

# Strategy and Development Plan 2021–2024



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ETH Zurich's Strategy and Development Plan provides a roadmap for the next four years: it is a tool to help the ETH community and the institution as a whole chart its course when it comes to education, research, and knowledge and technology transfer. Just like science itself, this process is not linear, but rather more akin to a constant search for solutions and a willingness to critically examine what has already been achieved.

This means that our roadmap must remain flexible to adapt quickly to changing circumstances, to let go of what has become obsolete, and to seize new opportunities. The coronavirus pandemic has shown the world just how quickly the best laid plans and intentions can turn to dust. The crisis is not an argument against far-sighted planning, but it has shown us that we need to put even more emphasis on scientific expertise.

Expanding this expertise and passing it on to the next generation is, after all, the *raison d'être* of our university. The Strategy and Development Plan ties into the strategic priorities of the previous four-year period and sets out four strategic action areas: data and information, health and medicine, materials and manufacturing, and responsibility and sustainability.

At the end of the day, it is people who drive ETH Zurich forward and make it so successful. This is why living out our values is so crucial: values like responsibility, openness, diversity, team spirit and excellence should be guiding our actions. In order to live up to these principles, we still have to make improvements in some areas: for instance, when it comes to raising female representation throughout the university, or transferring the spirit of solidarity shown during the corona crisis back into the "new normal" state of affairs.

ETH has a distinct culture of quality. By culture of quality, we primarily mean a culture of learning that adapts to the ever-changing demands and expectations of society, students, professors and employees. By laying out ETH Zurich's qualitative goals and the measures it will take to achieve them, this Strategy and Development Plan is also part of the university's quality strategy.

This Strategy and Development Plan outlines ETH's mission of contributing to prosperity and well-being in Switzerland and

advocating for the preservation of the country's vital resources. The scale and complexity of the global challenges we face require an interdisciplinary approach and the will to cooperate with stakeholders from every part of society. We have recalibrated our compass and are ready to take the next steps. The next four years offer many opportunities for ETH to develop as an educational institution and to raise its profile on the national and international stage.

A handwritten signature in black ink, appearing to read "J. Mesot". The signature is written in a cursive style with a prominent initial "J" and a trailing flourish.



# Charter





Paving the way in a complex world.

By educating the next generation of critical and creative thinkers, we make a significant contribution to the common good and the preservation of societal well-being, natural resources and the environment. Analysing, developing solutions, making decisions and creative thinking: these are the key skills of our graduates and staff. Our research generates new knowledge and technologies for the future. Together with our partners, we find answers to the important questions of our time – and in doing so, we advance our society, strengthen the economy, and protect nature and the environment.

### Excellence

We strive for excellence in everything that we do. Our students, researchers and employees shape our university and society with the high quality of their contributions.

### Responsibility

Integrity, mutual respect, and respect for people and the environment form the foundation of our actions and reflect our freedom in research and teaching. We are tackling the great challenges of our time and use a culture of critical thinking and the constant search for sustainable solutions as our basis.

### Diversity

Our success is based on the wide array of talented people in the ETH community who creatively develop bold ideas and put solutions into practice. We see all aspects of diversity as an opportunity. Our international orientation and our intense dialogue with society and across disciplines are factors that contribute majorly to developing new research questions and teaching our students.

### Openness

We are open to new ideas, new talent and new partnerships. As part of this openness, we attach importance to internal and external transparency. Participation and involvement are important features of our decision-making process and have an identity-forming effect. Students, researchers and employees are on equal footing in this regard. We are known as a place where people can freely express opinions and engage in open debate.

### Team spirit

We solve complex issues in complementary teams that cut across disciplines and job functions. We are committed to ETH and maintain a culture of togetherness, mutual appreciation and mutual learning.



# Context

## Paving the way

ETH is characterised by its curiosity-driven approach to science, proximity to research, innovative teaching, strong partnerships and entrepreneurial spirit. Our staff and students create an inspiring environment that stimulates dialogue and puts talent development in the spotlight. ETH is exploring long-term societal and environmental developments in-depth and is strategically working towards maintaining its position as one of Europe's – and the world's – leading universities.

**Innovative teaching.** ETH's main focus areas from the previous four-year period (2017–2020) – medicine, data, sustainability and manufacturing – brought about not only numerous new research projects, but also new degree programmes. The new Bachelor's programme in Human Medicine teaches students the fundamentals of molecular biology and medical technology alongside traditional medical knowledge. EPFL (Swiss Federal Institute of Technology in Lausanne) and ETH Zurich launched a joint Master's degree programme in Cyber Security. A new Master's degree programme in Quantum Engineering, which includes a strong emphasis on project-oriented learning, allows students to implement their knowledge in a modern engineering training programme. From 2017–2020, ETH almost doubled the amount of innovative continuing education programmes on offer. One example is the new Certificate of Advanced Studies (CAS) in Advanced Materials and Processes, in which industry specialists complete a hands-on continuing education programme as part of a sabbatical at ETH.

**Successful research.** The people at a university are what drives its success. Our researchers' success rate with regard to European Research Council (ERC) grants regularly exceeds – by far – the European average in every category. The same applies to being the home institution for the Swiss National Science Foundation's (SNF) National Centres of Competence in Research (NCCRs). Our researchers regularly receive the highest international honours, such as the Fields Medal in 2018. These are just a few select examples of our exceptional achievements. ETH has also made significant investments in new platforms and technologies, thereby creating an excellent environment for researching the key issues of the future.

**Participation and innovation.** Interdisciplinary collaboration is especially successful when people work together to devise solutions that

they otherwise would not have achieved without the knowledge, methodology and experience of all partners. Open ETH (formerly known as ETH+) allows all members of the ETH community to shape the future of the university. Since 2017, this initiative has seen around CHF 130 million invested in 15 new professorships, technology platforms, and the establishment of networks and interdisciplinary centres. Knowledge and technology transfer are part of our core mission. We are seeing positive trends when it comes to technology transfer: in 2020, 34 new companies were founded as ETH spinoffs. ETH Transfer was also the first non-Anglo-Saxon institution to be honoured by the Global University Venturing Award as "Tech Transfer Unit of the Year".

## Societal developments and global challenges

In 2015, the member states of the United Nations agreed on the Sustainable Development Goals (SDGs) as part of their 2030 Agenda. All countries are called on to work together to solve the urgent problems confronting the global community and to foster sustainable development. As platforms for research, teaching and knowledge transfer, universities have a special role to play in this undertaking. ETH has accepted the challenge and takes the SDGs into consideration as part of the university's mission. Below we will look at several important societal trends and global challenges that heavily influenced the formulation of ETH's four strategic action areas.

**Digitalisation is shaping all sectors of the economy and numerous facets of our lives.** Many people fear the job losses that will occur as a result of automation – a process that is also threatening careers in the knowledge economy. On the other hand, the automation process is bringing about new opportunities that will put completely different demands on how employees need to be trained and the types of tasks they have to perform. Modern, personalised products and services based on data have the potential to fundamentally change entire sectors in short periods of time – and to bring about entirely new models of doing business. The need to find solutions to the challenges of data protection, privacy and cyber security is becoming more urgent, and calls for transparency and personal sovereignty over data are growing louder. Research and teaching will not only have to take these trends into account but also influence them, generating stimuli for innovation.

**Climate change is proceeding apace.** The growing threat to the ability of the world to sustain a growing population can only be countered through joint global action towards behavioural change and more environmentally friendly technologies. The impact of climate change – temperature increases, natural disasters, thawing permafrost, rising sea levels – will not only be felt by coastal cities. Consequences such as droughts, famines and biodiversity loss pose a threat to global food systems and food security in both poor and prosperous regions alike – developments that jeopardise peace and security. We are witnessing the development of new technologies for renewable energy production and storage and energy-efficient systems for both household and industrial use. These technologies will provide a bridge to a low-emission or emission-free future. It is only possible to achieve a sustainable resource economy – one that also takes the growth and well-being of developing and emerging economies into account – through internationally recognised cooperation in research and training that cuts across borders.

**The population is ageing.** Birth rates are low in many industrialised nations, while many people born in baby-boom years are reaching retirement age. The resulting imbalance is jeopardising the long-term stability of healthcare and social welfare systems. Meanwhile, life expectancy is increasing thanks to the progress of modern medicine. In order for people to live longer lives while remaining healthy, society is looking to the scientific community for solutions: prevention and treatment that is affordable and can be sustained across generations.

**Urbanisation is creating megacities.** All across the world, there has been an increase in mobility and migration from rural regions. The drivers are population growth, coupled with a lack of economic perspectives and the impact of climate change. Growing urbanisation requires expanding the sustainable infrastructure of new megacities in a way that considers people's needs. These areas will influence a large part of global economic growth in the future.

Society is orienting itself towards a multipolar world in which education, technology and innovation will play a central role. ETH, as part of a network with partners in education and the private sector, now has a greater chance than ever before to contribute to understanding and solving all of these challenges. We are taking developments in academia and higher education on board and working to shape them actively going forward.

## Developments in academia and higher education

ETH operates in a competitive environment and measures its performance in research and teaching against the best universities and research institutions in the world. We want to be an attractive institution of higher education for our students and an excellent employer for our staff. Certain developments are particularly relevant to the international university landscape and will have a significant impact on our strategic development in the future. We will take a closer look at these topics in the chapters “The next generations”, “Pioneering research”, “Knowledge exchange, technology transfer and promoting innovation”, and “Enabling strategies”.

**The higher education landscape around the world is in a state of flux.** Universities are engaged in a global competition for talent, research results and funding, and strive to strengthen the national economies of their home countries. Countries like China are investing considerable resources in educational and research institutions and are currently in direct competition with traditional research centres in the United States and Europe. What we consider to be universal values are weighted differently in different cultures, which leads to different interpretations of scientific ethics and different opportunities when it comes to developing and using technology. This can have implications for our competitiveness going forward.

**Increasing the transparency of the university and research landscape.** The public is turning a critical eye towards scientific findings that significantly impact the future of the environment and society. At the same time, higher education budgets are coming under political pressure. There is an increasing expectation from the general public that universities should tackle issues such as good governance and social responsibility. Good scientific practice, transparency, better scientific communication, dialogue with policymakers and society at large, and an exchange between researchers and the general public – all of these help to explain research findings and to understand their practical implications, strengthening mutual trust on both sides. Scientific achievements require this kind of intellectual engagement in order for their societal relevance to be better understood, accepted and supported.

