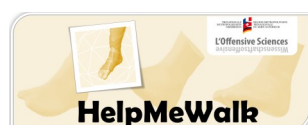


June 2026  
Newsletter No.4

# 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**



The Final Meeting of the HelpMeWalk project took place on 30 March 2026 at the ICube – TPS – Télécom Physique Strasbourg laboratory.



In the afternoon, there was a demonstration of the prototype developed in collaboration with BellwaldTec.

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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.

*The HelpMeWalk project consortium has developed a smart bandage equipped with magnetic sensors that can digitize the shape of a limb in just a few seconds.*

ML&s Suisse 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.



**Suisse**

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

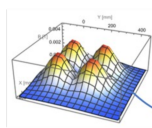
The HS-KL is in charge of the development of the algorithm providing the 3D model of the ankle from the scatter plot of the position of the sensors in the bandage.

### 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).

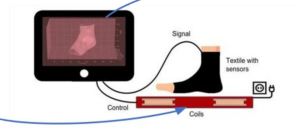
*Intelligent bandage system saves time  
when taking anatomical measurements during  
orthosis development, compared with plaster molds*

#### Description of the system



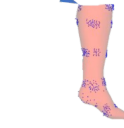
##### Coils

- Create a magnetic field
- Activated sequentially
- Simulated magnetic map



##### Bandages with integrated sensors

- Magneto resistive sensors for localisation
- Battery and Bluetooth for autonomy and comfort
- Silicone coating to protect the electronic components



##### Software

- Calculate the positions of the sensors
- Reconstruct the shape of the foot from the sensor's positions

To take the measurement, we wrap the foot in a bandage containing hundreds of magnetic sensors placed above a plate with integrated coils that generate magnetic fields (1). The magnetic sensors detect the field generated by each coil in the 'induction plate' (2). Based on these measurements, we can determine the position of each sensor, which then allows us to reconstruct a 3D model of the ankle (3).

## PARTNERS' TEAMS

### UNISTRA

Strasbourg, France

#### Morgan Madec

Luc Hebrard

Manon Lambert

Sarah Chouchene

Analbery Monteiro

### FHNW

Muttenz, Switzerland

#### Joris Pascal

Simon Lemoigne

Thomas Quirin

### HS-KL

Kaiserslautern, Germany

#### Uwe Tronnier

Maximilian Mock

Dua Shahid

Fabien Wilhelm

### HFU

Furtwangen, Germany

#### Volker Bucher

Nicolai Simon

Nicolas Pfaff

### BellwaldTEC

Bellwald, Switzerland

#### Ralf Schumacher

Corentin Féry

### MI&s Suisse

Delémont, Switzerland

#### Vincent Aubry

## HELPMEWALK IN WOMAG – OCTOBER 2025



An article about the HelpMeWalk project was published in WOMag – Expertise in Materials and Functional Surfaces (10/2025) :

### HelpMeWalk – The future of 3D body scanning in orthotics

*By Nicolas Pfaff, Nicolai Simon and Volker Bucher*  
**HFU Research Centre Rottweil.**

A new approach in orthotic development focuses on the use of magnetic sensors to record/reproduce anatomy.

The measuring electronics used for this purpose are to be coated using a surface technology process, making them washable and optimised for mechanical stress.

The HFU team's task is to identify an optimal encapsulation method that guarantees effective cleaning while ensuring mechanical and chemical protection. In addition, the manufacturing time must be kept to a minimum.

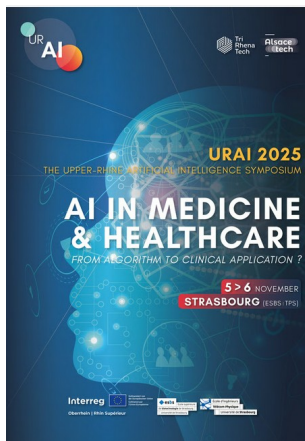
After the encapsulation process, the electronic components are subjected to further tests, such as washing and stress tests.

In the future, once all optimisations have been completed, the smart bandage will be tested on the first subjects. The main focus will be on the handling of the bandage and the measurement process itself.

