# Muscle patterns in High-Density EMG recorded during grasping in different arm positions

Luis Pelaez Murciego, Stine Bjerringgaard Rasmussen
Erika Spaich, Strahinja Dosen
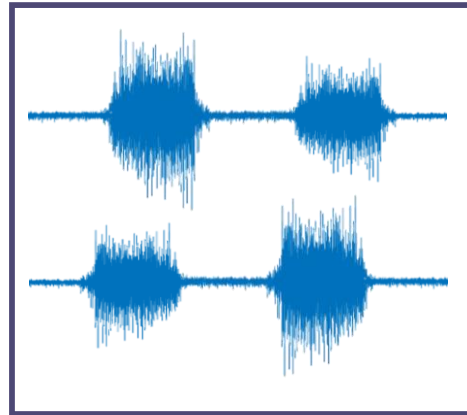
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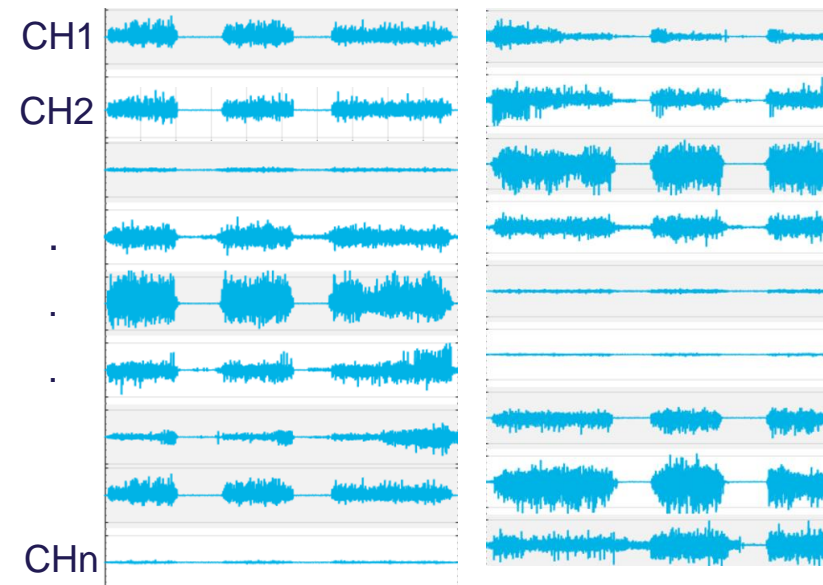# Myocontrol: Pattern Recognition



Hand Open

Algorithm

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# Myocontrol: Pattern Recognition

- 8-16 channels
- To work properly, each gesture MUST generate an unique EMG pattern.



CH1
CH2
.
.
.
CHn

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# Myocontrol: Pattern Recognition

- 8-16 channels.
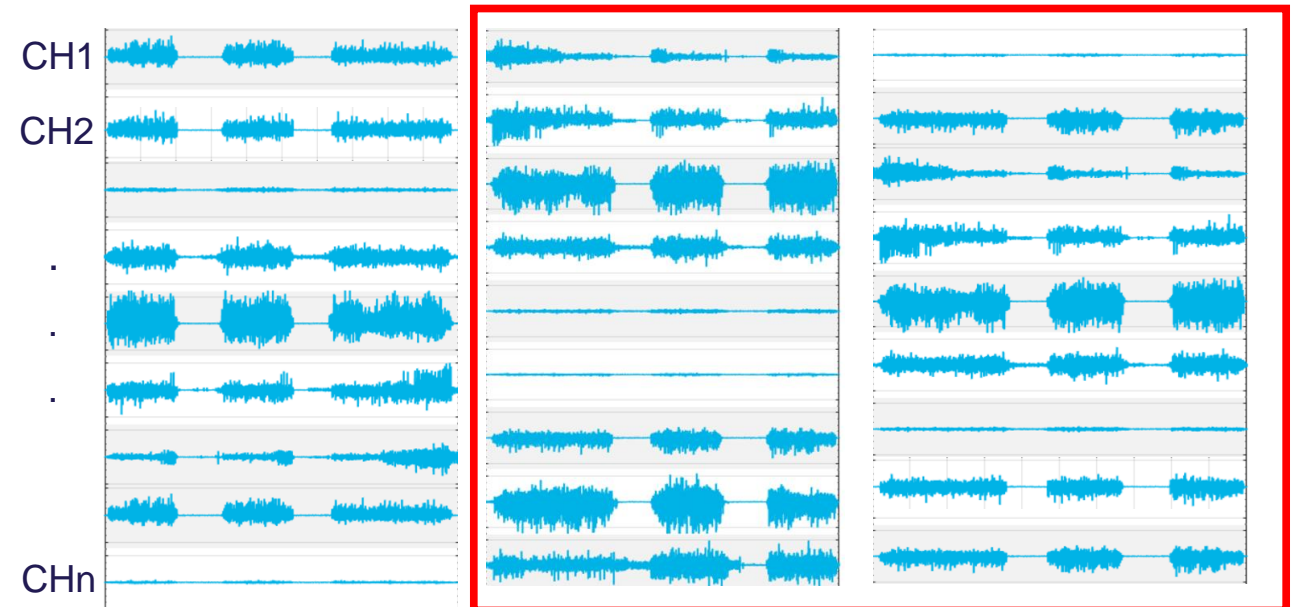- To work properly, each gesture MUST generate an unique EMG pattern.



