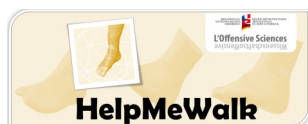


June 2025
Newsletter n°2

Newsletter



THE FUTURE OF 3D BODY SCANNING IN ORTHOTICS

Various pathologies require the use of orthoses, medical devices designed to compensate for musculoskeletal disorders. These devices can involve various body parts (arms, hands, knees, ankles, etc.), but all present a common challenge: precise adaptation to the patient's anatomy. In the case of an ankle orthosis, measurements are currently taken using a plaster cast. A Certified Prosthetist-Orthotist (CPO) manually corrects the position of the foot, placing it in an immobilized state, and then creates a mold used for the manufacture of the orthosis. This procedure is time-consuming and can lack precision, sometimes leading to the need to make a second version of the orthosis for improved comfort.

With the introduction of digital methods (computer-aided design, 3D printing), the orthopedic profession expresses the need for a digital alternative to plaster molding. The use of optical scanners for precise measurements is hampered by obstacles created by the technician's hands, covering the foot and making it partially invisible to the optical scanner.

HelpMeWalk consortium proposes an innovative technological solution for measurements: a smart bandage equipped with hundreds of magnetic sensors. These sensors provide a set of digitized points representing the anatomical shape enveloped by the bandage, which is then reconstructed using a software. These measurements can be used to 3D print a personalized orthosis.

First, the smart bandage and sensor system will be developed by project partners, together with the software for calculating anatomical shapes. The device will then be deployed with orthopedic partners and tested on a group of 200 patients. Finally, the prototype will be manufactured, and documentation will be prepared for certification. This fast and precise technological solution is expected to reduce the time required for orthosis design, facilitate optimal adaptation of the orthosis, and decrease manufacturing costs. In the long term, the goal for the industrial partners is to market the 3D imaging smart bandage so that this innovation can benefit a larger audience. This technology will also contribute strengthening the innovative ecosystem in the Upper Rhine region in the field of orthopedic technology.

The HelpMeWalk project is part of the Science Offensive of the trinational Upper Rhine Metropolitan Region



On December 17, the second meeting of the HelpMeWalk project took place at Hochschule Kaiserslautern - Zweibrücken Campus.

**Manon Lambert
took part in the**



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ASSOCIATED PARTNERS



The main associated partner of the project is the BellwaldTEC GmbH company, a start-up which is a spin-off of the FHNW, that develops and markets innovative solutions for body scan for orthopedic applications.



BellwaldTEC is developing a new and versatile digital measuring system for recording body surfaces.

The measurement principle is based on the determination of the spatial position in a magnetic field generated near the patient.

By using a magnetic field, the CPO's corrective hands are invisible to our scanning textile. When used in orthopedic technology, the corrective position of the limbs can be recorded under palpation, since the corrective hands of the CPO are invisible to magnetic fields.

CERTIFIED PROSTHETIST- ORTHOTIST

The CPO associated partners will contribute to the definition of the anatomical regions to be precisely measured.

They will carry out the validation study of the orthotic design using the intelligent bandage demonstrator.

Orthopedic centers will recruit patients for whom an orthosis will be made using the 3D scan obtained with the smart bandage.

Patients volunteers that will take part in the study will benefit from orthotics that are better customized and produced faster than the conventional method.

HelpMeWalk project aims to develop a smart bandage capable of digitizing in a few seconds the shape of a limb



Duotec is also an associated partner of the project.

It is a global electronics service provider, which works in innovative manufacturing technologies, as well as in basic research and the development of state-of-the-art microelectronics, sensor technology and connectivity solutions.

Duotec will collaborate with HFU in the development of a method of coating electronics to make them washable.

Duotec will be responsible for defining the specifications for the electronics, together with the partners BellwaldTEC, Université de Strasbourg, FHNW and HFU.

PROJECT PARTNERS

Strasbourg University - Unistra

The ICube Laboratory of the University of Strasbourg is the project coordinator. ICube is in charge of the design of the multilateration algorithm that accurately computes the position of each sensor from the magnetic field they measure as well as the integration of sensors in the bandage.

