

Bits and Atoms IV

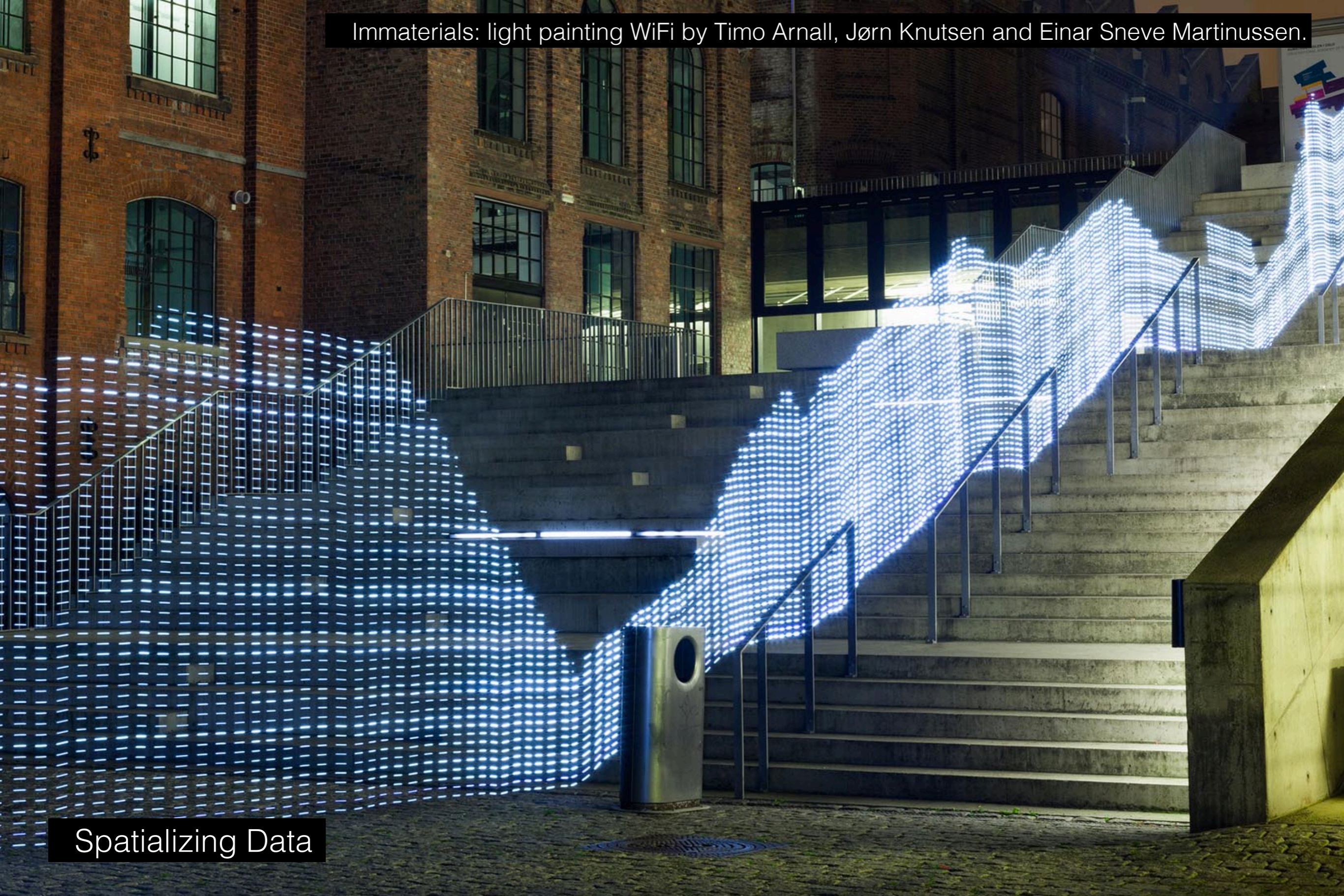
Luke Franzke - 2022

eawag



Networked Sensors

Immaterials: light painting WiFi by Timo Arnall, Jørn Knutsen and Einar Sneve Martinussen.




Spatializing Data



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Sensing



material als
experiment

Matter

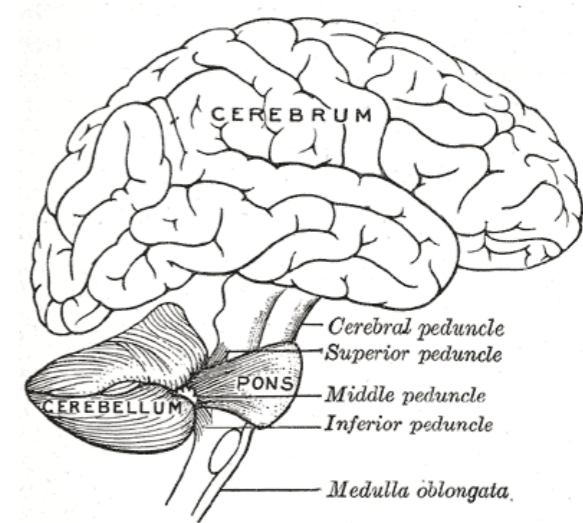
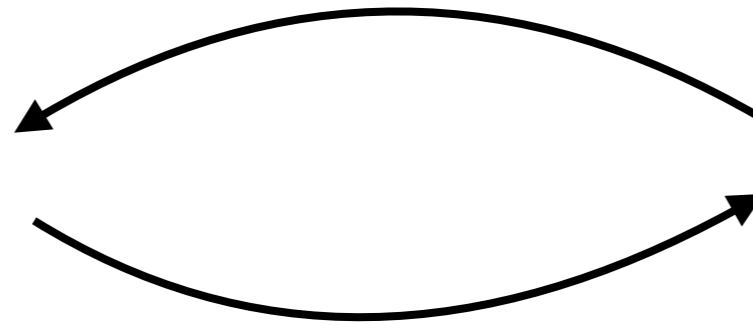
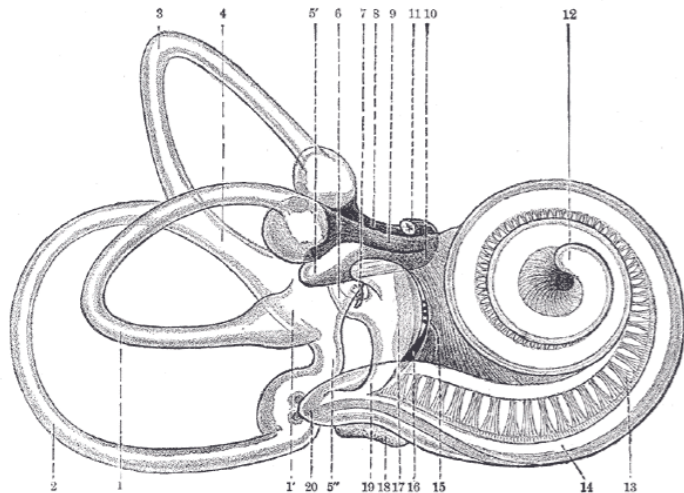
Energy

