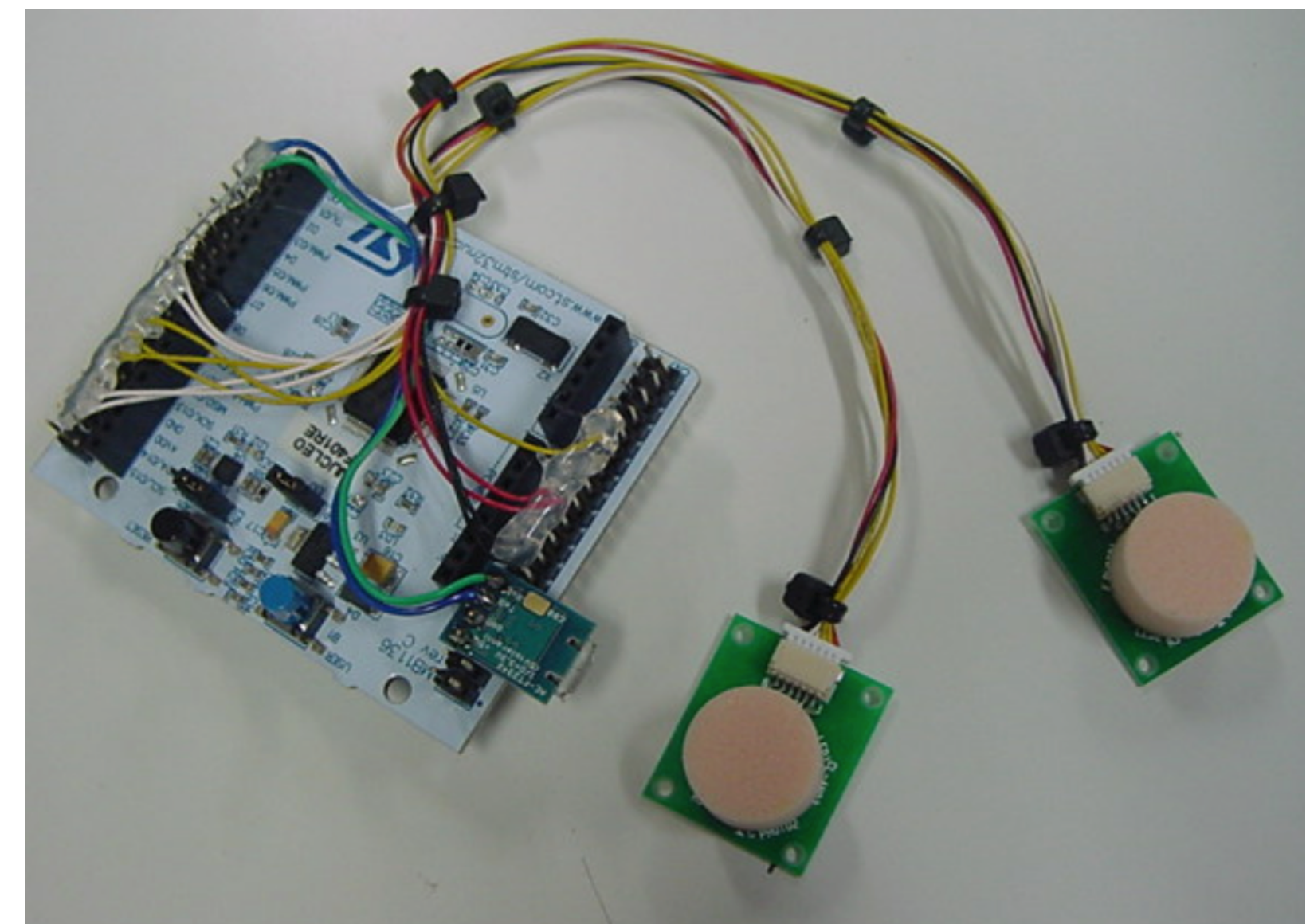
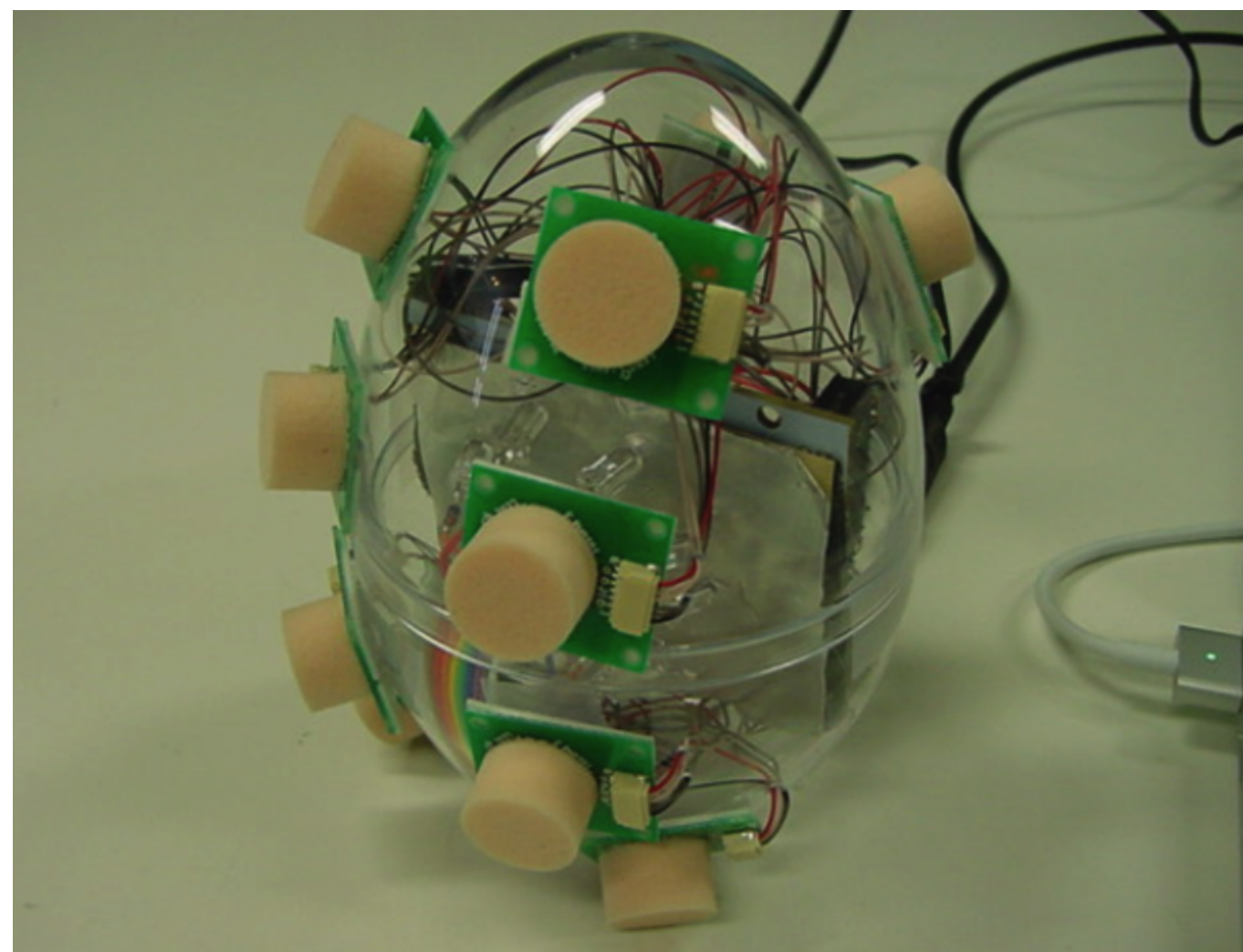
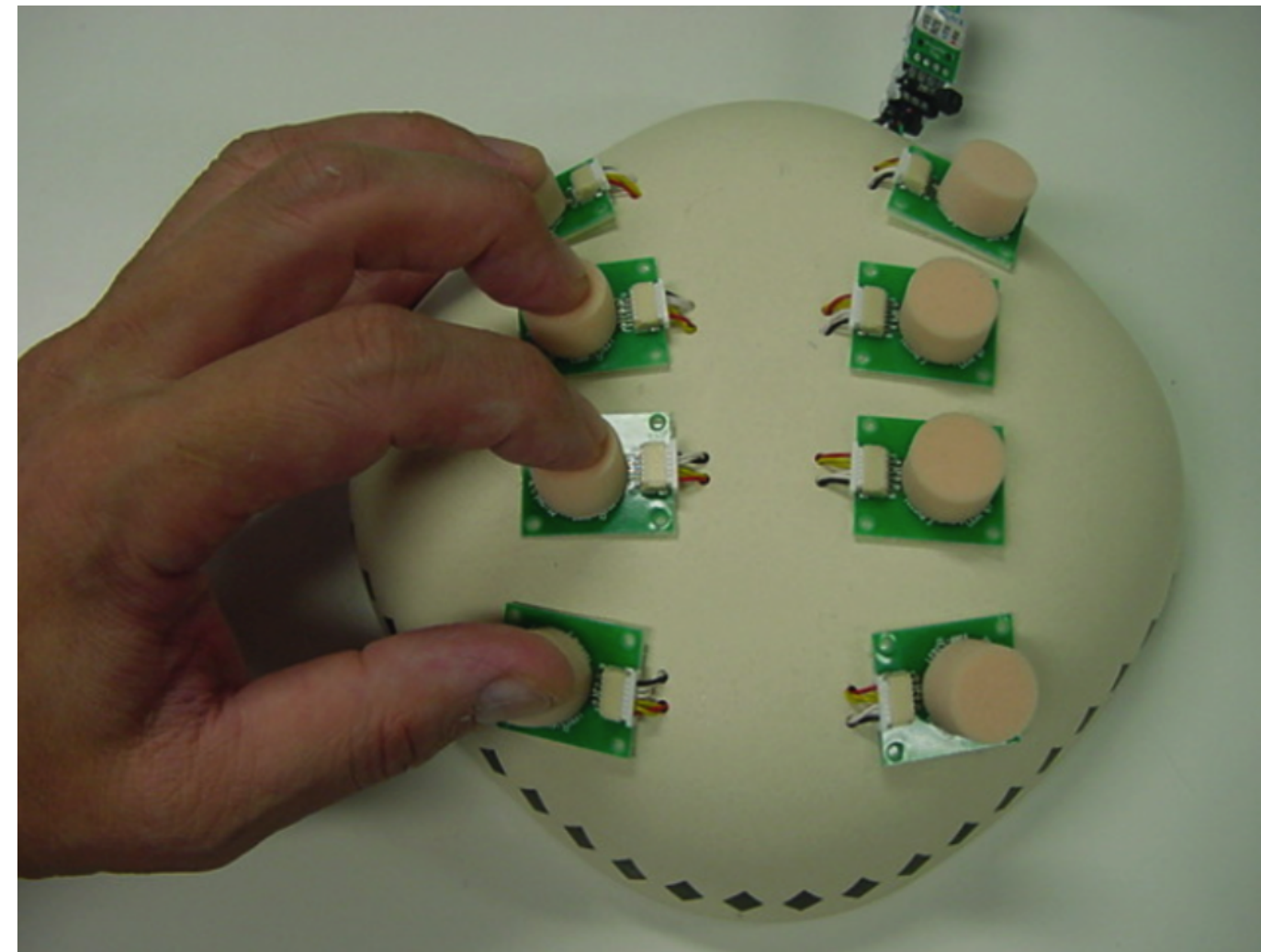
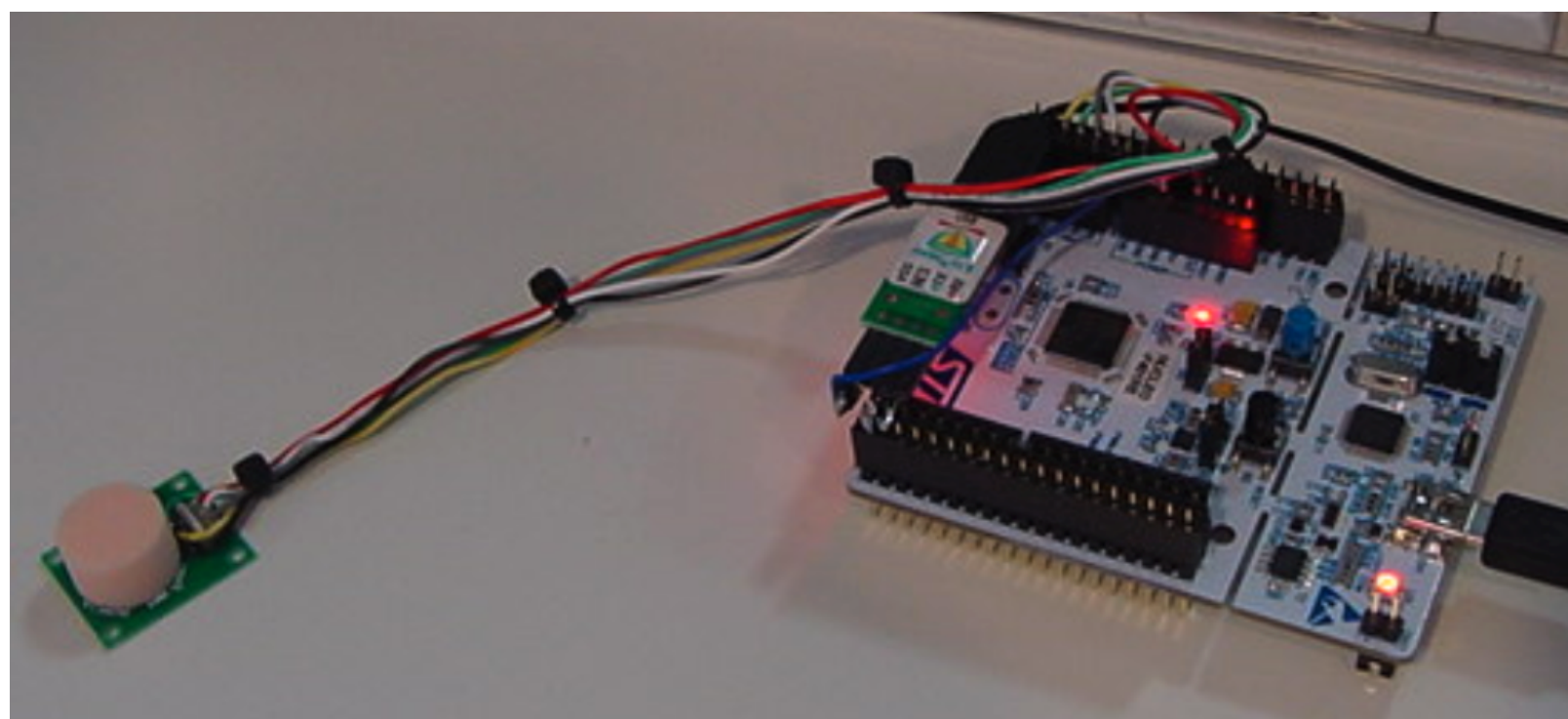


Interoception



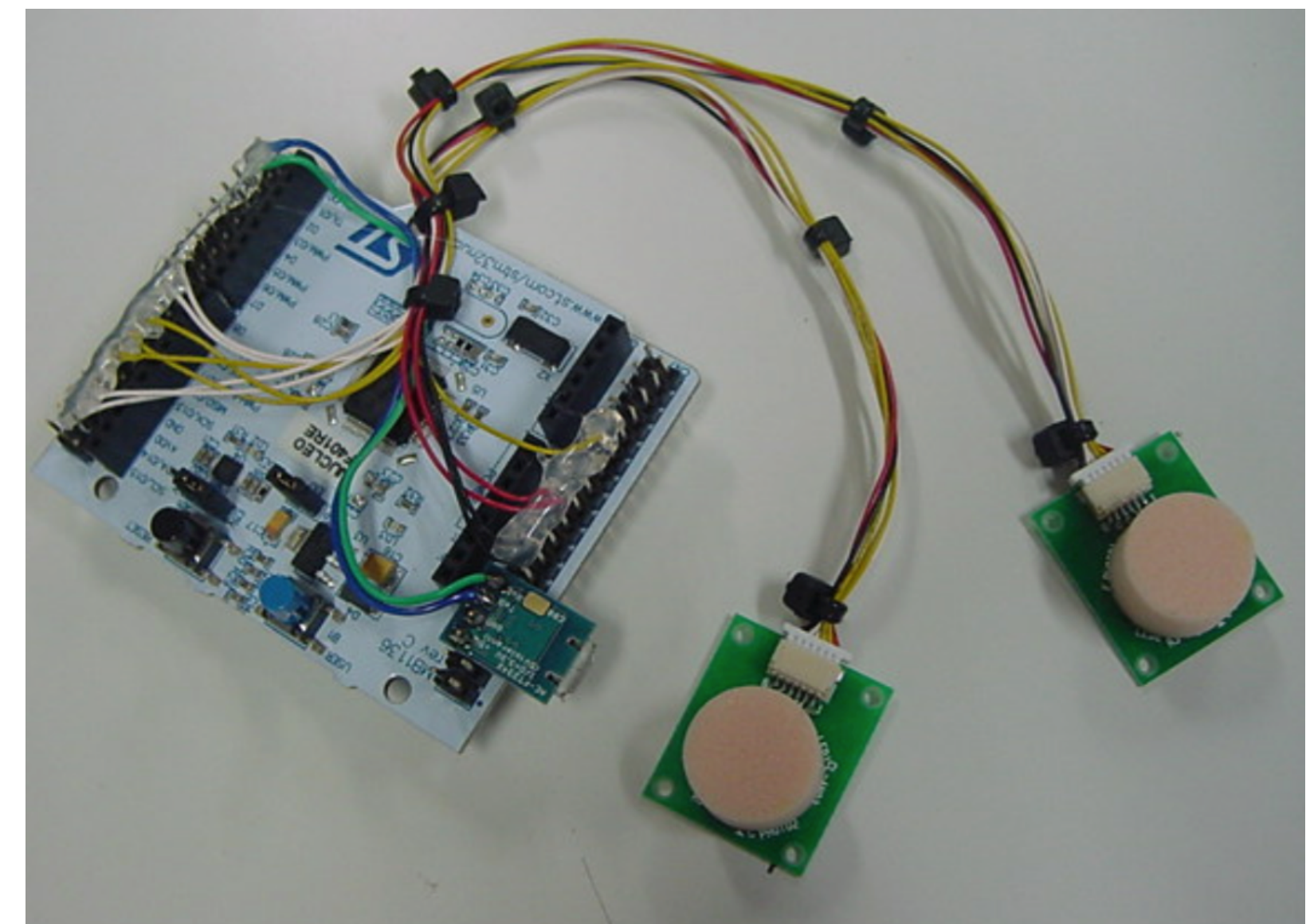
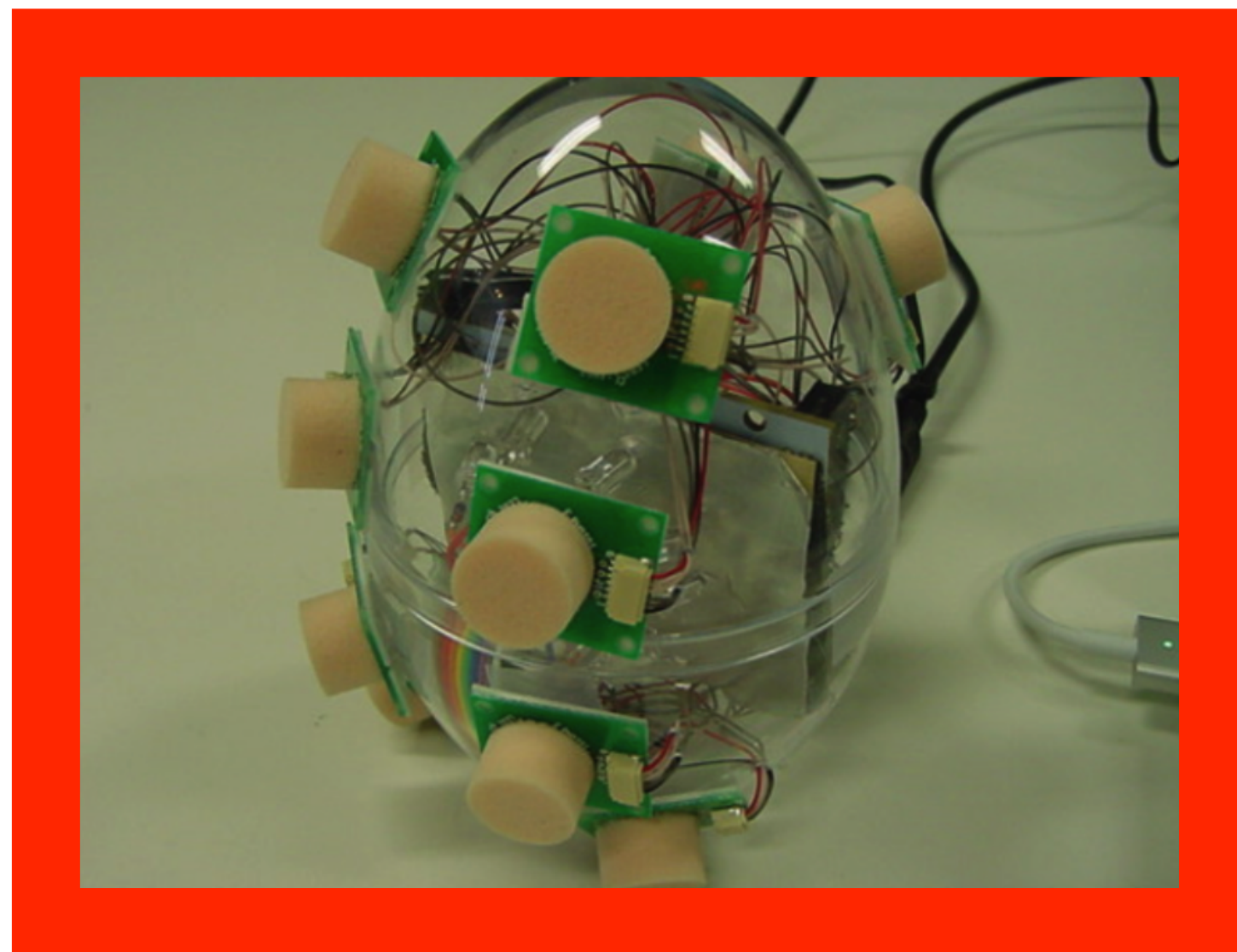
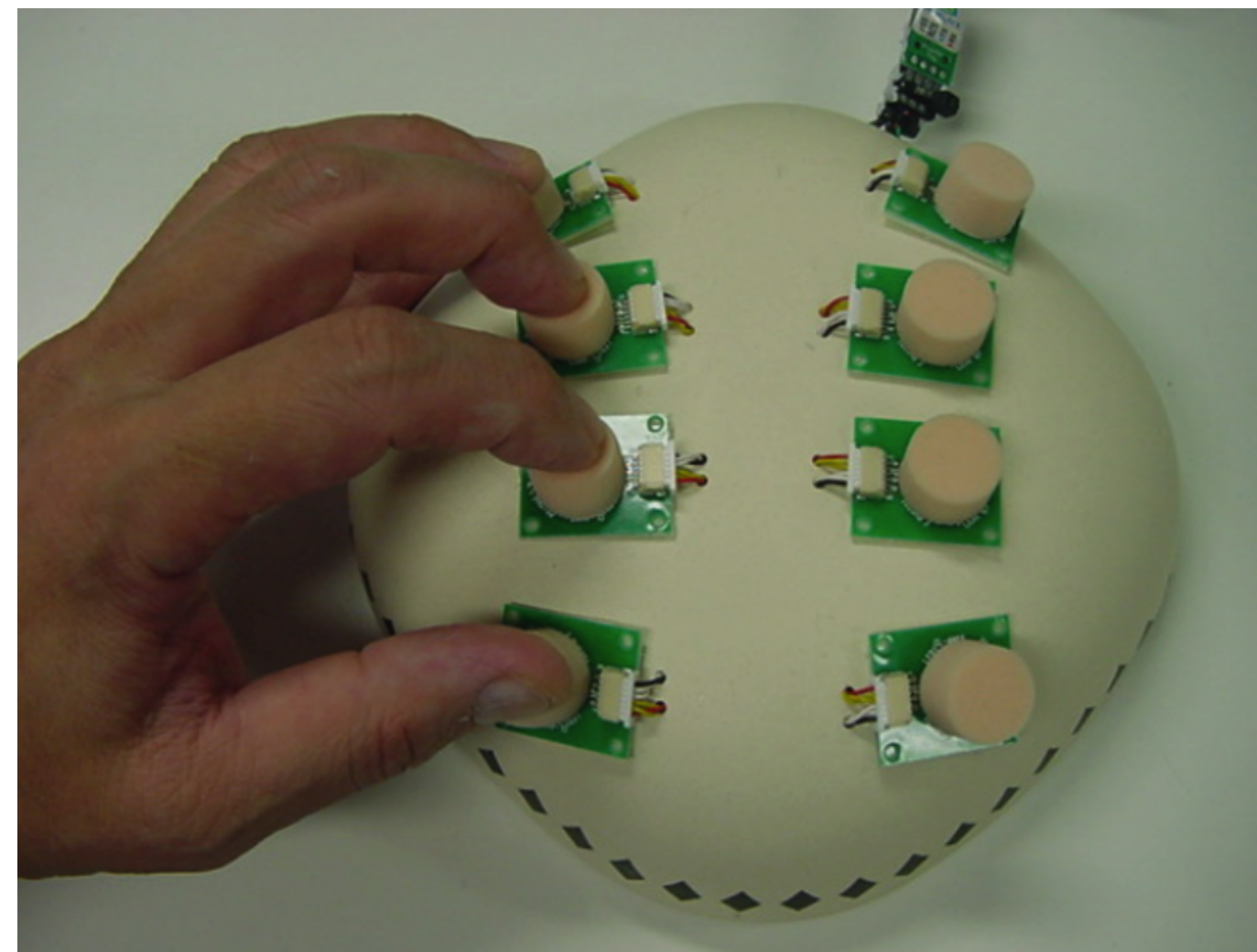
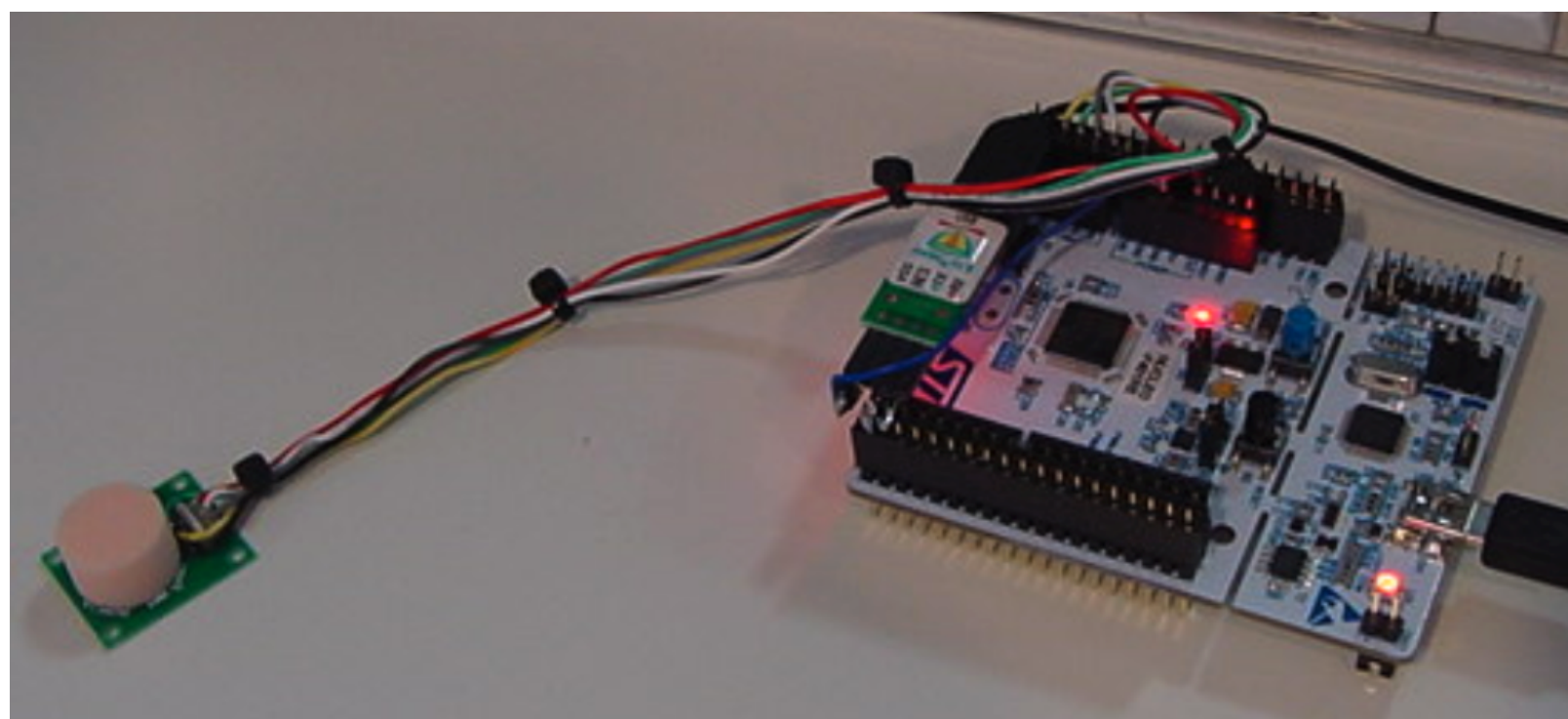


I have developed four generations system with this unique sensor.





# I have developed four generations system with this unique sensor.



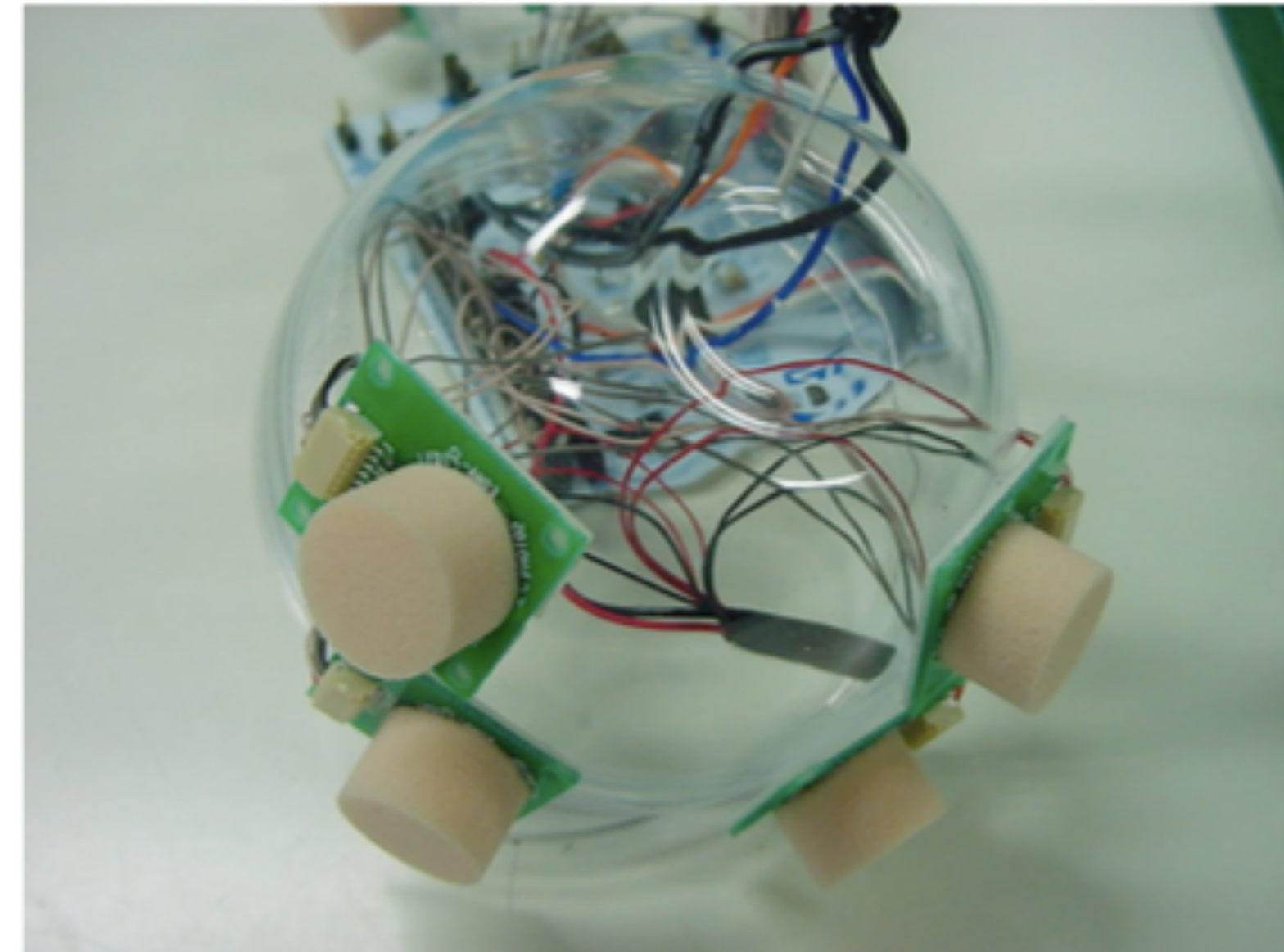
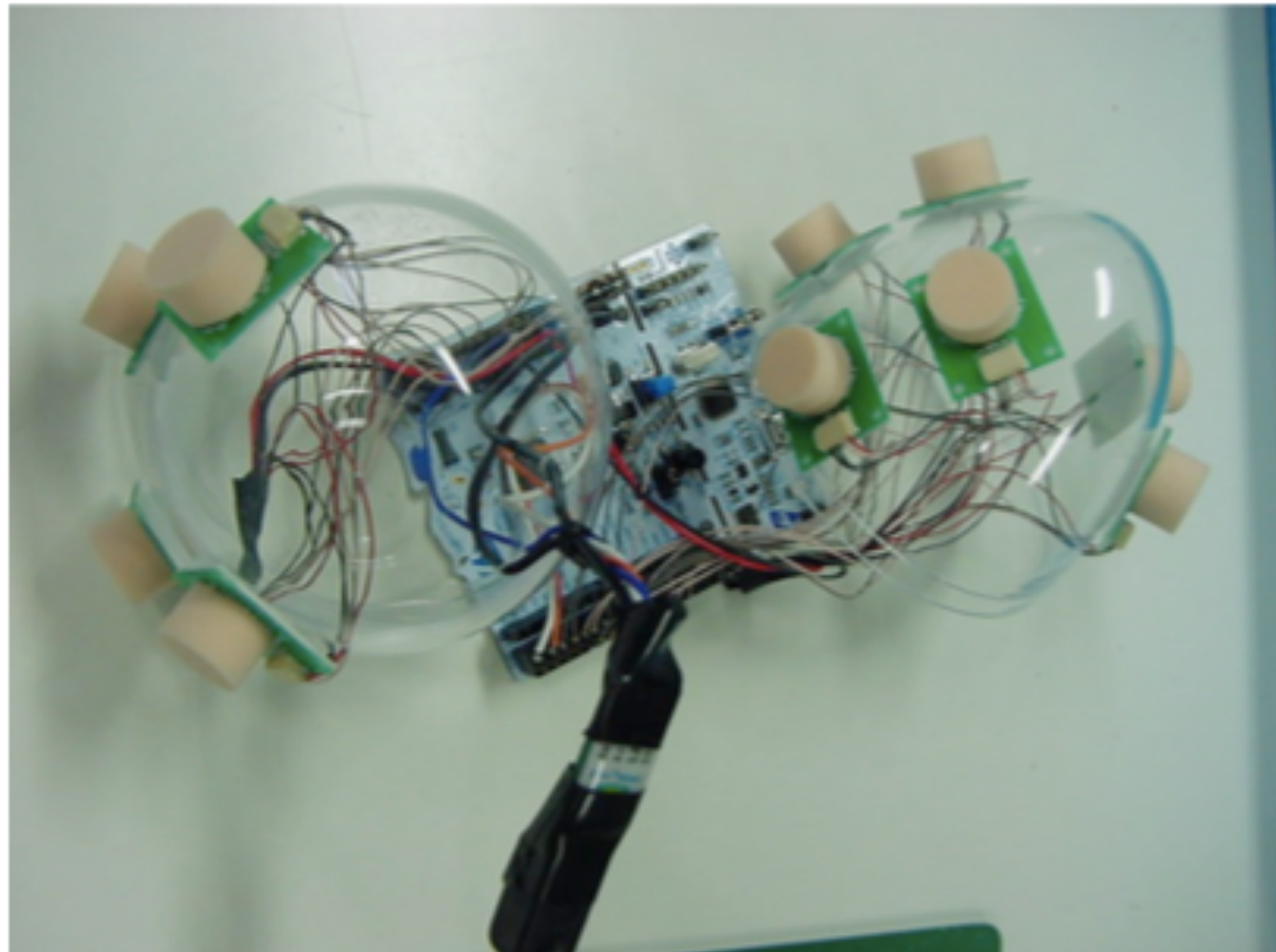
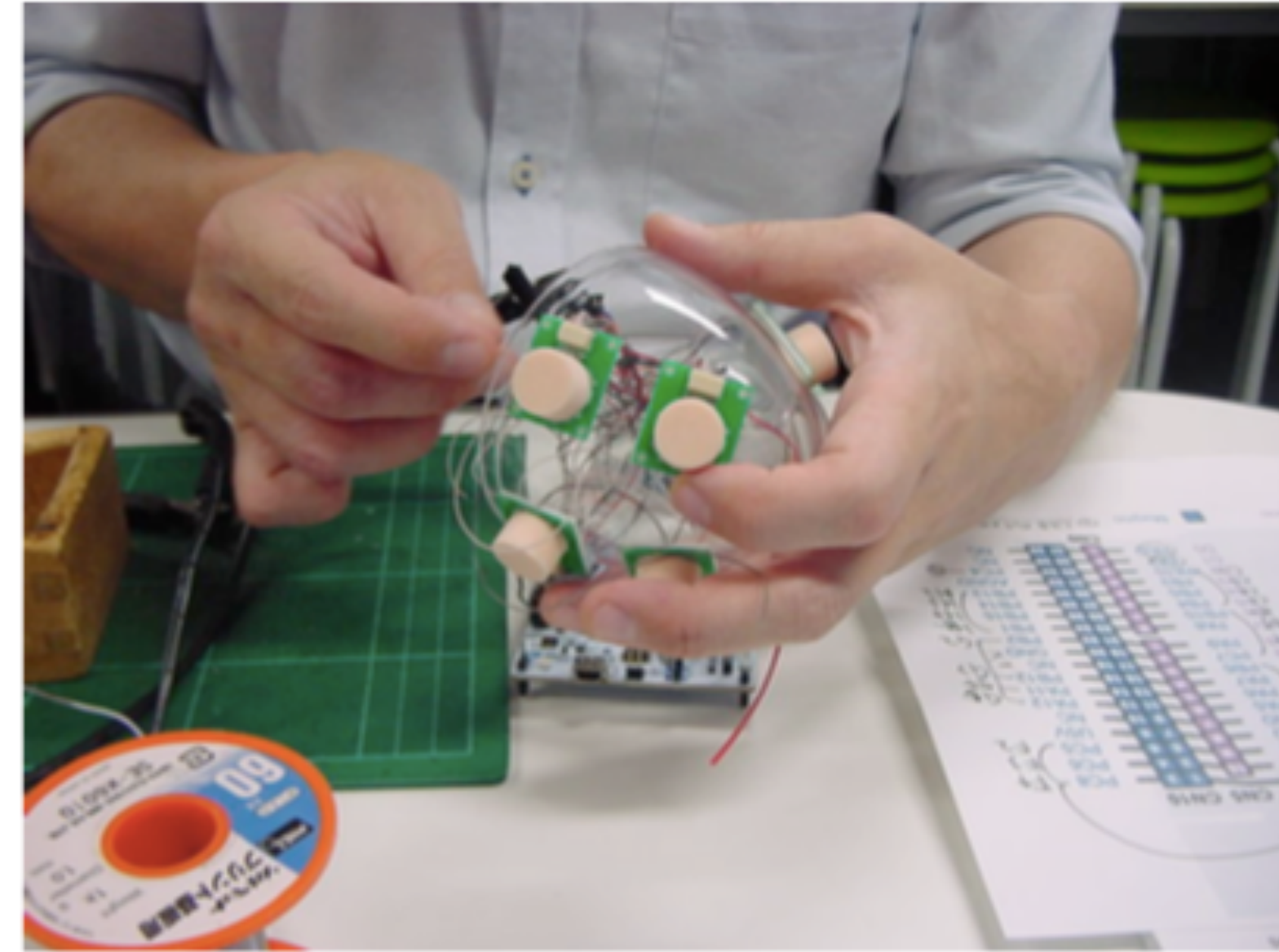
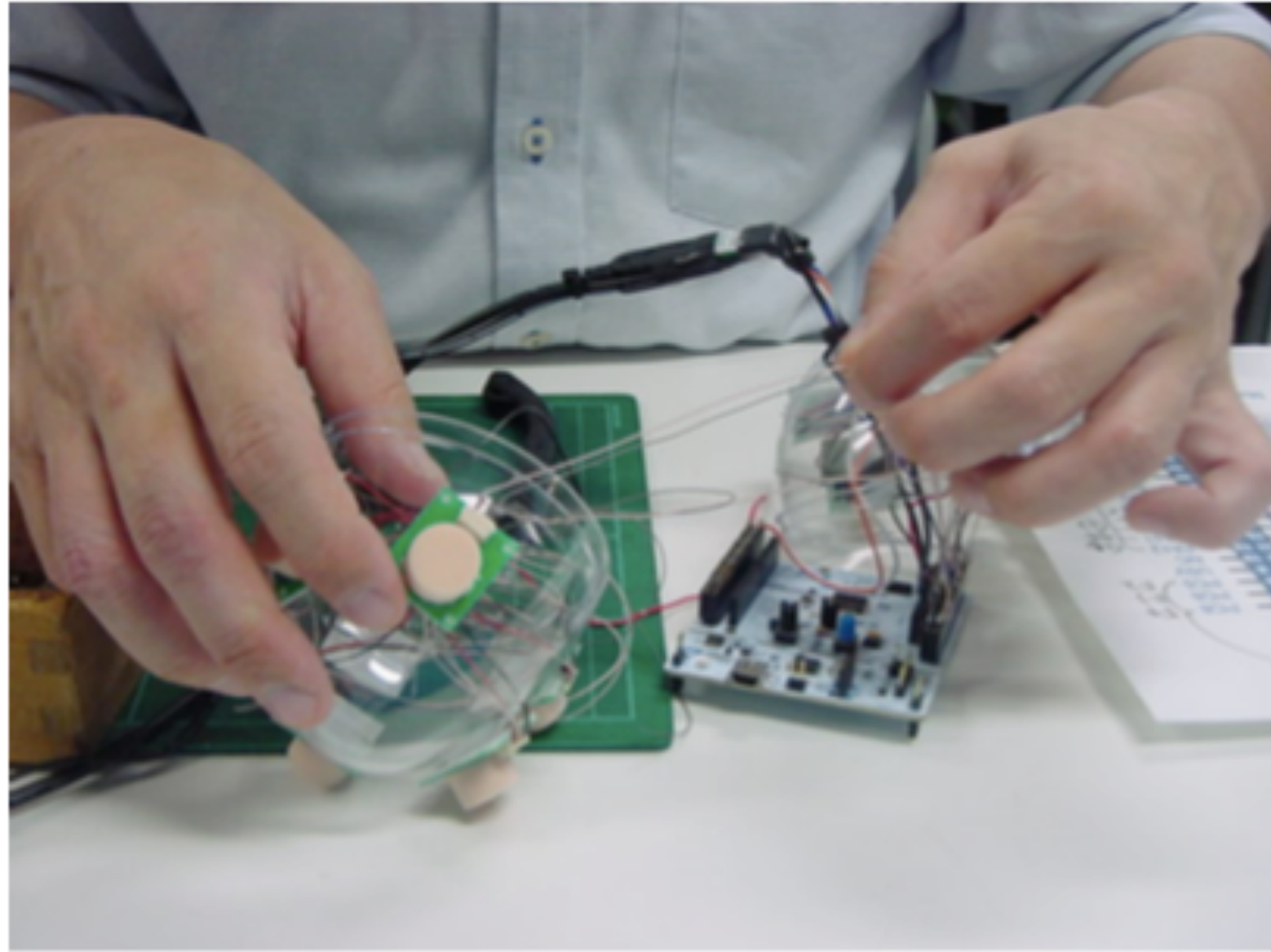


