

DECOMPOSITION OF HIGH-DENSITY SURFACE EMG: possibilities and limitations

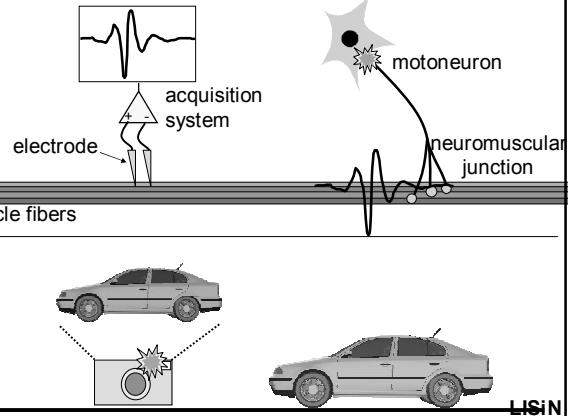
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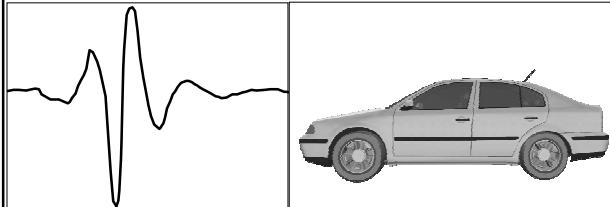
ISEK 2008, June 18, 2008

Intramuscular EMG



LISIN

Intramuscular EMG

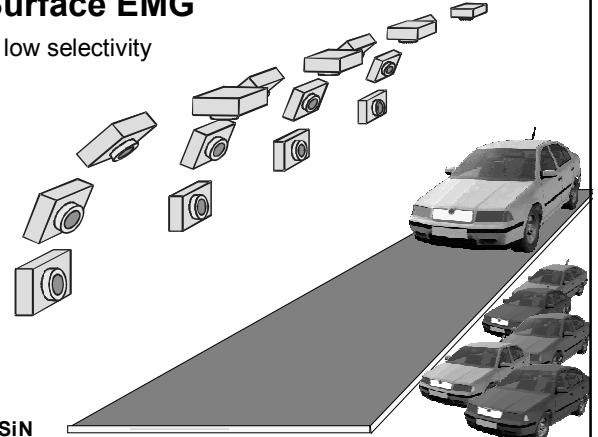


Intramuscular EMG: - high-fidelity image, with many details visible
- high selectivity

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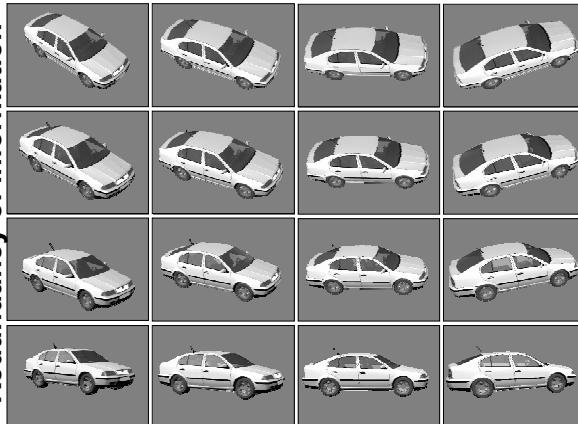
Surface EMG