Fachhochschule Nordwestschweiz - FHNW

The FHNW is in charge of the design of the electronic hardware for this project. This encompasses the PCB boards on which magnetic sensors will be soldered as well as the control of the coils that will generate magnetic fields.

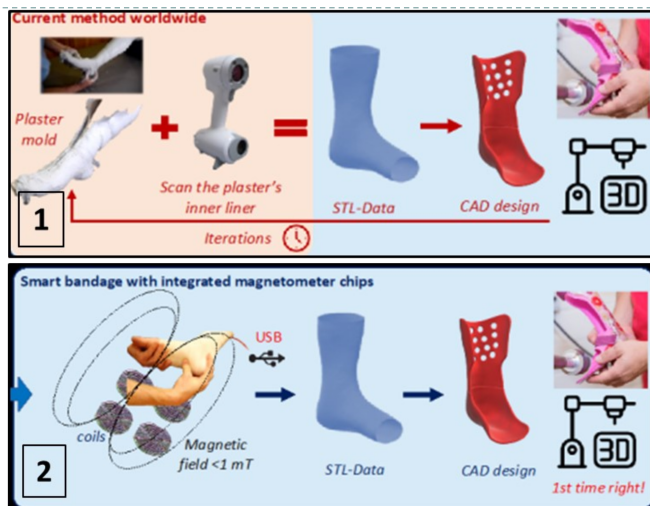
Hochschule Kaiserslautern - HS-KL

The HS-KL is in charge of the development of the algorithm providing the 3D model of the ankle from the scatter plot of the position of the sensors in the bandage.

Hochschule Furtwangen - HFU

The HFU is in charge of the encapsulation of sensors and electronic boards in a biocompatible polymer which aims at improving the robustness of the device towards mechanical stresses during usage (torsion, shear) and conditions of use (humidity, skin transpiration).

Intelligent bandage system saves time when taking anatomical measurements during orthosis development, compared with plaster molds



Workflow for current orthoses design (1) vs. future workflow with the smart bandage (2)

PARTNERS' TEAMS

UNISTRA
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Morgan Madec
Luc Hebrard
Manon Lambert
Sarah Chouchene
Analbery Monteiro

FHNW
MuttENZ, Switzerland

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HFU
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Volker Bucher
Nicolai Simon
Nicolas Pfaff

BellwaldTEC
Bellwald, Switzerland

Ralf Schumacher

duotec
Delémont, Switzerland

Vincent Aubry

2ND CONSORTIUM MEETING

On December 17, the second meeting of the **HelpMeWalk** project was held at Hochschule Kaiserslautern (HS-KL) – Zweibrücken Campus (Germany).

The HS-KL team welcomed academic partners from Hochschule Furtwangen, Fachhochschule Nordwestschweiz, and the University of Strasbourg, as well as associated partners duotec and BellwaldTEC

The morning was dedicated to presentations by each team on the progress of their work.

In the afternoon, discussions focused on the next steps of the project, including upcoming events where the partners plan to present their results.

The day concluded with a tour of the HS-KL laboratories.



«The next step of the project will be to develop a device for children »

HELPMEWALK AT DMEA 2025



DMEA is the leading European trade fair dedicated to digital health. This year, it was held in Berlin from April 8 to 10.

The team from the Department of Computer Science and Microsystems Engineering at Hochschule Kaiserslautern, led by Professor Uwe Tronnier, presented the **HelpMeWalk** project and its innovative process for digitally reconstructing anatomical shapes, which aims to replace traditional plaster casting in orthotic fabrication.

Professor Tronnier's team is developing an advanced software framework capable of processing sensor data and reconstructing high-resolution anatomical shapes.

These digital models serve as input for CAD-assisted orthosis design and can be directly used in additive manufacturing.

The entire process—from shape capture to 3D printing—can thus be carried out without any analog steps, improving both efficiency and precision.

