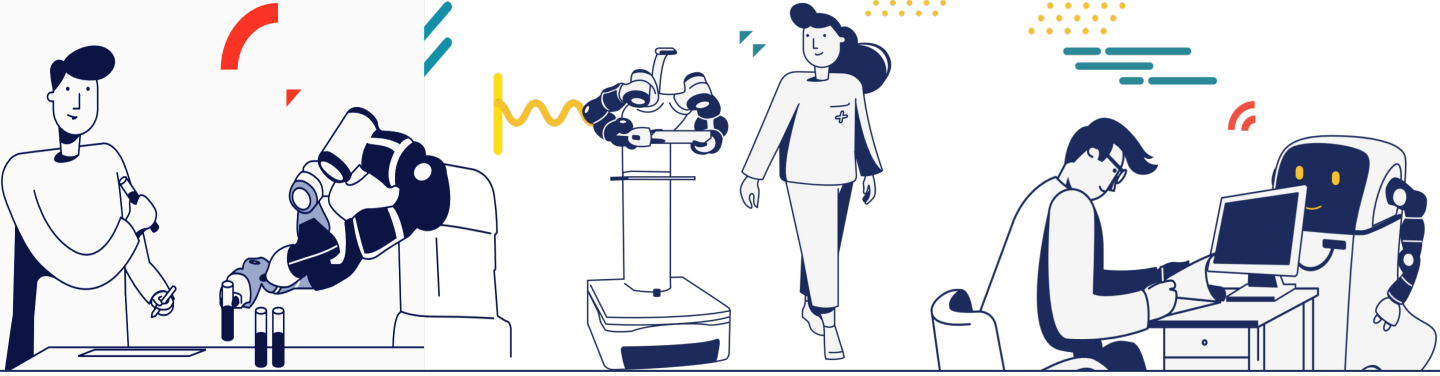

The hospital of the future – advances in healthcare robotics

Robots are used in operating rooms and in clinical settings to support healthcare professionals and enhance patient care. The use of robotics extends even to research laboratories to automate manual, repetitive, and high-volume tasks so technicians and scientists can focus their attention on more strategic tasks. As technologies evolve, robots will function more autonomously, eventually performing certain tasks entirely on their own. As a result, doctors, nurses, and other healthcare workers will be able to spend more time providing direct patient care.

Several public funded projects are currently conducted at ETH Zurich as well as in spin-offs to accelerate innovations in robotics for healthcare.

Find out, what the future could look like and how these new technologies can transform hospitals.

This event is open for experts from hospitals, the healthcare sector, industry and academia as well as other interested parties. Participation is free of charge, but registration is required:

Contact: ETH Zurich, EU GrantsAccess,
Katrin.Reschwamm@sl.ethz.ch

Program

14:30 Welcome & Introduction
Roland Siegwart, Salvador Pane, Peter Wolf

14:45 Project Presentations:

- HARMONY, *Lionel Ott, ETH Zurich*
- HOSMARTAI, *Florian Heemeyer, ETH Zurich*
- DIH-HERO, *Andrea Schwier, DLR*
- A Submillimeter Minimally Invasive System for Cardiac Arrhythmia Ablations, *Cedric Fischer, ETH Zurich*
- ANGIE, *Fabian Landers, ETH Zurich*
- MINIGRAPH, *Sandra Wells ETH Zurich*

16:15 Networking Break

16:45 Company presentations:

- Magnebotix, *David Sargent, CEO*
- Nanoflex Robotics, *Christophe Chautems, CTO & Alice Segato, Engineer*
- F&P Robotics, *Michael Früh, CEO*

17:45 Guided Lab Tours :

- Multi-Scale Robotics Lab
- Autonomous Systems Lab
- Sensory-Motor Systems Lab

18:30 Networking & Apero Riche

Subject to short-term changes

Date: 8. February 2023, 14:30 – 19:30 **New Place**: ML E 12, Tannenstrasse 3, 8006 Zurich

In-person and online participation possible!