Time

Space

Phenomenon

Sensing and Cognition



Sensing Structures and Materials

Computation

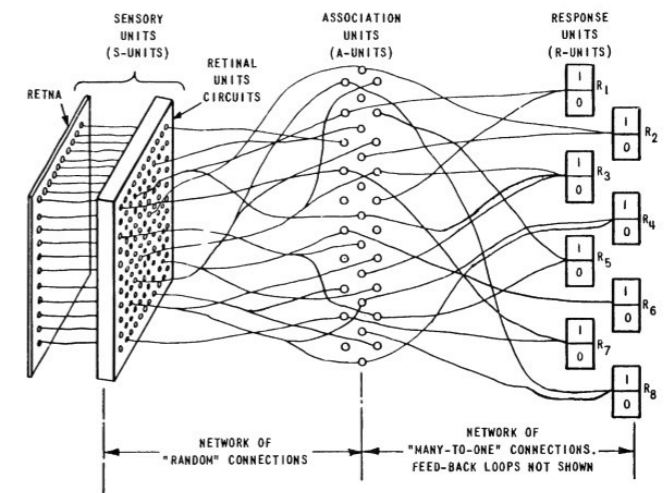
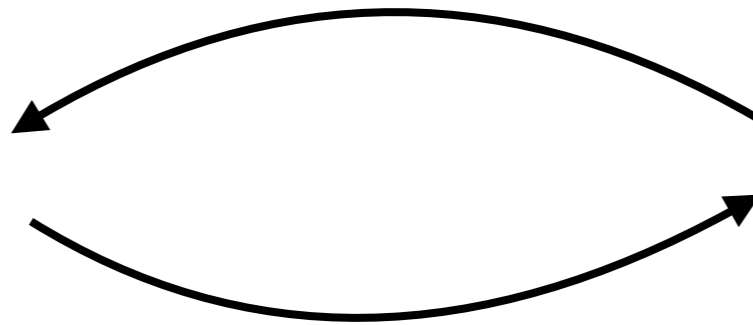
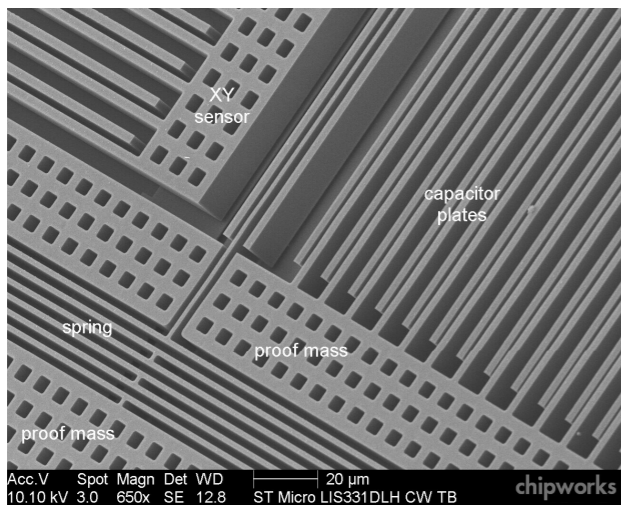
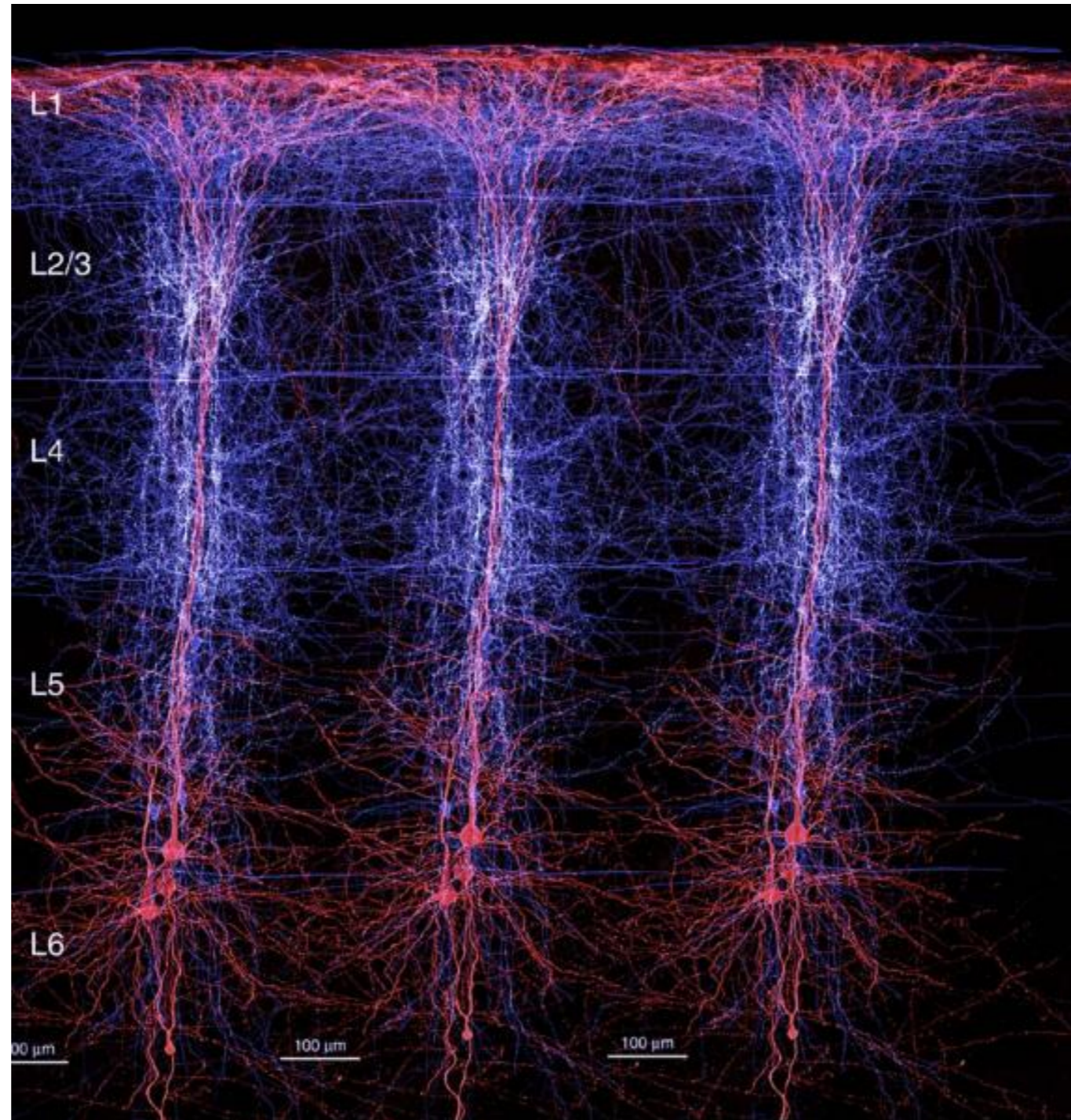