- low selectivity

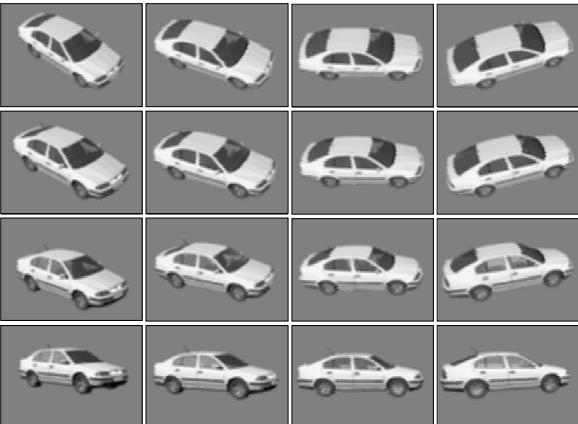


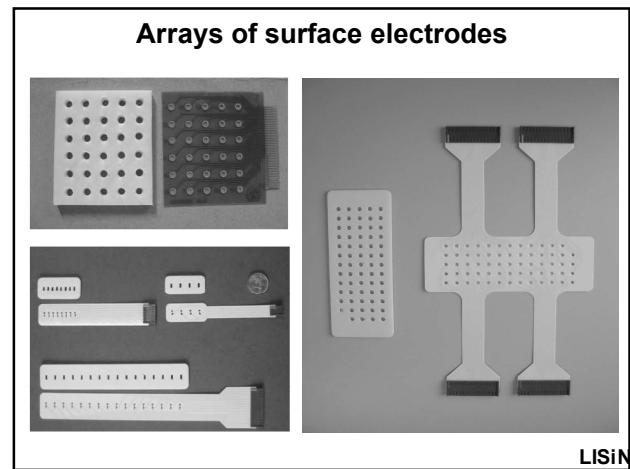
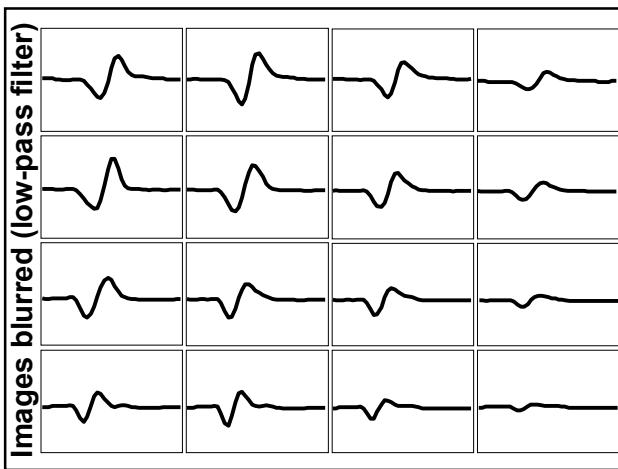
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Redundancy of information

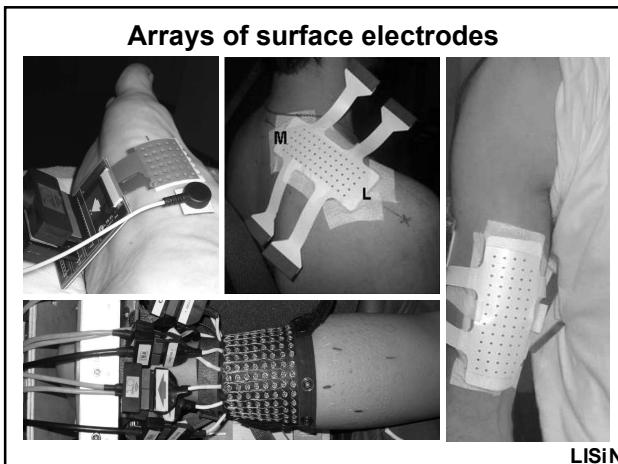


Images blurred (low-pass filter)