Open access and open data are making research results accessible to the general public and are changing the established system of verifying and disseminating these findings.

Gatekeepers such as prestigious academic journals and peer review processes are being questioned, and alternative models are being discussed. However, these alternative models must preserve basic requirements for scientific publications: accuracy, replicability and reproducibility.

In the future, the value that education brings to a certain location will be assessed on a global level. Universities should develop shared concepts for overcoming the language and cultural barriers that arise when working across borders – and for turning these experiences into mutual learning opportunities.

**Technological change shapes research and teaching.** Modern technology has fundamentally changed the way we communicate. It influences how we work together, how we share data, and how we make use of media. The ability to efficiently process large amounts of data has changed processes and methodologies in many areas of research. Established methods are now complemented by the use of machine learning, and new analytical processes are making large data sets more accessible and easier to analyse. The growing digitalisation of research requires the constant development of research infrastructure.

New technology-based formats are being experimented with as education and training tools. Around the world, billions are being invested in educational technology, and the online education sector is growing. There are two main questions that arise from this state of affairs: Who is checking the information that is available, determining its accuracy, and making it available? And who is teaching the skills and methods needed to put theory into practice, to assess knowledge critically, and to advance it to the next level? These questions are relevant to all phases of learning and teaching: secondary school, higher education and continuing education. Universities that conduct pioneering research and research-based teaching have the expertise needed to stake out a clear position in this environment and to integrate modern technologies into their operations. However, personal interaction will remain an important part of education in the future, which means that a modern infrastructure with auditoriums and flexible spaces is needed.

**Tech companies are investing in basic research and competing for talent.** Four of the five US companies with the biggest market capitalisation are technology companies. China is pursuing a strategy of promoting the global reach of its tech firms. These companies are investing billions in research and development, with particular emphasis on basic research. They are now competing directly

with universities – more so than at any time over the past few decades – to recruit the best and brightest minds.

**Investing in life-long learning.** The next generations will be characterised by their pursuit of multiple careers – sometimes simultaneously. The type and amount of available knowledge is changing ever more rapidly due to digitalisation and improved algorithms. This means that life-long learning – in particular, learning new methods for using knowledge for specific applications – will continue to grow in importance. Universities will need to work with stakeholders from the private sector and society at large to develop new models that extend beyond conventional continuing education programmes.

## The ETH environment

**Open and international.** The openness and international outlook of Switzerland as a location for education and research is central to ETH's ability to attract excellent students, early-career and established researchers, professors and staff. Switzerland's international orientation also makes it easier for us to shape and take part in international research networks.

European universities are characterised by their intense cross-border cooperation, which forms the basis of their joint efforts to find knowledge-based solutions to the most urgent challenges currently facing society. Horizon Europe is a research and innovation programme launched by the European Union and is the largest such programme in the world. Switzerland's participation in Horizon Europe is essential to the country's development and importance as a location for research and innovation.

Last but not least, the quality of life offered by Switzerland is very attractive to the large international companies (and their staff) who open research centres here. This strengthens the economic power of the region and the Swiss research community.

**Autonomy and governance.** The ETH Act, which grants us academic and financial autonomy, plays a significant role in our successful development.

The active participation of the entire ETH community in shaping the development of the university is an important factor in our success and sets us apart internationally. The rETHink initiative, which was launched in 2020 with the aim of setting the course for the university's future development, is a good example of our ability to consolidate our strengths and engage with the ETH community.



ETH's autonomy guarantees efficiency and academic freedom, thanks to a structure consisting of autonomous departments and independent research groups along with the freedom to set and implement our own strategic action areas in research and teaching.

**Stable and reliable funding.** Stable and reliable funding from the Swiss federal government is essential for fulfilling our core mission and for our future organisational development. This funding allows us to build excellent infrastructure and cutting-edge technology platforms. It also ensures suitable infrastructure for our professors, enabling them to submit successful research proposals at home and abroad and to conduct exploratory basic research. Furthermore, generous public funding is an important prerequisite for successfully acquiring third-party funds and is connected with sustainable financial management – essential preconditions for our ability to remain competitive on an international level.



# Strategic areas of action

We are continually developing the diversity of our research and teaching activities while at the same time keeping our focus on a few core areas that are of particular importance for the future of Switzerland. Bolstered by the individual strategies of our academic departments, we have defined the following strategic action areas for the 2021–2024 period: data and information, health and medicine, materials and manufacturing, and responsibility and sustainability.

All four strategic action areas open up equal possibilities for exploratory basic research, applied research, and new teaching programmes. Basic research is the foundation for the success of ETH as a whole and particularly for mission-oriented research targeted at solving global challenges. Interdisciplinary collaboration will be strengthened in all strategic action areas, thereby promoting the translation of research results into real-world applications and education and training programmes. Our research and teaching activities acknowledge and respect the diverse range of individual and group characteristics. All four strategic action areas will facilitate new degree programmes, innovative continuing education programmes, stronger networking within interdisciplinary degree programmes, and project work with practical applications.

## Data and information

Our society has been permeated by digitalisation, social networks, artificial intelligence and other IT-based innovations. The consequences of these disruptions – for instance, changes in the working world, or issues surrounding security and privacy – are fundamental in nature and closely linked to technological developments. Issues surrounding digitalisation are reflected in all strategic action areas, and we are translating these issues into concrete objectives and measures.

### Data science and artificial intelligence

Over the course of 2021–2024, we want to create more capacity in data science while strengthening the connection between the core subjects of computer science, mathematics, electrical engineering and information technology, and all other disciplines represented at ETH. The tension between the broad interest in data and the right to privacy has given rise to new interdisciplinary research topics that go beyond technical issues and require close cooperation with the social sciences and humanities.

Working together with Swiss and international partners, we will continue to engage in important collaborative research. Data Science is one of the ETH Domain's Strategic Focus Areas, and it is under this umbrella that we created the Swiss Data Science Center together with EPFL. The centre provides advice to Swiss businesses and research institutions relating to the use of appropriate models and methods for machine learning. The Center for Learning Systems is a joint research centre of ETH Zurich and the Max Planck Society and is dedicated to machine learning.

We educate computer scientists, giving them profound expertise and fostering their critical thinking skills when it comes to digital technologies. We teach the fundamentals of computer science and data science in all our study programmes. Beyond the walls of ETH, we are continuing to work with Swiss high schools to recruit students for our computer science programme, with an emphasis on encouraging female students to take an interest in the field. We support schools in their goal of comprehensively integrating computer science into their curricula and continuing education programmes.

The Greater Zurich Area and other Swiss cities are increasingly becoming IT hubs. This is

### Objectives

- ① We aim to secure our role as a leading research institution in data science, cyber security, artificial intelligence and machine learning. We seek to promote understanding of the opportunities and risks posed by new technologies while grappling with the associated ethical issues.
- ② We are strengthening our computer science and data science instruction by integrating these topics into all disciplines, thereby contributing to the upskilling of society.
- ③ We foster exchange and cooperation with the Swiss private sector and start-ups and act as an expert partner regarding issues of digital transformation.
- ④ We create conditions that attract the world's best minds in the fields of data science, cyber security and artificial intelligence and provide them with a challenging and inspiring environment with attractive conditions for conducting research.
- ⑤ We are increasing our involvement in digitalisation initiatives in Switzerland and abroad and take a leading role in these projects.

a development that we want to support, and we are increasingly working together with companies in the area.

Information security and cyber security are topics that enjoy high priority on an economic, societal, political and military level. The digitalised knowledge economy is critically linked with the ability to securely transfer, process and store information – while protecting privacy. In order to strengthen our expertise in information security, we will continue to invest primarily in the following areas:

- **Secure hardware:** The security of the entire hardware chain must be guaranteed via controlled, secure processes. This requires the development of new hardware concepts and security standards for connected devices. Notably, new computer architectures will become necessary to make security by design possible.
- **Secure software:** Software security – specifically, the ability to verify authenticity and protect against manipulation – requires new programming concepts and innovative protocols that work in tandem with secure hardware.
- **Secure systems:** The combination of secure hardware and reliable software delivers indispensable system security for robotics, networked systems and the Internet of Things. This has an impact on areas such as the future of mobility: self-driving vehicles must be secured against unauthorised interventions. Automated production, military systems, and critical infrastructure for energy, water and gas supply rely on these novel concepts for secure systems.

#### Measures and initiatives

- We are in the process of building up the ETH AI Center in order to strengthen research on artificial research and related disciplines. The ETH AI Center will promote interdisciplinary collaboration and drive the adoption of new AI developments in the natural sciences, health sciences, environmental sciences and robotics. An important component of this will be the ETH+ initiative Foundations of Data Science.
- A new National Centre of Competence in Research – NCCR Automation – is being created to fortify our research and education activities in the fields of cyber-physical systems, the Internet of Things, autonomous mobility and machine learning. Together with our research partners at EPFL, Swiss Federal Laboratories for Materials Science and Technology (Empa) and the University of Applied Sciences Northwestern Switzerland, we will advance the methodological and technological foundations of AI. The aim is to make the broad-scale implementation of complex automated systems possible.
- Thanks to new kinds of partnerships with private sector stakeholders – with large tech firms in particular, but also with SMEs and large medical, energy and environmental firms – we are securing access to data that is crucial for research. We are also advocating to ease access to public sector data.
- ETH is solidifying its position as a hub for research and education on security and privacy issues, for instance through the ETH+ Security and Privacy in the Digital Society initiative. We hope to meet the growing demand for expertise in information security and data protection with the new Swiss Support Center for Cybersecurity, which builds on existing initiatives such as the Zurich Information Security and Privacy Center, the SCION project for a secure internet, and the Cyber-Defense Campus. We run the centre in cooperation with EPFL and offer critical expertise to our partners in the Swiss government, private sector and civil society.
- The ETH+ initiative Digital Transformation and Society expands ETH's capacity for interdisciplinary research, teaching, knowledge transfer and outreach on the societal dimension of digital transformation. Operating at the interface of social sciences, computer science and humanities, the initiative also engages with the general public.



## Quantum engineering and computing

Our strategic involvement in quantum engineering and computing allows us to shape the development of new quantum hardware and software and to lay the foundation for future applications.

