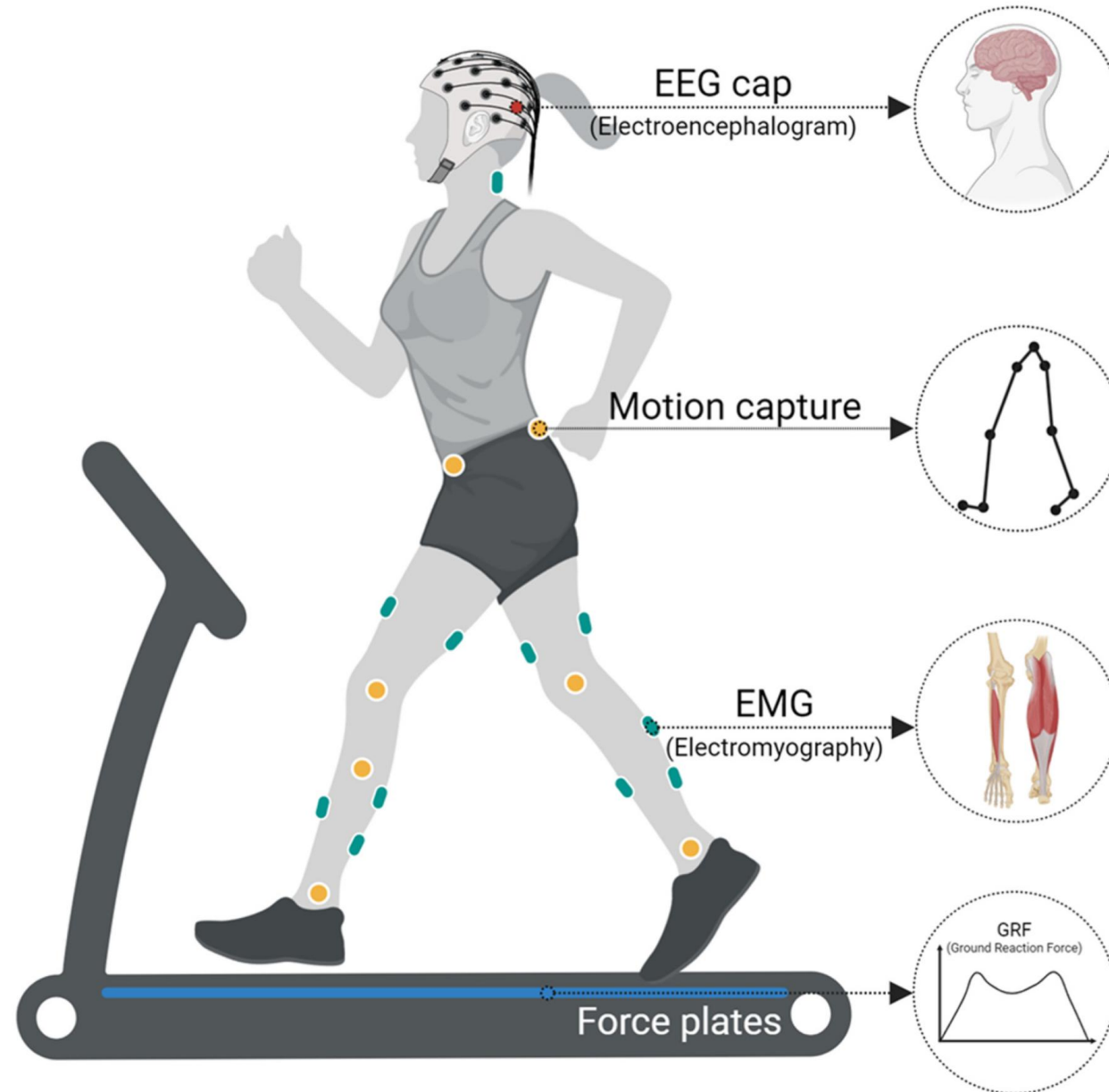


ISPGR WS

Bridging the Gap

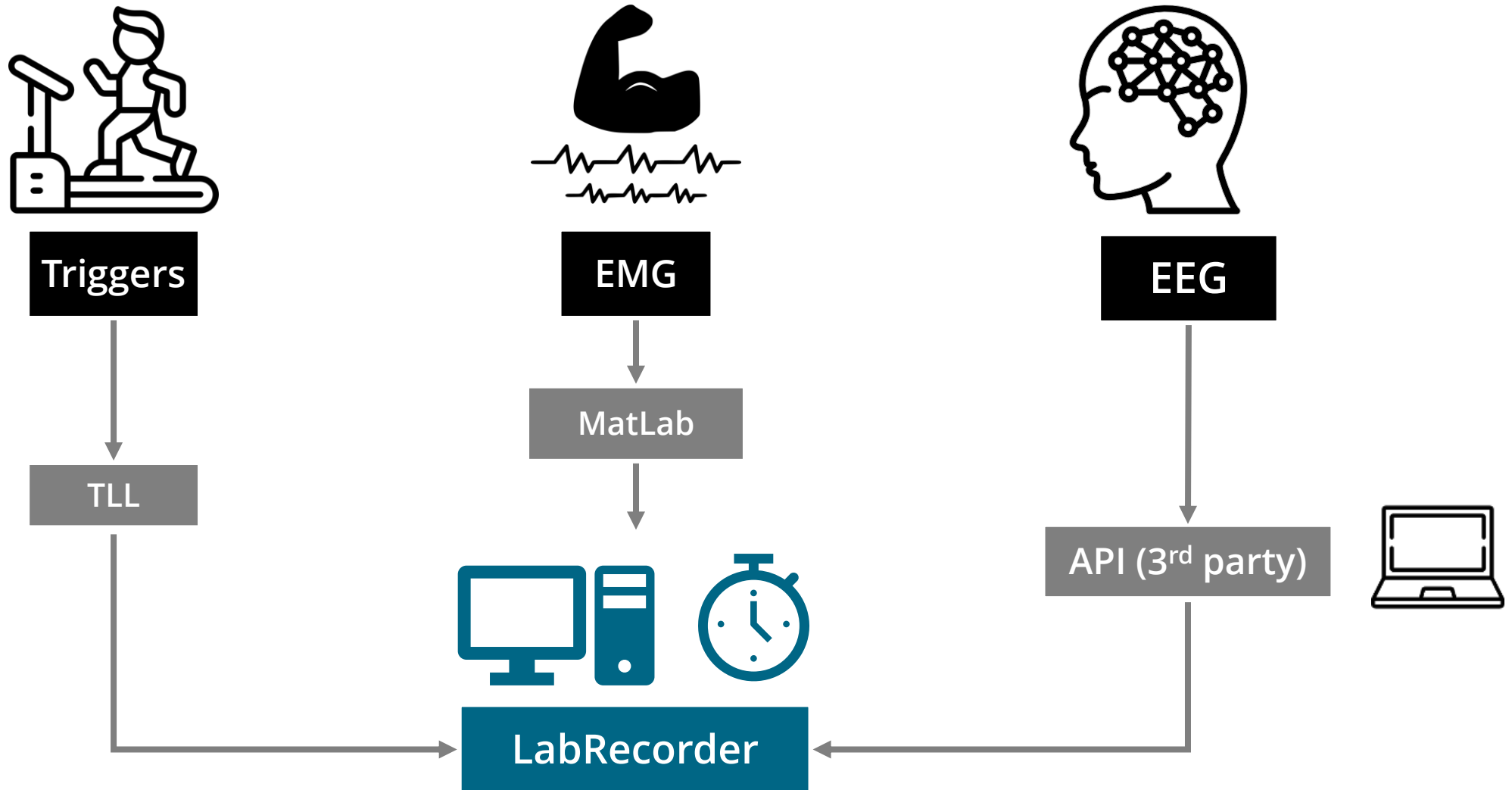
Best Practices in Mobile Brain Imaging

Maastricht 2025



How can I record **EEG, EMG,**
MoCap, video, ... in a
synchronized manner?

Part 1- How to synchronize recordings



LabStreamingLayer (LSL)

LSL distribution comprises:

- **Core Library:** liblsl and language interfaces (C, C++, Python, Java, MATLAB).
- **Platform:** General-purpose and cross-platform (Windows, Linux, macOS, Android).
- **Architecture:** Supports x86, amd64, and arm.

The most common way to use LSL is to use one or more applications to stream data from one or more devices (e.g., EEG and Eye Tracker) over the local network and record the with the LabRecorder.