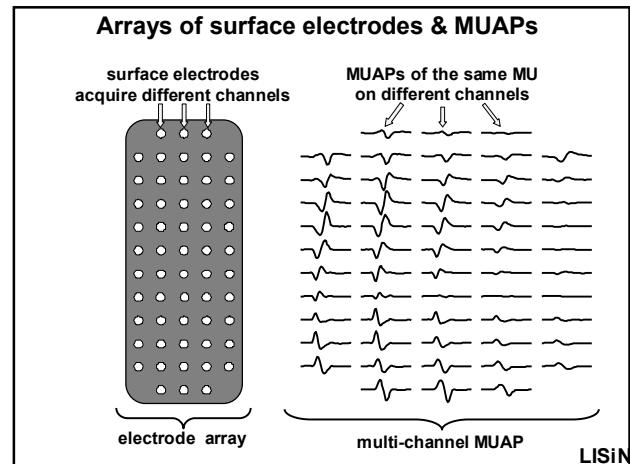




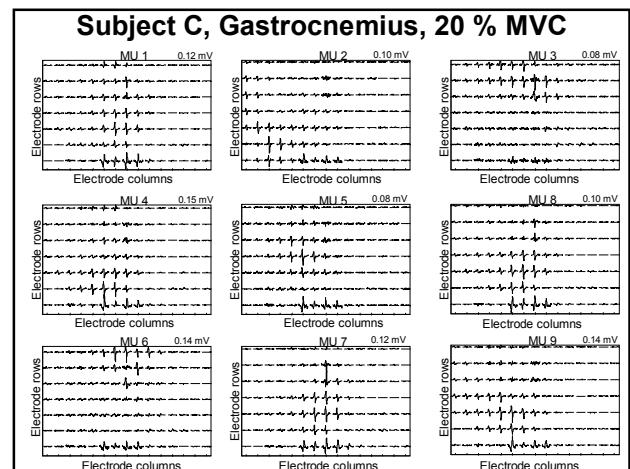
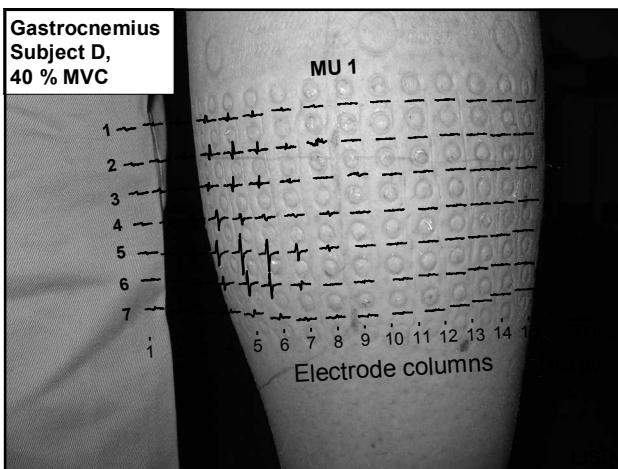
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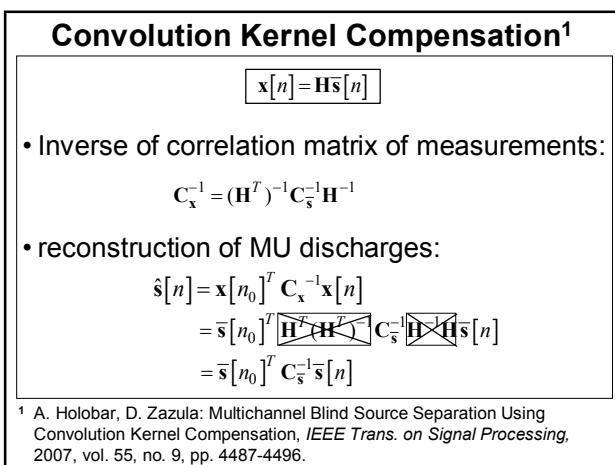
