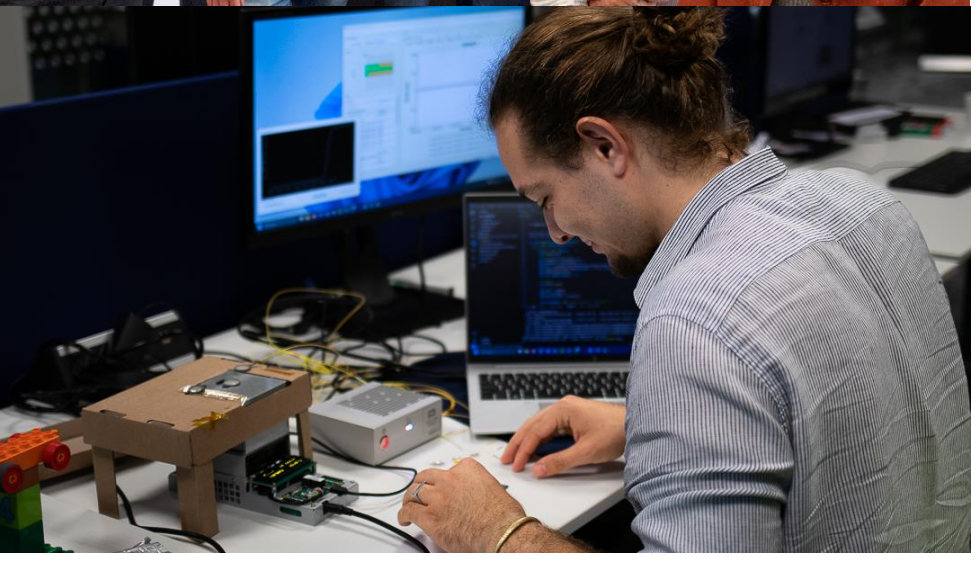
VitalWear

# Autonomous Detection of Pressure Ulcer Onset

VitalWear discovers vital information by embedding optical fiber sensing technology in textile materials, to create innovative sensor surfaces and, ultimately, sensor textiles, for non-invasive medical applications.

VitalWear's first application focus is the prevention of pressure ulcers, which annually affect 2.5m patients in the United States alone. Pressure ulcers often occur for immobilized or desensitized patients when skin cells under pressure die due to mechanical stress or due to disrupted blood supply.

VitalWear reduces the number of pressure ulcer cases and lowers the amount of time that the nurses need to spend on pressure ulcer prevention. By monitoring temperature in addition to pressure, around the clock and autonomously, without the need for a nurse to be present, VitalWear detects pressure ulcers at an early stage, so that their full formation can still be prevented, and indicates which patients currently do not need to be repositioned, so that the nurses can save precious time.

VitalWear's core team consists of senior innovators with a history at companies such as Philips and ASML and provides the required technology, innovation and business competencies. In addition, VitalWear surrounds itself with additional expertise in photonics, textile integration and healthcare.

To complete its pre-seed financing strategy after confirming more than € 1m in loans and grants, VitalWear is seeking € 500k from passionate private early-stage investors with expertise in healthcare. With these investments, VitalWear will develop its Minimum Viable Product and carry out clinical validation experiments before the end of 2025. VitalWear will then raise a Venture Capital Seed round of € 1.5m to facilitate its outcome-oriented clinical trial. The total financing requirements for VitalWear to establish scalable operations in multiple markets are estimated at between € 8m and € 12m during a period of about 5 years.

## NEED AND OPPORTUNITY

Pressure ulcers represent a significant, world-wide healthcare challenge, which in the United States every year leads to the death of 60,000 patients and to additional healthcare costs of more than $ 26b – as well as to 17,000 legal cases against healthcare institutions, which are settled for an average of $ 250k.

The current clinical practice guidelines call for the frequent repositioning of at-risk patients, which implies that guideline-compliant pressure ulcer care is currently very time consuming for nurses. This mechanism is not yet "smart", i.e. the repositioning actions are carried out purely based on timers – and not based on actual patient-specific information. As a result, some pressure ulcers are not caught early enough, so that pressure ulcer incidences are still much too high, while some patients are repositioned too often, causing unnecessary work for the nurses and unnecessary disruptions, especially also at night, for patients.

To avoid both under- as well as over-treatment and to provide optimized, patient-specific pressure ulcer prevention, there is a need for a solution that detects the actual development of a pressure ulcer at an early stage and informs the nursing staff accordingly.

## SOLUTION AND TECHNOLOGY

The VitalWear solution consists of sensor sheets, a readout device, data processing and interpretation algorithms, and a user interface for the nurses.

VitalWear leverages optical fiber sensing technology, which detects physical properties with high accuracy, and translates the sensor readings into pressure and temperature measurements. Temperature changes on the skin surface indicate the early stages of the development of a pressure ulcer. Local skin temperature decreases when blood flow is obstructed (ischemia) and increases when the body reacts to cell damage underneath the skin (inflammation).

VitalWear integrates the sensors into textile materials to create flexible and versatile measurement sheets, which are placed between the patient and the underlying surface (e.g. mattress or wheelchair). VitalWear's algorithms analyse the collected measurements over time to determine the specific risk for each individual patient.

VitalWear's initial prototype demonstrates the capability to monitor pressure and skin temperature distributions. First pre-clinical experiments are scheduled for Q1 2025.

## COMPETITIVE ADVANTAGE

VitalWear's unique monitoring and decision support solution informs nurses which patients need attention to prevent a developing pressure ulcer from fully forming and which patients currently do not need to be repositioned.
The monitoring focuses on the body areas where pressure ulcers typically occur, especially sacrum and heels.

VitalWear's solution improves upon competitors as it monitors continuously and autonomously, without requiring active support by the nurses, and as its textile measurement surface is fully comfortable for the patients.
VitalWear enables the transition from a time-based, generic risk management approach to an information-based, patient-specific prevention approach.

## IMPACT

Via timely interventions triggered by early detection, VitalWear lowers pressure ulcer incidences.

By not disturbing patients that currently do not actually require repositioning, nurses reduce, without higher risks for their patients, the amount of time that they need to allocate to pressure ulcer prevention.

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