

**Erasmus MC**

Universitair Medisch Centrum Rotterdam



# Development of automated continuous neonatal EEG monitoring

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# Neonatal brain monitoring group



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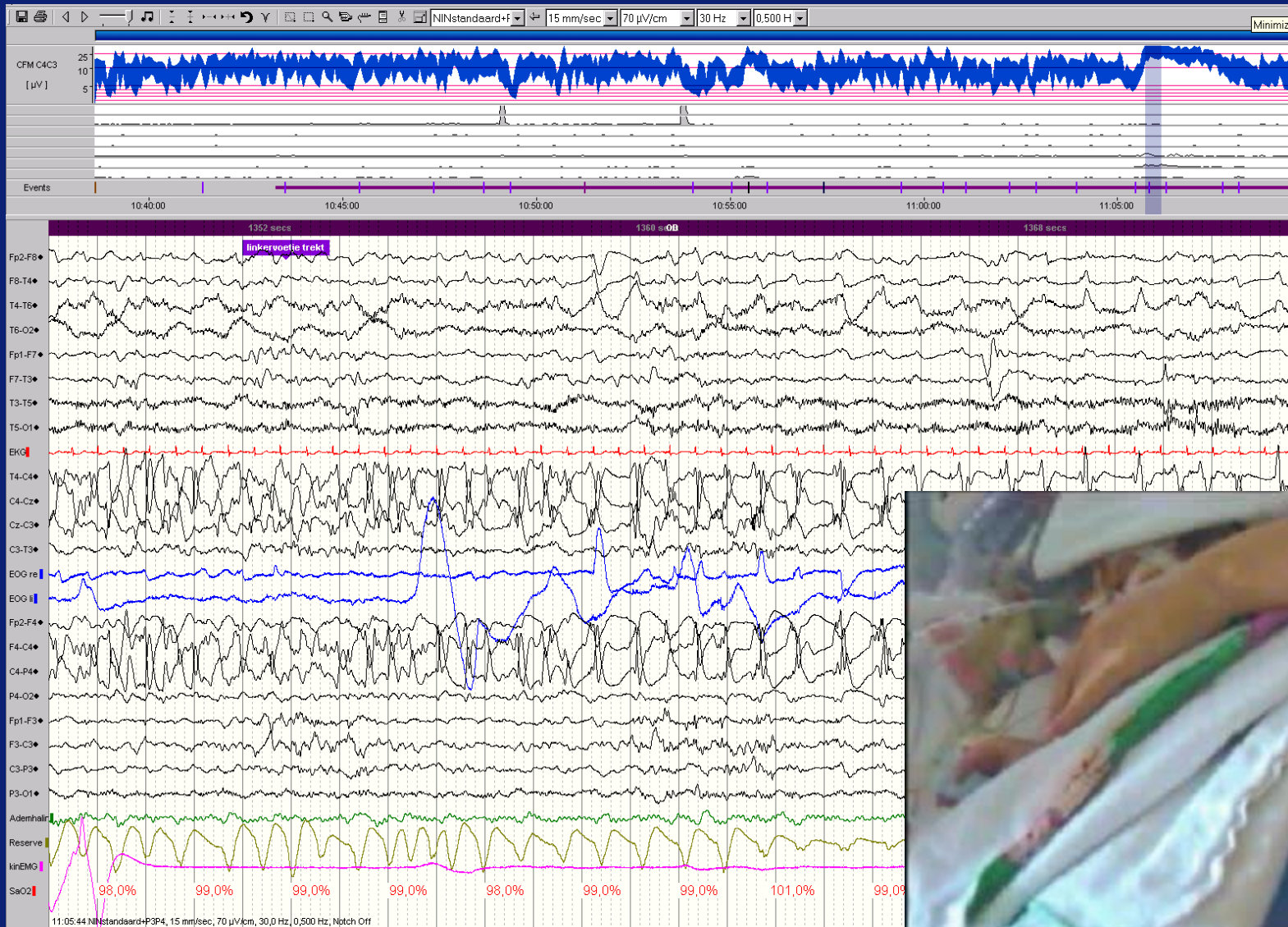