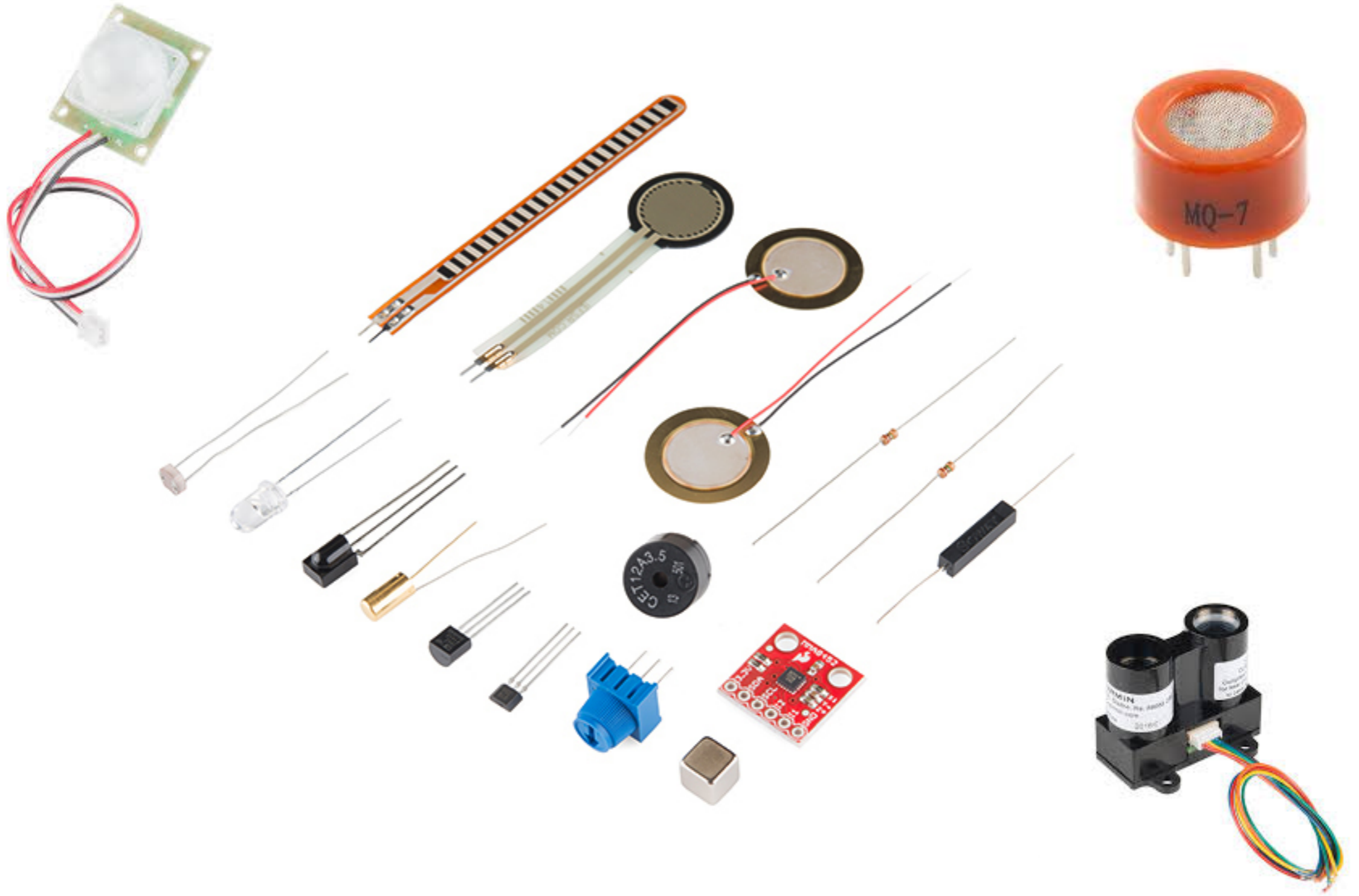
Figure 1 ORGANIZATION OF THE MARK I PERCEPTOR



Cajal Blue Brain Project, EPFL

Jeff Hawkins: Sensorimotor Object Recognition

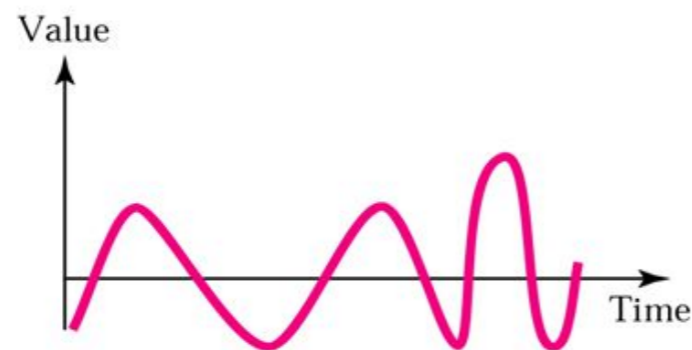
Sensors in Intelligent and Interactive Systems