The data obtained will make it possible to further simplify the manufacture of orthoses and improve patient comfort.

*\*More information in the **WOMAG Magazine** - available in the project website*

## HELPMEWALK AT URAI 2025



Every year, TriRhenaTech organises the URAI Symposium (**Upper Rhine Artificial Intelligence Symposium**), a tri-national scientific event dedicated to artificial intelligence.

It takes place in a different country each year, thus underlining the cross-border nature of the alliance.

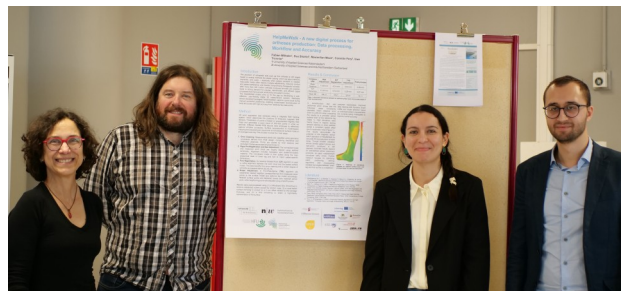
Two teams from the **HelpMeWalk consortium** took part in URAI 2025 and presented the results of their research –through an oral presentation and a poster:

⇒ **ICube-UNISTRA** : Sarah Chouchene  
**3D morphological reconstruction from magnetic data using deep learning.**

⇒ **HSKL**: Fabien Wilhelm  
**HelpMeWalk - A new digital process for orthoses production: Data processing, Workflow and Accuracy.**

This year, the URAI Symposium took place in France, at TPS (Télécom Physique Strasbourg Engineering School) in Illkirch, from 5 to 6 November.

The theme of this 7<sup>th</sup> edition was: **AI in Medicine and Healthcare: From Algorithm to Clinical Application.**



## HELPMEWALK AT aiHealth 2025

The **2nd Annual International Conference on Artificial Intelligence in Healthcare** (aiHealth2025) took place on 10 and 11 November 2025 at the **FHNW** (University of Applied Sciences and Arts Northwestern Switzerland) in Murtten, Switzerland.



Poster available on the projet website.

This conference aims to bring together industry partners, clinicians and academics to explore in depth the transformative role of artificial intelligence (AI).

Sarah Chouchene from **ICube-UNISTRA** presented a poster: ***Reconstruction of 3D shapes from magnetic data for orthopedic orthoses using deep learning.***

The highlights of Health 2025:

- Opportunity for industry partners, clinicians and academics to collaborate
- Focus on AI applications in diagnosis, treatment and digital twins in healthcare
- Presents insightful talks on AI in traditional and digital medicine
- Engaging discussions on integrating AI applications into digital twins for health
- Interactive panel discussions presenting emerging AI applications

## HELPMEWALK AT ISPO FRANCE

**ISPO** (International Society for Prosthetics and Orthotics) is a scientific conference bringing together all professionals in the field of external orthopedics and rehabilitation: surgeons, doctors, Certified Prosthetist-Orthotist, physiotherapists, occupational therapists, and biomechanical engineers.

Prof. **Dr. Joris Pascal** from the **FHNW** took part in the event, which was held in Lyon on November 13 and 14, where he presented the HelpMeWalk project.

Professionals in the field were enthusiastic about the demonstration of the prototype and the perspectives it opens up for faster design of custom-made orthoses and prostheses. It was an opportunity to answer questions about the new technology.

The conference also provided an opportunity to initiate collaborations with new orthopedic clinics.



