Life Sciences and Facility Management

Research, development and services


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At the interface of theory and practice

Environment, Food, Health – our expertise in life sciences and facility management allows us to make an important contribution to solving our societal challenges and improving our quality of life.

We have a range of disciplinary competencies
The range of disciplinary expertise in our institutes provides a solid basis for providing high-quality solutions to the problems our partners and customers may present. We implement projects and take on commissions with a practical and tailor-made approach. The spectrum is wide – from a bachelor's or master's thesis to an interdisciplinary, multi-year research project dealing with complex subject matter.

We work in interdisciplinary networks
Synergies arise at the numerous points where our disciplines intersect. The unique combination of competencies we have enables us to tackle topics holistically. Networking extends beyond the boundaries of both the institute and the school itself. In our international research projects, we work globally with a focus on Europe.

We promote knowledge transfer
Teaching and research form one unit and feed into one another. This results in the direct transfer of knowledge from research to teaching. The transfer of our R&D services to society is ensured by open access publications and, where possible, by open data publications. But knowledge exchange also takes place at the numerous research conferences we host ourselves as well as others in which our specialists participate.

We are committed to sustainability
The university is conscious of its shared responsibility for a sustainable society. We conduct research into sustainable development, share our knowledge and prepare students to shape the present and future so that subsequent generations can meet the social, economic and ecological challenges they may face.

www.zhaw.ch/en/focus-topics/zhaw-sustainable/

Our five institutes

- Chemistry and Biotechnology
- Computational Life Sciences
- Facility Management
- Food and Beverage Innovation
- Natural Resource Sciences

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Images on the left:
Impressions from the Life Sciences

Our research – Your benefit

With our high level of technical and methodological expertise, we work across wide networks and in a practical manner with state-of-the-art equipment and systems. Our goal: we want to contribute solutions to questions that make for a society which will endure into the future.

Professional project partner
We implement your project proactively with an eye on solutions and on time. We cover the entire value chain, from analysis to market entry. You benefit from our many years of experience and our extensive network. Whether you are looking for answers to a simple question or need a scientific partner for a complex project – we are happy to support you. You can also benefit from our expertise in writing project applications to funding institutions.

Modern infrastructure
Laboratories, state-of-the-art technological facilities as well as gardens and greenhouses are at our disposal. And we have been using high-performance computing (HPC) in many specialized fields for years.

In the Future of Food Campus (set to move into its new building in autumn 2023), we will unite the entire food value chain under one roof. Here we are committed to a future in which a sustainable, enjoyable and healthy diet is possible for all. In the Future of Food Campus we work in modern laboratories and pilot facilities with a high-end infrastructure on 7,800 square meters over seven floors. All will be accessible to start-ups as and when they need them and if they are available.

Interdisciplinary collaboration
Our agile teams tackle issues which are relevant both socially and economically. We support concrete projects in line with our strategic focus 'Environment, Food, Health, Society'. For example, activities related to health are bundled across organisational boundaries (e. g. Digital Health Lab).

Commitment to start-ups
The interface between academia and business is a fertile ground for business start-ups; ideas often reach market maturity via spin-offs / start-ups. We are involved locally in the founder organisation Wädenswil (grow). With the strategic initiative ZHAW Entrepreneurship and the 'Innovation to Business' (I2B) and 'Entrepreneurship@zhaw' programs, the university offers a point of contact and advice for employees and students interested in starting a business.

News
The magazine 'TRANSFER' gives you the latest news about our research and our range of educational programmes and courses.

www.zhaw.ch/en/lsfm/research/projects-and-publications/transfer/

Explore our projects
Our project database provides an insight into specific research projects.

www.zhaw.ch/en/lsfm/research/projects-and-publications/projects/

Read our publications
Publications from our researchers can be found on our publication database.

www.zhaw.ch/en/lsfm/research/projects-and-publications/

Research & development revenues

2021	23.4 million
2020	21.7 million
2019	23.8 million
2018	21.9 million
2017	18.3 million

Excluding contributions from the Canton of Zurich

Collaboration

If you are planning to collaborate, your first point of contact is the Technology Transfer Office at the School of Life Sciences and Facility Management (see contact details at the bottom of the page) or, depending on the topic, directly at the relevant institute (see pages 6 to 16). We will then jointly define the research topic and set out the form of the project. Legal certainty is important for the parties involved in all forms of collaboration. That is why we conclude contracts in which we clearly define the project content, its timespan and the use of the results for commercialization, research and teaching.

