

Competencies and organisations

School of Life Sciences and Facility Management



School management:

from left: Urs Hilber, Michael Kleinert, Diyana Petrova, Margrit Büeler, Thomas Ott, Irene Arnold, Christian Hinderling, Karin Altermatt, Rolf Krebs Photo taken in the new building "Future of Food", ZHAW-Campus Reidbach, Wädenswil.

Organisation:

- Department Transversalis Director: Karin Altermatt
- ICBT Institute of Chemistry and Biotechnology Director: Prof. Dr. Christian Hinderling
- ICLS, Institute of Computational Life Sciences Director: Prof. Dr. Thomas Ott
- IFM Institute of Facility Management Director a.i.: Irene Arnold
- ILGI Institute of Food and Beverage Innovation Director: Prof. Michael Kleinert
- IUNR Institute of Natural Resource Sciences
 Director: Prof. Dr. Rolf Krebs

Management and staff:

Prof. Dr. Urs Hilber, Dean ZHAW LSFM
Margrit Büeler, Assistant to the Dean
Dr. Diyana Petrova, Head of Education, Research and Resources

Innovations – practical, creative, passionate and reflective

Dear readers,

The goal of "Regenerative Food for Planetary Health" came into sharp focus in 2023. A particular highlight was the opening of the Elisabeth Weber-Hauser building. This new part of the campus dedicated to the Future of Food unites the entire value creation network under one roof at the ZHAW in Wädenswil, benefiting employees, students and our partners from business and science. Innovation is key to shared success – our innovations are practical, creative, passionate and reflective in teaching, research and international collaboration.

Future of Food – innovation united under one roof

After almost four years of construction, around 100 people from the School of Life Sciences and Facility Management, primarily employees of the Institute for Food and Beverage Research, moved into the new building in the summer of 2023. They had previously been spread across seven locations. Thus, not only the facilities, pilot plants and laboratories, but also the entire expertise in food science, from biotransformation to sensor technology. are now united under one roof. The building, named after Elisabeth Weber-Hauser, a 19th century entrepreneur from Wädenswil, was officially inaugurated in August 2023 by the Heads of the Department of Education and the Building Department, Dr. Silvia Steiner and Dr. Martin Neukom, respectively.

Studying life sciences and facility management is more attractive than ever

In 2023, numerous curriculum reforms were driven forward and implemented. The Bachelor's in Natural Resource Sciences focuses on project and problem-based work as well as providing student with creative freedom, and new thematic specialisations were also created. The Bachelor's programmes in Biotechnology and Chemistry introduced minors that enable students to acquire specialist knowledge, while the Bachelor's programme in Food Technology has been realigned in terms of content. In the reporting year, the Master's programme in Environment and Natural Resources was accredited without conditions by Acquin, the German accreditation, certification and quality assurance institute in the reporting year. Collaboration agreements were concluded with the Worcester Polytechnic Institute in Boston, USA and with the Università degli Studi dell'Insubria in Varese and Milan, Italy. This will enable our students on the MSc Life Sciences to obtain a double degree in the future.

Innovations published in 'Science', 'Nature Communications' and 'Nature Catalysis'

Enzymes are beacons of hope for the chemical industry on the road to greater sustainability. By using a customised automation platform and machine learning, the Competency Centre for Biocatalysis optimised the industrial application in collaboration with a partner from industry. Thanks to this project, the researchers were also able to publish research articles in the renowned journals 'Nature Communications' and 'Science'. Another success was achieved in the field of biosynthesis of anthocyanins in the successful production of these plant-based dyes in the laboratory which could help conserve resources. The discovery of a crucial synthesis step in this regard was published in 'Nature Catalysis'. This is just one example that shows how strong our school is in research and development. We were also able to achieve a new financial record in 2023.

With the support of all members of our school, I am certain we can achieve our goals. They have my heartfelt thanks for their level of dedication and impressive work.

Prof. Dr. Urs Hilber Dean Learn more about us. Simply scan QR codes and off you go!

+ Learn more about

our strategy in 3 minutes.