## HELPMEWALK AT HEALTH TEC DAY



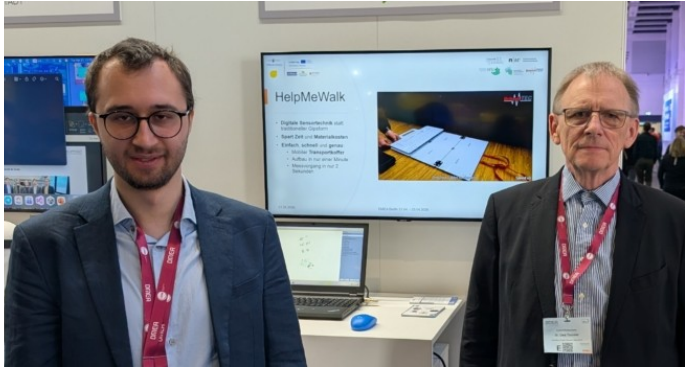
**HealthTech Day**, in collaboration with the **FMTS (Federation of Translational Medicine in Strasbourg)**, took place on Friday 14 November 2025 at the Faculty of Dental Surgery in Strasbourg.

The **ICube-UNISTRA** team participated in the event:

- ⇒ Dr. Morgan Madec gave an oral presentation : **Magnetic Localization for Biomedical Applications.**
- ⇒ Manon Lambert presented a poster with results from the : ***Reconstruction of 3D shapes from magnetic data for orthopedic orthoses using deep learning.***

## DMEA 2026

**DMEA 2026** took place in Berlin from March 21 to 23, 2026, bringing together key stakeholders across healthcare, technology, and policy to discuss the ongoing transformation of the healthcare ecosystem.



The conversations and announcements reflect a strong focus on digital health implementation, data-driven care, interoperability, and the role of AI and platforms in shaping more efficient and resilient healthcare systems.

Prof Uwe Tronnier and Fabien Wilhelm, from the **HSKL team**, participated to the event and presented the **HelpMeWalk project**.

## HEALTH CONFERENCE 2026

On 29 April, Furtwangen University (HFU) hosted the **HFU Health Conference 2026**, which this year focused on the theme: **‘Health for all ! Effective strategies through personalised healthcare?’**.

Discussions focused on ethical issues, innovative medical concepts, digital solutions and care models tailored to the specific needs of different target groups.

Professor Volker Bucher’s team from the **Institute of Microsystems Technology (iMST)** at the **HFU**, a partner in the **HelpMeWalk project**, took part in the conference. On this occasion, he provided an overview of their work and the results achieved as part of their contribution to the project.

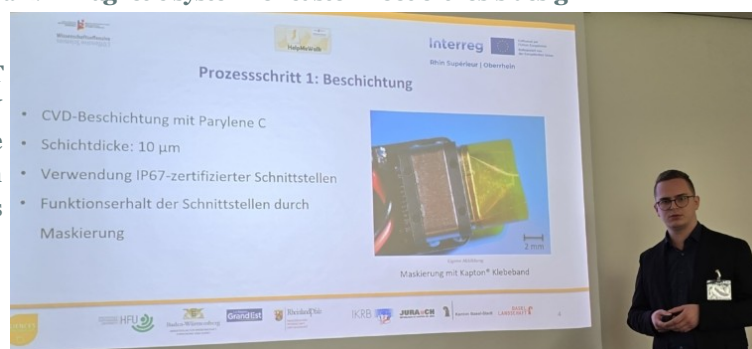
Nicolas Pfaff presented the results achieved as part of the project via a poster entitled: **‘Washable encapsulation of flexible printed circuits’**.



## MICROTEC CLUSTER CONFERENCE 2026

The **microTEC Cluster Conference 2026** took place from 19 to 20 May 2026 at the Kongresshaus Baden-Baden, bringing together experts from industry, research and politics to discuss current developments and future prospects in microsystems technology. **HelpMeWalk: A magnetic system for custom foot orthosis design**

Nicolas Pfaff from the Institute for the **iMST (Microsystems Technology)** at **HFU** attended the event and presented the **HelpMeWalk project**, as well as the work on encapsulating flexible sensor circuit boards carried out as part of the project.



## UNISTRA AT PINT OF SCIENCE

Morgan Madec (ICube – UNISTRA) participated in the **Pint of Science** event on **20 May 2026**. During a talk at the **O'Brother** bar in Strasbourg, he gave a presentation entitled:

### "Operating Without Seeing – Thanks to Electromagnetic Waves"

Did you know that some surgeons operate without directly seeing their instruments? The presentation explained how miniature sensors and electromagnetic waves can be used to track surgical instruments with millimeter-level accuracy, making procedures safer, more efficient, and less invasive.