CH1
CH2
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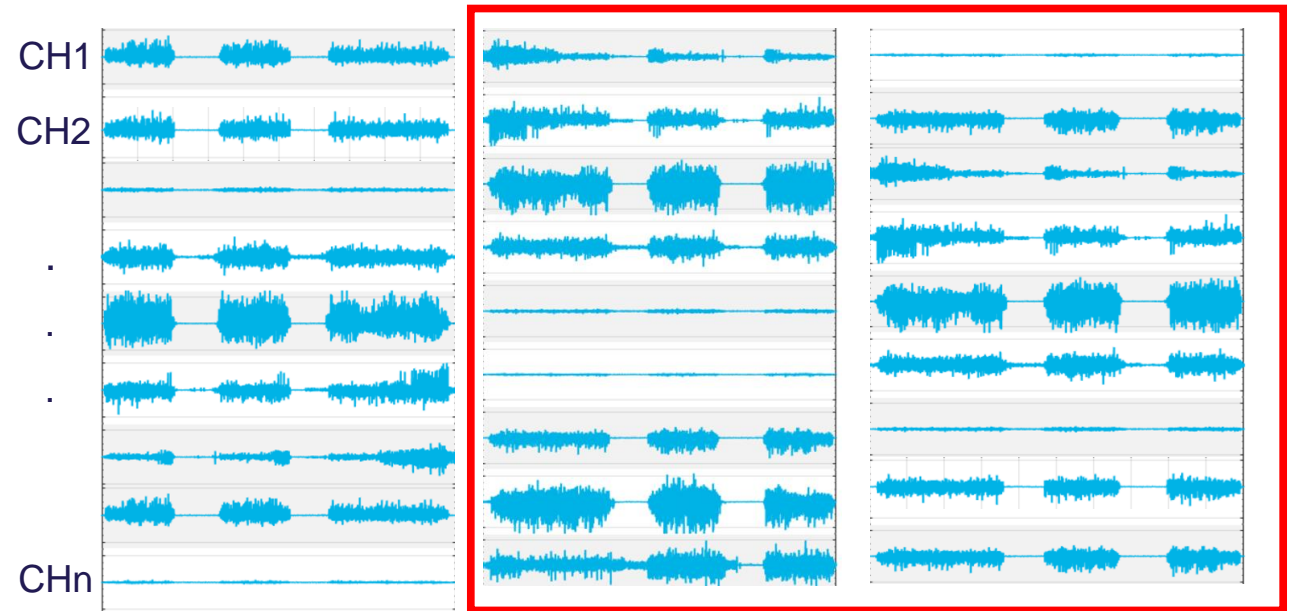