Review of the Lake Week from 29 January to 3 February 2024:

zhaw.ch/lakeweek/en

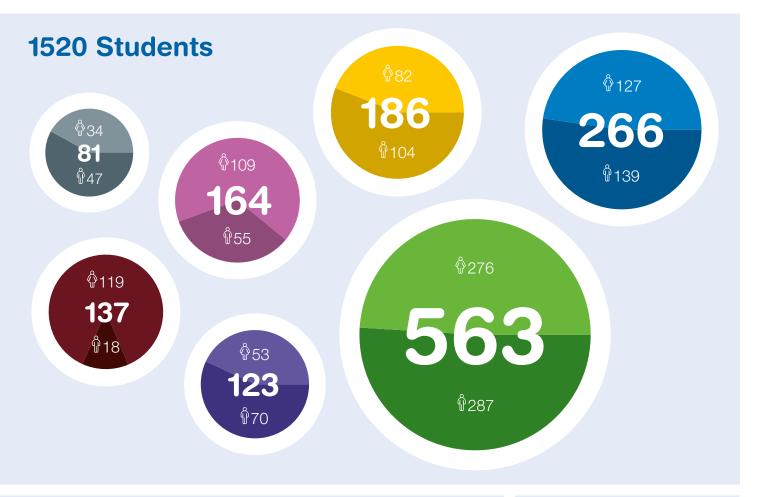


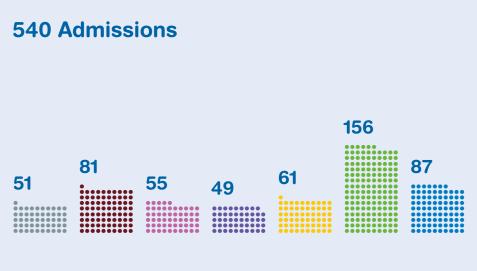


Environment | Food | Health | Society
Our competencies in Life Sciences
and Facility Management.

Bachelor's degree programme

2023







*First time 2025

Status as of 15.10.2023 based on SERI report

Applied Digital Life Sciences (Start HS22)
Biomedical Laboratory Diagnostics (Start HS22)
Biotechnology
Chemistry
Food Technology

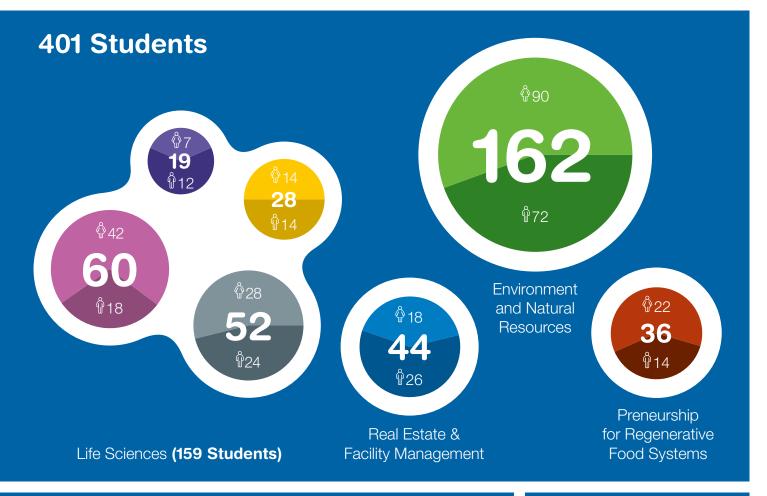
Food Technology
Natural Resource Sciences
Facility Management

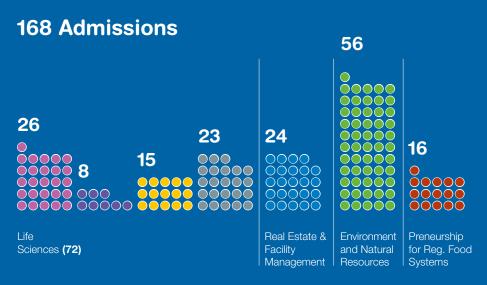
Master's degree programme 2023

+ Learn more about

our study programmes.