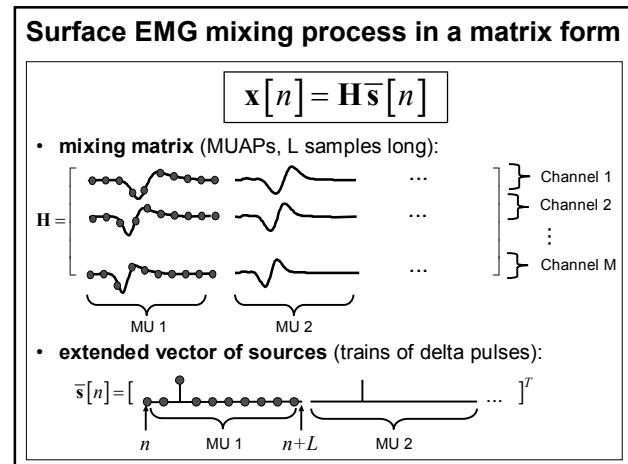
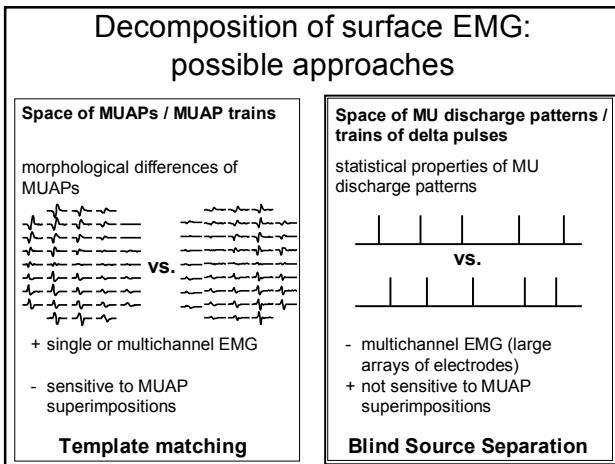
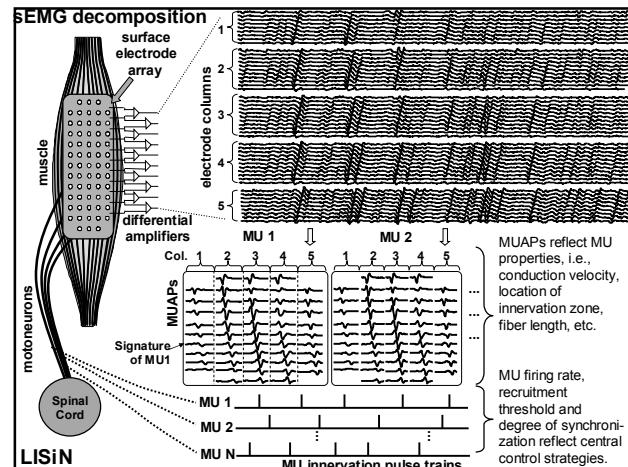
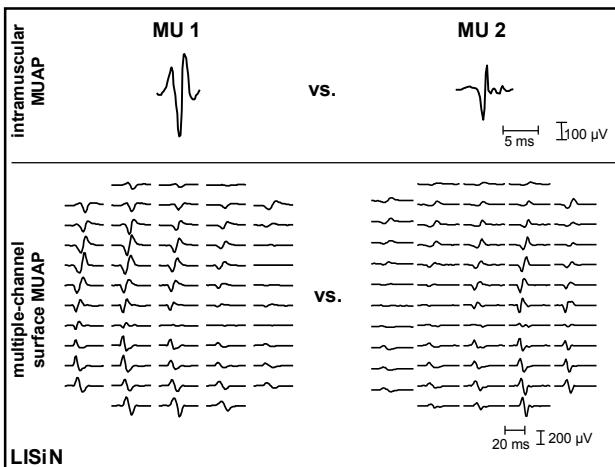