# MRTI2015 (Multi Rubbing Tactile Interface)



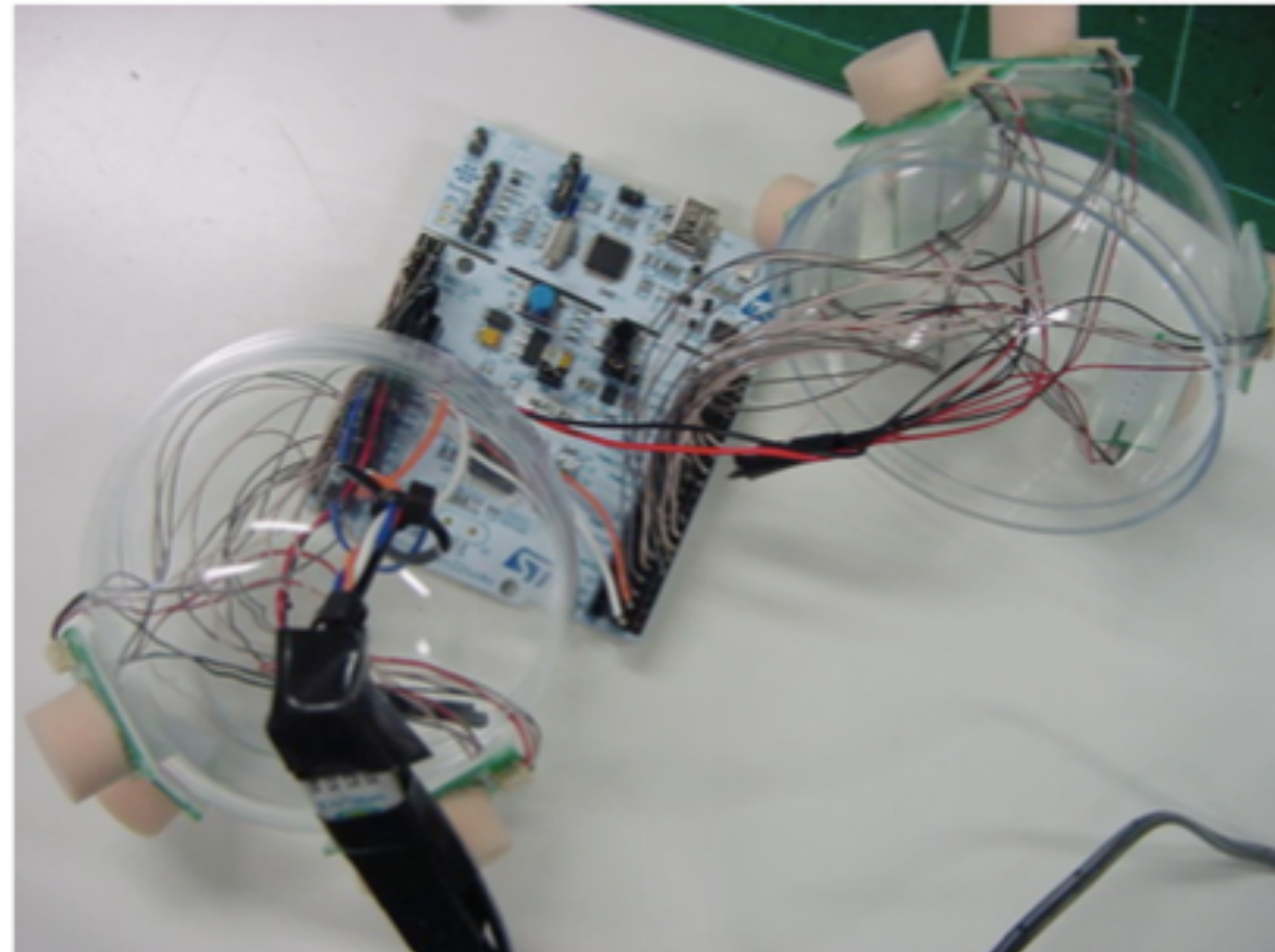
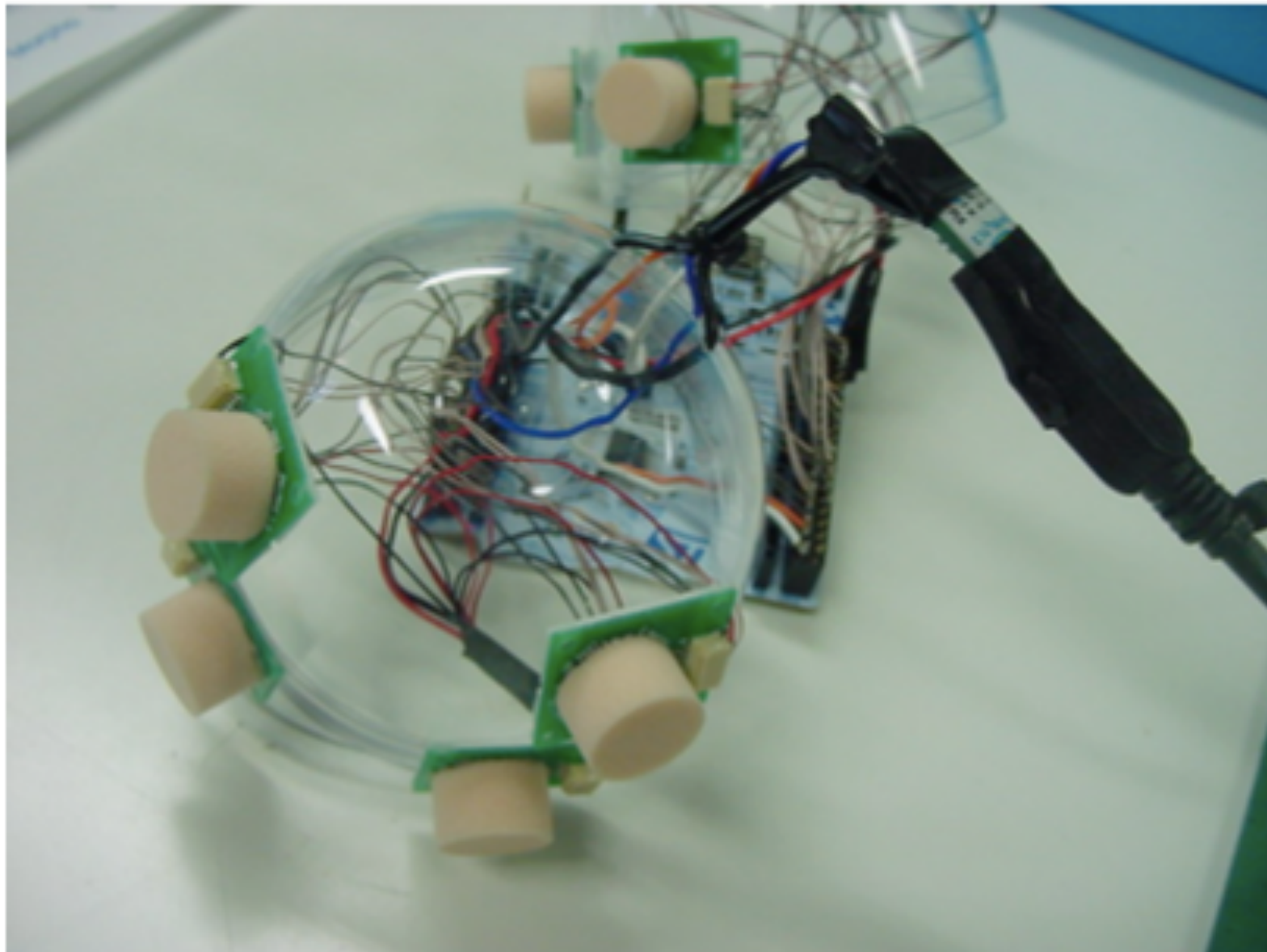
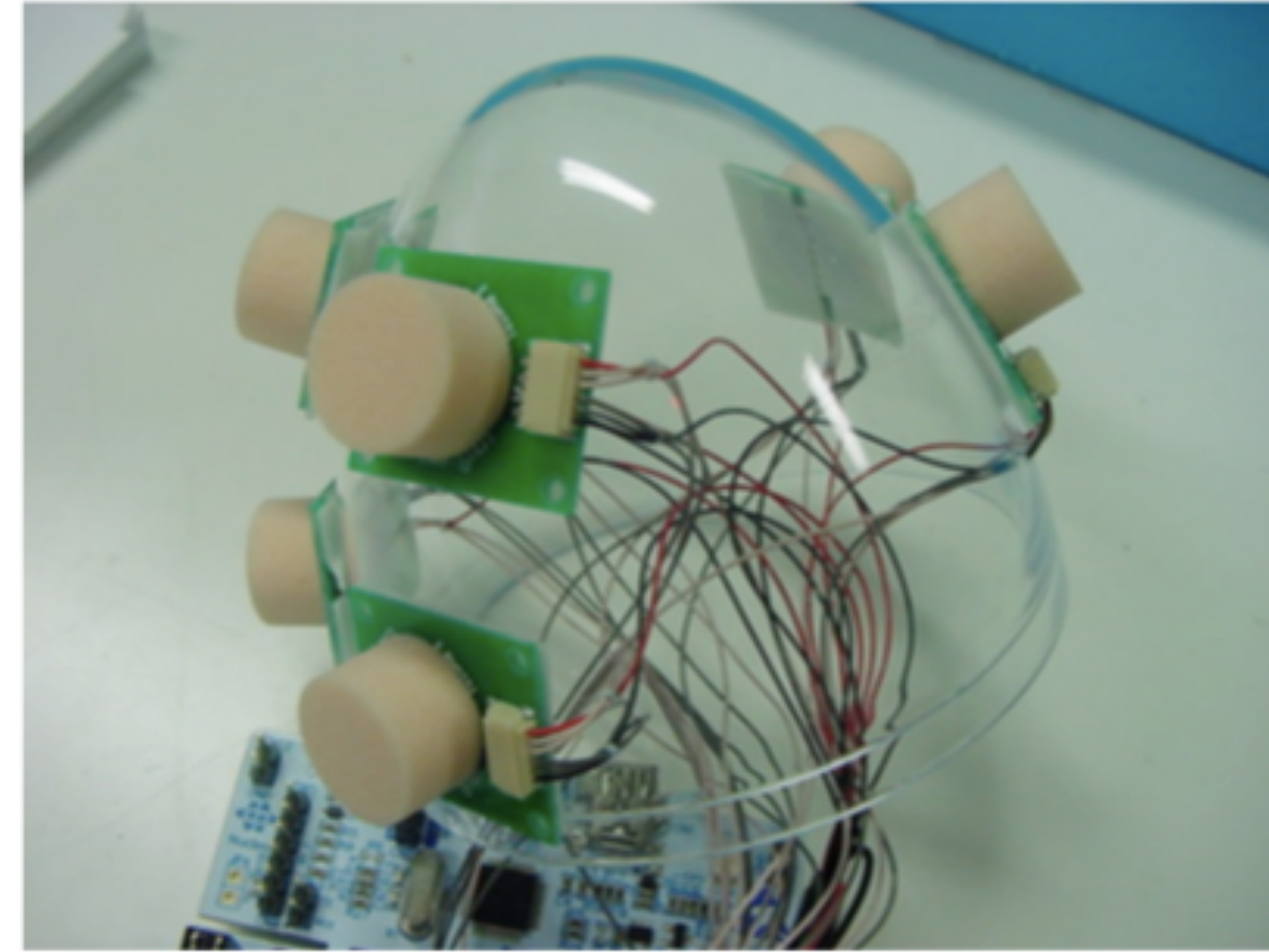
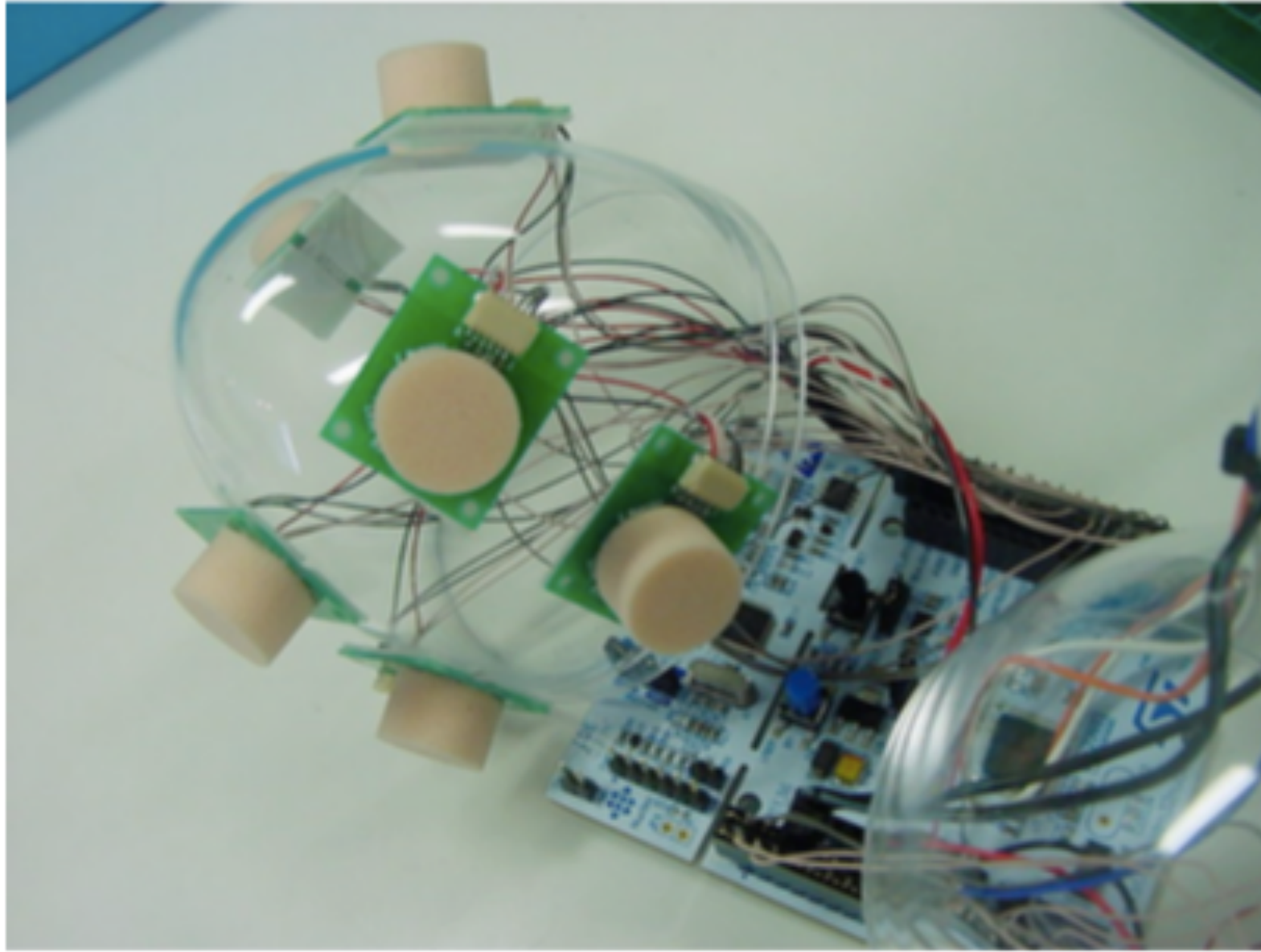


# MRTI2015 (Multi Rubbing Tactile Interface)



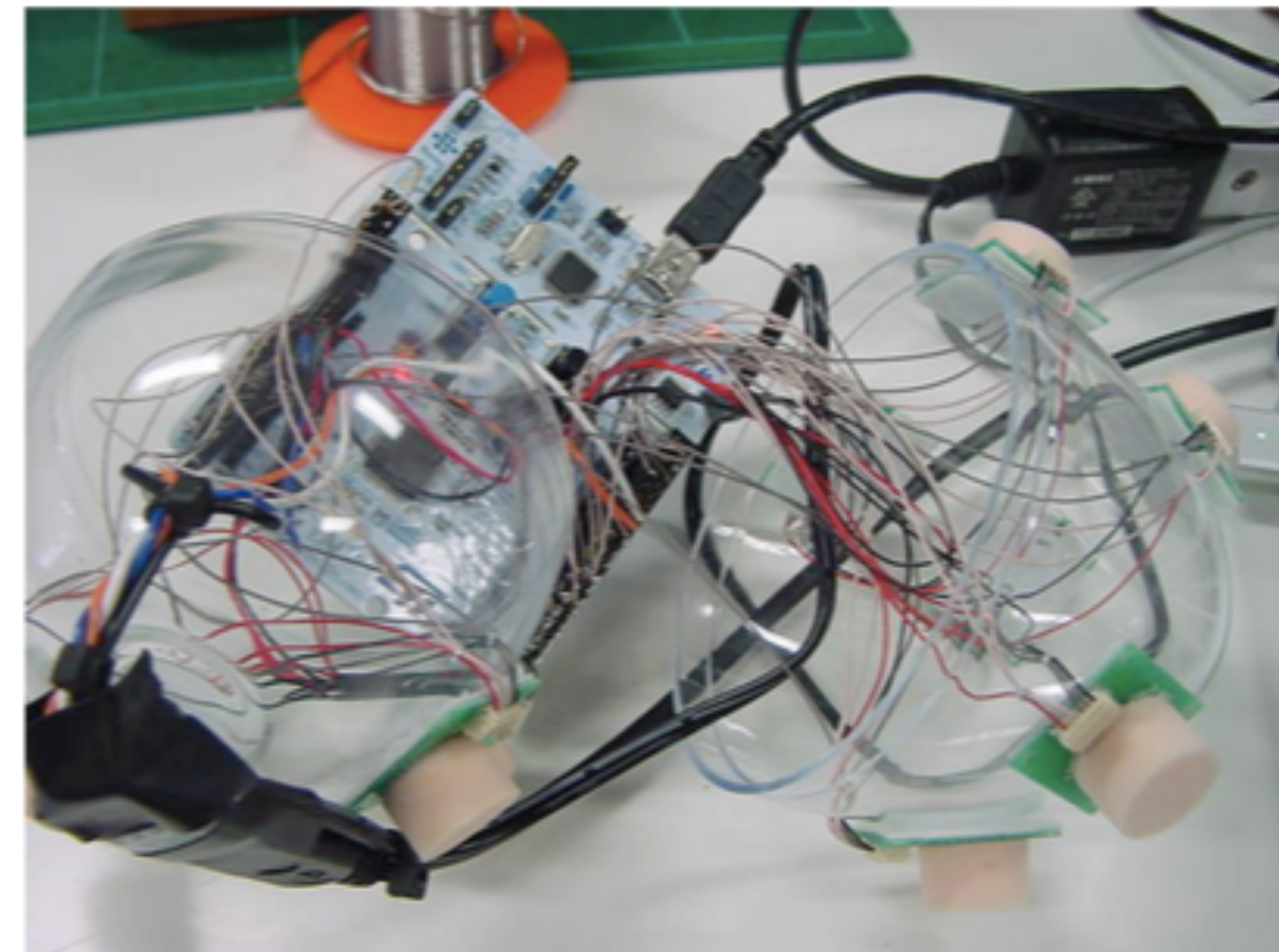
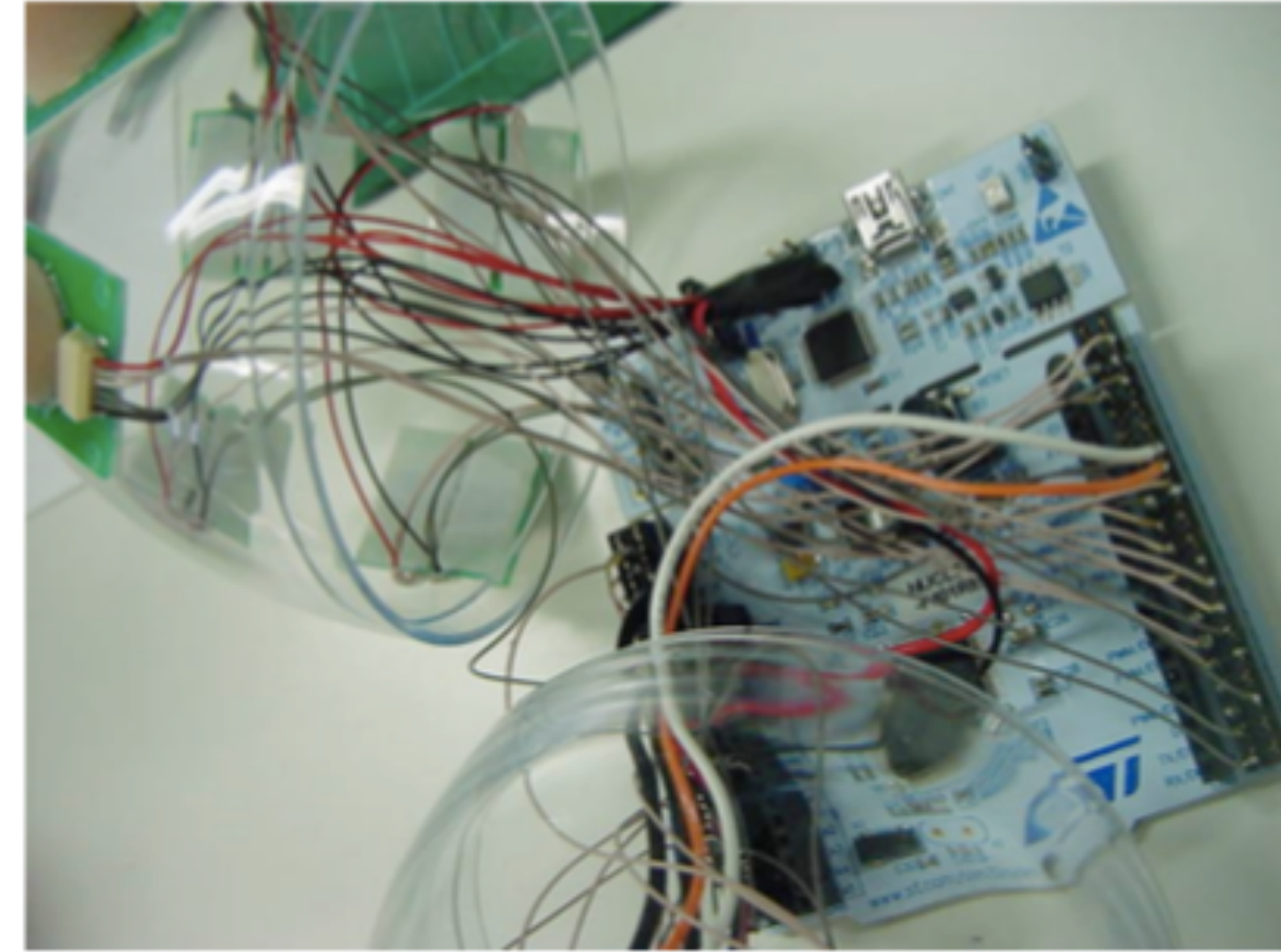
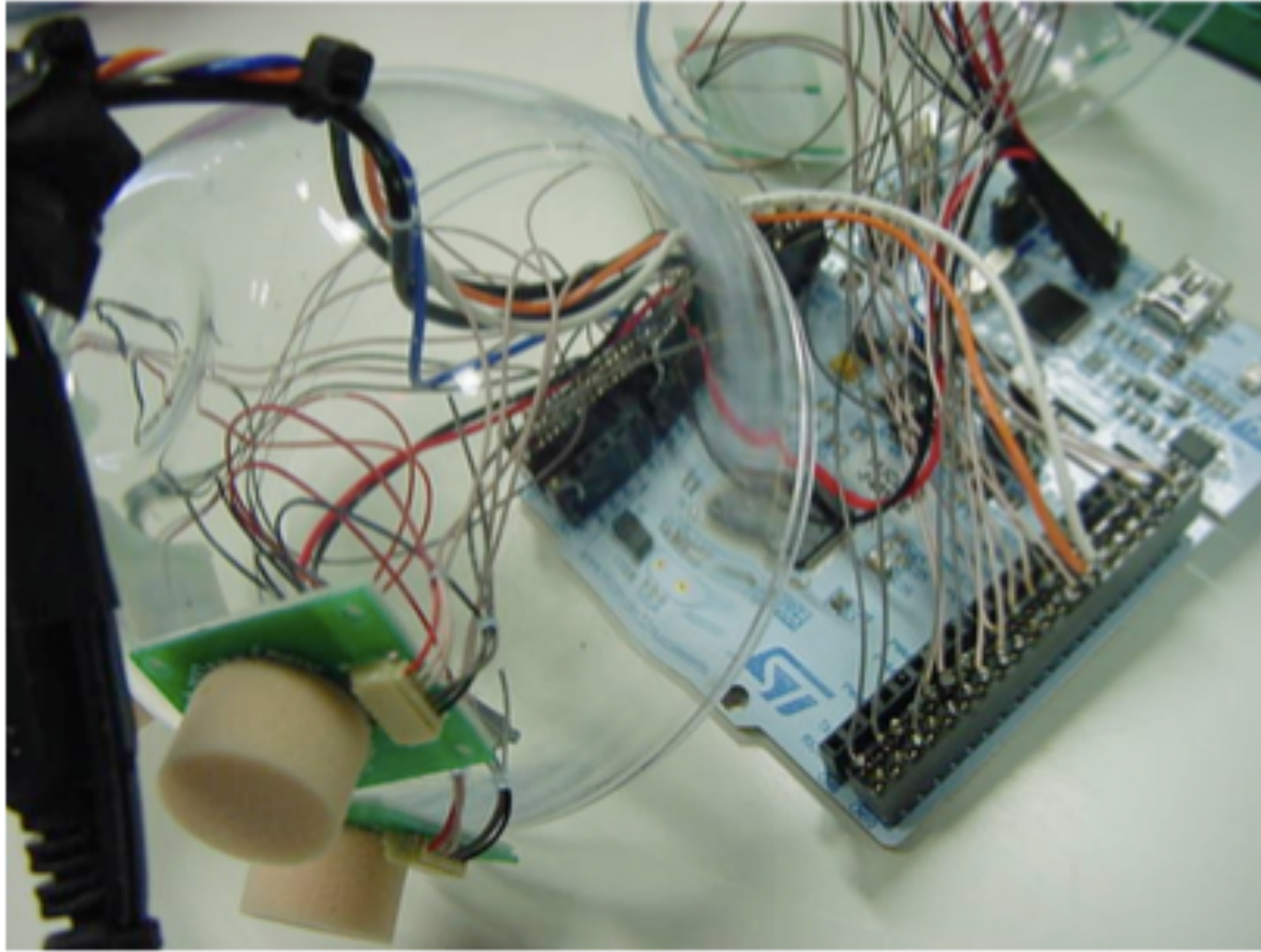


# MRTI2015 (Multi Rubbing Tactile Interface)



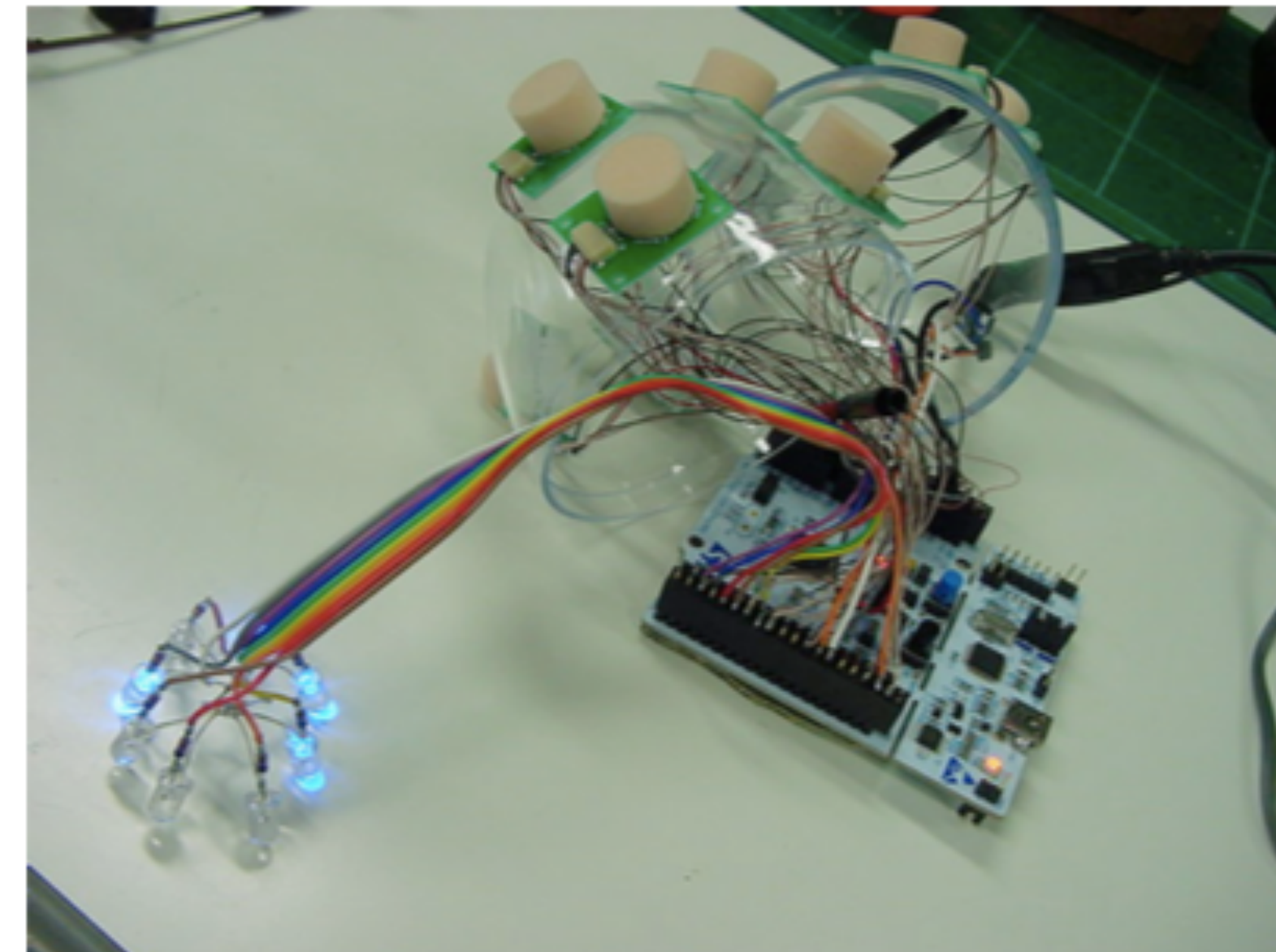
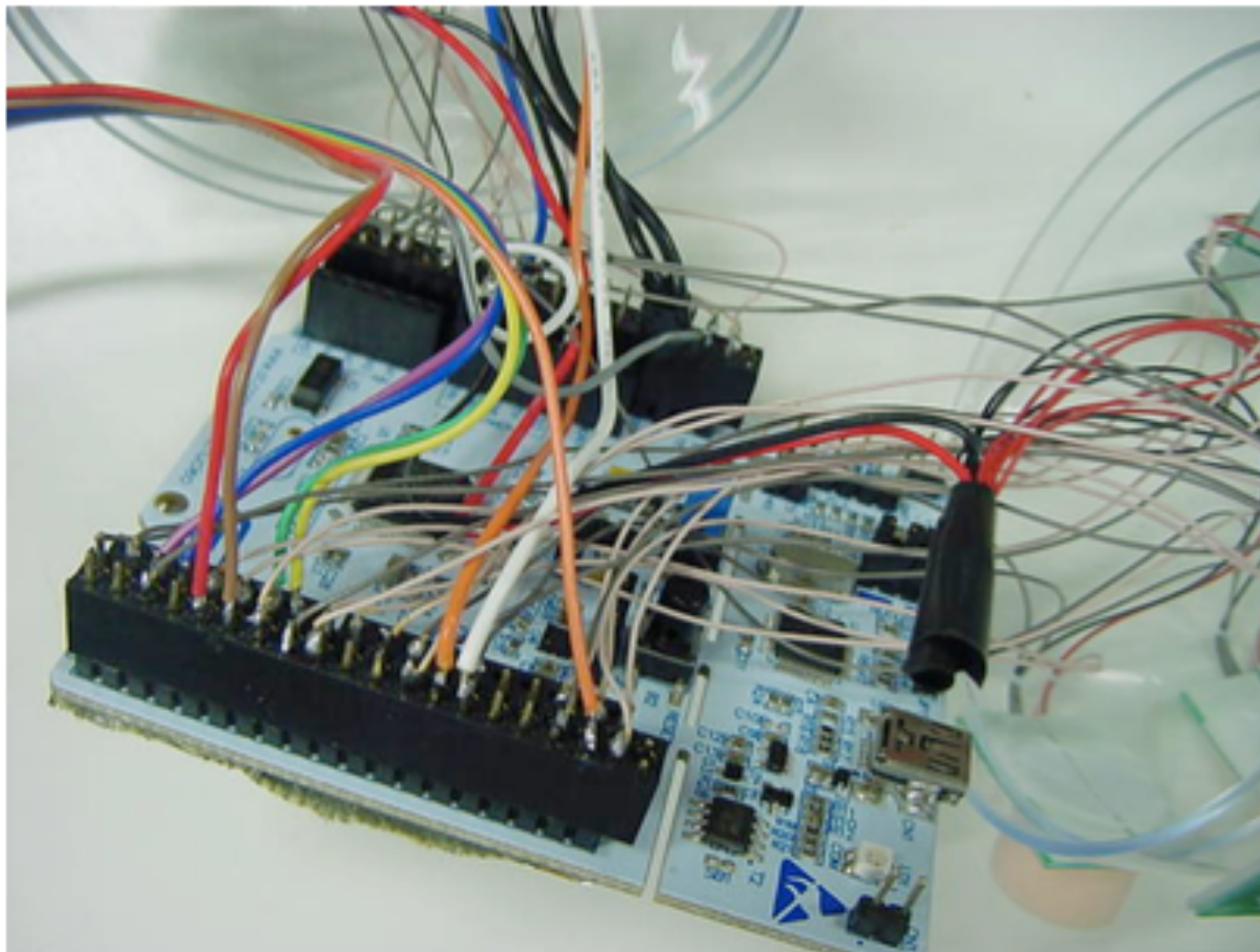
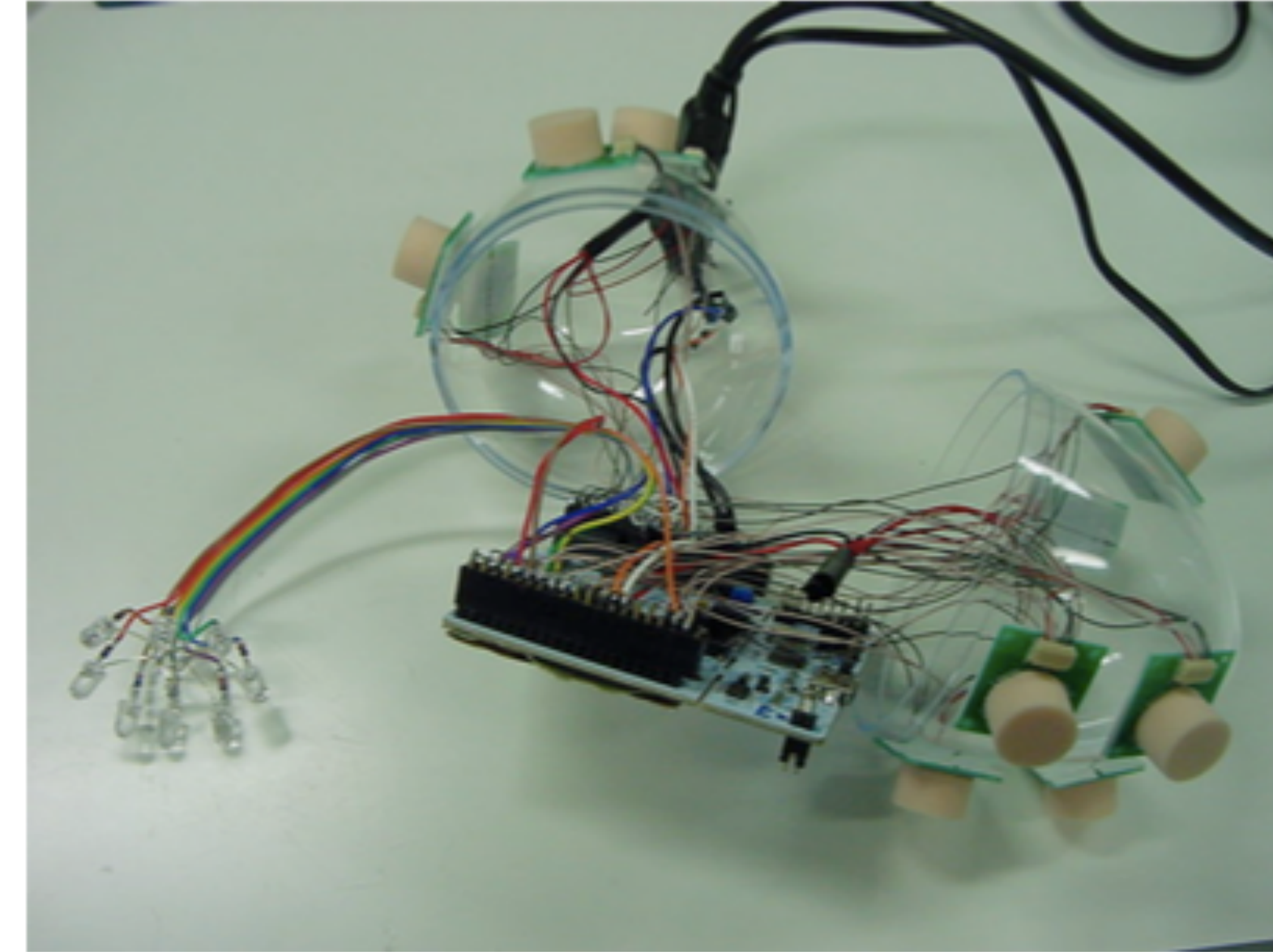
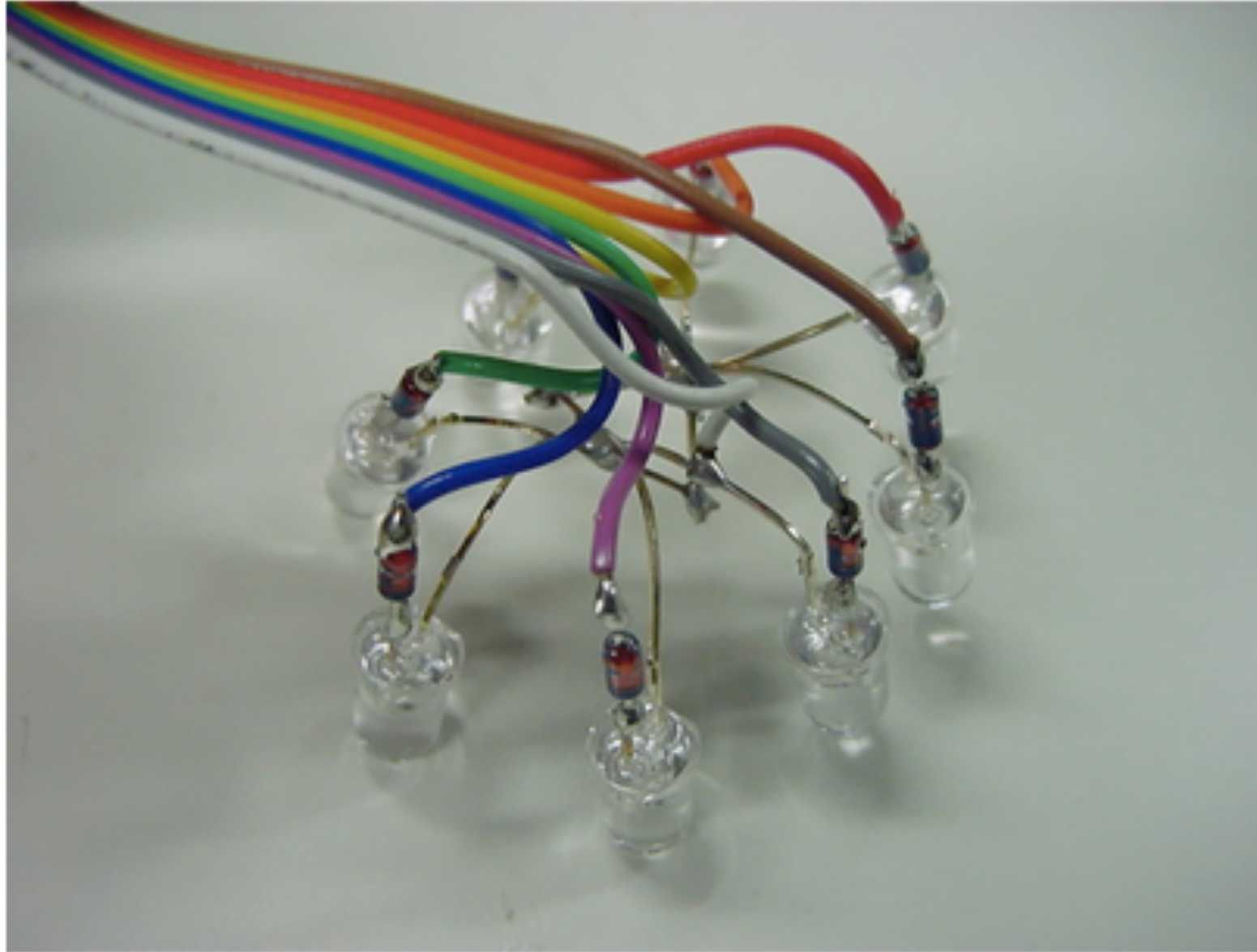


