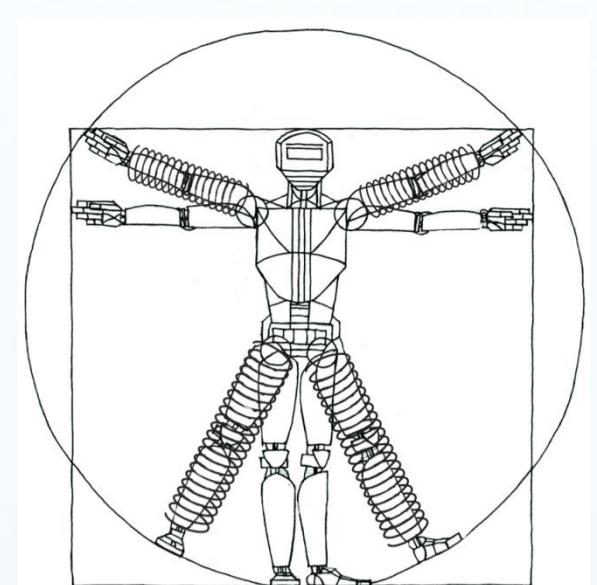


VIACTORS



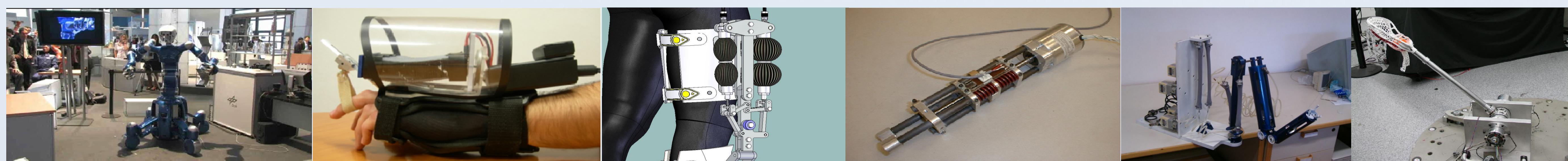
Variable Impedance ACTuation systems embodying advanced interaction behaviORS

Alin Albu-Schaeffer, DLR/Institute of Robotics and Mechatronics, Germany

Antonio Bicchi, Interdepartmental Research Center "E.Piaggio", University of Pisa, Italy

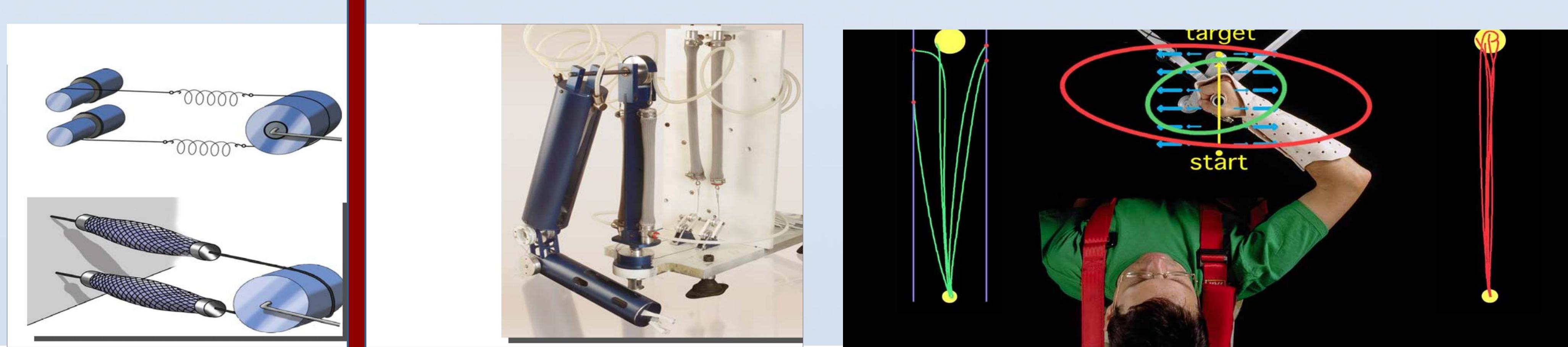
VIACTORS addresses the development of safe, energy-efficient, and highly dynamic variable-impedance actuation systems which will permit the embodiment of natural characteristics, found in biological systems, into a new generation of mechatronic systems.