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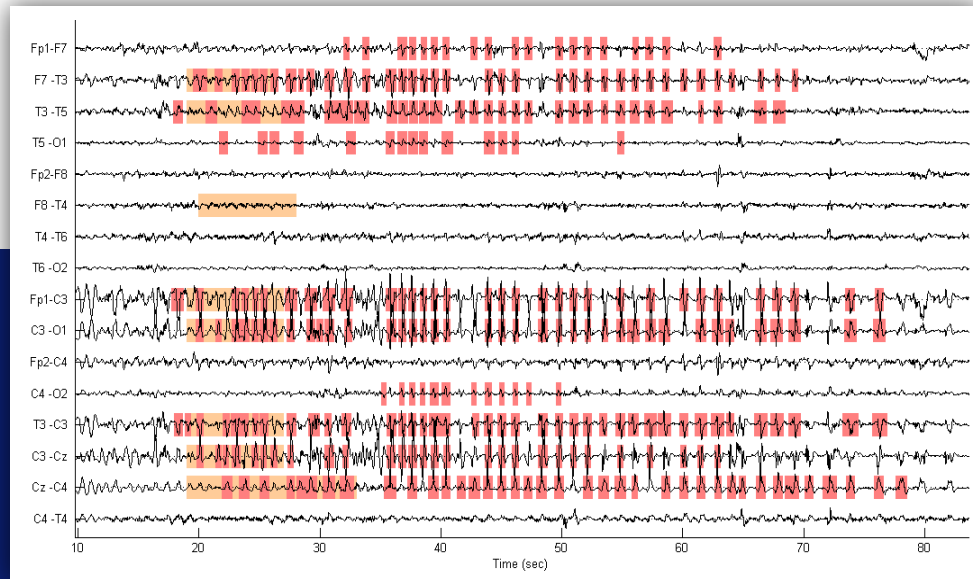
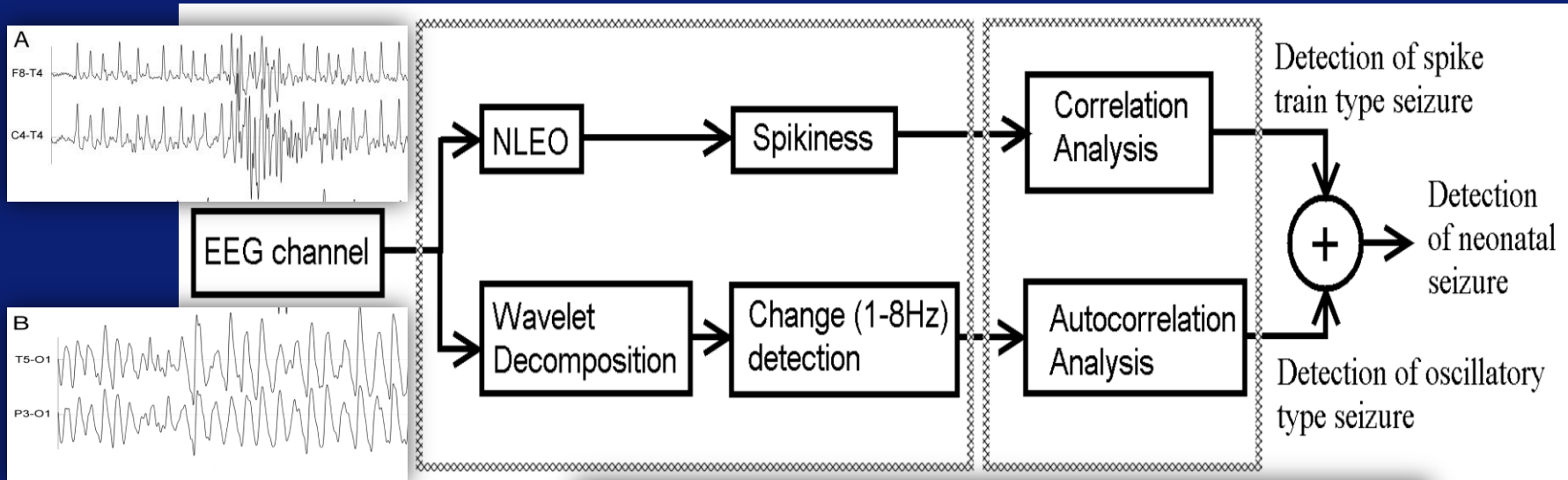
- Development of a bed-side brain monitoring system showing only clinically relevant information:
  - Detection of changes in ongoing (background) EEG activity
  - Seizure detection (and relevant characteristics)
  - Combined with other information (multimodality): NIRS, saturation, EKG, ABP, ....
  - Enough extra information to recognise artefacts
- A user friendly easy but reliable bed-side system for clinical use
- A more extensive version for research purposes

# Subclinical / subtile seizures



# Visual 2 seizure types: spike train & oscillations

## Detection algorithm



# Topographic localization

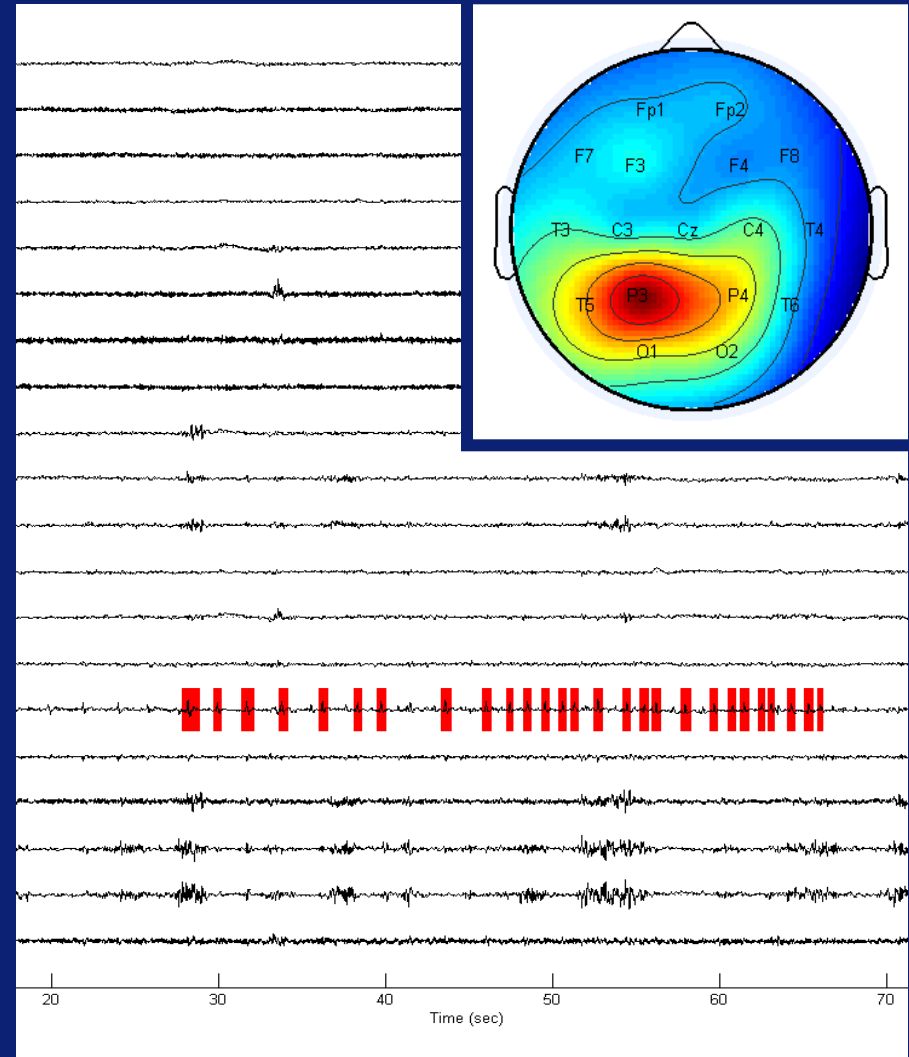
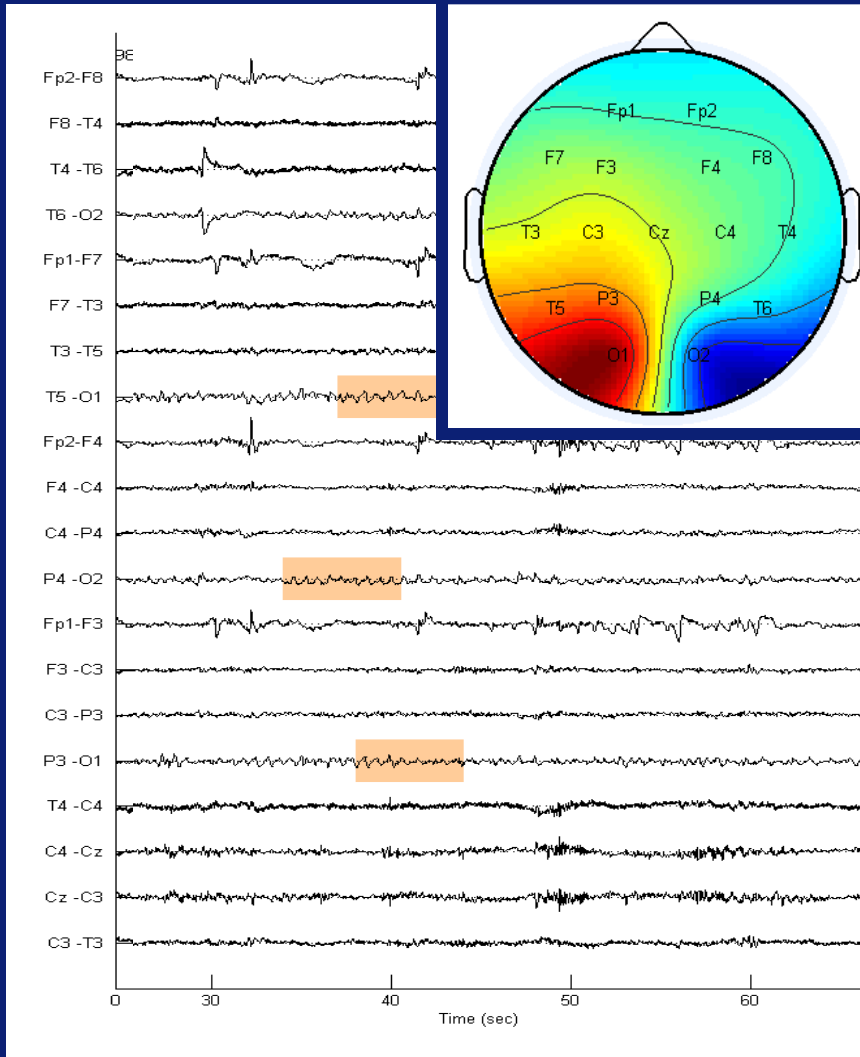
Lat  $51^{\circ} 55' N$   
Long  $4^{\circ} 29' E$   
**Rotterdam**