# MRTI2015 (Multi Rubbing Tactile Interface)



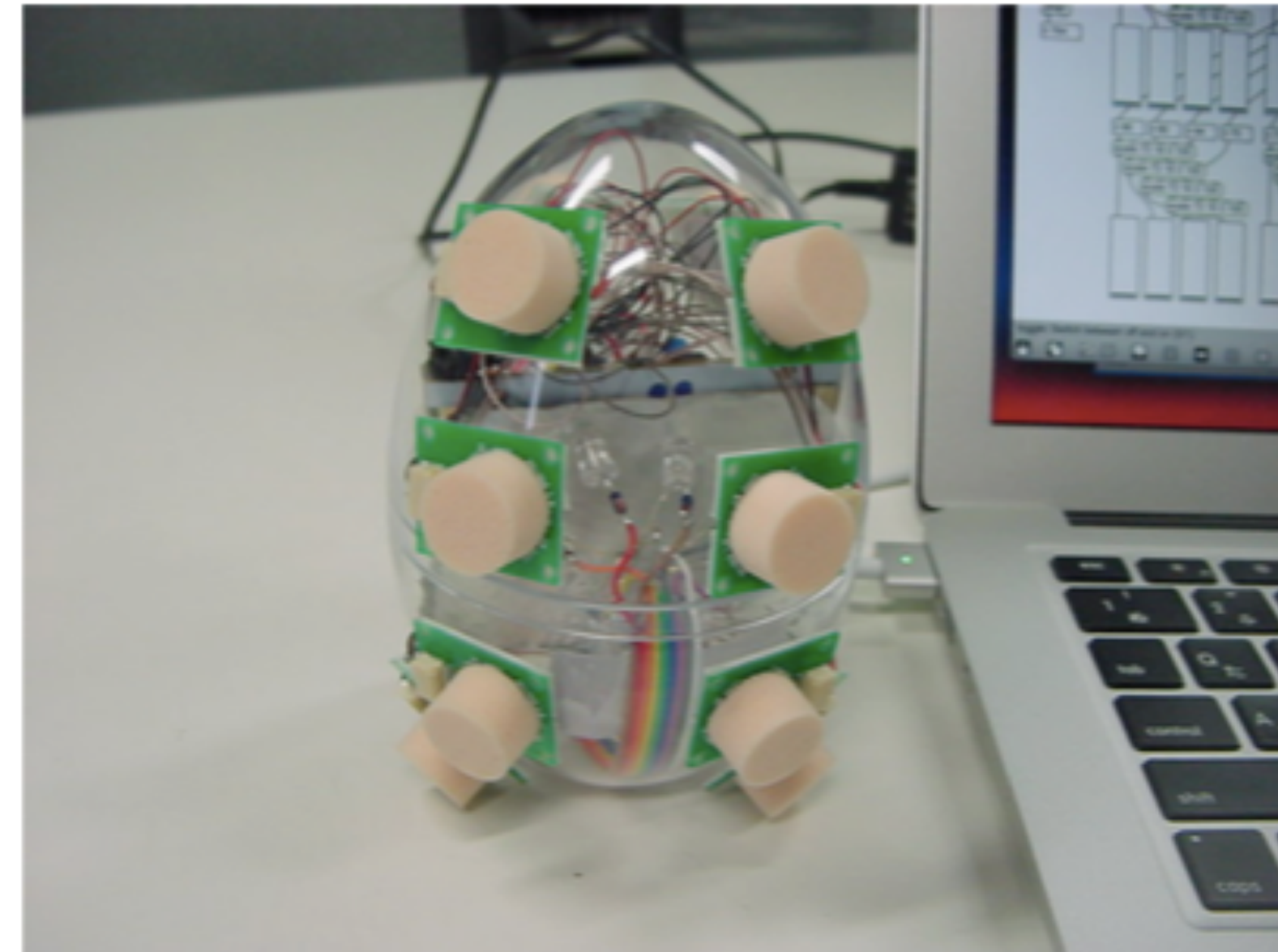
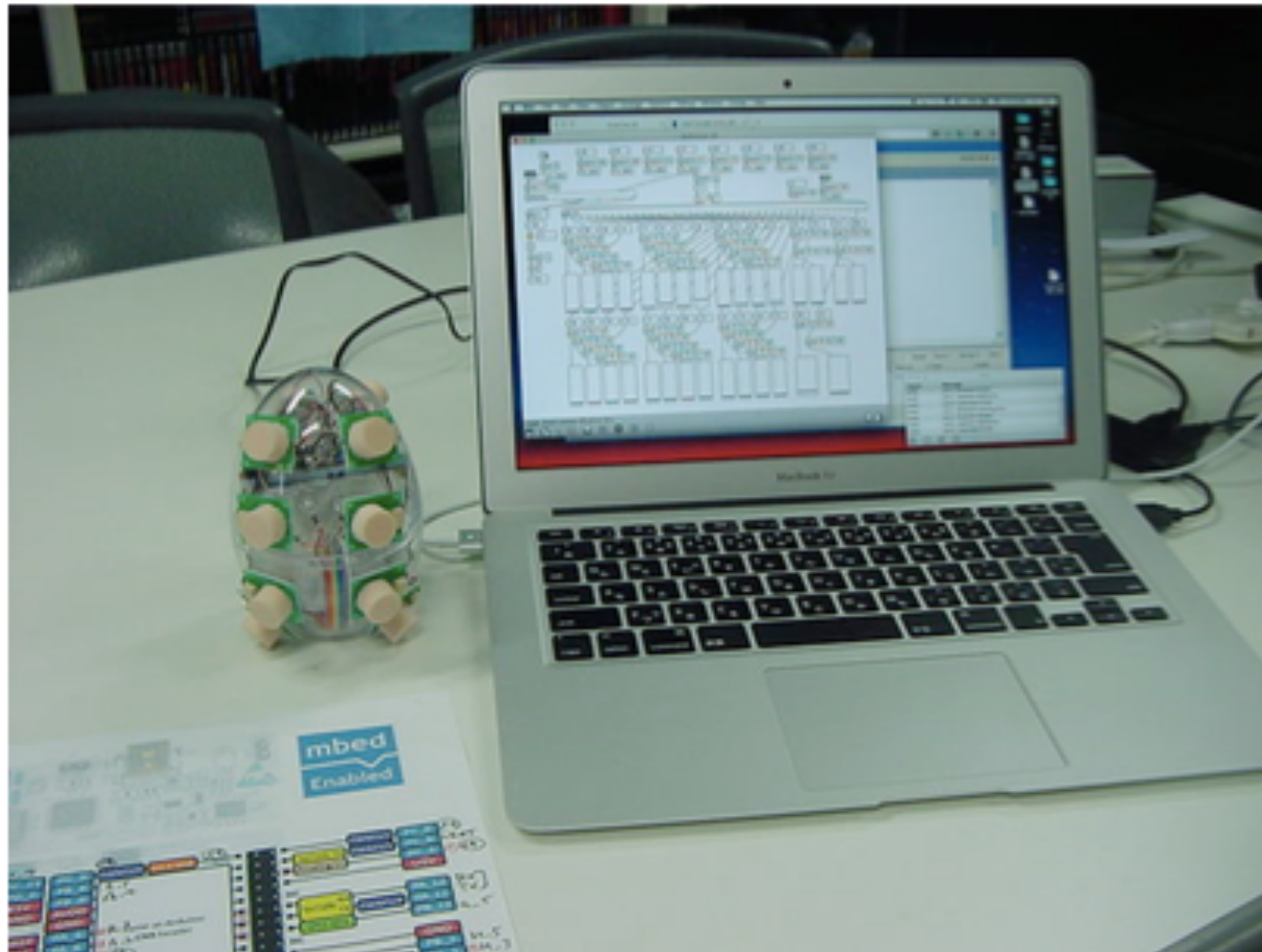
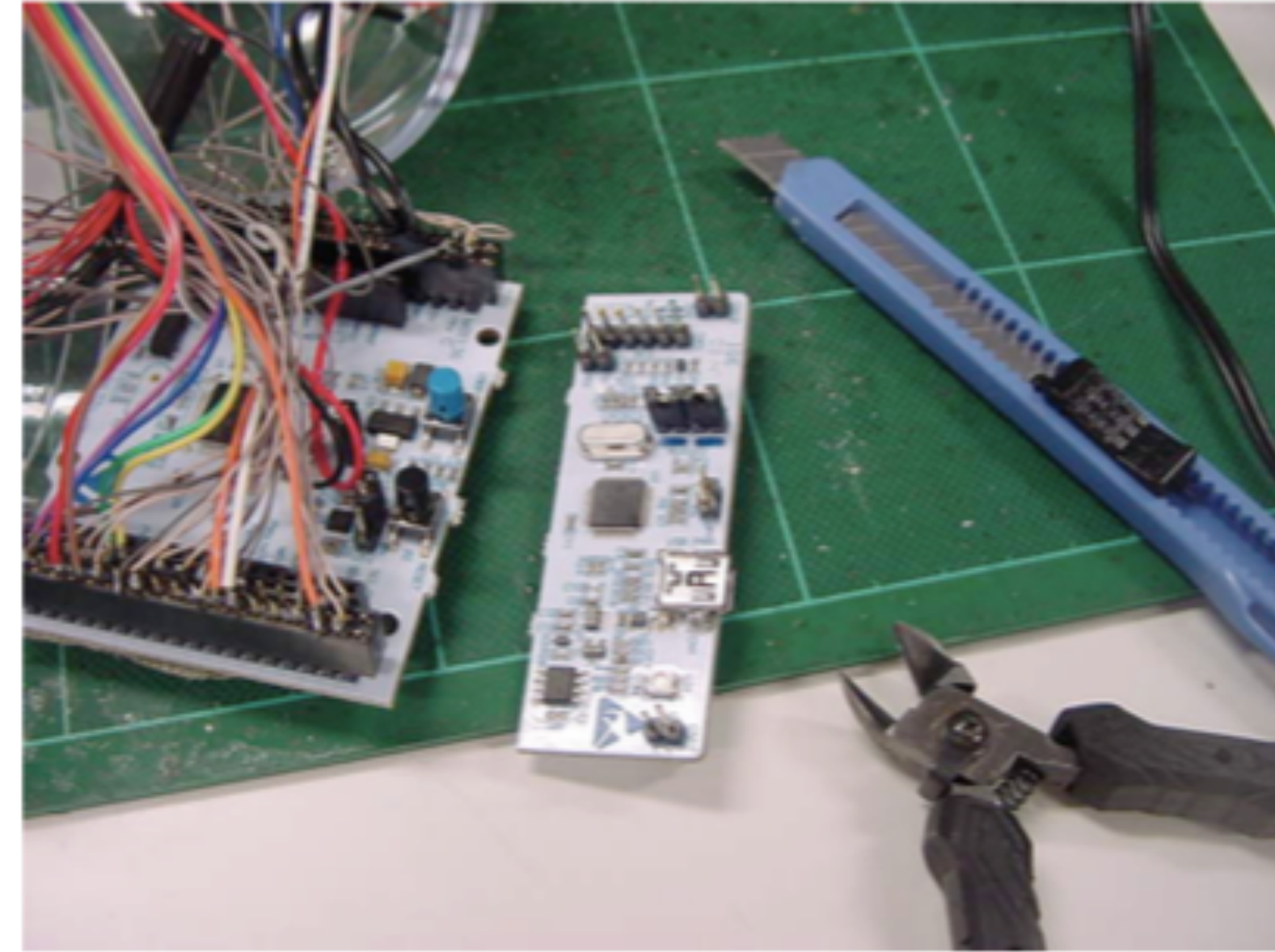
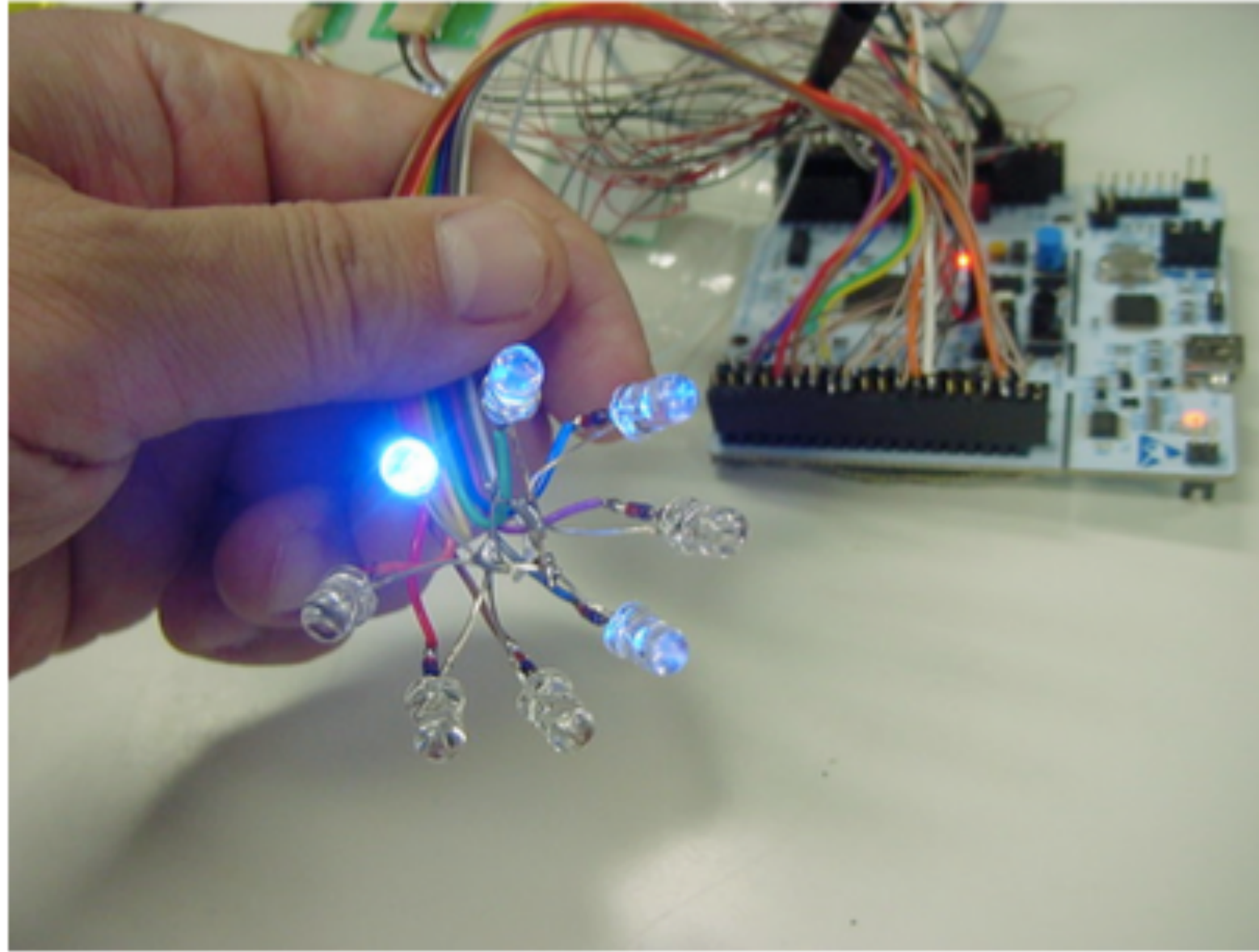


# MRTI2015 (Multi Rubbing Tactile Interface)



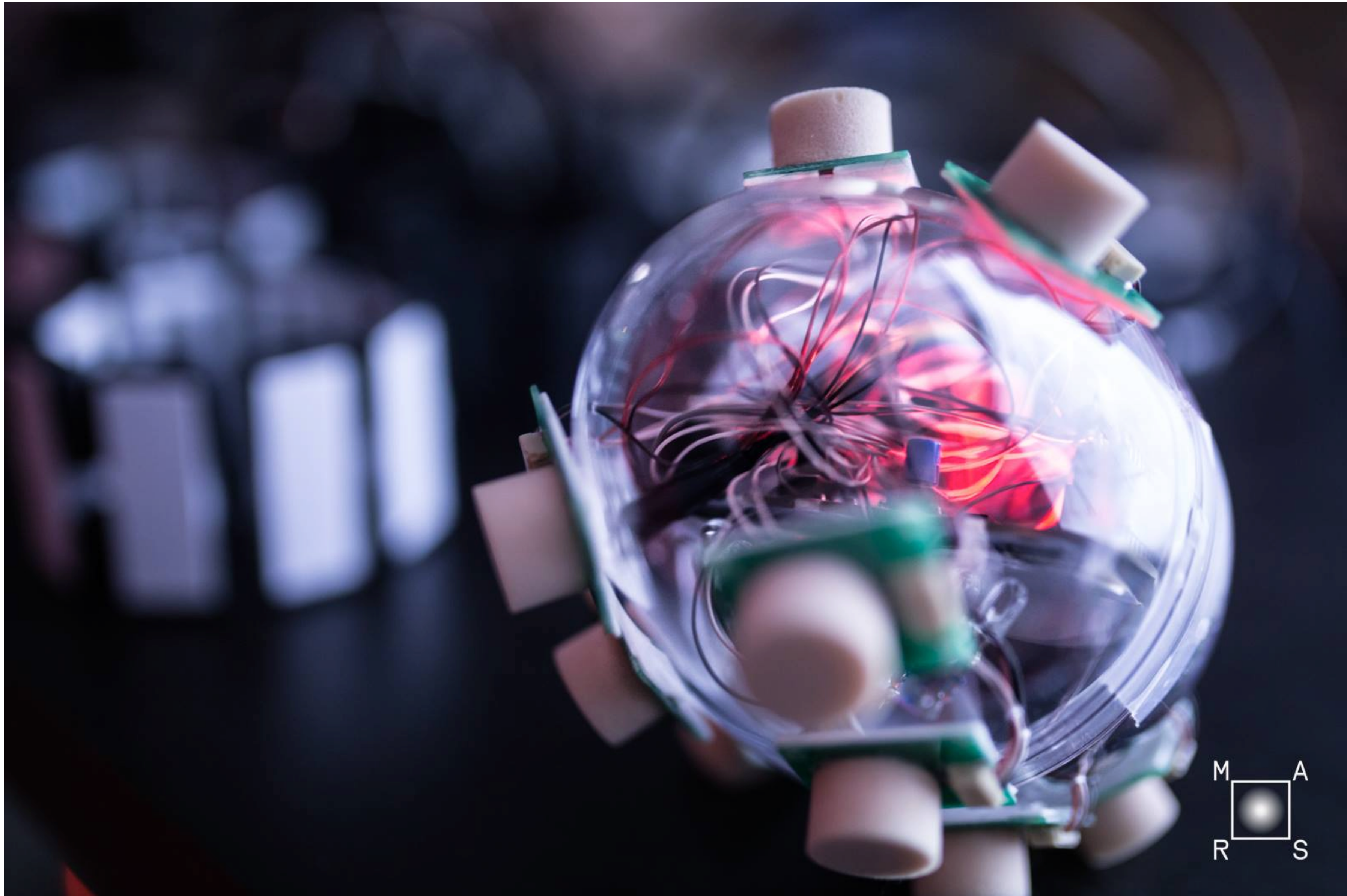


# MRTI2015 (Multi Rubbing Tactile Interface)



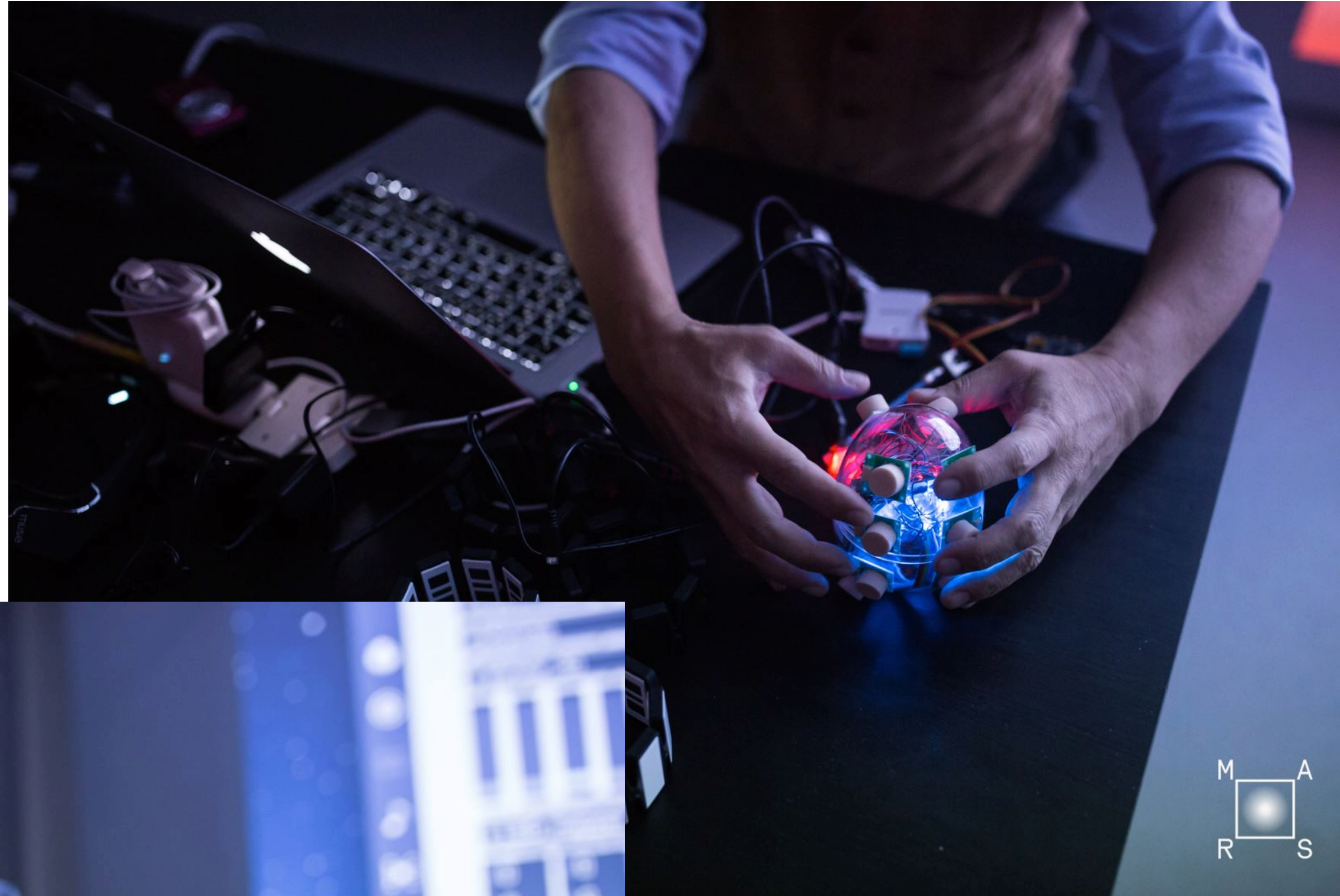


# MRTI2015 (Multi Rubbing Tactile Interface)





# MRTI2015 (Multi Rubbing Tactile Interface)



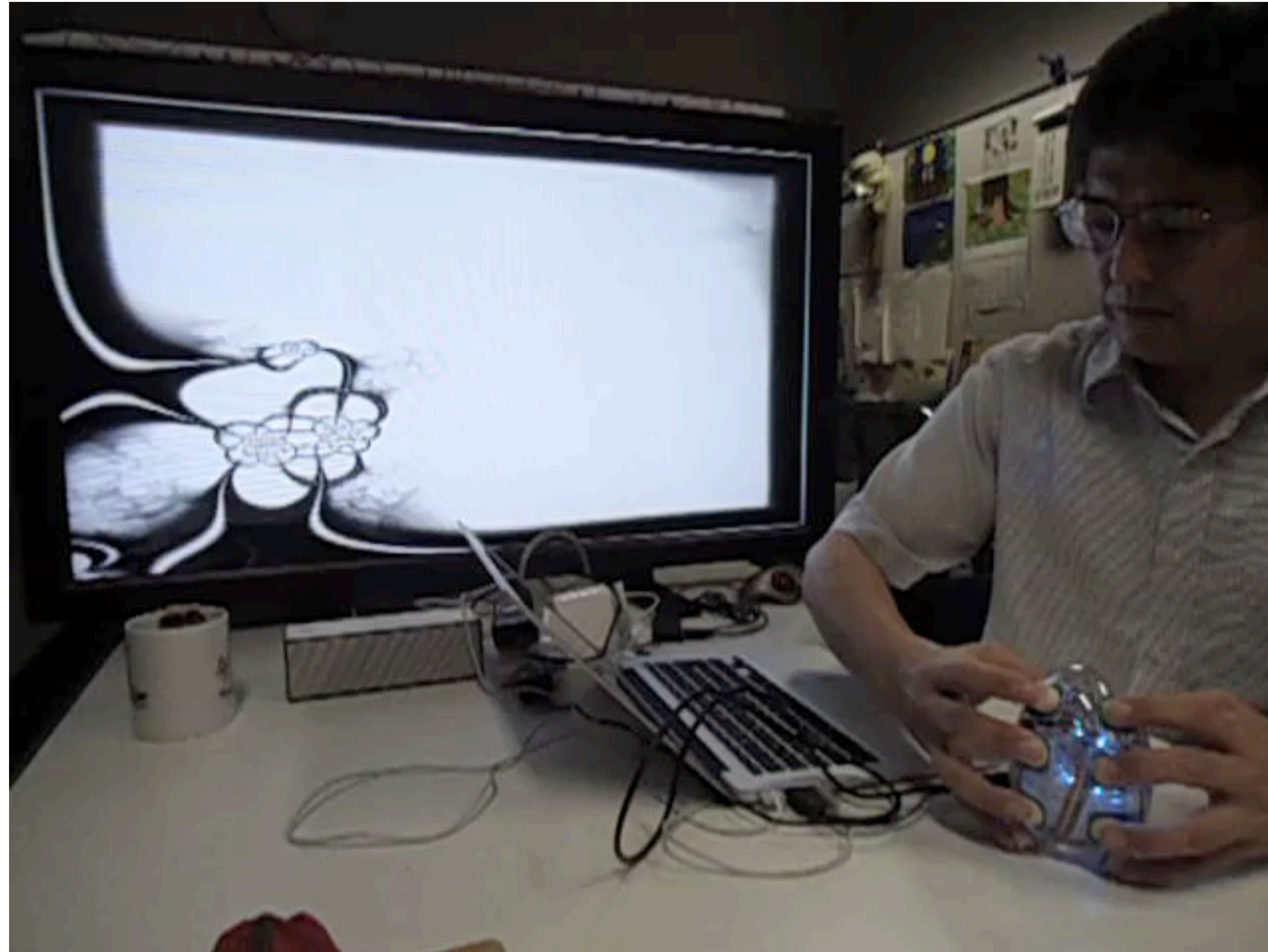


# MRTI2015 (Multi Rubbing Tactile Interface)





# MRTI2015 (Multi Rubbing Tactile Interface)



DEMO!

movie

MRTI2015.mp4

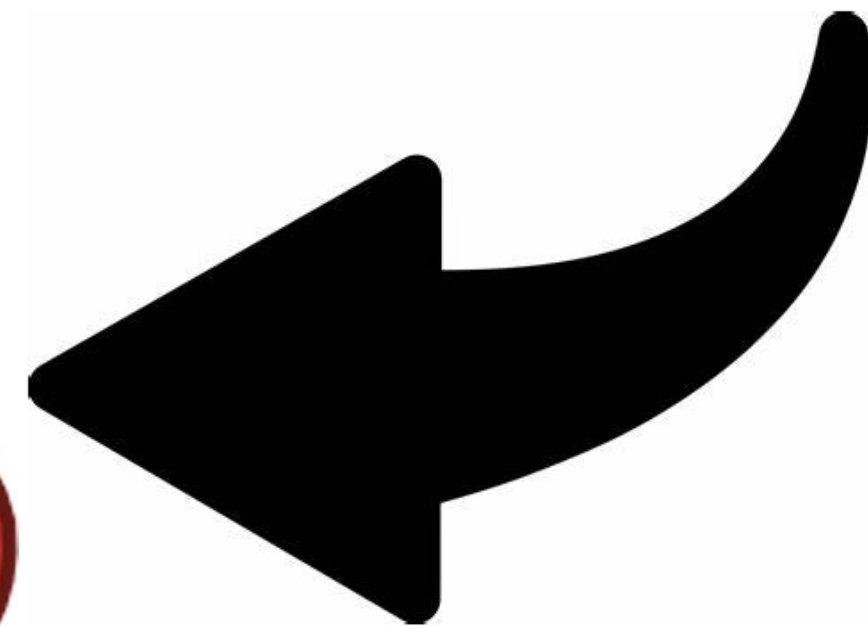
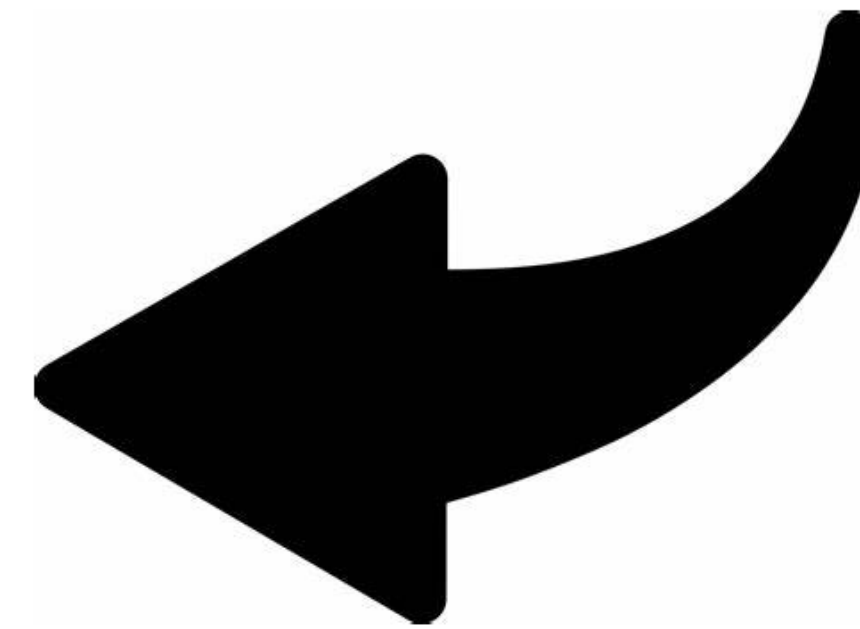


# Tactile Interaction

Smile (Emotion)

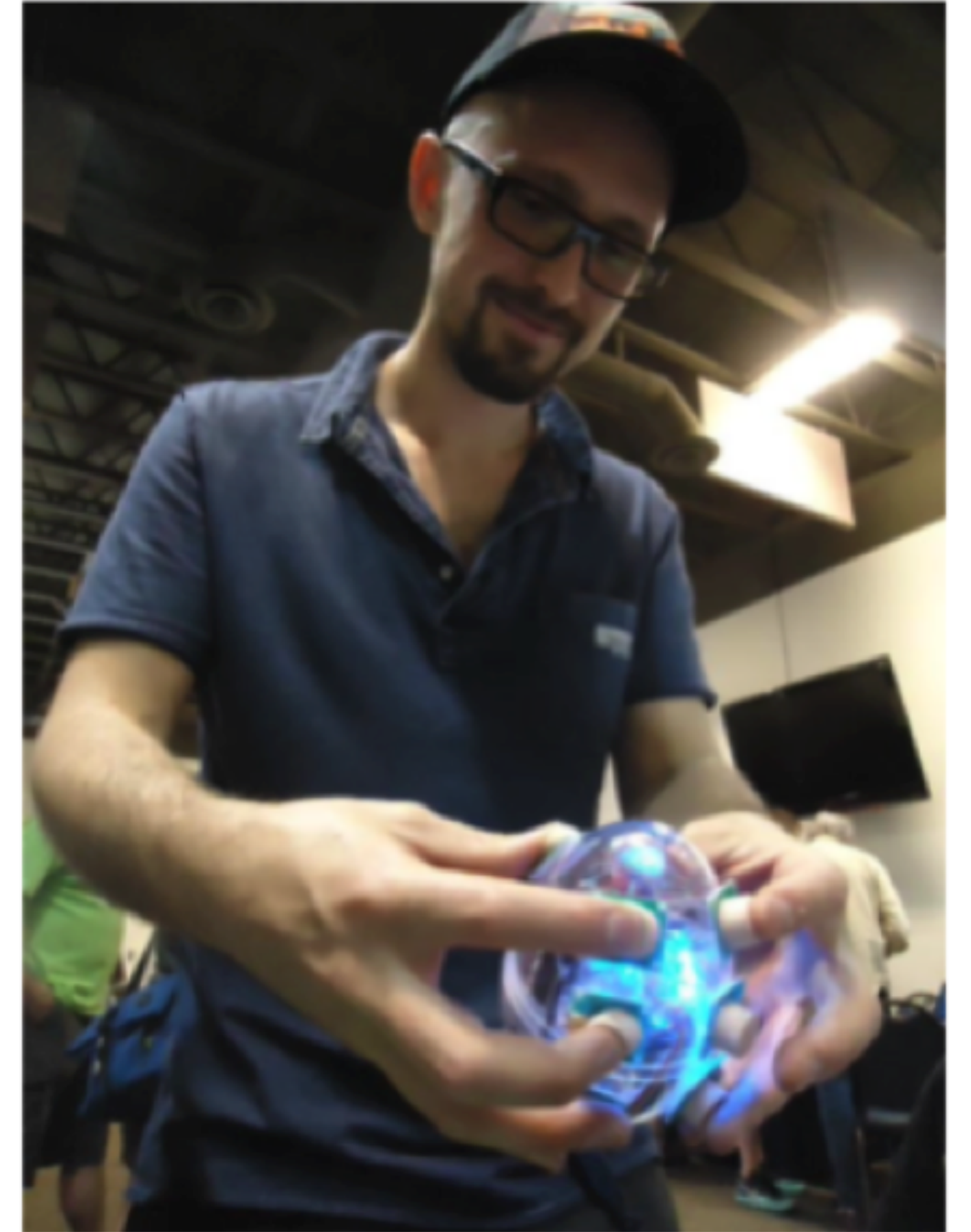


Wellness





# Sketching2015(Arizona)



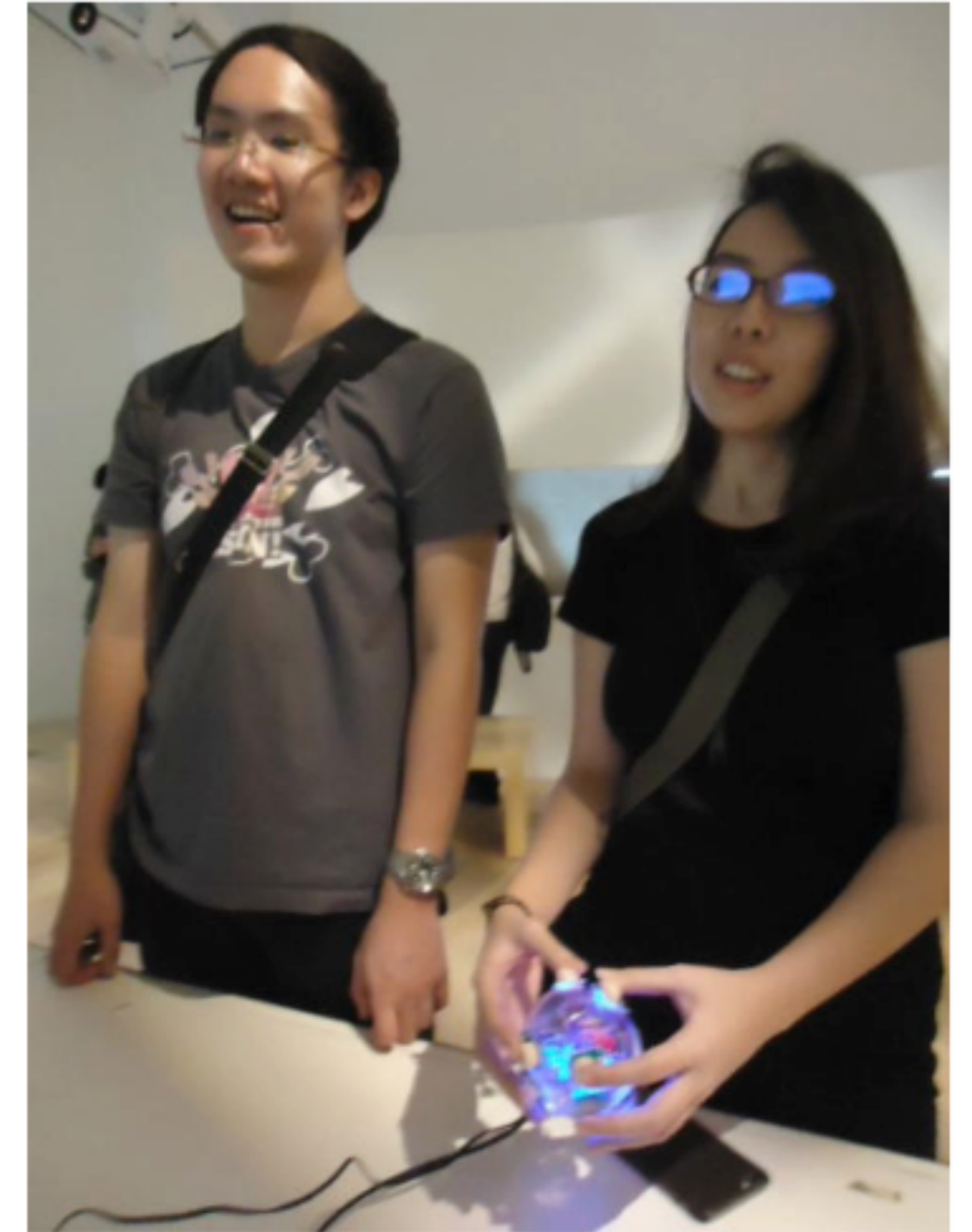


# Sketching2015(Arizona)





# Singapore Science Museum 2015



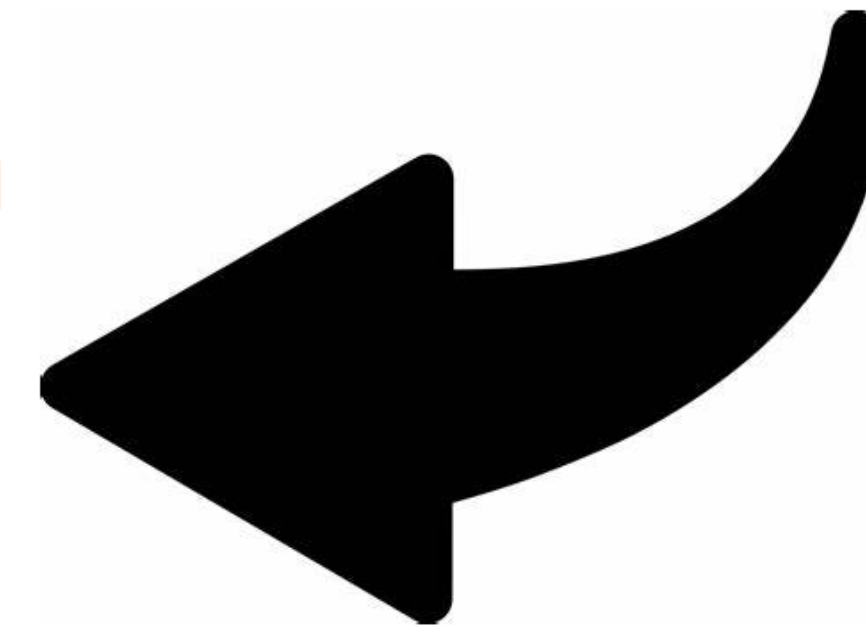


# Tactile Interaction

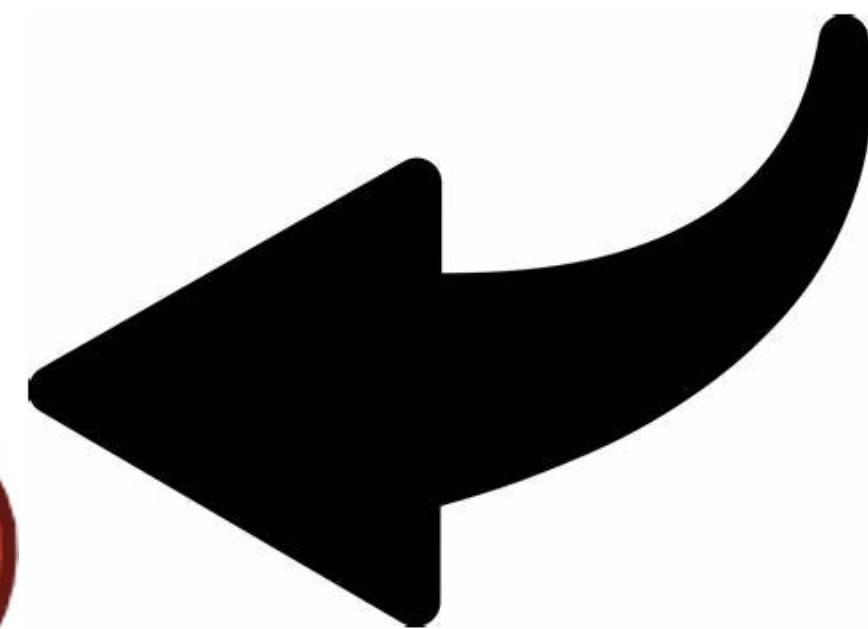
Smile (Emotion)