The guiding idea for designing the new robots is **embodiment in the morphology of the system a substantial part of the necessary intelligence**, in such a way that the system will be passively safe, efficient, compliant, and adaptable to different tasks.



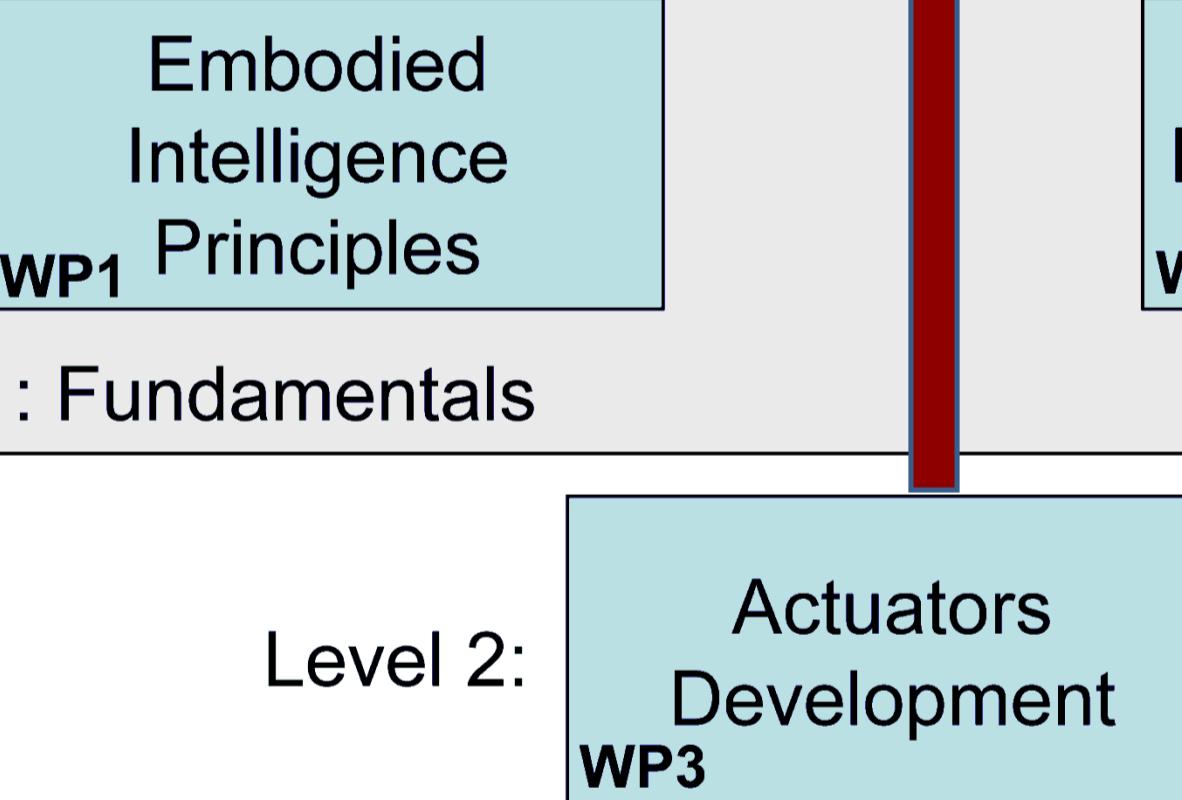
The **key innovation** of the project is the development, exploitation and integration of Variable Impedance Actuators (VIA) in manipulation, locomotion and rehabilitation systems .

Embodied Intelligence Principles What are the desired physical properties of the new type of robotic actuators?



