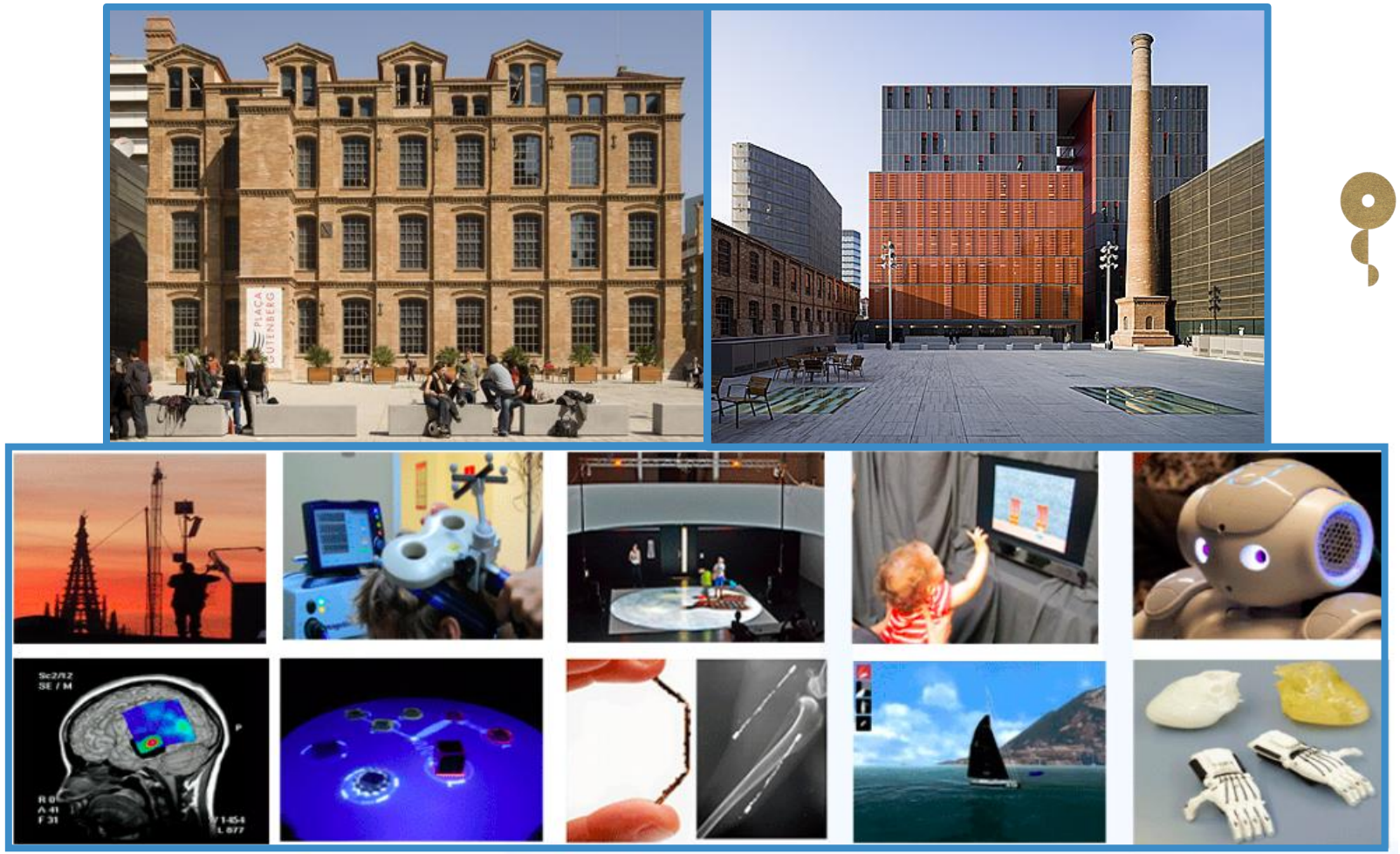
26th September 2024

Gemma Piella

UPF – Department of Engineering

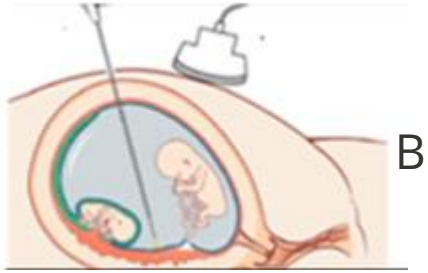


EXCELENCIA
MARÍA
DE MAEZTU

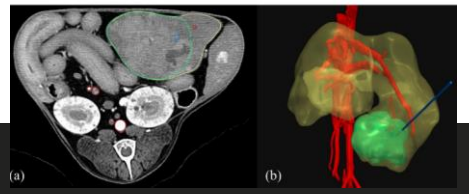
Barcelona Center for New Medical Technologies

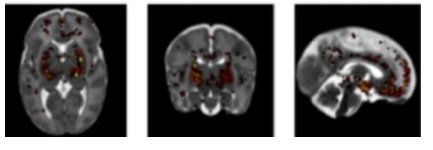
Interdisciplinary and **translational** platform for research in **biomedical engineering**

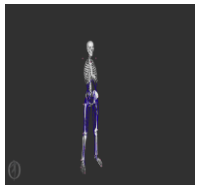
Work closely with industrial & clinical partners to **transfer to clinical practice**

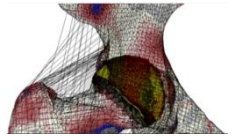


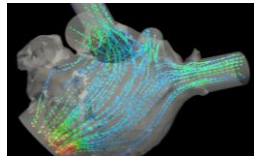
- Medical Image Analysis
- Biomechanics and Mechanobiology
- Physiological Modelling
- Biomedical Signal Processing
- Biomedical Electronics
- VR/AR and visual analytics
- Computer Assisted Surgery
- Clinical Translation

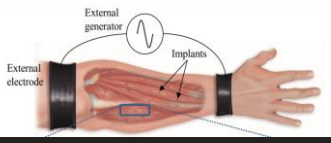










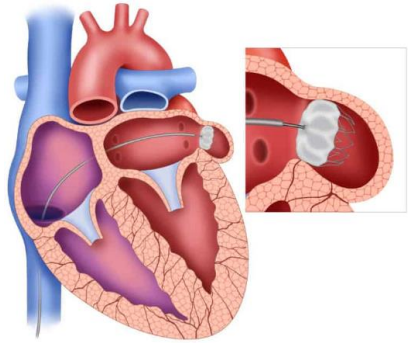


Transferring technology into real-world applications

Some examples:

- ✓ **VIDAA**: Virtual Platform for Implantation Devices for the Left Atrial Appendage
- ✓ **FORESEE**: Intravascular Microsensing for Remote Monitoring of Heart Failure Patients
- ✓ **LiverColor**: an AI tool to Quantify Hepatic Steatosis