Wellness

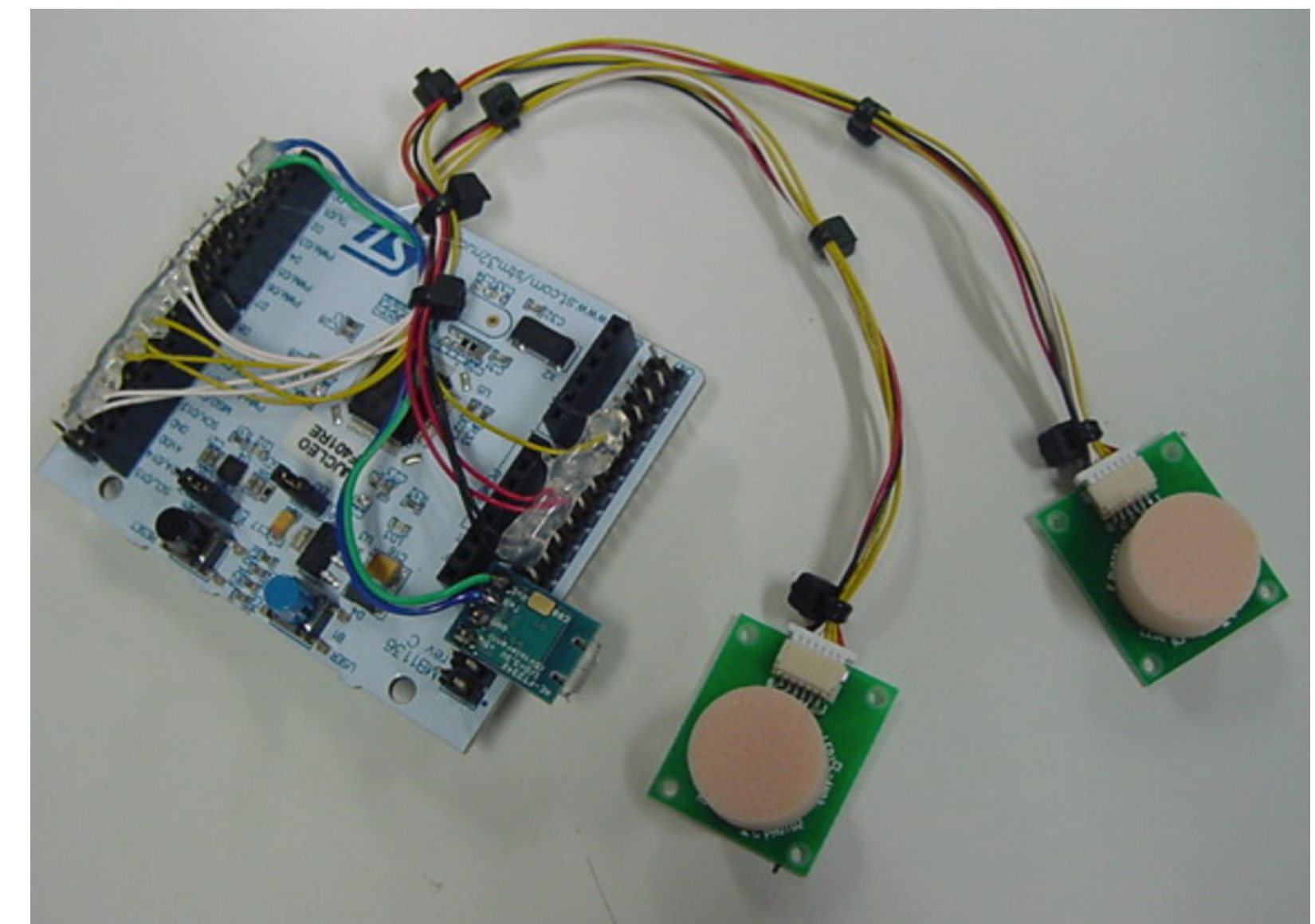
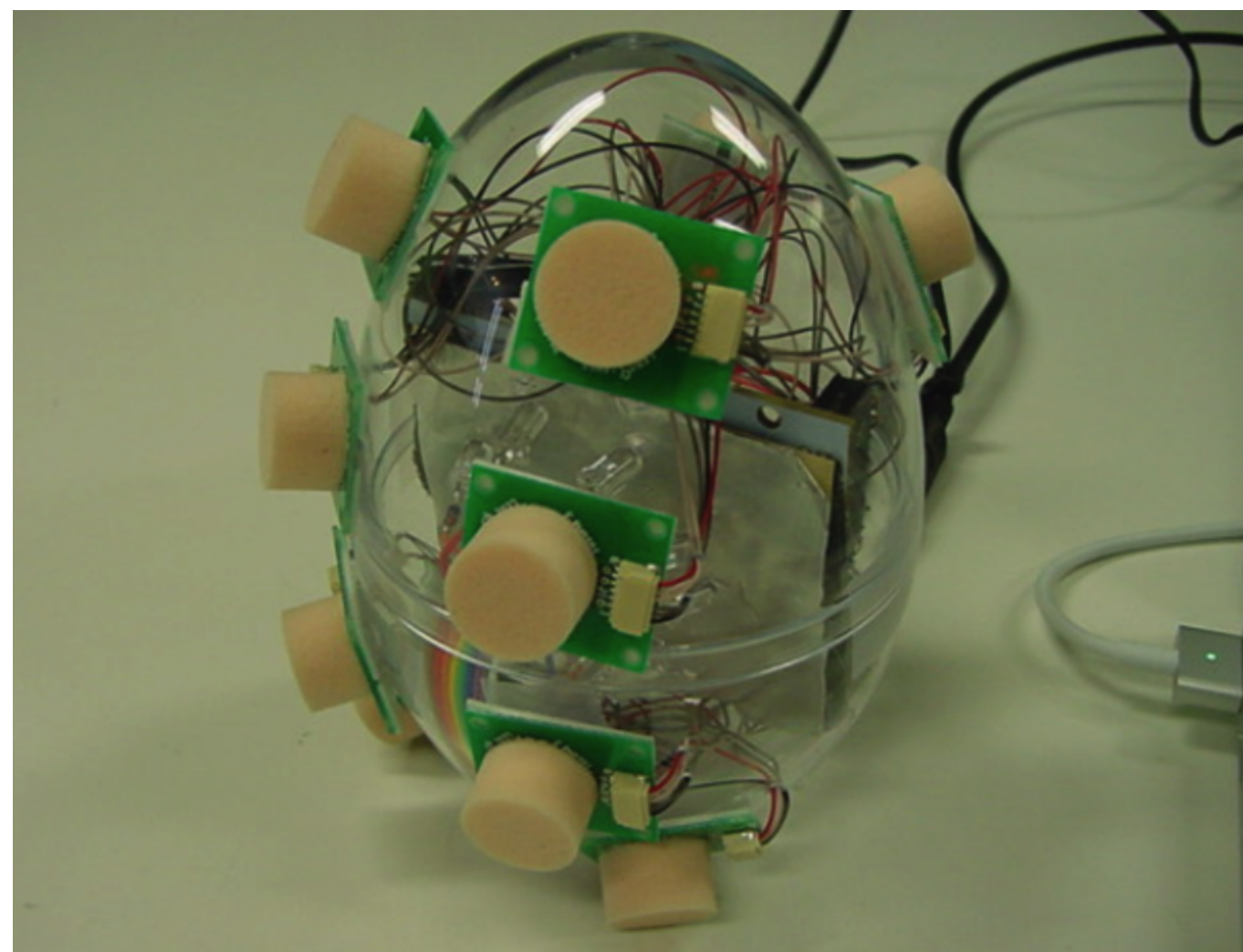
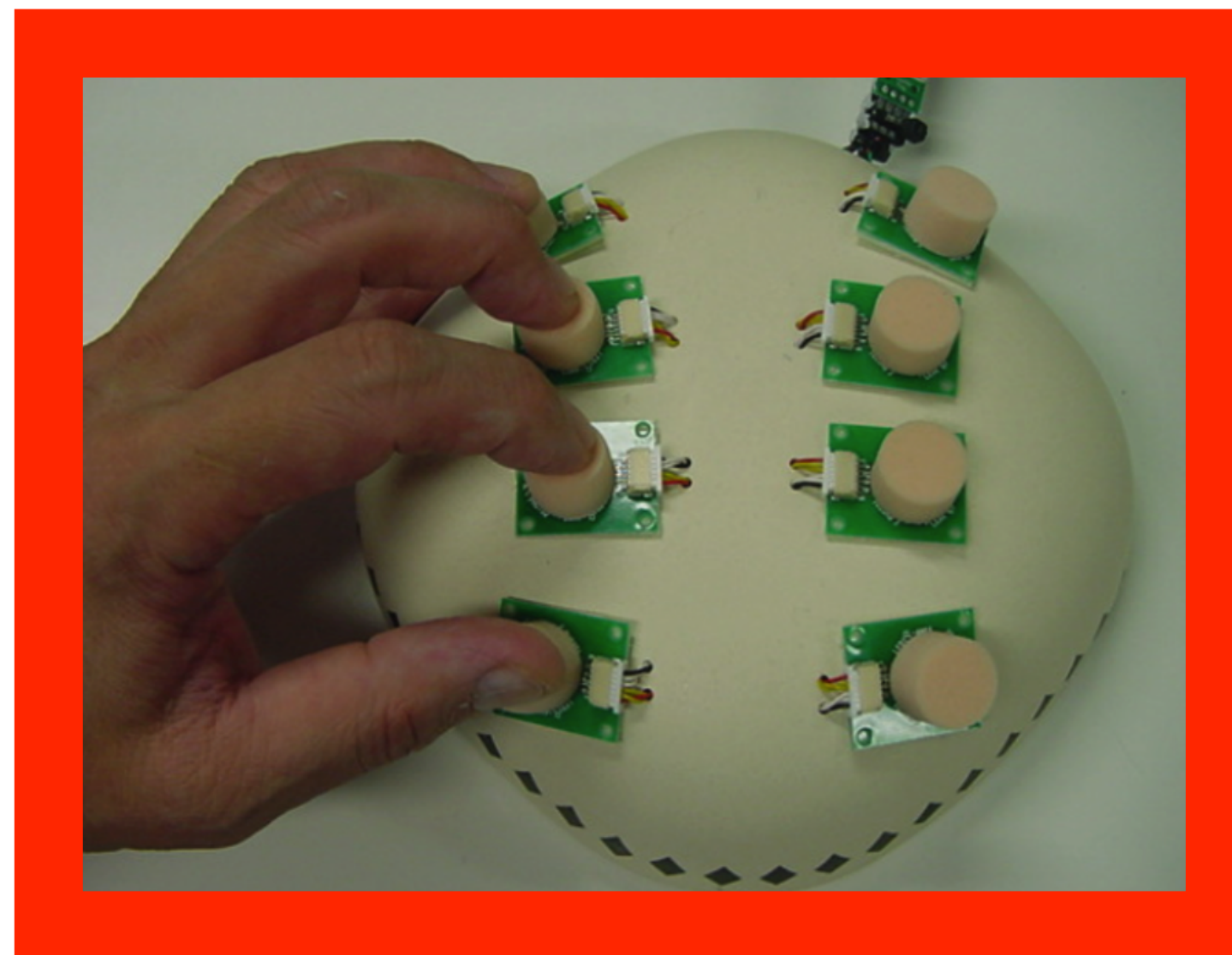
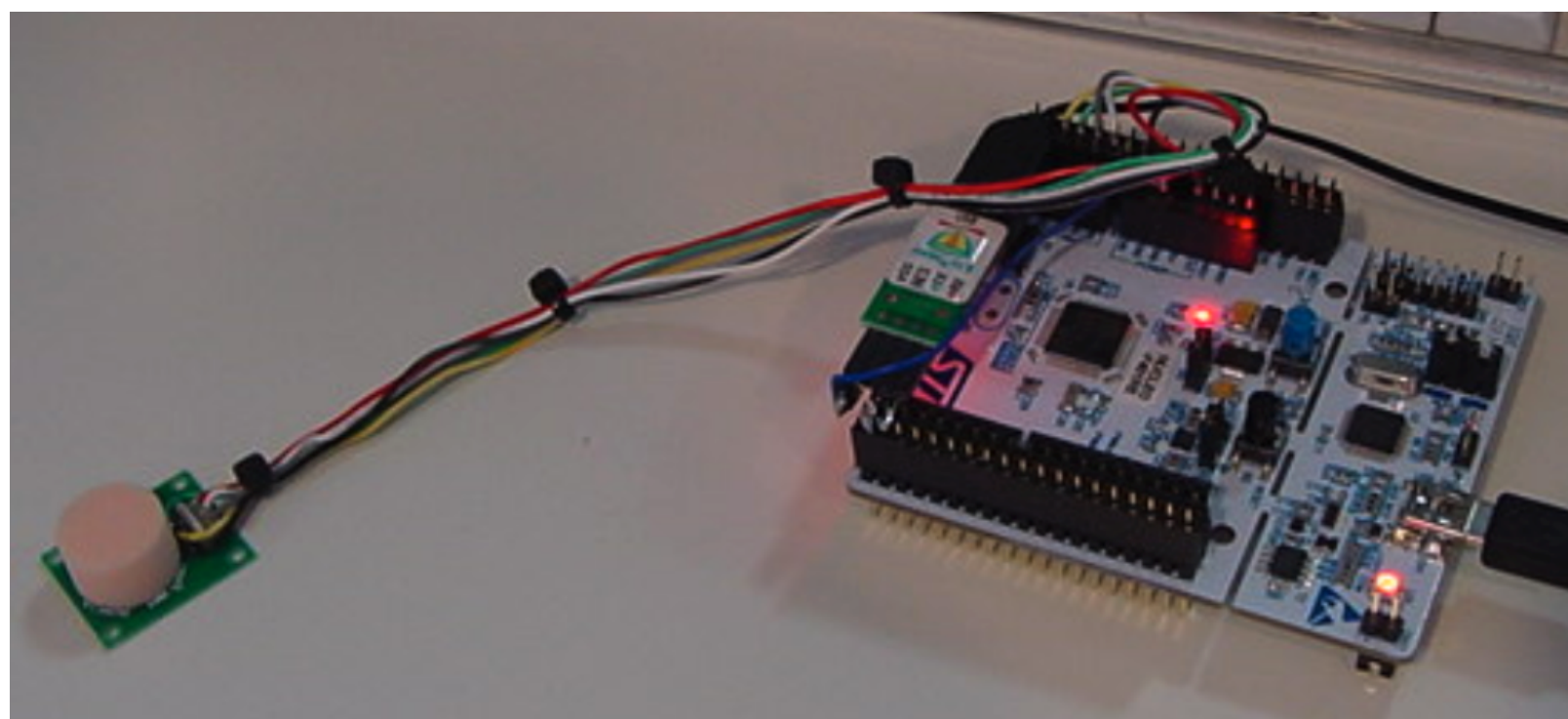


Interoception



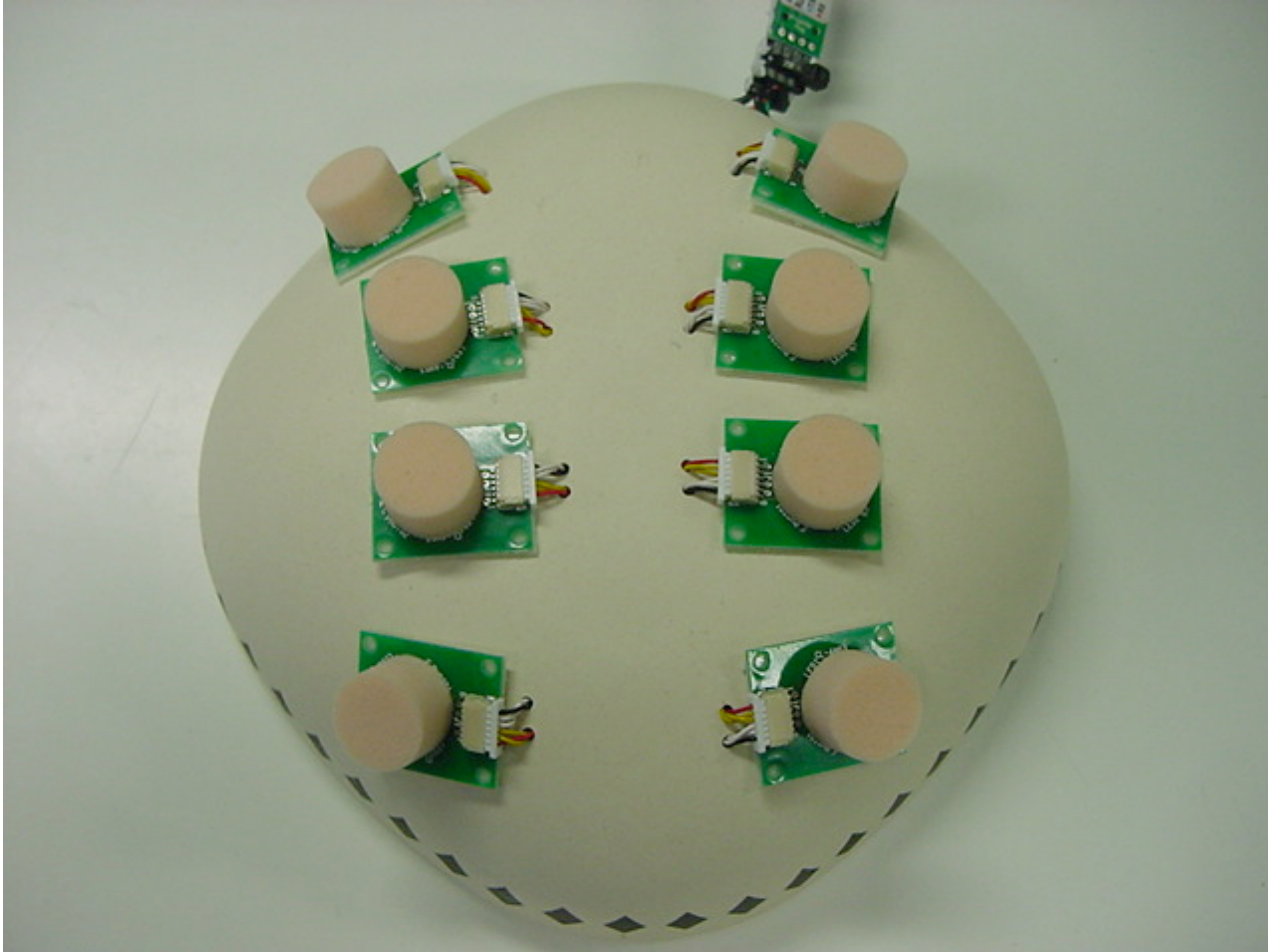


I have developed four generations system with this unique sensor.



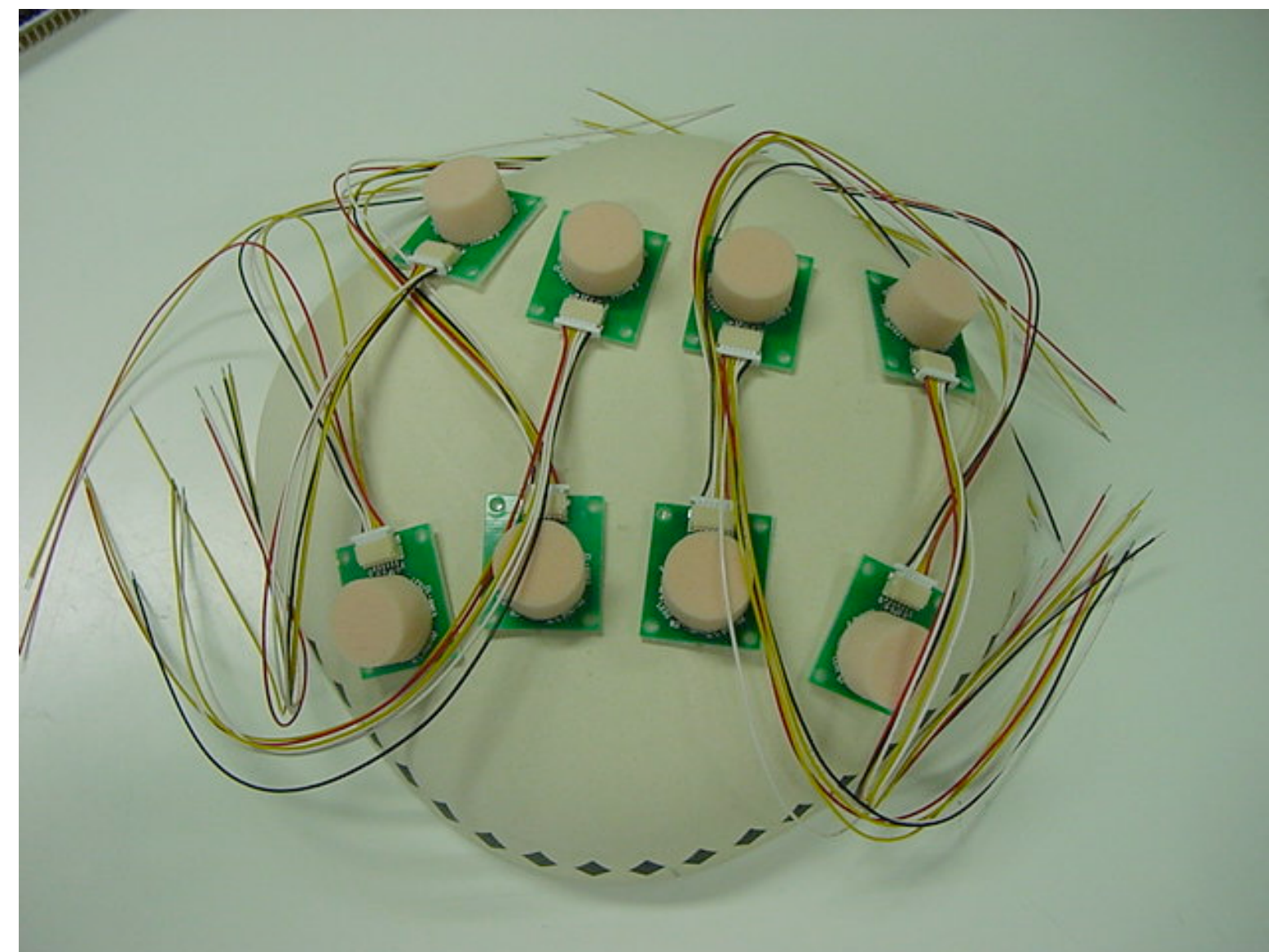
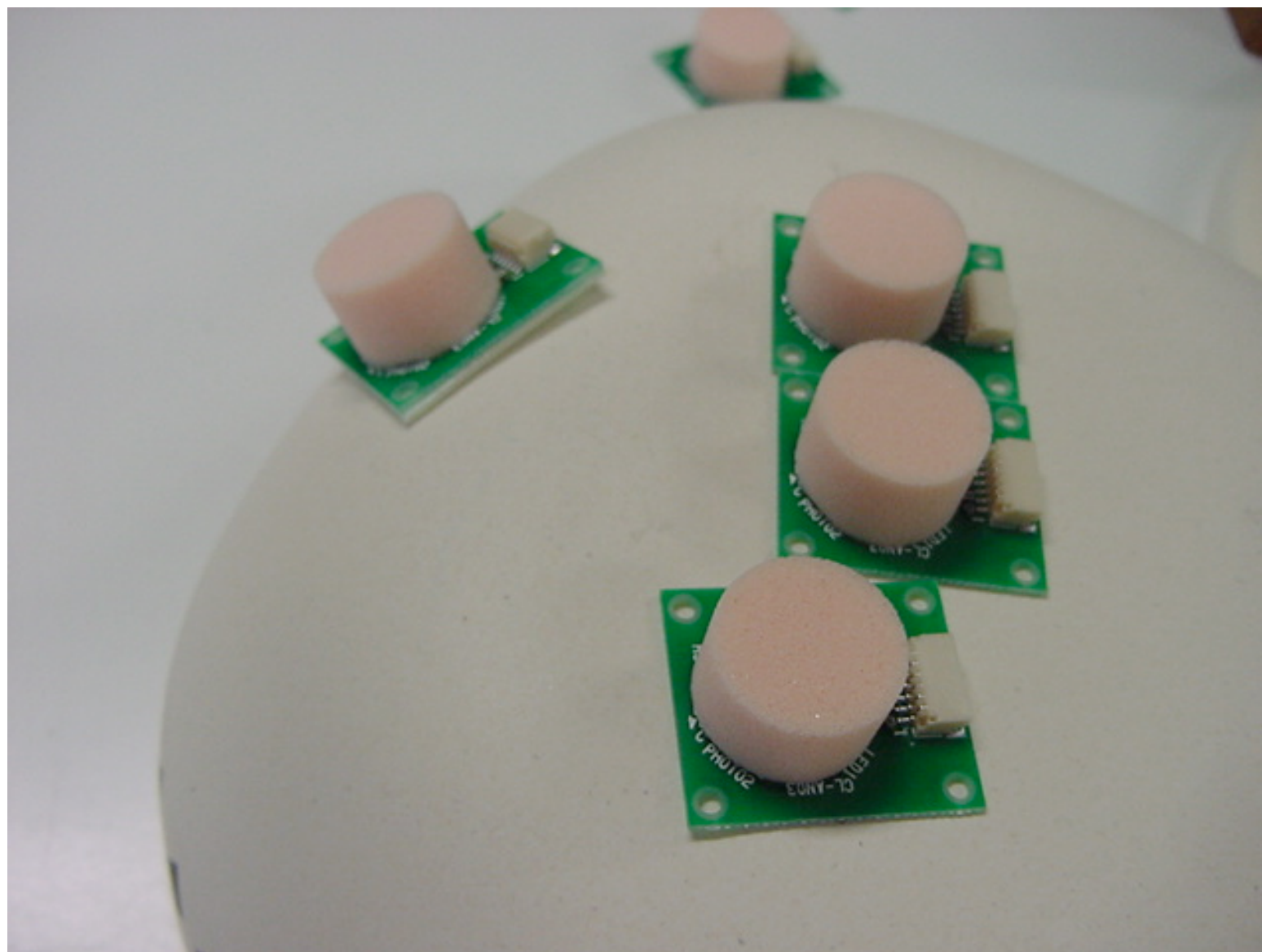
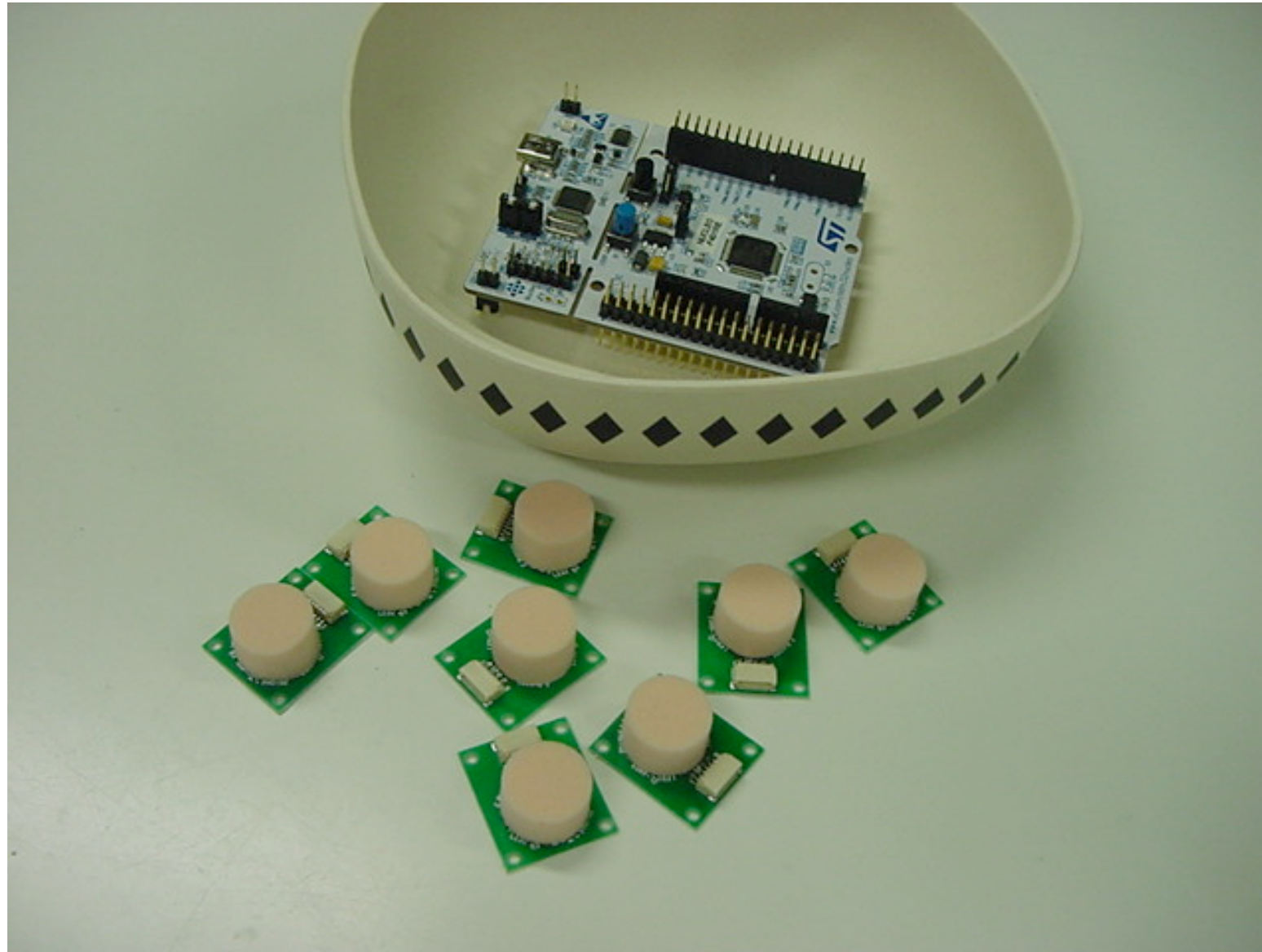


# PAW-eight



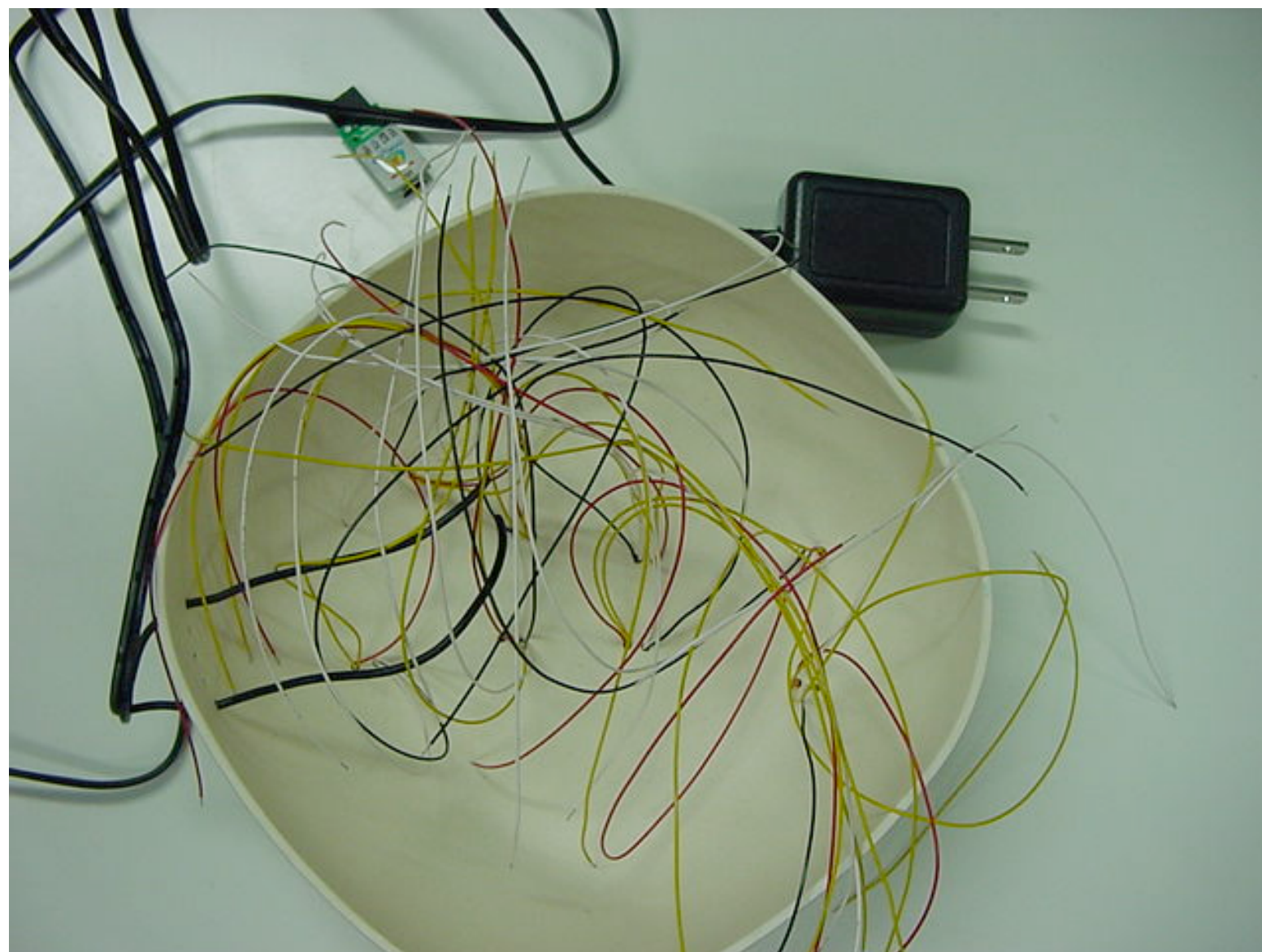
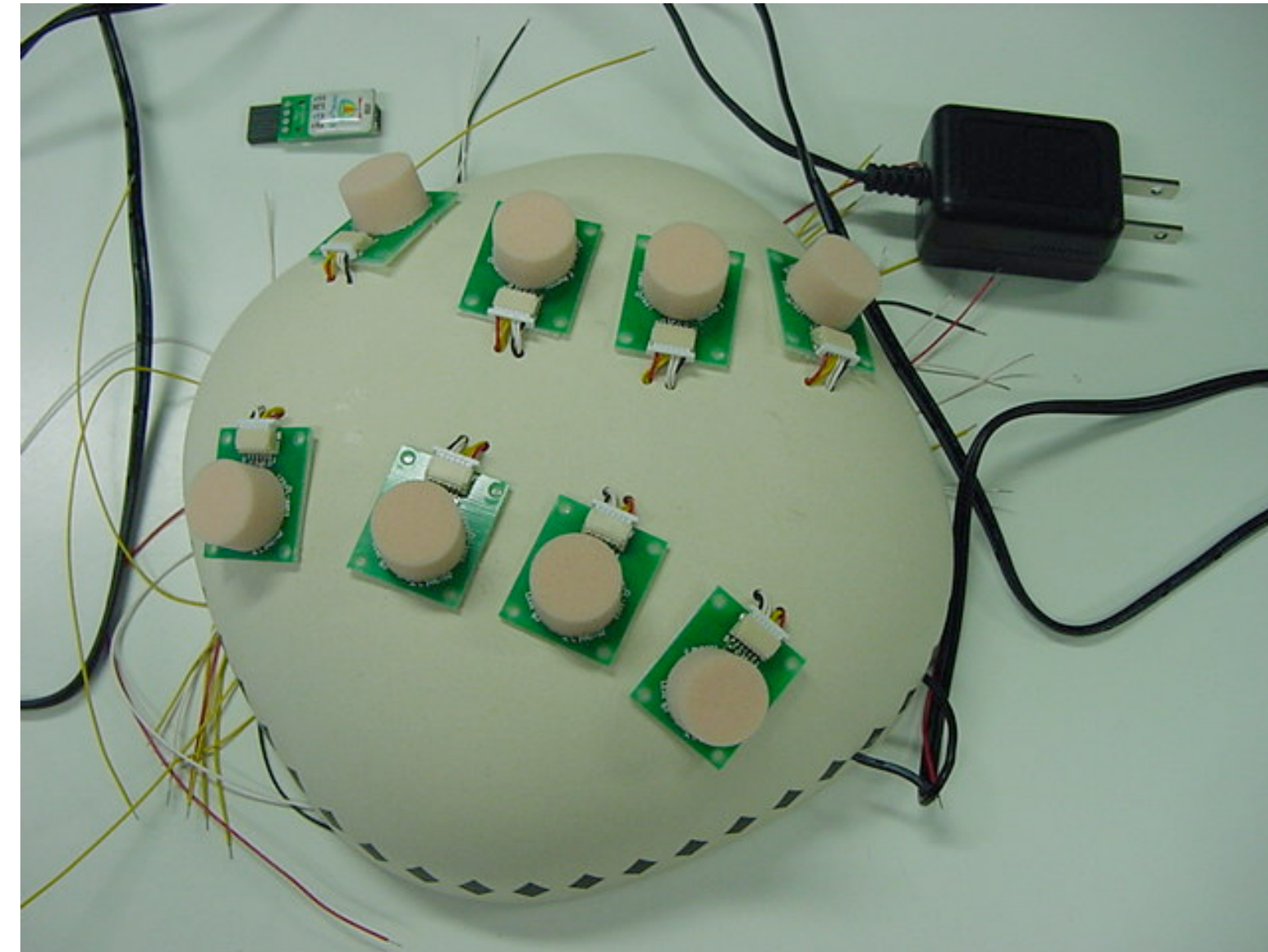
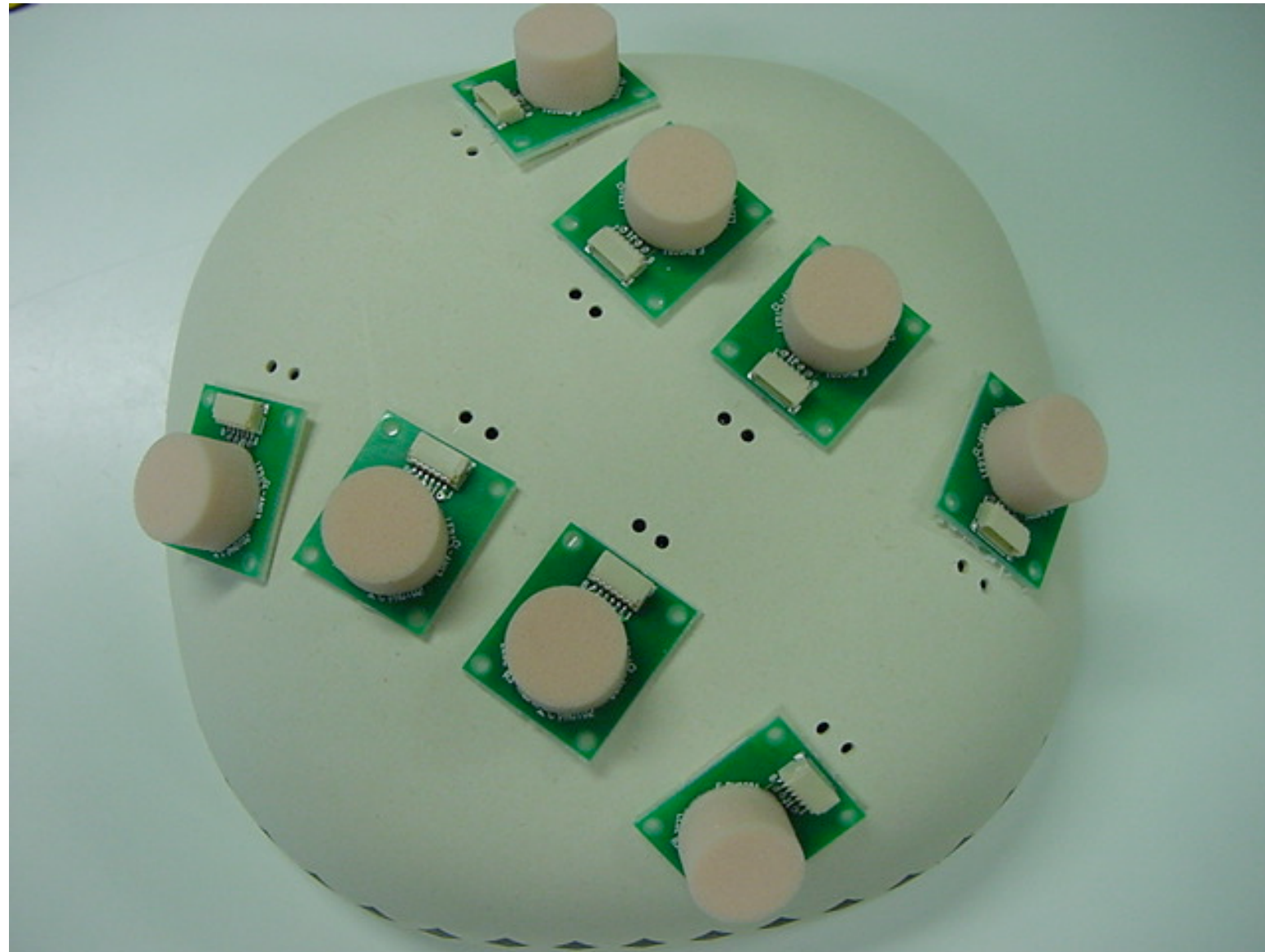


