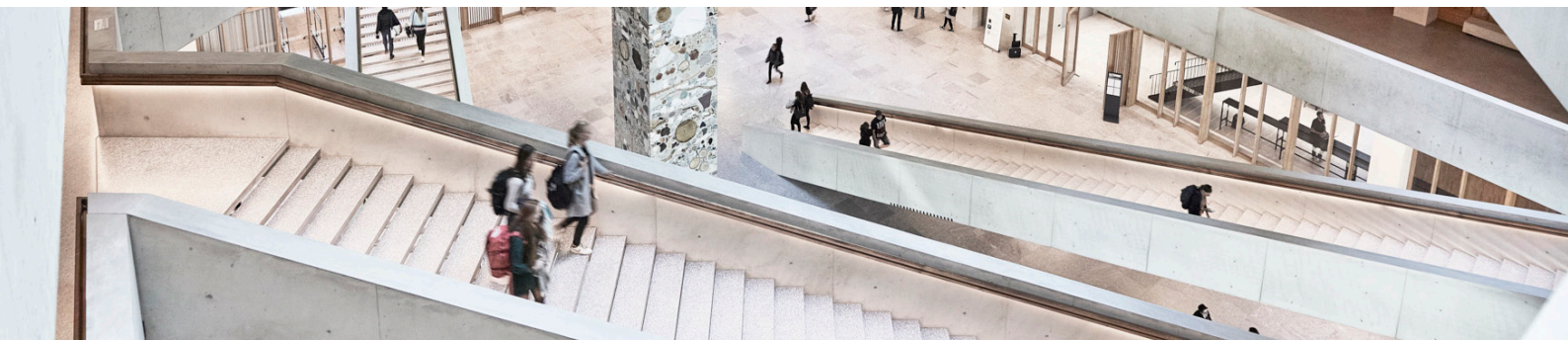


## Research, Innovation and Education at the Interface of Nature, Medicine and Environment



The FHNW School of Life Sciences (HLS FHNW) consists of four institutes involved in research & innovation (R&I) and education. It cooperates closely with prominent national, EU and international organizations and industries. The School has applied, industry-driven expertise in health & pharma technology, circular (bio) economy and environmental restoration, as well as biodiversity loss and climate change mitigation, in line with the European Green Deal priorities.

### **The Institute for Medical Engineering and Medical Informatics**

works with hospitals and industry to carry out R&I in diagnostic and therapeutic systems. It develops patient-oriented devices, implants and methods, as well as advanced tools for medical data processing and analysis.

**The Institute for Pharma Technology** maps industrial processes from raw ingredients to the final form of the drug. Its activities cover drug formulation, manufacture and delivery, with specific focus on dosage form design, production processes, quality, pharmacokinetics and personalisation. It has close partnerships with leading European and international pharma firms and start-ups.

**The Institute for Chemistry and Bioanalytics** collaborates with agro, food, pharma and bio-chemical industries on cutting edge research in fields such as sustainable processes, feedstock identification and preparation, advanced (nano) materials and organ function diagnostic systems. It has the expertise and capability to develop and implement processes up to pilot scale, including safety assessment.

**The Institute for Ecopreneurship** conducts lab and pilot scale interdisciplinary R&I in the circular (bio)economy and environmental restoration. It creates innovative solutions for waste stream conversion into marketable products and for treatment, detoxification and regeneration of contaminated water and soil. Sustainability is assessed with comprehensive ecotoxicological studies and life cycle analyses. It has close partnerships with leading EU biobased and bioremediation industries and start-ups.

### **Strategic Equipment, Technologies & Infrastructure**

Fully equipped laboratories and pilot plants with state of the art technologies for medical, industrial and environmental (bio-)engineering; equipment, infrastructures for wastewater treatment, biomonitoring and in vitro testing for industry.

### **Pilot scale facilities**

- Fully automated chemical, biochemical and fermentation facilities for down- and up-stream processes
- Wastewater management system equipped with online bio-monitoring (e.g. online toximeters and cell based in vitro test systems).
- Solid sterile containment and cleanroom pharmaceutical manufacturing, including individual technologies: semi-automatic filling-finish, dispersion, comminution, freeze and spray drying, extrusion, compression.

### **Specific equipments and tools**

**Additive Manufacturing:** 3D-Bioprinters for toxicological and environmental applications as well as 3D-printers for medical engineering applications (Ti, Shape memory NiTi, Ti6Al4V, Ti6Al4V ELI, CoCr 316L, plastics, ceramics).

**Medical Engineering:** implant surface functionalization, (Micro) CT, DVT, c-arm, REM, tribometry, static and dynamic mechanical testing stands, removal-torque-system, medical 3D-scanning /tracking, ultrasound, IR, movement and gait analysis, high speed camera, EMG, EEG, ECG, endoscopy.

**Micro and nano scale particle technology:** in micro and nano scale, solid state and surface characterization, light scattering, dispersed systems, rheology.

**Microscopy platform:** SEM, ESEM, TEM, AFM, confocal microscopy.

**Chemical analyses:** NMR, GC-MS; HPLC-MS (Ion Trap, qTOF, QqQ, LA-ICP-MS); ICP-MS (QqQ); LC-OCD-OND (drinking water analysis); LDIR chemical imaging system;  $\mu$ XRF, Radioisotope Lab (C-14, H-3); high precision isotopic carbon analyzer, surface plasmon resonance etc.

