ETH BOARD

EXCELLENCE IN TEACHING, RESEARCH, INNOVATION

THE ETH DOMAIN
IN BRIEF

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ETH zürich

EPFL

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Empa Materials Science and Technology

eawag aquatic research

VISION

Through excellence in research, teaching, and knowledge and technology transfer, the ETH Domain is driving innovation, strengthening the long-term competitiveness of Switzerland and contributing to the development of society. It sets an example by assuming its share of responsibility worldwide for the management of urgent social challenges, the enhancement of quality of life, and the long-term maintenance of our natural resources.

› Ruben Wyttenbach

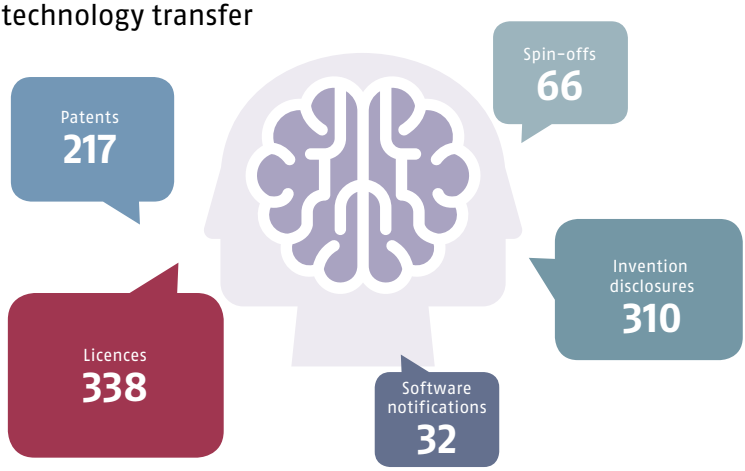
Professor Michael O. Hengartner
President of the ETH Board

"Science thrives on collaboration and the exchange of ideas. Switzerland's openness and internationality play a key role in making our country so innovative and competitive and our institutions world-leading."

Michael O. Hengartner

ETH DOMAIN IN FIGURES

Knowledge & technology transfer



Staff and students

23,472
Staff
(incl. professors, doctoral students, apprentices)

887
Professors

35,235
Students
Doctoral students

Figures correct as at 31 December 2020;
number of employees in employment contracts

Current facts & figures

International university rankings

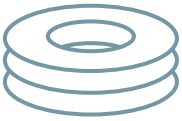
* 2019

Research facilities of national and international importance

Swiss National Supercomputing Centre CSCS

Swiss Plasma Center SPC with tokamak reactor

Modular research and innovation building NEST



Swiss Light Source SLS

X-ray free-electron laser SwissFEL

INTERNATIONAL EXCELLENCE

Teaching and research as well as knowledge and technology transfer at the very highest level worldwide: this is the mandate given by the Federal Council to the six institutions of the ETH Domain.

The ETH Domain comprises the two Swiss Federal Institutes of Technology, ETH Zurich and EPFL, as well as the four research institutes the Paul Scherrer Institute (PSI), WSL, Empa and Eawag. The ETH Board is the strategic management and supervisory body of the ETH Domain.

Excellent education and training
The institutions of the ETH Domain are tasked with educating scientists and experts in the engineering sciences, natural sciences, architecture, mathematics and related areas, and ensuring lifelong continuous training. In doing so, they include the humanities and social sciences as well as economics and management sciences. The institutions of the ETH Domain play a significant role in ensuring that science, business and public administration have sufficient experts and leaders.

Top-level research
Thanks to top-level basic research, complemented by application-oriented research, technology development and innovation, they help expand scientific knowledge, strengthen the Swiss economy, and tackle

current and future social challenges in Switzerland and around the world.

Effective knowledge and technology transfer
They also provide technical and scientific services and fulfil a range of responsibilities conferred on the ETH Domain by the Swiss government. Through effective knowledge and technology transfer, they play a role in ensuring that their findings are put to use by society and business and they educate a broader public on issues and results from science and research.