# PAW-eight



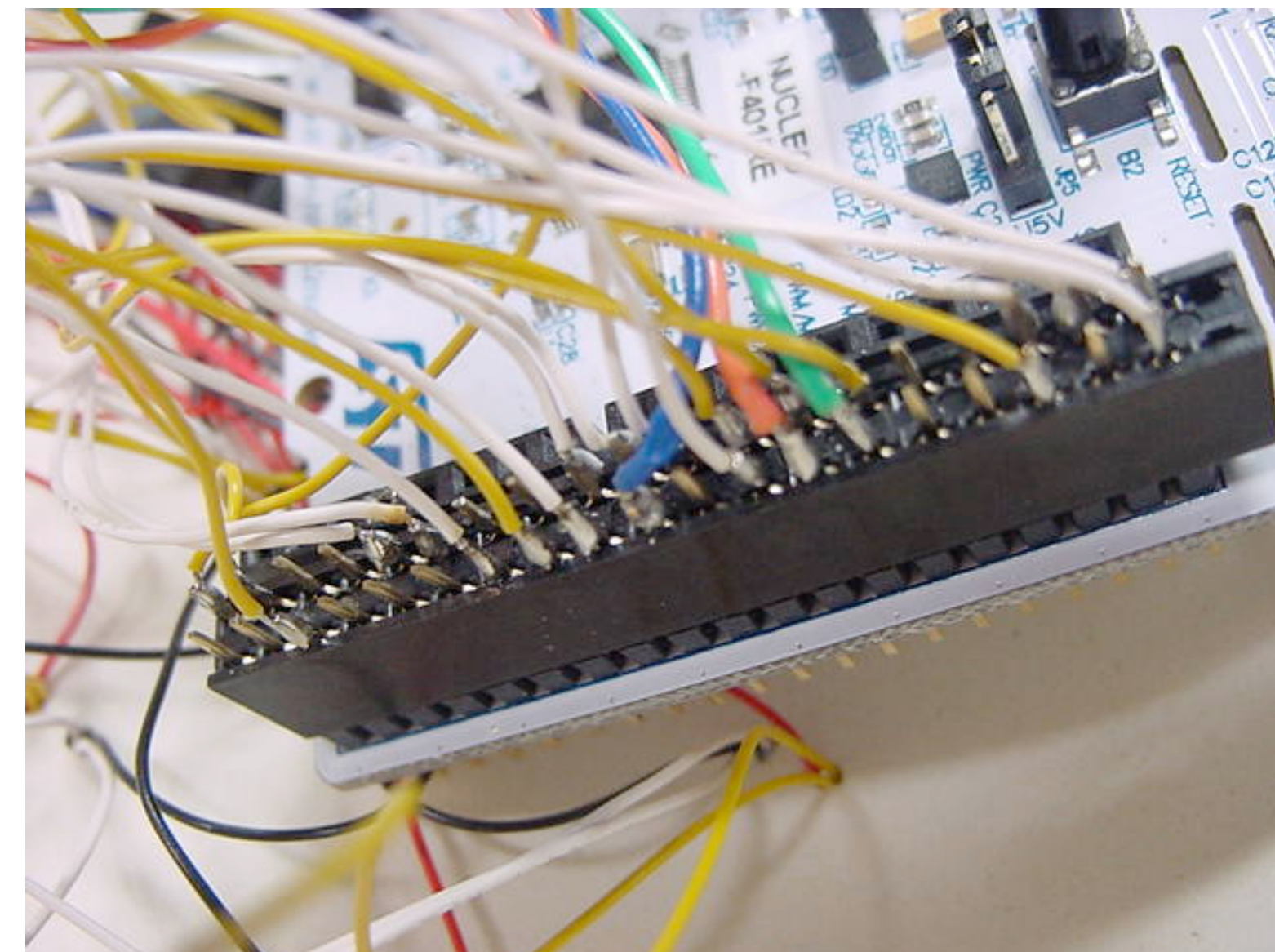
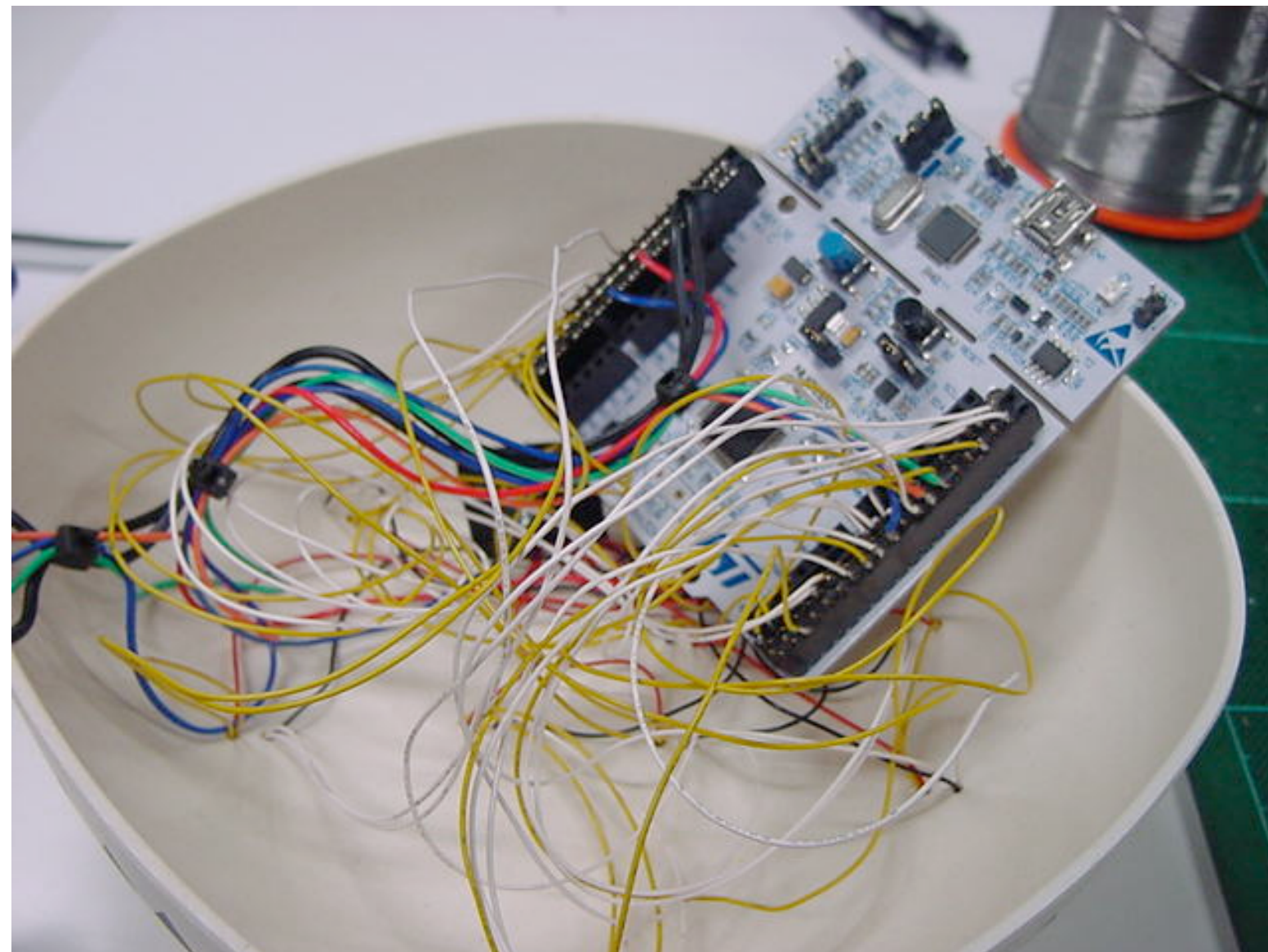
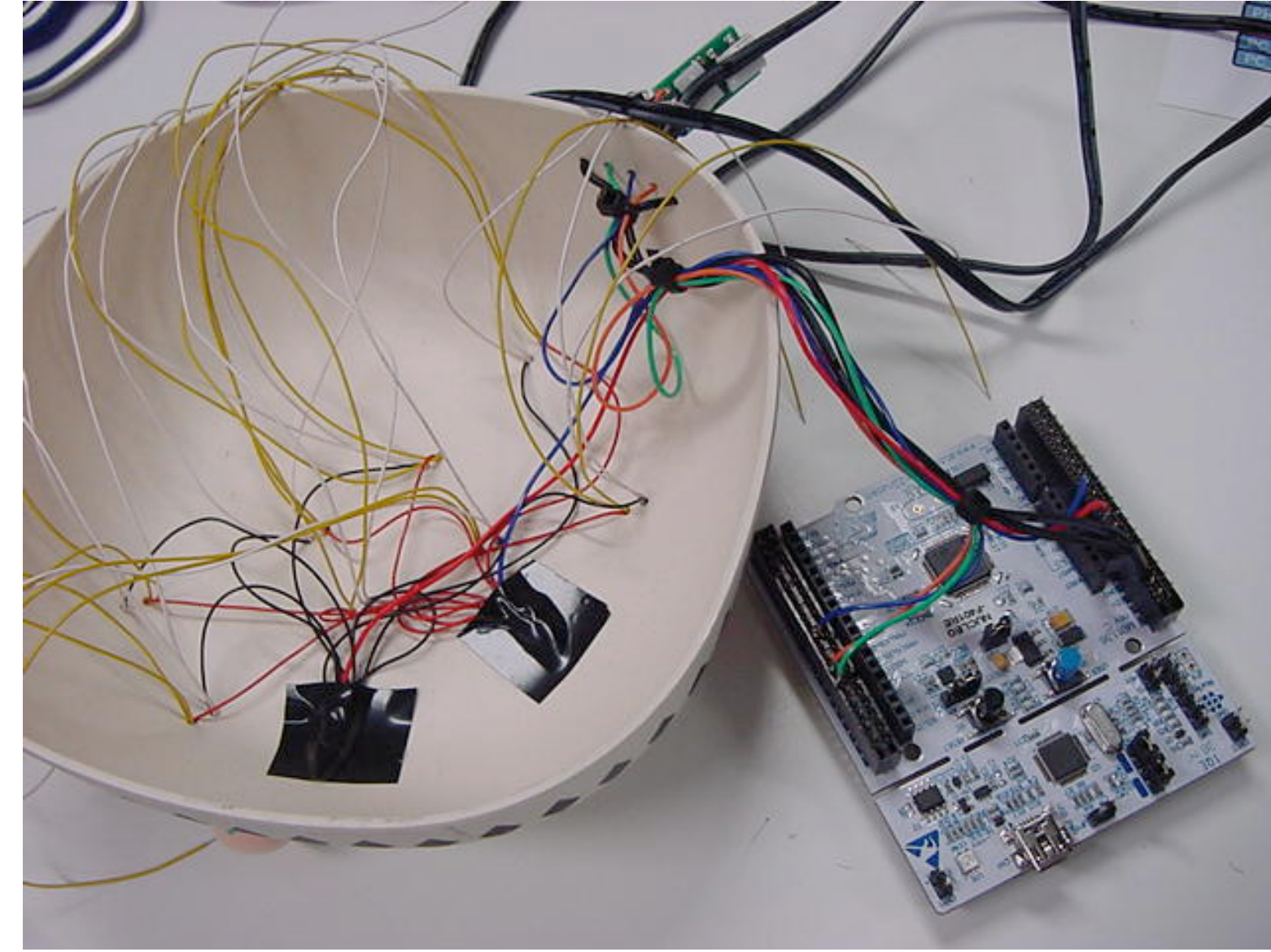
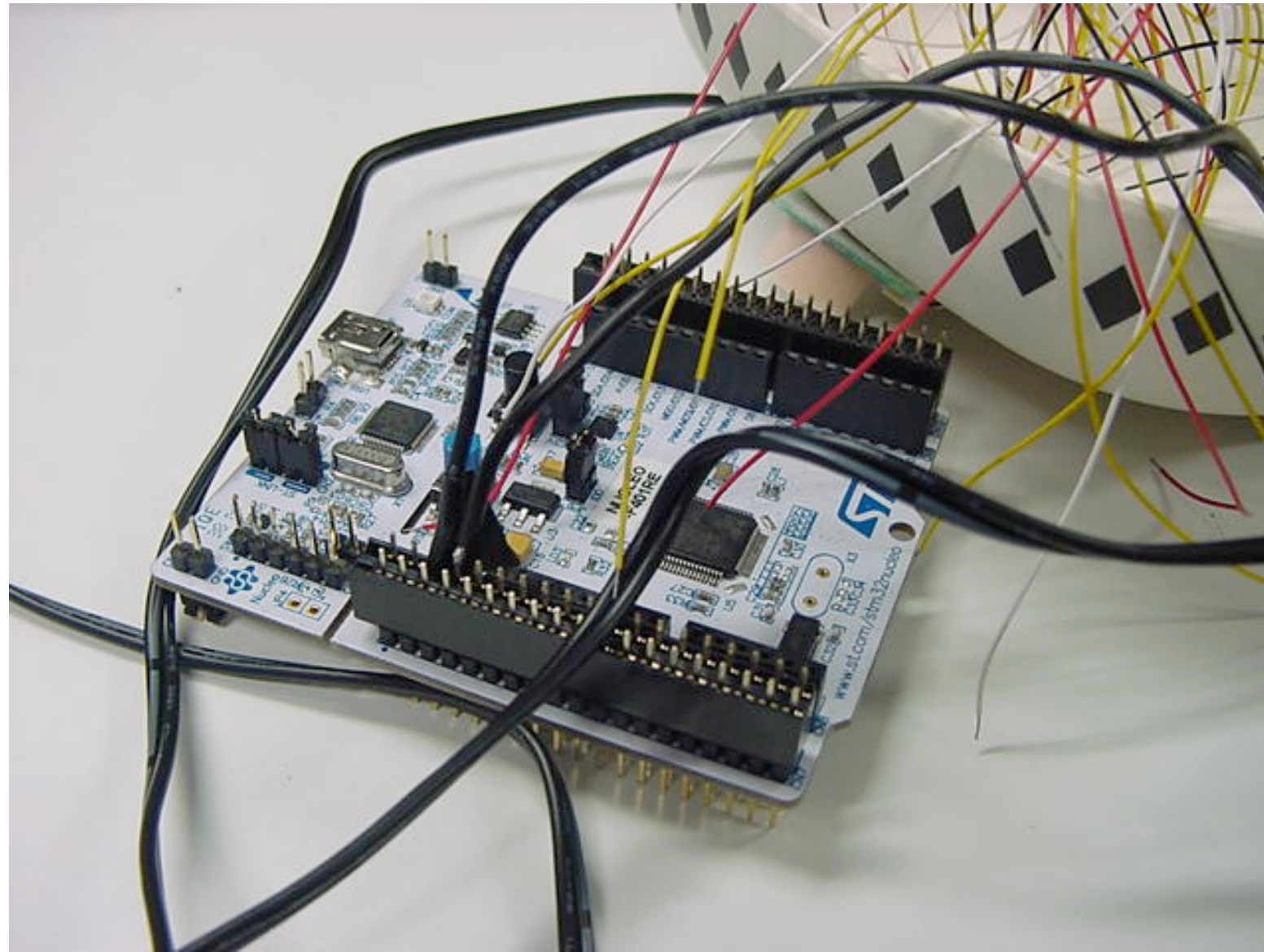


# PAW-eight



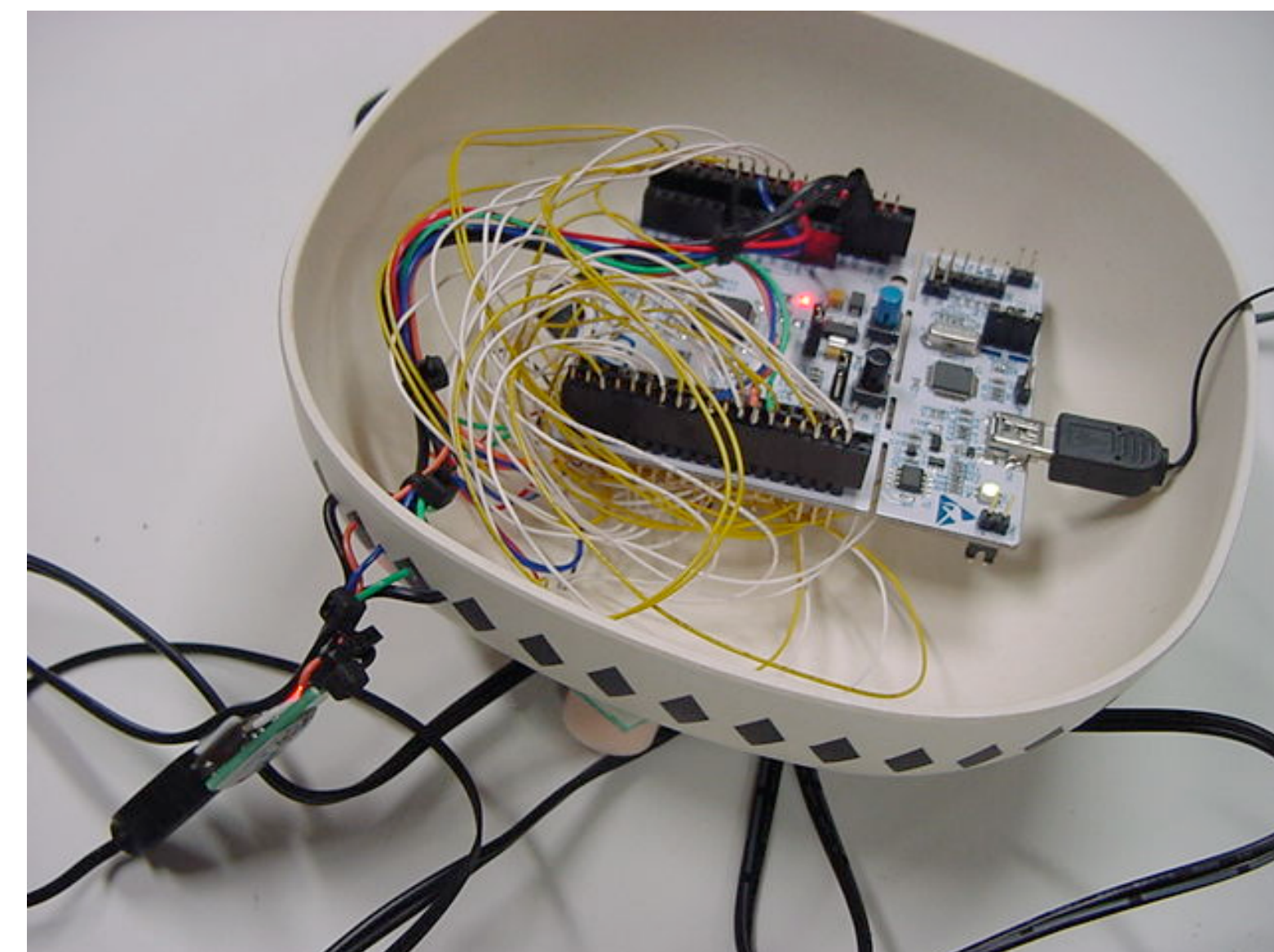
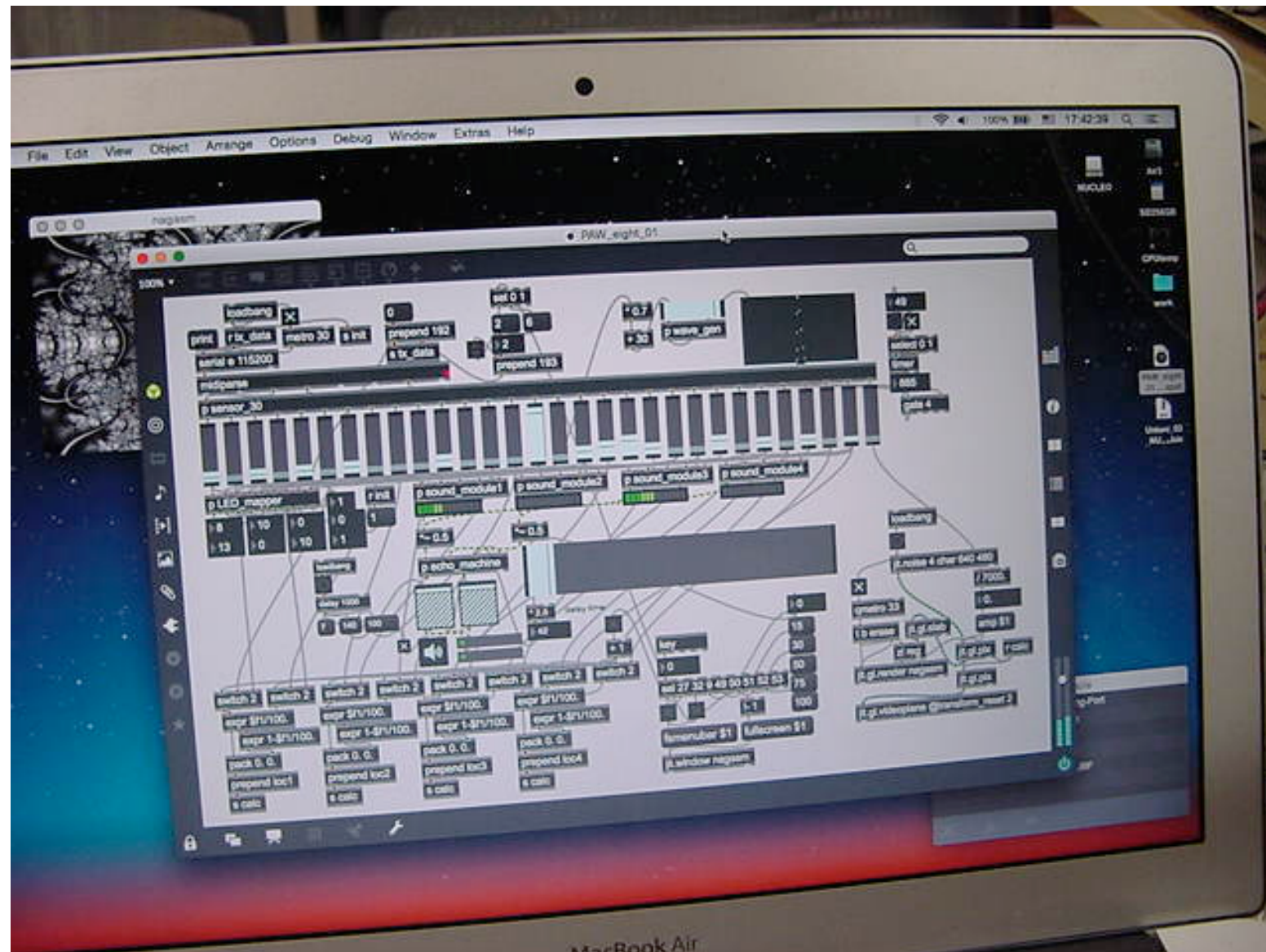
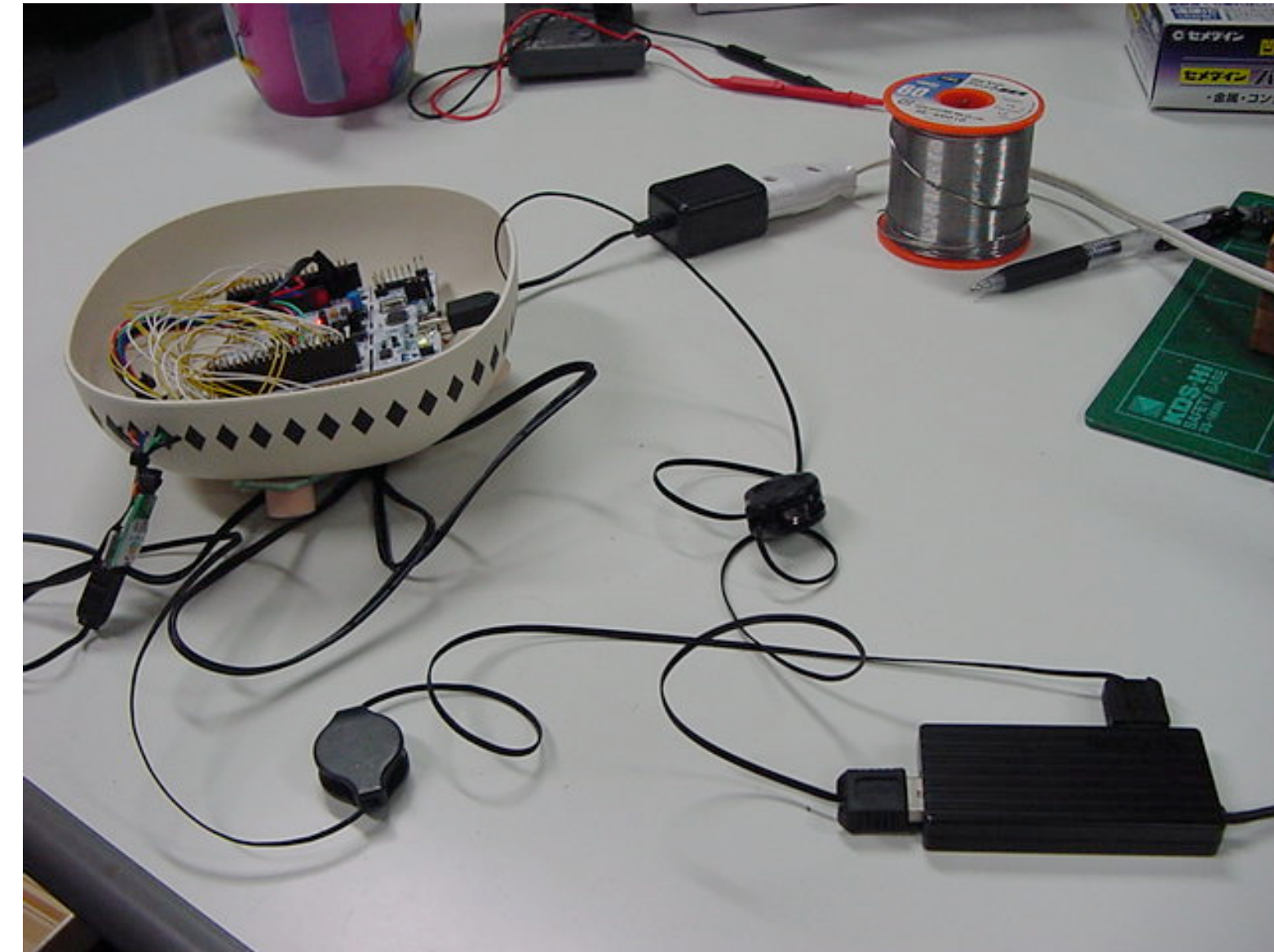
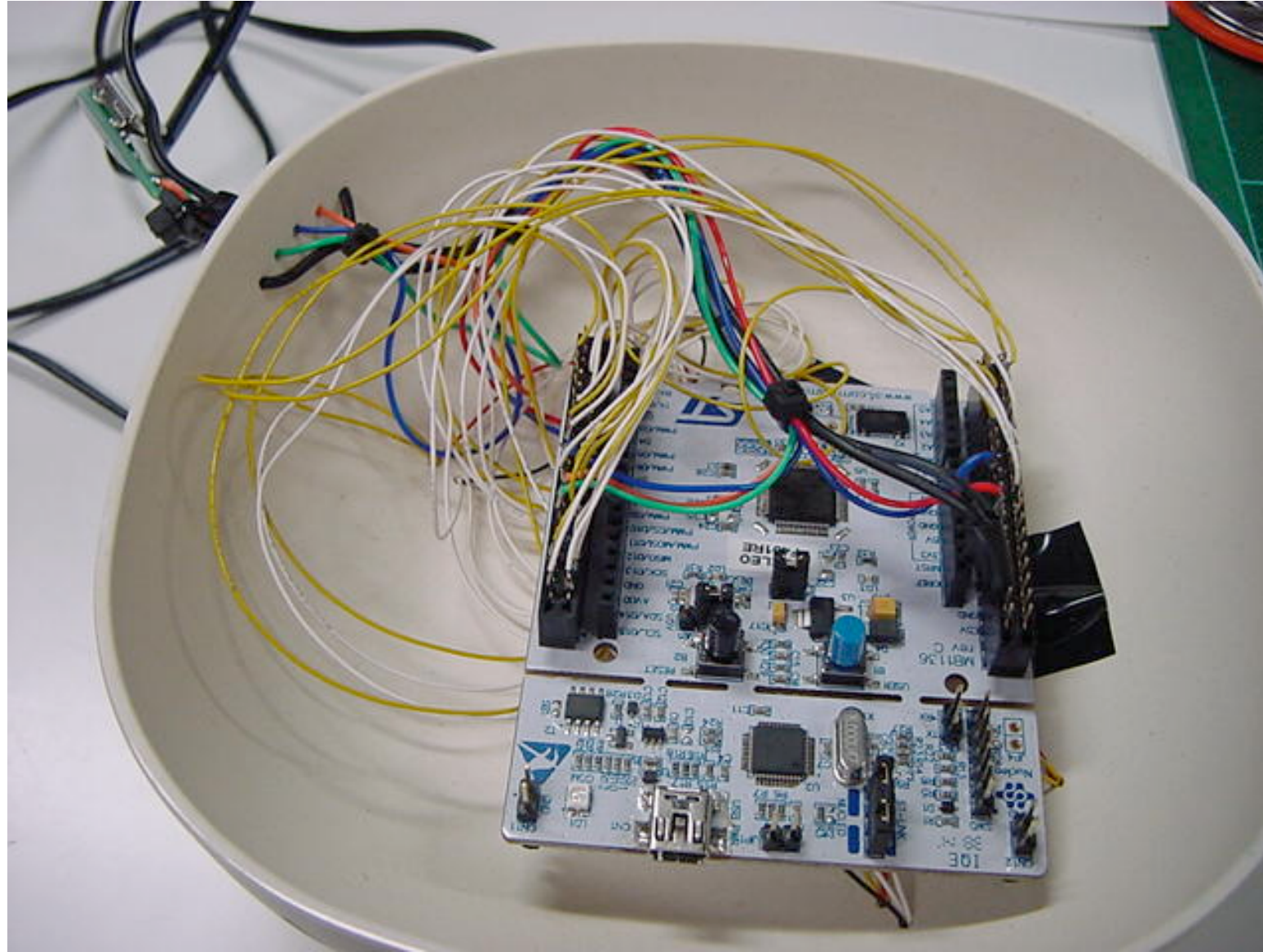


# PAW-eight



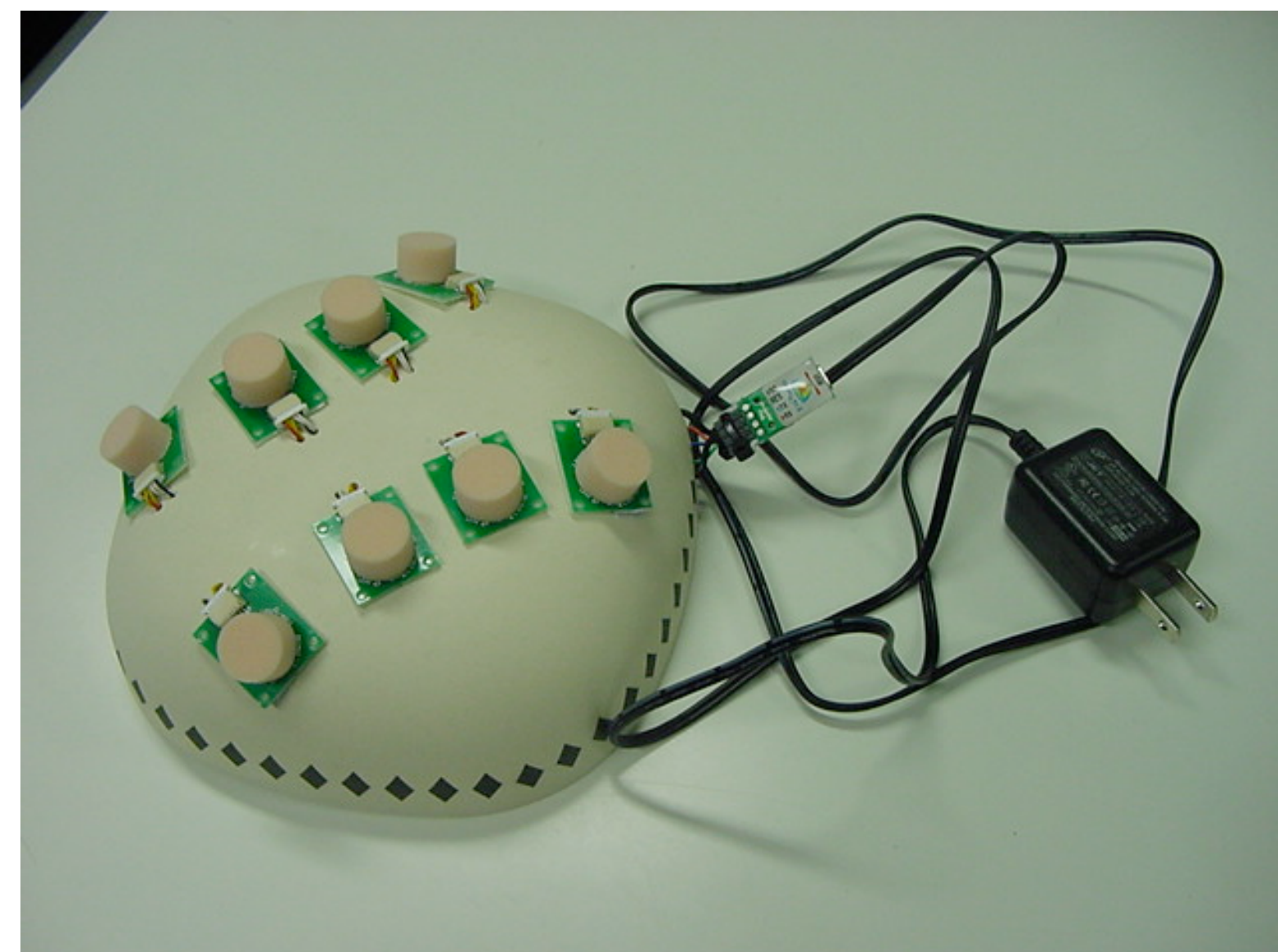
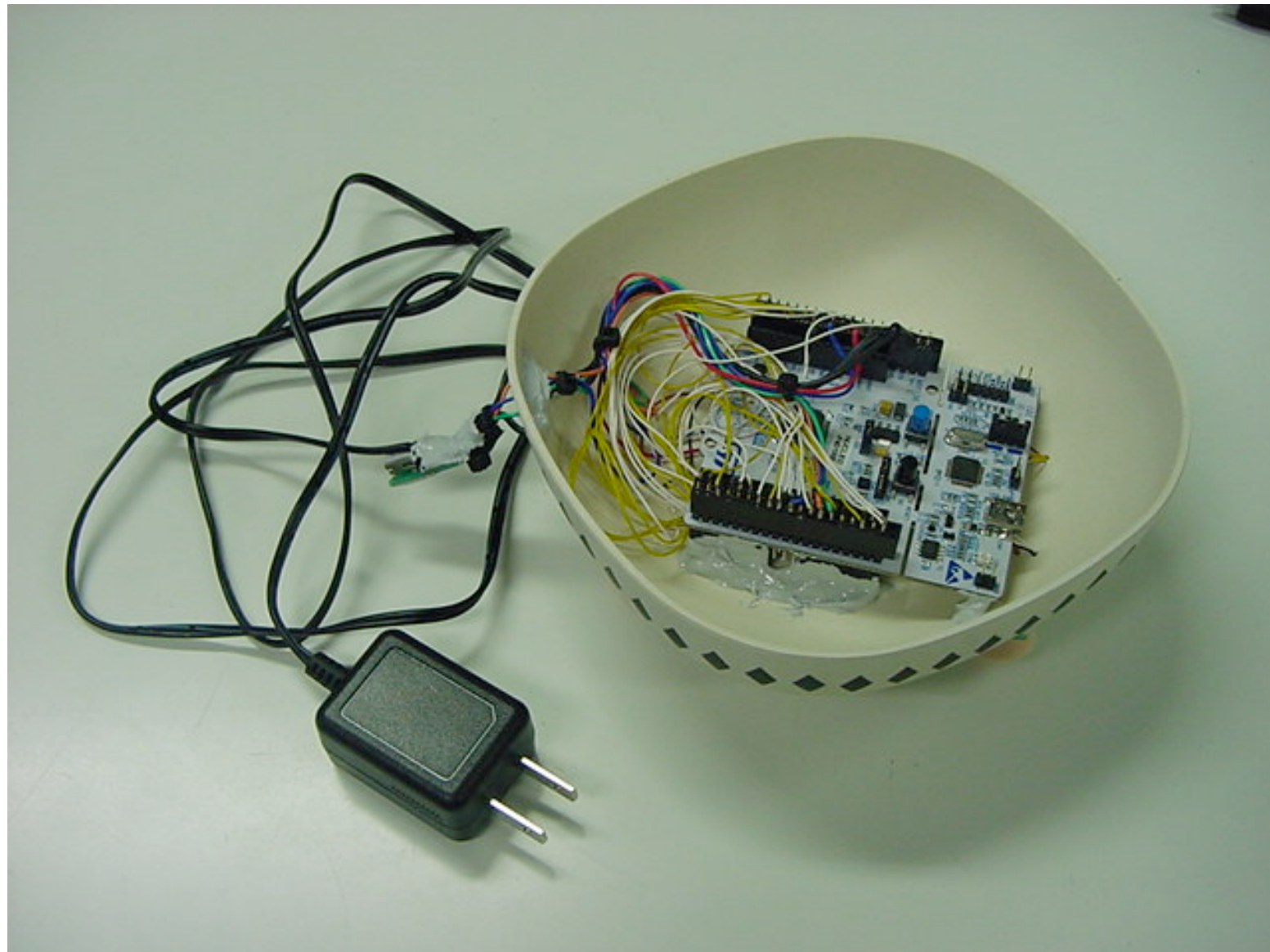
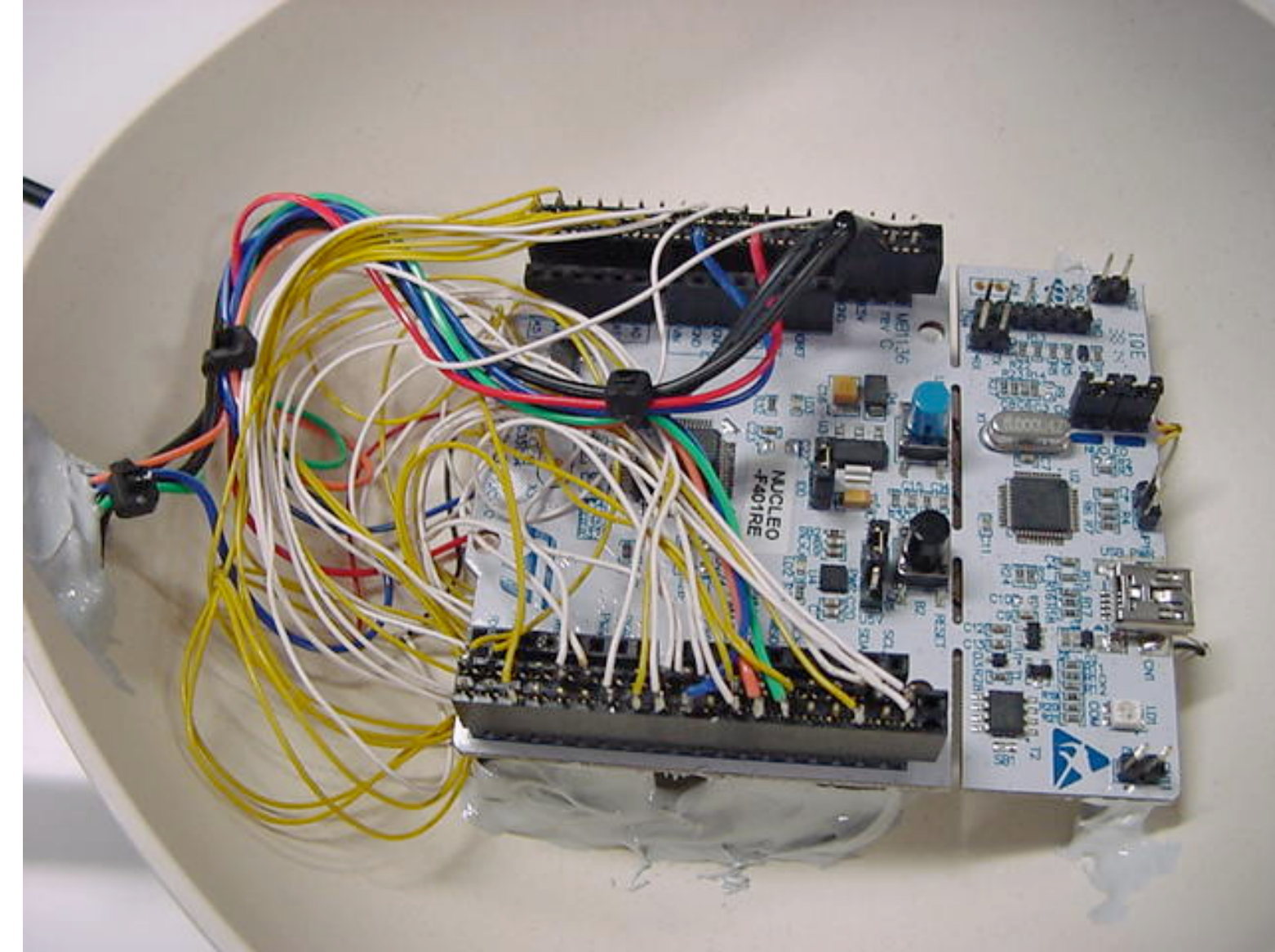
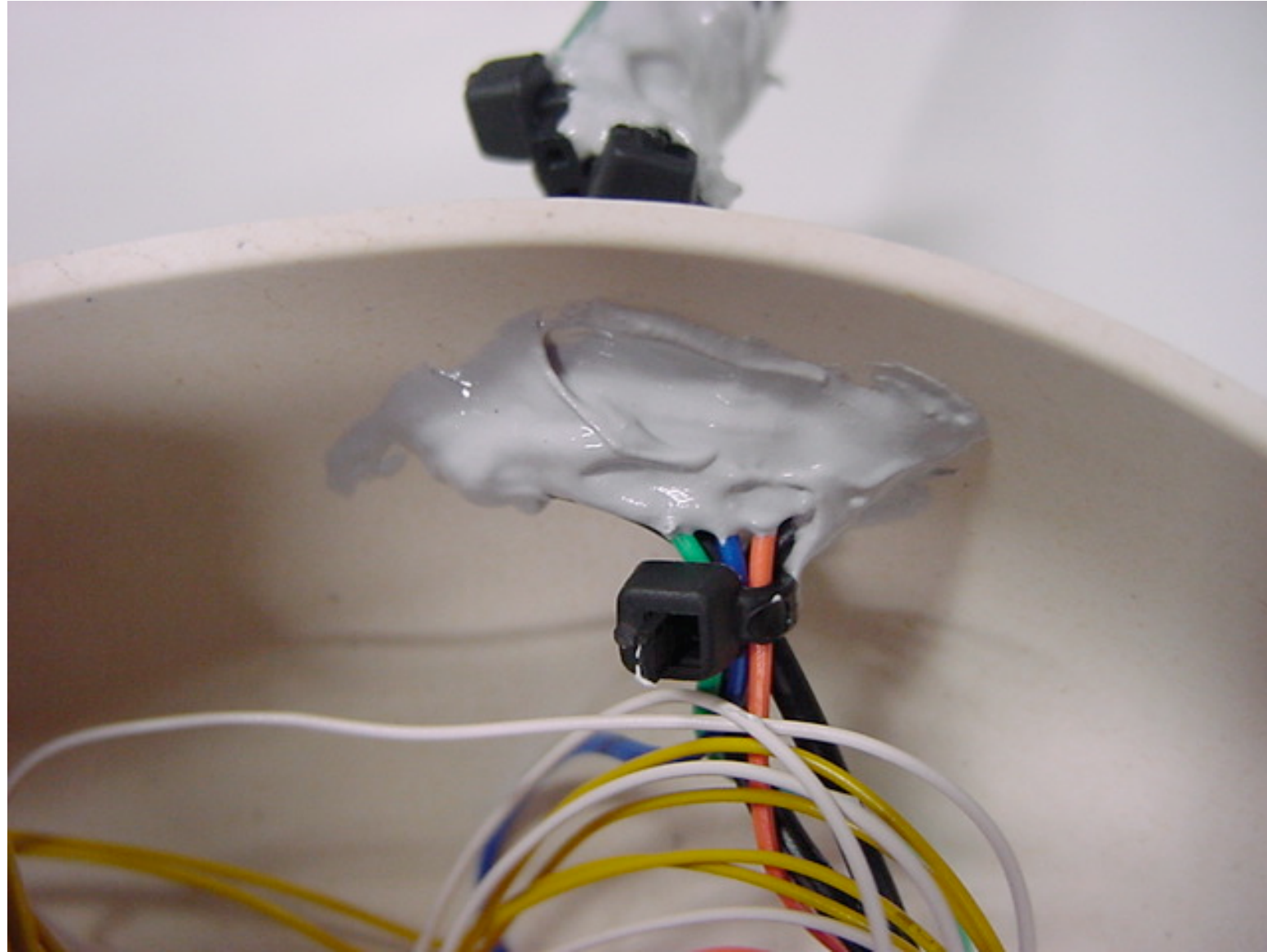