These contracts can take different forms, depending on the project's goal, duration and budget:

Service

Expert opinions, measurements and analyses, carried out by our experts using tried and tested methods.

Student project

Simple research or development assignments in the form of a bachelor's or master's thesis, carried out by our students under qualified supervision.

R&D support

Complex or interdisciplinary research support for the development of methods and processes to solve practical problems – implemented by our specialists.

R&D project and collaboration

Research and development projects with external partners, conducted as long-term collaborations, often supported by public funding.

Applied and basic research

Development of the groundwork for applied research projects, often in cooperation with network partners, supported by foundations, federal offices and national and international funding agencies or research networks.

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“With our motto ‘life-changing sciences’, we make a contribution to the knowledge landscape.”

Sensor development – Learning by understanding the biotechnological requirements.

Institute of
Chemistry and Biotechnology

At the Institute of Chemistry and Biotechnology (ICBT), we work at the interface of chemistry, biology and technology, and provide answers to the challenges of our time, such as climate change, the scarcity of raw materials and good health care.

We see ourselves as a driver of innovation in the pharmaceutical, biotech, chemical and environmental sectors. Our institute combines many years of experience and professional expertise to a depth and extent that is unparalleled in Switzerland. We work across the entire spectrum, from molecules and organisms to sustainable production processes to technical scale. We work on the following focal points across a number of specialist centers.

Main areas of focus

Detection and Diagnostics

We apply instrumental-analytical and bioanalytical methods and technologies and develop them further. We use these in the environmental and food sectors, as well as online for process monitoring in the life sciences. By using new methods in laboratory diagnostics, we contribute to safe and efficient healthcare.

Pharma Innovation

We develop novel therapeutics based on small molecules, peptides, recombinant proteins and cells. We cover the entire workflow from drug discovery and pharmacology to galenics, and from cloning to formulation. We are developing new methods for producing tissue models to test active ingredients, diagnose diseases and to discover next-generation therapies.

Smart Materials

We create nanostructured and functional materials with specific properties and apply these in various areas of the life sciences, from filtration to tissue cultures.

Sustainable Solutions

We take a holistic approach to designing and optimizing biotechnological, biocatalytic and chemical production processes, facilities and processes, i. e. taking into account material cycles as well as ecological and economic factors. We apply these to products from the pharmaceutical and chemical industries, integrating automation and digitalization.