Types of Sensors

Analog and Digital Signals

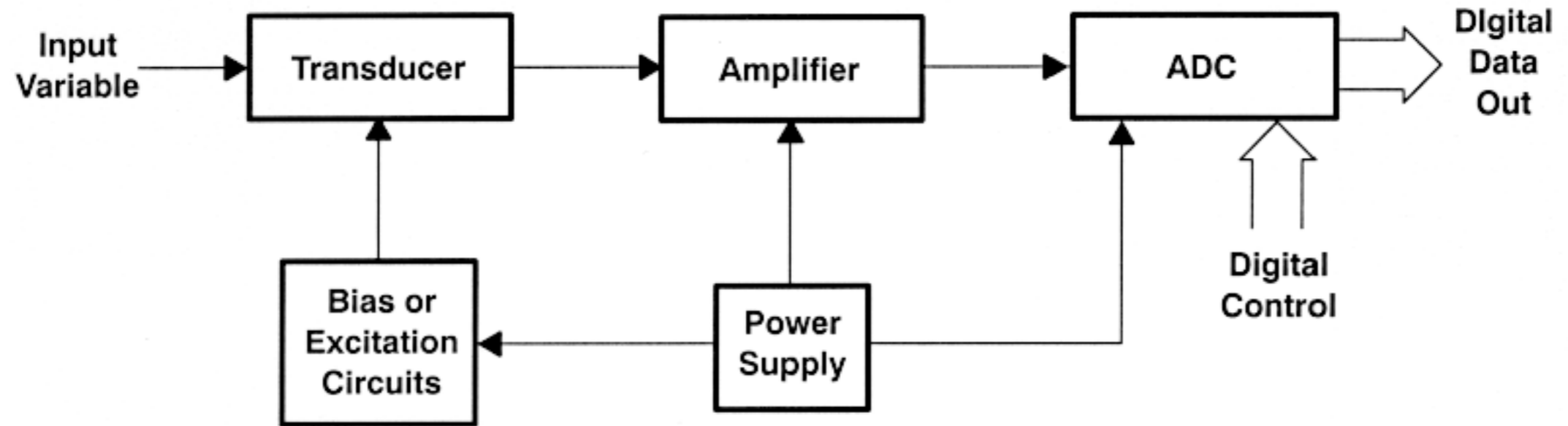
- An analog signal is a continuous wave form that changes smoothly over time
- A digital signal is discrete. It can have only a limited number of defined values, often as simple as 1 and 0