# PAW-eight



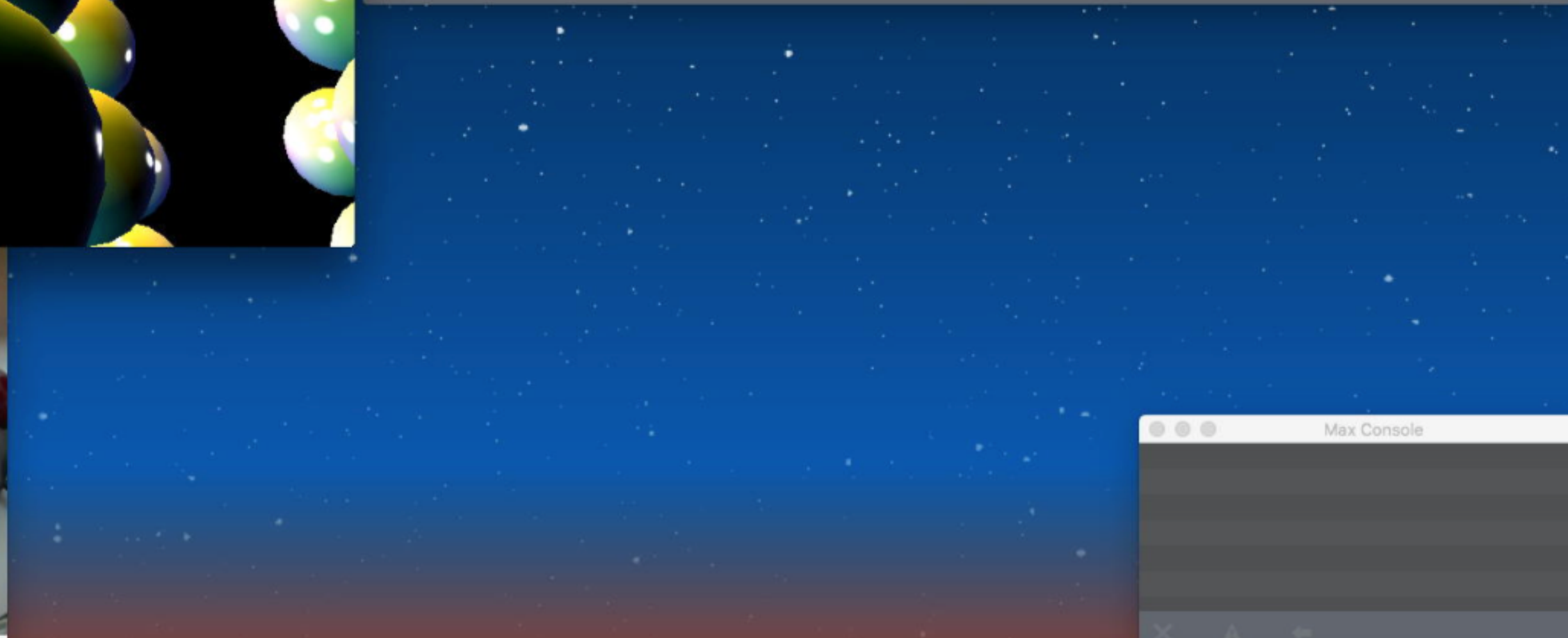
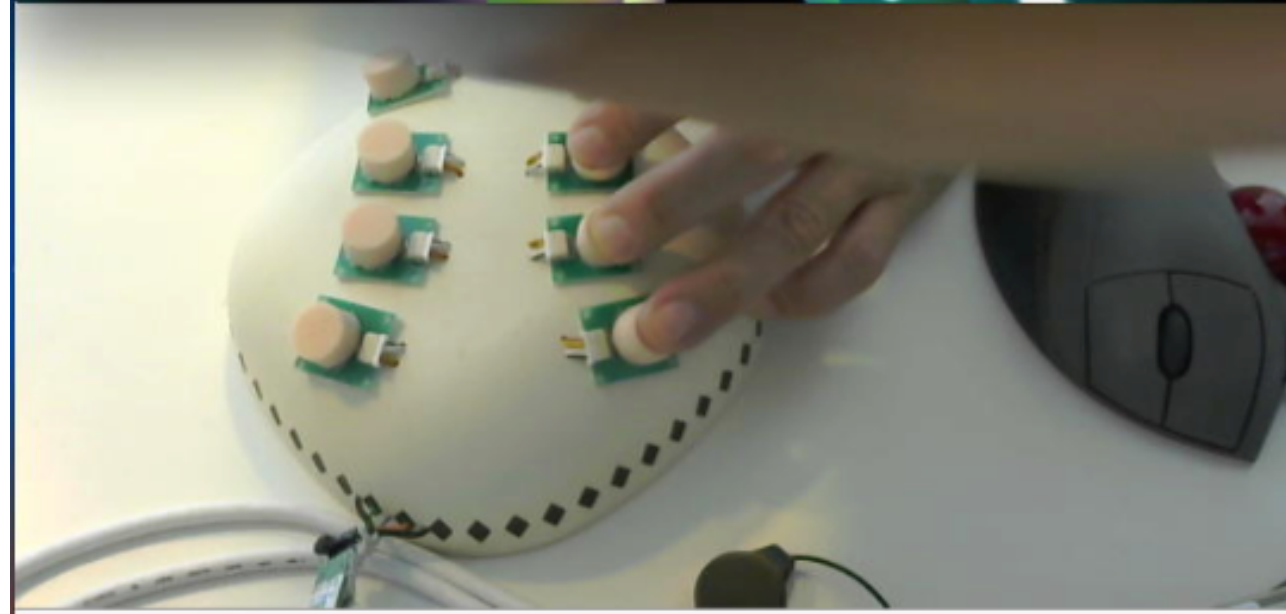
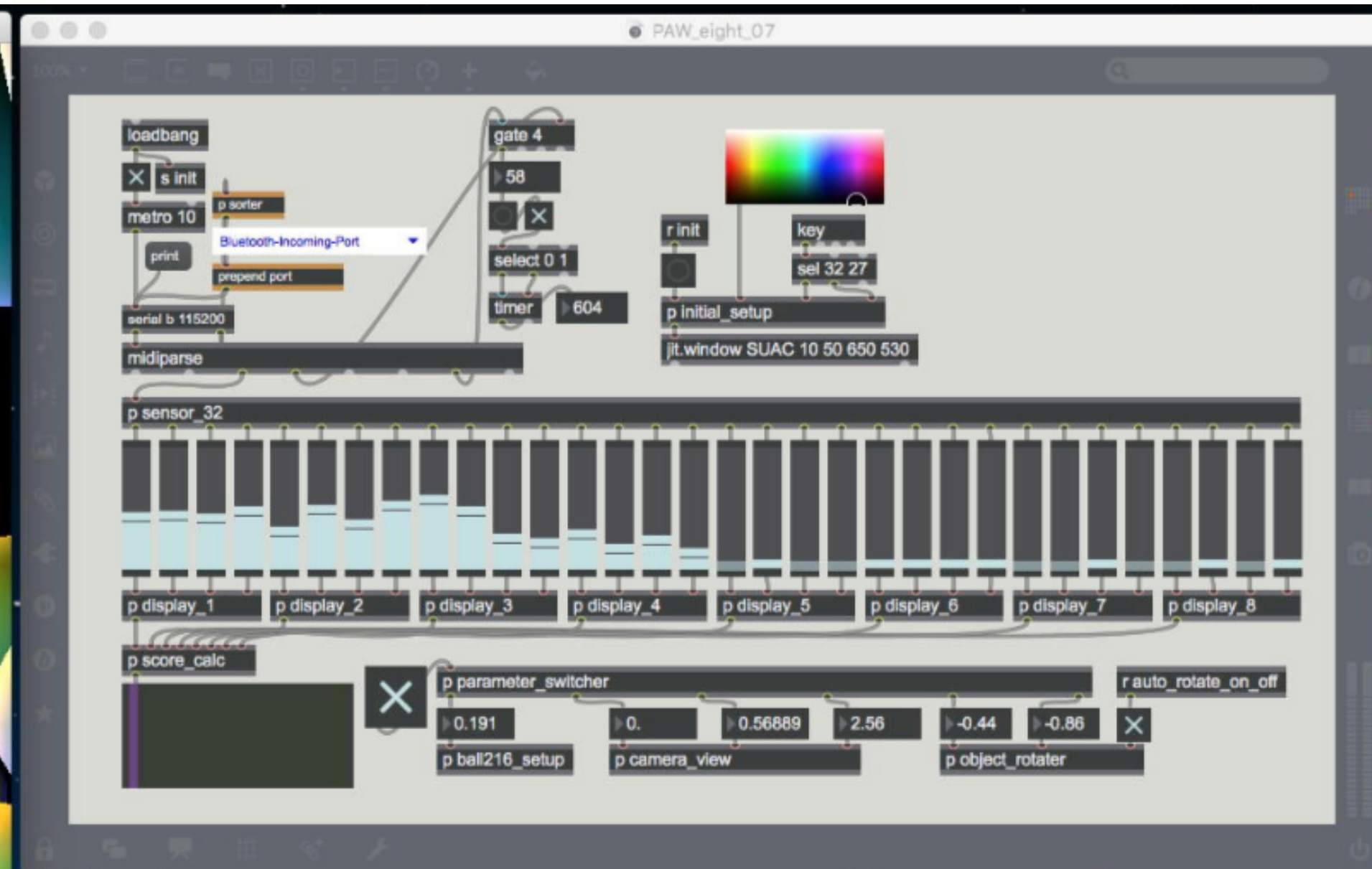
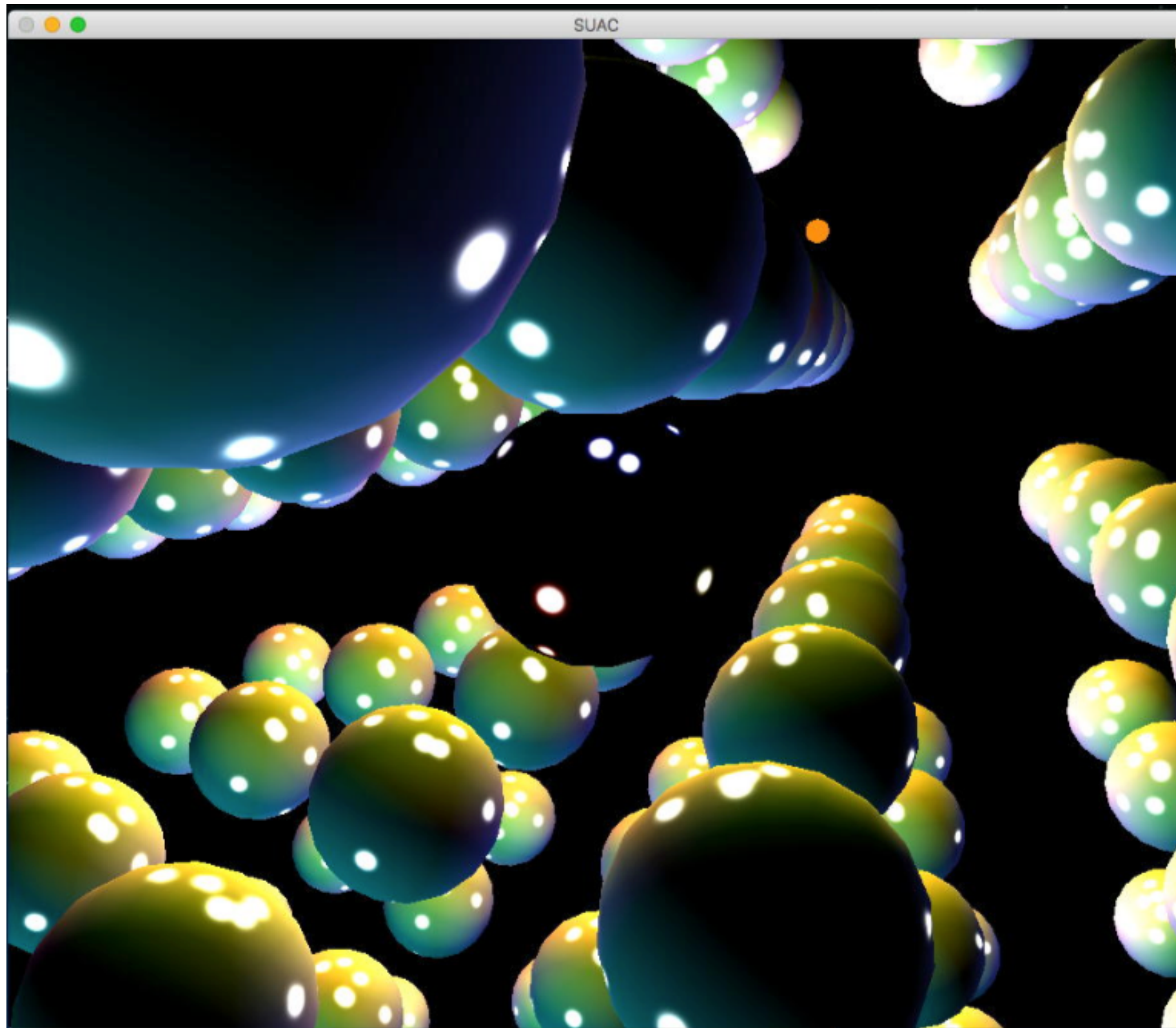


# PAW-eight



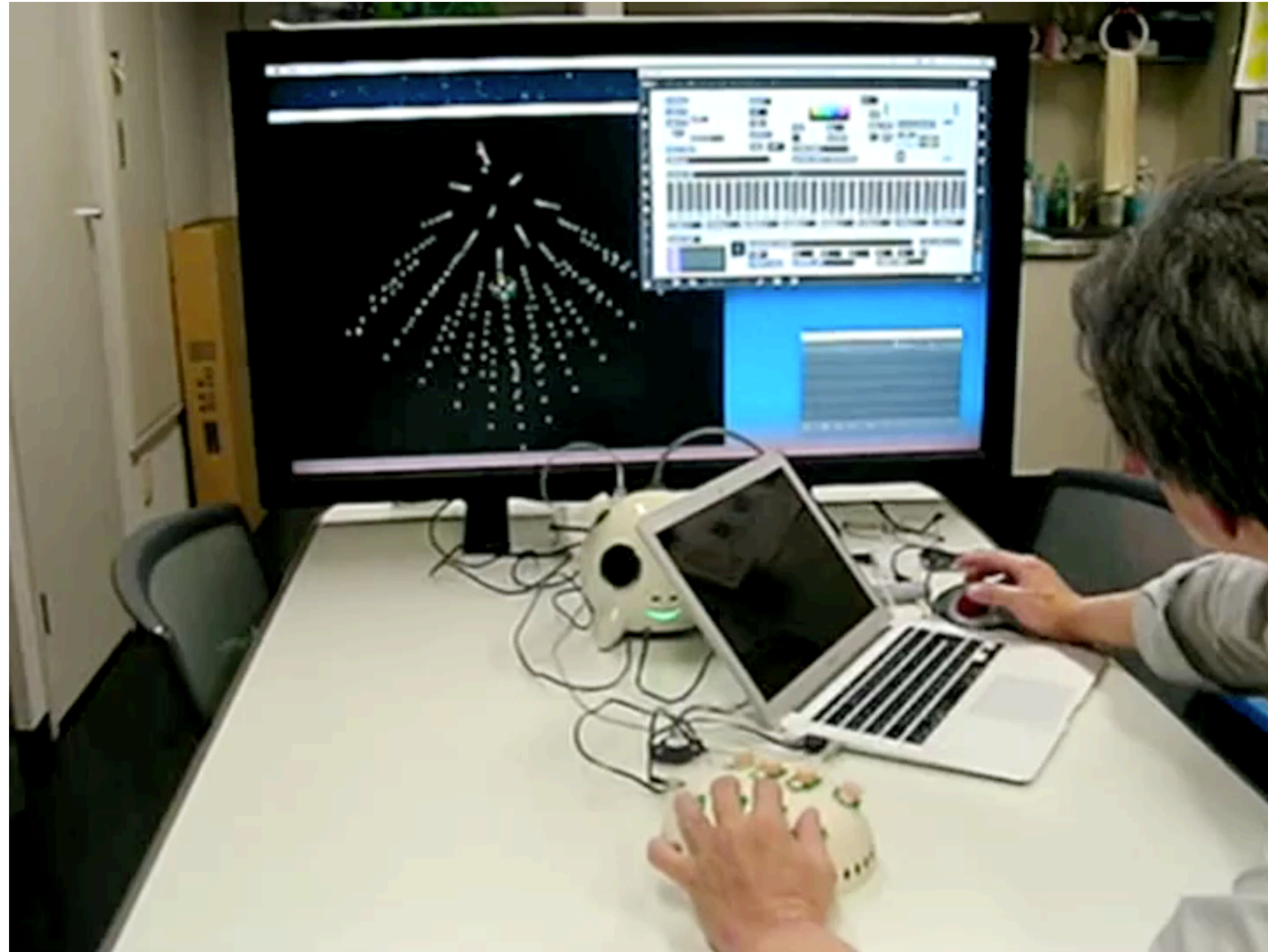


# PAW-eight





# PAW-eight



DEMO!

movie

PAW-eight.mp4

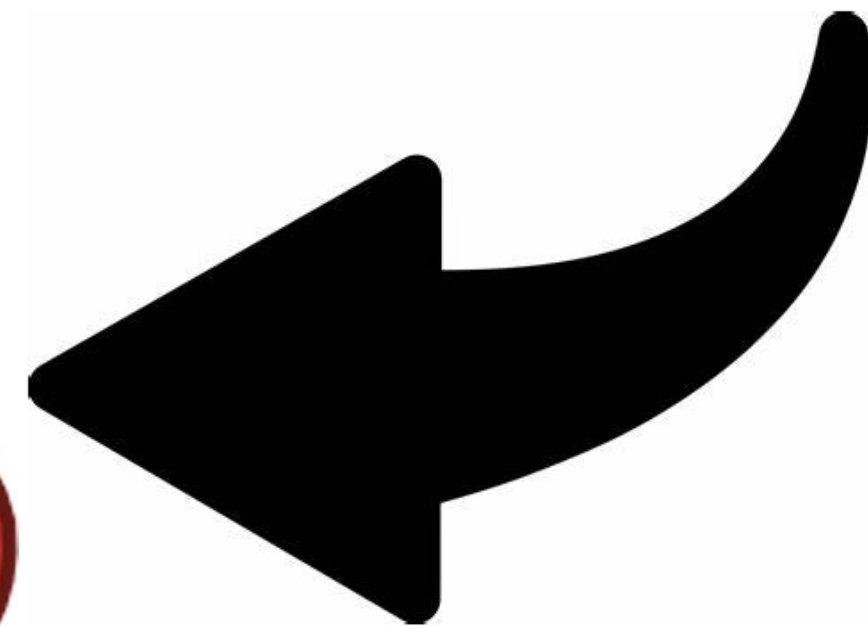
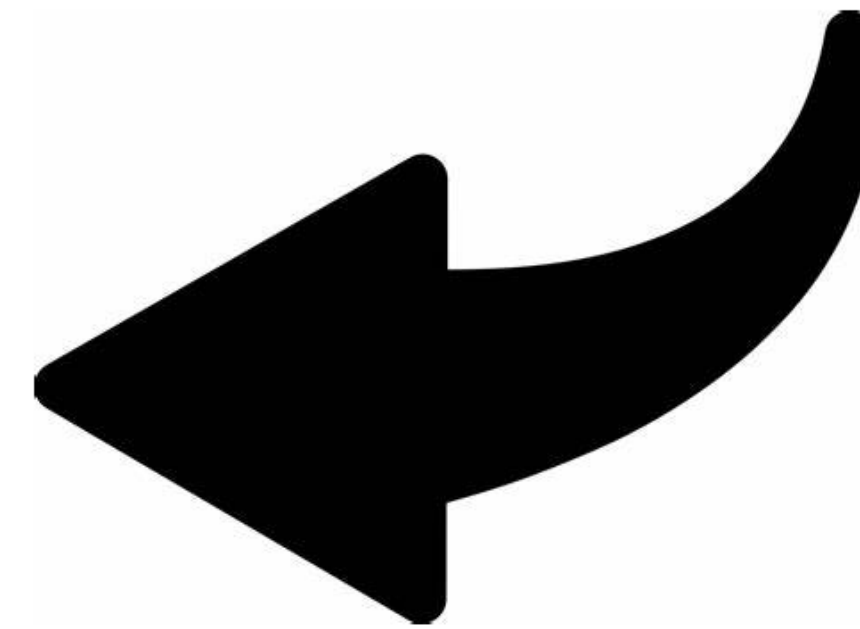


# Tactile Interaction

Smile (Emotion)

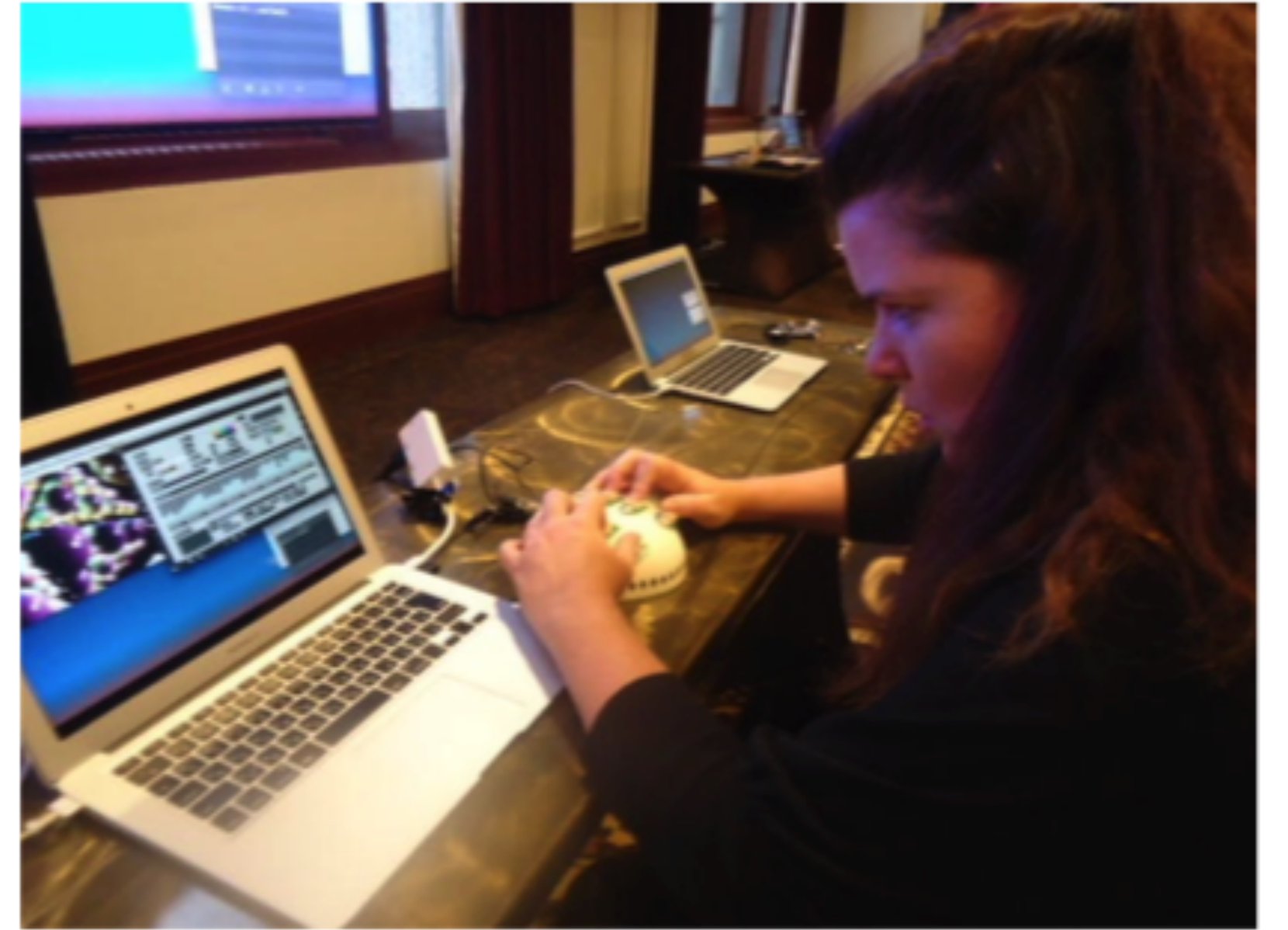
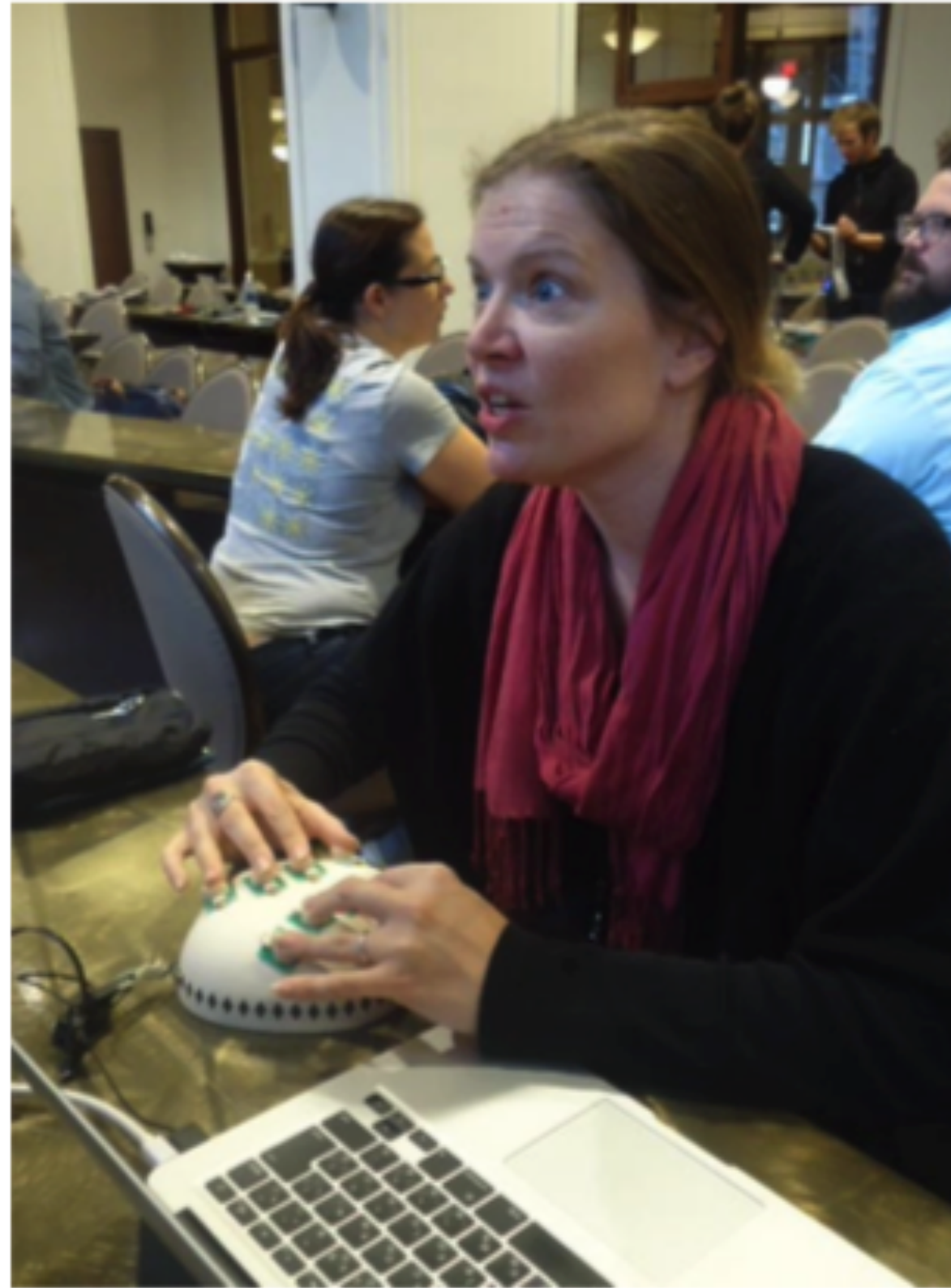
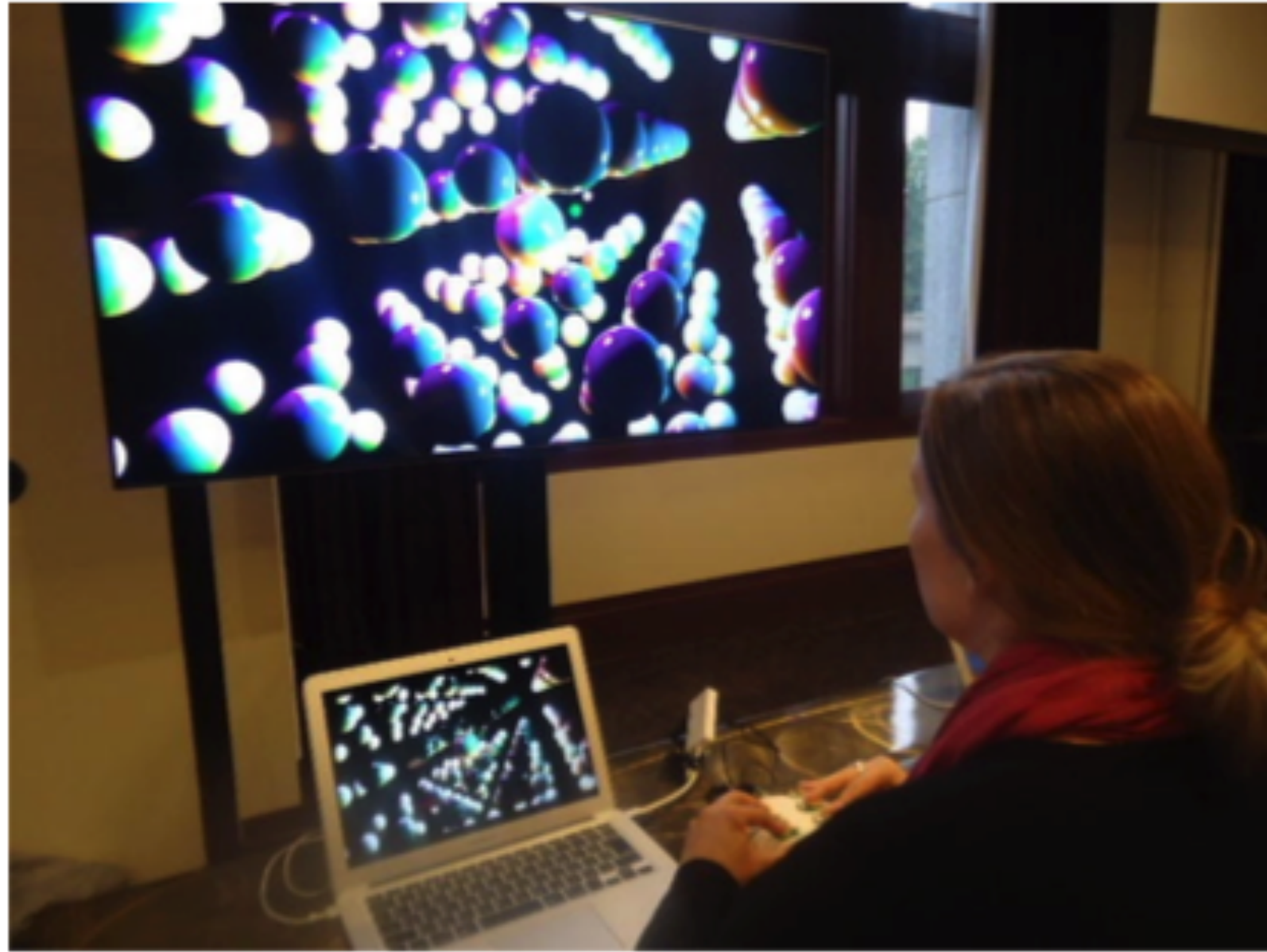


Wellness



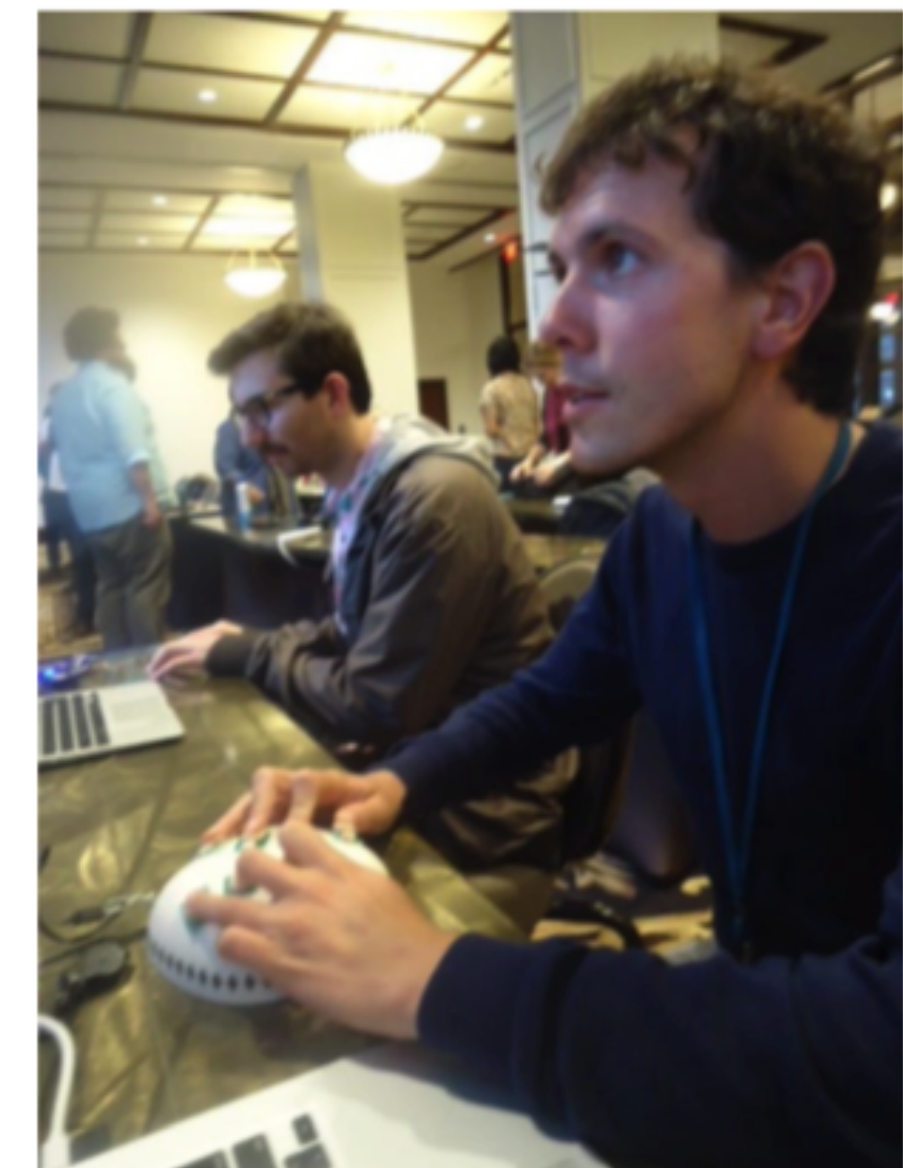
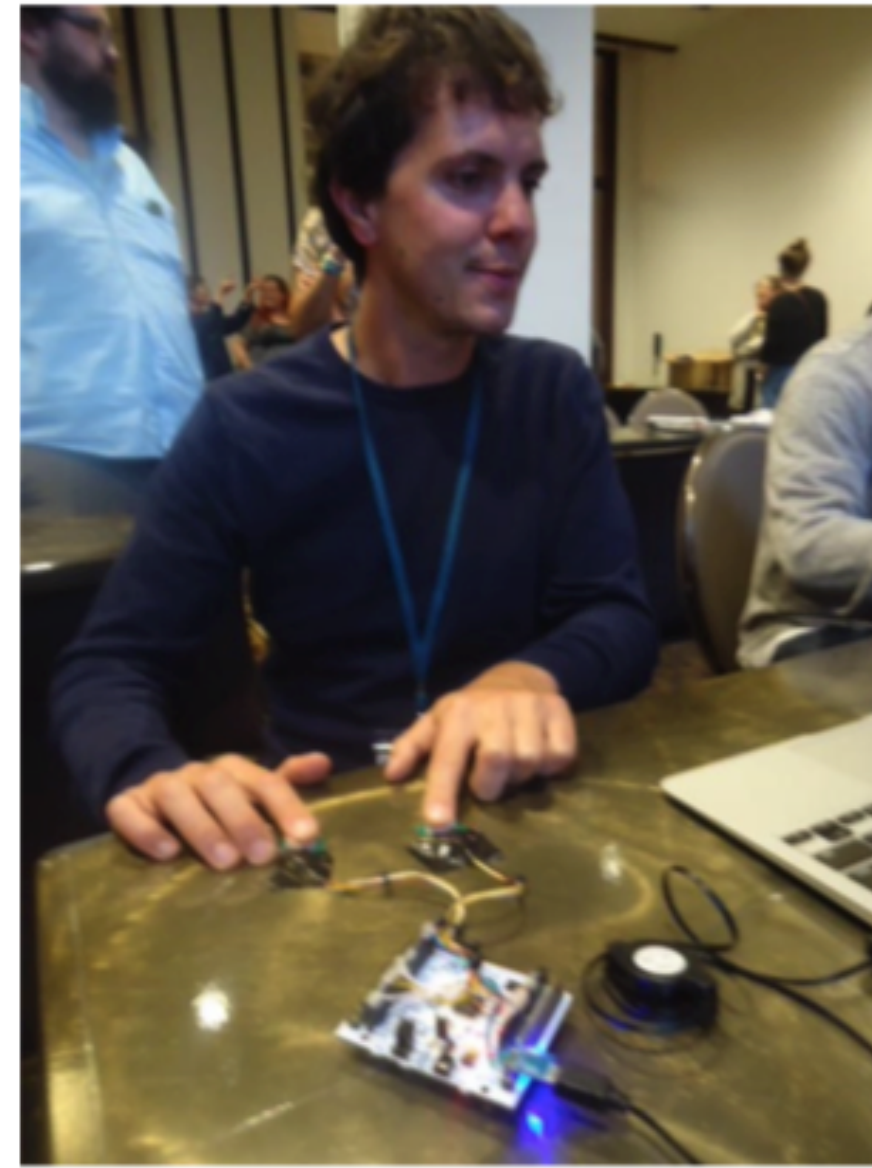


# Sketching2019 (Detroit)





# Sketching2019(Detroit)





# Sketching2019(Detroit)



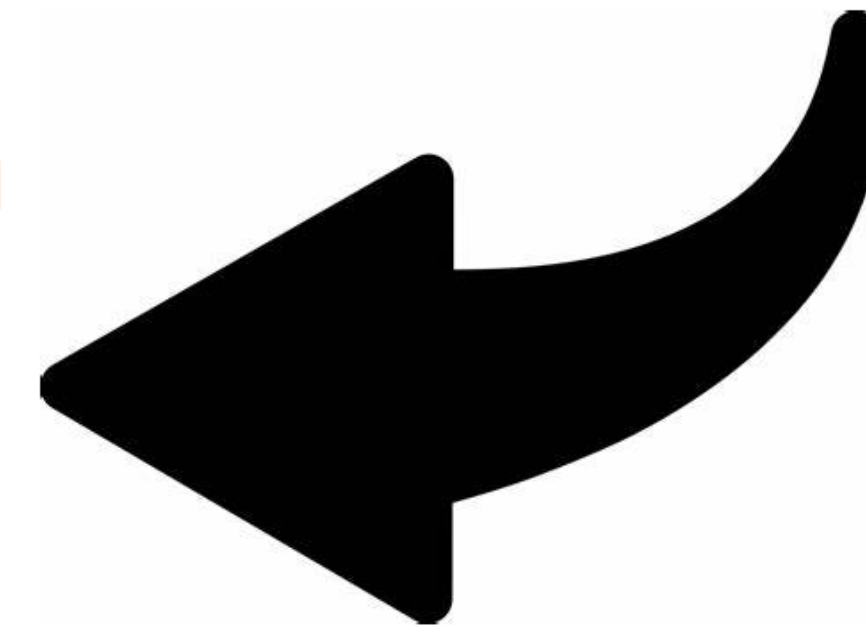


# Tactile Interaction

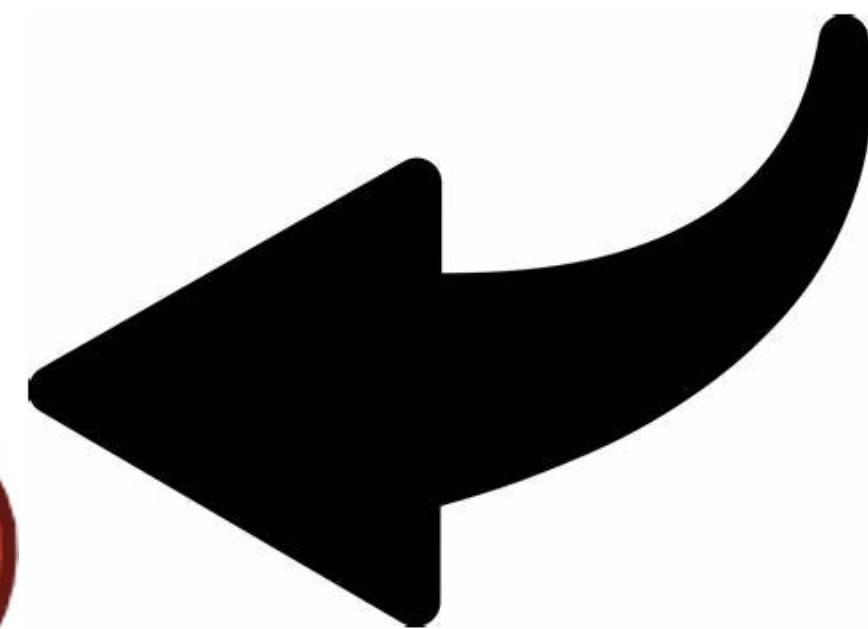
Smile (Emotion)