HELPMEWALK AT FETCH 2025



FETCH (Francophone Winter School on Design Technologies for Heterogeneous Embedded Systems) is a winter school dedicated to the design of heterogeneous

embedded systems, bringing together researchers and experts from various fields.

Dr. Morgan Madec, from the ICube laboratory (Unistra), had the opportunity to present the research conducted as part of the **HelpMeWalk** project at the FETCH 2025 conference, held on February 14 in Montreal. His presentation focused on magnetic localization and its biomedical applications — a topic that fits perfectly within the scope of FETCH.

The **HelpMeWalk** project, which applies magnetic localization techniques to rehabilitation and assistive technologies, illustrates the potential of these innovations in the healthcare sector.

SCIENTIFIC GAME JAM : PLAY MAGNETIC PIRATES !

The **Scientific Game Jam (SGJ)** is an international event that brings together scientists and video game developers with the goal of co-creating a video game in 48 hours, inspired by a research topic.

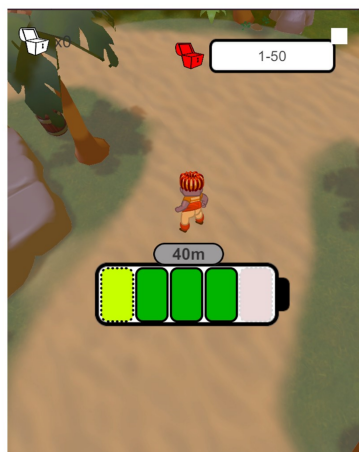
SGJ 2025 – Strasbourg took place from March 7 to 9, 2025, at Le Shadok.

Manon Lambert, a PhD student working on the **HelpMeWalk** project, took part in the event. Together with her team, *Bobby-n-the-socket*, they created the game **MAGNETIC PIRATES**.

Download and PLAY: link available on the project website.

HOW THE IDEA IS INTEGRATED IN THE GAME

Players use magnetic localisation to find chests while managing the power of their field. Cooperation is essential, as simultaneous scans render the information unreadable.



The power gauge illustrates the constraints associated with the use of a magnetic field. Cooperation reflects the need to combine distance information to access position.



THE IDEA

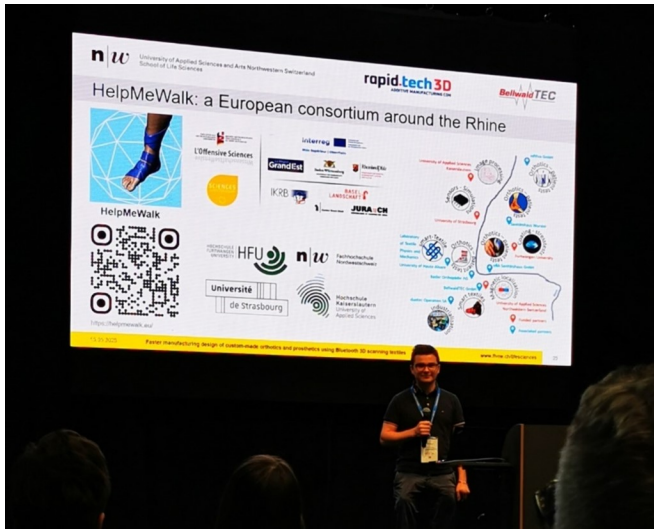


“HelpMeWalk: the future of 3D body scanning in orthotics ”

The idea involves locating sensors placed in a sock to reproduce the shape of a foot in 3D and facilitate the work of orthopaedists.



HELPMEWALK AT RAPID.TECH 3D



The team led by Prof. Dr. Joris Pascal from the University of Applied Sciences and Arts Northwestern Switzerland (FHNW) participated in the 21st edition of rapid.tech 3D, held in Erfurt from 13 to 15 May 2025.

Under the motto '*Innovative & Profitable – The Future of Additive Manufacturing*,' this 21st edition of rapid.tech 3D focused on practical applications, innovative technologies, and promising trends in additive manufacturing.

Corentin Féry, associate researcher at FHNW, presented the results of the HelpMeWalk project:

« **Faster manufacturing design of custom-made orthotics and prosthetics using Bluetooth 3D scanning textiles** ».

