Worksheet 1 - Signals and Noise

# Your EEG data

1. Open the EEG\_blink.csv file in Excel (or similar)
2. How many columns do you see?
3. What does one column correspond to?
4. How many rows do you see?
5. What does one row correspond to?

# Basic operations

1. In the first row, convert the numbers to time
2. In column A, convert the numbers to the names of the electrodes (use the electrode map image)
3. Calculate the minimum, maximum and average sample value for each row
4. Plot every channel as a line plot
5. Save the most interesting plots with the correct plot titles, axis names and axis units

# Sources of noise

1. Bad electrode connection
   1. Which channels were badly connected?
   2. What tells you that those were badly connected?
   3. How would you decide if a channel was bad? How would you quantify it?
   4. Remove the data from the bad channels
2. Blinking
   1. How many blinks can you identify?
   2. Which channels pick up the blinks?
   3. Find the starting time, peak time and ending time of the blinks
   4. Take the average of the channels that you identified as blinks
   5. Plot the average
   6. How is this different from the individual plots?
3. Repeat all of the above for horizontal eye movements using the *EEG\_eye\_movement.csv* file

# Noise generation

1. Create a new row and generate a 1s long noise signal
2. Repeat with another 10 rows, take the average of these channels and plot it
3. Repeat with another 100 rows, take the average of these channels and plot it
4. Generate a signal that simulates 50Hz power line noise
5. Repeat d) but imagine you are in the United States