



RÉSEAU SATT

# TECHNOLOGICAL INNOVATIVE SOLUTIONS

## FROM OUR MEDTECH PORTFOLIO





## BONESIS

Technology matured by



**Digital twin to model the cellular behaviors.**

#DigitalTwin

#CellFateDecision

#DeepLearning

Bonesis builds on bleeding-edge artificial intelligence technologies to automatically design executable models of gene regulatory networks and signaling pathways from bulk and single-cell RNA sequencing data.

From these mathematical models, BoNesis embeds algorithms for discovering genetic perturbations to control cell fate decision and cell reprogramming.



# TECHNOLOGIES MEDTECH – DRUG DELIVERY

## ARC

Technology matured by **CONNECTUS**  
FOURNISSEUR OFFICIEL D'INNOVATIONS

**The innovative passive steerable needle for accurate multimodal image-guided percutaneous interventions with its stiffness controlled at your fingertip.**

#PassiveSteerableNeedle

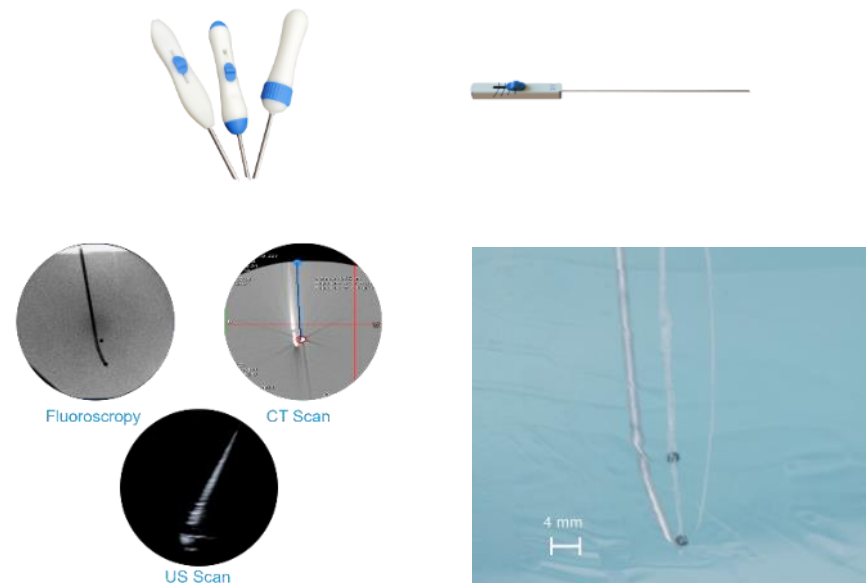
#StiffnessControl

#MultimodalImaging

ARC is a **novel needle for multimodal interventional radiology or minimally invasive surgery**. The stiffness can be easily controlled just by sliding a button on the handle according to combinatory patterns. Size, material and configurations can be designed on demand depending on the application.

ARC offers the opportunity to correct the trajectory and finally reach the target with limited tissues lacerations.

ARC offers the possibility to simplify the insertion planification , reduce the patient trauma, increase accessibility and lower the surgical intervention.



## DosIRM

Technology matured by



**Magnetic field exposure meter for Magnetic Resonance Imaging workers (MRI).**

#MRI

#Exposuremeter

#Sensor

DosIRM is a device for assessing the exposure of workers in the environment of equipment using magnetic resonance technology and in particular Magnetic Resonance Imaging (MRI). This demonstrator is based on hall effect sensors and movement sensors (accelerometer, gyroscope, etc.)

This small device allows a **personalized measurement** of the magnetic field and magnetic field gradients in static as well as in 3D and during displacements while storing the generated data which is processed in real time.