Steps to use LSL:

1. Create LSL outlet
2. Fetch data from device
3. Push data to LSL outlet

Example Matlab Code

```
1 %% instantiate the library
2 disp('Loading library...');
3 lib = lsl_loadlib();
4
5 % make a new stream outlet
6 disp('Creating a new streaminfo...');
7 info = lsl_streaminfo(lib,'DelSys','EMG',8,100,'cf_float32'); % 8 channels, 100 Hz, float32
8
9 % initiate DelSys Trigno wireless EMG SDK
10
11 DelsysInput = tcpip(HOST_IP,50041); % HOST_IP is the IP address of the computer running the Delsys SDK, 50041
12 DelsysInput.InputBufferSize = 6400; % Buffer size for the input stream
13
14 disp('Opening an outlet...');
15 outlet = lsl_outlet(info);
16
17 % send data into the outlet, sample by sample
18 disp('Now transmitting data...');
19 while true
20     % get data from device
21     tmp_data = fread(DelsysInput,bytesReady); % read data from device (8 channel EMG)
22
23     % push data to LSL outlet
24     outlet.push_sample(tmp_data); % push data to LSL outlet
25 end
```



EEG LSL outlet

`lsl_streaminfo(lib, 'BioSemi', 'EEG', 8, 100, 'cf_float32')`