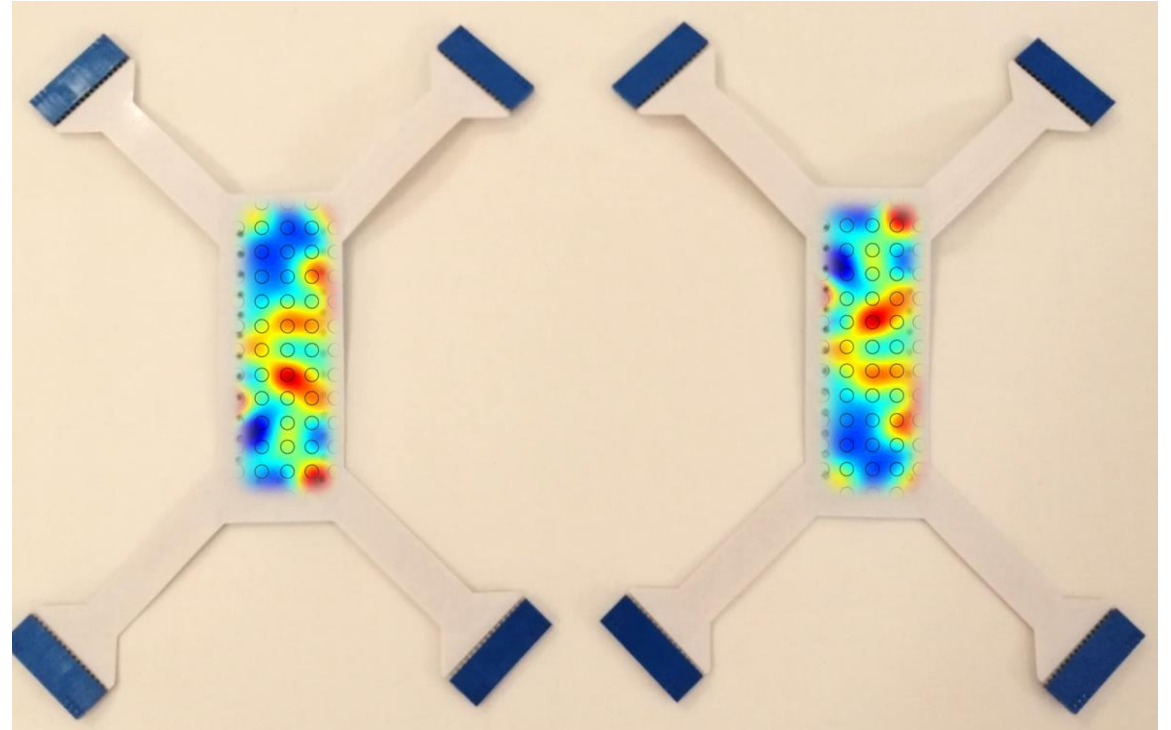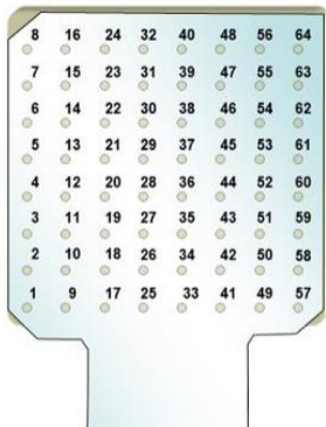
# Myocontrol: Pattern Recognition