The event is free of charge but registration is required: https://forms.gle/t1NWGToPbjNFwj9K9

Harmony
Assistive robots for healthcare

DIH-HERO

HOSMARTAI
AI for the smart hospital of the future

ETH zürich

The Projects

HARMONY will develop assistive robotic mobile manipulation technologies for use in hospital environments targeting two use cases: 1) the automation of on-demand delivery tasks around the hospital and 2) the automation of bio-assay sample flow. These highlight existing processes where there is a need for fast, reliable and flexible automation to undertake the dull and repetitive tasks that are currently conducted by over-qualified staff.

DIH-HERO will establish an open online portal offering multiple services facilitating collaboration on various innovations, emphasizing the sharing of best practice and enhancing the delivery of innovation throughout the value chain. DIH-HERO focuses on supporting small and medium-sized enterprises in maximizing their impact and reducing time-to-market. By connecting businesses and healthcare stakeholders, DIH-HERO enables them to develop innovative products and services that are better fitted to the needs of the healthcare systems in Europe.

HOSMARTAI aims to promote an effective and efficient healthcare system transformation, by the use of AI technological developments and robotics. In order to achieve this transformation, HosmartAI will create a common open integration platform with the necessary tools to facilitate and measure the benefits of integrating digital technologies (robotics and AI) for healthcare professionals, patients, information system managers and health organization administrations.

The goal of the "A Submillimeter Minimally Invasive System for Cardiac Arrhythmia Ablations" project is to develop a near-market system that combines catheter stiffness control with magnetic navigation. This includes the development of algorithms in the area of localization and control of the catheter. The project is funded by SNSF BRIDGE Discovery, No. 180861.

The **ANGIE** project will forge ahead with small-scale robotics, magnetic navigation systems and localized targeted drug delivery. Specifically, the project will develop magnetically steerable wireless nanodevices for the targeted delivery of therapeutic agents via the body's vascular system. It will enable doctors to deliver drugs precisely where needed with minimal side effects.

The **MINIGRAPH** project aims to develop and validate innovative brain implants with closed-loop neuromodulation capabilities, controlled by implanted electronics units and miniature arrays of graphene microelectrodes. The project will introduce a minimally invasive, high-precision implantation procedure using a single small skull incision enabling personalized and adaptive therapies for patients. (SERI 22.00163)

The Companies

MagnebotiX, a spin-off of IRIS at the ETH Zurich, Switzerland, produces and markets magnetic field generators (MFG). These systems are capable of generating a wide variety of static or time-varying magnetic fields for research on magnetic field-dependent phenomena, They are also used for developing applications for magnetic micro and nano robots as well as other micromanipulation procedures.

Nanoflex Robotics is a medtech spin-off and developed a soft robotic system that precisely inserts specially made guidewires and catheters deep into the brain. These novel devices are softer, more maneuverable, safer, and easier to use than anything currently available. The technology can simplify and shorten procedure time and reduce the risk of accessing the brain for interventional stroke treatment.

F&P Robotics is a pioneer in the field of human-robot interaction. Our aim is to create new opportunities in form of assistive robots for humans. The company offers professional personal robots and state-of-the-art technology created for working together with humans and assisting people in their daily lives. The company was founded in 2014 by Dr. Hansruedi Früh.

The ETH Zurich Labs at the Institute of Robotics and Intelligent Systems (IRIS)

The **Multi-Scale Robotics Lab** is led by Prof. Bradley Nelson. MSRL research develops the tools and processes required to fabricate and assemble micron sized robots and nanometer scale robotic components. Many of these systems are used for robotic exploration within biomedical and biological domains.

The **Autonomous Systems Lab** was founded in 1996 at EPFL Lausanne. Since 2006, it has been part of IRIS and is run by Prof. Roland Siegwart. The lab creates robots and intelligent systems that can autonomously operate in complex and diverse environments which can act on ground, in air and in water. Research focus is on novel methods and tools for perception, abstraction, mapping and path planning.

The **Sensory-Motor Systems Lab** focuses on the study of human sensory-motor control, the design of novel mechatronic machines, and the investigation and optimization of human-machine interaction. The lab is managed by Prof. Robert Riener and Dr. Peter Wolf. Current research pillars are wearable bio-sensing and AI for Healthcare, wearable robotics or arm rehabilitation robotics.

The projects HARMONY, DIH-HERO, HOSMARTAI & ANGIE have received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101017008, No 825003, No 101016834 & No 952152.