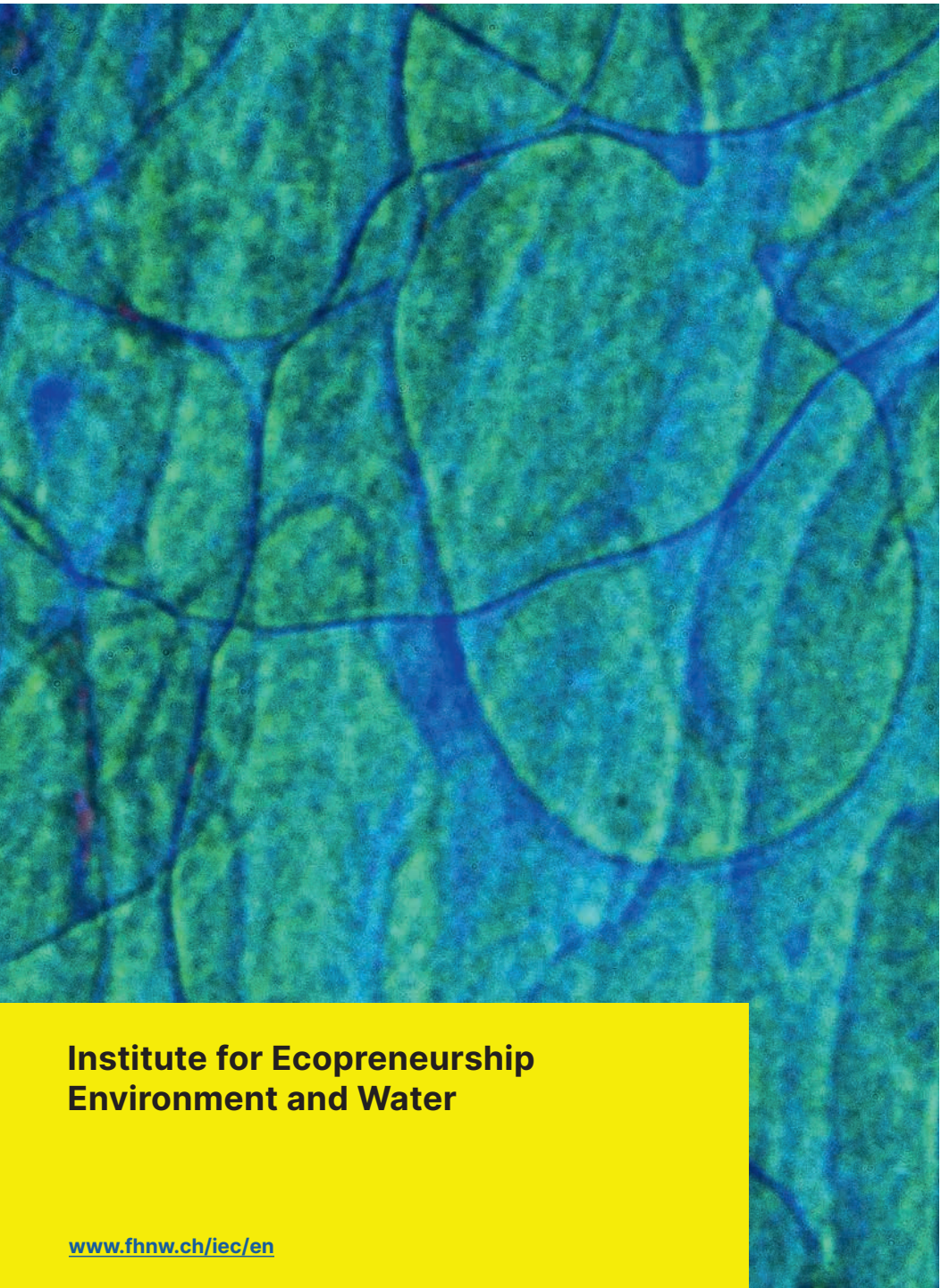
University of Applied Sciences and Arts Northwestern Switzerland
School of Life Sciences



Institute for Ecopreneurship Environment and Water

www.fhnw.ch/iec/en

Institute for Ecopreneurship / Environment and Water

Understanding the environmental effects of human activities and minimizing their impact.