- 8-16 channels.
- To work properly, each gesture MUST generate an unique EMG pattern.
- We need more data → HD-EMG.

# High-Density EMG

- Up to hundreds of channels
- Generates *High-Definition* maps of muscle activity
- Allows to study the changes in muscle patterns



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# Purpose of the study

❯ Investigate how muscle patterns change in different arm positions.



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# Experimental Setup
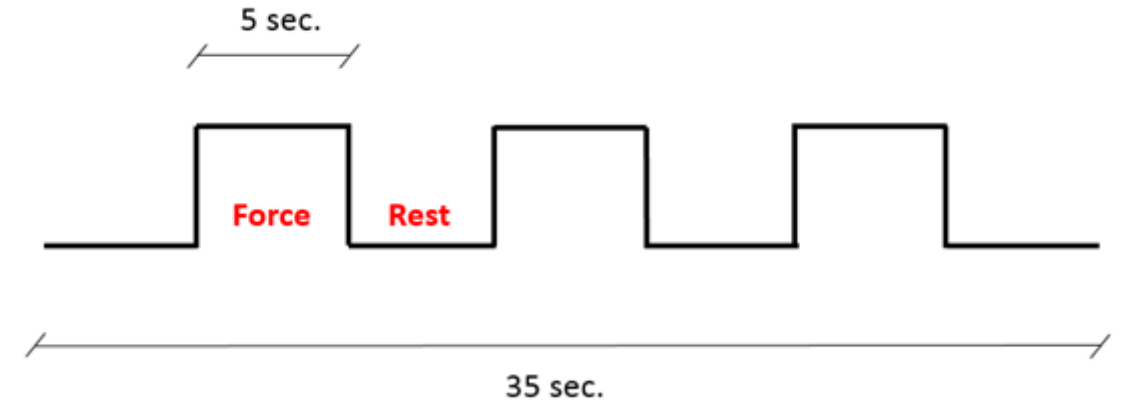
- 2 x 64 channels. EMG-USB amplifier (*OT Bioelettronica*)
- Torsiometer to measure wrist rotation
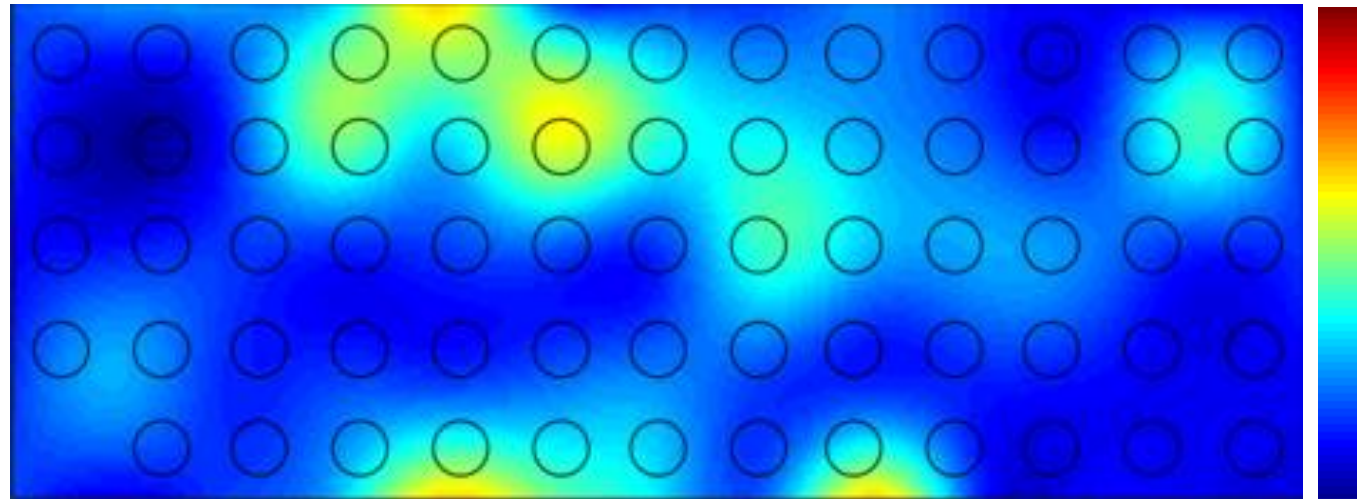- Goniometer to measure elbow angle.



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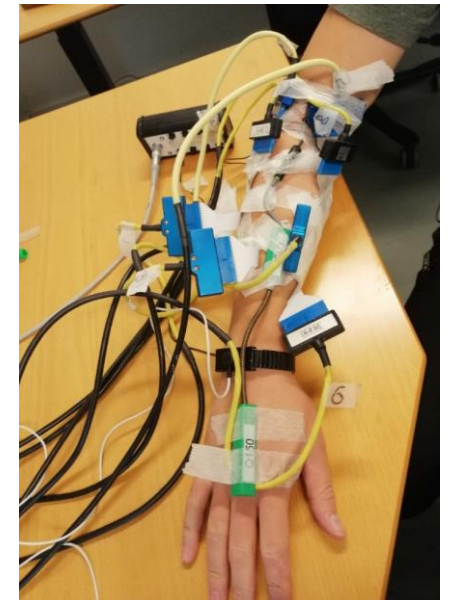
# Experimental Protocol

