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Professor Dr. Dario Farina has been Full Professor at Aalborg University, Aalborg, Denmark, (until 2010) and at the University Medical Center Göttingen, Georg-August University, Germany, where he founded and directed the Institute of Neurorehabilitation Systems (2010-2016) until he moved to Imperial College London as Chair in Neurorehabilitation Engineering. His research focuses on biomedical signal processing, neurorehabilitation technology, and neural control of movement. Within these areas, he has (co)-authored >500 papers in peer-reviewed Journals. He has been the President of the International Society of Electrophysiology and Kinesiology (ISEK) (2012-2014) and is currently the Editor-in-Chief of the official Journal of this Society, the Journal of Electromyography and Kinesiology. He is also currently an Editor for Science Advances, IEEE Transactions on Biomedical Engineering, IEEE Transactions on Medical Robotics and Bionics, Wearable Technologies, the Journal of Physiology, and IEEE Reviews in Biomedical Engineering. He has been elected Fellow IEEE, AIMBE, ISEK, and EAMBES.

Title of the lecture

Interfacing and decoding the activity of spinal motor neurons from non invasive bioelectric recordings

Alpha motor neurons receive synaptic input that they convert into the ultimate neural code of movement -- the neural drive to muscles. The study of the behaviour of motor neurons provides a window into the output circuitries of the spinal cord. Recently, the interfacing (bioelectrodes) and processing methods for identifying the output of motor neuron pools from interference electromyogram (EMG) signals have been advanced substantially. In the past decade, these methods have indeed allowed for the first time the monitoring of the behaviour of tens to hundreds of motor neurons concurrently, with non-invasive methods. The talk will overview the technology for motor neuron interfacing and its potential for man-machine interfacing. Examples of neural interfacing in spinal cord injury, pathological tremor, and amputees will be discussed.