



Affiliated with UPMC, CNRS and INSERM, the Interfaces Institute groups 5 research units specialized in:

- Computer science, in particular in the domains of connected objects, safety and reliability (LIP6)
- Robotics and Intelligent Systems (ISIR)
- Biomedical Imagery (LIB)
- Medical Informatics and biomedical knowledge management for e-health (LIMICS)
- Clinical and experimental respiratory neurophysiology (UMRS 1158)



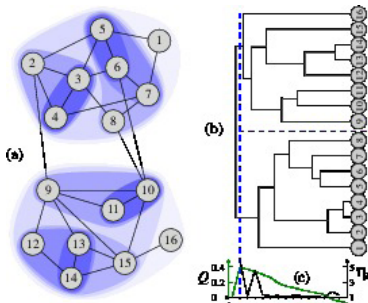
Innovative solutions for smart interfaces between humans and the digital world: creativity, efficacy, and safety

The presentation of Interfaces

Computer Science

→ Our know-how in modeling and solving fundamental problems towards real applications through public-private partnerships is organized around three axes:

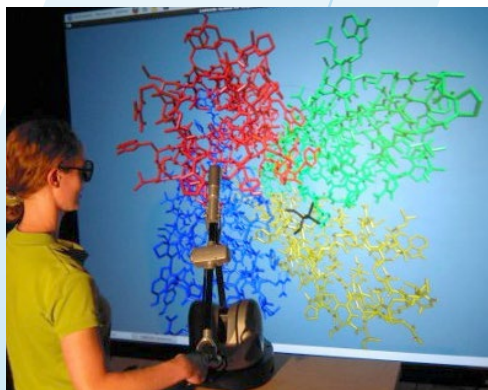
- Safety, security and reliability: ensuring reliability and computational efficiency by guaranteeing safety for both hardware and software, applied to networks, data (private life protection) and systems (on chip & embedded)
- Data science, artificial intelligence & optimization: modeling and optimizing complex systems, data and knowledge sciences ; artificial intelligence and operational research, from decision making to adaptive and multi agent systems, human learning and interactive systems
- Smart objects: tools and methods to observe, analyze, understand, process and design complex systems and networks and embedded systems.



Robotics and Intelligent Systems

→ Design and control of robotic systems with high dynamic complexity (mobile robots, humanoids) or for applications involving human-machine interaction (haptic interfaces, tangible interaction with microworld, assistance to rehabilitation)

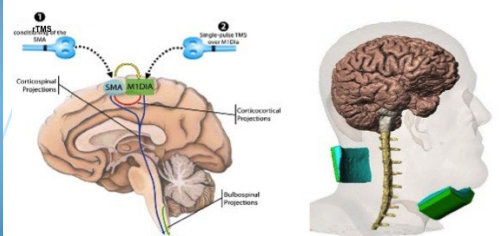
→ Disruptive concepts inspired from life sciences, such as multimodal perceptual systems, bioinspired robotics, artificial learning, etc.

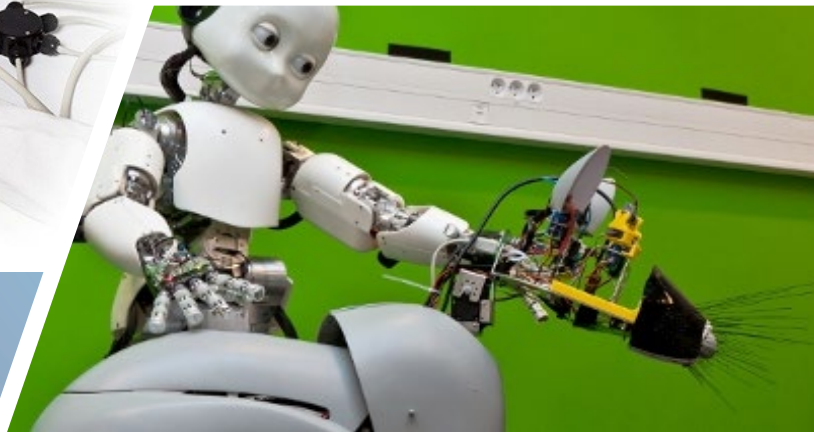


Biomedical Imagery

Morphological, functional and molecular imaging, at the preclinical and clinical stages. Target pathologies are related to aging, such as osteoarticular, cardiac, vascular or neurological diseases, and cancer.

- New diagnostic and therapeutic approaches based on ultrasound imager, MRI, C Scan, PET and diffuse optical imaging.
- Means for early diagnostic and for evaluating the response to ne theranostic modalities, new biomarkers adapted to biological analysis, improved understanding of physio-pathological processes.





Medical informatics

→ Modeling, visualization, processing and integration of biomedical data and knowledge for e-health.

→ Various contexts: pharmacovigilance, rare diseases, cardiovascular diseases, psychiatry, nutrition, prevention.

Nervous system and respiratory systems

Biological, histological, physiological, pharmacological and clinical approaches, including psychophysiology with a systematic use of biomathematics and modeling.

→ **Three main topics:**

- Cerebral cortex and respiration
- Automatic control of ventilation in animals and humans
- Respiratory neuro-stimulation in animals and humans

Research staff
(full-time equivalent): **612**
including PhD students: **277**

Partnership income
with industry: **6,5 M€**
Global budget: **41,7 M€**

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