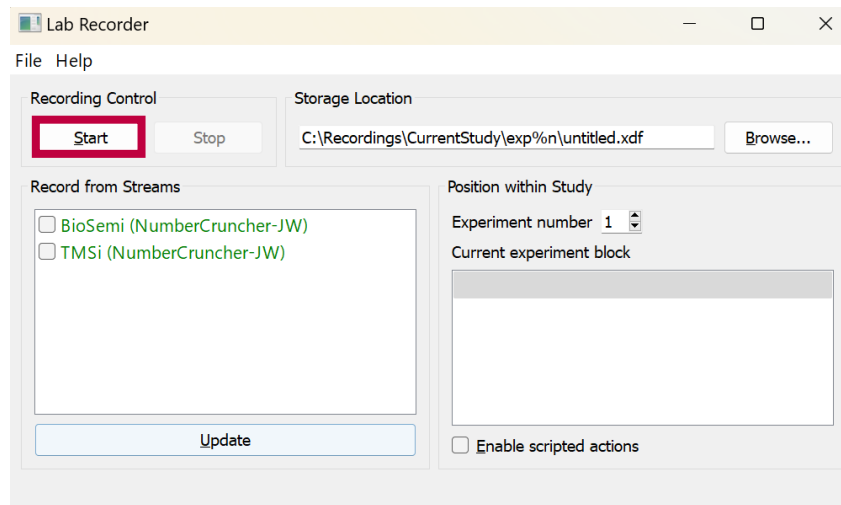


LSL lib



EMG LSL outlet

`lsl_streaminfo(lib, 'TMSi', 'EMG', 12, 200, 'cf_float32')`



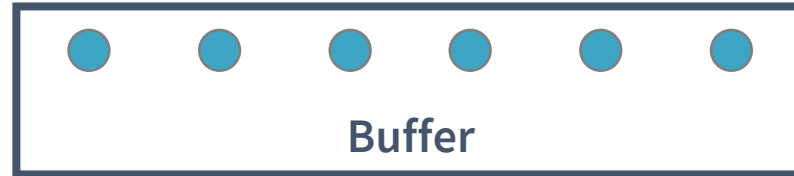
EEG Stream



EMG Stream



EMG

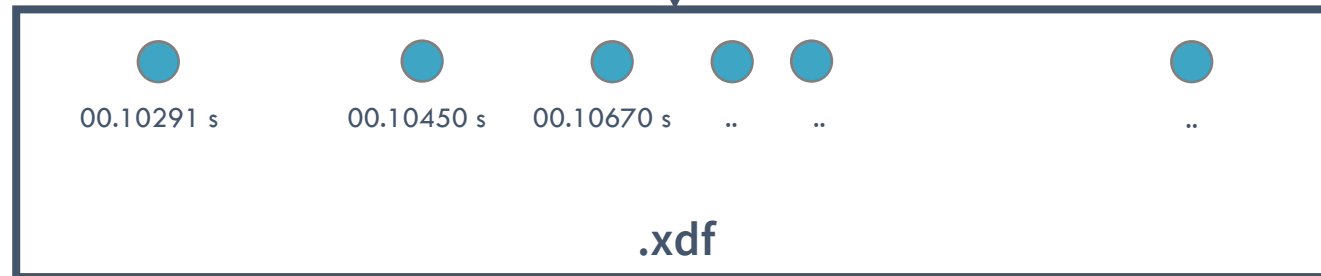


pulls data

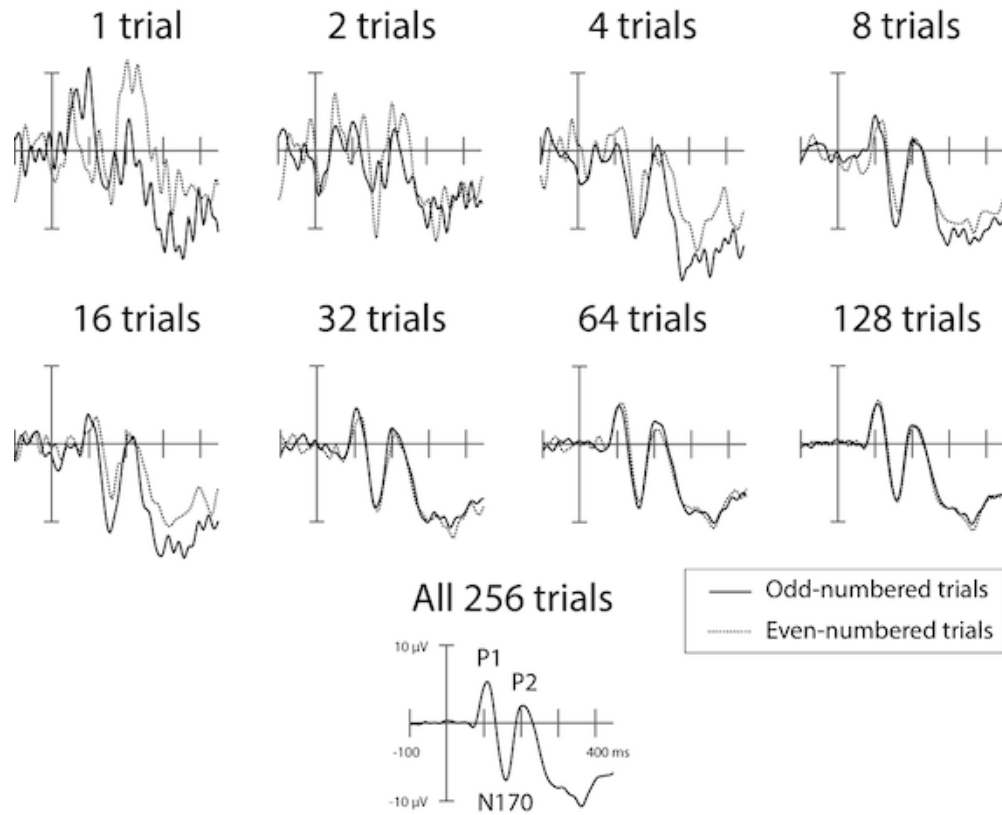


EMG LSL outlet

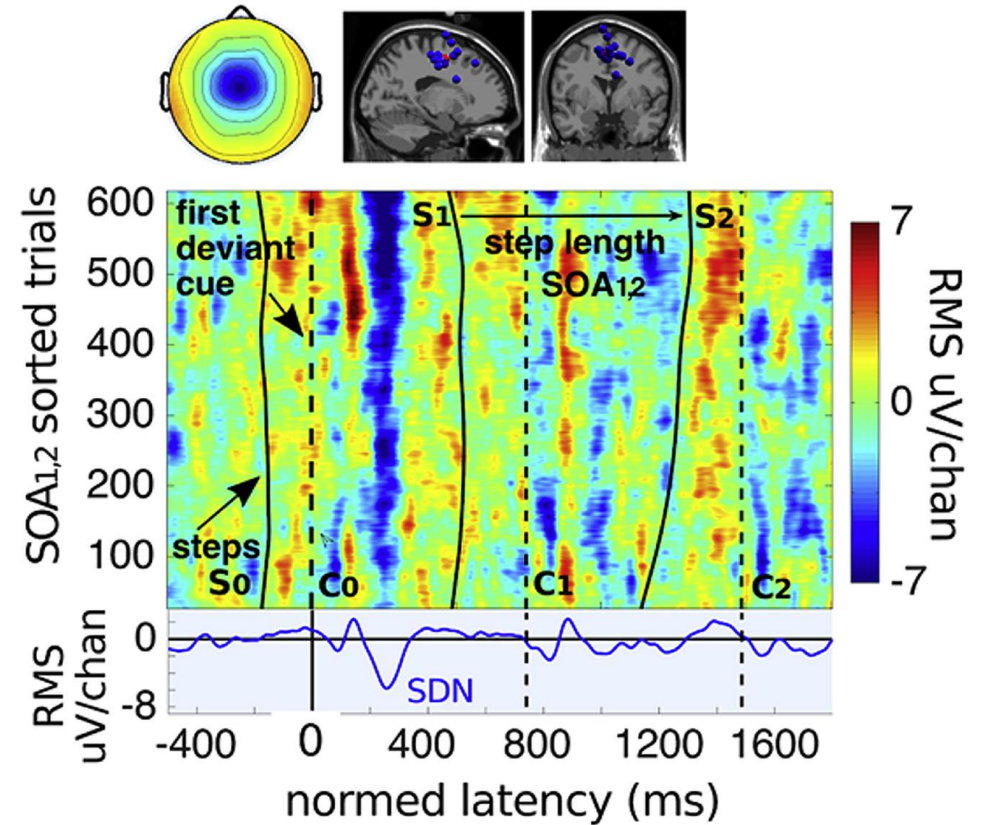
writes data



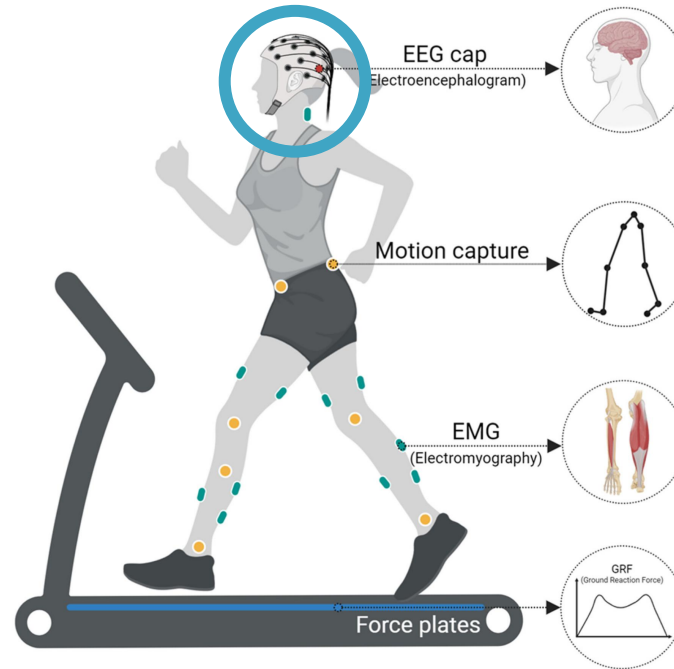
Why is subsecond precision important?



A step delay trials sorted by adaptation step size



What to expect today:

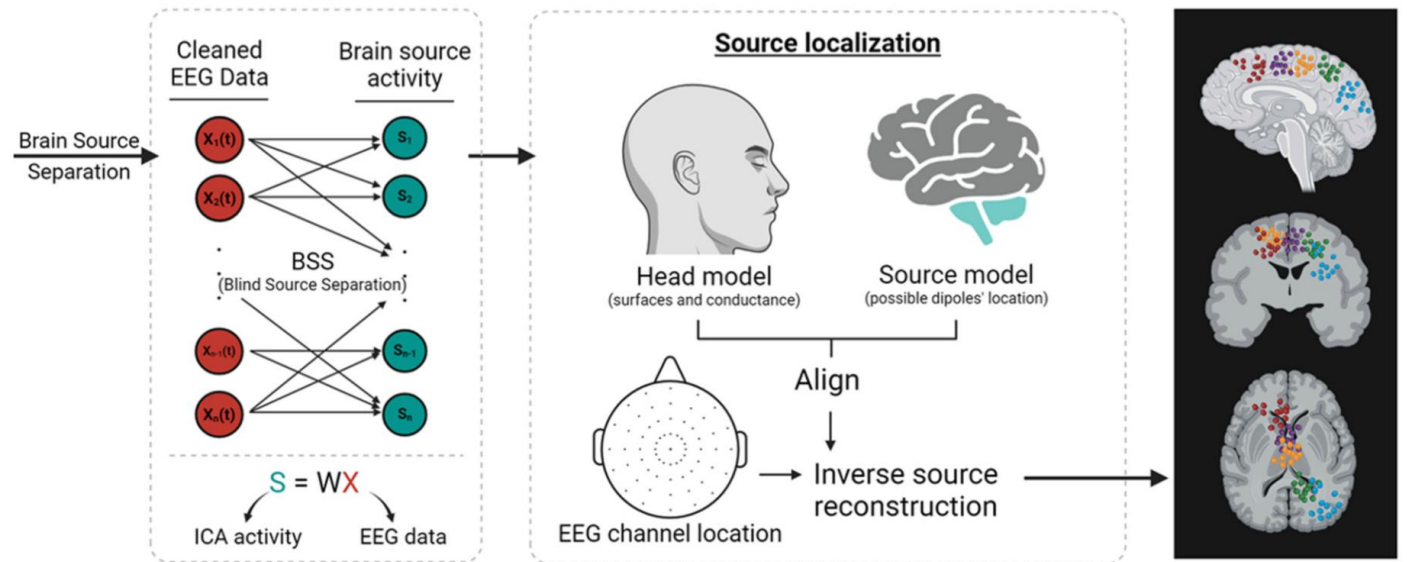
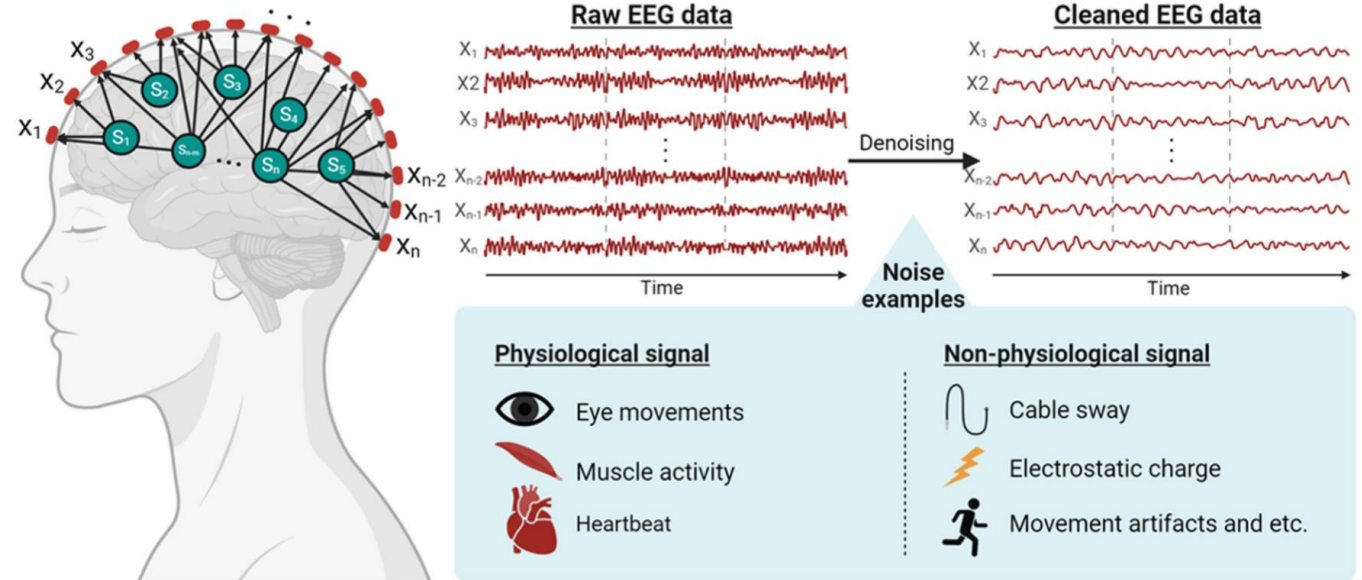


How can I record **EEG, EMG, MoCap, video, ...** in a **synchronized** manner?