International collaboration
Internationality is a key aspect of the science system. Top-level research and teaching thrive on the unhindered exchange of ideas and people. The institutions of the ETH Domain are part of strong international networks and attract students and researchers from around the world.

The success of the institutions of the ETH Domain is based on Switzerland's political stability, the international openness of the science system, stable funding and autonomy.

The ETH Domain – excellence in teaching, research and innovation

FORWARD-LOOKING RESEARCH

The ETH Domain places particular emphasis on digitalisation, climate change, and the environment, energy and sustainability. In selecting these areas, the ETH Domain is investing in socially relevant and future-oriented research fields, and strengthening its international competitiveness.

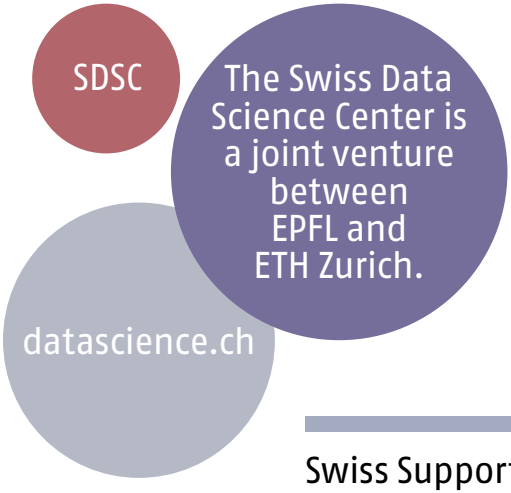
Additional professorships have been created in information technology and computer science, for example, and – in partnership with the four research institutes – there has been a concentration on strengthening the fields of personalised health, advanced manufacturing and data sciences.

Special importance is attached to collaborating with partners from industry and science. This allows the ETH Domain to align its research more specifically to urgent social issues such as the impact of climate change on the environment and society or the sustainable use of natural resources.

The area of energy, and by extension the ETH Domain's contribution to the implementation of the Swiss government's Energy Strategy 2050, continue to be of high importance.

Investigating climate change and natural hazards in the Alpine region

WSL, the Swiss Federal Institute for Forest, Snow and Landscape Research, has teamed up with the Canton of Grisons to found the new Climate Change, Extremes, and Natural Hazards in Alpine Regions Research Center (CERC) in Davos. Since January 2021 it has been researching socially and economically relevant questions relating to climate change, extreme events and hazards in the mountain region.
cerc.slf.ch



Swiss Support Center for Cybersecurity

The Swiss Support Center for Cybersecurity (SSCC) is a joint initiative of EPFL and ETH Zurich. The SSCC supports the government, society and industry through consultancy, training and knowledge transfer in the critical areas of cybersecurity, cybersecurity policy, information security and digital trust.
sscc.ethz.ch

Participation in international research infrastructures

The institutions of the ETH Domain also cooperate on major research infrastructures and important projects at both European and international level. ETH Zurich is involved in the EPOS research infrastructure (European Plate Observing System). 2020 saw the launch of EBRAINS – a state-of-the-art infrastructure that strengthens Europe's position in the field of multidisciplinary neuroscience research and is designed to make the latest scientific insights in brain research accessible to innovators, industry and medicine. EPFL and ETH Zurich, along with other research institutions on the Swiss side, also contribute to the "Swiss-Norwegian Beamline" at the European Synchrotron Radiation Facility (ESRF) in Grenoble. From 2021 EPFL has taken over coordination of the Swiss involvement. The PSI is involved in the realisation of the European Spallation Source (ESS) in Lund, Sweden, specifically in installing the ESTIA reflectometer, which has been in operation since July 2020.