On this occasion, he presented the results of the **HelpMeWalk** project, highlighting the development of a **line-of-sight-free 3D scanning system for orthopaedics** and discussing the potential applications of this technology.



## AUTEX WORLD CONFERENCE 2026

The 25<sup>th</sup> edition of the prestigious international event was hosted by **ESITH** (École Supérieure des Industries du Textile et de l'Habillement), from June 3rd to 5th, 2026, in Marrakesh, Morocco.



**AUTEX Wolrd Conference 2026** was organized by the **Association of Universities for Textiles (AUTEX)**.

Manon Lambert, from the ICube laboratory (UNISTRA), took part in the event. She presented the results of her PhD research, carried out as part of the HelpMeWalk project.

### HelpMeWalk: A magnetic system for custom foot orthosis design

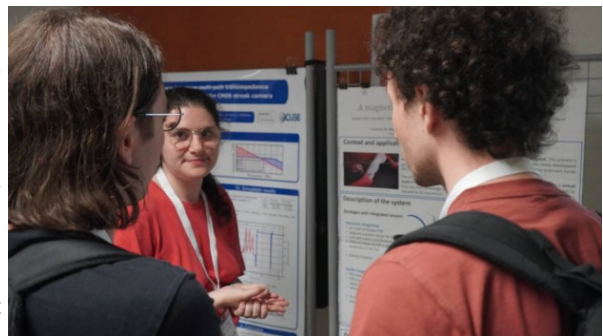
## 20<sup>th</sup> GDR SOC2 NATIONAL SYMPOSIUM

The **20<sup>th</sup> GDR SOC2 National Symposium** took place from 17 to 19 June in Marseille, on the Poly-Tech Marseille campus.

The conference brings together researchers, students, industry representatives and experts, providing a forum for discussion on innovations in microelectronic circuits and systems.

Manon Lambert, a PhD student at the ICube laboratory (UNISTRA), took part in the event and presented a poster entitled:

### HelpMeWalk: A magnetic system for custom foot orthosis design.



## FINAL CONSORTIUM MEETING

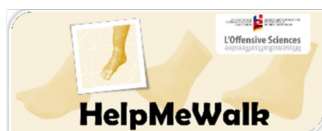
The final meeting of the **HelpMeWalk project** took place on March 30, 2026, at the ICube laboratory, at Télécom Physique Strasbourg (TPS), in Illkirch-Graffenstaden, France.

Participants included project partners (**HFU**, **HKSL**, **FHNW**, **BellwaldTEC**), representatives of the funding bodies (**INTERREG** and the **Sciences Pillar**), as well as colleagues from other projects (**KTUR**).

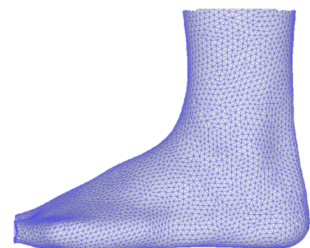
During the morning session, the partners presented the project's results. Each team gave a presentation on the outcomes achieved over the two years of the project's implementation:



Morgan Madec, Project Coordinator from UNISTRA, delivered an introduction to the HelpMeWalk project. He presented the project's objectives and highlighted the teams involved in the development of the prototype. He concluded by acknowledging the funding partners whose support made the presented achievements possible.



**HelpMeWalk: a game-changer in 3D body scanning for orthopedic applications**



Hardware  
design

Integration

Point-cloud  
calculation

3D Shape  
Reconstruction

## FINAL CONSORTIUM MEETING

Professeur Joris PASCAL from the FHNW, presented: **Digitizing the shape of a foot in less than 3 seconds: analysis of initial results obtained on patients requiring ankle-foot orthosis, AFO.**

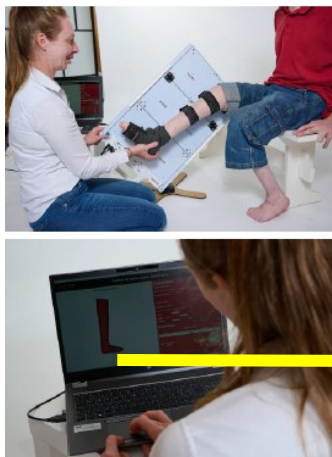


He presented **the Case Dstudy** carried out at **Basler Orthopädie**: the results of the measurements taken at Basler Orthopädie, compared with those obtained from 3D-printed legs.