Quantum technology is revolutionising the methodology of how specific numerical problems are solved, how data is transferred, and how tiny signals can be measured. New findings in quantum physics allow us to tackle problems that were previously difficult to solve and to revamp how data transfers are safeguarded.

ETH has been at the forefront of shaping quantum information science and quantum technology since the advent of these fields. Our strengths lie in conducting basic research: we are investigating various potential platforms and paying particular attention to superconducting and semiconducting systems, but also to configurations of atoms, ions and photons. Over the next few years, we want to work across disciplines with physicists, electrical engineers, material scientists and computer scientists in order to translate established research findings into applied technologies.

Thanks to our cooperation with the Paul Scherrer Institute (PSI) and the private sector, we will be able to build the infrastructure required for a countrywide quantum ecosystem.

### Objectives

- ① We are educating Switzerland's first generations of quantum engineers.
- ② We are expanding our capacity in quantum technology at the interface between basic research and engineering.

### Measures and initiatives

Based on the successes of the Quantum Science and Technology (QSIT) NCCR, the Quantum Engineering Initiative, and the EU Quantum Flagship, we aim to build a Swiss hub for quantum research over the 2021–2024 period. This ETH Centre for Quantum Science and Technology will cover the following areas:

- ➔ **Research:** Working at the intersection between physics, computer science and electrical engineering, we will translate fundamental findings from the quantum sciences into technologies and applications. We will expand our capacity at the interface of basic research and engineering.
- ➔ **Education:** We will continue to run the new Master's degree programme in Quantum Engineering, which was launched as a pilot project in 2019.
- ➔ **Cooperation:** We will work with the PSI and partners from the private sector to build a countrywide quantum ecosystem, taking research cooperation in Switzerland and Europe to the next level.



## Health and medicine

Ageing societies in industrialised countries require technological solutions for prevention, diagnostics, treatment and rehabilitation. These solutions must be affordable and sustainable across generations. Similar solutions can and should be used to open up access to medical services for all. New medical approaches are being developed with the help of data science, digitalisation, and new technologies in engineering and the life sciences. We understand health to be more than the result of medical processes: it is also the result of external influences such as nutrition, pollution and individual lifestyles. In today's society, living longer, healthier lives is a goal that challenges both medicine and the social system and also requires solutions for facilitating people's largely unrestricted participation in social life as they age.

Healthcare research must take a number of structural and financial challenges into consideration such as the shortage of highly skilled medical researchers as well as the high costs and stringent requirements of clinical trials. Partnerships between healthcare providers, industry and academia are needed to support high-quality medical research and its translation into real-world applications.

We aim to strengthen our contribution to the Swiss healthcare system by building on our involvement in existing national initiatives such as the Swiss Personalized Health Network and the ETH Domain's Strategic Focus Area Personalized Health and Related Technologies. We will continue to invest in partnerships with universities, hospitals and companies, thereby promoting the translation of research findings into real-world medical applications. University Medicine Zurich, a partnership between ETH, the University of Zurich and the University of Zurich's four hospitals, will play an important role in this process.

**Education and training.** We successfully launched the Bachelor's degree programme in Human Medicine as a pilot project in 2017. We will continue to run the programme and expand our cooperation with partner universities. Working alongside various Swiss universities, university hospitals and cantonal hospitals, we are treading new ground in educating and training doctors and other healthcare specialists. This is our contribution to training more doctors in Switzerland and is also our way of reacting to rapid developments in the medical field. New technologies

### Objectives

- ① We are committed to teaching and training a new generation of doctors and healthcare experts at the interface of medicine, technology and basic research. We support innovators who work in the healthcare industry.
- ② We foster interdisciplinary collaboration between hospitals, researchers and other stakeholders in the healthcare sector.
- ③ We support digital transformation in medicine by intensifying cooperation with computer science.
- ④ We are developing new solutions for healthcare provision in Switzerland, with a focus on prevention, diagnostics and rehabilitation. These solutions also help to improve healthcare in developing countries and conflict zones.



are making earlier prediction, reliable diagnostics and effective treatments easier and better. These developments, which are also due to digitalisation, require a rethinking and partial reorientation of what medical careers look like. They also require an increase in interprofessional cooperation between hospitals, researchers and other stakeholders in the healthcare sector.

**Access to medical research and translation into real-world applications.** We are opening up access to medical research and its translation into real-world applications. Approximately one-third of our professors in nine different departments – from the natural sciences to engineering – are directly or indirectly involved in medical research. Their activities include conducting basic research, developing new materials, medical technologies, pharmaceutical products and other bioactive substances, and creating novel approaches for prediction and diagnostics. Many of these activities are led by individual researchers who often do not have the access to patients, patient data or infrastructure that would allow them to translate preclinical findings into clinical practice. On the other side of the equation, healthcare professionals who work directly on the ground often lack access to research infrastructure and the knowledge of how to turn patient data into relevant insights. Closer working relationships with hospitals and new joint platforms for clinical research are improving the translation of new research findings into medically relevant applications.

**Strengthening capacity for medical research.** In order to promote cutting edge-research, we are creating new professorships that will be able to develop and lead new kinds of clinical studies. Their job consists of conducting basic and applied research and delivering first-class teaching to students without providing clinical services. We will work together with clinical partners to provide the infrastructure that is needed for independent medical research. Technological solutions can be used in tandem to conduct expensive, time-consuming clinical studies in a more efficient manner.

**Engagement in developing countries and conflict zones.** We are developing solutions and processes that allow for outpatient treatment and location-independent monitoring, thereby reducing costs. Intelligent algorithms can help to develop reliable and affordable models for diagnostics and prevention. By working together with international organisations, we are demonstrating our commitment to efficient solutions for crisis zones and developing regions.

#### Measures and initiatives

- Developing clinical research centres together with hospitals in Zurich (e.g. The Loop Zurich), Basel and other locations. Creating additional capacity via professorships that have access to clinical research infrastructure, e.g. ETHHeart, which aims to develop new therapies for cardiovascular diseases.
- Researching and developing digital/mobile healthcare solutions by establishing research partnerships with the private sector. We are paying particular attention to data science and personalised medicine: for instance, our tumour profiler project (a new diagnostic tool being developed with Hoffmann-La Roche, the university hospitals in Zurich and Basel, and the University of Zurich) and the Future Health Technologies programme at the Singapore-ETH Centre.
- At the Wyss Zurich centre, ETH and the University of Zurich are working together with the Wyss Zurich Foundation to translate findings from basic research into practical applications for the healthcare sector.
- Intensifying research, teaching and knowledge transfer in the field of rehabilitation technology and science via the Rehab Initiative and the Rehabilitation Engineering and Science Center, a centre of excellence that was founded in 2020. We will also continue our dialogue with the public by continuing our Cybathlon events.
- The Botnar Research Centre for Child Health is a research centre run by ETH and the University of Basel. The centre is dedicated to paediatric research, overcoming healthcare challenges in developing countries, and developing digital and mobile healthcare solutions as well as cell-based therapies.
- Launching the Microbiomes NCCR in order to study micro-organism interaction in various systems (human, animal, plant and environmental). A joint initiative by the University of Lausanne, ETH, EPFL, Lausanne University Hospital, the Swiss Federal Institute of Aquatic Science and Technology (Eawag), the University of Bern, and the University of Zurich, the Microbiomes NCCR brings together the life sciences, medicine, bioinformatics, nutrition and environmental science.
- SKINTEGRITY is an ETH+ initiative that brings together experts from basic research, clinical research, bioengineering and bioinformatics at ETH, the University of Zurich and the University Hospital Zurich. SKINTEGRITY is improving our understanding of and ability to diagnose and treat skin defects and severe dermatological illnesses.
- Thanks to the establishment of the MAS programme in Digital Clinical Research and the expansion of the MedLAB, we are creating an excellent foundation for doctors to familiarise themselves with the latest state of research at ETH, either during their specialist medical training or later when they are practicing physicians.

## Materials and manufacturing

New sustainable, resource-saving materials and production technologies are of great importance to the economy and the prosperity of Switzerland and the world. Digitalisation is fundamentally transforming the landscape when it comes to material development, constructive design and manufacturing technologies, and the reuse and recycling of materials. These developments are leading to more flexibility, productivity and quality. Innovative materials and digital manufacturing processes such as additive technologies and robotics are opening up new possibilities in the production of new shapes and combinations of materials.

Developing new materials and understanding them on all levels – from their atomic structure to their use as components – is of great importance to future manufacturing processes, which span a range that includes nanotechnology, surface technology, additive manufacturing, industrial processes and the construction industry. Take information and quantum technology as an example: progress in these fields depends on the ability to integrate new materials into semiconductor manufacturing. In medical technology and new industrial production processes, the properties of materials are decisive for both quality and reliability, for instance when it comes to metallic materials, ceramics, plastics, biomaterials and construction materials.

ETH helped to build up the ETH Domain's Strategic Focus Area in Advanced Manufacturing over the course of 2017–2020. Manufacturing technology was a main focus area of ETH Zurich during this time, and we will continue to actively promote and develop this field. ETH's interdisciplinary Competence Center for Materials and Processes has been successful in bundling the university's general expertise in innovative materials and its special expertise in soft materials and metals. The centre is helping to continue expanding this expertise by running joint cross-departmental projects. We also initiated innovative research projects on additive manufacturing and engaged with external partners through the ETH Domain's Strategic Focus Area in Advanced Manufacturing. We also strengthened research and teaching in digital fabrication and robotics with National Centres of Competence in Research by the same names: the NCCR Digital Fabrication and the NCCR Robotics.

### Objectives

- ① We are consolidating our position as a leading research and education centre for new materials and pioneering manufacturing processes. New findings in these areas will be applied in construction, the mechanical, electrical and metal industry, medical technology, the pharmaceutical industry and the food industry.
- ② We are creating networks between the fields of material science and manufacturing and process technology to generate new applications for industrial use in Switzerland and abroad. By bringing together computer science, artificial intelligence, and information and communication technology, we are exploring possibilities for digitalising and optimising entire production processes.
- ③ By working closely with large companies and SMEs, we create added value via active knowledge and technology transfer and innovations in materials and manufacturing.

