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[Bio-mechanical and Bio-engineering sciences](#)

## Helping cases for liver transplants

The 'NormoPerf' project - supervised at UTC by Prof. Cécile Legallais, Director of the UTC-BMBI Lab (Biomechanics and Bio-Engineering – offers up new therapeutic perspectives for patients suffering from liver diseases and awaiting an organ transplant operation. 'NormoPerf' also represents a successful partnership between medical practitioners and research scientists, plus numerous economics opportunities. It was awarded a Trophy for Innovation from SATT Lutec.

26 Jun 2018

## Helping cases for liver transplants

In 2013, the demand for liver transplants was more than double the number of donors available. Consequently, the very long delays have led to an excess mortality of some 10% of the patients on the waiting list. Moreover, the limited quality of certain grafts also leads to transplant rejections and hence to further deaths. A major challenge when seeking to improve survival rates for patients lies in extending the offer of organs that can potentially be transplanted.

The 'NormoPerf' project aims at developing a system to allow for preservation, under best possible conditions, of temperature and oxygenation of the organs collected, their pre-op preparation, and possible clinical assessment before transplantation. The project has its origins in needs expressed by the practitioners. "Contacts were established with Professor Olivier Scatton, the senior surgeon in charge of liver transplantation at the large Paris hospital complex known as 'Pitié-Salpêtrière'. *"The surgeon wanted to develop a less expensive technique than existed at the time in the market-place"*, explains CNRS research scientist Prof Legallais, who already had expertise in liver substitution technologies and techniques. The 'university institute for health engineering' (IUIS) - created recently by the Sorbonne Universities cluster - financially supported the project from the start providing for a grant of 10 000 € in 2016.

## Teamwork

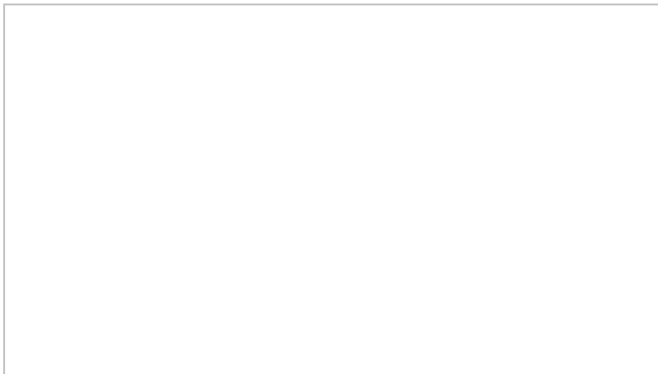
Over a period of a year and a half, a total 15 UTC student engineers – registered in mechanical and bio-engineering, and computer sciences – were involved in teamwork to define a very precise specification, designing and assembling a prototype and carrying out the first tests under the dual supervision of C. Legallais and P. Paullier, a CNRS research engineer. The specific characteristics of NormoPerf rely on well-tested technologies – a sensor controlled pump that requires knowledge of physiology and makes the project necessarily pluridisciplinary. The most challenging difficulty consisted of reproducing that natural perfusion of the liver where large volumes of blood flow at low pressure. *"The students first questioned the surgeons about organ vessel dimensions, based on which the mechanical engineering students designed and assembled a model liver using rapid prototyping protocols"*, recalls Cécile Legallais. The computer scientist students - with assistance from Jérémy Terrien, UTC's Electronics Department – designed the drive

sensors.

Various successive design versions were presented to the medical practitioners, leading to the currently adopted prototype. The reduced number of components involved led to production costs approximately 3 times less than commercially available but 'more complex' models. Various transplantation units in the Paris Region have already shown their interest in the device. Given the market potential, the SATT Lutech registered a patent claim in a partnership signed with the UTC Research Directorate. The SATT also made available a 400 000 euro 'co-maturing' fund to bring the project up to a pre-industrial phase. Moreover, the SATT teams are exploring possible commercial negotiations with the companies who have expressed interest

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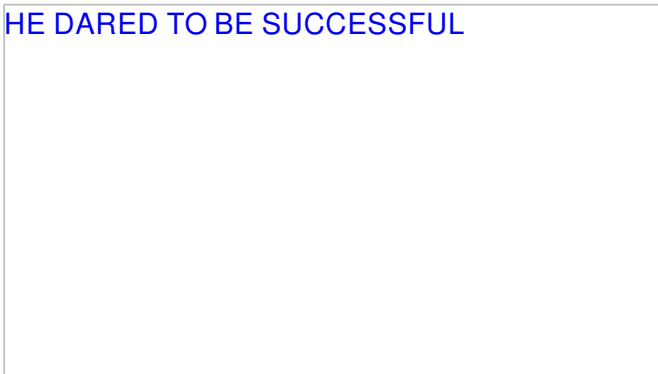


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