- 4 Gestures: Full Pronation and Full Supination.
- Constant and comfortable force.
- RMS envelope: 150ms windowing - no overlap.
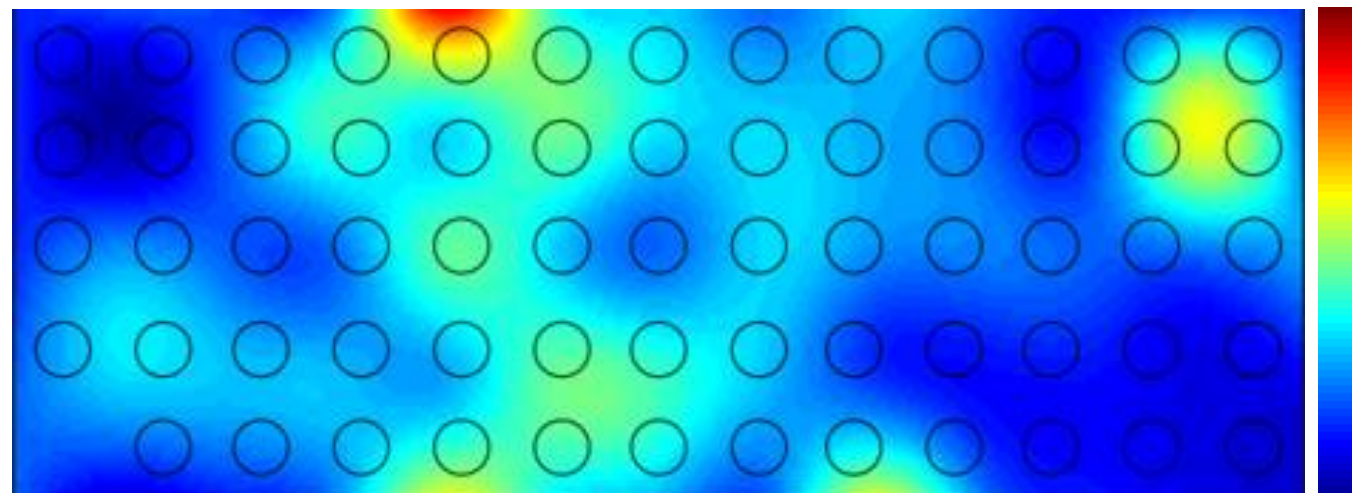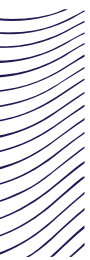

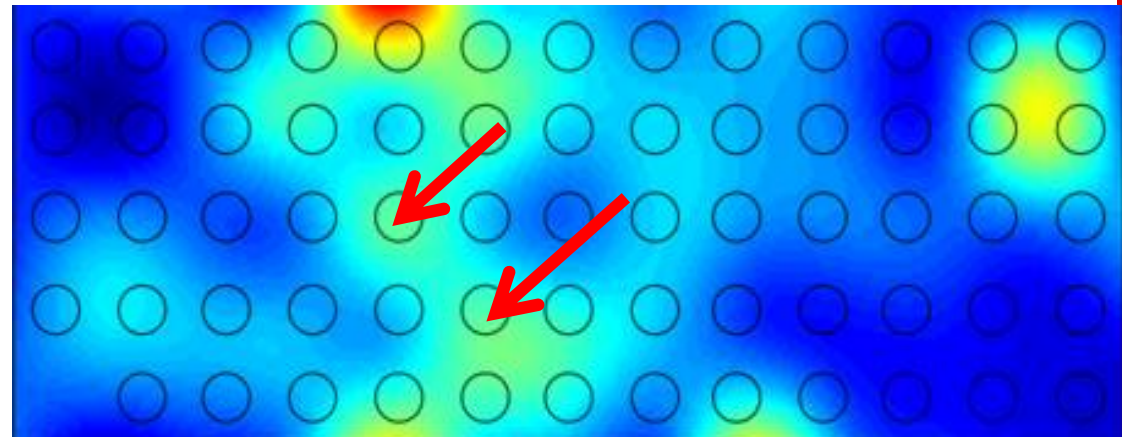
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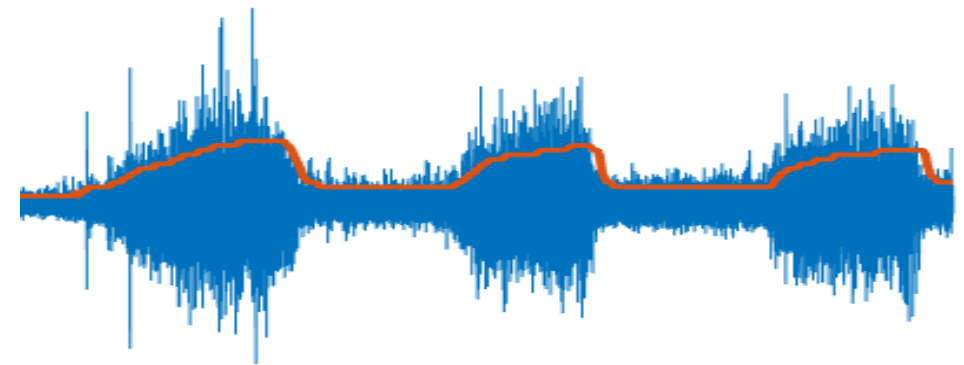
# Preliminary results: Full Supination

