

## Healthcare and medtech

Cutting-edge research and technologies to provide solutions in e-health and medtech, personalised medicine and diagnostics, brain and neuroscience, rehabilitation and accessibility taking advantage of and developing new computational models and tools.



### Computational Models

- ▶ **Intelligent interfaces.** Artificial cognitive systems, personalized and adaptive systems
- ▶ **Predictive models.** Molecular dynamics, predictive models for RNA and protein folding and protein-protein interaction
- ▶ **Epidemiological models.** Large scale simulations of emerging infectious diseases and evaluation of mitigation/containment policies

### Rehabilitation & Accessibility

- ▶ **Rehabilitation.** Ergonomic solutions, wearable computing, body sensors and actuators networks fibers, anti-wear, anti decay plastics and compounds, speech/language therapy and neuromodulation
- ▶ **Accessibility.** Systems for assessment and optimization of accessibility and personal assistance, Human-Robot Interaction and robotic walkers. HTA - health technology assessment

### Brain and Neuroscience

- ▶ **Brain Decoding.** Neural basis of reaching and grasping, the olfactory pathway, brain representation of physical and abstract objects, language/brain relationships, neural mechanisms of perception and attention, mechanisms of decision making and reasoning, machine learning algorithms to decode brain activity, novel methods to characterize human neural activation from functional data, nonlinear optical techniques for in-vivo morpho-functional imaging model brains
- ▶ **Brain development.** Neuroplasticity in model systems, neurodevelopmental and neurodegenerative disorders
- ▶ **Treatment.** Effects of cognitive treatment on movement disorders, treatment of neurocognitive impairments

### Personalised Medicine and Diagnostics

- ▶ **Personalised medicine.** Genome/transcriptome functional annotation, metagenomics and epigenetics
- ▶ **New diagnostic applications.** DNA and RNA sequencing, bioinformatics, liquid biopsy, microfluidic and Lab on Chip, novel biomarkers related to neurodegenerative disease and tumors, machine-learning algorithms for the diagnosis of language disorders.
- ▶ **Advanced imaging.** Multi-modal preclinical in vivo imaging, image processing and data analysis, development and optimization of human MRI acquisition methods.

### eHealth and Medtech Devices

- ▶ **eHealth systems,** integrated management of chronic patients, telemedicine, design of socio-technical system for quality of life and wellbeing
- ▶ **Medtech devices,** biocompatible, biodegradable and bioactive prosthetic materials, BioMEMS for biomedical applications, microgrippers for micro-surgery and objects, tissue and cells manipulation at micro and nano scale.