How to use **EEG**

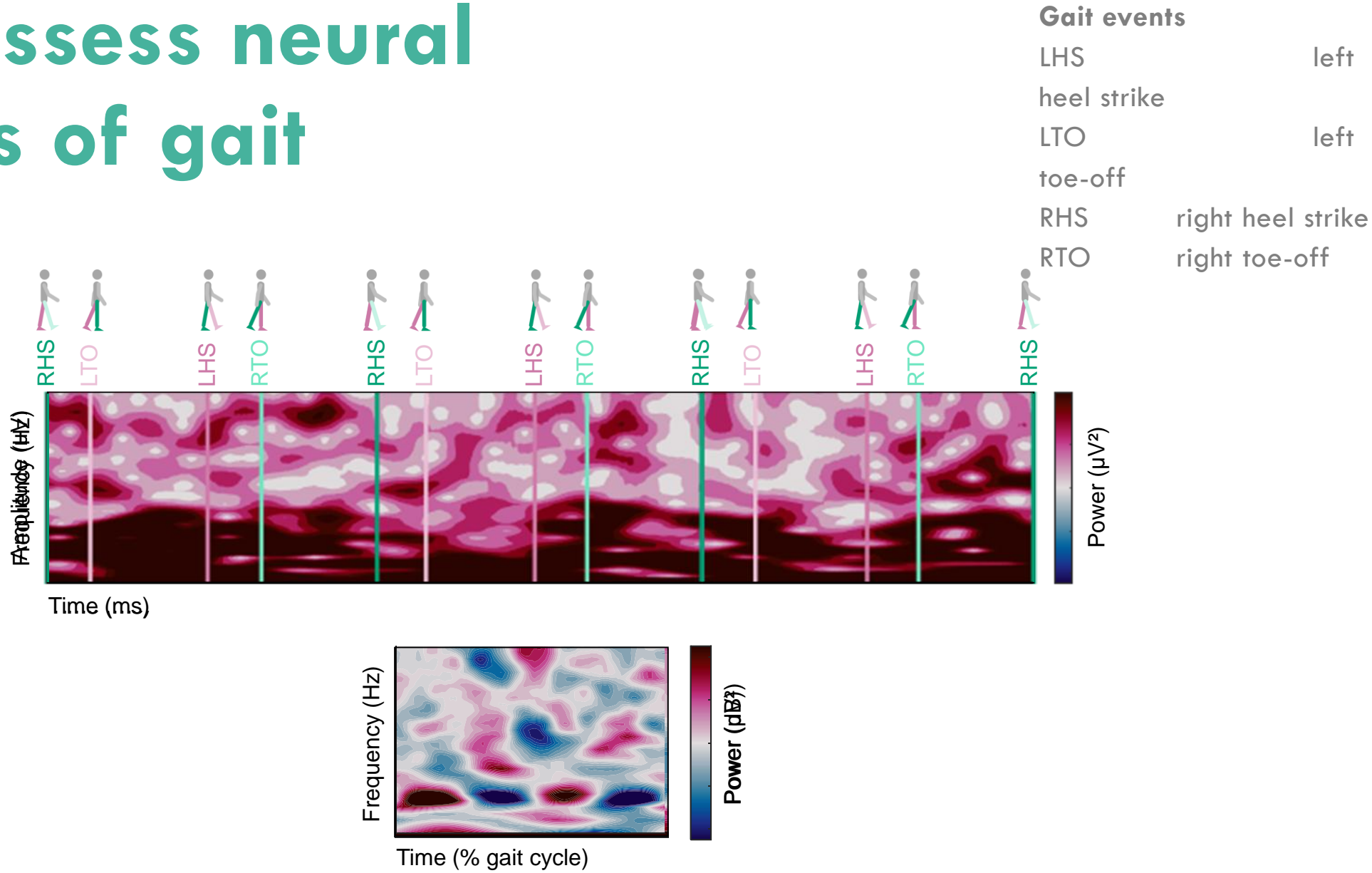
How do I interpret my **“mobile” EEG** data?

