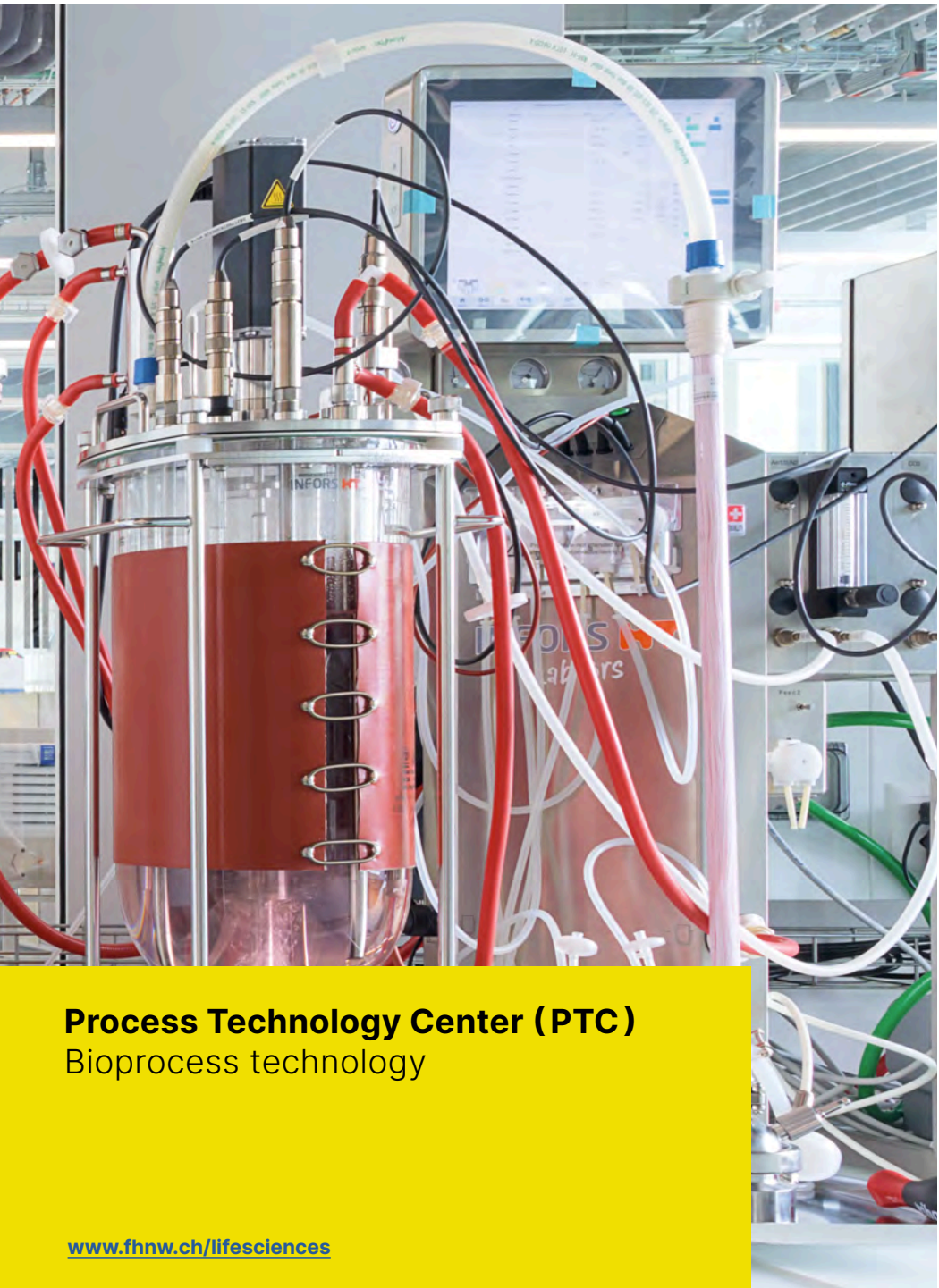
University of Applied Sciences and Arts Northwestern Switzerland
School of Life Sciences



Process Technology Center (PTC)

Bioprocess technology

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Bioprocess technology

Enzymes, antibodies and gene therapies rely on extremely complex, lengthy and expensive production processes. The bioprocess engineering plant at the PTC is designed to optimize these processes.

Whether the goal is process development, piloting or automation, important production steps can be analysed and evaluated with great precision. Process control can be increased and operations – including upstream and downstream processing – can be simulated and redesigned where necessary. This helps companies that want to bring a biomolecule to market and enables research groups to produce proteins to solve specific scientific problems. They can find out how a process should be run to achieve the desired yield as efficiently as possible in the targeted quality. Digitization and detailed data analysis play a decisive role.

Cell lines and media are optimized on a very small scale, and production is then carried out in bioreactors using batch, fed-batch and continuous processes. The cultivation of microorganisms or mammalian cells can be monitored and controlled in the bioreactors via numerous online samples. The biomolecules produced are purified by chromatographic and filtration steps (cell harvest clarification, TFF, UF / DF) and characterized by state-of-the-art analytical methods.

Our students learn the steps and techniques of upstream and downstream processing up to final formulation. In practical courses on cultivation, purification, sensor technology and analytics, as well as during their thesis work, they can develop this knowledge.

Infrastructure:

- Small- and pilot-scale microbial cultivation systems (shake flasks, 5-litre, 20-litre and 100-litre bioreactors)
- Fed-batch and continuous bioreactors for mammalian cell cultures (96 DPW, shake flasks, 3-litre and 10-litre bioreactors)
- Alternating Tangential Filtration (ATF) and Tangential Flow Filtration (TFF) for continuous upstream processes
- Inline / online sensors (Raman sensors, capacitive sensors etc.)
- Modern offline analytics (HPLC, BioProfile Flex2, Agilent Bioanalyzer etc.)
- Online process control system for all bioreactors (Infors Eve)
- Ultrafiltration / diafiltration (UF / DF) and TFF systems (Äkta Flux, Pall Centramate)
- Preparative chromatography (Äkta Avant)
- Continuous chromatography (Chromacon Cube)
- Pilot scale chromatography systems (Äkta Pilot, Merck K-Prime 40-III)

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The FHNW incorporates nine faculties:

- 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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