# BONES/ WELL BONES

Technology matured by  SATT LUTEC

## Ultrasound to visualize blood flow in trabecular bones for the diagnosis of joint diseases

## #Diagnosis

## #Ultrasound

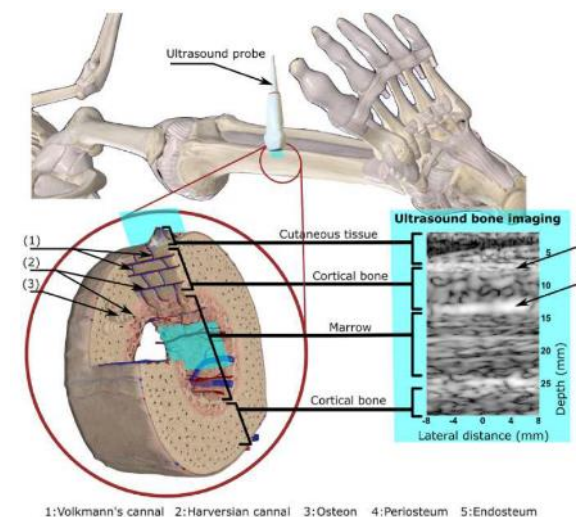
## #Bone

New **ultrasound technology** to determine the speed and direction of blood flow in a trabecular bone.

This allows to observe in real time the blood flows.

The technology **overcomes 3 limitations** for visualization in bone:

- the variation of the propagation speed of the ultrasound wave according to the density of the tissue
- the variation of the direction of the wave according to the anisotropy of the tissue
- the frequency of the wave adapted to obtain a better resolution





## CONTAGIOVID

Technology matured by **PULSALYS**

**Individual test to detect SARS-CoV-2 and other coronaviruses contagiousness**

#CoronavirusContagiousness

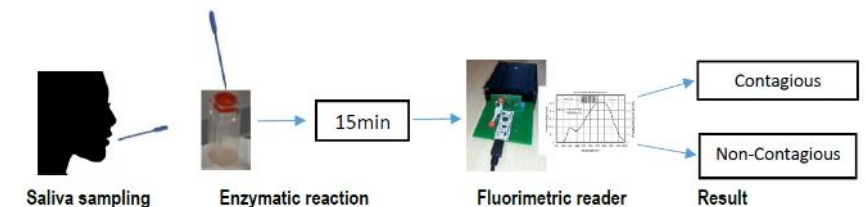
#SalivaryAutotest

#Fluorimetry


The objective of the test is to **detect replicating SARS-Cov-2** virus collected from the salivary symptomatic or asymptomatic people. The principle is to collect saliva samples non-invasively using a dedicated single use collector immediately adapted to a plastic cartridge containing colorimetric enzymes substrates and reagents.

The CONTAGIOVID test can be performed **without medical care** by each individual willing to know immediately if viable virus is present in his/her mouth. It is easy-to-use for end-user, cheap, with single use material (saliva sampler and reaction cartridge) and **reusable fluorimetric device** allowing each person to assess its actual oral contagiousness.

|              |  |
|--------------|--|
| Performances | Time to result: 15 minutes at hand temperature. Positive / Negative    |
|              | Limit of detection : 5 nM of viral protein ; equivalent RT-PCR : 28 CT |
|              | Sensitivity : 87.5 %   |
|              | Specificity: 100 %   |



## DIGINEWB

Technology matured by  OUEST  
VALORISATION  
Ressources d'innovation

#MaturationalEge

#NICU

#PretermBabies

Several markers - monitored in NICU - have been identified to determine the maturation level of preterm babies:

- **Cry analysis** : Automated detection and spontaneous cry extraction of long duration recordings for all types of cries, adapted to NICU with other noise like alarms or adults, Detection accuracy of 94.1%
- **Heart rate variability** : 30 minutes of continuous heart rate or respiration rate monitoring to produce an estimation of the FMA - Functional Maturational Age, Real time and as a bed-side tool in NICU settings
- **Motion** : automatically monitoring of motions on long periods to provide relevant information about premature newborns motion activity
- **Sleep** : Semi-Automated sleep maturation estimation