Virtual Platform for Implantation Devices for the Left Atrial Appendage



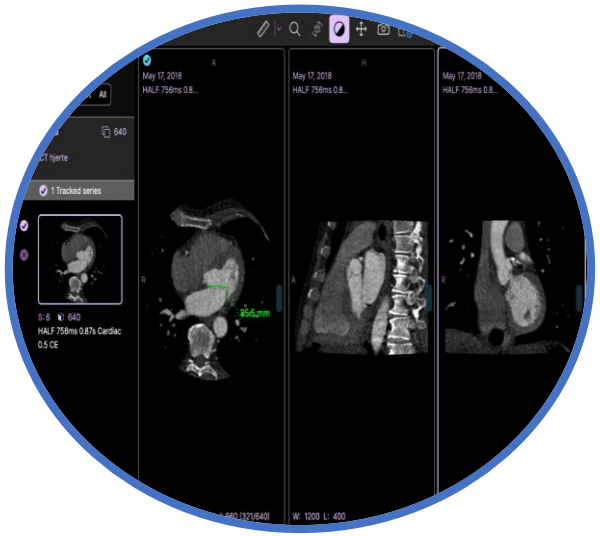
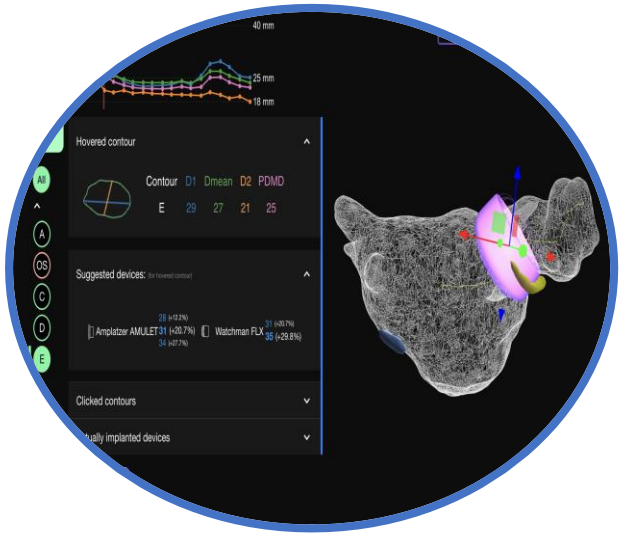
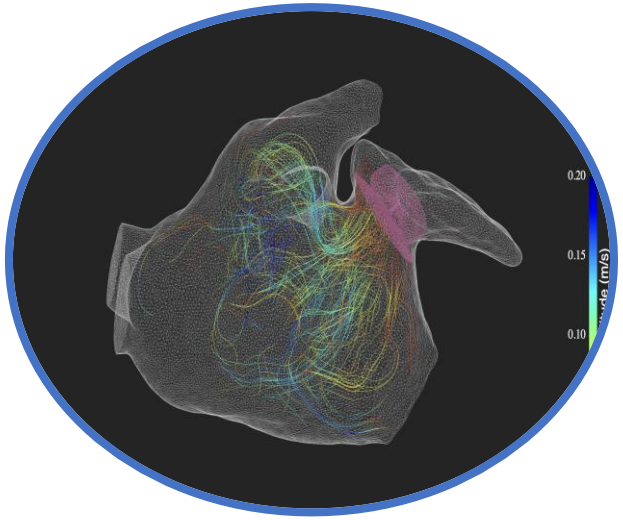