### Measures and initiatives

- ➔ The Centre for Computationally Augmented Design in Architecture and Construction (Design++) is an ETH+ initiative that is opening up new possibilities in digital design. In the robotics space, the RobotX Center brings together intelligent machines, infrastructure, education and research, while the Robotic Materials initiative is linking new paths in material development with the latest advances in robotics, human-robot interaction and artificial intelligence.
- ➔ The newly launched Laboratory for Multiscale Materials Synthesis is promoting investments in the development of new intelligent materials. Suitable models and machine learning allow scientists to design new metallic and semiconductive materials and to engage in their experimental production and characterisation.
- ➔ Bringing Materials to Life is an ETH+ initiative that uses an interdisciplinary approach to investigate how living organisms adjust and produce certain material characteristics in a targeted manner.
- ➔ We are developing a cross-departmental initiative called Engineering with Living Materials, which is dedicated to researching material systems that are adaptive, self-healing and organic. The goal is also to research temporary materials that break down in the body after fulfilling their function.
- ➔ Knowledge and technology transfer is supported by inspire AG, a national centre of excellence for technology transfer to the mechanical, electrical and metal industries.
- ➔ AdditivETH is a platform that supports capacity building and collaboration in the field of 3D printing and the scaling of additive manufacturing processes for personalised medicine and robotics.

## Responsibility and sustainability

The scope and complexity of the urgent challenges of our time require a holistic, interdisciplinary approach that calls for open cooperation between people who think and act critically. According to the ETH Act, teaching and research are guided by respect for human dignity, responsibility in the use of natural resources and the environment together with an evaluation of the consequences of technological applications. In order to live up to these principles, we integrate sustainability into our research activities and our daily actions. We promote responsibility, cooperation, and a culture of critical and constructive thinking, and we engage in dialogue with the general public.

### Objectives

- ① We promote the responsible use of natural resources through research, teaching and innovation.
- ② We aim to be carbon neutral by 2030 by reducing our greenhouse gas emissions by at least 50 percent compared to 2006 and covering the remaining emissions via carbon offsets. To help achieve this goal, we undertake research and teaching projects as part of our Living Labs programme.
- ③ We take on a leading role in society and the scientific community when it comes to assessing the opportunities, risks and consequences of technological change. We are strengthening our research in this area, which enables us to answer complex ethical questions and propose solutions.
- ④ We are creating structures and instruments to anticipate and develop solutions for future technological developments and societal challenges long before they happen.
- ⑤ We are internationally renowned as an interdisciplinary centre of excellence for integrative solutions that cut across disciplines, and we foster cooperation on a national and international level.
- ⑥ We maintain a dialogue with the general public, build new partnerships and perform our role as a provider of knowledge for evidence-based policy.
- ⑦ We foster the analytical abilities of our students and staff, encourage them to reflect on their own actions as well as those of others, and urge them to consider various perspectives when developing solutions. This allows them to act responsibly on behalf of ETH and society as a whole.

## Sustainability

We want to contribute to global efforts towards the sustainable development of all countries and the maintenance of our natural resources. We have consciously decided to take a holistic approach that combines the economic, social and ecological dimensions of sustainability. For this reason, we are actively committed to the sustainable use of resources in our research, teaching and innovation activities.

Sustainability is part of the culture at ETH and has played a central role in research, teaching and knowledge transfer for many years. Sustainability was one of our five main focus areas during the 2017–2020 period. Our research and teaching are aimed at better understanding the scientific underpinnings of the natural world and at bringing more sustainable practices to the fields responsible for the bulk of environmental pollution. We want to ensure that future generations can live more sustainably. For this reason, our sustainability efforts focus on protecting the environment, natural resources and biodiversity as well as finding sustainable solutions for construction, housing, energy, mobility and nutrition. Furthermore, we live up to sustainable values on our own campus and promote the idea of using ETH as a living lab.

### Measures and initiatives

- Urbanisation is a global trend that ETH has been researching at the Future Cities Laboratory at the Singapore-ETH Centre. The Future Cities Laboratory (FCL) – Global initiative will build on these efforts in order to research and design the cities of the future on a broader scale. Additionally, we are launching a new Master's degree programme in Landscape Architecture to teach the next generation about understanding, maintaining and developing public spaces and landscapes in a time of rapid change.
- We have partnered with the other ETH Domain institutions, private sector partners and additional universities to take part in SWEET (SWiss Energy research for the Energy Transition), a new funding programme of the Swiss Federal Office of Energy. The Energy Science Center has launched the Renewable Management and Real-Time Control Platform project as a test environment for researching future energy supply systems. The SCCER Mobility supported the development of expertise and networks within the research community as well as with the private sector and public authorities. We will build on the momentum generated by the SCCER Mobility and our mobility initiative to establish the Competence Centre on Sustainable Future Mobility.
- NCCR Catalysis, a new National Centre of Competence in Research, has begun and is being conducted jointly with EPFL, the University of Basel, the University of Bern, the University of Zurich, the School of Engineering and Architecture of Fribourg, and the Zurich University of Applied Sciences. Researchers are working to lay the basis for sustainable chemistry in order to create a CO<sub>2</sub>-neutral chemical industry.
- We are breaking new ground in researching and developing safe and healthy nutrition. The Future Food Initiative was jointly launched by ETH's World Food System Center and EPFL's Integrative Food Science and Nutrition Center. The initiative supports up-and-coming researchers on the postdoc level, brings academic and industrial research closer together, and strengthens efforts to translate academic findings in the field of nutrition into real-world applications. The Plant Hub Eschikon research station will create a comprehensive infrastructure for the next generation of plant science.
- By 2024, we aim to reduce our CO<sub>2</sub> emissions by a further 20 percent compared to 2018, and we will see a substantial reduction in emissions from air travel. ETH will also continue to decarbonise its energy supply by implementing the energy master plan for the central campus and developing the Anergie grid on the Höggerberg campus. This will allow ETH to achieve the targets set by the Swiss federal government.
- We are strengthening the ETH for Development initiative in order to combat poverty sustainably through collaborative research between the natural sciences, engineering and social sciences. Working together with EPFL, the International Committee of the Red Cross and other potential partners, we are strategically developing technologies and approaches that can be used in humanitarian relief work.
- Along with MeteoSwiss, Empa, the Swiss Federal Institute for Forest, Snow and Landscape Research (WSL), and Agroscope, we are jointly investing in the cross-institutional Center for Climate Systems Modeling and the ETH+ initiative EXCLAIM. These investments will create a state-of-the-art infrastructure that allows for weather and climate modelling, the development of new climate change scenarios for Switzerland, and an open conversation with the general public.



## Technological change: opportunities and risks

New technologies act as the driver of societal progress. At the same time, they have great consequences – both positive and negative – for the environment and society. These consequences are often unexpected and only become visible once the technology is at a further stage of development. We are examining this issue from two angles. Firstly, how can we use research to identify the opportunities and risks of technological change early on, enhancing its utility for business and society while at the same time limiting its downsides? Secondly, how can we identify pioneering developments early on in order to help ETH maintain its position as a leading technical and scientific university with national and international reach?

## Interdisciplinary cooperation

The complexity of scientific and sociopolitical issues has increased and often goes beyond the scope of a single discipline. Working together across different fields will better the odds of finding innovative solutions.

ETH+, an initiative launched in late 2017, began a process of promoting interdisciplinary issues that cut across departmental lines and building up the capacity needed to address them.

### Measures and initiatives

- An ethics centre will be established in order to address the mounting ethical challenges arising at the intersection of research, real-world applications and society. The focus is on technoethics, bioethics and scientific ethics.
- In order to understand the opportunities and risks posed by technological change and to share this expertise with the public and decision-makers, ETH researchers are joining the conversation on the development of new technologies and their real-world applications. We are integrating these issues into our curricula.
- We are creating a structure at ETH that allows us to anticipate technological and social change and to define strategic areas of action with international relevance at an early stage (strategic foresight).

### Measures and initiatives

- We are creating additional incentives and infrastructure for interdisciplinary collaboration. The ETH+ initiative, launched in late 2017, promotes capacity building and interdisciplinary collaboration between academic departments. Open ETH arose from the ETH+ initiative and goes one step further by promoting interdisciplinary collaboration beyond ETH, thereby lending support to long-term research initiatives.
- Collegium Helveticum has established itself as a transdisciplinary laboratory for creative partnerships and as a location for promoting selected up-and-coming talent in the arts and sciences.



## Engaging with the public

As a leading European scientific and technical university and one of the best universities in the world, we have a responsibility to constantly promote and cultivate knowledge exchange in a spirit of partnership with the scientific community, the private sector, policymakers and the general public.