Graduates Life Sciences 90, thereof: Pharmaceutical Biotechnology 38 Chemistry for the Life Sciences **15** Food and Beverage Innovation **15** Applied Computational Life Sciences 22 Real Estate & Facility Management 0* Environment and Natural Resources 36 Preneurship for Reg. Food Systems 0*

Master's degree in Life Sciences with specialisations in:

- Pharmaceutical Biotechnology
- Chemistry for the Life Sciences
- Food and Beverage Innovation
- Applied Computational Life Sciences
- Master's degree in Real Estate & Facility Management

Revision of the degree programme, starting as an MSc in Real Estate and Facility Management in autumn 2023.

- Master of Science in Environment and Natural Resources
- Master of Preneurship for Regenerative Food Systems (Start FS22)

*First time 2024

Status as of 15.10.2023 based on SERI report

Continuing education, courses and conferences

2023

Programmes

The continuing education courses at the campuses in Wädenswil and Zurich locations range from international conferences to various continuing education courses (WBK), and from certificate and diploma courses (CAS, DAS) to postgraduate courses lasting several semesters (MAS). The continuing education programme is aimed at interested persons who have completed a university education, are already working and would like to expand upon or deepen their specialist knowledge.

Qualifications

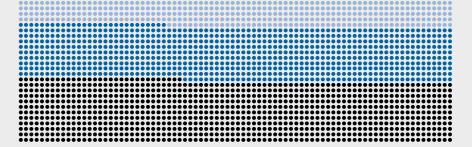
MAS: Comprising 60 credits, the Master of Advanced Studies (MAS) is the most comprehensive of our continuing education programmes. The programme is part-time, takes place over several semesters and is mostly modular in structure. Comprising an accumulation of partial qualifications, it is completed with a master's thesis.

DAS: The Diploma of Advanced Studies (DAS) comprises 30 credits. It offers in-depth further training in a specific professional field.

CAS: The Certificate of Advanced Studies (CAS) is an independent qualification with 10 to 15 credits, which can also be part of an MAS or DAS.

Participants in the continuing education events

2146



MAS, DAS, CAS 396 Continuing education courses 817 Symposia 933

Number of continuing education events

80

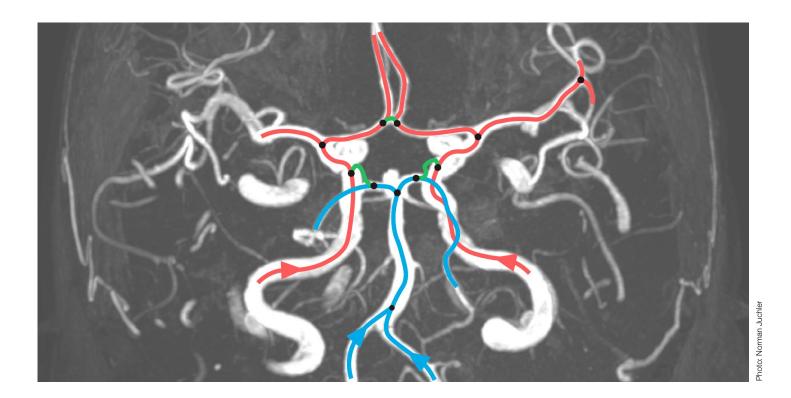
Status as of 31.12.2023





Research and Development

Competencies



The disciplinary expertise in our institutes constitutes a solid basis for providing expert solutions to the problems our partners and customers may present. We implement projects and assignments with a practical and creative approach. Whether as part of a specific bachelor's thesis or as an interdisciplinary research project over several years, we welcome the opportunity to support you.