www.zhaw.ch/en/lsfm/institutes-centres/icbt/

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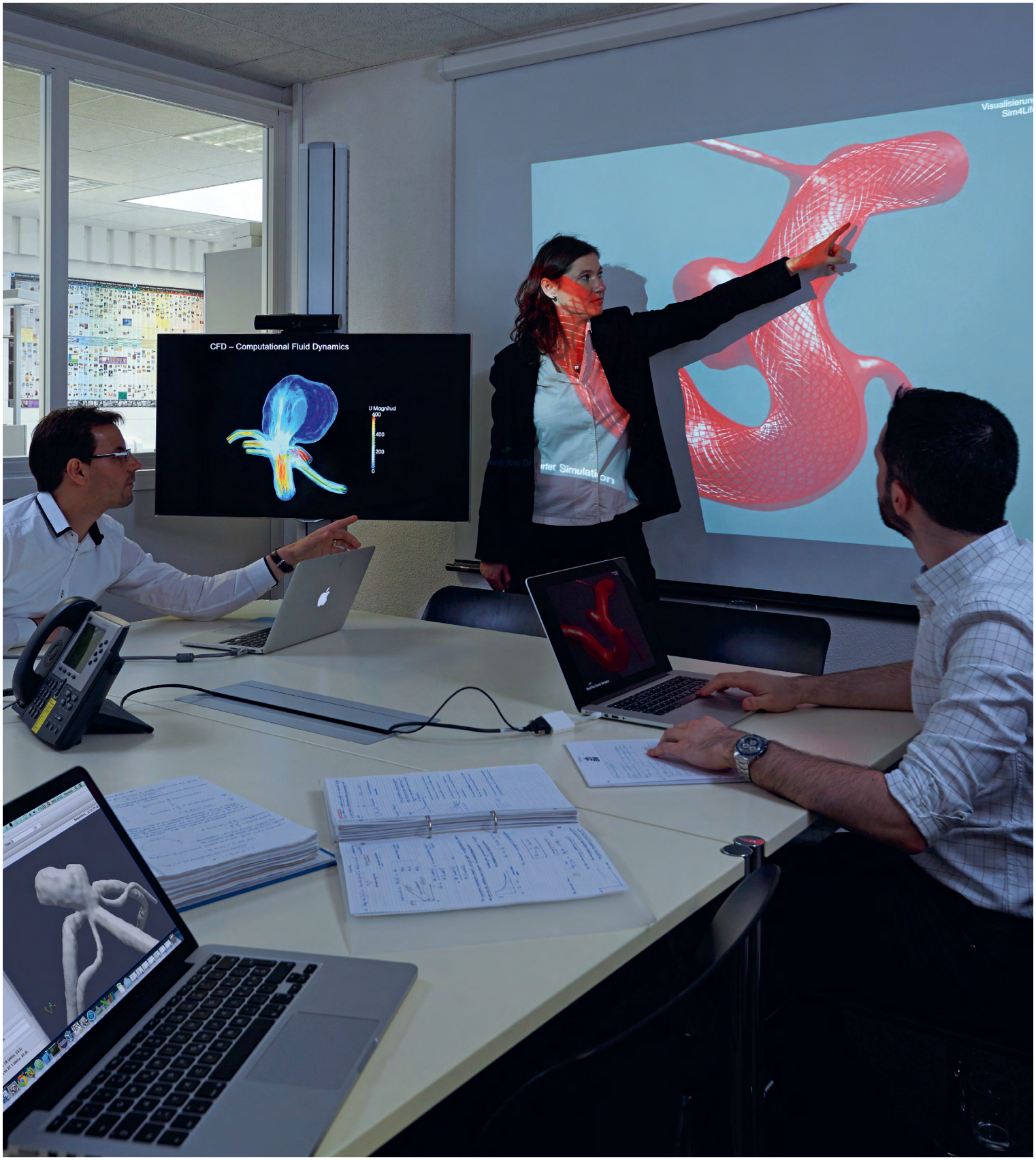
“Computational Life Science is our passion and forms the basis of our commitment to many aspects of life.”

In the area of computational health, a team of scientists is developing realistic simulations of blood flow in cerebral arteries for improved treatment planning.



Institute of **Computational Life Sciences**

Our mission at the Institute of Computational Life Sciences (ICLS) is to lead the way in applying the latest digital technologies and methods in the life sciences. We combine applied basic research with practical applications, in both business and society.

Our expertise in data science and computation and our understanding of the life sciences form the foundations of what we do. With our four focus areas – Bioinformatics, Cognitive Computing in Life Sciences, Computational Health and Digital Labs & Production – we have positioned ourselves as a center of excellence with a broad yet also specialized portfolio in the field of Computational Life Sciences.

Main areas of focus

Bioinformatics

We focus on the theoretical and computational aspects of the modelling of genome evolution and adaptive change. Our goal is to transform applied basic research and new methods into real applications. We focus on computational genomics, biomedical string analysis and applied mathematical biology.

Cognitive Computing for Life Sciences

We concentrate on developing and using computer-aided methods, models and systems that seek to mimic how natural systems learn. Our solutions support demanding human activities and decision-making processes. Our research focusses on applications in bio-inspired methods and neuromorphic computing, autonomous systems and reinforcement learning, predictive analytics, computational environment and sustainability.