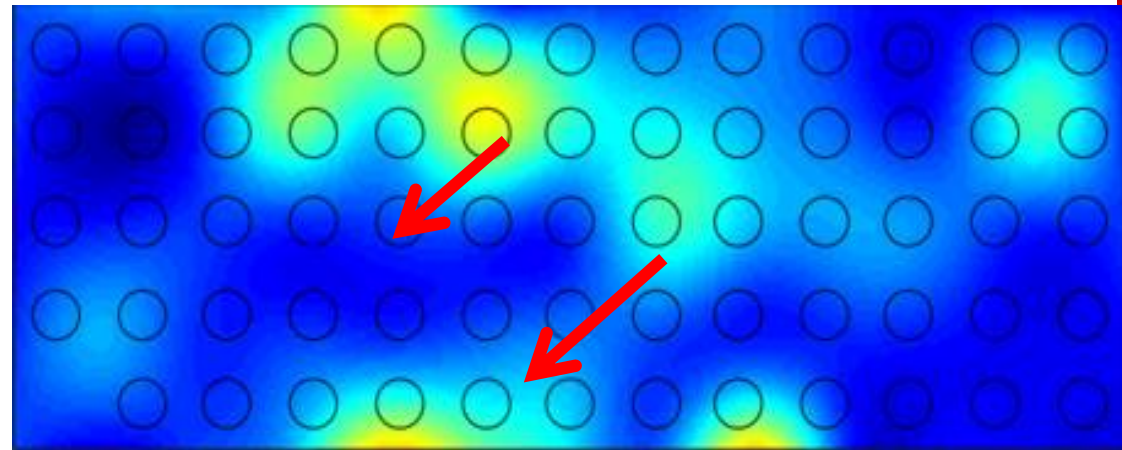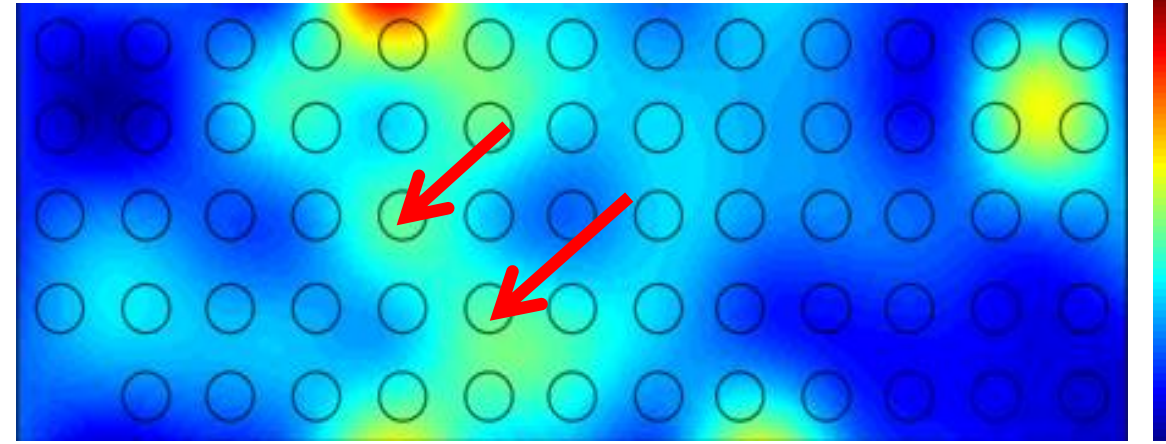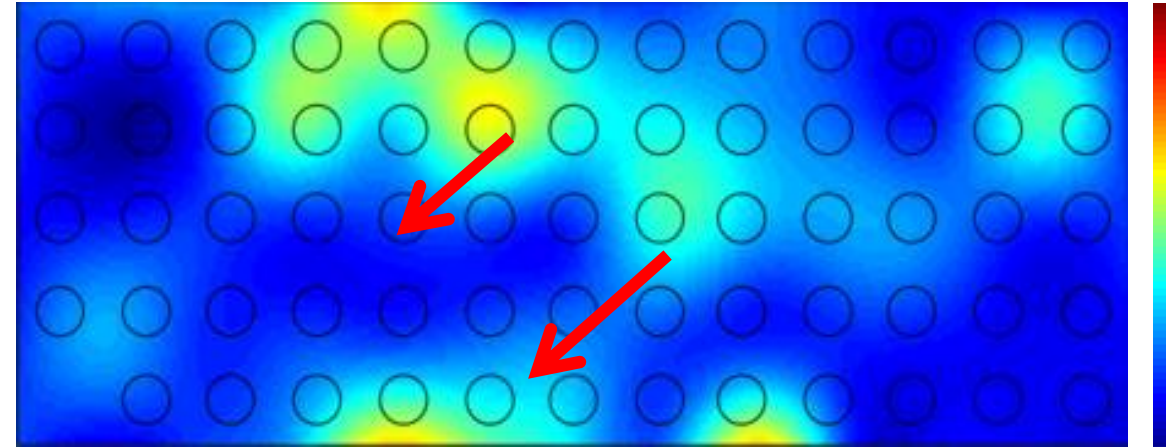# Preliminary results: Full Pronation