**Single cell analysis and sequencing:** Flow cytometers and FACS, TenX system, next generation sequencers (MiSeq and Nextseq 550) & qPCR.

## Cooperation with prominent industries and research organizations and institutions

### Previous and current large, European and Lighthouse Projects

#### The HLS FHNW in Horizon 2020 Projects:

As a coordinator:



As a partner:



#### The HLS FHNW in Horizon Europe Projects:

AgriLoop | MAR2PROTECT | StopUP | CUMERI | NEXUS | NYMPHE

In addition, researchers from the FHNW School of Life Sciences are engaged in the following nationally and internationally funded projects (in brackets: Budget HLS FHNW).

#### Projects funded by EU beyond H2020

- EU JPND project: "Multinational research projects on Personalised Medicine for Neuro-degenerative Diseases" (ORGOTHERAPY) (EUR 98'490.-)
- Eurostars project 113627: "Suppressing Tremor to A Bearable Level" (STABLE) (EUR 198'300.-)
- Eurostars project 113479: "3D cell culture platform for personalized ovarian cancer therapy selection" (EUR 223'240.-)

#### Projects funded by INTERREG (Funding Program by France, Germany & Switzerland for the Upper Rhine Region)

- SPIRITS: Smart 3D-printed interactive robot for interventional radiology and surgery (EUR 299'258.-)
- PERSONALIS: Platform for personalized medicine for autoimmune diseases (EUR 335'362.-)
- TRIMABONE: 3d printing for resorbable implants (EUR 200'000.-)

#### Projects funded by International Foundations and Organizations

- Wellcome Trust (UK), a renowned global charitable foundation: "Discovery of anti-DENV Antibodies Using Artificial Intelligence" (EUR 897'535.-)
- Adalbert-Raps Stiftung: "Effizienzsteigerung von Algenkultivierungsprozessen" (EUR 131'050.-)
- UNIDO: Provision of Eco-Industrial Park related services in Peru (EUR 85'000.-)

#### Projects funded by Swiss National Science Foundation (SNSF) / BRIDGE

- Structural and Functional Characterisation of the Primer Synthesis of Archaeoeukaryotic Primases (SNSF) (EUR 457'721.-)
- The underestimated role of the human omentum in metastatic spread (SNSF) (EUR 532'760.-)
- Efficient colonic drug delivery (Bridge – Discovery) (EUR 684'000.-)
- Implementation of Adverse Outcome Pathway in a «plug&play» Microfluidics System. Liver Fibrosis as a Proof of Principle (Bridge – Discovery) (EUR 705'696.-)

#### Projects Funded by Other Swiss Foundations

- Botnar Research Centre for Child Health (BRCC): "DAVINCI: Development and Validation of a Lateral Flow Test to Detect COVID-19 Antigens and Immunity in Saliva (EUR 473'000.-)

#### Projects funded by Swiss Governmental Institutions

- BAFU Project: Review study on the use of biotests for the assessment of industrial wastewater and proposal of an evaluation concept (EUR 175'200.-)

#### Projects funded by Innosuisse (Swiss Innovation Agency)

- Development of a dual mode marker system for X-ray and optical stereoscopic camera tracking (17077.2 PFLS-LS) (EUR 405'033.-)
- Development of a Nanoporous Antibacterial Surface for Titanium Implants by reverse-pulse electrochemical Copper deposition (NANTI) (14293.2;9 PFNM-NM) (EUR 111'933.-)
- Targeted vitamin delivery to the microbiome for improved gut health; in collaboration with DSM Nutritional Products (46093.1 IP-LS) (EUR 626'490.-)
- Automated LADME Assay platform Based on Advanced Microphysiological Arrays (ALABAMA) (44386.1 IP-LS) (EUR 790'994.-)
- Lyopan technology for orally dispersible tablets (18800.2 PFIW-IW) (EUR 433'222.-)
- Drugs for wound healing (25840.1 PFLS-LS) (EUR 698'050.-)
- Topical anti-infectives against leishmaniasis (34227.1 IP-LS) (EUR 397'351.-)

### Involvement in prominent R&I Networks

- European Federation of Biotechnology: Vice Presidency, Chairmanship of Environmental Biotechnology division and Vice-Chairmanship of the division Plant, Agriculture and Food
- Biotechnet: Executive Board member
- EHEDG: Swiss Regional Presidency
- PERSEO AG: Board member
- Biotechnet: Presidency
- Swiss Tox: Board member
- SCAHT: Foundation Council member
- NSF: Swiss Expert assessor
- IUPAC: Session member
- SCAHT: Swiss Centre for Applied Human Toxicology; member of the council
- BRIDGE Swiss National Science Foundation-Innosuisse: Board member
- Sefunda AG: Board of Directors
- European partnership for the assessment of risks from chemicals (PARC): CH National Hub
- European Alliance for Medical and Biological Engineering and Sciences: Council member
- Swiss Society for Biomedical Engineering: Board member
- Wallenberg Foundation: Scientific Advisory Board member
- CSEM: Scientific Advisory Board member
- IFMBE: Swiss Delegate



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