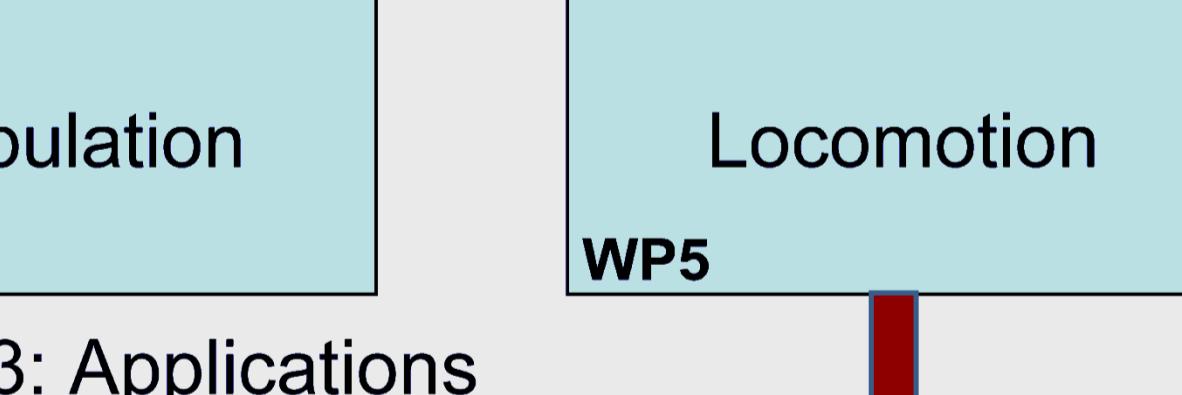
Manipulation how can grasping, and handling of objects be made more robust, more efficient, faster?

Analysis, design and applications of variable impedance actuator
Feed forward path