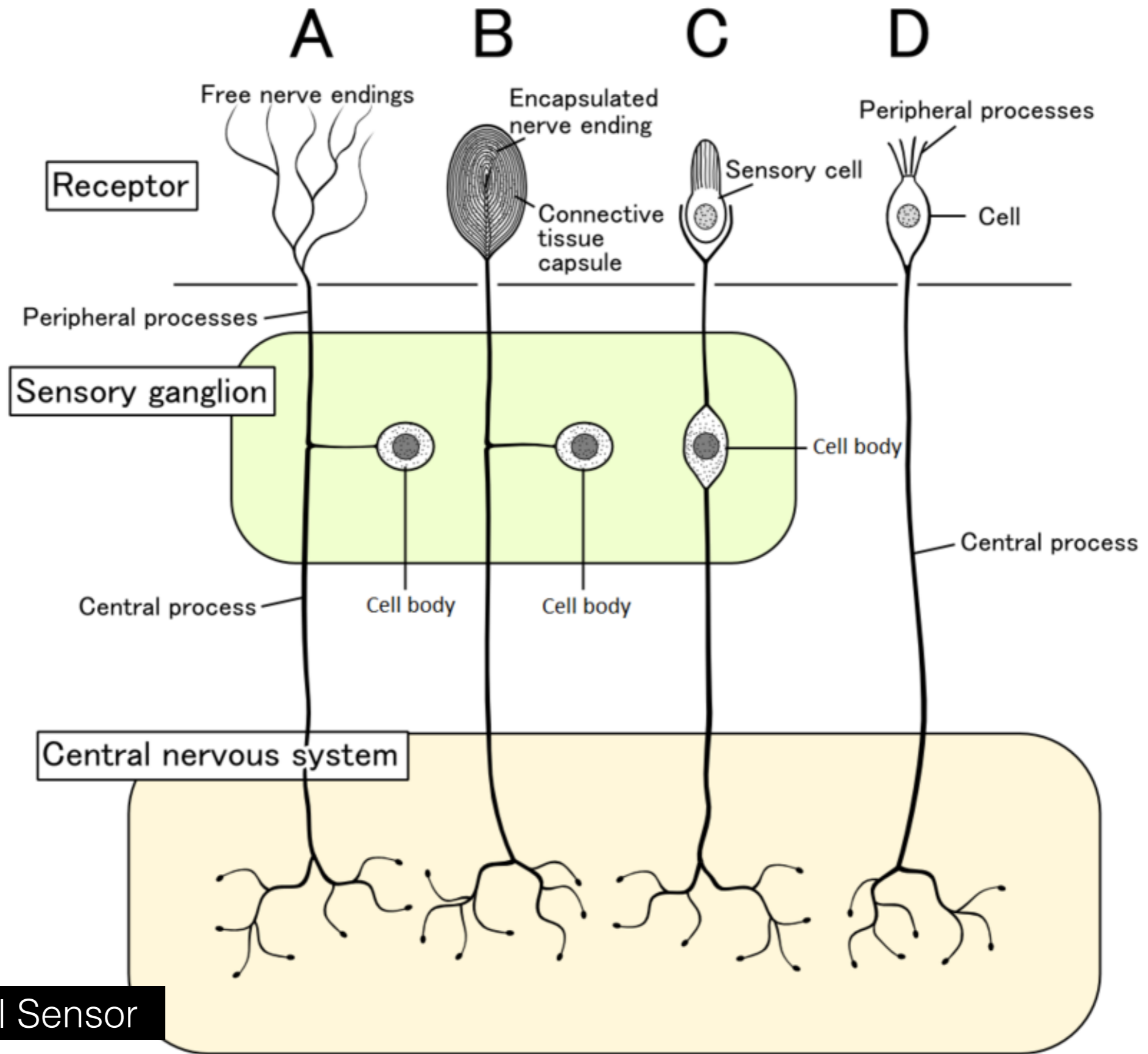


a. Analog signal



b. Digital signal





Biological Sensor

Future Sensors



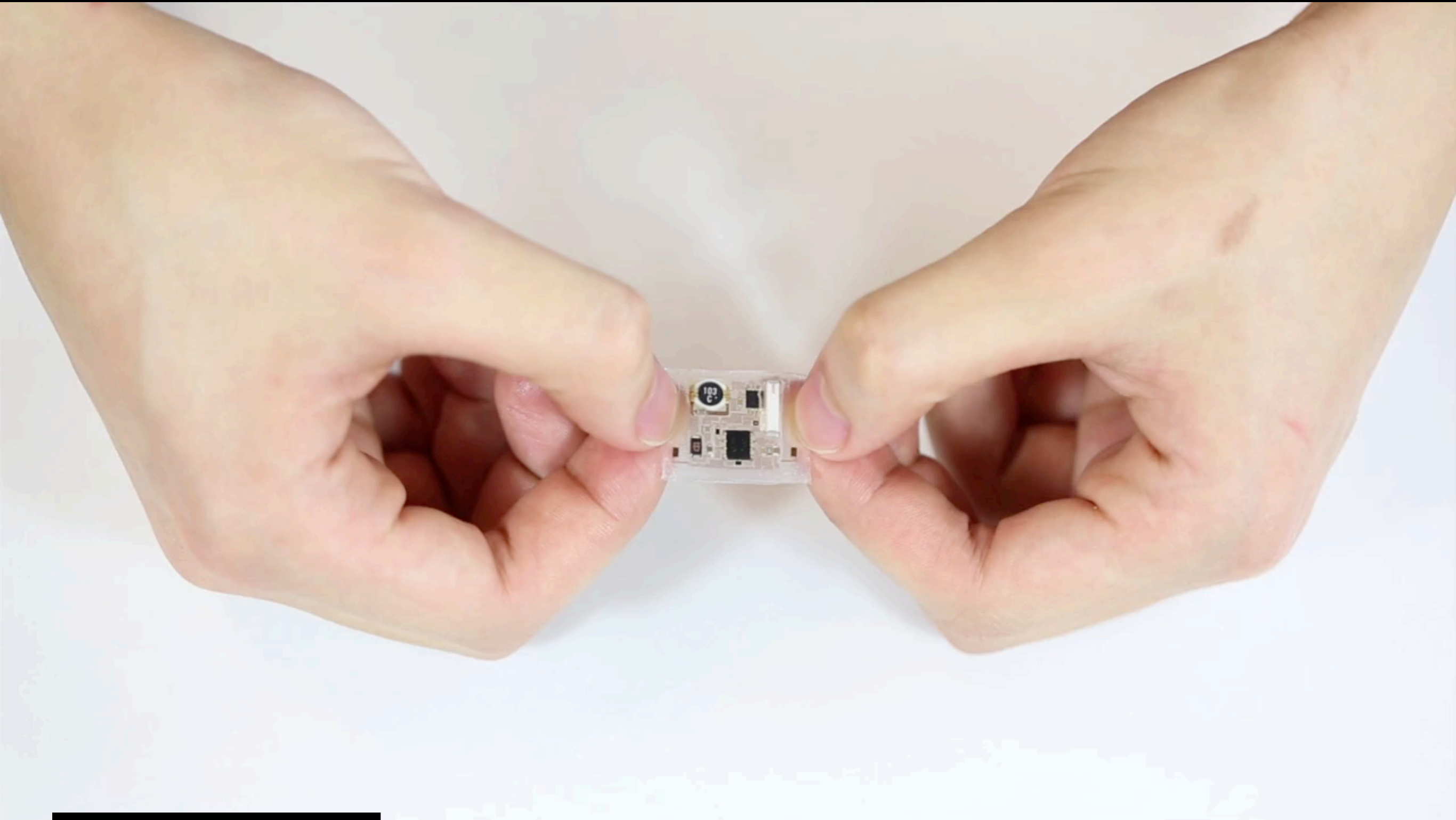


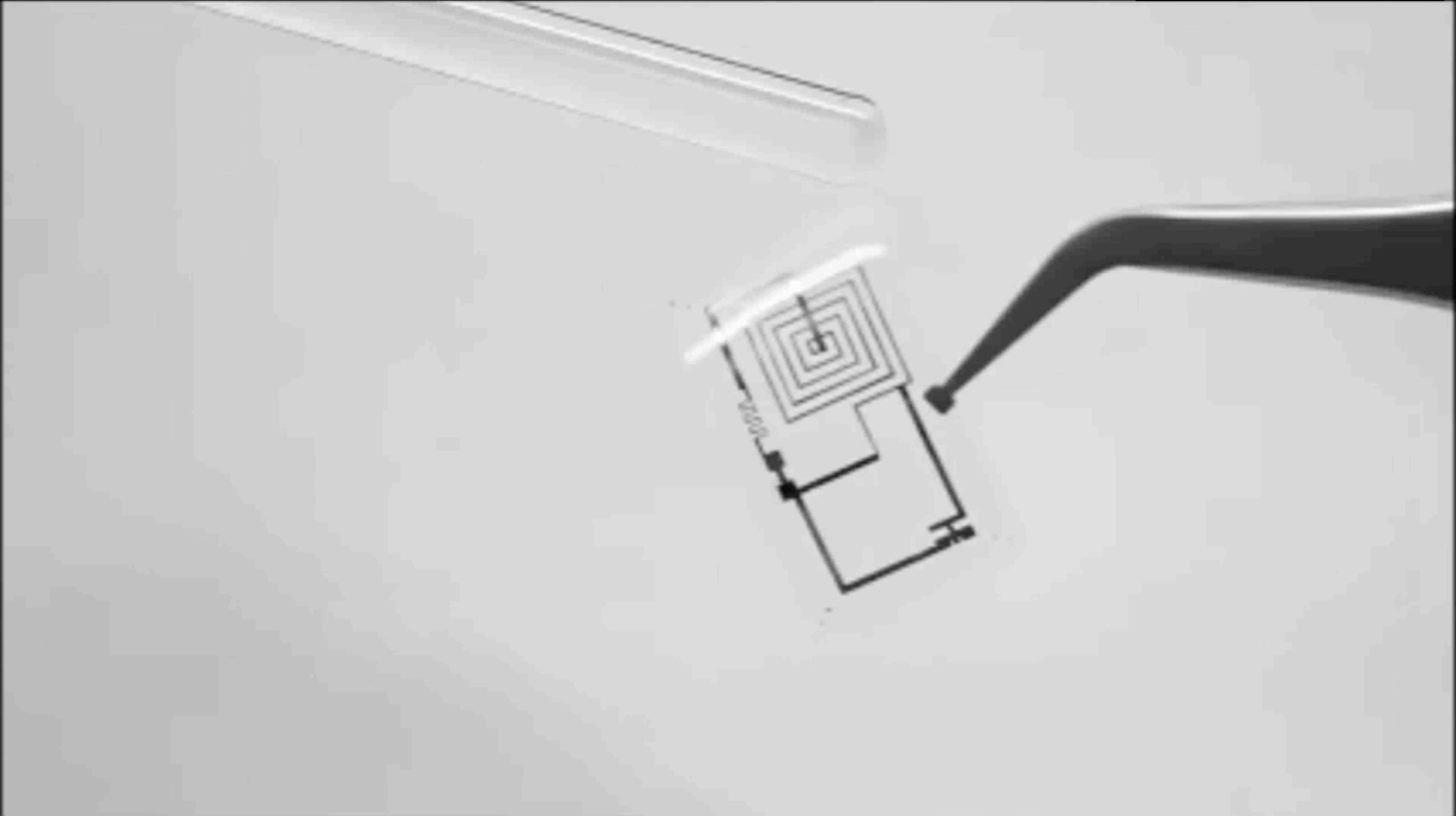
Human pulse



Respiratory motion

Eulerian Video Magnification

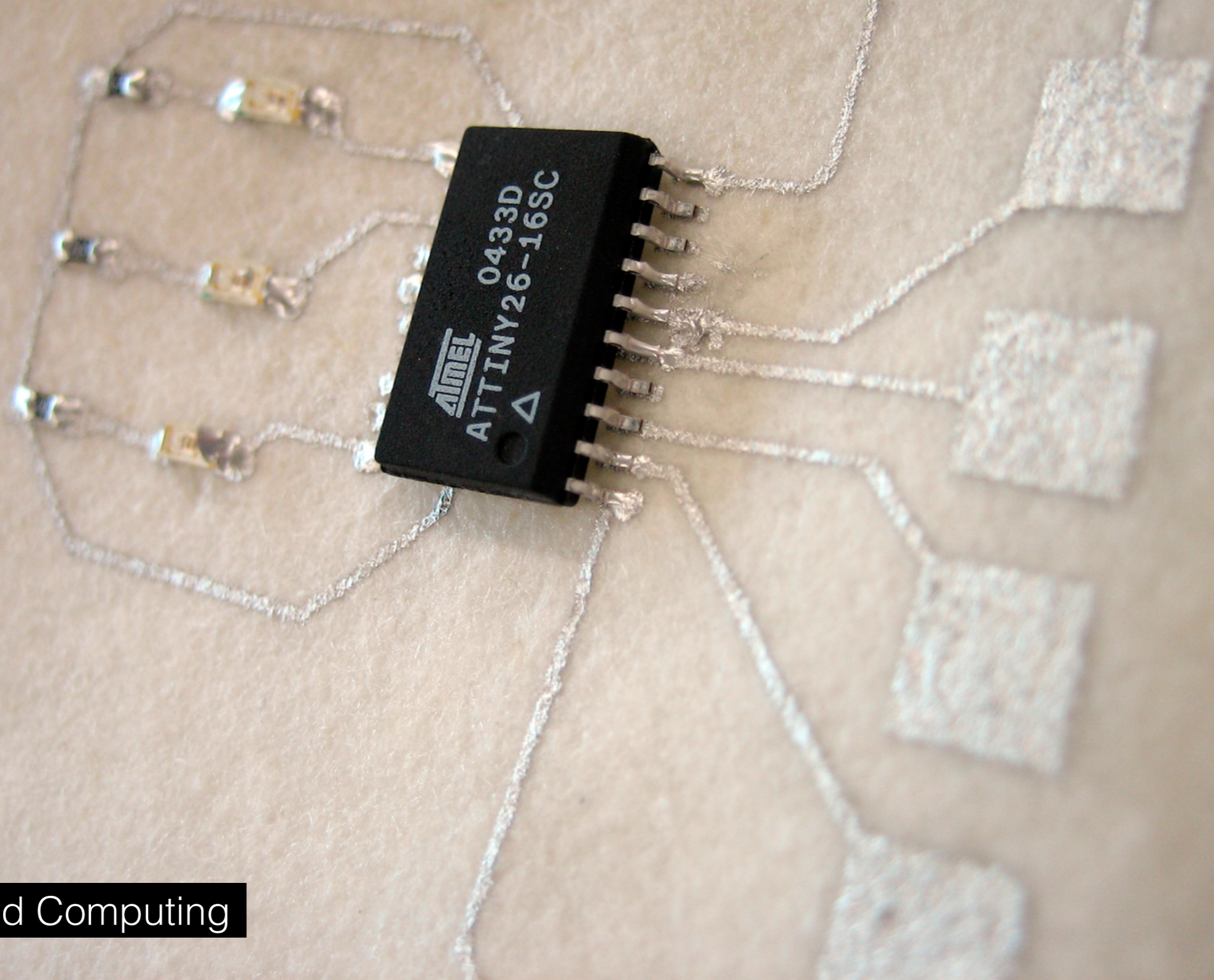


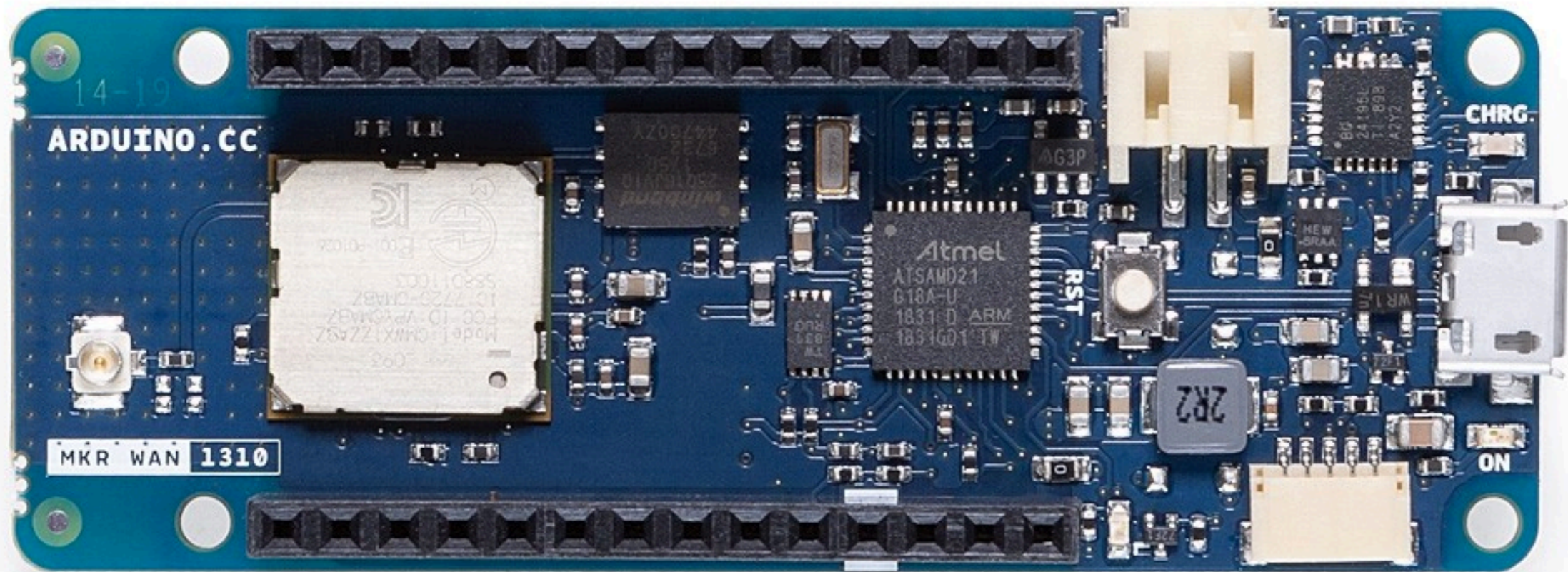