Research focal points at the Institute of Chemistry and Biotechnology ICBT zhaw.ch/icbt

- Detection and diagnostics
- Pharma innovation
- Smart materials
- Sustainable solutions

Research focal points at the Institute of Computational Life Sciences ICLS zhaw.ch/icls

- Bioinformatics
- Cognitive computing in life sciences
- Computational health
- Digital labs & production

Research focal points at the Institute of Facility Management IFM zhaw.ch/ifm

- Facility management in healthcare & food services
- Real estate & facility management digital
- Sustainability in real estate & facility management
- Workplace management

Research focal points at the Institute of Food and Beverage Innovation ILGI zhaw.ch/ilgi

- Beverage technology and flavour research
- Consumer behaviour and diet
- Food quality and safety, quality management
- Food technology and packaging

Research focal points at the Institute of Natural Resource Sciences IUNR zhaw.ch/iunr

- Organic farming, agroecology and food
- Ecological engineering; circulatory and energy systems
- Geoecology and nature management
- Communicating sustainability, transformation and tourism
- Urban ecosystems and climate adaptation

Publications

Extracts from 2023



our research and development.



Scientific publications are an important element in the transfer of knowledge between research and practice. A selection of key publications that appeared in 2023 is presented below. A complete list of publications from the School of Life Sciences and Facility Management can be found at zhaw.ch/lsfm/research

ICBT

Eichenberger, M., Schwander, T., Hüppi, S., Kreuzer, J., Mittl, P. R. E., Peccati, F., Jiménez-Osés, G., Naesby, M., & Buller, R. M. (2023). The catalytic role of glutathione transferases in heterologous anthocyanin biosynthesis. Nature Catalysis, 6(10), 927-938. https://doi.org/10.1038/s41929-023-01018-y

Buller, R., Lutz, S., Kazlauskas, R. J., Snajdrova, R., Moore, J. C., & Bornscheuer, U. T. (2023). From nature to industry: harnessing enzymes for biocatalysis. Science, 382(6673), eadh8615.

https://doi.org/10.1126/science.adh8615

Kalbermatter, D., Jeckelmann, J.-M., Wyss, M., Shrestha, N., Pliatsika, D., Riedl, R., Lemmin, T., Plattet, P., & Fotiadis, D. (2023). Structure and supramolecular organization of the canine distemper virus attachment glycoprotein. Proceedings of the National Academy of Sciences of the United States of America, 120(6), e2208866120. https://doi.org/10.1073/pnas.2208866120

ICLS

Ulzega, S., & Albert, C. (2023). Bayesian parameter inference in hydrological modelling using a Hamiltonian Monte Carlo approach with a stochastic rain model. Hydrology and Earth System Sciences, 27(15), 2935-2950. https://doi.org/10.5194/hess-27-2935-2023

Glüge, S., Balabanov, S., Koelzer, V. H., & Ott, T. (2023). Evaluation of deep learning training strategies for the classification of bone marrow cell images. Computer Methods and Programs in Biomedicine, 243, 107924. https://doi.org/10.1016/j.cmpb.2023.107924

Apsley, A. T., Domico, E. R., Verbiest, M. A., Brogan, C. A., Buck, E. R., Burich, A. J., Cardone, K. M., Stone, W. J., Anisimova, M., & Vandenbergh, D. J. (2023). A novel hypervariable variable number tandem repeat in the dopamine transporter gene (SLC6A3). Life Science Alliance, 6(4), e202201677. https://doi.org/10.26508/lsa.202201677

IFM

Gerber, N., & Merkle, T. (2023). Improving residents' wellbeing in senior citizen homes with more individualized food services [Conference paper]. IOP Conference Series: Earth and Environmental Science, 1176, 12016. https://doi.org/10.1088/1755-1315/1176/1/ 012016

Windlinger, L., & Gerber, M. (2023). Functions and relevance of spatial co-presence: lessons learned from the COVID-19 pandemic for evidence-based workplace and human capital management. Frontiers in Built Environment, 9(1035154).

https://doi.org/10.3389/fbuil.2023.1035154

Meslec, M., & Druhmann, C. K. (2023). Impact investments in real estate development: no trade-offs with digital entrepreneurship [Conference presentation]. Conference Book of Abstracts ICREDM 2023, 137. https://digitalcollection.zhaw.ch/handle/ 11475/30134