Image analysis



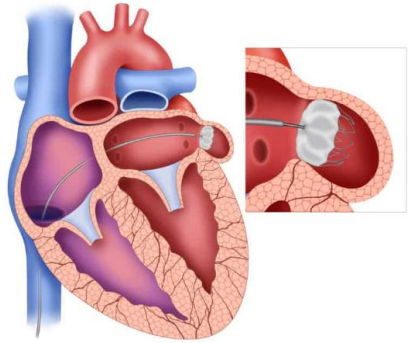
Device deployment

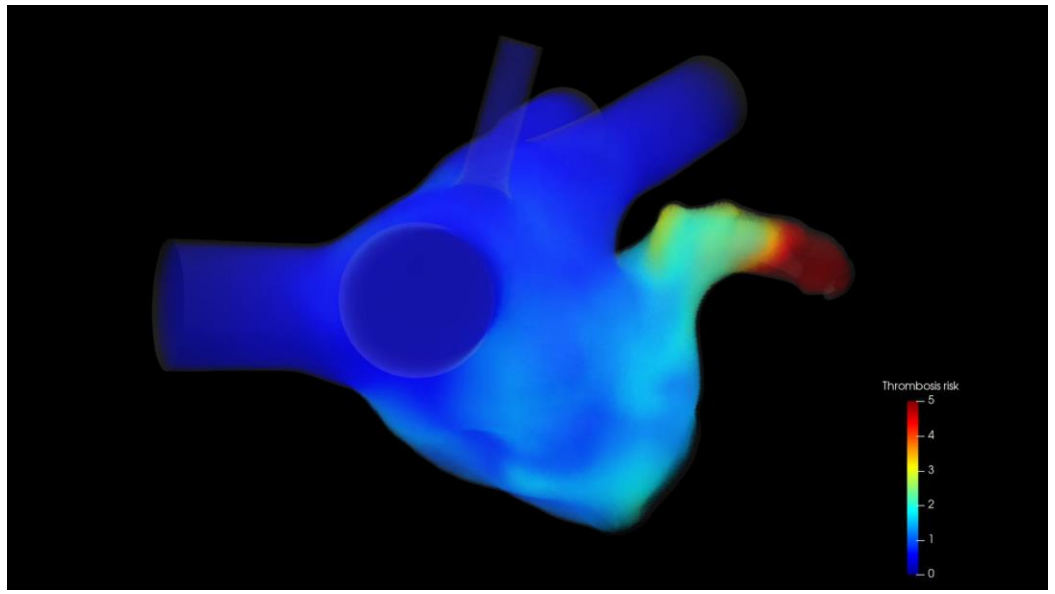


Advanced flow simulations

Oscar Cámara

Virtual Platform for Implantation Devices for the Left Atrial Appendage



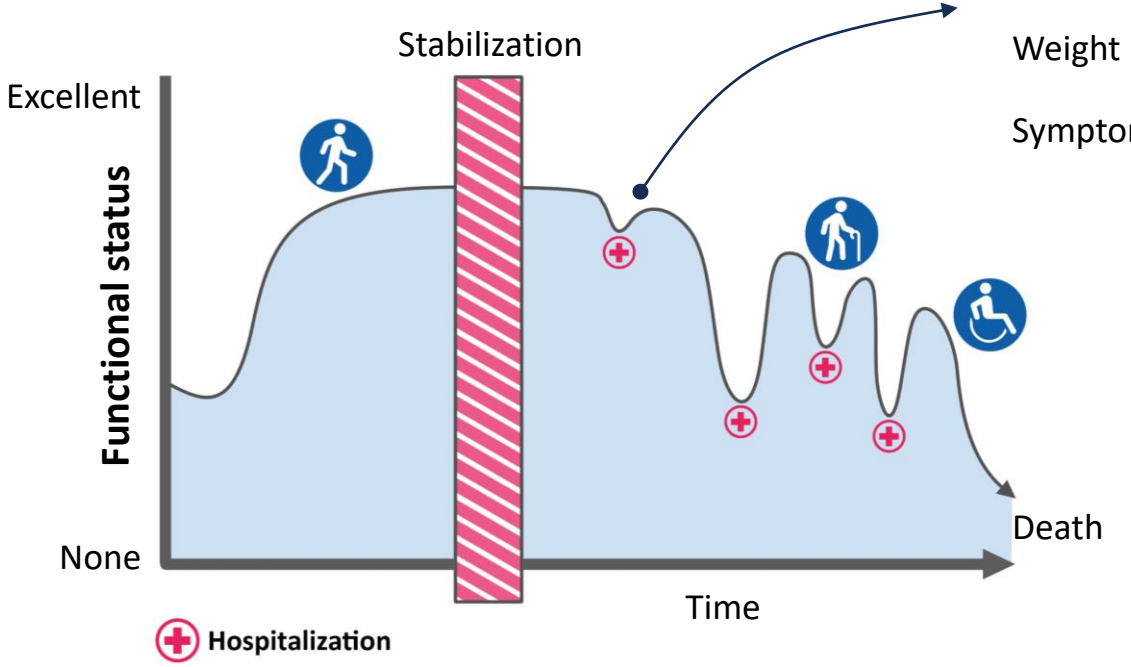


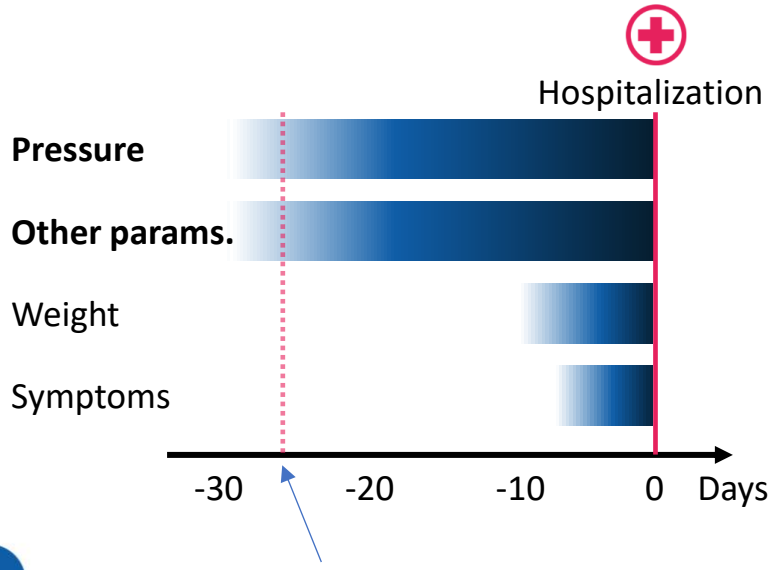
Oscar Cámara

Intravascular microsensing for remote monitoring of heart failure patients

Laura Becerra Antoni Ivorra

Course of decompensation of chronic heart failure





Sooner pharmacological treatment to avoid decompensation

PEOPLE WITH HF
64 M

5-YEARS MORTALITY RATE
50%

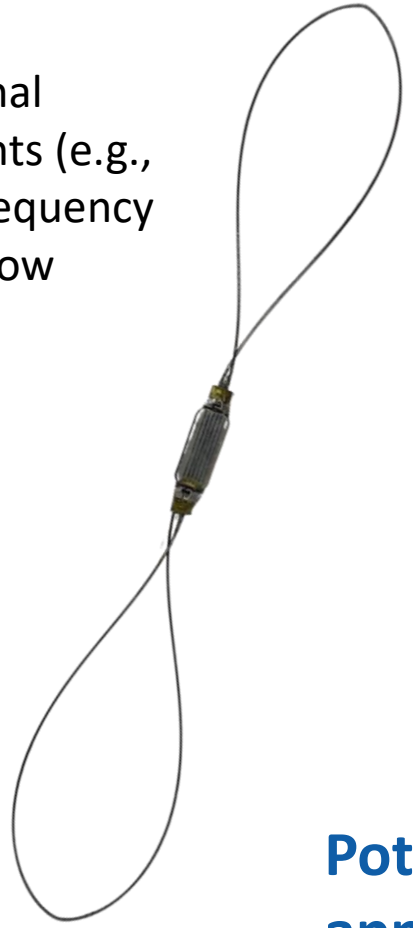
ANNUAL COSTS UK
£2 B

Adapted from: Can J Cardiol. 2020 Jul;36(7):1050-1060.

Intravascular microsensing for remote monitoring of heart failure patients

Laura Becerra Antoni Ivorra

Our implantable sensors achieve exceptional miniaturization by lacking bulky components (e.g., batteries). They are powered using high frequency current bursts applied to the skin, which flow through tissues by **volume conduction**.



IPR STATUS

- IP1: basis of sensing method; national phases (USA, EU, CA, AU, CN)
- IP2: pressure transduction; **European patent granted**, national phases
- Positive FTO analysis

COMPETITIVE ADVANTAGES

1. Can sense multiple biomedical parameters in a single device
2. Network of devices for multi-site sensing
3. Fits in thinner blood vessels
4. Easier and safer to implant

Potential to address several cardiovascular applications including heart failure

LiverColor: an AI tool to quantify hepatic steatosis

Surgical team travels to the donor hospital

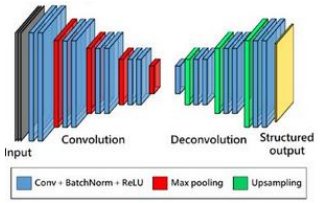
Surgical extraction & **visual organ evaluation**