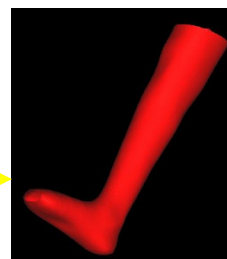
### The Standard workflow



### The digital textile



- Five bandages ~400 Sensors points on anatomical landmarks
- Statistical Shape Model algorithm
- A conventional bandage was applied to the heel and malleoli to compress the sensors on the anatomy



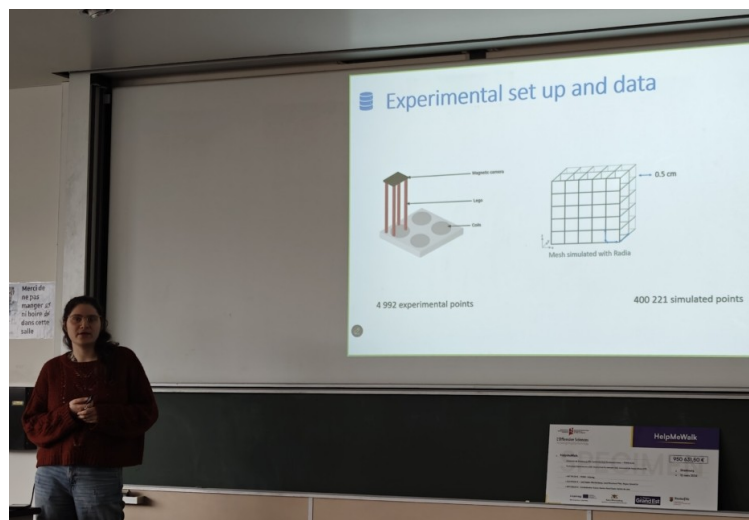
## FINAL CONSORTIUM MEETING

The work carried out by the **ICube laboratory (Unistra)** team was presented by:

- Manon Lambert presented the results of her PhD research, conducted within the framework of the HelpMeWalk project: **Machine learning applied to magnetic localization**.

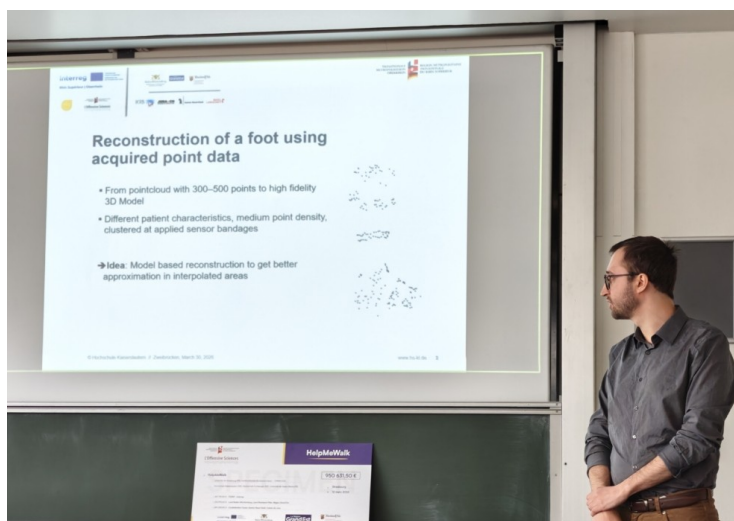
Her work demonstrated that AI models can achieve submillimeter accuracy when evaluated on simulated datasets. However, their performance remains limited by the discrepancy between simulated and experimentally measured data. The study also showed that the position and orientation of the sensors can be accurately estimated from magnetic field measurements,

- Sarah Chouchene participated by visio, and presented her work: **Deep learning based-model for shape reconstruction using measured and synthetic data**.



