

*[...] man is the most intelligent
of animals because he has hands...*

Anaxagoras, cited by Aristotle, De partibus animalium

THE Hand Embodied refers to the “hand” as both a cognitive entity – standing for the sense of active touch – and as the physical embodiment of such sense, the organ, comprised of actuators and sensors that ultimately realize the link between perception and action. The general idea is to study how the embodied characteristics of the human hand and its sensors, the sensorimotor transformations, and the very constraints they impose, affect and determine the learning and control strategies we use for such fundamental cognitive functions as exploring, grasping and manipulating. The ultimate goal of the project is to learn from human data and hypotheses-driven simulations how to devise improved system architectures for the “hand” as a cognitive organ, and eventually how to better design and control robot hands and haptic interfaces. The project hinges about the conceptual structure and the geometry of such enabling constraints, or synergies: correlations in redundant hand mobility (motor synergies), correlations in redundant cutaneous and kinaesthetic receptors readings (multi-cue integration), and overall sensorimotor system synergies.