State-of-the-art production processes strengthen business location

The ETH Domain works with industrial partners to develop cutting-edge production processes. The ETH Domain is therefore highly committed to the development and implementation of a national network of technology transfer centres focusing on advanced manufacturing. These close the gap between lab-based research and industrial application.
am-ttc.ch

Advancing medicine

Natural sciences and engineering sciences have become indispensable in the field of health research. The institutions of the ETH Domain work closely with hospitals on the research focus "Personalised Health and Related Technologies". The aim is to make treatments more effective and cost-efficient through patient-specific approaches. Improved healing processes, higher quality of life, independence in old age and new ways of tackling diseases that are difficult to treat create tangible benefits for individuals and society and take the pressure off our healthcare system.
sfa-phrt.ch

ETH AI Center

As ETH Zurich's central hub for artificial intelligence, the ETH AI Center brings together researchers from all departments who are occupied with AI principles, applications and implications.
ai.ethz.ch

EQUAL OPPORTUNITIES AND DIVERSITY

Gender Strategy 2021–2024

The ETH Domain's Gender Strategy 2021–2024 aims to ensure a balanced gender ratio and equal opportunities for women and men. It focuses on five key areas, including awareness of gender stereotyping and gender-related prejudices, respectful behaviour and communication, career development for women at all levels and creating the right conditions for a good life/Domain balance.

The ETH Domain's "Equal Opportunities" working group facilitates communication and promotes collaboration between the ETH Domain's institutions, while the ETH Board, in keeping with its role as a strategic management and supervisory body, monitors the gender ratio and equal opportunities for women and men throughout the ETH Domain.
ethrat.ch/en/genderstrategy2021_2024

Promoting diversity and respect

Regular discussions with LGBTQIA+ groups and with the office for equal opportunities and diversity (EQUAL) take place within the ETH Domain. The advisory and mediation centre "Respect" was set up at the beginning of 2019 and is responsible for issues such as bullying, (sexual) harassment and discrimination. In addition, a newly created, independent, external advisory body supports consistent implementation of the "Respect" code of conduct.

ETH ZURICH

www.ethz.ch

ETH Zurich is one of the leading technical and scientific universities. It has a reputation for excellent teaching, pioneering fundamental research and the direct transfer of new findings into practical applications. ETH Zurich provides an inspiring environment for researchers and a comprehensive education for students.

Established in 1855, ETH Zurich now has around 23,500 students and doctoral students from over 120 countries. More than 500 professors are currently engaged in teaching and research in the fields of natural science, engineering, architecture, mathematics, system-oriented sciences and in management studies and the social sciences.

ETH Zurich is regularly rated as one of the world's best universities in international rankings. It is ranked 6th in the QS World ranking and 14th in the THE World ranking. In Europe ETH Zurich ranks even higher, at 2nd and 4th (QS Europe ranking and THE Europe ranking). Twenty-one Nobel laureates have studied, taught or done their research at ETH Zurich. The innovations of the university flow into the most forward-looking sectors, from computer science to micro- and nanotechnology, to high-tech medical equipment. A total of around 500 spin-off companies since 1996, up to 100 patent applications each year, and around 1,500 collaborations with businesses worldwide and in Switzerland all go to show how successful ETH Zurich is in imparting its knowledge to industry and society.

ETH Zurich – where the future begins

ETH Zurich contributes to the sustainable resolution of global challenges. It is focused on data science, specialising in cybersecurity; health, with a new Bachelor's degree in medicine (since 2017); sustainability, with topics such as energy supply or world food systems; as well as innovative manufacturing technologies.

23,500	students and doctoral students[1]
12,800	employees[1/2]

[1] Key figures rounded
[2] Employment contracts including doctoral students

View the report here

Artificial intelligence and machine learning
"At the new ETH AI Center, founded in 2020, we are training a new generation of AI researchers, who are investigating interdisciplinary AI issues."

Professor Andreas Krause (right), Chair of the ETH AI Center, with Julia Vogt, one of the new professors, who is building a bridge between data-driven computer science and applied medicine.

Supramolecular nanomaterials and interfaces Professor Francesco Stellacci, head of the EPFL laboratory SuNMIL, channels his knowledge of supramolecular nanomaterials and interfaces into virus research. One of Stellacci's drugs places the virus under increasing pressure until it bursts like a balloon. Clinical trials are imminent.

