Press Release

IMMEDIATE RELEASE

CEA-Leti Worked with STMicroelectronics on Health & Wellness Breakthrough: A Wearable System For Continuous Sweat Monitoring

'Sweat Patch' Delivers Reliable Monitoring for Hydration, Fatigue And Exertion Directly from the Skin

GRENOBLE, FRANCE — Dec. 19, 2025 — CEA-Leti has collaborated with STMicroelectronics to unveil a major step toward practical, continuous biochemical monitoring: a wearable patch prototype that analyzes sweat in real time. Powered by ST's new, high-precision analog front-end R&D prototype project for solid-state electrochemical sensors and CEA-Leti's advanced sensing platform, the prototype collects sweat directly from the skin through an adhesive collection layer with an integrated microfluidic circuit.

Electrochemical pilot sensors inside the device track indicators linked to hydration, fatigue, thermal stress, and exertion. After analysis, sweat is evacuated through a microporous evaporation layer. All functional layers are fabricated on flexible substrates thin enough to conform comfortably to the arm.

The small device—called Sweat Patch—combines solid-state prototype sensors, an innovative microfluidic network, and compact wireless electronics. Designed for extreme environmental conditions, it continuously measures three key physiological markers in its first version: pH, sodium, and potassium.

"In this novel system, all the sweat produced is efficiently collected and transported through microfluidic pathways to measurement chambers, each equipped with an electrochemical sensor, and then into the drainage system for disposal," said Nadège Nief, Deputy Head Micro-Technologies for Biology and Healthcare Division at CEA-Leti. "While earlier generations of analysis rely on only intermittent readings, Sweat Patch ensures a continuous, stable biochemical signal that allows a dramatic improvement in analysis."

The prototype measures 3 cm in diameter and under 1 cm thick and was developed under CEA-Leti's "human-use-compliant by design" framework for health technologies. All materials are medical-grade, non-toxic, and biocompatible.

Monitoring Biochemical Markers Continuously

The Sweat Patch is pioneering a new era of non-invasive, continuous biochemical monitoring by unlocking the rich diagnostic potential found in sweat — often described as a "goldmine" of vital health information. This innovative technology continuously tracks key biochemical markers such as glucose, potassium, sodium, and lactate, providing real-time insights into hydration status, electrolyte balance, physical exertion, and stress levels. At the heart of this breakthrough is ST analog front-end prototype, a compact high precision potentiostat designed to control and read solid-state electrochemical sensors with exceptional accuracy. When implemented in synergy with ST advanced MEMS motion sensors, the potentiostat could enable seamless fusion of biochemical data with detailed motion and activity metrics. This powerful combination transforms raw measurements into deeply contextualized, actionable insights—offering a comprehensive understanding of an individual's physiological state in real time.

Enrico Alessi, R&D Manager of System Architectures in the Central R&D of Analog, Power & Discrete, MEMS and Sensors Group at STMicroelectronics, highlighting the innovation, states: "The Sweat Patch beyond traditional monitoring solutions, delivering meaningful, personalized data can drive smarter decisions across diverse environments. Potential applications of this innovative technology are vast and impactful, spanning from personal fitness optimization, occupational health and safety to early-warning