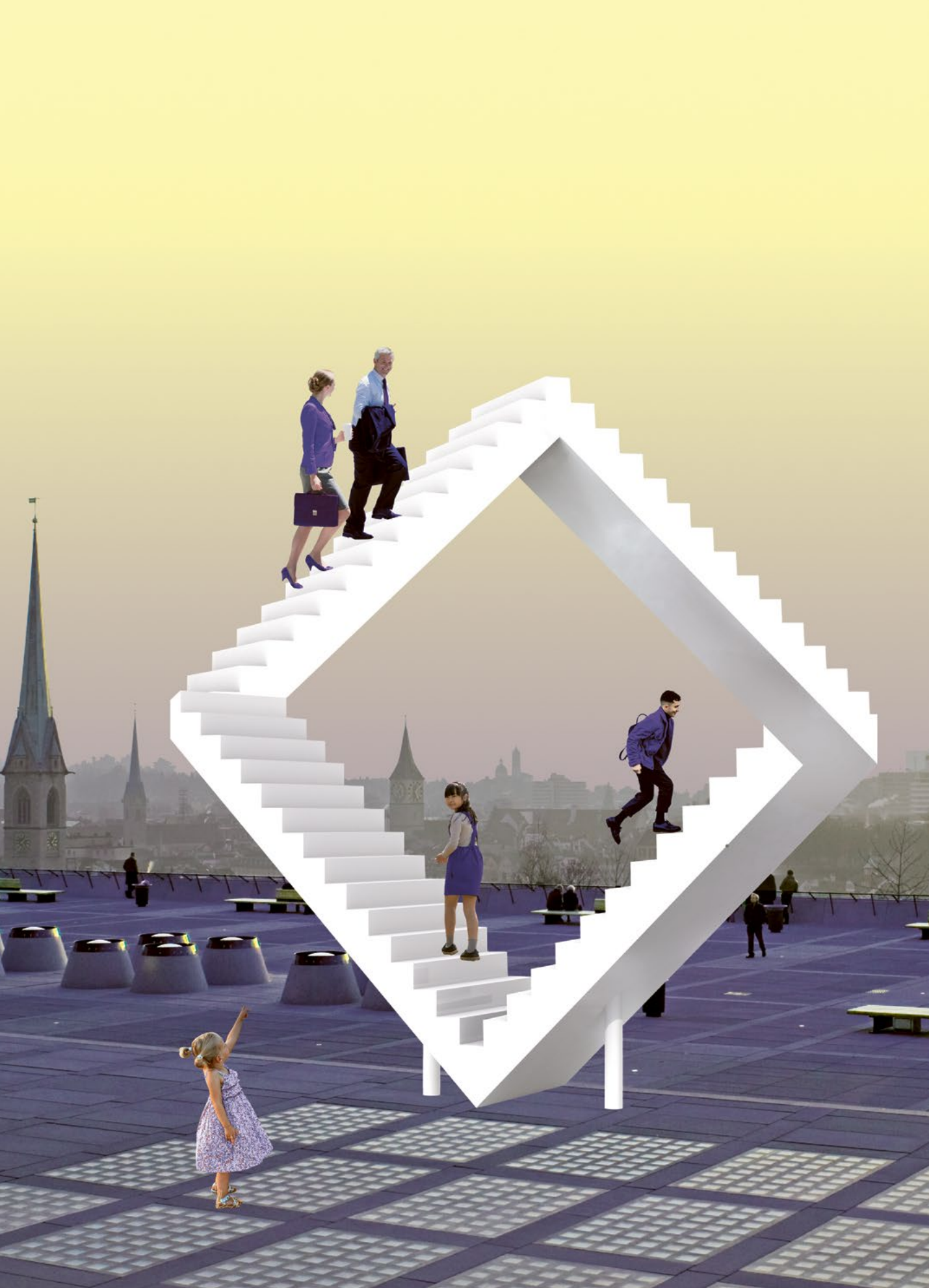
We serve society by educating graduates with a sense of responsibility and sending them into the world equipped to think and act in a global, sustainable context. We use our research findings to provide an empirical basis for political and economic decision-making and to cultivate a dialogue with the public on equal footing.

The COVID-19 crisis has once again confirmed how important scientific findings are to governments and societies. Although most research had to be conducted remotely, new research activities quickly arose and contributed to our understanding of the pandemic and how to deal with and contain it. Researchers pushed ahead with new projects at breakneck speed, ranging from basic research in biology, chemistry, health science and medicine to engineering new types of ventilators. The helpfulETH platform was created to bring hospitals and other healthcare institutions closer to the research community so that researchers could react quickly to concrete needs and develop solutions.

The social, economic and political implications of the pandemic are also important research questions, including the impact on our behaviour, the working world and management. Two areas of research have enjoyed particular prominence: investigations of how the virus spreads, both within Switzerland and globally, and the development of the SwissCovid app, a tool for contact tracing that was created in cooperation with EPFL and the Federal Office of Public Health. Several ETH professors serve on the Swiss National COVID-19 Science Task Force and provide their expertise to the federal authorities.

### Measures and initiatives

- We are intensifying our dialogue with society at large when it comes to issues from our strategic action areas, employing innovative formats and contemporary forms of science communication. We will continue to increase our capacity to engage in an open, proactive dialogue with the public, building on successfully established outreach programmes such as Treffpunkt Science City, Scientifica, ETH Meets You and the ETH Digital Platform.
- We engage with policymakers and inform policy through dialogue and new platforms, bringing the scientific community and decision-makers together.
- We are developing new exhibition formats and platforms for dialogue that fuse science and art and help to present complex topics in an attractive, accessible way. By moving art and science closer to one another, we are acting in the spirit of Gottfried Semper's motto: "Science shall be pervaded by art and art by science."
- We bring ETH to life in an interactive visitors' centre. Our diverse collections are being made more accessible thanks to digitalisation.



# The next generations

We are training our students to become independent and creative thinkers who can act as responsible citizens and help shape the future. Education at ETH is interdisciplinary and research-based; it trains students to identify problems and find solutions in our complex, quickly changing world.

Our degree programmes provide a solid methodological foundation and technical expertise, interdisciplinary and systemic thinking, and social skills. We foster a culture of independent learning that boosts students' individual strengths and allows them flexibility in designing their study programme. Our study programmes and curricula are competitive and oriented towards the needs of the next generations and the working world. Our graduates are in high demand in society, the scientific community and the private sector in Switzerland and abroad.

Students are active agents in their education and help shape courses through their participation. They are motivated, committed to acquiring social and technical skills, and open to innovative forms of teaching.

#### Research-based teaching

Research and teaching must be closely linked. We therefore continually develop the content of our degree programmes based on the latest developments in science and technology. The challenge lies in developing new content that simultaneously teaches and solidifies the basics of the field while taking cutting-edge developments into equal consideration. Integrating all ETH researchers into our teaching activities is the best way to achieve this. Our close working relationship with the private sector allows us to hold courses that give students real-world insights and encourage entrepreneurial thinking.

Our curricula are systematically developed in order to foster flexibility and personal initiative. We give students more freedom of choice within their degree programmes by offering more specialisations and electives. Students are supported by tutors when designing their studies. Our Master's degree programmes are designed to give students direct entry into cutting-edge research or the ability to launch a career in the private or public sector.

#### Creativity and soft skills

Teaching skills outside of the subject immediately at hand is an important component of all courses. Students and staff develop and practice the ability to differentiate between different positions, points of view and behaviours, to critically – and self-critically – examine them, and to identify appropriate courses of action. Critical thinking thus forms the foundation of a comprehensive vision of university education and organisational

#### Objectives

- ① We promote the acquisition of soft skills (e.g. entrepreneurial thinking), social skills, leadership abilities, computational competencies, and the ability to analyse complex issues.
- ② We are intensifying our efforts to create space for curiosity, creativity and flexibility in our degree programmes, thereby laying the foundations for lifelong learning.
- ③ We use modern technology in our teaching activities, integrate scientific findings into our lessons, and conduct pedagogical research.
- ④ Our courses for future teachers place heavy emphasis on teaching critical thinking skills to ensure that this fundamental concept is already taught in early education.

culture that teaches additional soft skills. These skills make it possible to solve complex problems and shape our transformation towards a sustainable society.

Soft skills also include the ability to openly reflect on and maintain one's own physical and mental health. We support students by giving them appropriate workloads. We live up to our leadership responsibilities and offer support and advice to students and staff.

We motivate students and staff to think creatively beyond cultural and field-specific borders, to assess complex problems holistically, to adopt stances based on ethics and to act in a responsible manner. They should also recognise how stereotypes and unconscious bias work and understand why awareness of equal opportunity and diversity form an important component of responsible conduct.

The Science in Perspective programme teaches students to recognise connections between scientific findings, technical innovations, cultural contexts, individuals and societies and to assess them in a critical manner. This improves students' reflection skills and prepares them for the societal developments and global challenges that they will later face. This kind of thinking is being increasingly integrated into all degree programmes.

We are particularly committed to project-based learning, which is being strengthened and promoted in all departments. Projects are an important tool for increasing students' motivation and curiosity via interdisciplinary collaborative work. They also serve to promote the development of students' social skills and ability to think holistically. Experiential and problem-oriented learning, comprehensive skill development and constructive feedback are all central components of this process.

### Quality through innovation

Quality assurance for teaching and curriculum development needs to be viewed through the lens of ETH's growing student population, the growing heterogeneity of the student body and the addition of new degree programmes and technologies.

This growth, particularly on the Master's degree level, is a challenge because of the level of individual supervision required for each student. For this reason, we need to develop instruments that allow for moderate growth without losing sight of quality, to significantly increase our teaching capacity both in terms of infrastructure and staff, and to develop new teaching formats and techniques that increase the efficiency of teaching without reducing its quality.

New technologies have had a major impact on teaching over the past two decades, making it possible to host remote lectures and easier

### Measures and initiatives

- We are launching new initiatives and developing existing programmes such as ETH Week in order to meet the urgent need for soft skills and critical thinking abilities. The ETH Talent project aims to emphasise the importance of soft skills, to boost the visibility of interdisciplinary training, and to provide lecturers with easy-to-implement didactic models. PRISMA is a student project that integrates interdisciplinary project work into the ETH curriculum. As part of PRISMA, students work in small interdisciplinary teams to tackle important social and scientific questions and to develop answers to challenges facing societies across the globe.
- The Student Project House promotes the development of soft skills and entrepreneurial thinking. The Social Innovation Lab, which is part of the Student Project House, offers students the opportunity to tackle unsolved societal problems of global significance by working together in interdisciplinary teams. The ETH Singapore Month programme pursues a similar goal. The four-week summer school at the Singapore-ETH Centre is run together with CREATE and local partners.
- The new Future Learning Initiative is supported by twenty-three professors from nine departments. The aim is to make ETH a leading centre for the science of learning, with research that can be immediately applied to teaching practice. ETH supports innovative adjustments to teaching in its academic departments as well as student initiatives.
- ETH supports student initiatives. One example is the establishment of the new Interdisciplinary Engineering degree programme, which provides students with the opportunity to combine the fundamentals of engineering with content from all engineering fields, business and management, and the social sciences and humanities. The programme promotes a holistic interdisciplinary education and meets the demands of the job market by expanding the methodological skills of our graduates.
- Our Youth Academy promotes STEM subjects and specialisations to high school students, recruits suitable students to study at ETH, and prepares them for their degree programmes. The initiative is based on ETH's strong relationships with high schools in German- and Italian-speaking Switzerland. It offers exciting courses that are scientifically evaluated for effectiveness and continually improved.

to study on a flexible timetable. By combining these formats with mentoring and interdisciplinary project work, it becomes possible to take students' individual learning styles more into account. Teaching concepts based on this kind of new technology require that students have the skills and ability to deal with flexible, changing and individualised forms of learning – skills that are becoming increasingly important in the working world as we move into the future.