Schmid, T., Leue-Rüegg, R., & Müller, N. (2023). Heat and shear stability of particle stabilised foams for application in gluten-free bread. Journal of Food Science and Technology, 60(11), 2772-2781.

https://doi.org/10.1007/s13197-023-05794-0

Ullrich, L., Gillich, E., André, A., Panarese, S., Imhaus, A. F., Fieseler, L., & Chetschik, I. (2023). Influence of ozone treatment during storage on odour-active compounds, total titratable acidity, and ascorbic acid in oranges and bananas. Applied Sciences, 13(19), 10885.

https://doi.org/10.3390/app131910885

Streule, S., Freimüller Leischtfeld, S., Galler, M., Motzer, D., Poulose-Züst, M., & Miescher Schwenninger, S. (2023). Variations in Ecuadorian cocoa fermentation and drying at two locations: implications for quality and sensory. Foods, 13(1), 137. https://doi.org/10.3390/foods13010137

IUNR

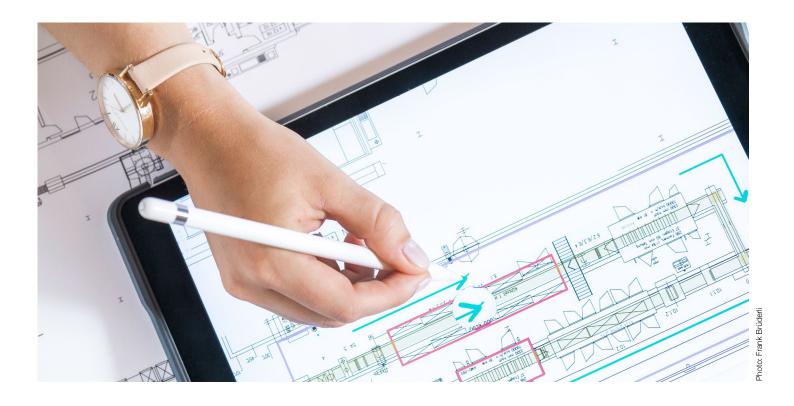
Aubert, A. H., Schmid, S., & Lienert, J. (2023). Can online interfaces enhance learning for public decision-making?: eliciting citizens' preferences for multicriteria decision analysis. European Journal of Operational Research, 314(2), 760-775. https://doi.org/10.1016/j.ejor.2023.10.031

Bokusheva, R., & Baráth, L. (2023). State-contingent production technology formulation: identifying states of nature using reduced-form econometric models of crop yield. American Journal of Agricultural Economics, 106(2), 805-827. https://doi.org/10.1111/ajae.12424

Kurz, M., Sultangaziev, O., Szalatnay, D., Sodonbekov, I., Naizabayeva, D. A., Milikbekova, M., Akbarsho, S., Bobushova, S., Doolotkeldieva, T., Rezzonico, F., & Smits, T. H. M. (2023). An app for apples: citizen-led mapping of fire blight in Central Asia. Journal of Plant Pathology. https://doi.org/10.1007/s42161-023-01406-0

Finances

2023



Student numbers are increasing slightly

With 1921 enrolments, student numbers for 2023 are marginally higher than the figures for 2022 (1867). Of these, 1520 (compared to 1488 in the previous year) are studying for their bachelor's degree and 401 for their master's degree (compared to 379 in the previous year). This slight growth in student numbers is primarily due to the introduction of new study programmes in 2022. The first graduates from these are expected in 2024 (for the master's degree programmes) and 2025 (for the bachelor's degree programmes).

