



# FOLLOWKNEE

## MULTI-SENSOR SYSTEM FOR KNEE IMPLANTS: DETECTS INFECTION AND FACILITATES SURGERY AND REHABILITATION

### ? WHAT IS FOLLOWKNEE?

CEA-Leti is excited to introduce FollowKnee, a smart integrated multi-sensor system for knee implants that drastically reduces the risk of revision surgery. FollowKnee provides reliable data leveraging three sensors and an accelerometer. The data collected facilitates knee surgery, post-op care, and rehabilitation:

- **More accurate fitting**  
Deformation sensor and accelerometer: help the surgeon position the implant more accurately.
- **Early detection of infection**  
pH and temperature sensors: detect infection early, a world first.
- **Detection of mechanical troubles issues**  
Deformation sensor and accelerometer: trigger an alert in the event of loosening or deformation.
- **Better rehabilitation**  
Accelerometer and deformation sensor help physiotherapist better adapt therapy.

### DEMO @ CES 2022

The sensors, electronics, and reader integrated by CEA-Leti will be presented in a clear acrylic column representing a leg fitted with a complete knee prosthesis. A tablet will display the data collected by the sensors.

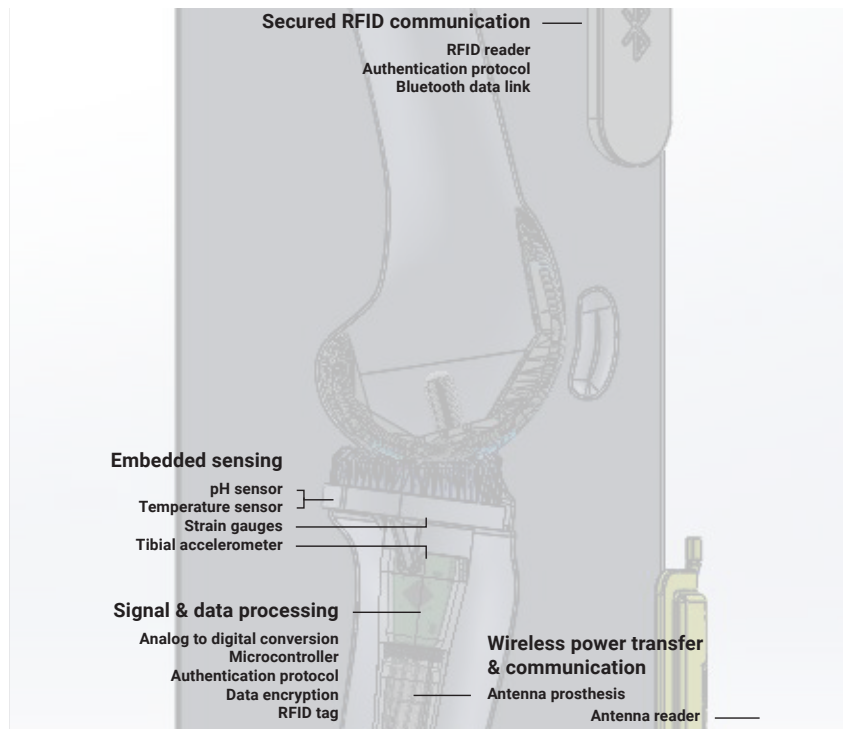


## ! WHAT'S NEW?

CEA-Leti's team leveraged its solid expertise in sensor and integration technologies to develop:

- The first pH sensor in contact with living tissue to detect infection
- The first low-power deformation sensor
- A biocompatible system
- Highly compact electronics powered via inductive coupling

The sensors and electronics are integrated into the titanium tibial baseplate.



### SCIENCE FOR A BETTER FUTURE

**Patients:** More accurately fitted implants, earlier detection of infections and loosening, better rehabilitation.

**Healthcare professionals:** Access to new data that can be used to improve surgery, reduce the risk of revision surgery, and improve rehabilitation.

**Insurers:** Fewer revisions and the associated cost overruns.

**Manufacturers:** An ultra-miniaturized multi-sensor system, an easy-to-manufacture deformation sensor.

## APPLICATIONS

- Knee replacement
- Hip replacement
- Shoulder replacement

## KEY FIGURES

- **1** patent
- **+673%** increase in knee replacements expected by 2030
- **+3.5 million** increase in surgeries worldwide

*(source: The Center, Orthopedic & Neurosurgical Care & Research, Bend, Oregon)*

## >> WHAT'S NEXT?

- Mechanical and functional testing in progress
- Keep the partnership with the University hospital, Brest, France.
- Additive manufacturing (3D printing) of FOLLOWKNEE
- An augmented reality surgical assistance solution to improve fitting of the implant.
- Partnership with a manufacturer available

## INTERESTED IN THIS TECHNOLOGY?

Olivier FUCHS  
Business Developer, CEA-Leti  
Tél.: +33 438 781 992  
olivier.fuchs@cea.fr

## CEA

91191 Gif-sur-Yvette Cedex I  
France  
www.cea.fr