# Spatial displacement

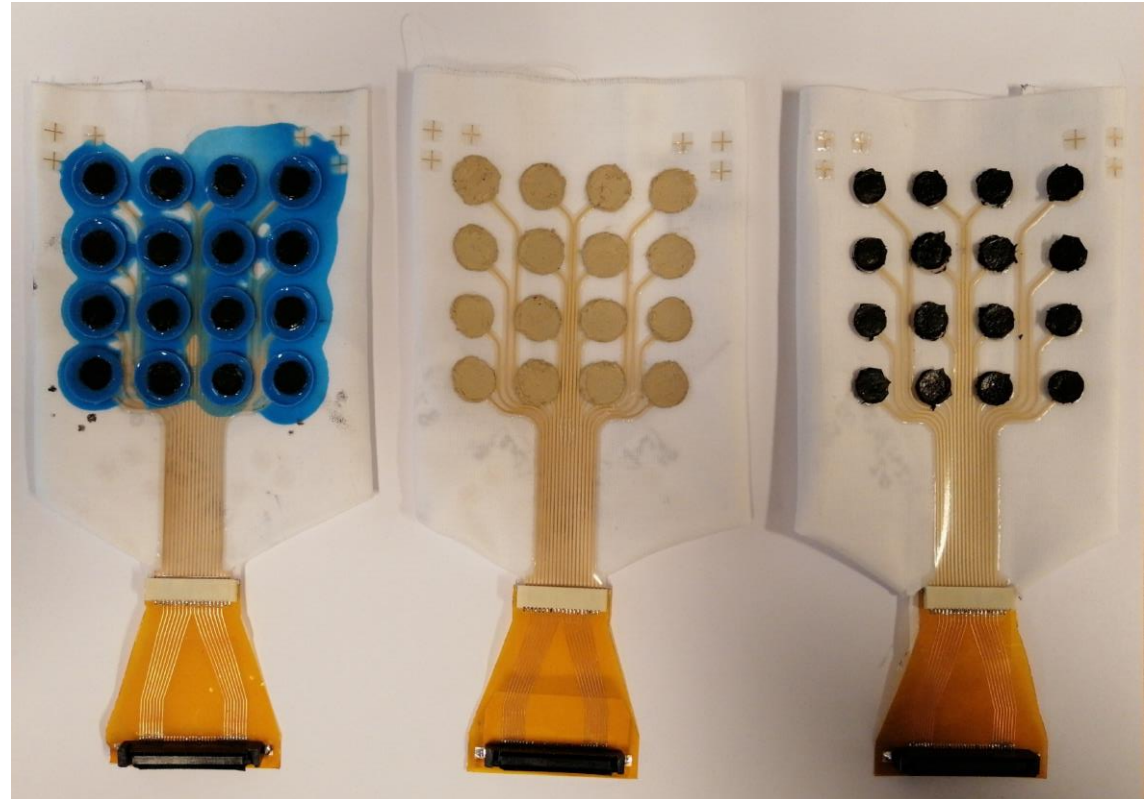❯ Displacement of activity *hotspots* due to the muscles twisting around the forearm.

# Spatial displacement

- Displacement of activity *hotspots* due to the muscles twisting around the forearm.
- Investigate displacement of *hotsposts*
- Improve EMG driven control of FES in stroke subjects

# WEARPLEX

- Textile electrodes
- Integrated electronics
- Smart electrode configuration
- Quick setup
- Visit our stand at the post-conference workshop





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# THANK YOU

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