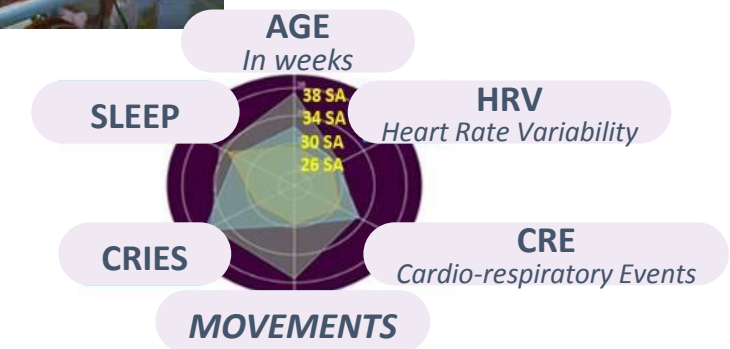
**Measure of the maturational age of preterm babies monitored non-invasively and in real-time in the setting of NICU**



Electrophysiological signals

Sound & Video

### Maturation chart





## MAMAN

Technology matured by



**Pressure and trajectory sensors for obstetrical extraction devices**

#Obstetrics

#Forceps

#Extraction

Trajectory and pressure exerted on the fetal head are transmitted to a monitor by bluetooth and analysed in relation to pre-established thresholds, giving real time feedback. The device consists of **biocompatible silicone socks covering the spoons**, a pressure sensor and an inertial unit. The device can be adapted to all forceps and other extraction procedure devices such as gloves.

The potential applications are:

- **Training**, evaluation and validation of future and confirmed gynecologists associated or not with a serious game which simulate the birth room and associated stress
- Clinical situations even critical
- **Providing data for forensic purposes.**



## AFES

Technology matured by **ERG\NEO**

L'AVENIR EST FAIT D'AUDACE

**Adaptive Functional Electrical Stimulation (AFES) based on knee kinematics to assist foot dorsiflexion in hemiparesis with adaptative stimulation.**

#Stroke

#FootDrop

#Neurorehabilitation

Adaptive Functional Electrical Stimulation (AFES) **detects onset and end of swing phase without using a foot switch**, to stimulate tibialis anterior and evtor muscles by adapting the stimulation intensity (compared to conventional FES) to the level of knee flexion, to help activate dorsiflexors and ensure smooth ground clearance during the swing phase of gait.

The algorithm should help hemiparetic patients walk more comfortably and naturally by delivering stimulation as needed during the swing phase. Furthermore, this neurorehabilitation device should allow the patient to regain neurological functions and to become independent from it.



## FACE-A-MAIN

Technology matured by **PULSALYS**

#BrainPlasticity

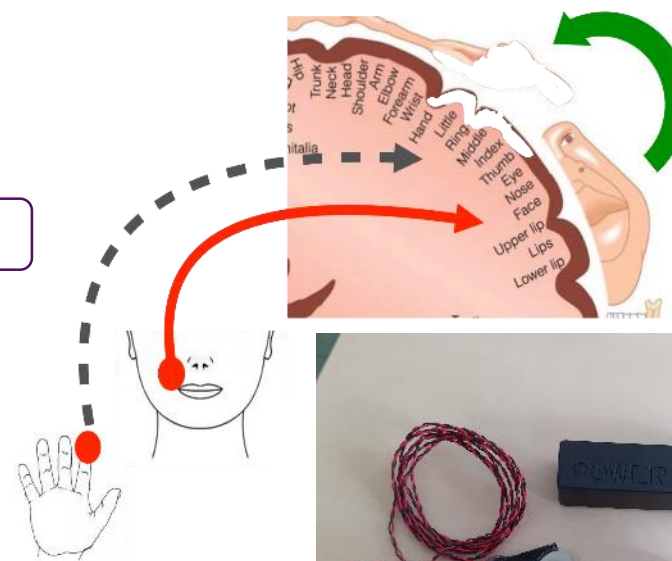
#SensoryDeficits

#SomatosensoryStimulation

The developed device delivers a specific **sequence of mechanical stimulations** applied directly to the skin. It improves the tactile perception of the hand thanks to cortical phenomena of plasticity at a distance, after a few hours of use on a "remote" region, that is to say other than the hand. Its use is non-invasive, passive and autonomous (portable system).


