

**Martín García Carmueja:**

**Flexible software for human-computer interaction: the Myoelectric Personal Training and Control Environment.**

Electromyography (EMG) measures the electrical impulses produced by the activity of skeletal muscles. In rehabilitation, EMG signals are used to prostheses. In order to facilitate neuromuscular control, biofeedback is used.

The Christian Doppler Laboratory for Restoration of Extremity Function at the Medical University of Vienna develops devices for EMG biofeedback. Patients with upper limb amputations should be able to use these devices at home for achieving necessary training intensity and frequency. Hardware and interface are readily available, but software that can be used outside of a laboratory setting is still lacking.

The aim of this project is to develop modular, lightweight and expandable software that includes myoelectric data acquisition, as well as extraction and treatment of signal features. In order to generate commands that enable the control of a human computer interface, the software provides different processing algorithms. For the development process, an agile, iterative approach was used. Design decisions were focused on promoting concurrence, reusability, expandability and portability, making use of well-known software design patterns.

The product of this development process is an open source graphical frontend and libraries for EMG training and control written in C# with modest system requirements. New components providing additional functionality can be integrated without changing the existing code.