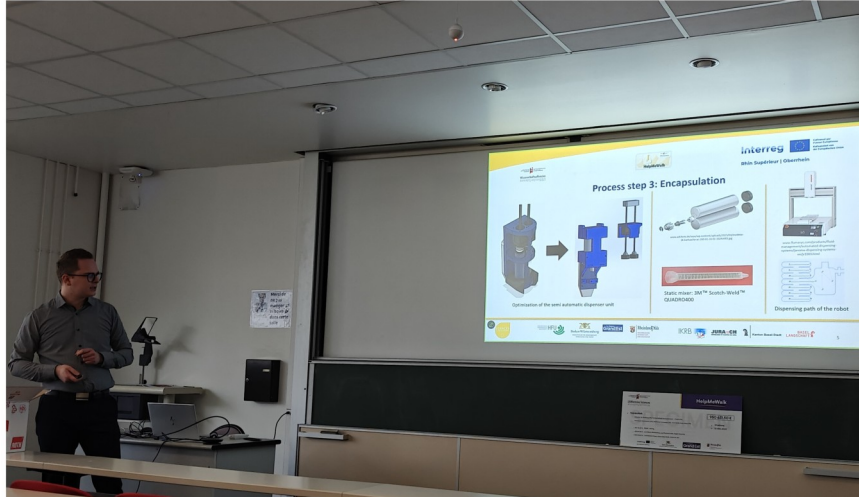
The *HSKL* team's results were presented by Fabien Wilhelm in a talk entitled : **Model guided point cloud-surface reconstruction**.

The team developed a Random Forest-based algorithm to predict sensor orientation. Evaluation on simulated datasets demonstrated a mean orientation error of  $0.33^\circ$ .



## FINAL CONSORTIUM MEETING

Nicolas PFAFF from the Institute for Microsystems Technology (**iMST**) at **HFU**, presented : **Washable encapsulation of flexible sensor circuit boards** .



The **iMST** team has developed a parylene C coating to protect the flexible sensors and achieve a watertight encapsulation. Static tests have confirmed the effectiveness of the water barrier.

A process for sealing the edges of the coating at the junctions has also been put in place.

The HFU team also developed a semi-automated dispensing unit that enables the encapsulation of a larger number of sensor-integrated printed circuit boards (PCBs) in a single processing step.

In addition, a test device for evaluating the mechanical resistance of the printed circuit boards was completed.



## FUTURE OF THE PROTOTYPE



*Building on the results of the HelpMeWalk project, BellwaldTEC is continuing the development of the smart bandage.*

*Corentin Féry has joined BellwaldTEC as Head of R&D and is leading the next stages of its development.*



## OUTLOOK FOR THE FUTURE

Other applications for the project results:

**FHNW**, in collaboration with BellwaldTEC: are currently developing a prototype suitable for children. In the future, it may be possible to adapt the technique for use on other parts of the body.

**HSKL**: the algorithms developed for surface reconstruction from models can be easily adapted for use on other parts of the body, such as the trunk and upper limbs.

**HFU**: the encapsulation device developed can be used for many other types of encapsulation involving two-component materials.

**Unistra**: work on magnetic localisation could be applied to other applications, in particular magnetic tracking projects in assisted and/or robotic surgery.

### New collaborations

- ⇒ **HelpMeTouch**: aims to promote the results of the HelpMeWalk project among the general public. We plan to develop an educational and interactive workshop featuring engaging experiments that will be presented during public outreach events.
- ⇒ A project focused on the development of customized prostheses, in partnership with a Strasbourg paratriathlete, is currently being launched.
- ⇒ An ERC Synergy project aiming to develop a versatile magnetic localization system for computer-assisted surgery shall be submitted.

## 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.



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l'Union Européenne  
Kofinanziert von  
der Europäischen Union

Rhin Supérieur | Oberrhein



Kanton Basel-Stadt