The COVID-19 crisis was a great challenge for lecturers, students and staff at ETH. At the same time, however, the crisis provided an impetus for innovative teaching ideas. Driven by the special circumstances of the lockdown, distance learning became a widespread form of instruction within just a short period of time. While it is clear that direct interaction between lecturers and students will remain a core component of excellent teaching, our experiences with remote teaching during the lockdown have advanced our understanding of how to best combine classroom teaching with new online methods in the future.

The changes in education accelerated by the corona crisis have boosted the importance of research into teaching and learning. Our goal is to continue improving teaching and learning outcomes on the university level and to take on a leading role in the science of teaching and innovative teaching methods. We want to understand the nature of formal and informal learning on a neural, cognitive, social and cultural level and to drive the implementation of these findings in real-world teaching activities.

We foster innovation in teaching via strategic programmes, funding instruments, prizes and curriculum development experts. We give the Golden Owl and KITE awards to teaching staff who exhibit excellence in teaching and enrich their lessons in innovative ways. We will continue expanding virtual reality and online platforms that enable new kinds of interactions. While regular interaction between teaching staff and students should take place in person wherever possible, digital technologies can complement personal contact and allow for independent learning, subject specialisation and flexibility. There will be expanded options for participation, and the personal supervision of large groups of students will become easier, even when the students are scattered across the globe.

Findings from research in teaching and learning and the development and application of new technologies help us to develop strategies for dealing with the growth of the student body. During the last planning period, the academic departments and the Educational Development and Technology office launched several initiatives such as the Center for Active Learning

and sabbatical opportunities for lecturers in the private sector (and vice versa). We will build on these initiatives in order to continue shaping the development of teaching, particularly with regard to introducing new technological tools and innovative teaching methods.

A significant portion of math, computer science and natural science teachers in advanced high schools in Switzerland are graduates of ETH Zurich. By training these future STEM teachers, we support high school students' interest in science and mathematics and foster the skills they need to succeed in these subjects. We therefore consider the education and training of high school teachers to be one of our core activities and an important contribution to knowledge transfer in Switzerland. We also run learning centres at EducETH, where we support instruction in STEM subjects at the primary and secondary level by working together with teachers to develop and implement new teaching concepts.

# Pioneering research

Research is the primary source of innovation in knowledge-based societies. It forms the foundation for higher education at ETH. Our outstanding research achievements are made possible by generous federal funding, competitive research grants (particularly those from the Swiss National Science Foundation, Innosuisse, numerous foundations, and European research funding programmes), and collaboration with the private sector. This helps us ensure that our research findings can make long-term contributions to the wellbeing of society, to economic development, and to solving the complex problems facing our planet.

Our current strategic challenge is balancing the need to advance new fields of research while further developing our expertise in core fields. Our goal is to add new research areas by continually expanding capacity, particularly by appointing new professors, and to open up important new areas of interdisciplinary investigation.

#### Investment in curiosity-driven research

We ensure that researchers have optimal conditions and financial resources for conducting cutting-edge basic research. We promote research into new issues through bottom-up research initiatives while respecting the principles of subsidiarity and autonomy.

#### Research networks

We are continuing to promote bottom-up interdisciplinary projects within ETH and will take part in national research networks such as NCCRs. Furthermore, we make significant contributions to the Strategic Focus Areas of the ETH Domain: Data Science, Personalised Health and Related Technologies, and Advanced Manufacturing. We are also intensifying bilateral cooperation with institutions within the ETH Domain, with the University of Zurich, and with other players.

#### The digitalisation of research

The ability to efficiently collect, store and process vast amounts of data is changing the way we do research and making a big impact on scientific methodology in many fields. Examples include using computer-assisted machine learning to complement model-based approaches, and the extraction of information and knowledge using new types of analytical processes. In order to stay on top of these trends, we are building our expertise and resources in statistics, data science, information theory, modelling and machine learning in several departments. At the same time, we are intensifying the links between mathematics, computer science, information technology and other disciplines in order to develop new research areas at the intersection of these disciplines.

#### Objectives

- ① We will continue to create space for exploratory research and provide optimal conditions for using the great innovative potential of basic research.
- ② Building on their strengths and expertise, our academic departments work together closely with the aim of strategically establishing interdisciplinary research expertise and research centres.
- ③ We will maintain, consolidate and construct top-notch scientific infrastructure and make our technology platforms available to the research community and the private sector.
- ④ We create structures to ensure that our scientists respect ethical principles and good scientific practice in their research and day-to-day interactions.



The digitalisation of research also requires constant infrastructure development. This requires an expansion of our existing data processing and storage infrastructure – and related programming support – in strategically important areas.

### Research infrastructure and technology platforms

Today's research is, to a large extent, based on technology. This means that we can only maintain our top position by operating and constantly updating our cutting-edge research infrastructure and by strengthening collaborative research through our technology platforms.

National and international consortia are increasingly needed to tackle this challenge due to the complexity and the rising costs for planning, building and operating this kind of infrastructure. For this reason, we operate large-scale national research infrastructure and take part in international consortia and cross-border funding for international research organisations such as CERN.

### Good scientific practice

Our structures and processes ensure that ethical principles and good scientific practice are respected and adhered to, both in our research and in our daily interactions with one another. The Commission for Good Scientific Practice promotes the development of a common understanding on issues surrounding ethical principles and scientific integrity in research.

### Open science

Increasing the quality and speed of research requires faster, more comprehensive access to research findings as well as a higher degree of transparency in research processes. These are values currently at the heart of a global debate on what is referred to as “open science”. Both the scientific community and society at large are putting more pressure on institutions to take action in this regard. We recognise the strategic importance of open science and provide clear guidelines on this topic, chiefly for areas that aim to improve research collaboration. ETH will continue to develop its excellent open access and open data services and will expand them to include the closely related areas of open code and open innovation.

### Measures and initiatives

- We promote basic research and interdisciplinary research by operating and expanding existing structures and initiatives such as the Institute for Theoretical Studies and National Centres of Competence in Research.
- We are launching the Origin and Prevalence of Life initiative to explore the origin and diversity of life on this planet and beyond. The main elements of the initiative are an interdisciplinary centre and the creation of new professorships to build an important bridge between existing professorships and activities in biology, chemistry, physics, earth science and environmental science. There are also plans for courses with a stronger interdisciplinary focus in this area.
- We are launching the Filming Electrons in Action initiative in collaboration with the PSI. The latest advances in ultra-fast laser technology combined with XFEL technology allow us to better understand the swift movements of electrons over very short distances.
- The development and university-wide implementation of a software system for evaluating and funding projects in teaching and research (eResearch) will make it possible to manage funding more efficiently and advance digitalisation at ETH.
- We are planning a significant development of the Swiss National Supercomputing Centre, with the upcoming upgrade of the Sustained Scientific User Lab for Simulation Based Science deserving special mention. There are also plans for new research infrastructure. ETH will continue to provide dedicated data processing infrastructure, expanding it based on the needs of researchers.
- We are working together with EPFL to establish the Swiss Catalysis Hub, a new research infrastructure within the ETH Domain. Various other ETH Domain institutions are involved in establishing the hub, which will advance the development of new kinds of catalytic processes and the use of renewable energy sources such as hydroelectric, solar and wind energy to power chemical reactors. The hub is a central element of the NCCR Catalysis.<sup>1</sup>
- We will continue to develop guidelines and processes with regard to scientific integrity, good scientific practice and dealing with scientific misconduct.
- We are developing university-wide guidelines for handling research data. These guidelines will take the principles of open data, open code and open innovation into account. In the long term, we are striving towards a comprehensive open science policy that will serve as the basis for further concrete measures.

<sup>1</sup> Please refer to the section entitled “Responsibility and sustainability”.



# Knowledge exchange, technology transfer and promoting innovation

Sharing knowledge and translating research results into commercial products are two activities that build an important bridge between academia and society. We have a responsibility to make original insights and new findings available to the public via education and knowledge exchange.

We actively contribute to progress and prosperity in our digitalised world by translating our research results into concrete applications, by educating graduates who go on to work in private companies and government, and by founding innovative spin-off companies. Educating our students is our most important contribution to knowledge exchange and building Switzerland's innovative strength. We complement this through a broad spectrum of knowledge exchange activities such as joint research projects with business and licensing new technologies. Additionally, we are increasingly committed to continuing education, which meets society's growing demand for lifelong learning.

#### **Collaboration with the private sector**

One important feature of ETH as a scientific and technical university is its close collaboration with business partners in Switzerland and abroad. In addition to joint projects, these partnerships also lead to the establishment of new professorships. Many departments have economic advisory committees that help shape the development of teaching and research and serve as an important barometer for the needs of the economy. Members of these committees provide mentoring to students and junior researchers. On the other side of the equation, our researchers play important roles as leaders and advisors in national and international companies and organisations.

#### **Promoting the innovation ecosystem**

In addition to direct collaboration with the private sector, ETH Zurich shapes society and the economy through its start-ups. We promote entrepreneurial activities throughout the ETH community, with a special emphasis on bringing our research findings to market by patenting promising technologies and founding spin-off companies. Diverse programmes such as the ETH Zurich Pioneer Fellowship support young researchers as they transition from research to start-up life. Official ETH spin-offs receive support during their founding and the first few years of their existence, including receiving professional advice, access to essential infrastructure and networking with key players in the private sector. More than 100 new ETH spin-offs have been founded over the past four years.

We view engagement with industry and knowledge and technology transfer as a long-term commitment and our way of contributing to

#### **Objectives**

- ① We promote partnership-based exchange and collaboration with Swiss companies, which contributes to the prosperity and innovative strength of the country.
- ② By working closely together with businesses and public authorities, we enable society to benefit from our research findings, and we support the swift translation of new ideas into real-world applications through our spin-off companies. We aim to sustain the positive trend of the last few years.
- ③ We are developing new models for lifelong learning and continuing education and tapping into new target groups, thereby strengthening the employability of the Swiss workforce and the competitive advantage of the country.

innovation and prosperity in the Canton of Zurich as well as Switzerland as a whole. For this reason, we work together with public and private sector partners to develop the innovation ecosystem in the greater Zurich region and throughout Switzerland. We take an active role in shaping knowledge and technology transfer thanks to our strong collaboration with business incubators and venture capital funds and our participation in innovation parks. We work closely together with the city, canton, federal government and private businesses to make this happen.

In order to develop and strengthen our knowledge transfer activities and private sector engagement, the ETH Executive Board will have its own Vice President for Knowledge Transfer and Corporate Relations starting in 2021.