EPFL

www.epfl.ch

EPFL is a young, world-leading technical university, which is committed to three important tasks: teaching, research and innovation. Around 12,000 students and doctoral students from 120 countries and more than 370 laboratories conduct leading research in areas such as renewable energy, medical technology, neurotechnologies, materials science and information technology at the campus in Lausanne, on the banks of Lake Geneva.

EPFL is made up of several teaching, research and innovation centres of national and international importance. The high quality of its fundamental and applied research is demonstrated particularly by the considerable quantity of ERC grants obtained by EPFL researchers. And also by its ambitious scientific projects and sustainable innovations such as transparent-dye solar cells, the solar-powered aircraft Solar Impulse or the ultra-fast yacht Hydroptère. EPFL is also exploring new routes in education as a pioneer in the provision of MOOCs, which have been accessed by around 2 million students to date. It has been running the new Master's degree course in Data Science since September 2017 and is also doing ground-breaking work in terms of "computational thinking" with a foundation course for all first-year students.

EPFL has been growing continuously since it was founded in 1969. Various rankings underline the progress made and the high standards achieved. Since 2010, EPFL has risen 18 places in the QS World ranking and more than 10 places in the THE World ranking.

EPFL – one university, five campuses

Another area of expertise for EPFL is partnerships and projects that ensure its scientific and social impact. The EPFL Innovation Park is one of the first innovation parks in Switzerland and is home to around 200 start-ups and research centres run by noted companies. In 2020, 25 spin-offs were founded at EPFL.

12,000	students and doctoral students[1]
6,300	employees[1/2]

[1] Key figures rounded
[2] Employment contracts including doctoral students

View the report here

PAUL SCHERRER INSTITUTE

www.psi.ch

The Paul Scherrer Institute (PSI) is the largest research centre for natural sciences and engineering in Switzerland. It carries out top-level research in the fields of matter and materials, energy and the environment, as well as humanity and health. By carrying out fundamental and applied research, the PSI has been working on sustainable solutions for central questions arising within society, the economy and science since 1988.

The PSI operates large-scale research installations that are unique in Switzerland – and in some cases in the world – such as the Swiss Spallation Neutron Source SINQ, the Swiss Light Source SLS, the Swiss Muon Source SμS and the X-ray free-electron laser SwissFEL. Each year, over 2,500 researchers from Switzerland and all over the world come to perform experiments at the PSI. In addition to its research, the PSI operates the only installation in Switzerland for the treatment of specific types of cancer using protons.

Of the 2,100 or so staff members of the PSI, over 780 are scientists. The education of young people is a central concern of the PSI: around one quarter of the staff are postdocs, doctoral students or trainees.

PSI – the largest research centre for natural sciences and engineering in Switzerland

Schoolchildren discover a fascination with natural sciences in the iLab school laboratory, and professionals receive initial and further training at the PSI training centre. The psi forum visitor centre welcomes over 10,000 visitors a year, giving them an insight into research at the PSI.

2,100	employees from around 60 nations [1/2]
2,500	researchers [1] make use of the large-scale research facilities every year

[1] Key figures rounded
[2] Employment contracts including doctoral students

View the report here

SLS 2.0 upgrade
"Through research at PSI, we now have a better understanding of electron beam dynamics. That is helping us with the SLS 2.0 upgrade."

Professor Mike Seidel (left) and Hans-Heinrich Braun

In the storage ring of the new SLS 2.0, the brilliance of the synchrotron light produced will be greatly improved by a new, finely graduated magnet arrangement.

Energy Change Impact research programme
WSL programme coordinator Astrid Björnsen heads the joint WSL/Eawag research programme "Energy Change Impact". It provides precise data on the potential and availability of renewable energies for Switzerland.

WSL

www.wsl.ch | www.slf.ch

WSL investigates changes to the terrestrial environment and the use and protection of natural habitats and cultural landscapes. It monitors the condition and development of forests, landscapes, biodiversity, natural hazards, and of snow and ice, and develops sustainable solutions for socially relevant problems – in collaboration with its partners from academia and society.