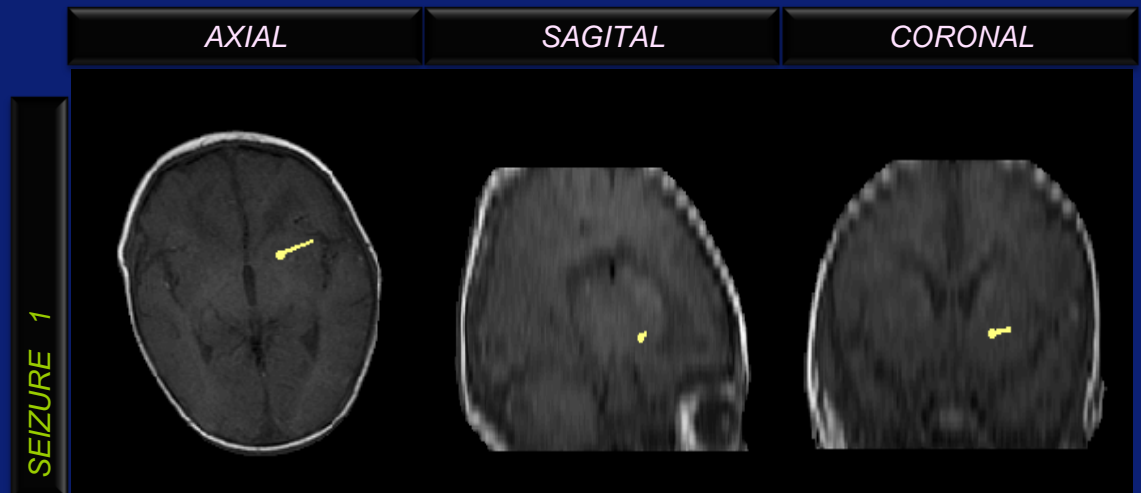
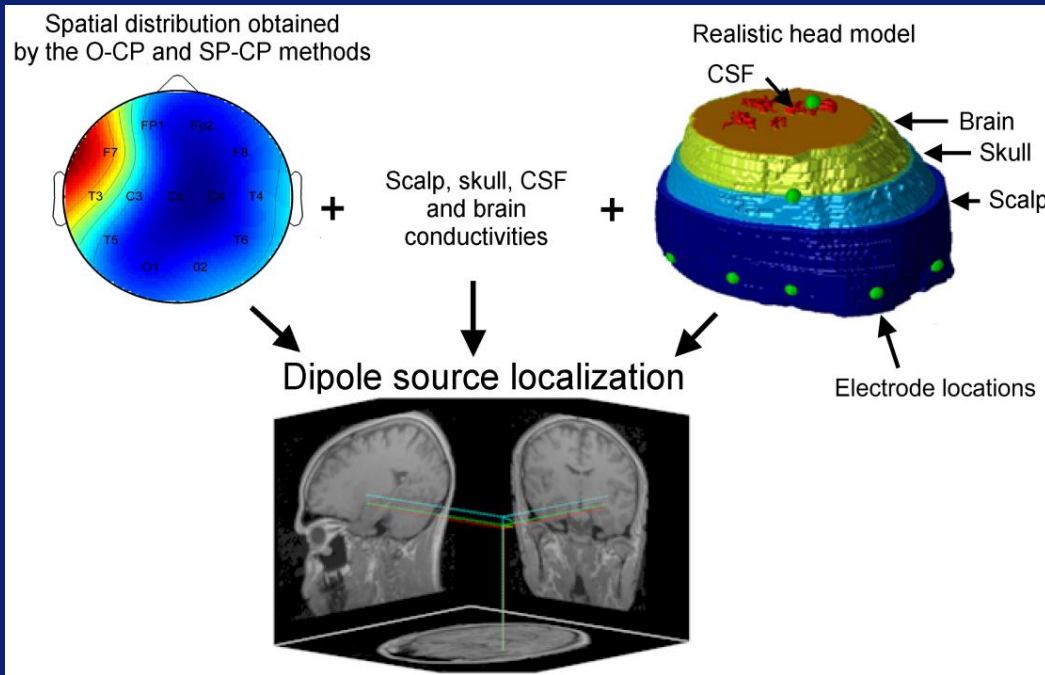
Lat  $80^{\circ} 29' N$   
Long  $76^{\circ} 59' E$   
**Thiruvananthapuram**