#### **Lifelong learning:**

##### **new models of continuing education**

Digitalisation is rapidly changing the world of work. This development is closely linked to the changing, increasingly individualised learning behaviour of today's and tomorrow's generation.

Continuing education gives people the opportunity to secure their livelihoods by adapting to the needs of the labour market, and it helps maintain Switzerland's innovative strength and competitive advantage. We promote continuing education primarily by expanding our continuing education programmes, an effort that is supported by the School for Continuing Education. Our continuing education programmes are closely linked to our research activities and geared towards the needs of the labour market, both in terms of content and format.

#### **Measures and initiatives**

- We are expanding the innovation ecosystem in the Zurich region and accelerating knowledge and technology transfer by building on existing initiatives such as Technopark and the Innovation Park in Dübendorf.
- The construction of the ultra-modern Good Manufacturing Practice technology platform at the Department of Biosystems Science in Basel is advancing the knowledge translation process and progress in personalised medicine. This technology platform is creating strong synergies between the University of Basel, the University Hospital Basel and ETH.
- A new building for student and business projects is being built on Höggerberg campus. It will house existing initiatives such as the Student Project House and offer space for new projects that promote entrepreneurialism and collaboration with the private sector.
- Our new Certificate of Advanced Studies (CAS) programme in Entrepreneurial Leadership in Technology Ventures offers participants with backgrounds in the natural sciences or engineering essential skills in business administration, strategy and leadership.
- We offer continuing education programmes so that the Swiss workforce can meet the challenges of digital transformation. To this end, we will continue developing the School for Continuing Education and its research-related, market-oriented curriculum.
- Novel concepts and formats for lifelong learning provide support to graduates throughout their entire careers and also get them involved with ETH by providing a platform to contribute their knowledge and experience.



# Enabling strategies

Our staff is key to the success of ETH. Thanks to them, we achieve excellence in research, teaching, knowledge exchange and technology transfer. They are highly educated, engaged in lifelong learning and development, and participate in the success of our institution. Recruiting and appointing new professors plays an essential role in the continued development of our teaching and research activities. In addition, we maintain modern infrastructure and technologies and offer efficient, customer-oriented internal services. We anticipate and adapt to the requirements of digitalisation on an ongoing basis.

Quality assurance enjoys the highest priority in all areas at ETH. All members of the ETH community, whether they work as academics or in support or administrative roles, strive to achieve top quality in everything they do. By laying out ETH Zurich's qualitative goals and the measures it will take to achieve them, this Strategy and Development Plan is also part of the university's quality strategy. Our quality assurance principles, processes and responsibilities for teaching, research and knowledge transfer are outlined in a separate report entitled "Guidelines for the internal quality assurance system at ETH" (available in German only).

We are a socially responsible employer that creates attractive conditions for our employees. We support our staff in all job functions and at every level of responsibility. During the 2021–2024 period, we will place special emphasis on developing our management's leadership skills, increasing diversity and promoting equal opportunity.



## Diversity and equal opportunity

Diversity is a source of intellectual creativity, especially now that scientific work is increasingly collaborative in nature. We want to ensure the success of scientific work that is conducted by large interdisciplinary teams from across the world. This is why diversity is an important factor to our success.

We want to create an environment for working and studying in which all participants experience the same level of appreciation and support. We perceive diversity as an opportunity. This also includes making sure that women are involved in a variety of roles on all levels: whether as students, doctoral students, professors, or scientific, technical or administrative staff, having more women means having more diverse perspectives – which is key to remaining innovative and successful in the future. Just like at many other leading scientific and technical universities, women are under-represented at all academic career levels at ETH. For this reason, promoting women is one of our top priorities on every level. We will ensure that women can realise their potential at ETH.

In 1992, we established the Equal Opportunities Office, which now goes by the name Equal!. The Equal! office issues an annual Equality Monitoring Report and hosts a variety of events every semester. We will continue pursuing the measures outlined in the Gender Action Plan, which was launched in 2014. We are placing special emphasis on the Fix the Leaky Pipeline career development programme, which supports doctoral candidates and other young female scientists over the course of their academic careers.

### Objectives

- ① We foster a culture of appreciation, respect and inclusion that allows all members of the ETH community to productively interact on equal footing.
- ② We ensure equal opportunities and are working to increase the percentage of women in research and teaching at all levels, with emphasis on leadership positions and committee memberships.
- ③ We are increasing the proportion of female professors by striving to fill 40 percent of new professorships with women.
- ④ We define inclusion as a task shared by all organisational units at ETH. In doing so, we follow the principles of accessibility and participation.

### Measures and initiatives

- In order to increase the percentage of women at all levels – and especially as professors – we have set aside part of the budget to create ten additional professorships by 2024, on top of the professorships that were already planned.
- We address and avoid prejudice of all kinds and raise the ETH community's awareness of unconscious biases – for instance, by including the topic in teaching evaluations and as part of the professorial appointment process. We also train professors and other managers to be aware of bias in recruitment, promotion, supervision and conflict management.
- The Barrier-Free ETH Zurich project, which was launched in late 2018, is currently underway. This accessibility project aims to eliminate as many barriers as possible to improve access to ETH for everyone, regardless of impairment. This extends to students, staff and visitors. "Design for all" is the guiding principle, meaning that ETH is aiming for a general improvement in quality for everyone without erecting new barriers.
- We are strengthening work-life balance. We offer family-friendly conditions to members of the ETH community and work to continually develop these conditions.
- We pursue a variety of measures to strengthen communication and togetherness in order to promote multilingualism and the integration of all ETH members into the community. We offer new forums for exchange and interaction and encourage ETH Zurich members from Switzerland and abroad to take our language courses, which also helps to improve their skills for the labour market.

## Talent and early-career researchers

Our international positioning is contingent on our ability to recruit the most talented people from around the globe, no matter their gender or sociocultural background. Our students' and employees' different perspectives and experiences are a significant source of our school's strength as well as a source of enrichment for the ETH community. These perspectives and experiences also create added value when it comes to the global competition for talented people. Our goal is creating a working environment that can make use of this potential.

International mobility is a prerequisite for academic careers: as academia is international in nature, this allows us to acquire new expertise and create new collaborative partnerships.

For this reason, it is crucial to recruit, develop and build relationships with talented academic and non-academic staff. While recruiting international top talent is of central importance, we must also create excellent conditions to develop talented researchers from our own degree programmes, doctoral programmes and post-doc programmes.

### Doctoral studies at ETH Zurich

The doctorate is the first step in a scientific career in academia or business and lays the foundation for a successful management career. Doctoral programmes are our most important contribution to promoting early-career researchers. This is why supervising and mentoring doctoral candidates enjoys the highest priority. We provide holistic doctoral education that spans research, technical knowledge, soft skills and integration into the scientific community. Using these principles as a guide, we are expanding our doctoral education programmes based on scientific findings, international best practices, and a dialogue with doctoral student organisations.

Our doctoral students are selected based on their proven performance and academic potential. We give them the chance to join the scientific community by conducting independent research and to gain experience in teaching. This provides them with valuable qualifications for working in different areas later in their careers.

Experienced researchers act as supervisors to doctoral students, which plays a decisive role for success in their doctoral studies. We are expanding our training and support in this area for both professors as well as doctoral students.

### Objectives

- ① We train early-career researchers and prepare them for a career in academia or the private sector in a competitive global environment.
- ② We aim to systematically expand recruitment, training and supervision of early-career researchers. In doing so, we will also expand and support the optimal development of our career ecosystem.
- ③ We foster permeability and mobility between academic and private sector careers and equip early-career researchers with the skills and knowledge they need for different positions in the labour market, both inside and outside academia.
- ④ We offer our administrative and technical staff a variety of development opportunities, enabling them to maintain their performance and skill development throughout their careers.
- ⑤ We create an inspiring environment that allows for exchange and interaction among colleagues, academic freedom, and secure access to top-notch infrastructure.

### Postdoctoral researchers

Early-career researchers can take several paths: they can pursue academic careers with the goal of becoming a professor, aim for permanent employment within a research group, or take on demanding positions outside of academia. Early-career researchers in many disciplines decide on their future path during their time as postdocs.

Because the postdoc phase is a major bottleneck in the academic career trajectory, it is a time of great uncertainty for many early-career researchers. At the same time, employment opportunities outside academia are limited for postdocs. Bearing in mind the heterogeneity of postdocs as a group, we are systematically expanding our mentoring and development efforts for young scientists in this phase of their career. We are providing strategic continuing education and advice to support postdocs in choosing the right career path at an early stage: either quickly working to carve out the kind of academic independence required for an academic career or trying to establish themselves in the job market outside of the university. Here we will also need to raise awareness of alternative career paths and to support postdocs during transition phases.

### Administrative and technical staff

Having qualified administrative and technical staff with extensive specialised knowledge is key to ETH's success. Our staff contributes greatly to achieving excellence in research and teaching.

We are also an important training centre for vocational and professional education. ETH trains over 170 apprentices in a wide variety of professions, which helps Switzerland maintain its ability to compete as an attractive place to work.

### Measures and initiatives

- For doctoral programmes, we are introducing new measures in order to improve the supervision of doctoral students. For instance, we are developing an orientation programme for professors and providing doctoral students with a second mentor/supervisor (in addition to their thesis supervisor) in the early stages of their doctorate. In parallel, we are also implementing strategic measures to support collaboration between doctoral students and supervisors.
- We are intensifying our support for early-career researchers, with particular emphasis on diversifying internal research funding instruments and providing sufficient funding for the ETH Postdoctoral Fellowship programme. These funding instruments help us recruit outstanding postdoctoral talent.
- We are improving the onboarding of new postdocs through various events and training courses and are expanding our supervising and mentoring initiatives. We are paying special attention to promoting career development via events that are tailored to postdocs. We train supervisors and raise their awareness of the challenges that are common for academics on the postdoc level.
- We are encouraging and devising concepts for mobility within ETH as a development opportunity for interested members of staff.

## Leadership and good governance

Employees at all levels of our university are skilled and responsible. They deliver top performance in teaching, research, knowledge transfer and administrative functions. Students, staff and managers interact on a basis of trust, openness and respect. Our managers sustain and promote their employees' motivation and allow them to achieve top performance in their fields by giving them trust and autonomy on the job.