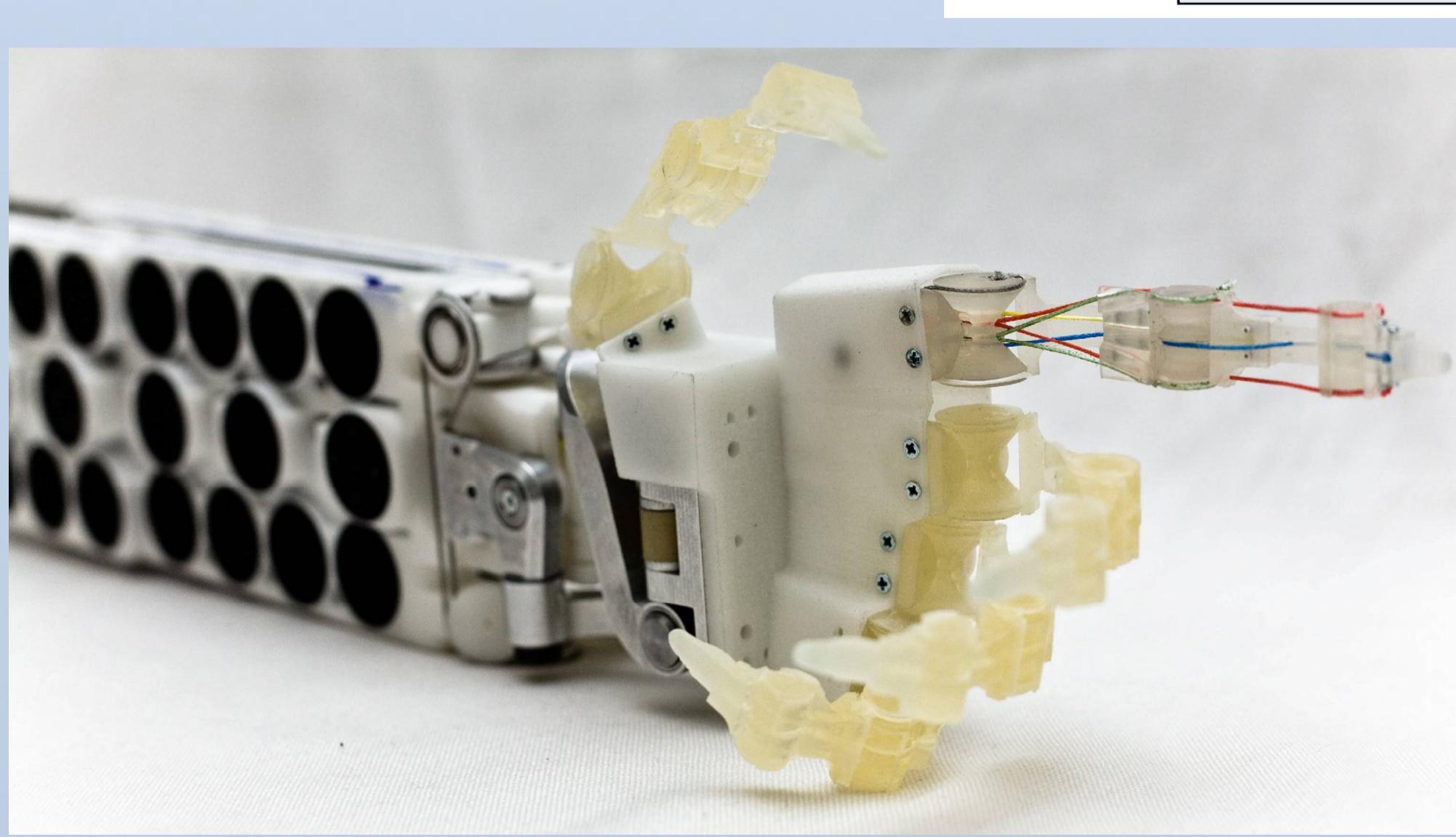


Biological Control
Study of physical and biological principles governing human motor control and learning