The Institute for Ecopreneurship conducts research in applied environmental science and environmental engineering. We analyse current ecological challenges and develop measures to preserve and improve the quality of the environment. Further, we are dedicated to contribute to the transition towards a circular economy by improving existing and developing new processes.

Our work is interdisciplinary, combining e.g. biology, chemistry and process engineering applied on different scales.

We develop and test high-tech solutions to reduce emissions and recover valuable raw materials. We design concepts and optimize processes for resource-efficient production and evaluate the environmental compatibility of substances and processes using ecotoxicology and life cycle analyses.

We are a reliable, innovative R&D partner with highly specialised expertise, close contacts with industry and authorities, and wide-ranging international professional networks. Our teaching benefits directly from these strengths.

Interdisciplinary fields

Resource scarcity, environmental pollution, antibiotic resistance, species loss and climate change are growing challenges for humankind. In these broad fields we research options for maintaining and improving environmental quality and closing material cycles effectively and efficiently.

Environmental and Water Technologies / Environmental Engineering

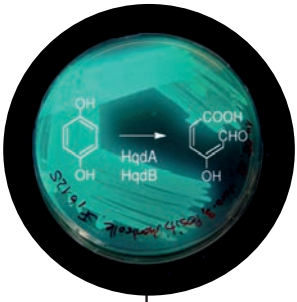
Standards for drinking water and wastewater treatment are becoming ever stricter. Processes such as oxidation or adsorption as well as membrane systems can largely remove pollutants and impurities.

Water, Sanitation and Hygiene (WASH)

WASH services in many low- and middle-income countries need enhancement. To achieve this, we integrate laboratory research, field testing and social sciences in close partnership with implementing organizations and local universities, e.g. the development of an innovative membrane-based handwashing station for water recycling in Mali, Burkina Faso and Nigeria.

Integrated Water Management

Holistic strategies and planning instruments are being developed for sustainable water use and re-use to balance the demands of consumption and protection.



Environmental Biochemistry and Biotechnology

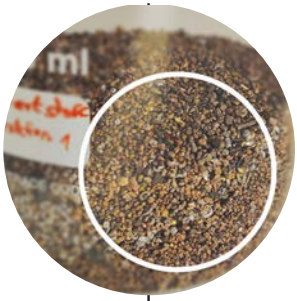
Microorganisms and enzymes play a central role in resource exploitation and pollutant degradation. To take advantage of this potential in environmental biotechnology, microorganisms and enzymes must be identified and isolated so that they can be used for bioremediation or biosynthesis.

Cleaner Production and Industrial Symbiosis

The efficient reduction or avoidance of harmful environmental impacts through optimization of industrial processes and synergies in industrial networks continue to offer significant potential.

Resources Management

Sustainable resources management seeks solutions for the intelligent sourcing and use of resources such as water, energy and raw materials, and promotes the concept of a circular economy.



Applied Circular Economy

(Bio)hydrometallurgical processes are understood to be processes, that use acidic, basic or complex-forming aqueous solutions. Such processes can be used to recover raw materials from secondary sources such as industrial wastes with minimal environmental impact.

Ecotoxicology

Ecotoxicology studies the effects of environmentally hazardous substances or environmental samples on plants and animals, using various test systems like in vitro cell cultures or target organisms such as water fleas, zebrafish or bees. For example, the molecular effects of pesticides on the brains of honeybees can be detected by gene expression analysis.

Trace Analysis

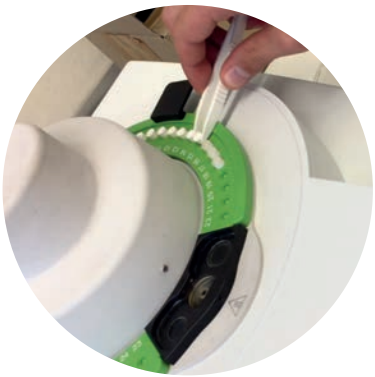
Many organic pollutants occur in very low concentrations in the environment. Detecting them in water or in the food chain is only possible with extremely sensitive analytical methods.