Stable figures for continuing education

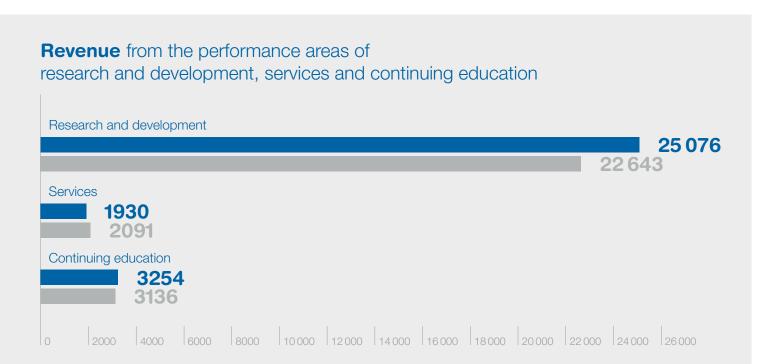
In 2023, the number of participants within continuing education as a whole was close to the previous year of 2167, with 2146 attendees. The number of participants has increased in continuing education courses - from 704 people in the previous year to a total of 817 people in 2023. The number of participants attending conferences also increased. In general, face-to-face events held on site were particularly popular.

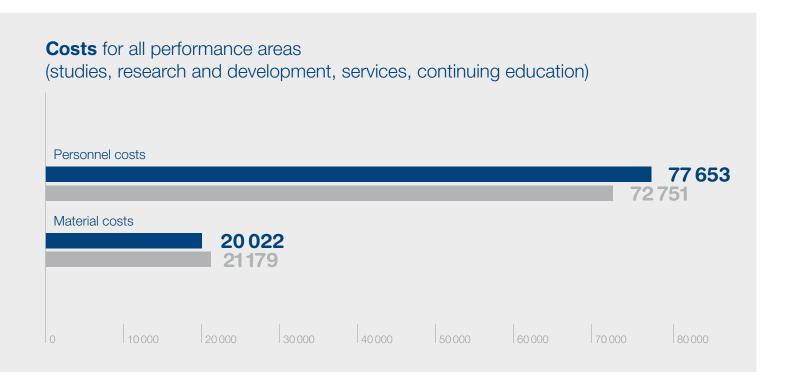
Research with record results

Outstanding results were achieved in the area of research and development. Our researchers generated around CHF 25.1 million, a significant increase compared to the previous year (CHF 22.6 million) and well above the previous record year of 2019 (CHF 23.8 million). Our current projects and research topics can be found on our project database as well as in the twice-yearly publication 'Transfer'. Free subscription at:

zhaw.ch/lsfm/research/transfer

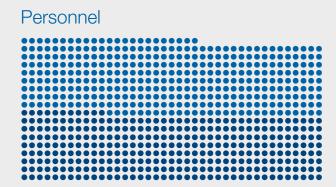






Revenue not including contributions from the Canton of Zurich. All amounts are given in CHF 1,000.

Employees School of LSFM



Full-time equivalents

555

Employees by organisational unit

Computational Life Sciences

Institute of Chemistry and Biotechnology

Institute of Facility Management

Institute of Natural Resource

\$\text{9} 363 \cdot \text{9} 323

686

Department Transversalis

Management/ Strategic Affairs Unit

Employees by category

Professors and lecturers

Research

associates

150

Assistants

Administration, technology and operations personnel

Interns

Apprentices

Status as of 31.12.2023

Foundations and boards

Foundations

The School of Life Sciences and Facility Management (LSFM) supports various foundations, mostly in terms of technical expertise and personnel, and also benefits financially from this commitment. The LSFM is represented by the following people in the foundations listed below:

Stiftung Technische Obstverwertung, Wädenswil

- Prof. Dr. Urs Hilber, Dean, ZHAW LSFM

Müller-Thurgau-Stiftung

- Prof. Dr. Urs Hilber, Dean, ZHAW LSFM (on the board of trustees)

grow, Wädenswil start-up organisation

- Prof. Dr. Urs Hilber, Dean, ZHAW LSFM (on the board of trustees)
- Catherine Kroll, Head of the Technology Transfer Office, ZHAW LSFM (senior management)

Alumni organisations

Representatives from the School of Life Sciences and Facility Management:

Alumni of ZHAW Facility Management

- Irene Arnold, Interim Director, Institute of Facility Management (member of the board)

Alumni of ZHAW Life Sciences

- Dr. Diyana Petrova, Head of Education, Research and Resources, ZHAW LSFM

Alumni Netzwerk Wädenswil

- Dr. Diyana Petrova, Head of Education, Research and Resources, ZHAW LSFM

Advisory boards

In order to ensure the long-term practical relevance and quality of the education provided as well as of the applied (application-oriented) research and development, numerous representatives of industry and professional associations support our institutes in an advisory capacity.