Computational Health

We deal with fundamental questions and applications from medicine and biology by using computer-aided, data-driven and mechanistic modelling. We process data from medical imaging, biosensors, wearables and the clinical context in order to extract clinically relevant digital biomarkers. Machine learning for image and signal analysis, graphical networks, parameter estimation for differential equation systems and physiological simulation are all important instruments we use. We create tools and solutions in the field of medical diagnostics, disease understanding, patient-centered medicine and digital health.

Digital Labs & Production

We are working on the digitalization and virtualization of processes, laboratories and production facilities. This includes the digital networking of devices, processes and people as well as the modelling and simulation of physical systems and infrastructures. Our research focuses on simulation and optimization, data management and visualization as well as edge computing & interfaces.

www.zhaw.ch/en/lsfm/institutes-centres/icls/

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“We are committed to sustainable development and the management of healthy living and working environments.”

Mixed reality as agile visualizations and communication for construction and operational processes in real estate and facility management.

Institute of **Facility Management**

At the Institute of Facility Management (IFM), we are committed to sustainable real estate, intelligent building systems, healthy workplaces and innovative services.

We make successful real estate and facility management possible. Our specialists design sustainable infrastructures and processes and are committed to innovation, while always keeping the users in mind. In doing so, we support the core activities of businesses and public administrations, in ways that take economic, environmental and social factors into account. We are also active in research in the area of increasing digitalization with a focus on real-world practical needs.

Main areas of focus

Digital FM

We work on developing, adaptating and implementing digital technologies and methods in real estate management. These include, for example, virtual design, construction and operation with the corresponding technologies. Our guiding principle in all of this is that 'digital tools and methods are developed, adapted and implemented to increase the performance and quality of assets and processes'.

FM in Healthcare

We research and work on topics from the fields of hospitality and service management. Our FM in Healthcare research focus is all about stakeholder-centered management of non-medical support services in healthcare organizations. We work together with our partners in industry to analyze problems, develop practical approaches and support their implementation. Our customers and partners include businesses and institutions of all sizes.

Sustainability in FM

We create solutions for owners, users and operators to help organizations achieve their sustainability goals. Thus, with the help of adaptive re-use models, the service life of assets can be extended. Our partners benefit from our many years of experience and an excellent network, such as the Swiss Society for Sustainable Real Estate (SGNI).

Workplace management

We investigate the design and management of working environments with an eye on integrating spatial, human and organizational factors. We seek to bring what makes economic and ecological sense into dialogue with what is desirable at an individual level, such as studying the effects of the working environment on the health, performance and satisfaction of employees.

www.zhaw.ch/en/lsfm/institutes-centres/ifm/

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“For us, the Power of Foodtec means thinking holistically and acting with focus.”

A new process for the production of aroma-intensive and less bitter chocolates that reflect origin and variety.

Institute of
Food and Beverage Innovation

At the Institute of Food and Beverage Innovation (ILGI), we devote ourselves to how food is made and are committed to enjoyable, healthy, safe and sustainable food. Our focus is on the entire agro-food sector and the design of the food of the future. The 'Future of Food' campus, which we will move into in 2023, will unite the entire value chain under one roof, giving us the opportunity to promote food and nutrition in teaching, research, continuing education and service in new laboratories, high-end technical facilities and classrooms. This is all because food is our passion – from food safety to packaging, to the enjoyable and healthy food of tomorrow.

Sustainability is at the heart of what we do. We want to encourage transformation of both food production and nutritional behavior, and are working towards a system that is sustainable and regenerative.

Main areas of focus

Food composition and process design

We work out which ingredients determine the quality of food and research the occurrence, effect, significance and composition of these substances for the food of the future. Our work combines sensor technology and flavor and ingredient analysis, enabling us to develop technological processes for use in the production and preservation of food.

Food production and packaging

We develop innovative technologies for producing high-quality, safe and sustainable products from new raw materials as well as from by-product streams. To this end, we combine our proven expertise in food technology and packaging with close interdisciplinary collaboration with partners from science and industry.

Food safety and quality management

We research the safety of food, developing new starter and protective cultures, detecting pathogenic bacteria and using bacteriophages to do so. We carry out challenge tests, develop self-monitoring and HACCP concepts and offer training in food law and quality management – either at our institute or in your business.