The feasibility and effectiveness of the technology has been demonstrated thanks to a first laboratory prototype. A proof of concept in healthy individuals as well as in post-stroke patients was performed with very good results.

### Hand sensory rehabilitation medical device





## BODY IN BRAIN

Technology matured by   
technology transfer & startup building  
Grenoble Alpes

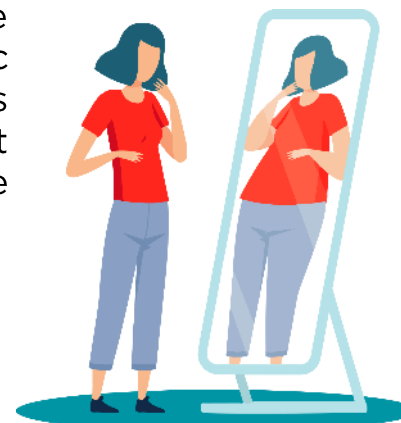
#BodyMap

#Distortion

#AnorexiaNervosa

Body map distortions can exist in many mind-body pathologies. The "Body in Brain" platform integrates a standardized and ergonomic body map assessment tool capable of generating reliable measurements with speed and ease of use. Ergonomic and transportable in different environments (hospitals, consulting rooms, experimental cubicles), the tools allow a treatment in a limited time.

- SKIN tool: measurement of tactile perception
- MOVE tool: measurement of motor distortion



### Body map assessment e-health platform

The Body in Brain platform consists of two non-invasive and painless assessment tools



#### Skin

Touch tablet  
tactile perception



#### Move

Virtual reality  
perception of body limits

## T3D

Technology matured by



**Designing customized tracheotomy tubes by in-silico simulation**

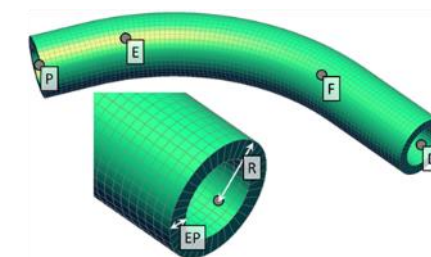
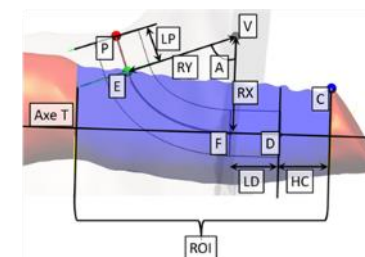
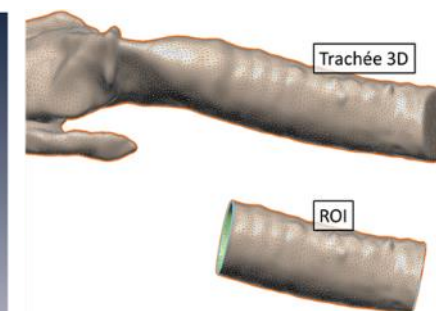
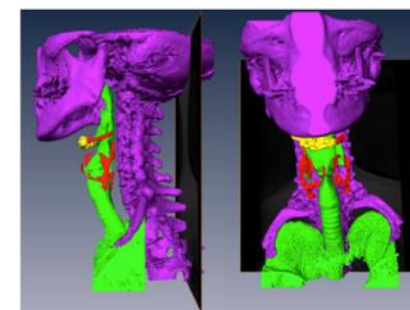
#Tracheotomy

#BiomechanicalModeling

#CustomPrinting

The T3D project proposes in-silico modeling and mechanical simulation of tubes and patient airways by imaging.