We cultivate a culture of empowerment and trust and make space for curiosity and creativity. This is our way of promoting critical thinking and empowering students and staff to develop and implement innovative ideas that arise at the forefront of current knowledge. Leadership responsibilities also include teaching good scientific practice.

This is why we provide targeted training and support to staff and researchers in leadership positions. We are extending the Executive Board by creating a new Vice President for Personnel Development and Leadership in order to cement leadership as an institutional value.

ETH has a code of conduct that guides how members of the ETH community should interact and sets out the values that the university stands for.

### Objectives

- ① We are developing the leadership skills of our managers and academic departments. Leadership skills are systematically taken into account as part of the appointment process for new professors and as part of the tenure process.
- ② We are strengthening our career development system in order to identify suitable candidates for managerial posts and strategically develop them via training and mentoring programmes.
- ③ With regard to corporate governance, we are adjusting structures, planning processes and decision-making processes in order to establish leadership as a pillar of ETH Zurich and its culture.

### Measures and initiatives

- Leadership skills and social skills are evaluation criteria considered by professorial appointment committees. They shape the committee's recommendation to the President, along with consideration of the candidate's excellence in teaching and research. When interviewing candidates, we also conduct separate panels with students and lecturers.
- After professors are appointed, we have various measures in place to introduce them to the ETH culture and their new management responsibilities. These measures are complemented by coaching and training programmes.
- Leadership skills and behaviour are aspects that are also increasingly taken into account during the tenure process. We offer leadership workshops to professors to help them with recruiting, supervising and mentoring doctoral students.
- We identify potential managers at an early stage. We are strengthening our training and mentoring courses and offering them to all managers commensurate with their level.
- We are expanding our contact and advice services for inappropriate behaviour by hiring more staff and bringing internal and external experts on board where necessary.

## International networks, partnerships and alumni

Our international involvement permeates all our activities, ranging from training and research to collaboration with alumni and partners all around the globe. We are in a position to support individual faculty members' initiatives thanks to our established presence in Singapore and other strategic partnerships and alliances. Our researchers and students work with partners across national borders, and the impact of our research enjoys international visibility. Our global network consists of universities and research centres, business partners, international organisations, NGOs and the media and includes thousands of people all around the world. Our alumni, scientists and friends use their personal and professional networks on behalf of ETH, expanding our visibility and reach on a global level.

From a national perspective, one of ETH Zurich's key tasks is strengthening Switzerland's international reputation in education, science and technology. As a leading member of the international academic community, we are in an excellent position to do so. We are internationally recognised for innovative, original research and excellent education with global reach. We define our goals and measures in the context of the globalisation of science, economics, politics and society.

Our current collaboration with universities in Asia is wide-ranging and successful but suffers from being rather fragmented. Cooperation with traditional partner countries such as Japan and Singapore – along with our steadily growing cooperation with Chinese partners – is greatly important to us. It is therefore necessary to have a strategic long-term approach in order to build effective and mutually beneficial relationships with our partners in Asia.

### Objectives

- ① We are strengthening our international networks and visibility through a collaborative approach to research. We are members of selected alliances and partnerships that generate added value for the entire university.
- ② We promote top performance in research by working together with other researchers with complementary abilities. This primarily occurs through interactions among researchers themselves, thanks to their efforts to continually develop research collaborations with global partners.
- ③ We enter into partnerships with leading universities and up-and-coming institutions in order to provide mutually beneficial student exchange opportunities. We ensure that our students gain experience in a variety of cultural environments while also receiving an excellent education in their chosen field.
- ④ We are increasing our involvement in Asia, with a special focus on China, and are using our strong established presence in Singapore as a springboard.
- ⑤ We are expanding our international alumni network and strengthening their impact as ambassadors and supporters for ETH on a global stage.

### Measures and initiatives

- We aim to advance our international collaboration activities by developing and strengthening our networks – particularly those in Europe, North America and Asia, while also looking towards developments in Africa. By expanding and consolidating the Singapore-ETH Centre, we will solidify our hub for research and innovation in Asia.
- We work with organisations and platforms that have strong international networks with the aim of boosting ETH's visibility on the international stage, recruiting talented people, and securing access to funding.
- Switzerland's neighbouring countries and the rest of Europe remain our most important partners for collaborative research and for recruiting students, researchers and professors.
- In North America, we are focusing on building and developing relationships with universities, businesses in the tech and start-up space, and philanthropists.
- We are raising our profile in Asia in order to recruit the best minds. In parallel, we are strengthening our intercultural knowledge and skills in order to facilitate our work with Asian partners. Thanks to selected partnerships and our role as the leading house for Switzerland's bilateral cooperation with the Asia-Pacific region (on behalf of SERI, the State Secretariat for Education, Research and Innovation), we are enjoying increased access to data, infrastructure and funding in Asia for our research and education activities.
- We will further develop our global alumni chapters and mobilise our alumni to build new relationships in research and private industry, intensify exchange, and create opportunities for our students.

## Infrastructure and resources

Credibility requires us to live up to our principles. For this reason, we foster a general culture of sustainability at ETH and apply these principles to sustainable construction on our campuses. We offer our university as a living lab to test the technical, social and economic aspects of sustainable development and integrate them into our daily lives. This extends to the entirety of research, teaching and employment operations at ETH. By constructing and operating sustainable buildings, we are able to promote the health, performance and satisfaction of our students and staff. Infrastructure that is planned, built and maintained according to these principles is a form of valuable capital over the longer term. With the help of innovative modern technology, we are creating an efficient, flexible and secure working environment to meet the needs of everyone at ETH.

Our real estate is a flexible strategic resource that allows us to fulfil our core missions in teaching, research, knowledge exchange and technology transfer. We expand our real estate based on future academic development, the principles of sustainability, and the maintenance of our investments.

ETH's space needs are growing and constantly changing. Drivers of this trend include the growing number of students and staff, along with academic planning needs. There is mounting pressure on infrastructure, spatial development and services. This pressure is due to internal and societal needs with regard to teaching and research with new technologies, new research priorities, and new research locations.

The digitalisation of all research areas is creating more demand for computing power and requires the ongoing expansion of our data infrastructure in order to remain globally competitive. The advent of digital technologies has also transformed teaching. New teaching and learning methods require an innovative and attractive learning infrastructure as well as access to cutting-edge information technology. The learning spaces of the future must therefore be flexible enough to adapt to changing needs and new technologies.

As digitalisation increasingly penetrates our society and research becomes more and more interdisciplinary, it is more important than ever to have a lively real-life community. For this reason, we see our campuses as a place of formal and informal exchange between various disciplines and the public. We invite stakeholders from society at large to participate in an active dialogue

### Objectives

- ① We offer modern, cost-effective, needs-based, coordinated assistance for teaching, research, and knowledge exchange and technology transfer.
- ② We aim to maintain and expand our excellent and flexible infrastructure and manage growth via the use of modern technologies.
- ③ We adhere to the principles of sustainable development by using our financial resources responsibly and by taking the environment and resource use into consideration when constructing, using and operating buildings.
- ④ We are advancing the digital transformation of the university and are actively accompanying all members of the ETH community on this journey.
- ⑤ We live by the principles of a responsible culture of health and safety.

with the ETH community and support these conversations as an integral part of our real estate and service strategy. We initiate a broad spectrum of social and cultural activities and strive to involve the broader population in ETH's campuses and services through active communication, tours, events, and other information and discussion sessions.

Safety and security are fundamental parts of the ETH Zurich culture. All members of the ETH community identify with a culture of safety and security that spans the spectrum from legal compliance to workplace safety.

#### Measures and initiatives

- We will continue expanding teaching infrastructure and services with a particular emphasis on online exams, modern lecture hall infrastructure, rooms for project-based teaching, and support for interdisciplinary collaboration.
- As part of our real estate strategy, we will continue developing our portfolio, especially on the Zentrum and Hönggerberg campuses at our main Zurich site. Our strategy is to maximise building density at our current locations before expanding to new sites. We are accommodating our rapid growth by entering into short-term rental arrangements, which gives us the flexibility to react quickly to unforeseen developments. We are developing ways to ensure that there is enough office space even in the face of limited financial resources. Our real estate planners are working to define space requirements, maximise density within buildings, and draw up plans such as desk sharing and multi-space concepts along with other forms of agile working (mix of teleworking and on-site presence). This type of planning also applies to the academic departments.
- We are making advances in digital transformation, data science, research data management, open access and open data with IT infrastructure that is stable, scalable and operates under reasonable security conditions. We are increasing our computing power to meet demand in a cost-effective way. A harmonised approach to hardware and software helps our employees get the job done.
- When it comes to our library's large, valuable holdings and collections, we adhere to open science principles and are using the opportunities presented by digital transformation in order to create added value for research, teaching and dialogue with the public. One example is the development of new innovative models of information management at the ETH Library Lab. We efficiently tailor what our library and collections offer based on the needs of our clients. For this reason, we are focusing on the following three priorities: consistent client focus, holistic client support, and the establishment of an integrated platform for information, communication, services and tools.
- We offer tailored, future-oriented courses and consulting services on safety and security issues in order to help people take a conscious approach to risks in their teaching, research and work activities. We are developing evidence-based risk reduction measures with regard to accident prevention and health protection.





In the spirit of the adage “the whole is more than just the sum of its parts”, ETH Zurich bundles and leverages its individual strengths in order to face the global challenges of the future. Thanks to our combination of basic research and interdisciplinary collaboration in strategic action areas, we are able to drive research forward in service of society. We also follow this principle when it comes to teaching, combining knowledge from various disciplines in order to provide our students with a well-rounded education. This is an important contribution to helping society meet the growing need for qualified graduates.

Even this strategy document was created in the tradition of ETH Zurich’s participative culture: it is the result of a broad, bottom-up process that involved the Strategy Commission, the four university groups (faculty, non-professorial scientific staff, students, and technical and administrative staff), and the academic departments. The process of drafting our strategy for the 2021–2024 period helped us analyse the landscape in which ETH is embedded along with the opportunities and challenges that the future will bring. This involved critical discussion between all stakeholders throughout the university as well as an internal consultation process. Thanks to the reflection and participation of the entire ETH community, we were able to develop a strategy that reflects the true complexity and diversity of our institution – showing that ETH Zurich is indeed more than just the sum of its parts.

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