Advisory Board of the Institute of Chemistry and Biotechnology (ICBT)

- Dr. Inken Beulich, Dow Europe GmbH
- Dr. André T. Dahinden
- Prof. Dr. Dr. Gunter Festel, FESTEL CAPITAL and Technical University at Berlin
- Prof. Dr. Ursula Graf-Hausner, graf 3dcellculture

- Prof. Dr. Christian Hinderling, Director of the ICBT. ZHAW
- Dr. Jan Lucht, scienceindustries. Chemistry Pharma Biotech Business Association
- Dr. Hans-Peter Meyer
- Dr. Thomas Münch, Givaudan Schweiz AG
- Dr. Martin Riediker
- Dr. Philippe Steiert, CSEM (Swiss Center for Electronics and Microtechnology)
- Markus Tanner
- Dr. Pius Waldmeier, Head of Synthesis & Process Research Group, F. Hoffmann-La Roche Ltd.
- Prof. Dr. Roland Wohlgemuth, Lodz University of Technology

Advisory Board of the Institute of **Computational Life Sciences (ICLS)**

- Dr. Thomas Anken, Head of Digital Production, Agroscope
- Stefan Baumann, Managing Director, Gigmade GmbH
- Prof. Marcel Burkhard, former Director of the Institute, ZHAW
- Martin Andreas Düblin, Managing Director, One One Eleven GmbH
- Prof. Dr. Olga Fink, EPFL
- Dr. Gundula Heinatz, Managing Director, Data Innovation Alliance
- Dr. Jens Jelitto, University Relations Manager, IBM
- Prof. Dr. Daniel Kiper, Director of the Life Science Zurich Learning Center, ETH/UZH
- Dr. Lukas Müller, Head of Corporate Development, Cistec AG
- Prof. Dr. Thomas Ott, Director of the ICLS, ZHAW
- Thomas Zaugg, Head Open Innovation & External Networks, Roche Diagnostics

Advisory Board of the Institute of Facility Management (IFM)

- Irene Arnold, Interim Director of IFM, ZHAW
- Michael Bürki, Head of Organisation and Strategy City of Aarau, Co-President IFMA Switzerland
- Markus Faber, COO Customer Operation, Apleona HSG AG
- Astrid Furrer, Councilwoman Planning and Building Wädenswil
- Renate Gröger, ex. Director of Operations, University Hospital Zurich

- Prof. Dr. Iva Kovacic, Professor and Head of Department of Integrated Planning and Industrial Building at the Faculty of Civil Engineering, Vienna University of Technology
- Katrin Leuenberger, Head of Real Estate Office, Canton of Zurich
- Wolfgang Stiebellehner, ex. CEO, Livit AG
- Daniel Zbinden, Head of Photovoltaics & Heat, CKW Conex AG, Lucerne

Advisory Board of the Institute of Food and Beverage Innovation (ILGI)

- Dr. Michael Beer, Vice Director, Head of the Food and Nutrition, Federal Office of Public Health
- Dr. Thomas Büeler, Head of Food Safety and Analytics, Hochdorf Swiss Nutrition Ltd.
- Prof. Michael Kleinert. Director of the ILGI. **ZHAW**
- Cédric Ochsner, Lead Consultant eXcellence
- Nadja Nabholz, Owner, Nadja Nabholz Consulting
- Clemens Rüttimann, Managing Director, cr-solutions
- Peter Schmidheiny, Head of Supply Chain, Hilcona AG
- Andreas Schwab, Head of Planning and Control, Bell Schweiz AG
- Thomas Truttmann, Managing Director, Compass Group (Switzerland) AG
- Susan Tschäppät, Head of Quality Management Europe, cpw, Nestlé & General Mills
- Prof. em. Dr. Erich Windhab, Professor of Food Processing Engineering, ETH Zurich
- Othmar Wohlhauser, CTO, Wipf AG