The technology therefore serves two main purposes: it helps healthcare professionals decide which standard, commercially available tubes are best-suited to the patient, and it generates a file that can be used to manufacture custom tubes.



## Laparoscopic liver surgery model

Technology matured by



## Physical simulation model for learning laparoscopic liver surgery

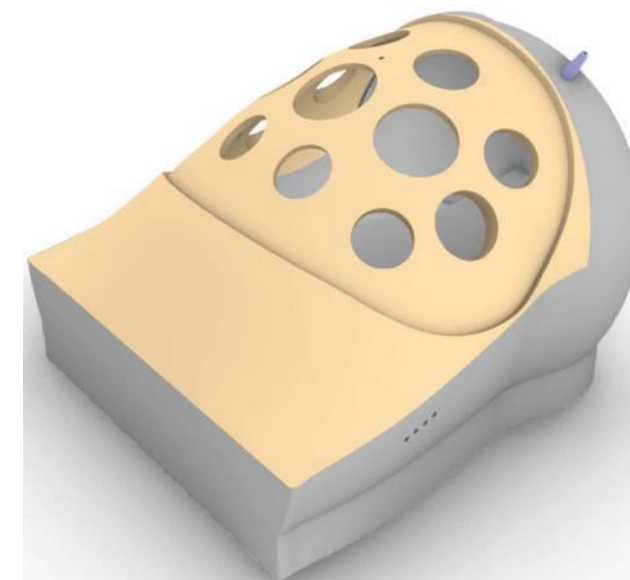
#Liversurgery

#Manekin

#Learning

The simulation model is based on :

- A **3D-printed pneumoperitoneum** with free and realistic placement of trocars
- Explanted liver (from hog or human corpse, different sizes and morphology, fresh or frozen) repressurized with fake blood.
- It reproduces real-life conditions. Explanted liver can simulate adverse events like bleeding and biliary leakage. It also allows to test various patient's or trocars' positioning. In addition, this system is versatile and could be used for teaching open surgery, and soon with a surgical robot (Da Vinci). It can also be easily adaptable in the future to accommodate other abdominal organs, or even synthetic organs for broader learning.





# TECHNOLOGIES MEDTECH – VETERINARIAN

**BEA**

Technology matured by

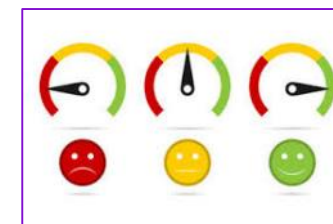


**Animal well-being assessment device**

#AnimalWellbeing

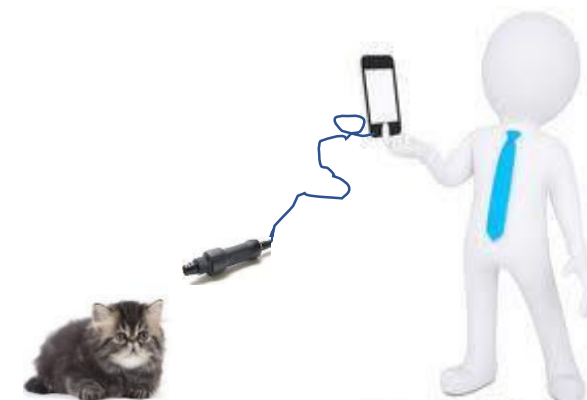
#Device

#NonInvasive



**Non-invasive device** to assess and predict the level of well-being, stress, and more generally the **emotional state of an animal**. Device: prototype using a commercial near-infrared spectrometer (MicroNIR Onsite), perpendicular to the measurement zone.

Type of samples: wet (blood, tears, sweat, urine, feces), dry (mucosa such as ear, axilla, udder), from a distance. Readout: global and direct molecular signature including molecules featuring stress, anxiety, bad feeling and well-being (spectra distinguishing 2 emotional homeostasis states: balanced and unbalanced). Prediction of emotional state of the animal reliable at 90-100%



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