

## **Active orthoses design aided by multibody dynamics techniques**

The talk presents the so far achieved progress in an ongoing project addressing the design of active orthoses aimed to reduce the energetic cost of the gait of spinal cord injured subjects. The basic idea is to add, to the classical elements of knee-locking and anti-foot-drop systems, an electric motor at the knee joint which helps the leg to accomplish the swing phase. Multibody dynamics techniques are of great applicability in the design process, since they make it possible to study both the kinematics and dynamics of the gait of these subjects, thus providing clues to develop the orthosis controllers. The well-established methods of gait analysis based on motion capture through infra-red cameras and foot-ground contact force measurement by means of force plates, must be extended in this case as these subjects need crutches to walk in order to preserve stability. Therefore, the crutches should be included in the human model and the crutch-ground contact forces should be also experimentally measured.