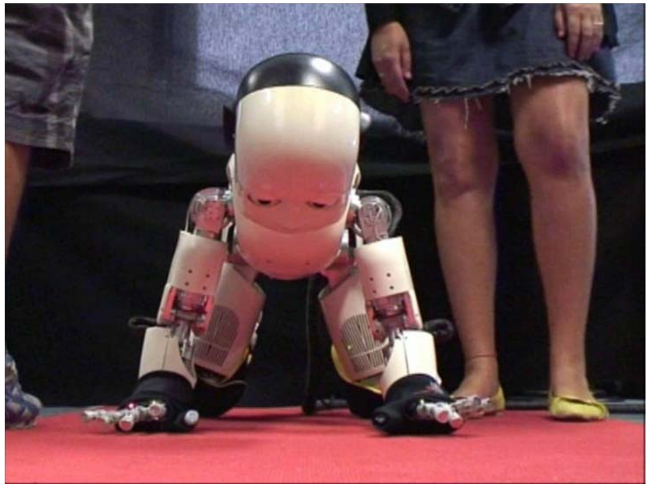
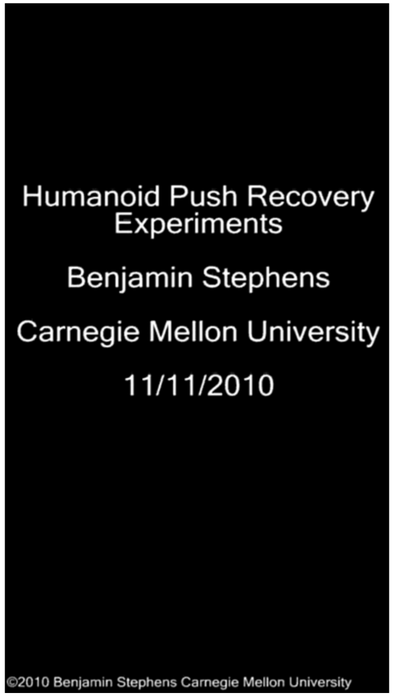
(Force Controlled) iCub Balancing

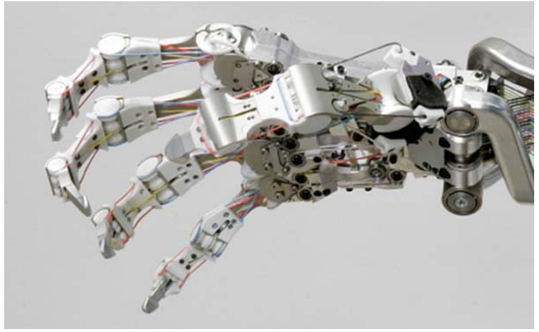
Competences:

- Control theory
- Dynamic modeling
- Programming (C++)
- Biomechanics?
- Human motor control?



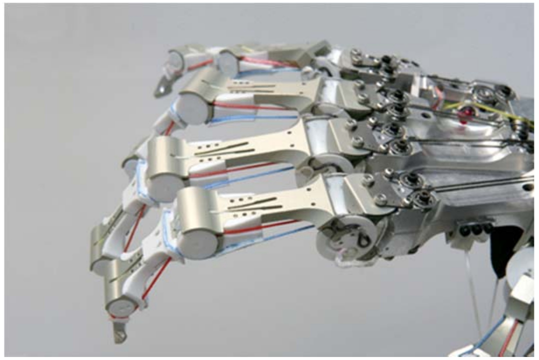


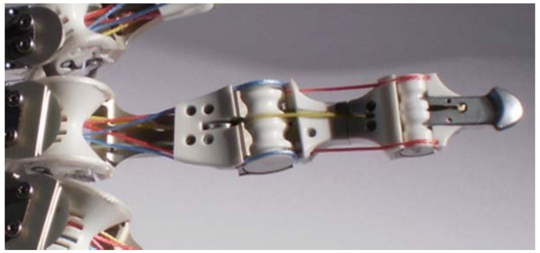
SOFT ROBOTICS



- Antagonistic actuation
- Tendon driven
- Monolateral contact joints

These principles have been successfully integrated in the DLR HAND III system [Grebenstein et al. 2010] (see photos)





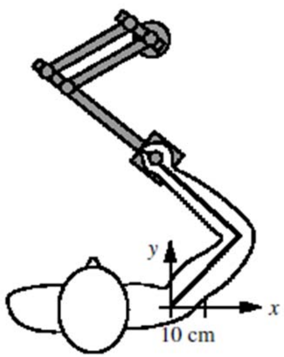
- Growing interest in the research community on the development of “soft” robotic systems
- Other works within RBCS on this topic focused on the design of soft hands

Competences:

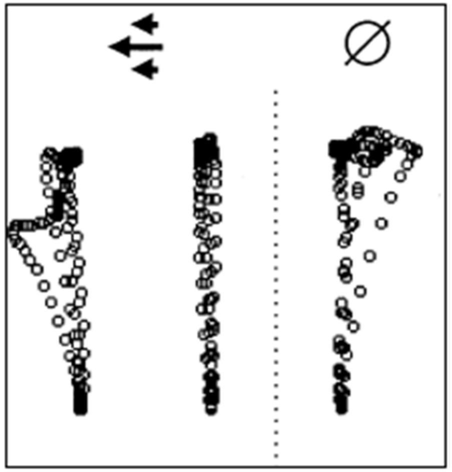
- machine/mechanism design skills
- usage of 3D parametric CAD programs (ideally ProE)
- knowledge of the properties of and processes for polymeric materials

Muscle Synergies and Cocontraction

F. Mussa-Ivaldi

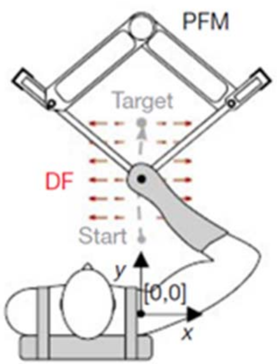


Velocity Dependent Force Field

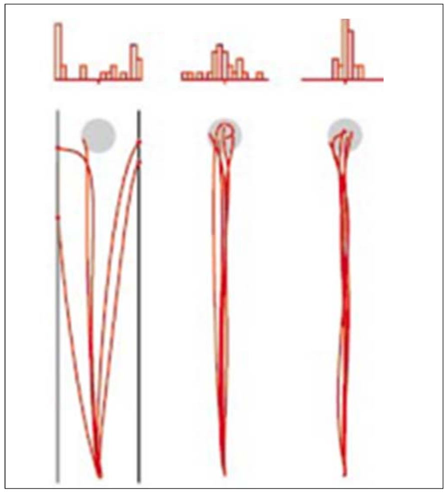


Initial Trials | After Learning | After Effects

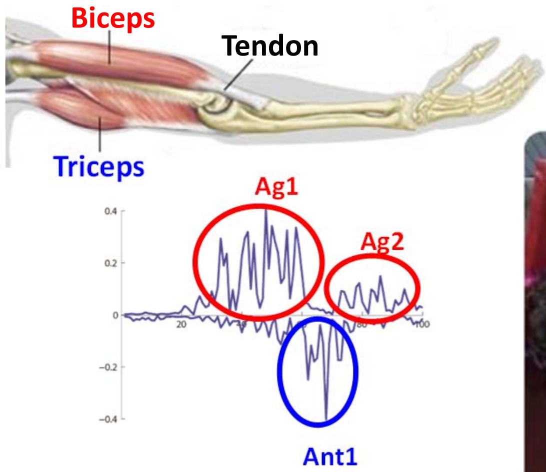
E. Burdet



Divergent Field

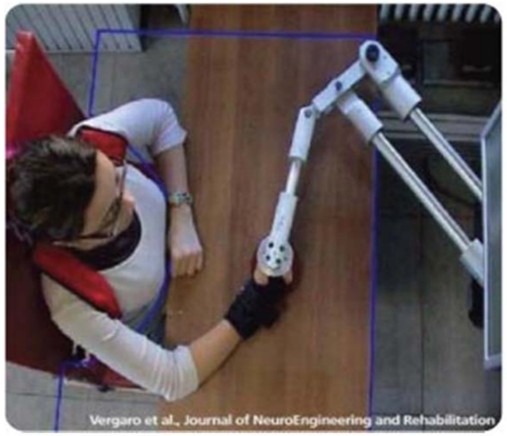


EMG Signals



Competences:

- Human motor control
- Biomechanics
- Dynamic modeling
- Data analysis



$$X = l_1 \begin{pmatrix} \cos\theta_1 \\ \sin\theta_1 \end{pmatrix} + l_2 \begin{pmatrix} \cos(\theta_1+\theta_2) \\ \sin(\theta_1+\theta_2) \end{pmatrix}$$

$$X = l_1 \begin{pmatrix} \cos\theta_1 \\ \sin\theta_1 \end{pmatrix} + (l_2+\Delta) \begin{pmatrix} \cos(\theta_1+\theta_2) \\ \sin(\theta_1+\theta_2) \end{pmatrix}$$

$$X = \begin{pmatrix} l_1+\Delta \\ l_2 \end{pmatrix} \begin{pmatrix} \cos\theta_1 \\ \sin\theta_1 \end{pmatrix} + \begin{pmatrix} l_1 \\ l_2+\Delta \end{pmatrix} \begin{pmatrix} \cos(\theta_1+\theta_2) \\ \sin(\theta_1+\theta_2) \end{pmatrix}$$