Wellness

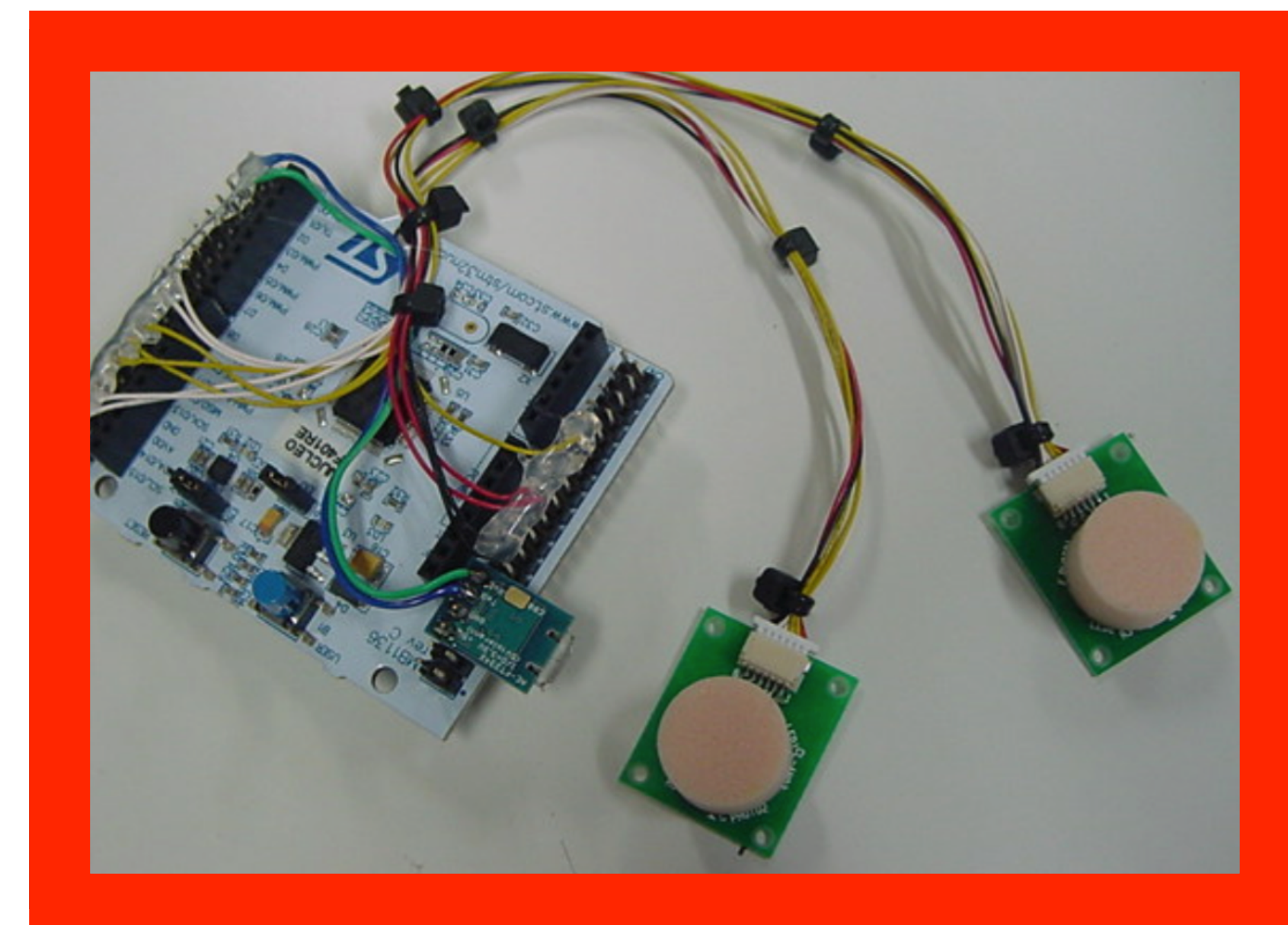
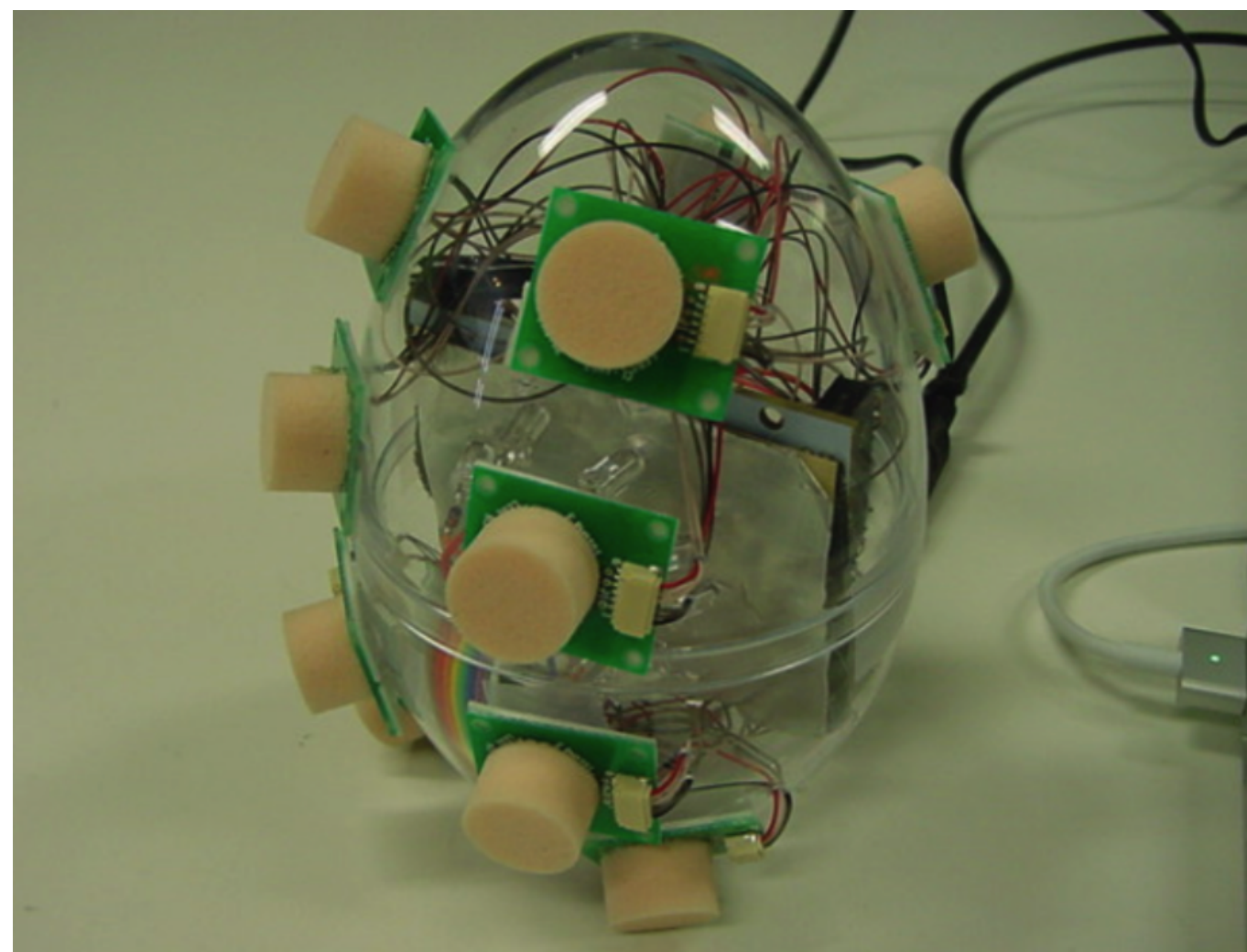
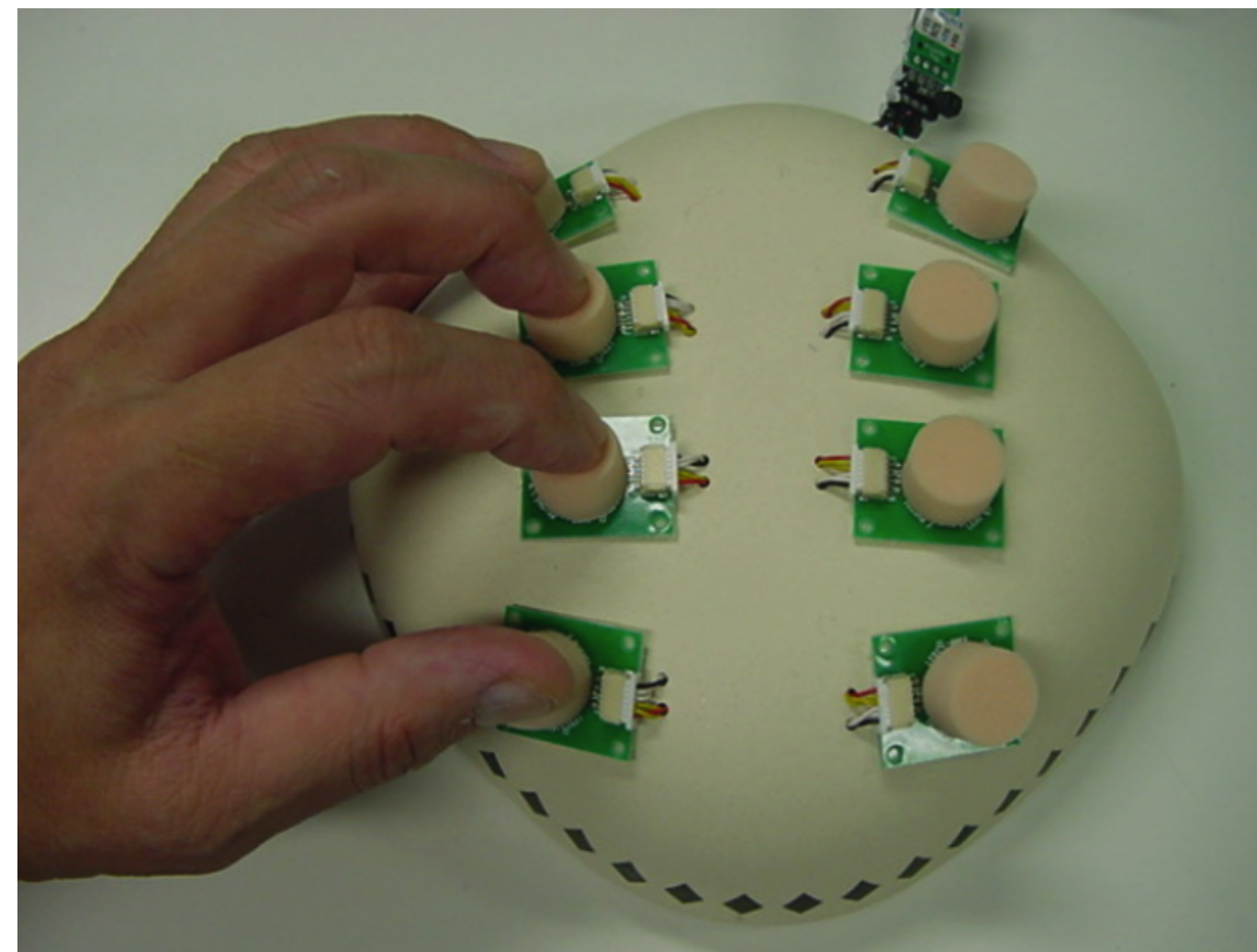
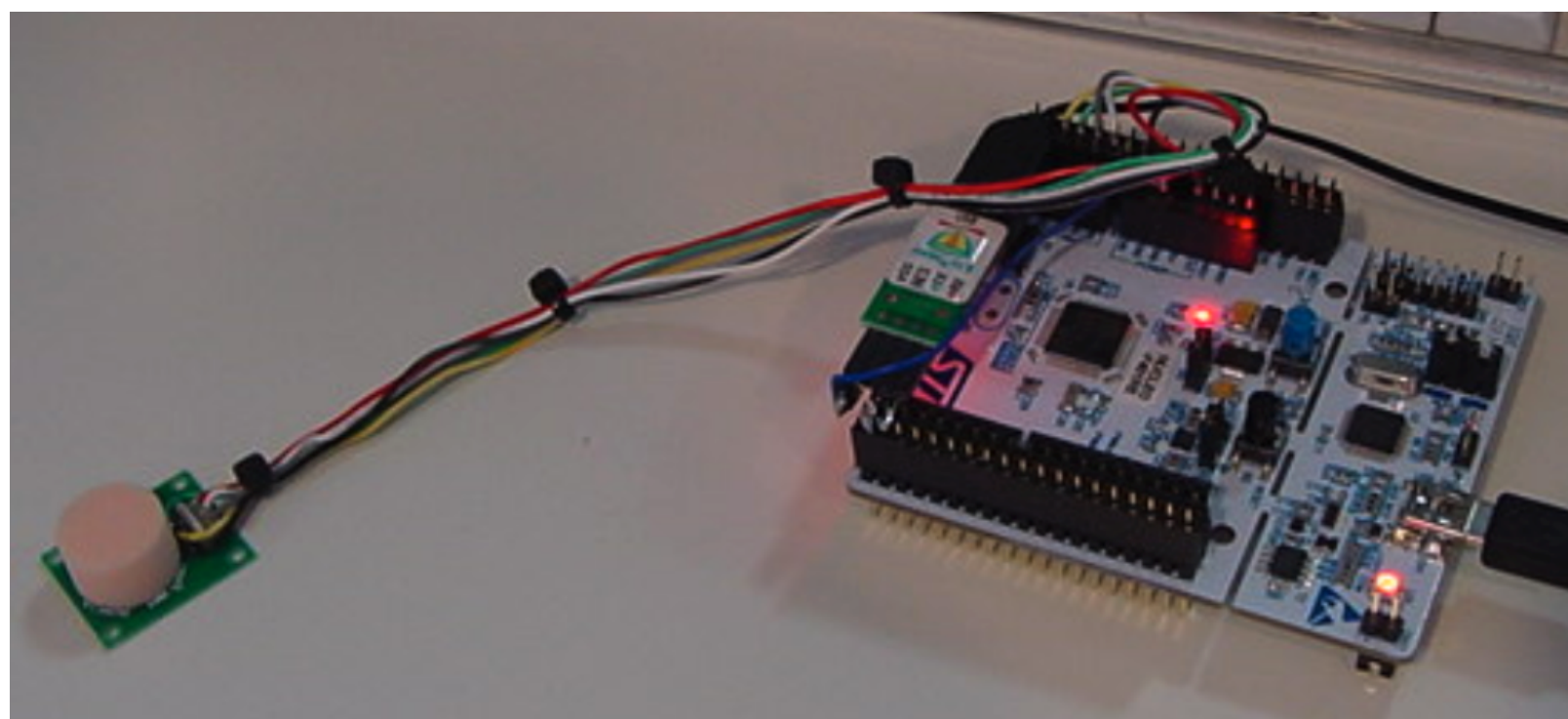


Interoception



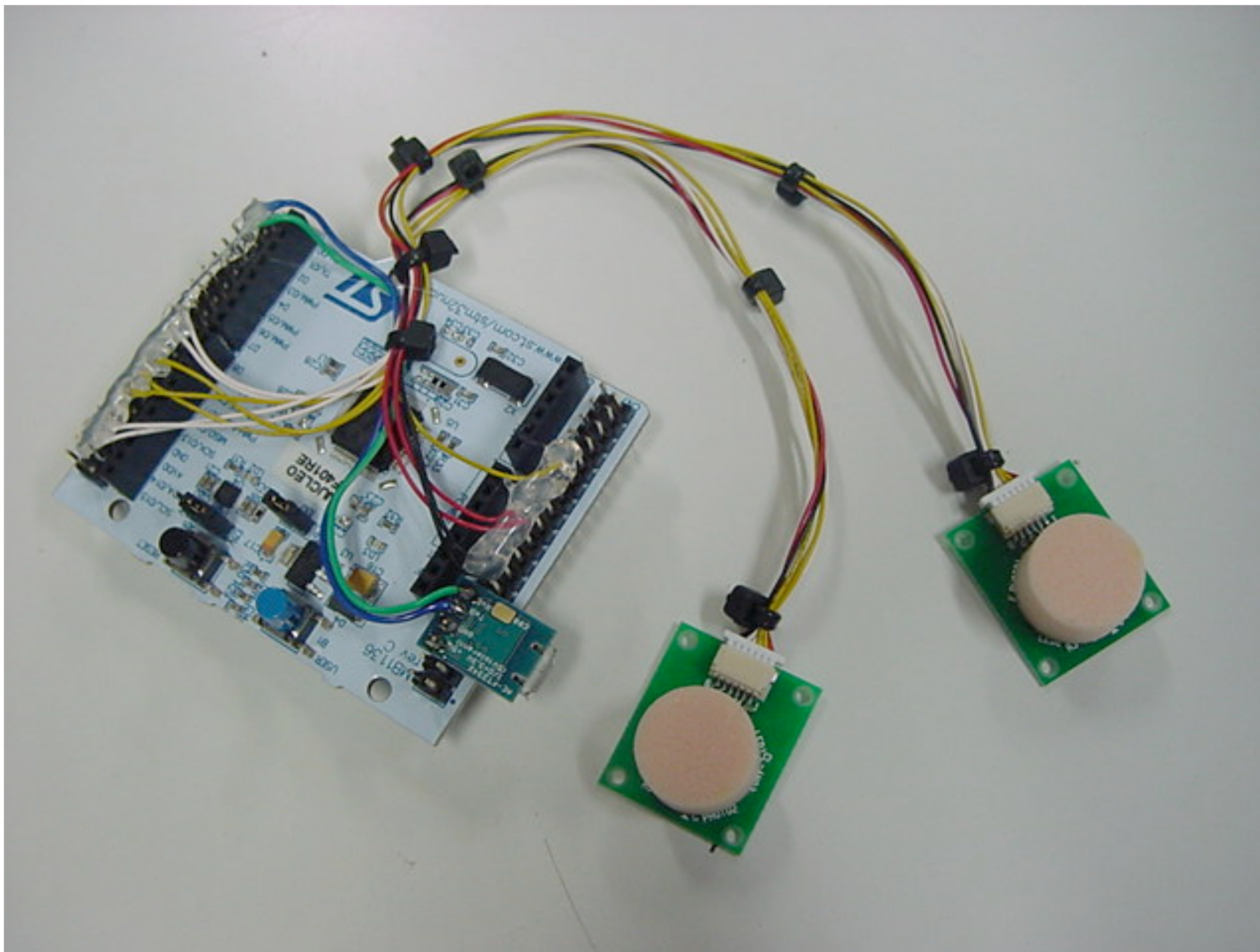


# I have developed four generations system with this unique sensor.





# PAW-double





# PAW-double

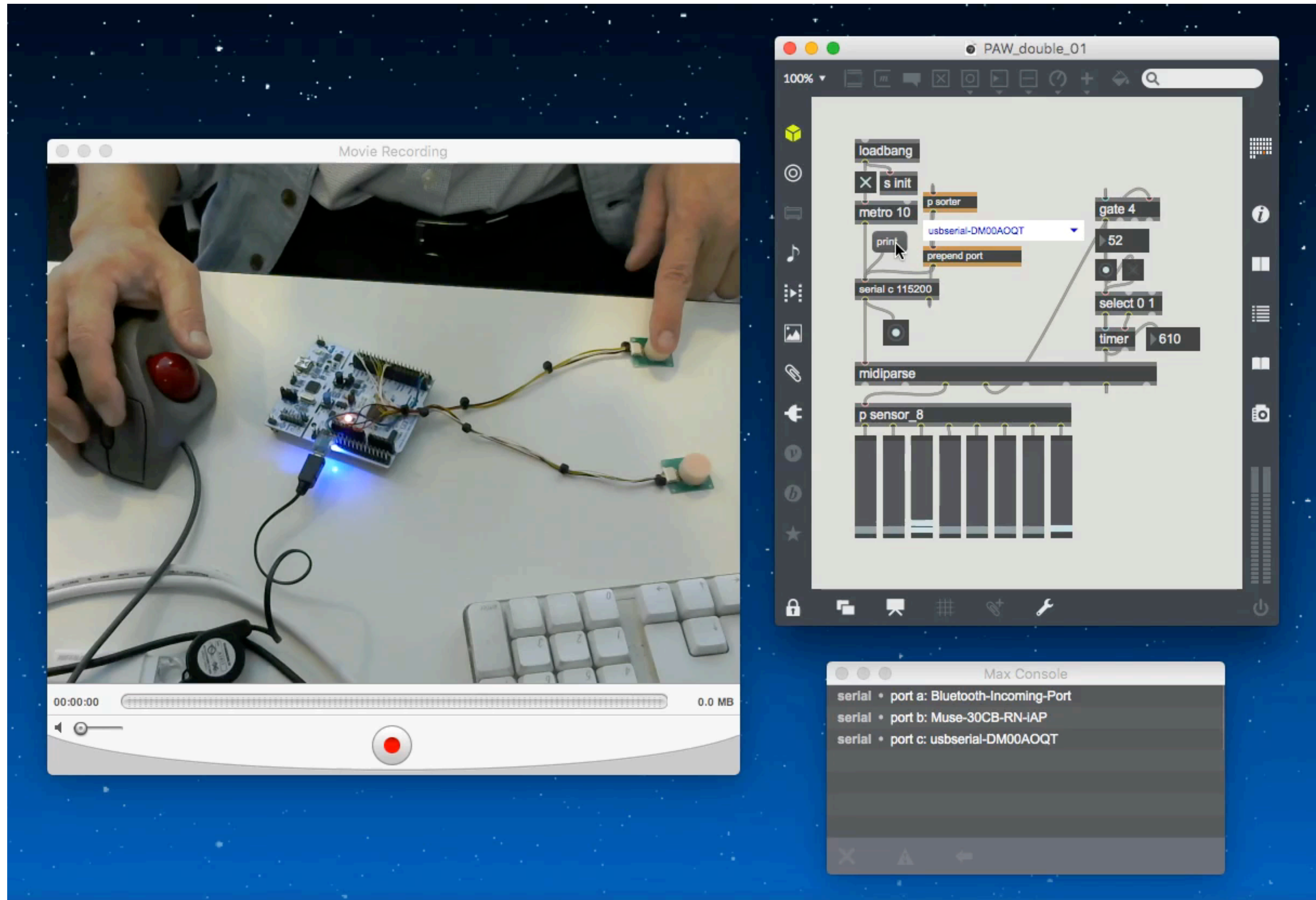
This page is written in  
Japanese, so please  
use DeepL translation.



- Only 2-channels
- **Open-Source** (everyone can make)
- for Workshop



# PAW-double



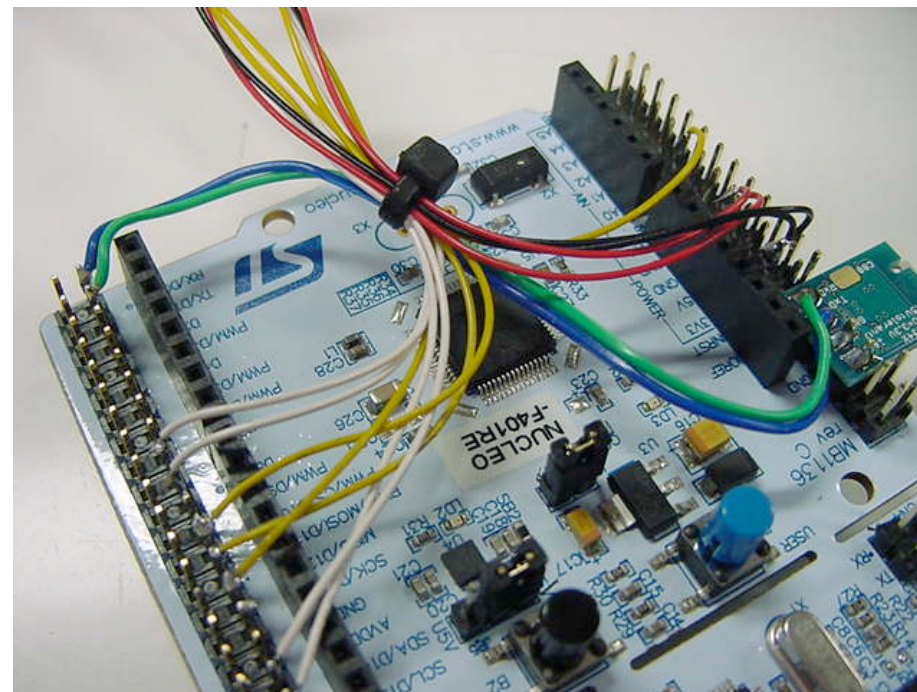
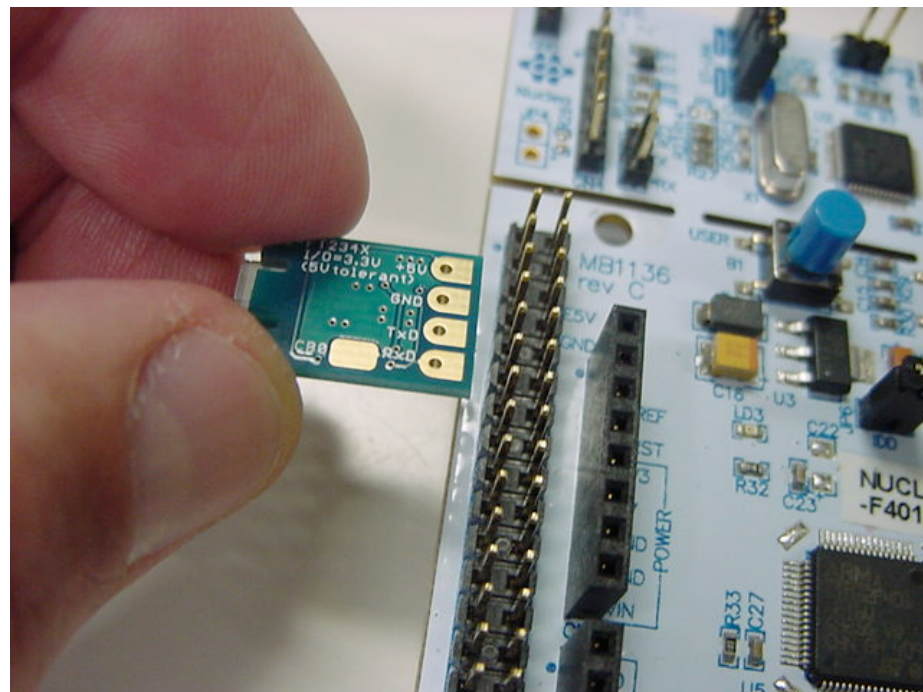
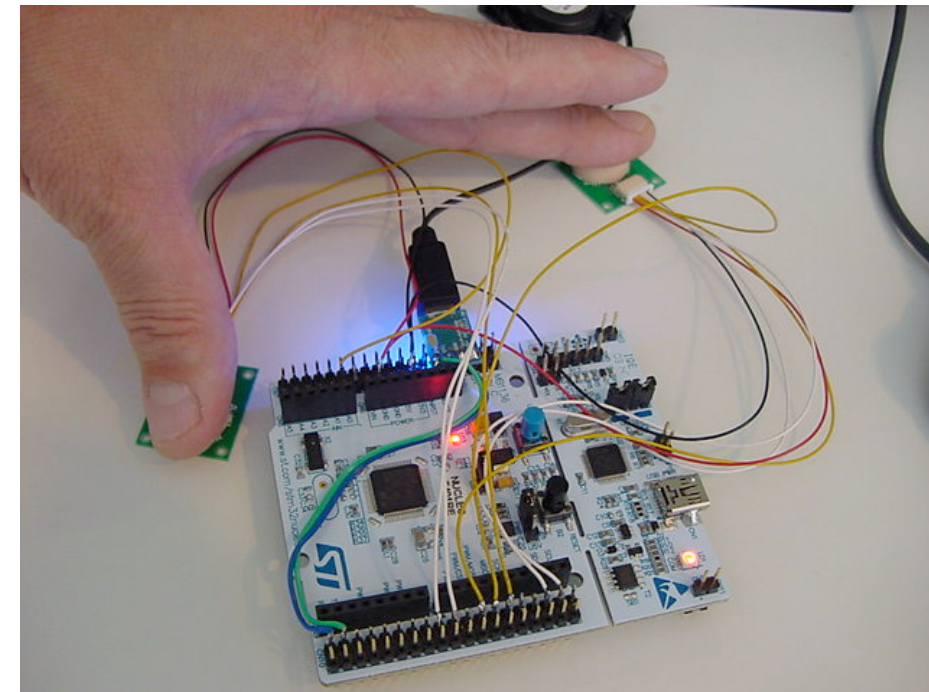
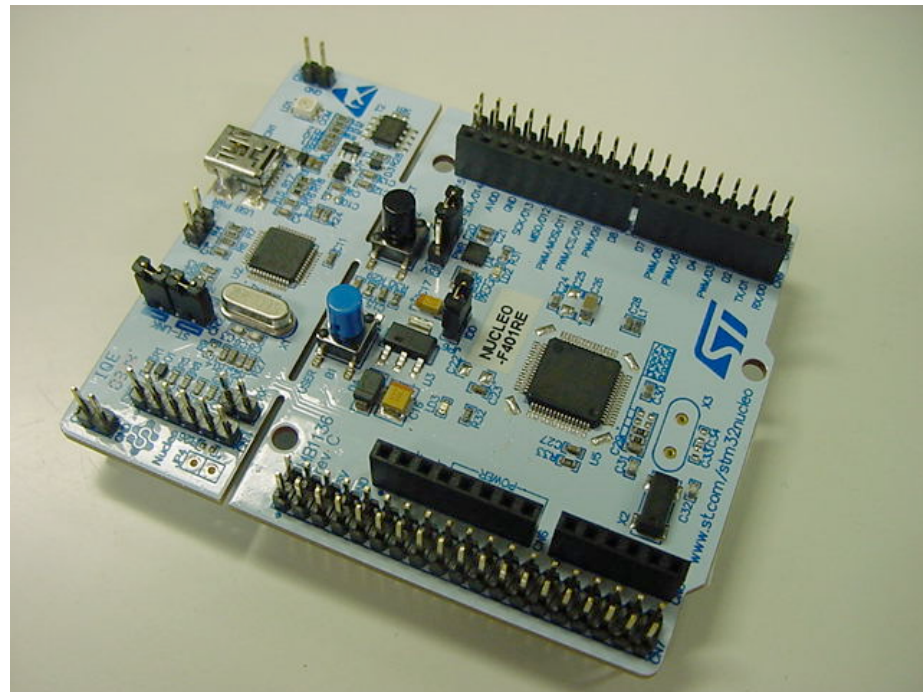
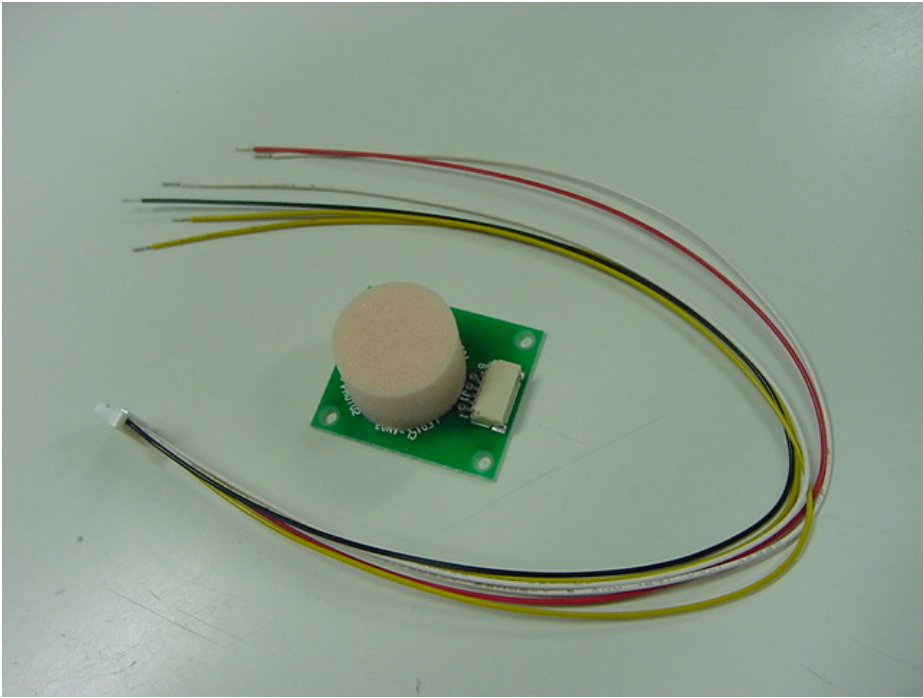
movie

PAWdouble.mp4



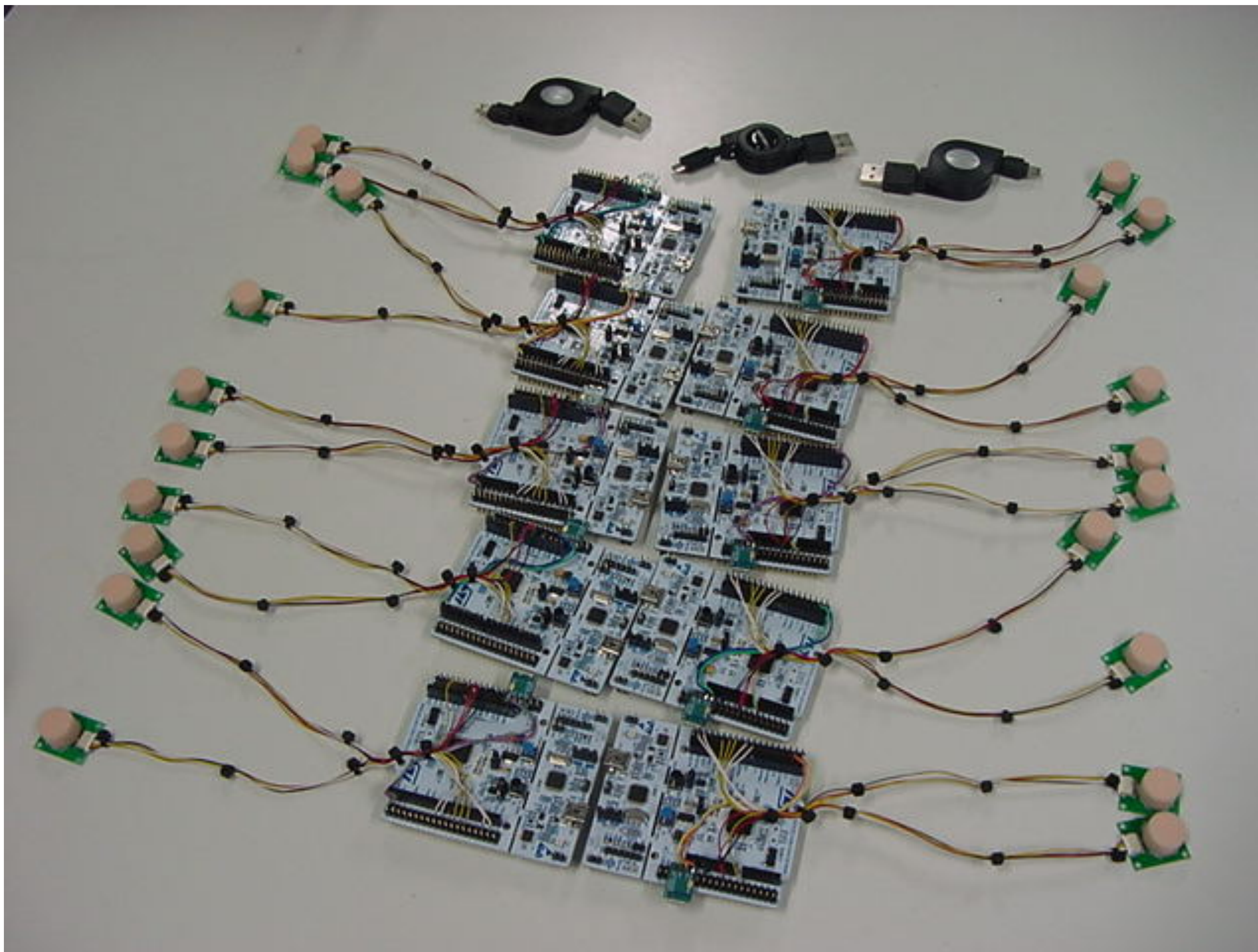
# How to make the PAW-double

This page is written in  
Japanese, so please  
use DeepL translation.



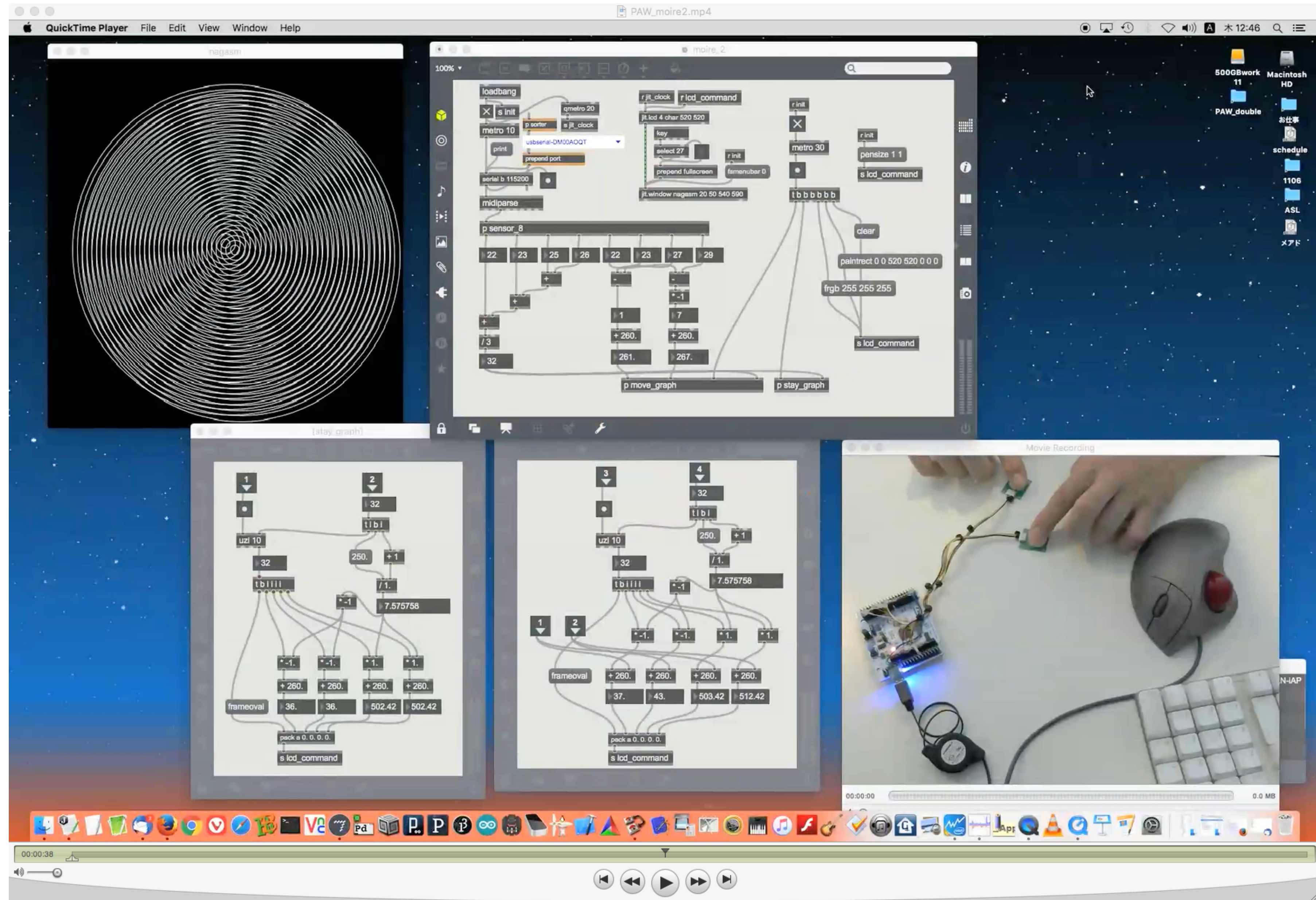


# PAW-double





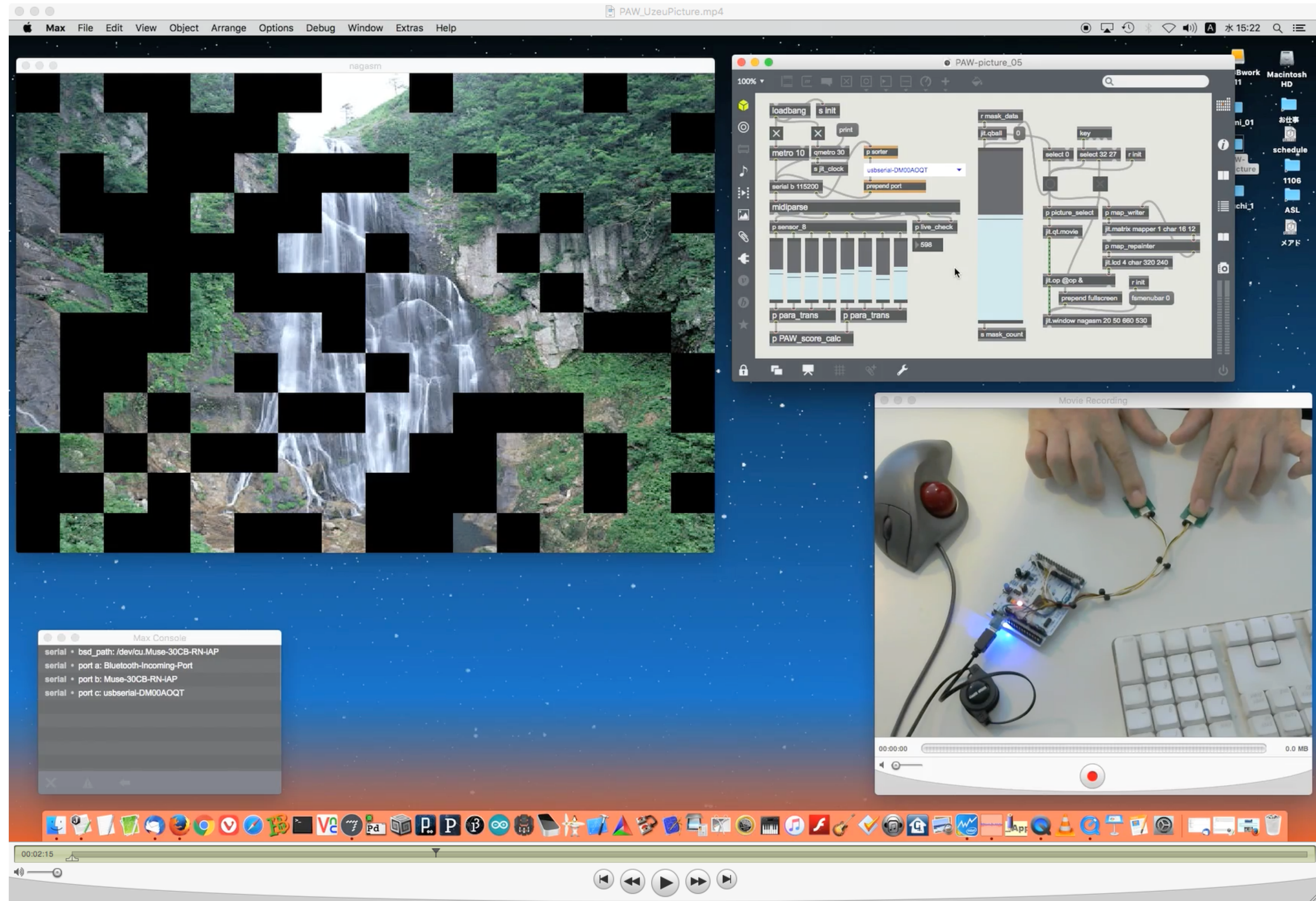
# PAW-double works



movie



# PAW-double works



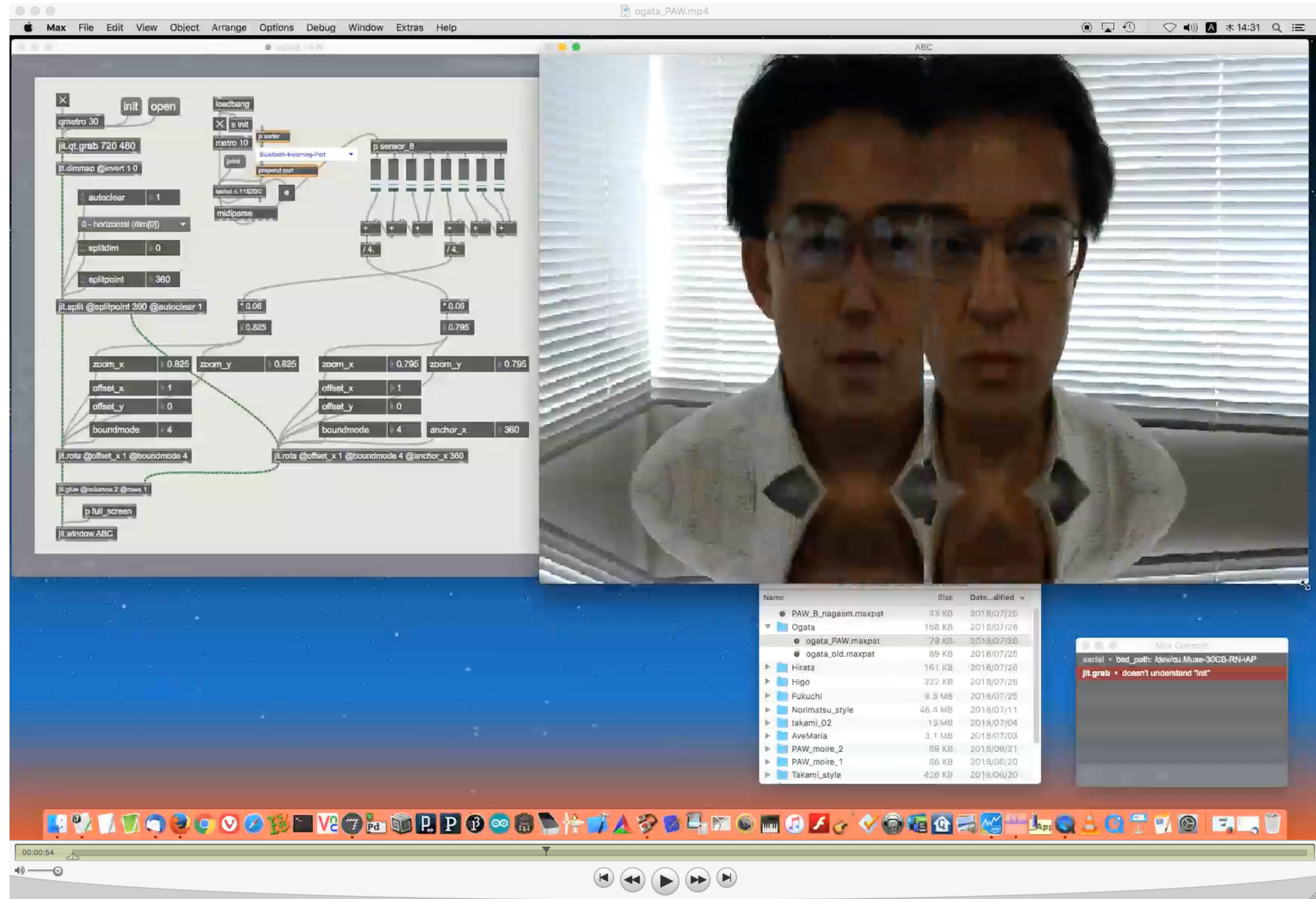
movie



# movie



# PAW-double works



movie

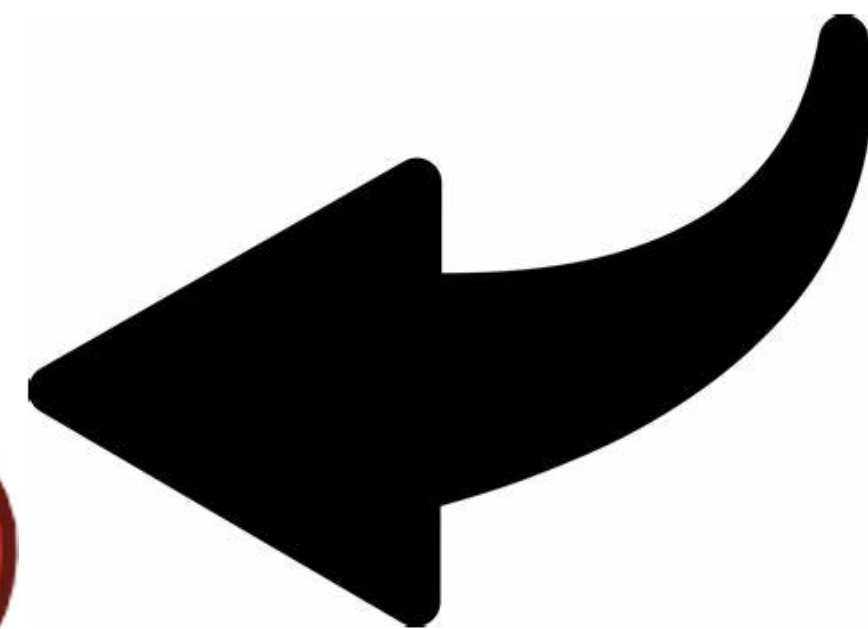
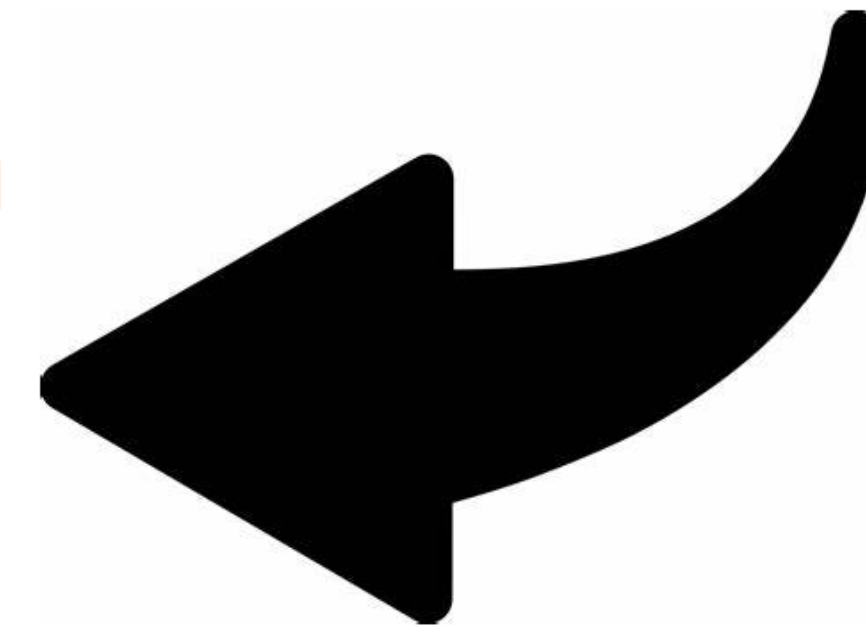


