



State of the Art in Robotic Leg Prostheses: Where We Are and Where We Want to Be

Workshop website: <https://belab.mech.utah.edu/iros2020/>

Dirk Lefeber, Ph.D.

In this talk, Dr. Dirk Lefeber will present his latest results related to the development of an efficient powered prosthesis based on a novel compliant actuation system. Restoring the propelling characteristics of an intact ankle-foot complex to an amputated person is a huge technical challenge in the field of engineering. From biomechanical analysis it is known that, compared to the other joints of the human body, it is the ankle that produces the most energy during locomotion. To present a quantitative indication, a 75 kg person produces a maximum joint torque of 120 Nm and a peak power between 250 and 350 W at the ankle while walking at approximately 3 km/h. Recreating these joint properties with a device matching the size and weight of a human foot is therefore extremely difficult and challenging. Within the Robotics & Multibody Mechanics Research Group, great effort is made in the research of energy efficient lower limb prostheses. Several prototypes have been built such as a Powered prosthesis using PPAM (IPPAM), The AMP-Foot 1.0, 1.1, 2.0, HEKTA and CYBERLEGS.