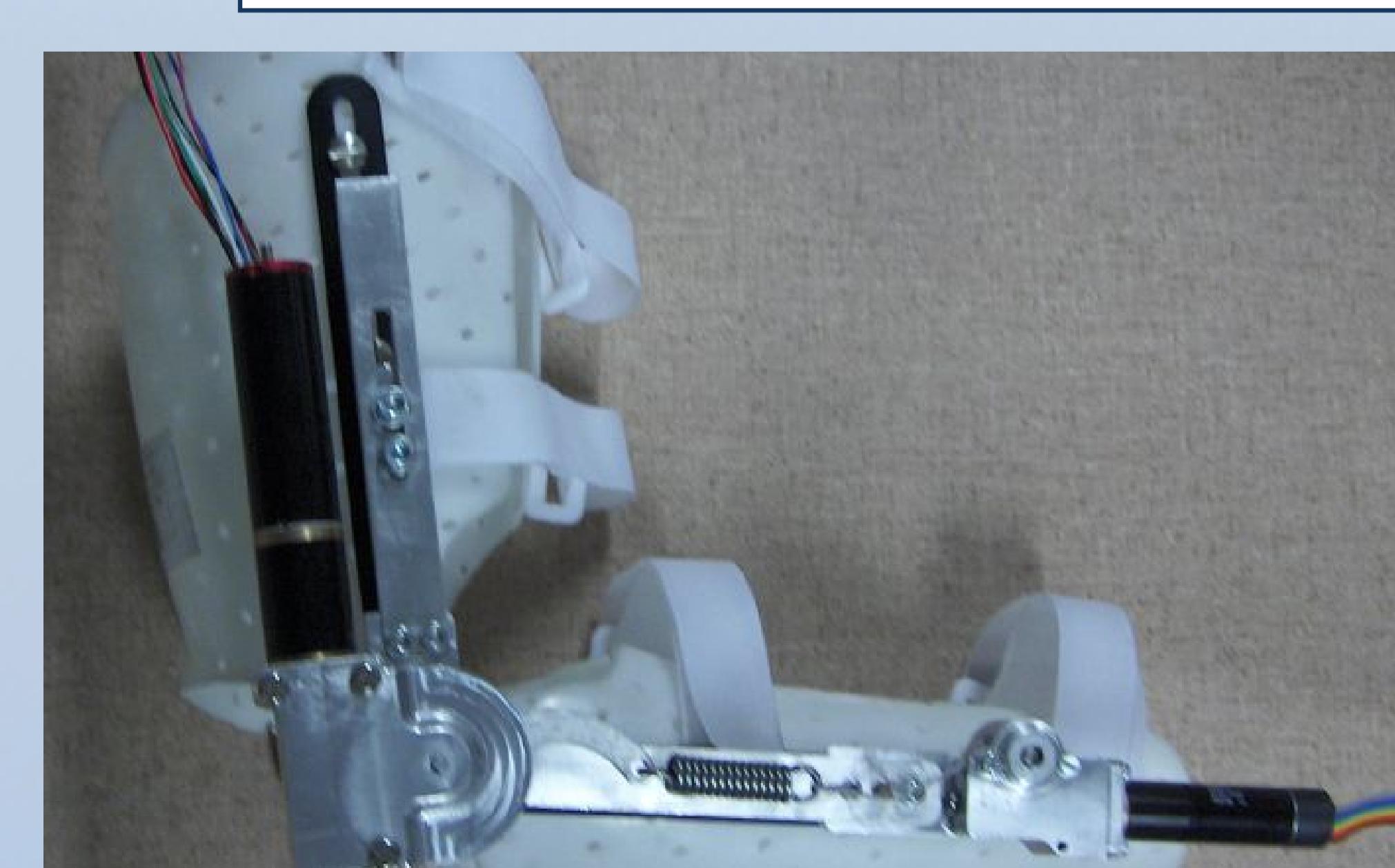
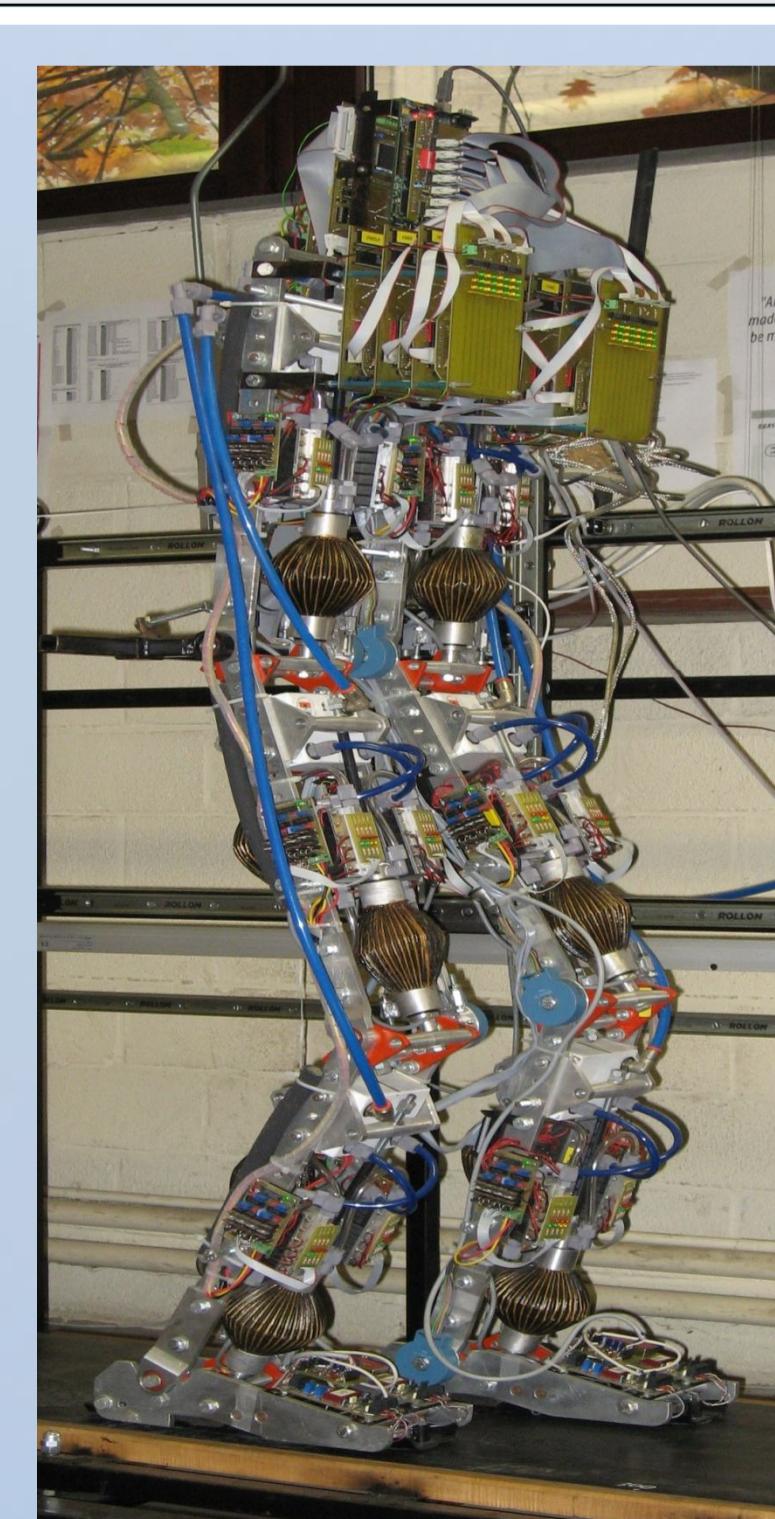
Specifications and experimental feedback
Feed back path