# Seizure localization - PARAFAC decomposition

## Descriptive classification of neonatal EEG seizures



# Inverse source localisation with realistic head model





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# Measurement of motorunit function and motorunit tracking

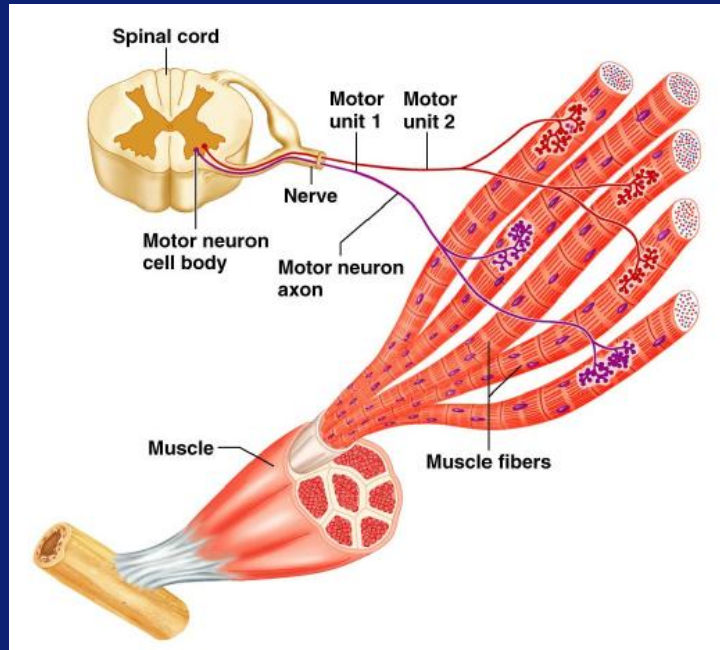
Gerhard Visser, Joleen Blok

Ellen Maathuis, Judith Drenthen

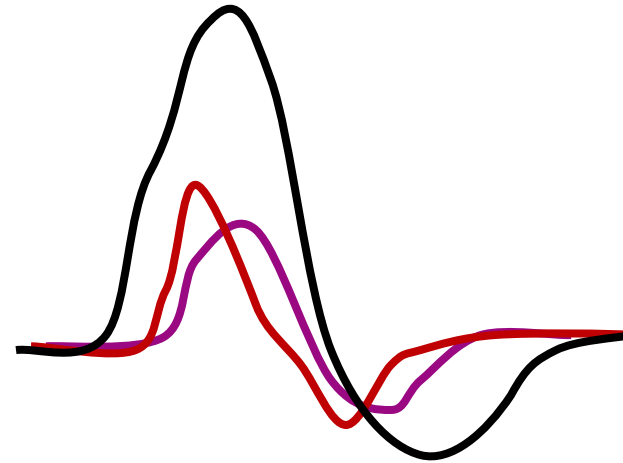
*Department of Clinical Neurophysiology*

- Obtain detailed information about the function of the motor unit  
*(smallest functional entity of peripheral motor nerve)*
  - *Diagnostic purposis*
  - *Estimation of motorunit number*
  
- longitudinal tracking of single nerve cells, repeated identification and characterization of motor units
  - study of disease processes and recovery (prognosis)
  - assessment of therapeutic interventions

