FHNW School of Life Sciences

Driving innovation in Europe's largest life sciences cluster

The FHNW School of Life Sciences consists of four institutes involved in research, innovation and education. Located in the heart of Europe's largest life science cluster, it collaborates closely with prominent national, European and international organisations and industries. The School has applied, industry-driven expertise in health and pharma technology, as well as circular bioeconomy, environmental restoration, mitigation of biodiversity loss and climate change, in line with 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 and Biotechnology** 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.

Discover our institutes:
www.fhnw.ch/en/lifesciencesR&D

The Institute for **Chemistry and Bioanalytics** collaborates with agro, food, pharma and biochemical industries on sustainable processes, feedstock identification and preparation, advanced (nano)-materials and organ function diagnostic systems. It has expertise in analysis of large data sets, and the ability to develop and implement processes up to pilot scale, including safety assessments. It has close partnerships with leading EU bio-based and bioremediation industries and start-ups.

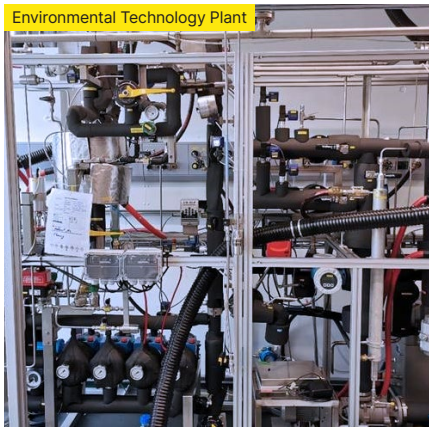
The Institute for **Ecopreneurship** conducts lab- and pilot-scale interdisciplinary R&I in the circular bioeconomy and environmental restoration. It creates innovative solutions for waste stream conversion into marketable products and for the treatment, detoxification and regeneration of contaminated water and soil. Sustainability is assessed with comprehensive ecotoxicological studies and life cycle analyses.

Chemical Process Development and Process Reliability

Pharmaceutical Process Technology

Cleanroom - Sterile Pharmaceutical Production

Environmental Technology Plant



Bioprocess Technology

Thermal Separation Processes and (Bio-)Refinery

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

Process Technology Center
The Process Technology Center (PTC) offers research and industry partners the ideal platform for scaling up processes developed in the laboratory before large-scale implementation.

Natural Product Technology

"Our unique infrastructure, linked with automation and digitalisation, is amongst the most modern in Europe. The Process Technology Center of our School is specifically designed for the requirements of the life sciences industry and offers unique opportunities for research and development, training and education."

Prof. Dr. Falko Schlottig, Director FHNW School of Life Sciences

Infrastructure

Pilot-scale facilities

- Fully automated chemical, biochemical and fermentation facilities for upstream and downstream processes.
- Wastewater management system equipped with online biomonitoring, such as online toximeters and cell based in vitro test systems.
- Solid sterile containment and cleanroom pharmaceutical manufacturing, including semi-automatic filling-finishing, dispersion, comminution, freeze and spray drying, extrusion, and 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, CT and Micro-CT, DVT, c-arm, REM, tribometry, static and dynamic mechanical testing stands, removal-torque-system, medical 3D-scanning and tracking, ultrasound, IR, movement and gait analysis, high speed camera, EMG, EEG, ECG, endoscopy.

Micro- and nano-scale particle technology: Solid state and surface characterization, light scattering, dispersed systems, rheology.

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

Chemical synthesis and analysis: DNA and peptide synthesiser, electro- and photo-chemistry, NMR, GC-MS; HPLC-MS including Ion Trap, qTOF, QqQ, LA-ICP-MS; ICP-MS (QqQ); LC-OCD-OND for drinking water analysis; LDIR chemical imaging system; µXRF, Radioisotope Lab (C-14, H-3); high precision isotopic carbon analyser, surface plasmon resonance.