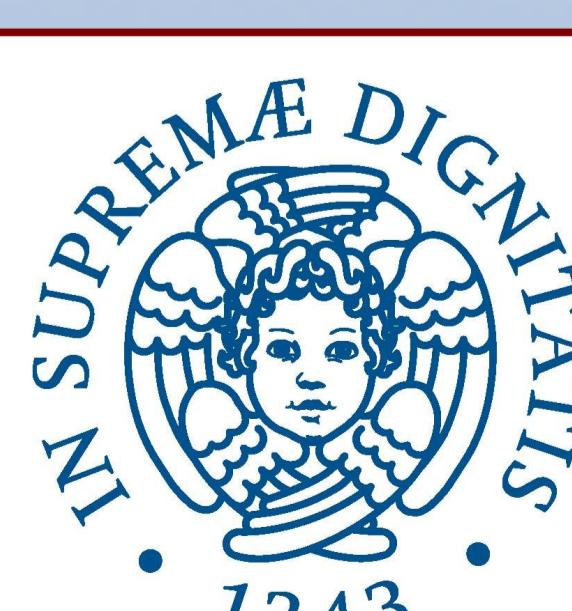
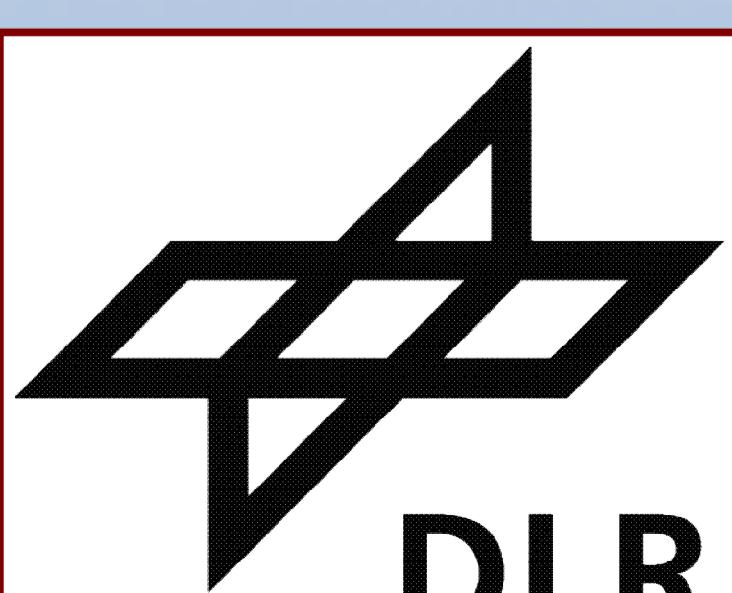
Rehabilitation
design of safe, human compliant devices



Locomotion
fast, energy efficient, intrinsically stable walking and running



VIACTORS technology will pave the way towards new application fields: industrial co-workers, household robots, prostheses and rehabilitation devices, autonomous robots for exploration of space and hostile environments.



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