CONNECTED HEALTH
Technologies and smart systems for health monitoring and care
Leti Connected Health Solutions

As more and more individuals become key actors of their own health, behavioral awareness, acceptance of continuous monitoring and compliance to treatment will increase, reducing illness and the need for acute medical care for many. Smaller, smarter and safer data collection, analysis and transmission technologies will enable this new paradigm to diffuse globally.

Smart wearable devices: enabling new healthcare strategies

Increased life expectancy and improvements in public health are some of the great achievements of the last century. As a result, more and more people are living past the age of 65 and the number of chronically ill patients is rising, exerting considerable demands on health systems worldwide. To address these challenges, new medical approaches are needed. Smart connected wearable devices are playing an important role in establishing new health maintenance and care strategies globally.

The increasing popularity and adoption of mobile technologies are paving the way for the universal acceptance of self-monitoring portable devices. Wearables in the well-being market are raising public awareness of the effects of daily habits on health maintenance. Patient medical information can now be made accessible in real-time to the patients themselves, their doctors and caregivers. Closed-loop wearables are improving diagnostics, monitoring and treatment of chronic diseases (such as diabetes), maximizing adult autonomy and the participation of individuals in their own health care.

**FUTURE MEDICAL TRENDS: PATIENT CENTERED HEALTHCARE**

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**HEALTH CARE SYSTEM**
- Patient centered teamwork
- Shared data platforms

**CONTINUOUS MONITORING**
- Linked to medical/care services

**PERSONALIZED MEDICINE**
- Lifestyle, habits, DNA, etc. taken into account

**ADAPTATIVE THERAPIES**
- Regular medical input, closed loop systems

**NEW USER FRIENDLY MEDICAL DEVICES, CAPABLE OF:**
- Data Collection
- Data Analysis
- Data Transmission
- In a secure way

**Increased life expectancy and improvements in public health are some of the great achievements of the last century.**

Source: World Health Organization

**600M**
people in the world suffer from hypertension

Source: World Health Organization

**1.5B**
adults worldwide are overweight


**415M**
people in the world are diabetic

Source: www.afd.asso.fr/diabete/chiffres-monde

**Increased life expectancy and improvements in public health are some of the great achievements of the last century.**

Source: National Institute on Aging, NIH, USA
LETI’S ONE-STOP-SHOP

FROM TECHNOLOGICAL INNOVATION...

- INTERFACE CHEMISTRY
- HETEROGENEOUS PACKAGING
- MICROFLUIDICS & BIOLOGY
- NANOCHARACTERIZATION PLATFORM
- DATA PROCESSING
- SILICON & PLASTIC PLATFORMS

...TO CLINICAL VALIDATION

- USE CASES PLATFORM
- CLINICAL PLATFORM
- PRECLINICAL PLATFORM
- NANOSAFETY PLATFORM
- BIOINTERFACE CHARACTERIZATION

EXCELLENCE
- Miniaturization technologies
- Systems integration
- Information & communication technologies

MULTIDISCIPLINARY SKILLS
- Electrical Engineers
- Mechanical Engineers
- IT scientists
- Biologists & Doctors

CLINICAL KNOWLEDGE
- Full value-chain offer
- Global systems & data analysis
- In-house clinical validation
- Key Opinion Leaders
- Medical partnerships
Leti intends to be a major player in the connected health world, providing differentiating technologies and smart systems for health monitoring, diagnosis and treatment. Leti is present along the whole value chain and delivers components, system elements and clinically validated complete systems to its industrial partners, according to their needs.

Diabeloop is the world’s first portable artificial pancreas which combines a continuous blood glucose sensor and an insulin pump. The system was developed by French diabetes research center CERTID in conjunction with Leti. It combines a continuous blood glucose sensor (Dexcom) and a miniature patch-type insulin pump (Cellnovo). The sensor and pump communicate via Bluetooth with a smartphone equipped with a closed loop personalized algorithm developed by researchers at Leti for the application.

System demonstrator: The device developed for Avalun is based on an advanced lensfree microscopy technology that leverages a CMOS sensor to pick up light diffraction patterns. Leti developed algorithms to reconstruct an “image” from the patterns. The image can be used to perform measurements like cell dynamics, colorimetry, and microscopy, all on the same reader. Leti also developed the microfluidics technology used to carry the very tiny volumes of blood required for each test, (less than 5 microliters) to the microscope’s sensor.

On-going R&D: Researchers at CEA Tech are working on a health patch for sufferers of sleep apnea that could improve diagnosis and treatment. Leti developed the signal processing and analysis technology that monitors patient physical parameters in real time and calculates a diagnostic score. The patch will ultimately be equipped with a CO2 sensor and be used by sleep apnea patients for in-home health monitoring.
ABOUT LETI

Leti is a technology research institute at CEA Tech and a recognized global leader in miniaturization technologies enabling smart, energy-efficient and secure solutions. Committed to innovation, its teams create differentiating solutions for Leti’s industrial partners.

By pioneering new technologies, Leti enables innovative applicative solutions that ensure competitiveness in a wide range of markets. Leti tackles critical, current global issues such as the future of industry, clean and safe energies, health and wellness, safety & security…

Leti’s multidisciplinary teams deliver solid micro and nano technologies expertise, leveraging world-class pre-industrialization facilities.

For 50 years, the institute has been building long-term relationships with its industrial partners providing tailor-made solutions and a clear intellectual property policy.