# Motorunit and motorunit potentials

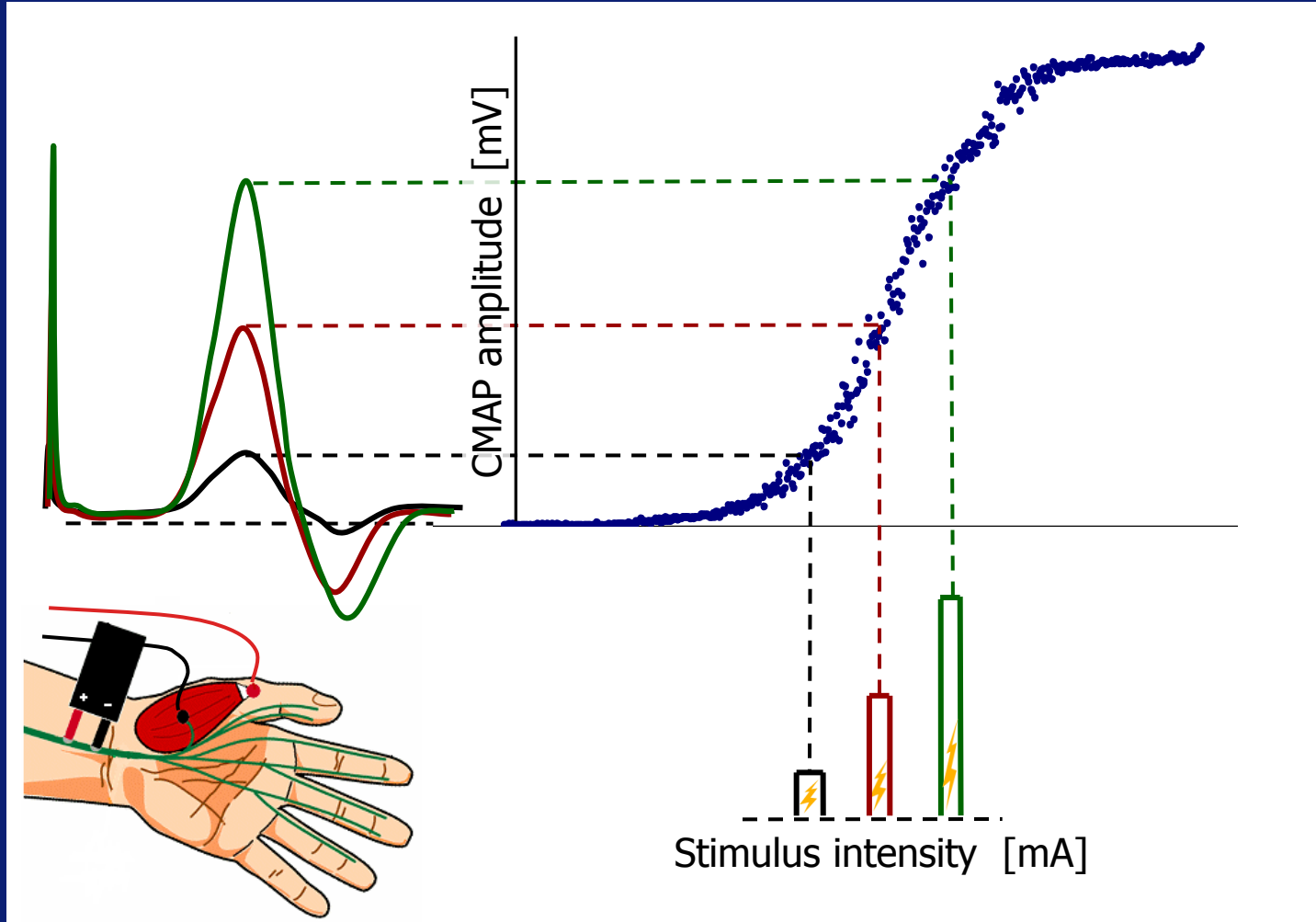


Summated responses  
(CMAP)