Transient Sensors

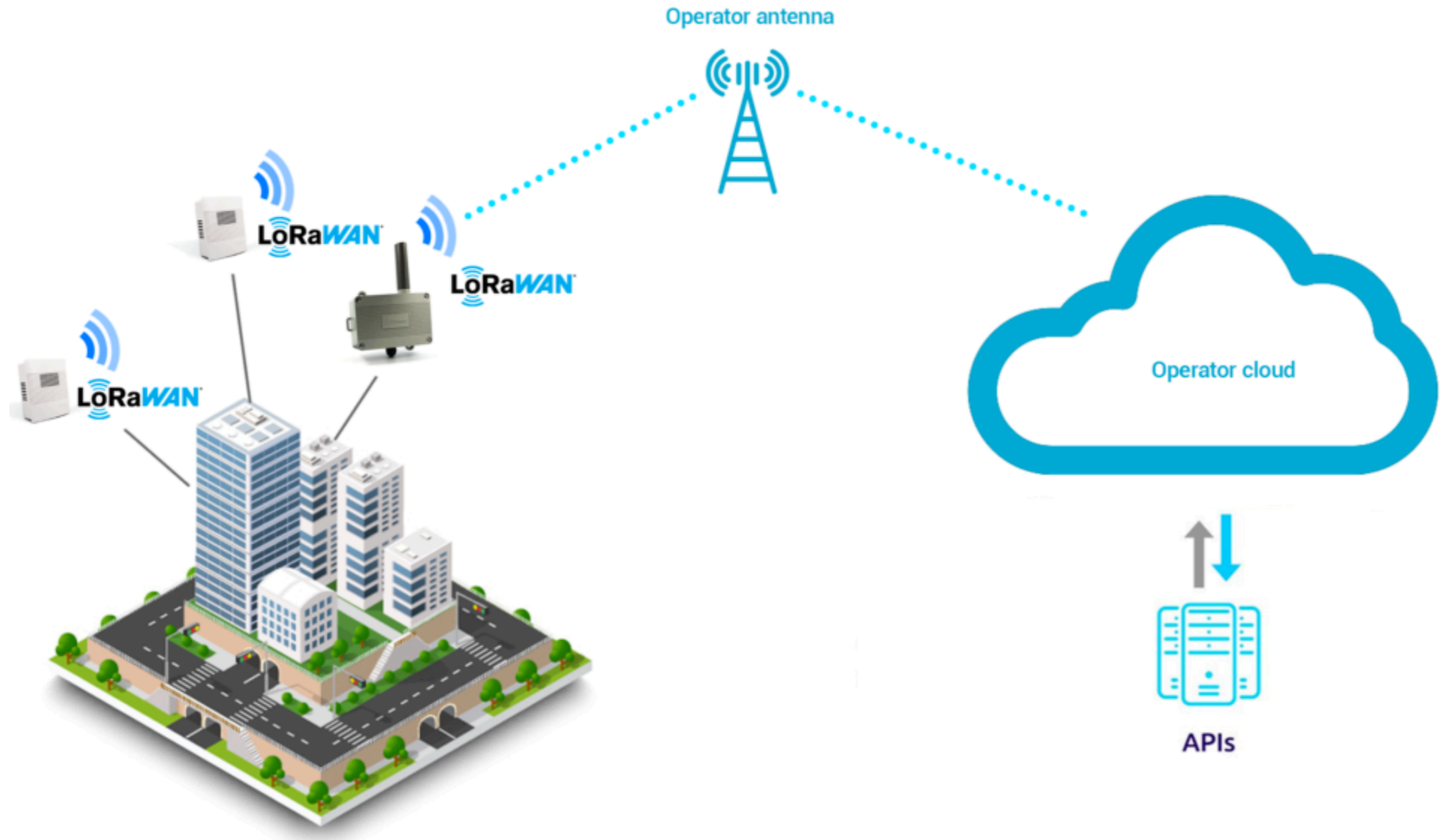


Biochemical Sensors



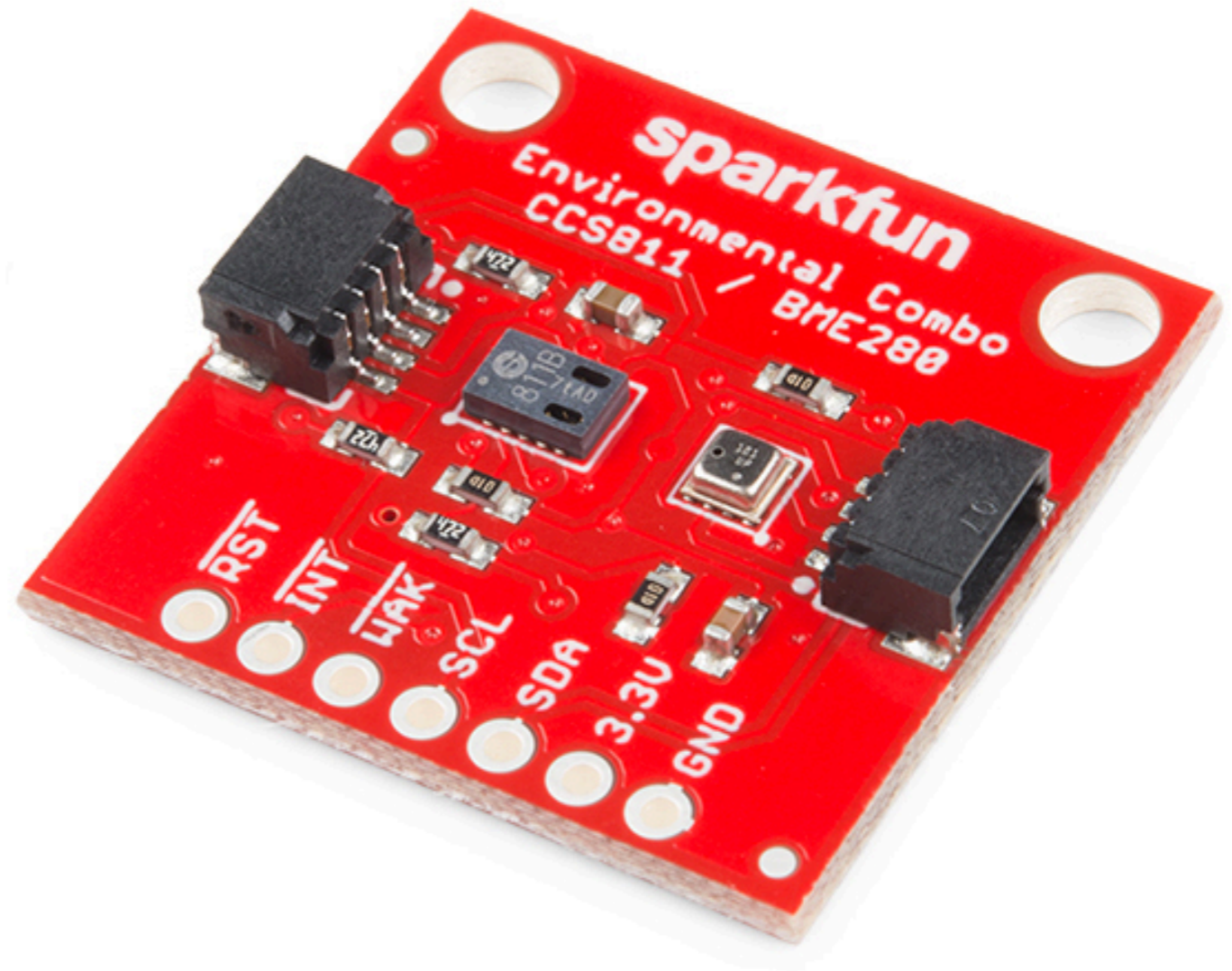


Arduino MKR 1310 WLAN

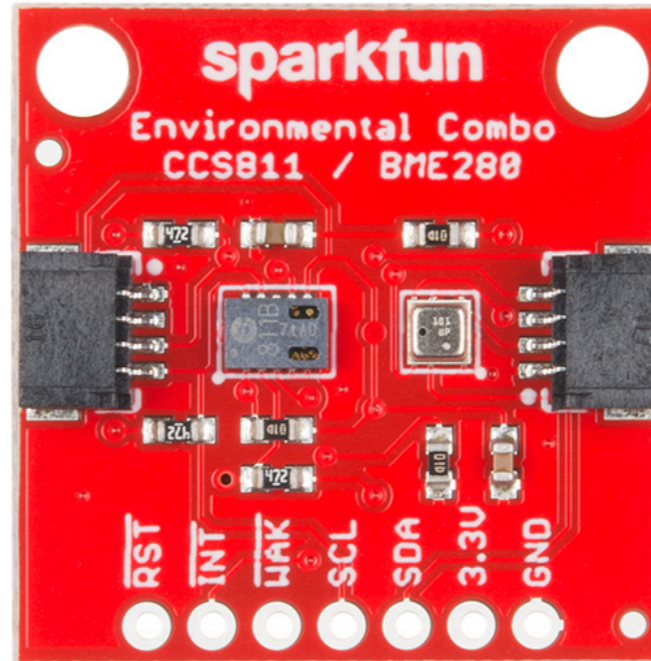


LORA and LORAWAN

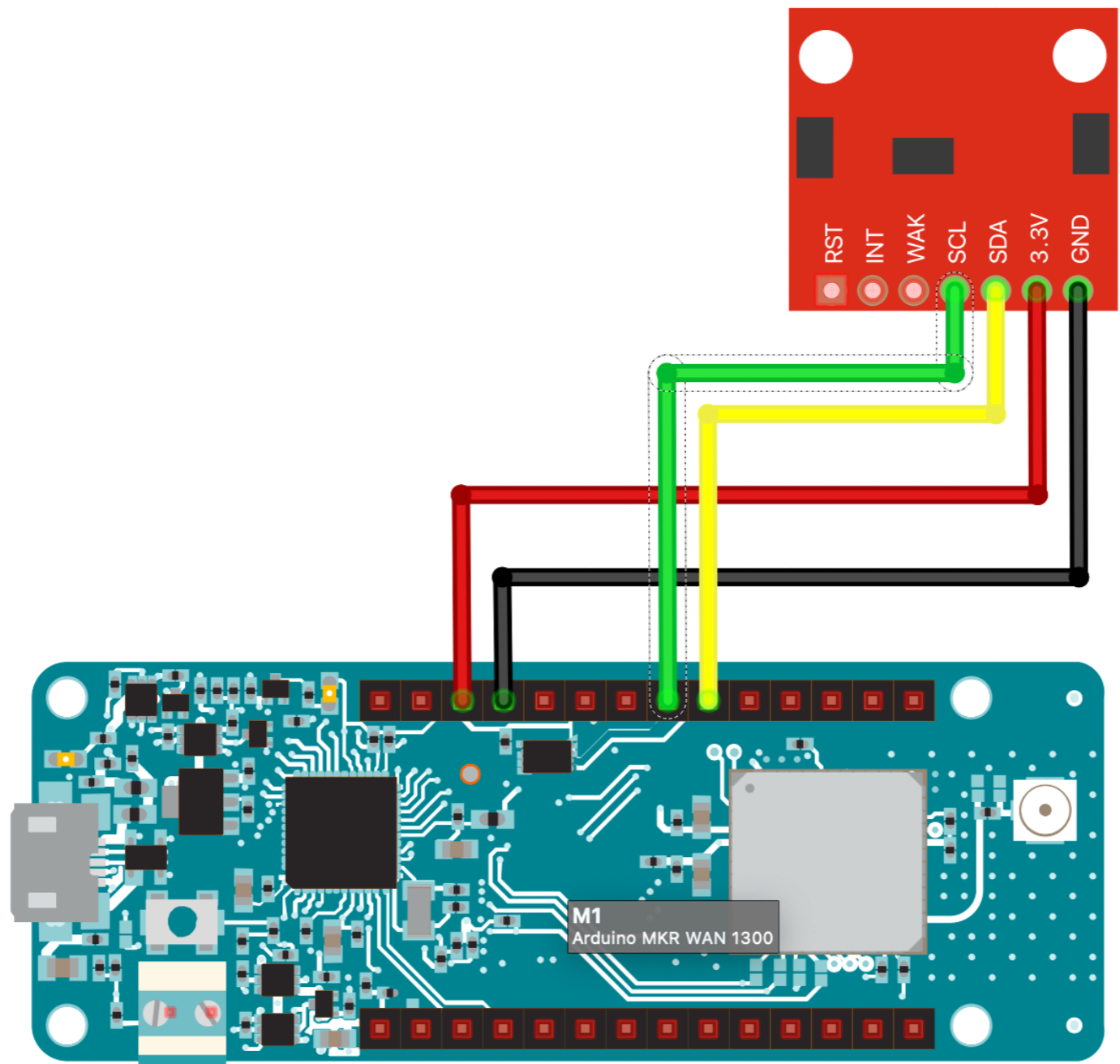
- CCS811 Air Quality Sensor
 - TVOCs in PPB
 - equivalent CO2 in PPM
- BME280 Temperature Humidity Pressure Sensor
 - Temperature
 - Humidity
 - Barometric Pressure



SparkFun Environmental Combo CCS811/BME280



- Hook up the Environmental Combo
- Install the board profile (MKR 1310)
- Install the required libraries (CCS811 & BME280)
- Get a basic example up and running with a serial output



Hook up

- Download the examples from the git repository
- Modify the Arduino code to output a single line of comma separated values over serial
- Modify the visualisation to be mapped appropriately to the data
- Label the channels on the visualisation
- Create new visuals suitable for the data

- Choose a physical Phenomenon
- Find a sensor that may be able to measure this phenomenon