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## A cooperative agreement to study next generation micro-systems

The LIMMS (Laboratory of integrated micro mechatronic systems), the first CNRS affiliated Franco-Japanese laboratory, housed by the Institute of Industrial Science (IIS) at the University of Tokyo, is a 'bookmark' in the fields of micro- and nano-systems applied to biomedical, energy and optical domains. An international conference organized in April 2018 at UTC provided the opportunity for both parties to get to know each other better and to envisage signing new partnerships.

26 Jun 2018

## A cooperative agreement to study next generation micro-systems

April 12-13, 2018, a mixed delegation of 14 Japanese and French research scientists addressed a floor of some 100 participants, presenting several LIMM research thematics. The main UTC labs returned the compliment, presenting their own research programmes. The French Director of LIMM, Eric Leclerc took part in this visit-cum-conference. He knows UTC well, given that up to 2015 he was employed by the CNRS UTC mixed lab – BMBI (biomechanics and bio-engineering).

He was appointed Director of the LIMM in 2016; in fact, he has been working with the University of Tokyo since his post-doc work on artificial micro-organs in 2000. A specialist of bio-processors (aka ‘labs on chips’) – which are glass or silicon wafers carrying microcircuits somewhat similar to those found in micro-electronics, used to grow cells and/or tissues. He sees Japan as a major scientific and technological actor in his field: *“Japan has pioneered work on stem cells and implantations have already been made in man cornea and hearts and within two years, tests will be conducted for the pancreas”*. LIMMS has played no small part as and when it developed micro technologies that prove both vital for the implementation of such medical progress and technical successes *per se*. LIMMS has notably designed highly accurate components such as the sensors and tools needed for micro-manipulation. Using such tools helps provide optimal conditions for cell and tissue cultures.

## Numerous possible synergies

The BMBI laboratory’s expertise and long-standing relationships have convinced its research scientists to collaborate with the Franco-Japanese laboratory in the area of bio-hybrid micro-organs. A thesis funded by UTC has stated recently between the two, laboratories. A mention must also be made for the university hospital project called ILIT (Innovations in Liver Tissue Engineering), financially supported by the French government incentive programme ‘Investments for the Future’ (8.5 Meuros) under the supervision of the ‘hepato-biliary centre’ of the Paul Brousse Hospital, at Villejuif just South of Paris. The theme of this programme is the so-called liver lab-on-chip and the LIMMS and UTC-BMBI are collaborating with other Paris regional partners too.

Japanese and French scientists and PhD students will work together to design micro-livers to pursue investigations in toxicology which are of special interest to the pharmaceutical industrial sector and the bio-medical sector in general. These are highly strategic domains but not the only ones the partners are exploring. The skills of the Japanese scientists in electronic components can prove very advantageous for many other applications. The April conference enabled numerous contacts to be made, with the prospect of taking on more diversified projects in the future. For example, the research scientists from the UTC Heudiasyc Lab discussed possibilities with colleagues from the Advanced Mobility Centre (a specific group of laboratories of the IIS institute at the University of Tokyo who are also working on the theme of autonomous vehicles.

The UTC-Roberval Lab (mechanical engineering) was especially interested in the Japanese micro-sensors which open up new prospects for mechatronic control systems. The links between the two institutions (UTC and LIMMS) will be strengthened and implemented further. A return visit by UTC representatives to Japan is 'on the books' for some time later this year.

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