We also work in the following areas:

- Food Fermentation & Biotransformation: Analysis of value-determining ingredients
- Regenerative Food Processing: Development of innovative technologies for production and preservation
- Sustainable Food Packaging: Research on sustainable packaging materials and processes

www.zhaw.ch/en/lsfm/institutes-centres/ilgi/

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“We research answers to global challenges at the local level and inspire the sustainable use of natural resources.”

We research answers to global challenges at the local level
and inspire the sustainable use of natural resources.

Institute of
Natural Resource Sciences

The Institute for Natural Resource Sciences (IUNR) is committed to the sustainable use of natural resources and the promotion of biodiversity. We use our dedication to shape urban and rural areas as valuable habitats for people, animals and plants, while at the same time preserving them as locations where goods can be produced.

Our research focuses on topics on the interfaces between society, the environment and technology. Our goal is to address socially relevant issues and enable sustainable transformation with innovative approaches and practically oriented solutions.

Main areas of focus

Agroecology and Food Systems
We promote networked thinking throughout the entire food system, from production to consumption. We pinpoint the synergies between production and ecosystem services and aim to close nutrient cycles and increase diversity and resilience in food systems.

Biodiversity and Ecosystems
We research how ecosystems function, work to preserve and promote a high level of biodiversity and develop the practical tools to do so. We also monitor the efficacy and efficiency of the methods used, both theoretically and in practice.

Climate protection and adaptation
We assess the effects of climate change and develop ways to adapt to climate change in agriculture and in cities. This is how, for example, we develop green open spaces in cities and agglomerations and we demonstrate the mitigation potential of land use changes and adapted food consumption.

Circulatory and energy systems
We develop circulatory and energy systems that are both ecologically and economically sensible as well as practical, for example in the field of soil-independent food production. This can save energy, water or nutrients, prevent their loss and even tap into new resources.

Sustainability transformation
We identify relevant areas of action and develop the scientific basis for socially viable, feasible transformation processes. For social change and a sustainable future, aspects of food production, resource economics, regional development and environmental education must be considered across disciplines.

www.zhaw.ch/en/lsfm/institutes-centres/iunr/

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Partners in science and industry

Across Switzerland and beyond, we maintain a lively exchange and work closely with other universities of applied sciences, universities and governmental bodies. Our researchers take part in numerous national and international professional associations.

Practice-oriented and tailor-made to the needs of our partners in industry, we transform requests into realities. The expertise and experience of our specialists provide a solid basis for developing concrete solutions for our clients.

Some of our partners from industry and science:

livit

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Innosuisse – Schweizerische Agentur für Innovationsförderung

FiBL

lifescience zurich
business network

73 NFP **Nachhaltige Wirtschaft**
Nationales Forschungsprogramm

CAUSE WE CARE
myclimate

u b

b
UNIVERSITÄT
BERN

techno therm
energie·technik·umwelt

Biotta®
Der Schweizer Bio-Pionier

planted.™

Schweizerischer
Nationalfonds

patiswiss
Inspired by Quality

Roche

CDR-Life

Universität St.Gallen
Institut für Technologiemanagement

Advisory boards

Complete list of advisory boards: www.zhaw.ch/en/lsfm/about-us/advisory-commitee/

We maintain an intensive exchange with project partners and through our research networks. In addition, our institutes are assisted by numerous experts from industry and professional associations in the form of advisory boards. In this way, we maintain both practical relevance and quality in research and education.

“Research questions, such as how we feed ourselves sustainably and healthily in the future, cannot be answered with simple recipes. Research only does justice to the complexity of the topic if experts with different competencies and from different disciplines work together. Research at the IUNR follows precisely this path of interdisciplinarity and combines complementary expertise under one roof.”

Dr. Mathias Stolze
Department of Socioeconomics, Research Institute of Organic Agriculture FiBL

“For me, research and sustainability belong together. I am therefore delighted that sustainability and its transparency have such a strong focus in the ILGI.”

Nadja Nabholz
Owner, Nadja Nabholz Consulting

“As a pacesetter for leading applied research and development, the ICBT contributes significantly to the competitiveness of Switzerland as a life sciences hub.”