# Tactile Interaction

Smile (Emotion)



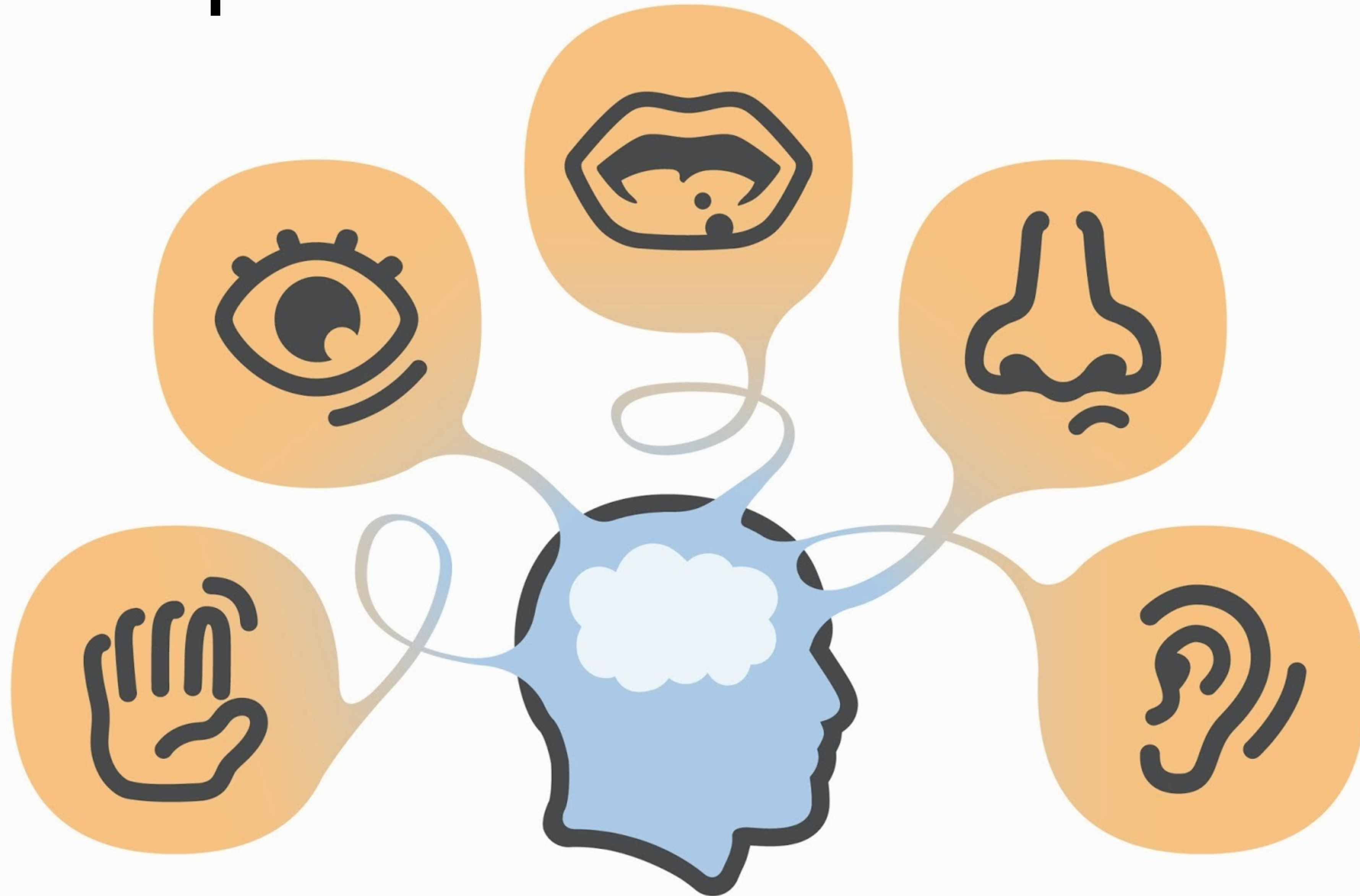
Wellness



Interoception

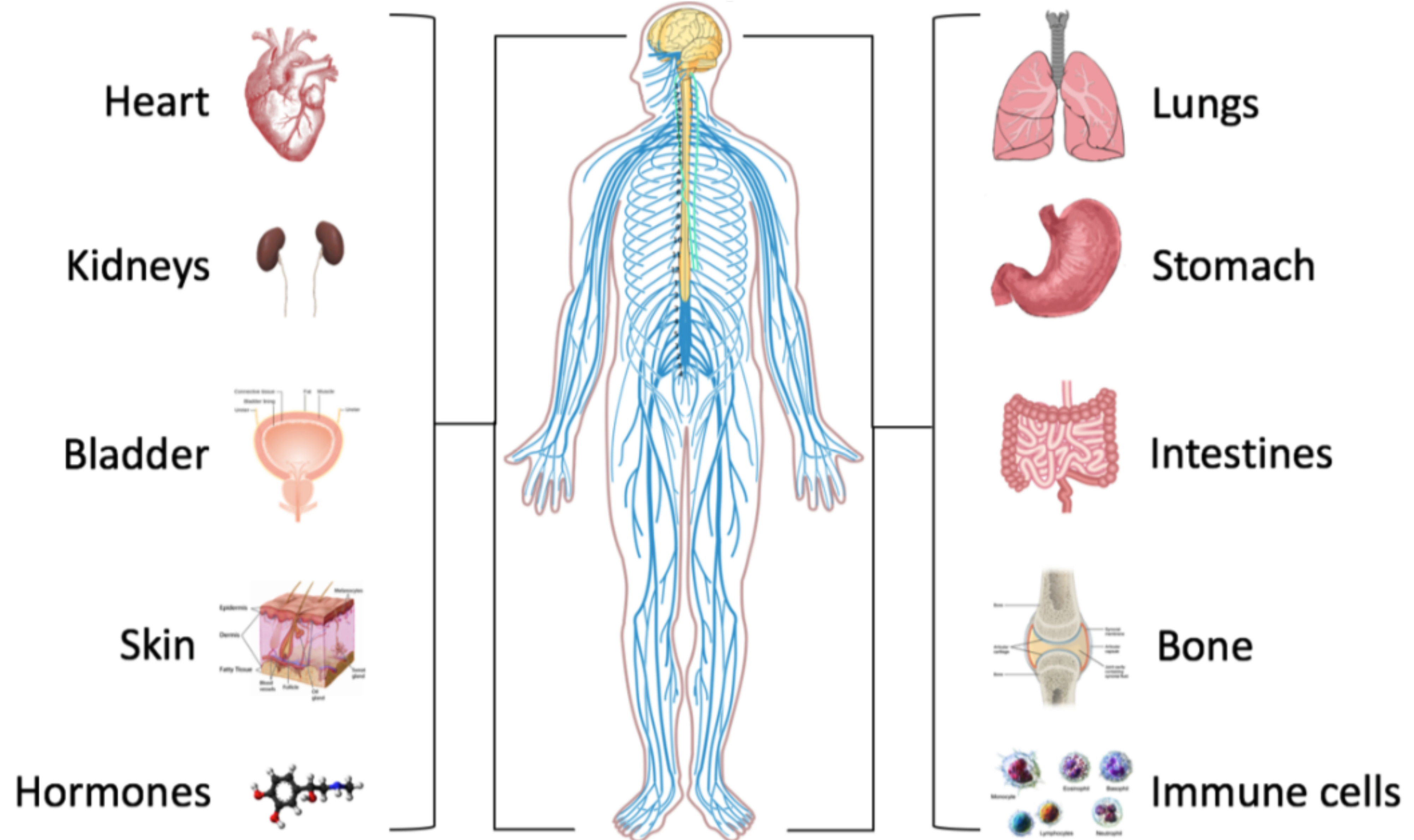


# Exteroception





# Interoception



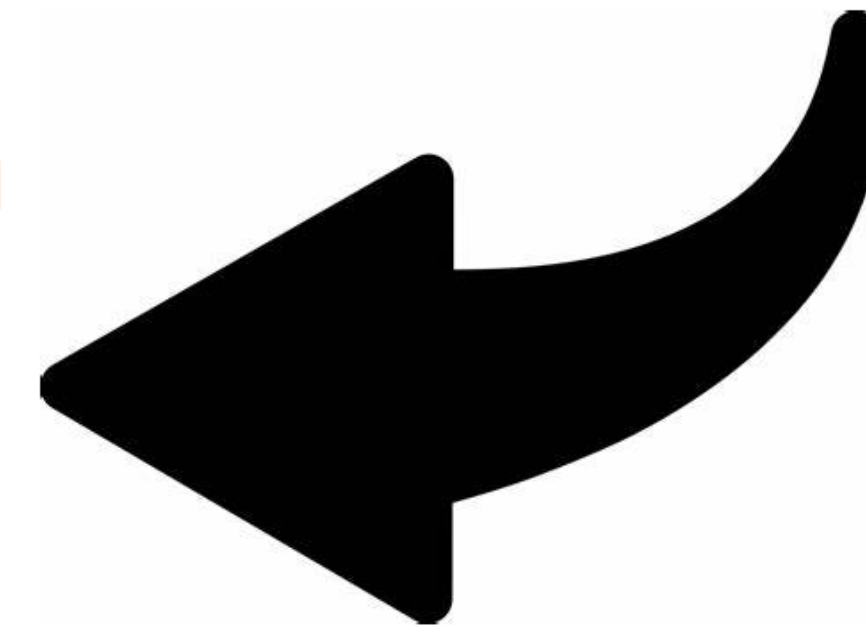


# Tactile Interaction

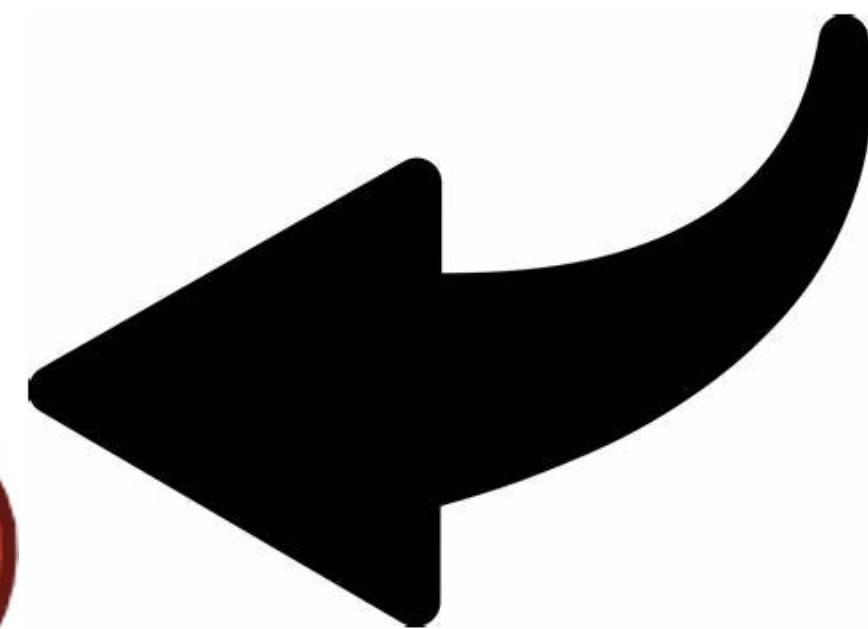
Smile (Emotion)



Wellness

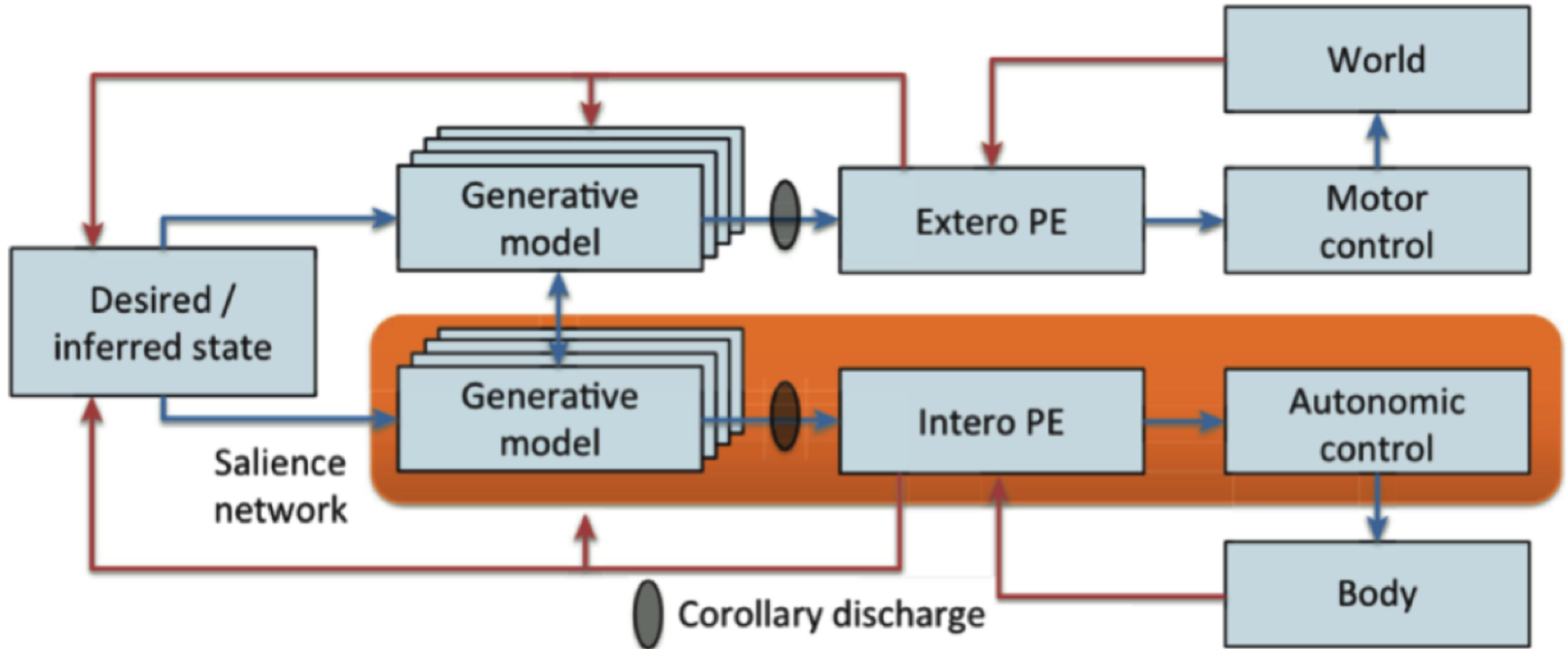


Interoception



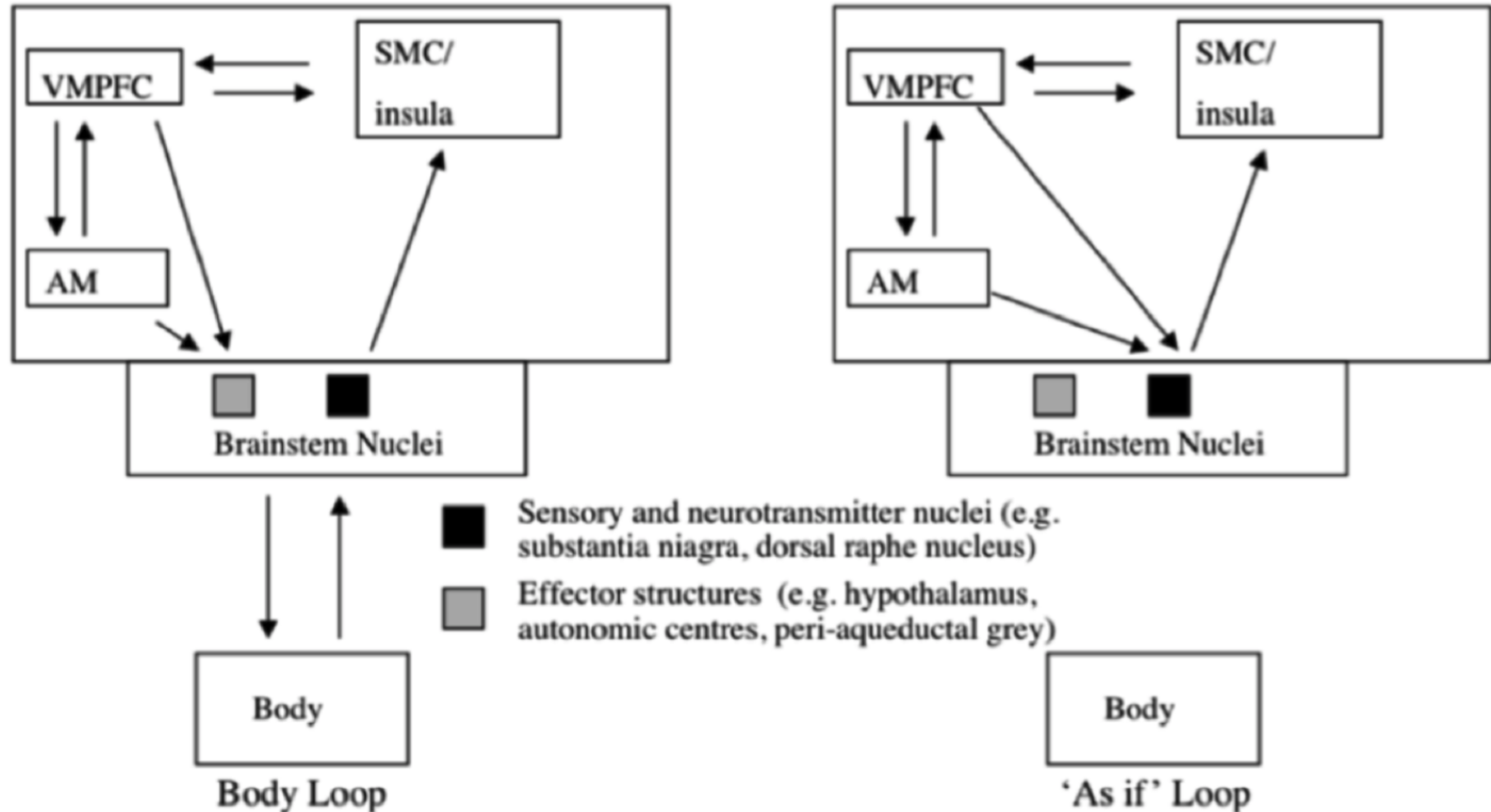


# Exteroception and Interoception



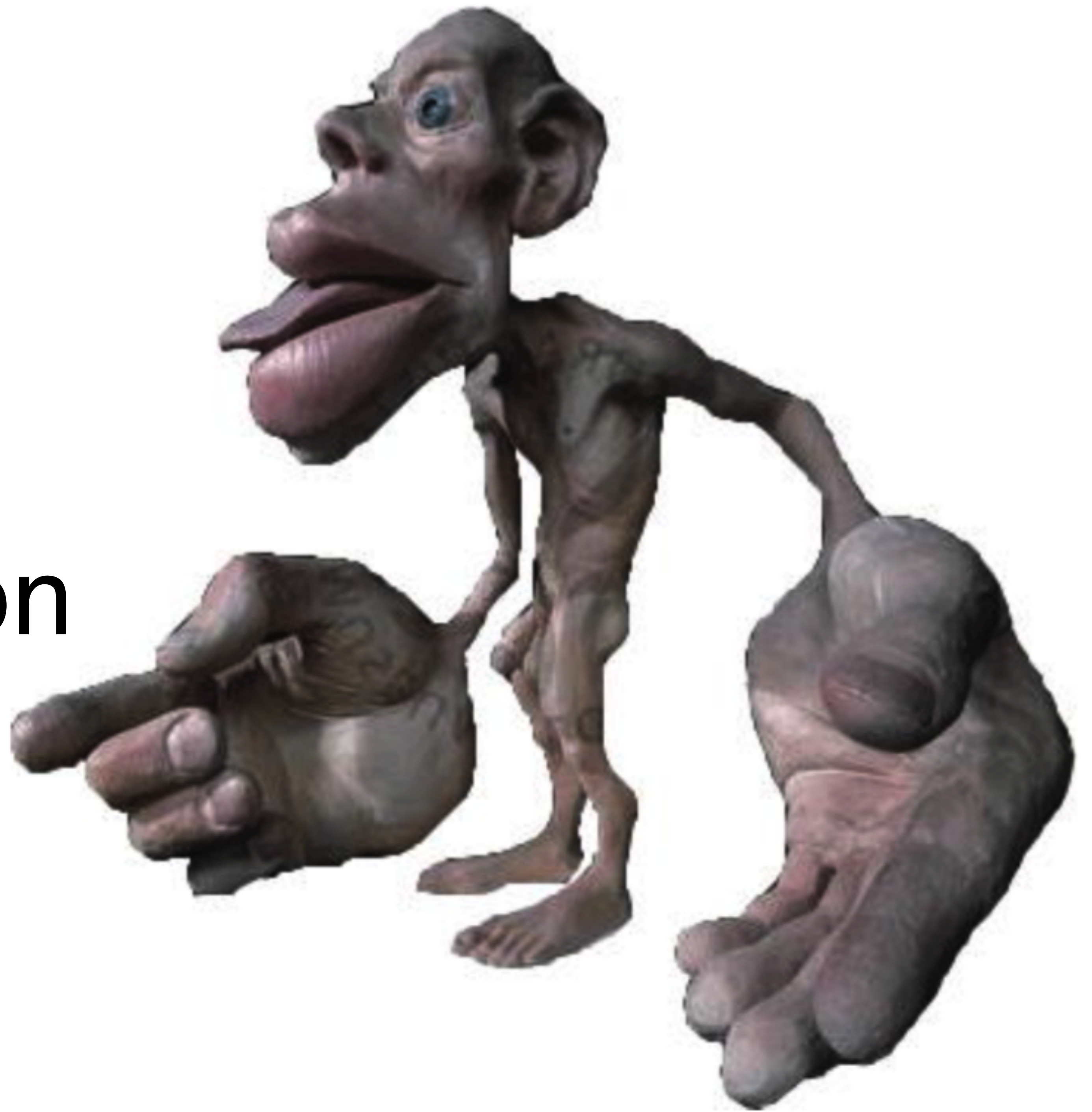


# Somatic Marker Hypothesis





# Tactile Interaction





# Forcefully Pushing



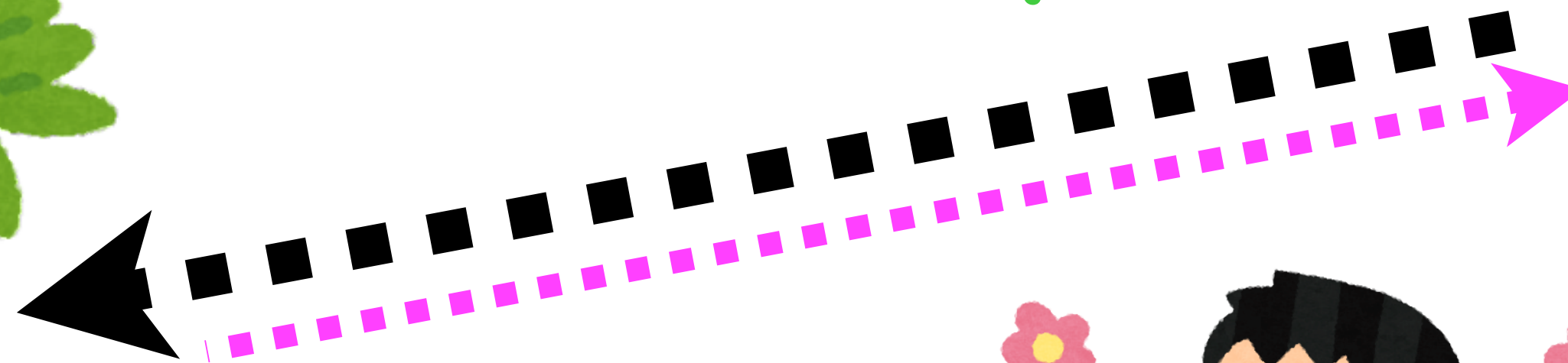
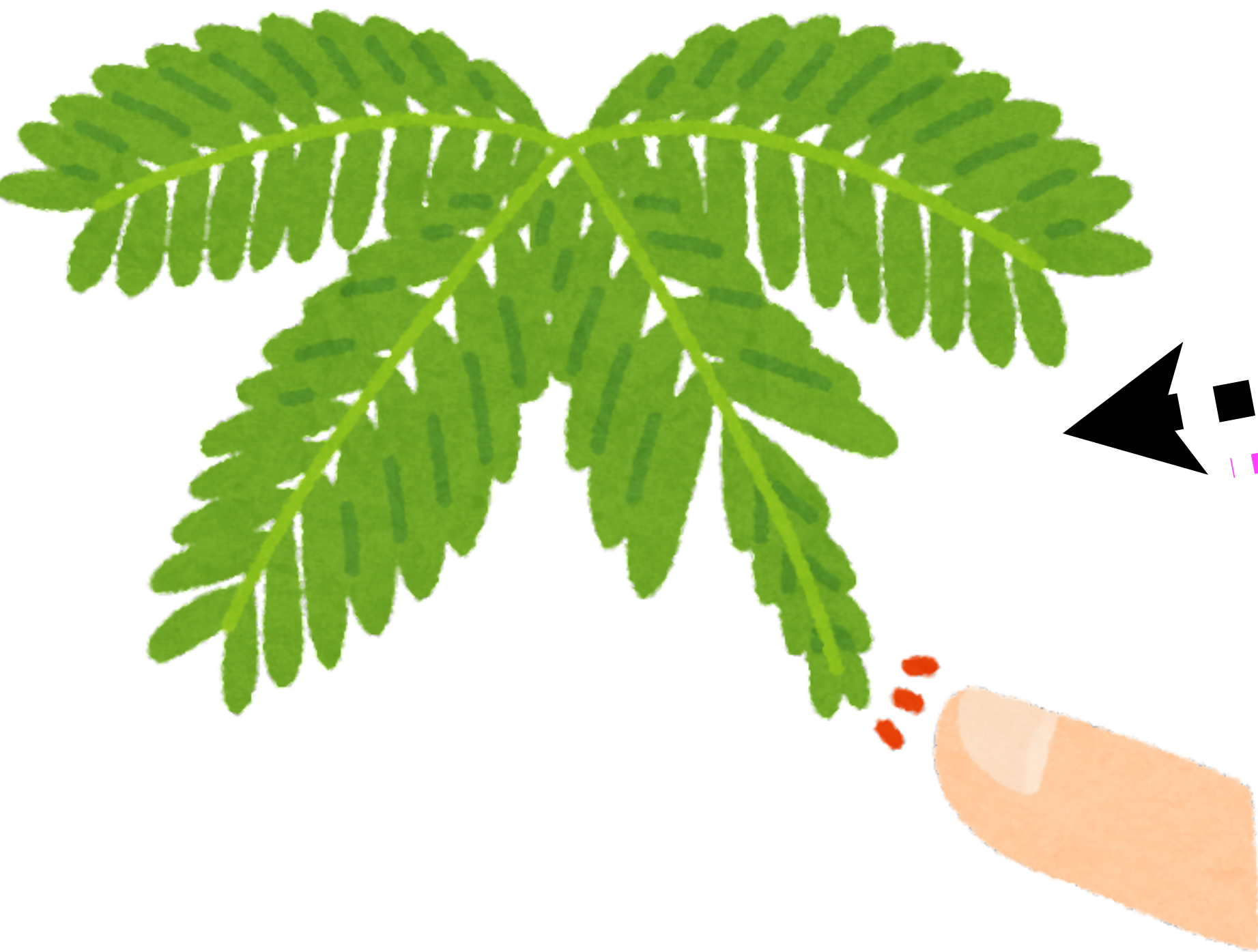
**Push! Push!**





# Gently press with half force

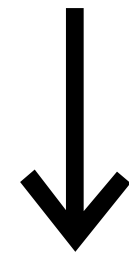
Push softly,  
Release force



Interoception



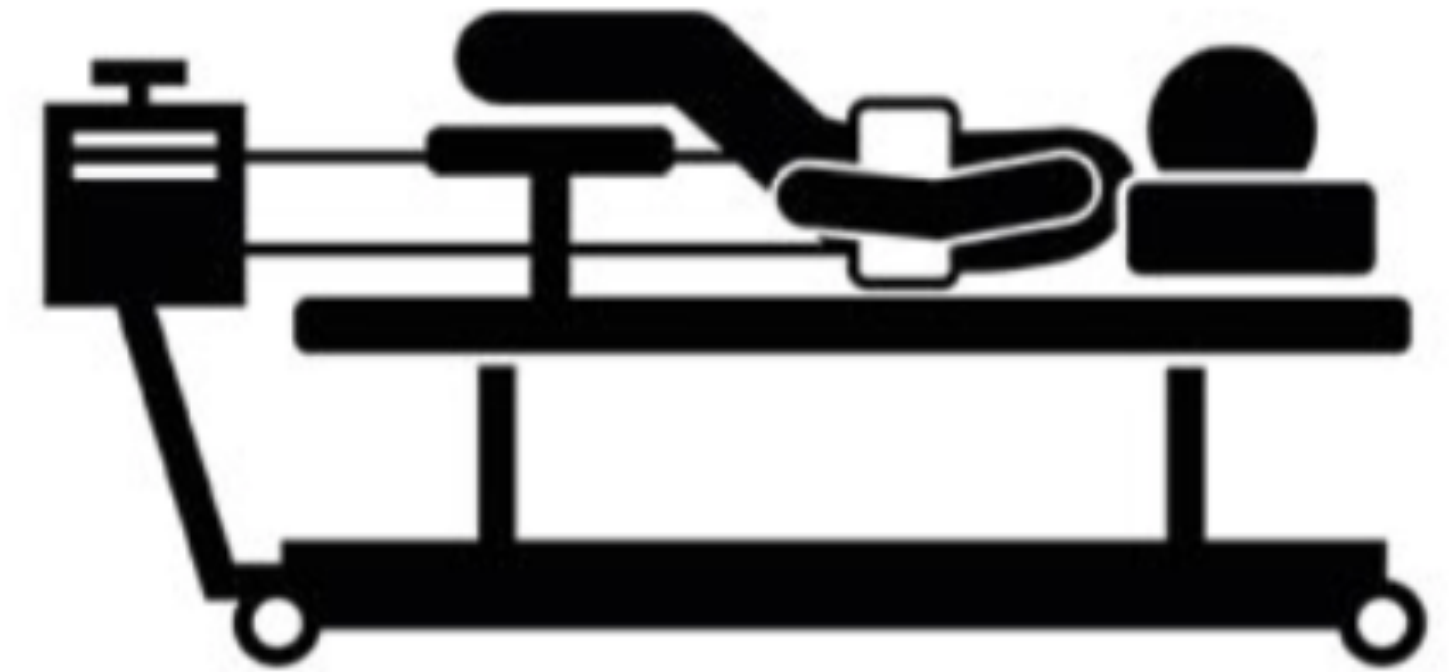
Activates multiple regions of the brain



Rehabilitation  
Well-being



# Rehabilitation



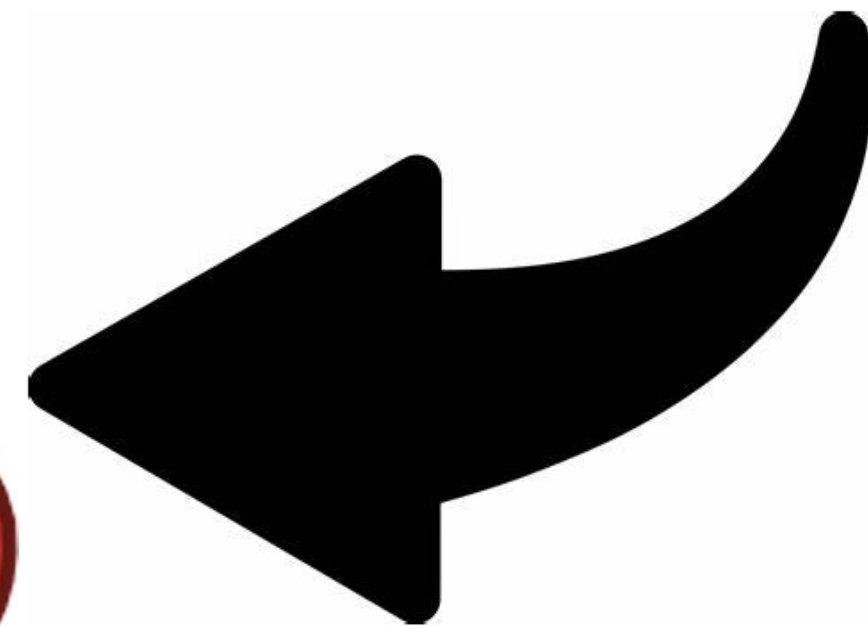
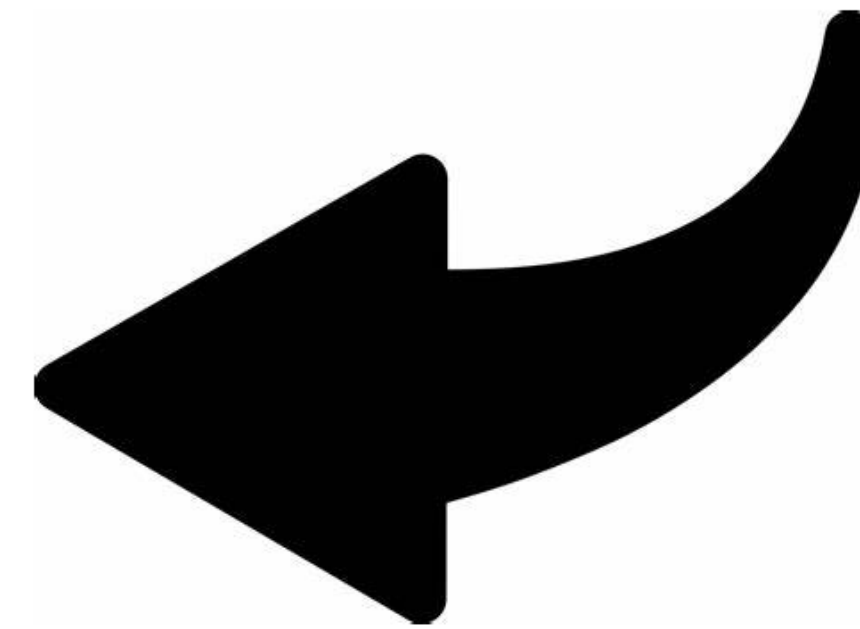


# Tactile Interaction

Smile (Emotion)



Wellness





# ARS ELECTRONICA FUTURELAB

Futurelab Day 2022 | Photo credit: Birgit Cakir

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# Maker Faire

From tech enthusiasts to crafters to homesteaders to scientists to garage tinkerers, Maker Faire is where novices and experts of all ages come together to show what they've made and share what they've learned. A community built on curiosity, collaboration, and resourcefulness.

## What are you making?







THREE DAY CONFERENCE  
SEPTEMBER 30TH TO OCTOBER  
2ND 2022

Dublin, Ireland Accenture  
The Dock Innovation Hub, 7 Hanover Quay,



# Workshops:

- Interactive Multimedia
- Tactile Interaction
- Rehabilitation / Welfare
- Wellness Entertainment

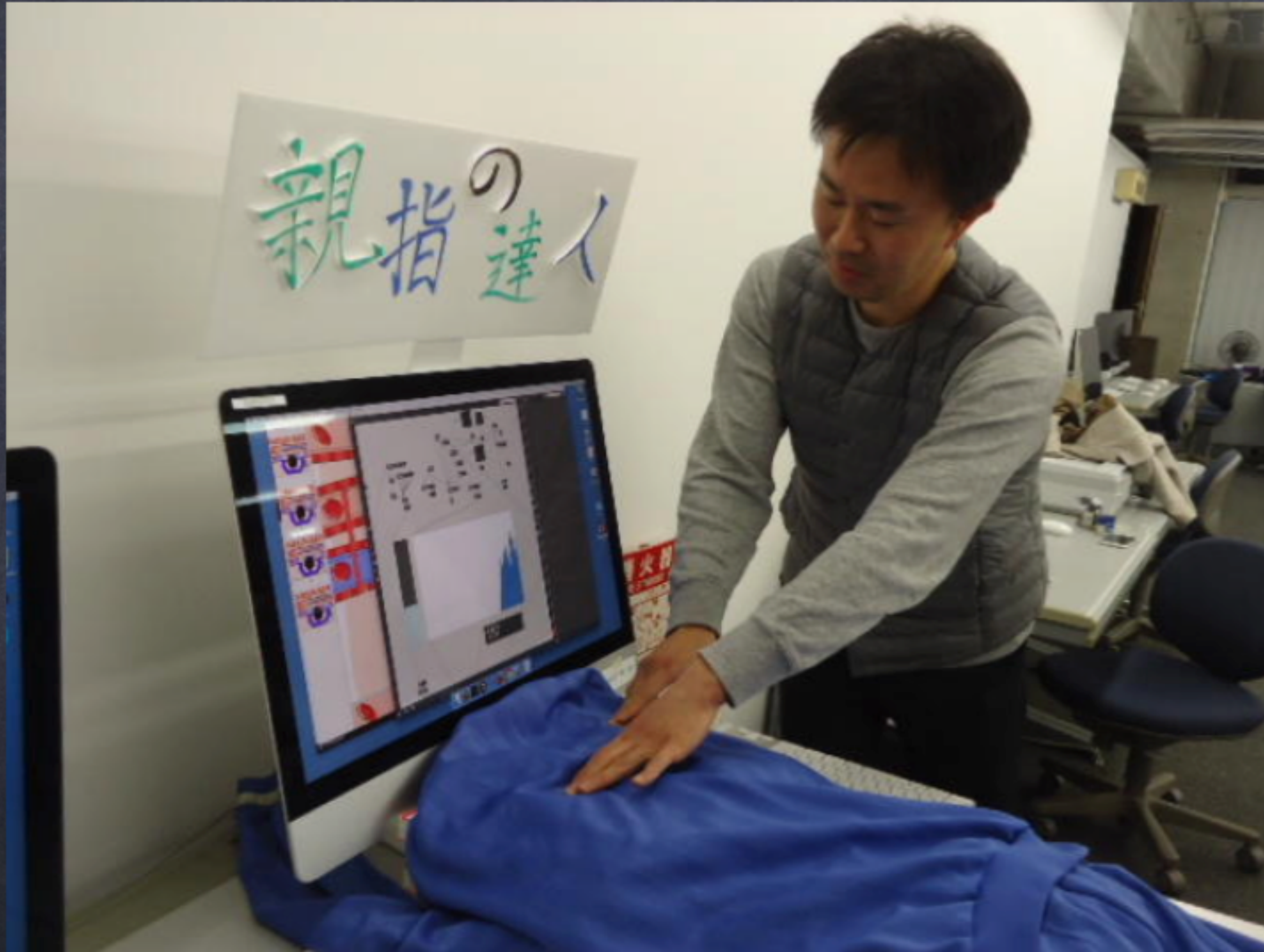


# Sketching Workshop in SUAC





# Sketching Workshop in SUAC



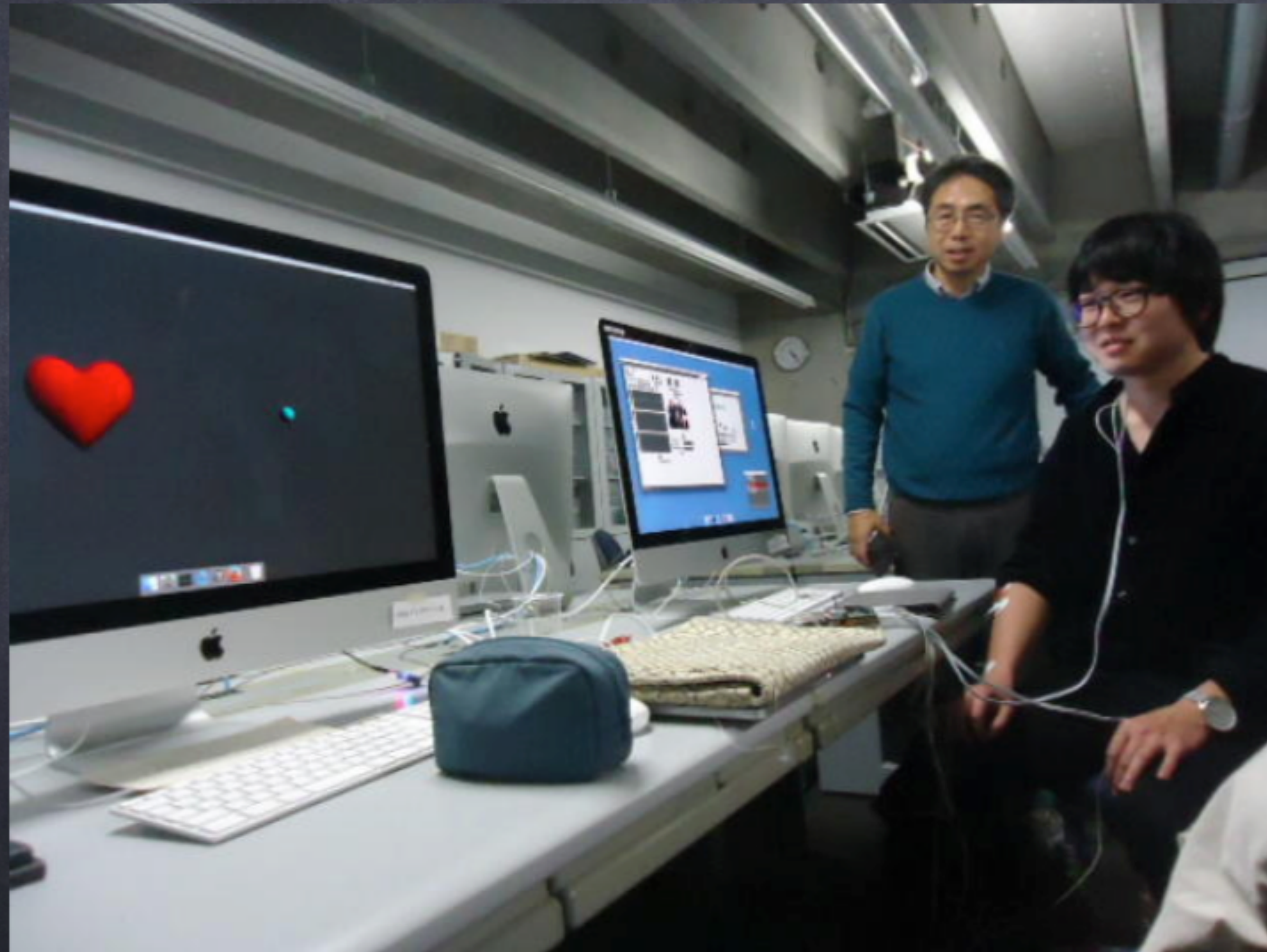


# Sketching Workshop in SUAC





# Sketching Workshop in SUAC





# Sketching Workshop in Japan





# Sketching Workshop in Russia





# Sketching Workshop in Moscow





# Sketching Workshop in Poland





Call me and I will go  
wherever I can to  
help you all.



Thank You !!

