Title: **Effective experiment design for myocontrol**

Authors: C. Castellini and D. Farina

Presenter: Claudio Castellini

Affiliation: DLR – German Aerospace Center, Oberpfaffenhofen

E-mail: claudio.castellini@dlr.de

**Abstract**

Despite decades of research, pattern-recognition-based myocontrol has only recently moved out of the laboratories and into the clinics. Indeed, one facet of the problem is the lack of *effective* experiments – myocontrol as an academic topic is still, by and large, removed from the clinical reality. Data are collected while subjects perform overtly simple tasks and examined offline; the experimental setup is unrelated to real prosthetic hardware; patients are hardly involved (when they are at all); and so on. To bridge this gap we plan to issue a set of guidelines on how to design effective experiments for myocontrol. Myocontrol should be *dexterous, reliable, flexible and natural;* these four characteristics pave the way to *trust* in the prosthetic hardware, foster man-machine *adaptation* and in the end provide *acceptance* and *restoration of the lost functions.* And in fact, to reach these goals much can be done already when a novel myocontrol system is tested in an academic lab. We argue that experiments in myocontrol should involve patients since the start and resemble daily life, which implies, for instance, using wearable hardware and real-time control; online tests enforcing complex tasks needing bodily movements, real-life objects and realistic environments; evaluation of performance not only on the speed of execution and/or the success rate, but also on co-adaptation; and so on. We will discuss these aspects in detail and provide a set of guidelines to design more effective academic experiments for myocontrol.

**Acknowledgements**

This work was partially supported by the German Research Agency project *TACT-HAND: improving control of prosthetic hands using tactile sensors and realistic machine learning* (DFG/SNSF Sachbeihilfe CA1389/1-1).

**References**

-