Dr. André T. Dahinden

“Practical relevance in education is enormously important in today’s very theoretical world. Methodological competence, theoretical models, automation and digitalization are simply buzzwords if the teaching does not also impart competence in implementation. As a member of an advisory board, I can contribute insights into the needs of industry so that teaching and practice remain closely linked.”

Wolfgang Stiebellehner
Head of Property Management / Executive Board Livit AG

“Optimal use of data and digitalization is a decisive driver of innovation in the life sciences today and in the future. Collaboration in education, training and applied research between Roche and university partners such as the ZHAW is key to ensuring a sustainable high level of innovation intensity in the face of new requirements, methods and trends.”

Thomas Zaugg
Head of Open Innovation & External Networks, Roche Diagnostics, Rotkreuz

The ZHAW at a glance

Eight specialist schools are united under the umbrella of the Zurich University of Applied Sciences (ZHAW). At its locations in Wädenswil, Winterthur and Zurich, its experts conduct application-oriented research in over 60 institutes, centers and specialist centers. Together, the ZHAW carries out several hundred research and service projects each year and organizes specialist conferences, symposia and workshops.

The sustainability and future viability of society is a central concern of the ZHAW. Strategic goals are pursued via interdepartmental strategic initiatives and focus areas.

The ZHAW's primary areas of focus: www.zhaw.ch/en/focus-topics/

Energy

ZHAW researchers are involved in work to restructure both national and international energy systems. They work closely with public authorities, industry and NGOs. Our research sets itself apart through linking scientific quality with concrete application.

Digital transformation

The ZHAW deals with digital transformation and is working on innovative projects in education and research: the reduction of food waste using artificial intelligence and a digital campus with free continuing education are just two of many examples.

Sustainability

The ZHAW conducts research into sustainable development and shares its knowledge arising from this research. We prepare students to shape the present and the future so that subsequent generations can cope with social, economic and ecological challenges.

Entrepreneurship

As an Entrepreneurial University*, we are the breeding ground for new and different solutions for the future of our economy and society. We attract people and partners who want to make a difference, who help to shape the future courageously and just as daringly as responsibly.

*Strategic initiative being developed

Achieving social inclusion

The ZHAW addresses social inclusion with its interdisciplinary research approach. Insights from the applied social sciences and humanities as well as from cultural, economic and environmental research come together in the projects we support.

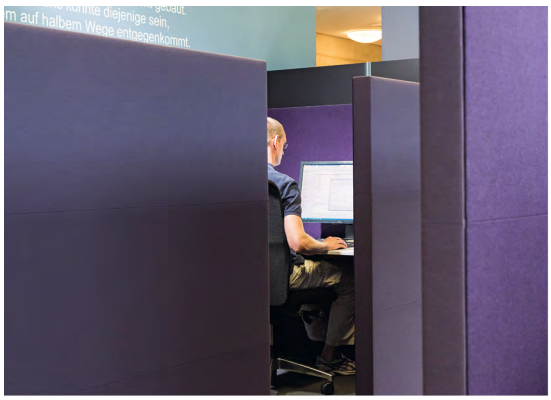
Lifelong learning

The ZHAW creates educational opportunities that satisfy market demand and meet social and individual interests. The Lifelong Learning Strategy serves as a guiding principle for the ZHAW in its process of continuous development.

R&D Online: News about ZHAW research and development in the blog: **blog.zhaw.ch/forschungssupport**

ZHAW Newsletter R&D: www.zhaw.ch/de/forschung/kontakte/newsletter/

Images on the right: Views of Facility Management.



Studying and researching in Wädenswil: practically oriented, creative, passionate and reflective

The ZHAW is one of the leading Swiss universities of applied sciences in Switzerland. The School of Life Sciences and Facility Management currently has almost 1,800 students and employs more than 600 people. Its educational program includes Bachelor's and Master's degrees as well as a wide range of further education courses.

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, applied simulation/computational life sciences and facility management make this contribution through their research, development and services.

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

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www.zhaw.ch/en/lsfm/research/

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wädenswil

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