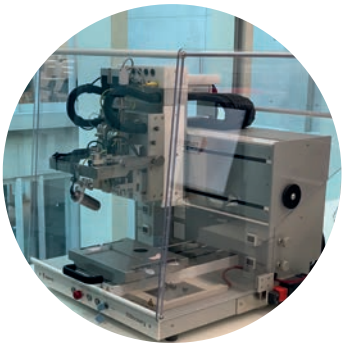
Expertise and infrastructure

Our extensive modern infrastructure means we can run a wide range of laboratory and pilot scale experiments, along with state-of-the-art analytics.

Experimental

- Membrane test stands and test cells, acid-stable nanofiltration unit, membrane modification unit
- Various wastewater treatment plants, filtration plants, aerobic and anaerobic membrane bioreactors, neutralization plant
- Process Technology Centre (PTC) with wastewater treatment plant
- Ozone plant
- Ecotoxicological in vivo biotests: exposure analyses with algae, daphnia and fish; flow-through system for fish exposure; fish embryotoxicity, acute and chronic toxicity of invertebrates in online biomonitoring systems.
- In vitro ecotoxicological bioassays: bioassays, cell culture assays and gene expression analysis.
- 3D biofilm printing



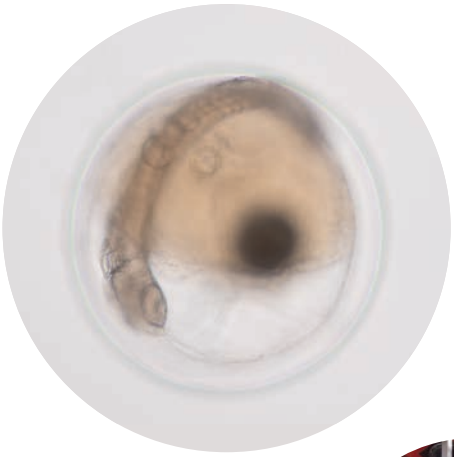


Analytical

- Molecular biology detection methods (quantitative PCR, next-generation sequencing platforms, electrophoresis)
- Biochemical methods (protein chromatography, Western blot, etc.)
- High-resolution chromatographic detection / chromatography and spectrometry for organic and inorganic analysis (LC, LC-OCD, QQQ and IonTrap LC-MS^n, UPLC-QTOF, GC-MS, LC-QQQ-ICP-MS, ICP-OES, NMR)
- Radioisotope analysis (^{14}C and ^{3}H, liquid scintillation, autoradiography, HPLC with liquid scintillation detector, sample oxidizer)
- Water chemical analysis and environmental analysis (sum parameters such as BOD5, COD, TP, TN, TOC, methane yield etc.)
- Microbiology lab (S2 work, flow cytometry, anaerobic glove box, multi-parallel bioreactors, etc.)
- Physical and chemical solid or surface characterization (µXRF, XRF, TOC, TGA, ESEM-EDX, etc.).

Applied Research

- Process piloting
- Process evaluation
- Ecotoxicological in vivo/ in vitro effect studies
- Microbiome analysis
- Metabolism studies and degradation tests
- Metal speciation
- Enzyme characterization
- Risk assessment
- Sustainability assessment
- Life cycle assessment and cost-effectiveness analysis



Services

- Environmental consulting for industry
- Training
- Contract analysis

Continuing Education

Master of Advanced Studies in Environmental Engineering & Management (MAS-U):

- CAS Development and Environment
- CAS Industry and Environment
- CAS Management and Environment
- CAS Health and Environment
- CAS Environmental Law and Enforcement

FHNW School of Life Sciences

At the new FHNW Campus in the heart of Europe's largest life sciences region, the School of Life Sciences does cutting-edge research for a better future. State-of-the-art infrastructure and equipment, including a new Process Technology Centre, enable our researchers and industry partners to work together to develop new technologies and products from concept to market.

The campus has an ideal location close to public transport links and with a view over Basel. In addition to the School of Life Sciences, the new FHNW Campus Muttenz houses the Schools of Architecture, Civil Engineering and Geomatics, Education, Social Work and Engineering, where around 4500 people study and work.

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For further information about our research fields:
www.fhnw.ch/iec/en

The FHNW incorporates nine facilities:

- FHNW School of Applied Psychology
- FHNW School of Architecture, Civil Engineering and Geomatics
- FHNW Academy of Art and Design
- **FHNW School of Life Sciences**
- FHNW Academy of Music
- FHNW School of Education
- FHNW School of Social Work
- FHNW School of Engineering
- FHNW School of Business

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