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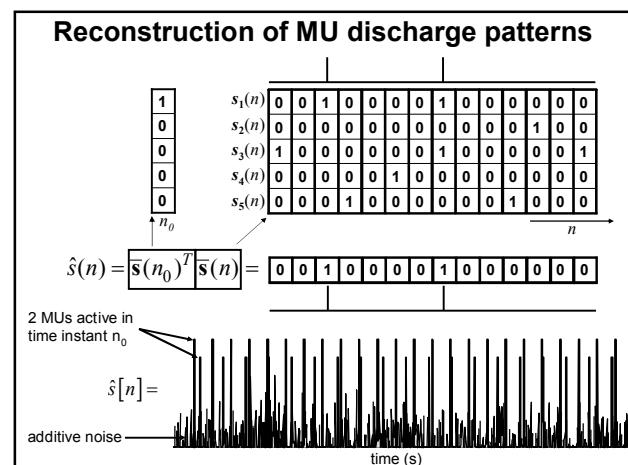


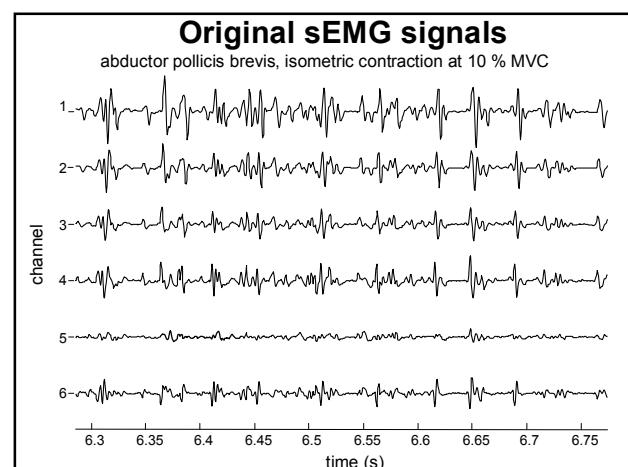
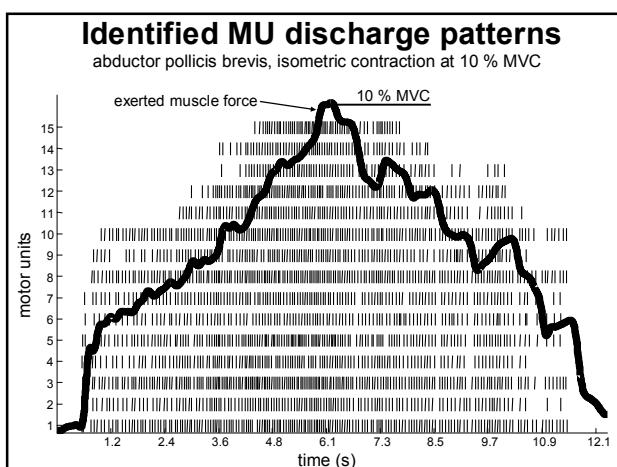
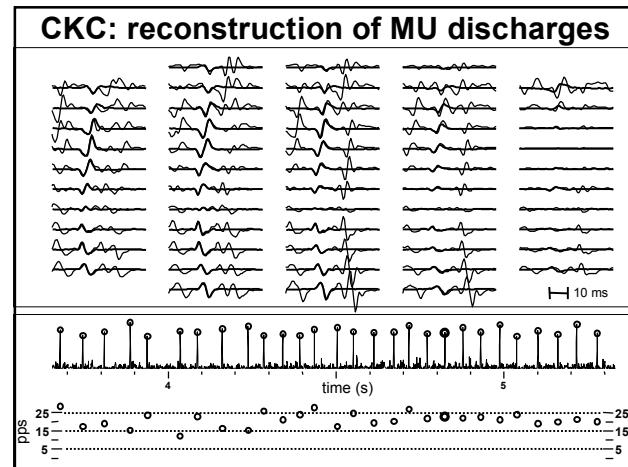
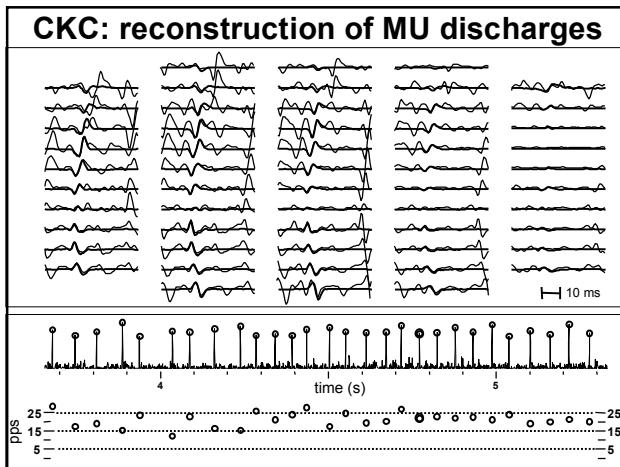
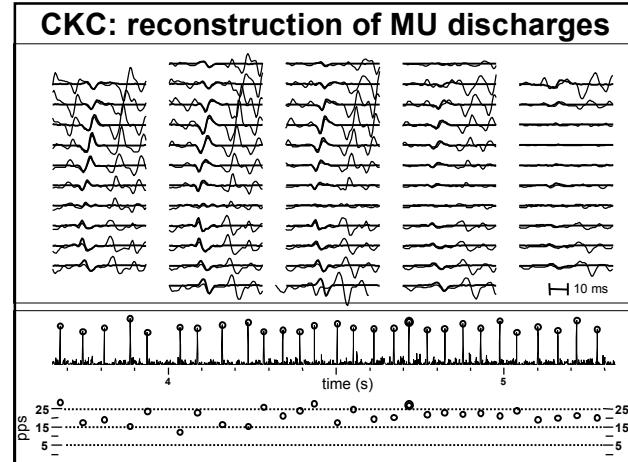
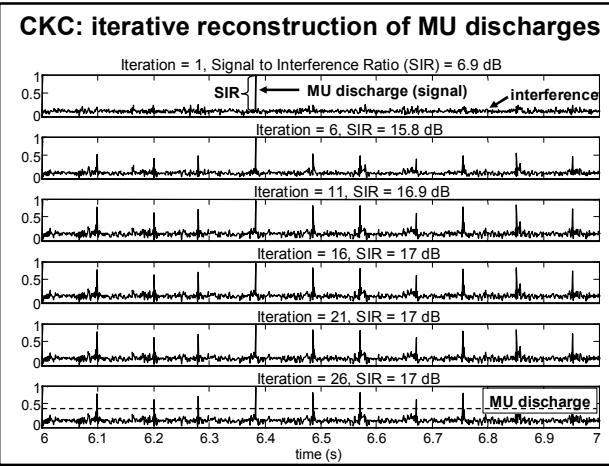
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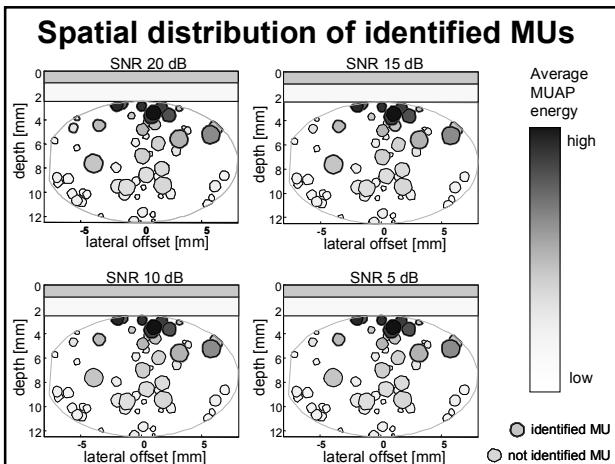
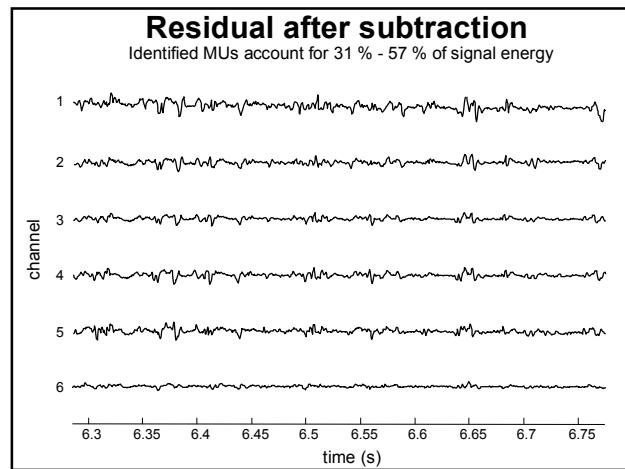
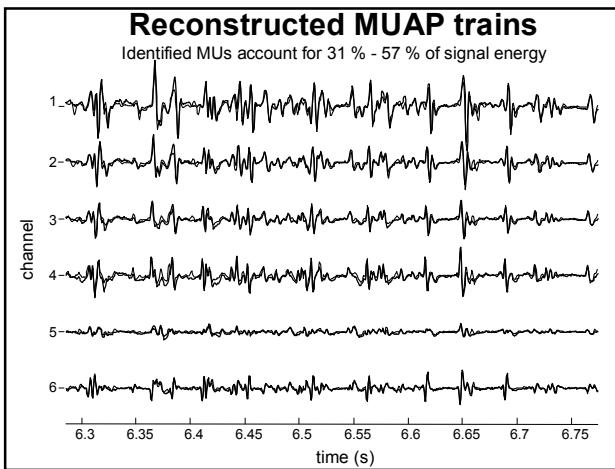




¹ A. Holobar, D. Zazula: Multichannel Blind Source Separation Using Convolution Kernel Compensation, *IEEE Trans. on Signal Processing*, 2007, vol. 55, no. 9, pp. 4487-4496.







Conclusions

- Decomposition of HD-EMG calls for different approaches than decomposition of intramuscular EMG:
 - via template matching
 - small number of channels
 - problems with superimpositions and similar MUAPs of different MUs
 - via blind source separation
 - large number of channels: 2D arrays of surface electrodes
- Assessing accuracy:
 - mutual comparison of different decomposition techniques (intramuscular & surface)
 - How can we be sure?



Acknowledgement

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