HELPMEWALK AT NEWCAS



Manon Lambert, a PhD student in the ICube UNISTRA team, participated in the IEEE NEWCAS interregional conference, which took place in Paris from 22 to 25 June 2025.

This is a meeting in the fields of circuits and systems.

A joint publication with the FHNW and BellwaldTEC teams has been accepted and will be published on IEEE Xplore: **Machine-learning algorithm applied to magnetic localization.**

Applications of magnetic localisation:

Magnetic localisation is a technique widely used in the biomedical field to track objects in environments without direct visibility. The versatility of this technology allows it to be applied to various problems such as

- indoor localisation,
- needle tracking for surgery,
- motion tracking in the entertainment industry.

Beyond its traditional uses, magnetic localisation now enables advanced applications such as **body scanning**. In this type of application, a set of magnetic sensors is placed on the object whose shape is to be determined. The position of each sensor is calculated by magnetic localisation, and the resulting point cloud is used to reconstruct the scanned shape.

* **Poster available on the project website**

HELPMEWALK AT SWISS MEDTECH DAY

Swiss Medtech Day is one of the most important events for the Swiss medical technology sector.

On 25 June 2025, our colleagues from FHNW (Hochschule für Life Sciences) took part in Swiss Medtech Day in Bern, Switzerland.

Corentin Féry and Simon Lemoigne represented the Institute of Medical Technology and Medical Informatics at FHNW.

They showcased examples of research projects carried out at their institute in collaboration with students and companies.

BellwaldTEC and the HelpMeWalk project from the EU-supported Interreg cross-border programme were once again in the spotlight, presenting our prototype for faster design of custom-made orthoses and prostheses using 3D-scanned textiles via Bluetooth.



PARTNERSHIP WITH BASLER ORTHOPÄDIE

Basler Orthopädie René Ruepp AG is a leading company in Basel in the field of innovative orthopedic and rehabilitation technologies.

Master orthopedic craftswoman Florence Ruepp is the company's managing director. In line with the Ruepp family's commitment to supporting innovation in the orthopedic field, she generously offered her time and expertise to test the usability of the bandages developed within the consortium.

Having followed our progress for some time now, Florence is convinced of the necessity and relevance of our project. She praised the simplicity of applying the textiles and gave us advice for future prototypes, in particular reminding us of the important points to consider when designing an orthosis



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WE HAVE RECRUITED

Sarah Chouchene : joined the ICube-Unistra laboratory in March 2025.



She holds an engineering degree in Intelligent and Autonomous Systems from Polytech Nancy (France), and a Master's degree in Complex Systems Engineering from the University of Lorraine (France). She earned a PhD in the application of artificial intelligence to plasma physics and computer vision from the Jean Lamour Institute, University of Lorraine.

Nicolas Pfaff: joined the HFU team in May 2025.



He is in charge of encapsulating various types of printed circuit boards to make them washable and is developing a device for stress testing.

He holds a Bachelor's degree in Medical Engineering from HFU and a Master's degree in Mechatronic Systems (HFU). He previously worked on the development of ophthalmic surgical devices in Switzerland (Oertli

Instrumente AG).

WHERE TO FIND US

Scan the QR code



to access the agenda of upcoming events in which consortium members will be taking part.



Contact

<http://www.helpmewalk.eu>

NEXT CONSORTIUM MEETINGS



On 30 April 2025, the consortium partners will meet in Rottweil.



In December 2025, the 5th consortium meeting will take place in Strasbourg.

PROJECT FUNDING

The HelpMeWalk project is part of the Science Offensive of the trinational Upper Rhine Metropolitan Region, co-financed by the European Union via the Interreg Upper Rhine programme, the Grand Est Region, the Ministerium für Wissenschaft, Forschung und Kunst of the Land of Baden-Württemberg and the Ministerium für Wissenschaft und Gesundheit of the Land of Rhineland-Palatinate.

The Swiss Confederation and the Cantons of North-Western Switzerland are contributing to the funding of the Swiss partners in the project.

Interreg



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