How to use EEG

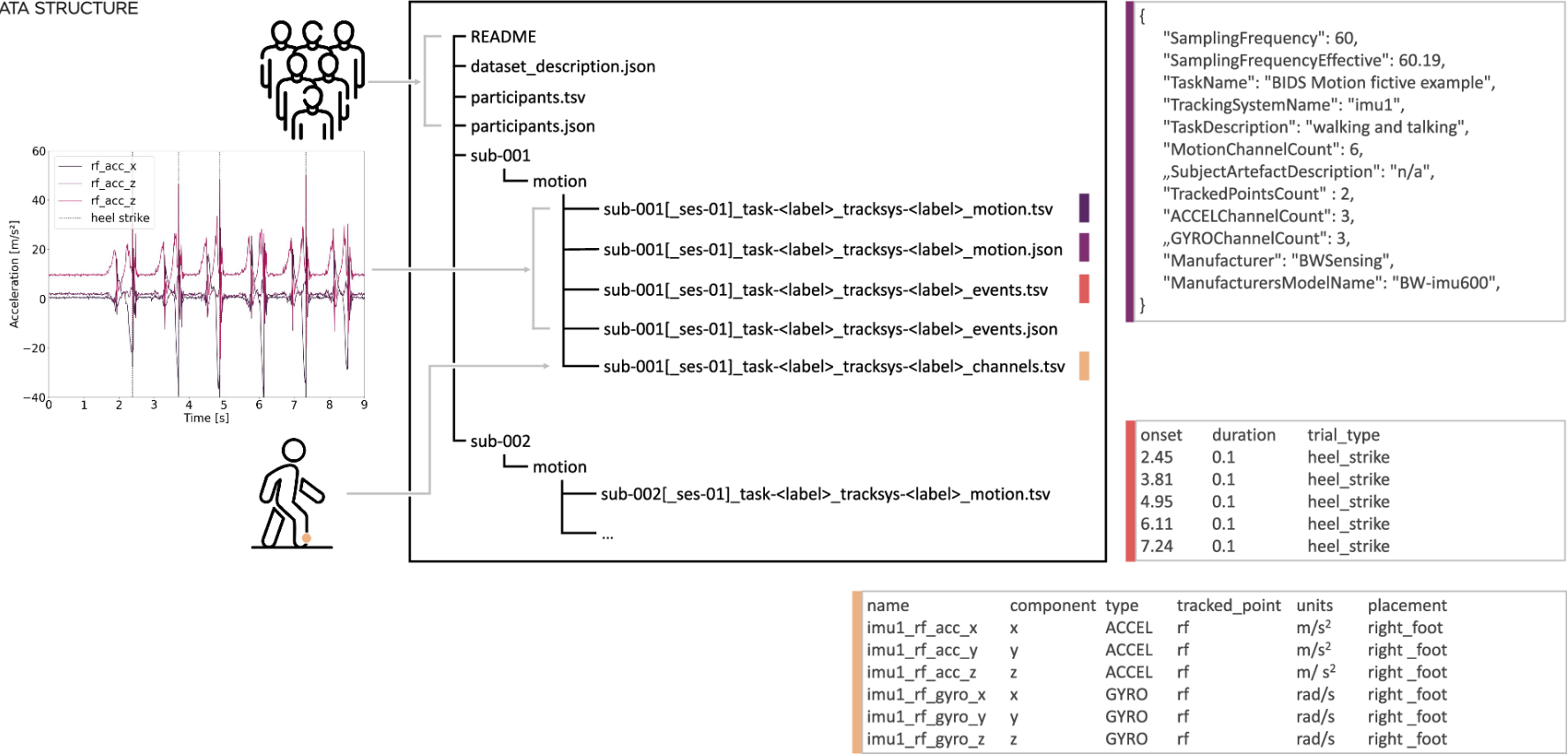




How to assess neural correlates of gait



Organise your data



0,26345511	0,092292015	0,008668652	0,930514317	0,690193606	0,809881135
0,694520294	0,191824943	0,843726573	0,397571025	0,88542996	0,895276224
0,076633595	0,258720111	0,547534792	0,282283781	0,27890791	0,232620594
0,577995093	0,045616941	0,04903375	0,940889749	0,153318421	0,668360752
0,054555716	0,791513927	0,587116733	0,466957774	0,975446368	0,048053341
0,966026984	0,196283834	0,711044406	0,338944328	0,719445195	0,438488392
0,98417512	0,507944361	0,1180168	0,796692478	0,175376468	0,488659533
0,98839607	0,155737146	0,800206213	0,633481382	0,752698206	0,852943441
...

Thank you for listening