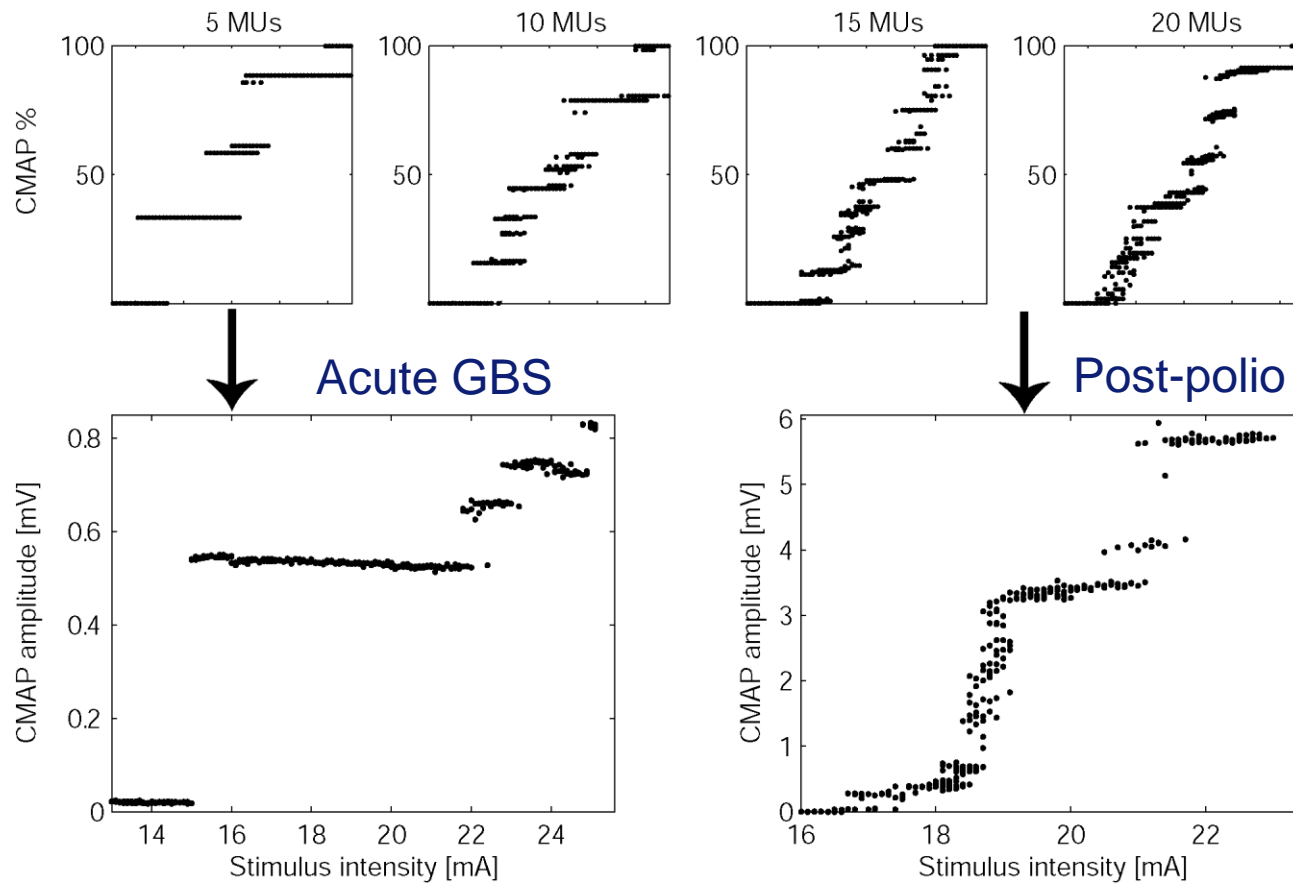


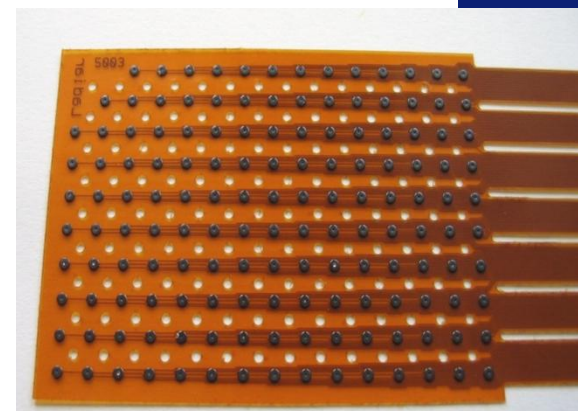
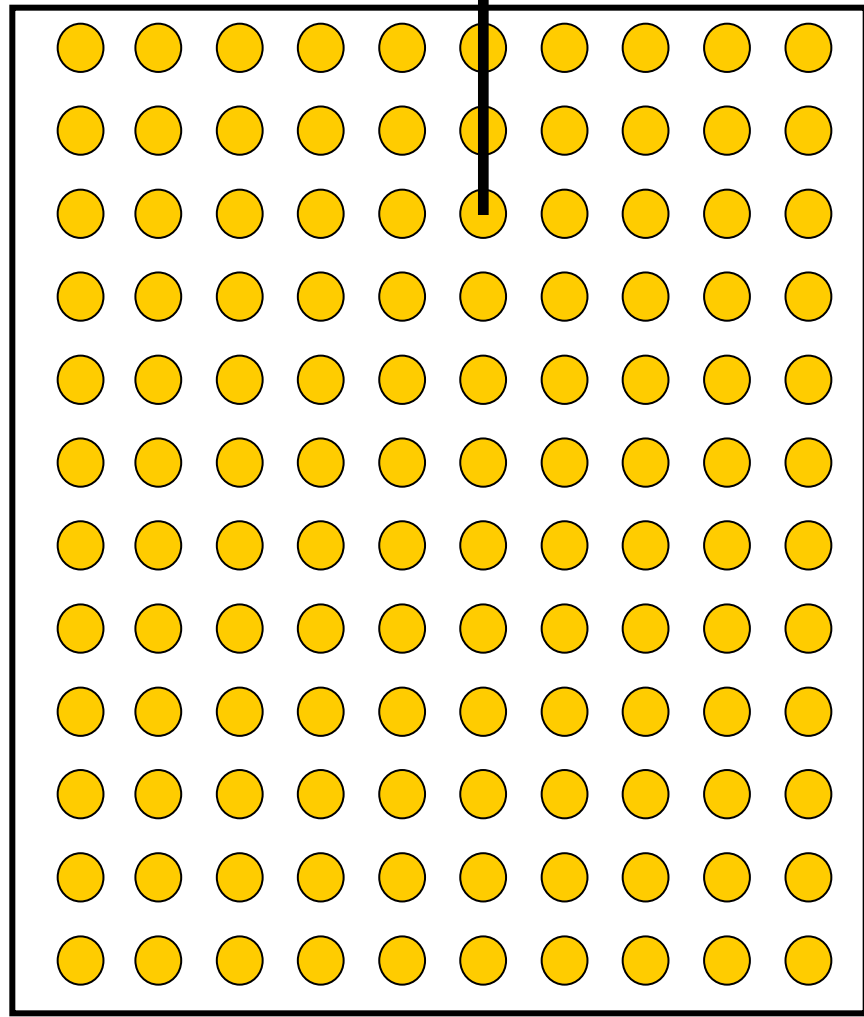
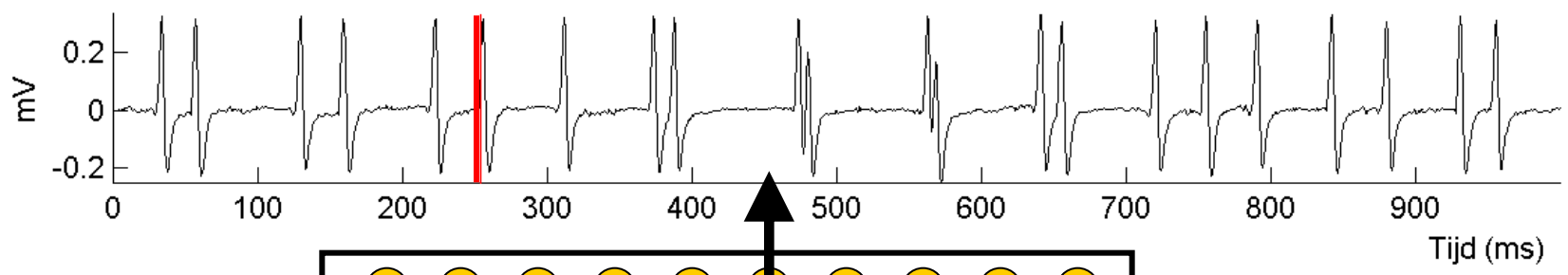
Individual responses  
(MUAPs)