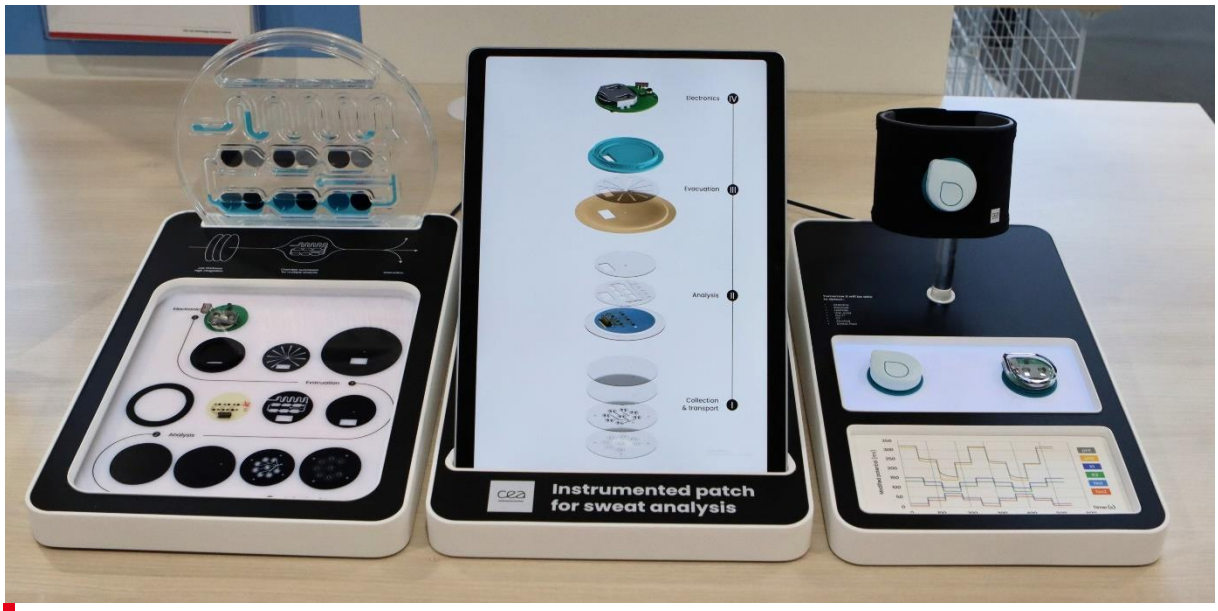
CEA-Leti, technology research institute
17 avenue des Martyrs – 38054 Grenoble Cedex, France
T. +33 (0)4 38 78 44 00
cea-leti.com

health monitoring, and non-invasive clinical screening. In industrial settings, continuous sweat analysis can serve as an early detector of heat stress and electrolyte imbalances, helping to safeguard worker health*".*

Andreja Erbes, Director of Technology Scouting and R&D Partnerships at STMicroelectronics, adds: "Interesting applications are emerging from companies investing in biochemical markers for wearable devices that offer non-invasive, continuous, and context-aware solutions. Additionally, new markets such as food analysis, industrial process control, and environmental monitoring are showing great potential, leveraging the capabilities of ST's R&D prototype and highlighting its versatility beyond healthcare".

Yohann Thomas Research engineer and electrochemical sensors expert of CEA-Leti added: "Sweat Patch demonstrates what becomes possible when electronics, microfluidics, and solid-state chemistry are developed as a unified system rather than separate components. Real-time biochemical sensing depends on every part of the chain performing reliably on the skin."

Looking ahead, CEA-Leti and STMicroelectronics are focused on advancing the technological maturity of this integrated platform, industrializing electrochemical sensors with additional biochemical biomarkers, while also enhancing device connectivity and data security to enable seamless data transmission. This complete platform serves as a technology enabler for future customers developing next-generation contextual sensing solutions.



Sweat Patch prototype

Photo credit: ©CEA/M.EXBRAYAT

About CEA-Leti (France)

CEA-Leti, a technology research institute at CEA, is a global leader in miniaturization technologies enabling smart, energy-efficient and secure solutions for industry. Founded in 1967, CEA-Leti pioneers micro-& nanotechnologies, tailoring differentiating applicative solutions for global companies, SMEs and startups. CEA-Leti tackles critical challenges in healthcare, energy, and digital migration. From sensors to data processing and computing solutions, CEA-Leti's multidisciplinary teams deliver solid expertise, leveraging world-class pre-industrialization facilities. With a staff of more than 2,000 talents, a portfolio of 3,200 patents, 11,000 sq. meters of cleanroom space and a clear IP policy, the institute is based in Grenoble (France) and has offices in San Francisco (United States), Brussels (Belgium), Tokyo (Japan), Seoul (South Korea) and Taipei

(Taiwan). CEA-Leti has launched 80 startups and is a member of the Carnot Institutes network. Follow us on www.leti-cea.com and @CEA_Leti.

Technological expertise

CEA has a key role in transferring scientific knowledge and innovation from research to industry. This high-level technological research is carried out in particular in electronic and integrated systems, from microscale to nanoscale. It has a wide range of industrial applications in the fields of transport, health, safety and telecommunications, contributing to the creation of high-quality and competitive products.

For more information: www.cea.fr/english

Press Contacts

CEA-Leti Agency
Sarah-Lyle Dampoux
sldampoux@mahoneylyle.com
+33 6 74 93 23 47