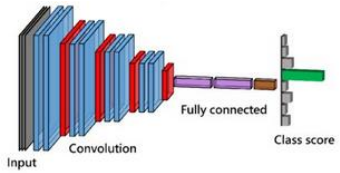
Preservation/Transport to recipient hospital

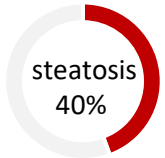
Transplantation

Subjective & error-prone: 30% discarded, despite organ shortage

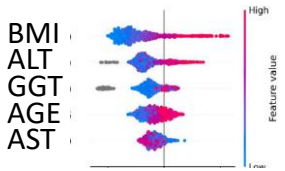
50% of the livers discarded by visual inspection could have been used



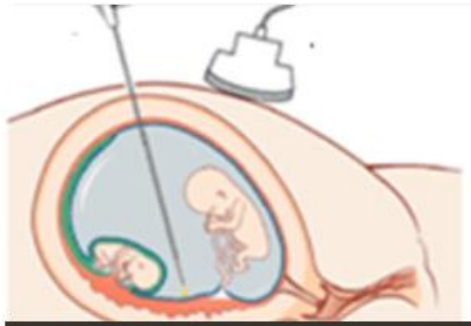




AUC: 0.8
89% accuracy (vs 73% surgeon's acc.)



And many more applications ...

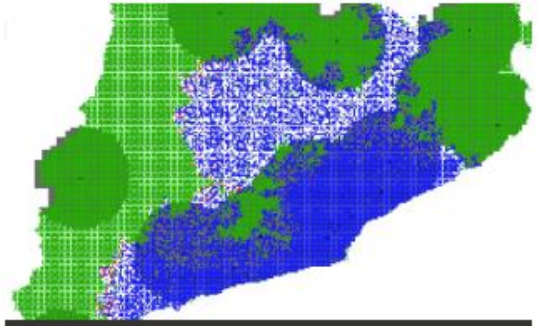


Foetal Surgery

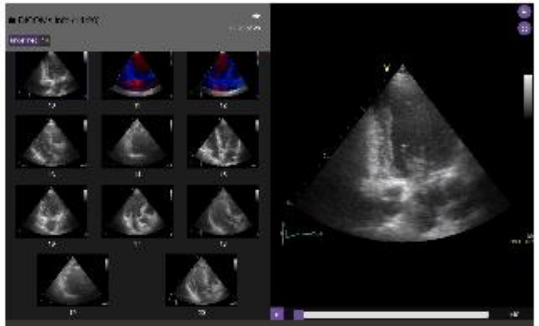
Injectable Electronic Implants

Surgical planning for cochlear implants

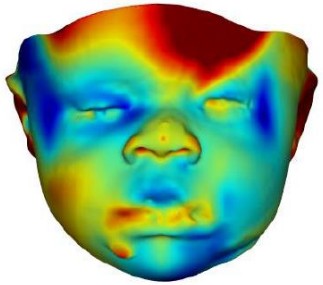
MiWendo Solutions - Endoscopic Navigation



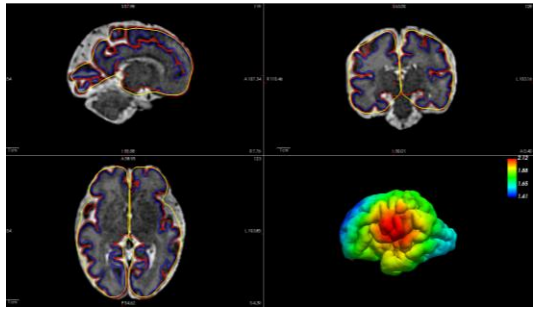
Agent based models for the study of infectious phenomena



ReImaging - Biomedical Data Platform



3D face analysis for genetic screening



Neurodevelopment across lifespan