# CMAP scan concept

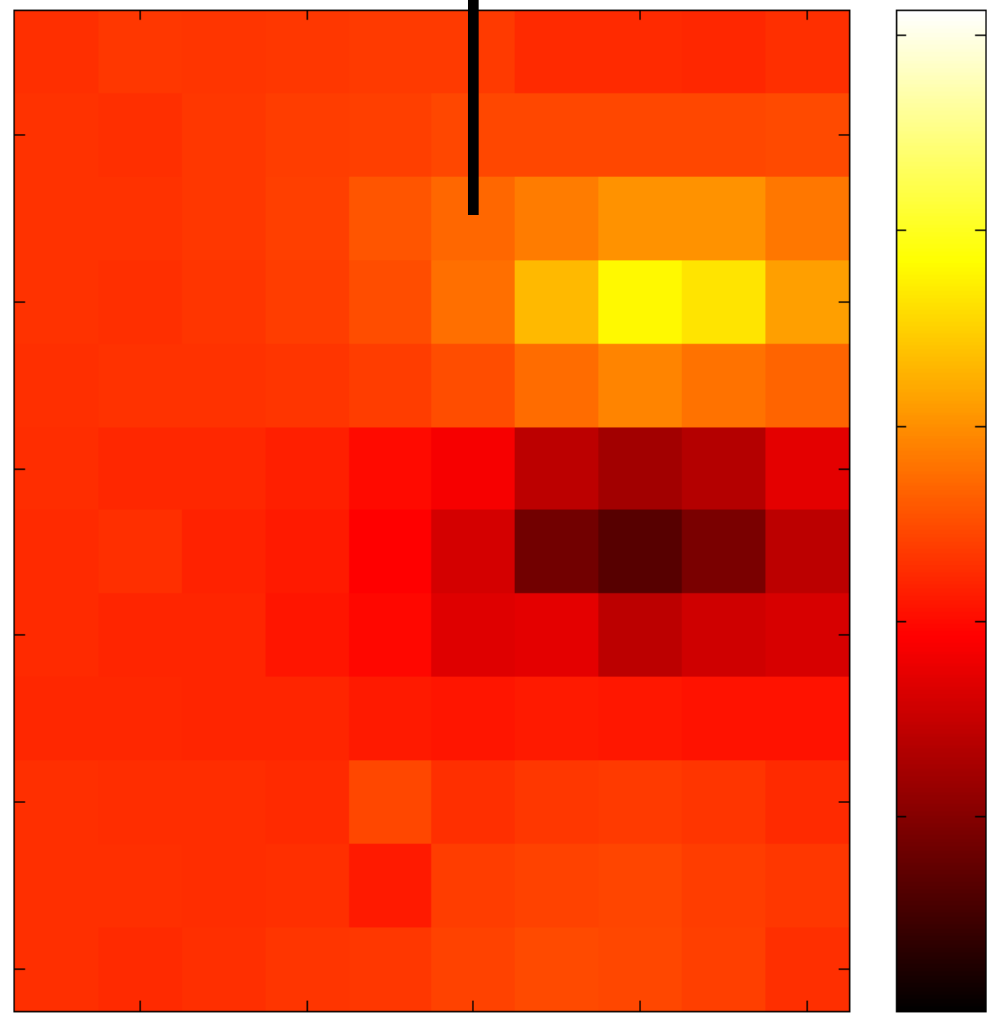
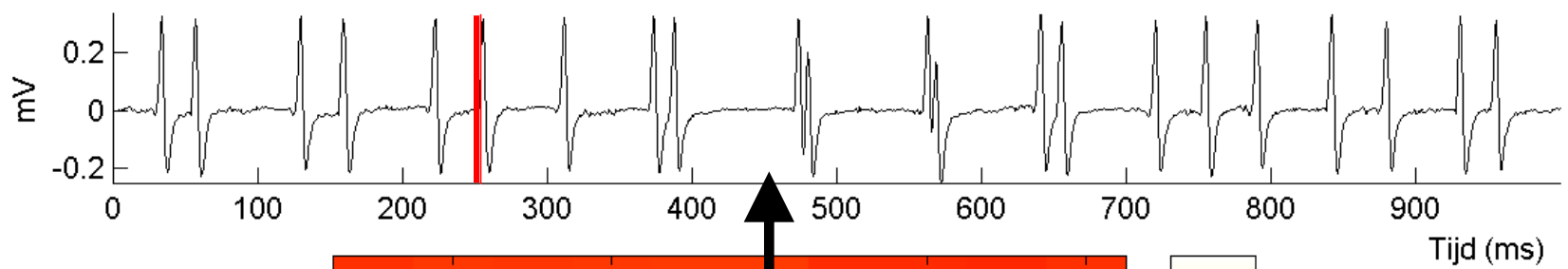