Almost 60 percent of the 560 or so employees in Birmensdorf, Davos, Lausanne, Cadenazzo and Sion are scientists, including almost 70 doctoral students and 50 postdocs. The workforce also includes about 170 technical staff and 60 administrative staff plus 14 trainees and interns. About a quarter of the employees work at the WSL Institute for Snow and Avalanche Research SLF in Davos.

Disciplinary research is the cornerstone of WSL. In order to answer urgent questions facing society, the WSL portfolio also includes fixed-term, interdisciplinary research programmes. While one such programme – on the consequences of the energy revolution for the environment – was recently completed, another on extremes – set to become the "new normal" in the near future – and one on the impact of climate change on natural disasters in the Alpine region are in preparation.

WSL – excellence in terrestrial environment research

560	employees from around 36 nations[1/2]
885	publications, around a quarter of them practice-oriented

[1] Key figures rounded
[2] Employment contracts including doctoral students

View the report here

EMPA

www.empa.ch

Empa is the interdisciplinary research institute of the ETH Domain for materials science and technology. The researchers at Empa find solutions for industry and society in the fields of nanoscale materials, energy technologies, sustainable building technologies and new types of production technologies, plus bio- and medical technologies.

Working with industry partners and via spin-offs, Empa transforms its research results into marketable innovations, helping to make the Swiss economy more innovative and more competitive. Moreover, it creates a scientific basis for the sustainable development of society.

Empa provides authorities and other public-sector bodies with data resources for their policy-making decisions, and it carries out studies on behalf of federal government agencies. There are currently about 1,000 staff including 38 professors, as well as over 220 doctoral students and 40 apprentices working at Empa. In addition, there are over 140 Bachelor's and Master's students and interns, as well as numerous projects with researchers from industry and around 260 projects funded by the Swiss National Science Foundation (SNSF), Innosuisse and the EU Framework Programmes.

Empa – materials and technologies for a sustainable future

1,000	employees from around 50 nations[1/2]
600	current cooperation agreements[1]

[1] Key figures rounded
[2] Employment contracts including doctoral students

View the report here

Urban Energy Systems
In urban areas, it is vital to transition energy production and mobility to sustainable systems. This requires complex energy models, which scientist Kristina Orehounig is researching in her Urban Energy Systems department at Empa.

Biodiversity research in an interdisciplinary environment
"At Eawag, biodiversity research covers all aquatic ecosystems and a whole range of organism groups. This means that even complex cascade effects can be studied."

Professor Florian Altermatt, co-head of the "Blue-Green Biodiversity" research initiative

EAWAG

www.eawag.ch

Eawag is one of the world's leading water research institutes. Its success is based on the combination of research, teaching, training and consulting that it has provided for over 80 years. The combination of natural sciences, engineering and social sciences enables comprehensive research of water in relatively untouched rivers and lakes, right through to fully automated wastewater management systems.

The research activities are focused on how to strike a balance between humanity's use of water and the preservation of robust aquatic ecosystems. Thirty-four professors, almost 200 scientists and more than 150 doctoral students meet at Eawag in a unique research environment to investigate questions that lead to new scientific findings and solutions for the fundamental challenges facing society.

Its interdisciplinary nature and knowledge transfer with authorities and interest groups from business and society play an important role in this. The 5,200-plus teaching hours at Swiss universities and the supervision of over 160 Bachelor's and Master's degree theses every year are contributing towards the education of young specialists in the Swiss water sector.

Eawag – the world's leading water research institute

Teaching at Eawag goes beyond the ETH Domain and is based on research conducted in-house. It covers specific areas of specialisation and considers various uses of water and their impact on ecosystems. In addition to academic teaching, Eawag is committed to the continuing education of practitioners and vocational training.

520	employees from around 40 nations[1/2]
38	joint projects with universities of applied sciences

[1] Key figures rounded
[2] Employment contracts including doctoral students

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SCIENA Swiss Science Today

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