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

Collaboration with industries and research organisations

Horizon 2020 projects

As a coordinator:

As a partner:

Horizon Europe projects

Projects funded by EU beyond H2020 and HEU

- EU JPND: Multinational research projects on personalised medicine for neuro-degenerative diseases (ORGTHERAPY)
- Eurostars project 113627: Suppressing tremor to a bearable level (STABLE)
- Eurostars project 113479: 3D cell culture platform for personalised ovarian concer therapy selection

Projects funded by INTERREG, a funding programme by France, Germany and Switzerland for the upper Rhine region

- SPIRITS: Smart 3D-printed interactive robot for interventional radiology and surgery
- PERSONALIS: Platform for personalized medicine for autoimmune diseases
- TRIMABONE: 3d printing for resorbable implants
- WaterPollutionSensor: Use of a sensor network for the continuous monitoring of pesticides in drinking water
- ALBUCOL: Customisable natural hybrid protein materials for tissue engineering
- HelpMeWalk: Replace plaster casting in orthopedics with a digital solution
- Variopore: Innovative technology for fast and reliable diagnosis of infectious diseases

Projects funded by international foundations
- Wellcome Trust: Discovery of anti-DENV antibodies using artificial intelligence
- Adalbert-Raps Stiftung: Effizienzsteigerung von Algenkultivierungsprozessen
- UNIDO: Provision of eco-industrial park related services in Peru

Projects funded by the Swiss National Science Foundation (SNSF) and BRIDGE
- Structural and functional characterisation of the primer synthesis ofarchaeoeukaryotic primases
- The underestimated role of the human omentum in metastatic spread
- Efficient colonic drug delivery
- Implemention of adverse outcome pathway in a plug and play microfluidics system
- Liver fibrosis as a proof of principle
- European Joint Programme Rare Diseases: Development of new analytic tools and pathways to accelerate diagnosis and facilitate diagnostic monitoring of rare diseases

Projects funded by other Swiss foundations
- Botnar Research Centre for Child Health: DAVINCI: Development and validation of a lateral flow test to detect COVID-19 antigens and immunity in saliva

Projects funded by Swiss governmental institutions
- BAFU: Review study on the use of biotests for the assessment of industrial wastewater and proposal of an evaluation concept
- BAFU: Development of a concept for the determination and assessment of toxic wastewater in industrial plants

Projects funded by Innosuisse
- Development of a dual mode marker system for X-ray and optical stereoscopic camera tracking
- NANTI: Development of a nanoporous antibacterial surface for titanium implants by reverse-pulse electrochemical copper deposition
- Targeted vitamin delivery to the microbiome for improved gut health
- ALABAMA: Automated LADME assay platform based onadvanced microphysiological arrays
- Lyopan technology for orally dispersible tablets
- Drugs for wound healing
- Topical antiinfectives against leishmaniasis
- Impulse: a novel vaccine platform for antimicrobial resistant bacteria
- Multitron autoBP: Automated bioprocessing platform
- transFORM3D: Intelligenter und automatischer Schuheinlagen Design-Algorithmus
- FFORTESS: Fluorine free omniphobic roughness tailored extended slippery surfaces
- Raman ready
- Portable magnetocardiography device for the diagnosis of functionally relevant coronary artery disease

Participation in R&I networks and boards
- European Federation of Biotechnology (EFB): Vice-chairmanship of the plant, agriculture and food division
- European Hygenic Engineering and Design Group (EHEDG): Swiss regional presidency
- European partnership for the assessment of risks from chemicals (PARC): Swiss national hub
- International Union of Pure and Applied Chemistry (IUPAC): Session member
- Swiss National Science Foundation (SNSF): Swiss expert assessor
- BRIDGE (SNSF-Innosuisse): Board member
- Biotechnet Switzerland: Presidency
- Swiss Society of Toxicology (SST): Board member
- Swiss Centre for Applied Human Toxicology (SCAHT): Council member
- Swiss Center for Electronics and Microtechnology (CSEM): Scientific advisory board member
- Swiss Society for Biomedical Engineering (SSBE): Board member
- European Alliance for Medical and Biological Engineering and Sciences (EAMBES): Council member
- Wallenberg Foundation: Scientific advisory board member
- International Federation for Medical and Biological Engineering (IFMBE): Swiss delegate
- PERSEO AG: Board member
- Sefunda AG: Board member

Find more information and pictures of our fully equipped laboratories and state-of-the-art pilot plants on our website.

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