# Motor unit number Measurements vs simulations

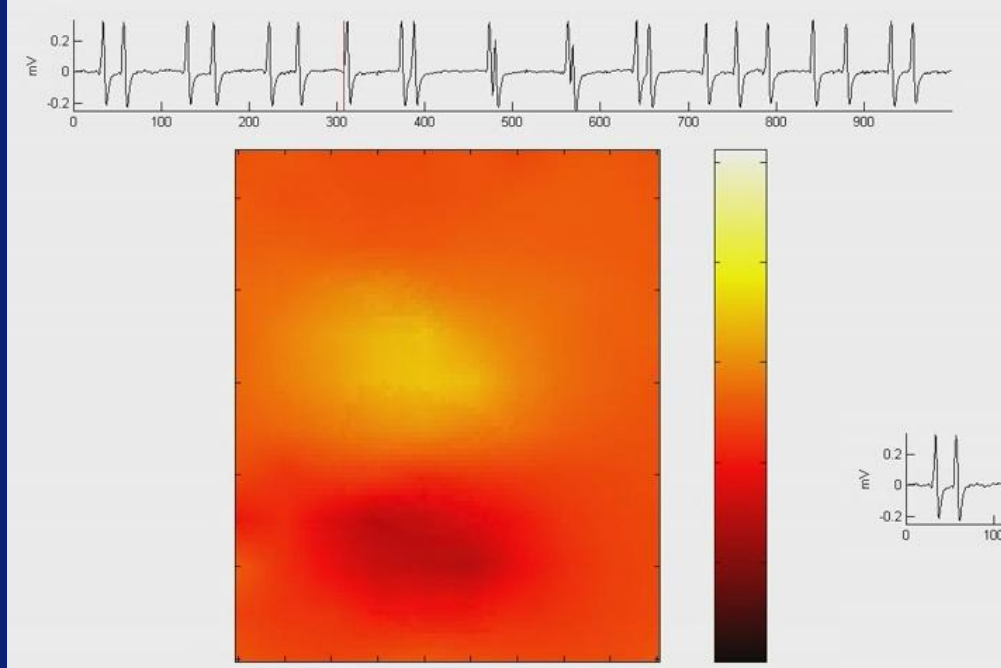




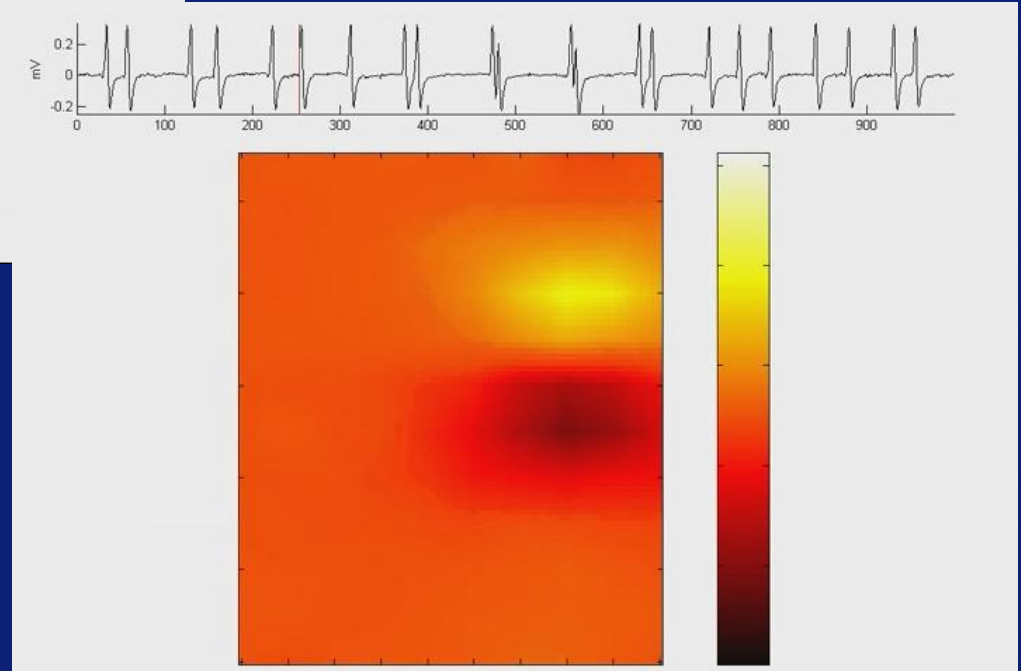




# “Fingerprints” of 2 different motorunits

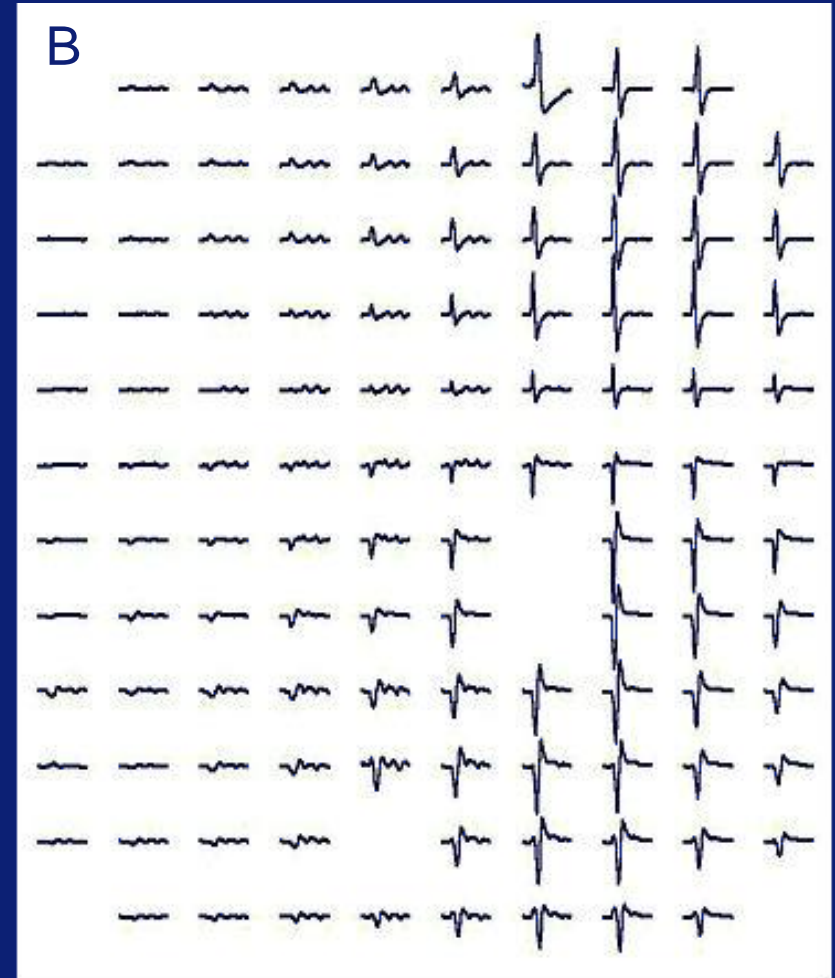
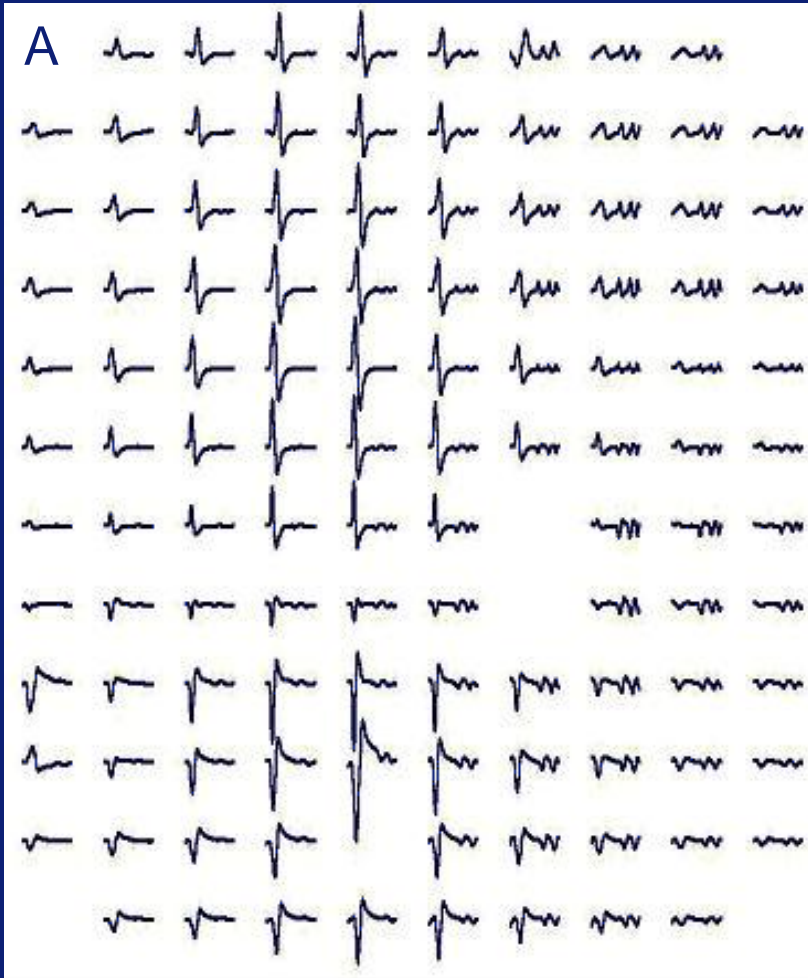


**Motorunit A**



**Motorunit B**

# Motor unit “fingerprints” recognition



# Motor unit 1 in two different sessions

*reproducibility*

