

Press release

CSEM INVENTOR AWARD 2025 HONORS BREAKTHROUGH ALGORITHMS FOR ACCURATE PULSE MEASUREMENTS AND ACTIVITY ANALYSIS

- **Award-winning algorithms:** Philippe Renevey has received CSEM's Inventor Award 2025 for his patented *PulseSpeed* technology, which enables highly precise pulse rate measurements and activity tracking—without relying on GPS.
- **Commercial success:** The technology has been integrated into smartwatches, wearables, and clinical research worldwide, driving innovation for major brands like Tissot, Festina, and ActiGraph.
- **A pioneer in wearable tech:** For over 25 years, CSEM has been at the forefront of wearable technology, securing patents and transferring cutting-edge innovations to industry leaders.

Neuchâtel, February 19, 2025 – More than twenty years after CSEM first pioneered continuous wrist-based- pulse monitoring, engineer Philippe Renevey has been honored with the CSEM Inventor Award 2025 for his game--changing work. His *PulseSpeed* patent enables high precision- measurement, offering huge commercial potential for wearable devices.

Whether jogging, climbing stairs or going for a walk, smartwatches, fitness trackers, and other wearables provide valuable insights into physical activity, such as pulse rate and oxygen saturation. But to ensure reliable data, these devices must rely on sophisticated algorithms to interpret sensor signals accurately.

One person behind these algorithms is Philippe Renevey, this year's CSEM Inventor Award recipient. As a Senior Expert in the Signal Processing & AI group, Renevey specializes in biomedical signal analysis from optical and other sensors. His goal? To develop energy-efficient algorithms that deliver precise, reliable results across a range of devices.

First patented in 2014, *PulseSpeed* is a cutting-edge- algorithm that accurately determines heart rate from wearable sensor data collected by devices like smartwatches and smart rings. Beyond just heart rate, it can also detect different activity types and calculate speed and distance—without needing GPS.

Industry is reliant upon inventions like these

"This patent embodies everything CSEM stands for," says Jens Krauss, Business Unit Manager of CSEM MedTech, based at the Inselspital campus in Bern, Switzerland. "We set out to make innovative inventions that can be transferred to industry, creating the greatest possible economic added value there."

Philippe Renevey's invention is a perfect example of this approach: In just the past year, four commercial products have been launched based on the *PulseSpeed* patent. The technology powers Tissot's T-Touch Connect Sport watch, Festina's connected hybrid smartwatches, and the Inspiring® smart ring from Norway. The American company ActiGraph also uses the *PulseSpeed* to collect data for major clinical trials.

"I am delighted to see that Philippe Renevey is being honored – a colleague who has been involved in the development of technologies for mobile monitoring of vital data right from the very outset," adds Krauss. With 25 years at CSEM, Renevey played a key role in the company's very first patent for continuous pulse rate measurement, filed in 2001.

CSEM the trailblazer

"CSEM developed a watch prototype for heart rate measurement 14 years before the Apple Watch even came to market," says Krauss. "We were the first to measure a pulse rate using integrated optical-inertial sensors on the wrist."

CSEM's pioneering technology has since been commercialized, copied, and widely adopted. Philippe Renevey's *PulseSpeed* patent extends protection beyond the 2001 patent, safeguarding the rights of industry partners using CSEM's technology in their products.

Another inventor behind the award-winning- *PulseSpeed* patent is Oliver Grossenbacher, a former CSEM engineer who is now Head of Engineering at CSEM's spin-off company Aktiia. The spin-off develops wearable blood pressure monitors, built on the technologies first developed at CSEM.

Further information

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About CSEM—Facing the challenges of our time

CSEM is a Swiss technology innovation center developing advanced technologies with a high societal impact, which it then transfers to industry to strengthen the economy. The non-profit orientated, public-private organization is internationally recognized, and works to support the disruptive activities of companies in Switzerland and abroad. CSEM operates in the domains of precision manufacturing, digitalization, and sustainable energy. To accomplish its mission as gateway between research and the economy, CSEM's 600 employees from 46 countries collaborate with leading universities, scientific institutions, research institutes, and industrial partners. With its six sites in Allschwil, Alpnach, Bern, Landquart, Neuchâtel and Zurich, CSEM is active all over Switzerland. www.csem.ch