Advisory Board of the Institute of **Natural Resource Sciences (IUNR)**

- Ursin Ginsig, Managing Director, Eberhard Recycling AG
- Dr. Melanie Haupt, Co-Managing Director, REDILO GmbH
- Karin Hindenlang, Managing Director, Wildnispark Zürich
- Prof. Dr. Rolf Krebs, Director of the IUNR, 7HAW
- Dr. Dr. h.c. Raimund Rodewald, Managing Director, Swiss Foundation for Landscape Conservation
- Dr. Mathias Stolze, Member of the Executive Board, Research Institute for Organic Agriculture (FiBL)

The ZHAW in Wädenswil

The ZHAW at a glance

Eight specialist schools are united under the umbrella of the Zurich University of Applied Sciences (ZHAW). With 14,000 students in 34 bachelor's and 20 master's programmes and more than 10,000 participants in continuing education each year, the ZHAW is one of the leading universities of applied sciences in Switzerland. All of our locations - Wädenswil, Winterthur and Zurich – are located within the economically strong Greater Zurich Area. They offer a high quality of life for both work and study and are well served by public transport. (figures taken from the ZHAW annual report 2023)

www.zhaw.ch

Attractive campuses and locations

The Grüental and Reidbach campuses in Wädenswil, which includes the RA building on the Seestrasse, are situated in a beautiful location on the western bank of Lake Zurich. The green spaces around the Grüental campus serve not only as learning and research sites, but also inspire the general public with their extensive collection of plants.

In 2023, the Future of Food campus, a unique, state-of-the-art centre for food and beverage technology, was opened on the Reidbach campus. In this new building, teaching and research will merge into a single entity and it will be possible to comprehend and work on all of the processes in the food industry under one roof.

The continuing education courses offered by the Institute of Facility Management take place at a central location in Zurich. The research group "Tourism and Sustainable Development" is leading the way at the Center da Capricorns in Wergenstein, Grisons.

Local and regional roots

Wädenswil has established itself as an education and research town, and actively supports the ZHAW. The regional networking of science and industry is also evident in the ZHAW's longstanding and close cooperation with the University of Zurich and the ETH Zurich as well as with Zurich Park Side, the region's promotional foundation, and Agroscope.

International orientation

ZHAW students have the opportunity to spend a semester abroad so that they are well prepared for international competition in their future careers. In addition, many of the Wädenswil institutes' research projects and specialist conferences, as well as their summer and winter schools, are also internationally-oriented. The specialised programmes of these events bring scientists and students from all over the world to Wädenswil.

Promotion of entrepreneurship

Together with other initiators, the ZHAW is actively involved with the Wädenswil startup organisation 'grow'. Advice, inexpensive rooms and the immediate proximity to the university facilitate the step into self-employment. In this way, ZHAW students later become entrepreneurs and ideas turn into concrete products. 'grow' currently comprises 19 organisations with 210 employees.

Through the 'entrepreneurship@zhaw' programme, the university also provides a point of contact and advice for employees interested in starting a business.























Education and research in Wädenswil: practical, creative, passionate and reflective The ZHAW is one of the leading Swiss univer-Sciences and Facility Management currently has almost 1,900 students and employs more grammes as well as a wide range of further raining and education co With our expertise in life sciences and facility management, we make an important contribution to meeting societal challenges and to improving quality of life in the areas of environment, food and health. Five research-strong institutes in the fields of chemistry and biotechnology, food and beverage innovation, natural resource sciences, computational life sciences and facility management make this contribution in the form of research, development and Contact ZHAW Zurich University of Applied Sciences Life Sciences and Facility Management Grüentalstrasse 14 P.O. Box 8820 Wädenswil/Switzerland +41 58 934 50 00 info.lsfm@zhaw.ch www.zhaw.ch/lsfm bilden und forschen Visit us at #zhawlsfm on social media. wädenswil in in in in