2021 : Looking forward

We believe that science and technology allow us to understand our world and contribute to make it better.

We inspire and guide future generations of scientists, engineers and architects in order to develop tangible solutions to shape a better world for all together.

This is achieved through promoting, sharing and transferring knowledge, by training responsible leaders in technology and by developing and supporting meaningful innovation.

I am pleased to share with you the broad outlines of EPFL's strategic plan for the 2021–2024 period. The strategy was developed through a fully collaborative approach involving the deans and more than a hundred members of the EPFL community. I wish to thank all those who helped us in this important endeavor for their hard work and dedication.

I would also like to take this opportunity to thank my colleagues on the outgoing management team for their selfless and tireless commitment to EPFL over the past four years.

I will not look back on 2020, except to say that it was not an easy year for the EPFL community. The COVID-19 pandemic has demanded many sacrifices from all of us, but you have demonstrated courage and resilience. I am grateful for all your efforts in helping stop the spread of the virus.

Despite the worry and uncertainty surrounding the pandemic, there are some bright spots: it has helped us focus on our core missions – namely, research, education and innovation – while making our organization more resilient and efficient. It has also strengthened our sense of community. Indeed, it is only as a community that we will be able to address the challenges of the 21st century. Finally, the pandemic has reminded us that a university is based on shared values embedded in a campus culture. And this culture needs to evolve for us to remain relevant and in tune with society, be it in terms of diversity, inclusion, ethics or meaningful technology, to name just a few topics that require our attention.

Academic start of EPFL students © A. Herzog / EPFL

Research

As a research university, our talented faculty members and their research labs are among our greatest assets. With generous base funding and state-of-the-art facilities, our faculty members enjoy a high level of academic freedom. But with great freedom comes great responsibility, be it in delivering excellence in science and technology, conducting top-notch teaching and mentoring, achieving unique innovations and performing knowledge transfer, or serving our society.

For the 2021–2024 period, we have identified six academic priorities that span our various disciplines and schools and will enhance our impact in the coming years:

- **Strengthening fundamental sciences:** Fundamental sciences are the alpha and omega of an institute of technology. They were strengthened at EPFL 20 years ago, when they were fully transferred from the University of Lausanne (UNIL), and we now plan to further increase and enhance our capacities in these areas. These efforts will be accompanied by investments in an Advanced Sciences Building (ASB) and the launch of a Quantum Science & Engineering initiative, involving three EPFL schools, to name just one example.

- **Climate change:** While the COVID-19 pandemic's time horizon is measured in years, the climate crisis is unfolding over decades. This does not diminish the sense of urgency, as further delays in climate action will make it more difficult and more expensive to achieve the goals set out in the Paris Agreement. As an institute of technology, we have a particular responsibility to contribute to a sustainable society through our educational programs, research, technological developments and innovation activities. To amplify our impact, we have joined forces with UNIL to create the CLIMACT Center, and with UNIL and IMD to create the Enterprise for Society Center (E4S).

- **Imaging:** It is no surprise that the two Nobel prizes recently awarded to scientists in the Lake Geneva region were in areas where imaging plays a key role. From cryogenic electron microscopy (cryo-EM) to astrophysics – and the many fields in between – the capacity to acquire new forms of data, process them, apply state-of-the-art machine learning and ultimately derive new knowledge will be critical to advancing science and engineering. This is precisely where the EPFL imaging initiative comes into play. The Dubochet Center for Imaging (DCI), a joint initiative of EPFL, UNIL and the University of Geneva, will be a cornerstone of this initiative, bringing state-of-the-art cryo-EM tools to the region.

- **Intelligent systems:** If there were a need to show that machine learning and artificial intelligence are transforming science, then the protein-structure prediction problem would be a showcase example. For decades, this was one of the great challenges in computational biology. Yet in the last couple of years, an interdisciplinary team at DeepMind has made significant progress with a program called AlphaFold. The lessons we can draw are twofold: machine learning and artificial intelligence permeate all fields of science and engineering, and interdisciplinary teams are crucial to achieving success. Our Center for Intelligent Systems (CIS), which involves all five EPFL schools, along with our key role in the Swiss Data Science Center (SDSC) shows our commitment to this field.

- **Neuro-X:** The convergence of neuroscience, engineering and artificial intelligence is creating a unique opportunity to address 21st-century challenges in the area of neurotechnology. With the launch of Neuro-X, a cohesive network of researchers from EPFL and other Swiss entities dedicated to neuroscience, neurocomputation, neurotechnology and clinical translation, we will strengthen our position as a leader in neuro-related fields and create a unique ecosystem for basic and translational research, leading-edge education and technology transfer.

- **Health sciences and technology:** The COVID-19 pandemic has demonstrated the importance of technology in health-related research. From drug discovery to public-health issues, advanced technology at the interface between engineering and health sciences is playing an increasingly critical role. As a case in point, our joint initiative with CHUV and UNIL on cancer research is one of several projects in which EPFL is engaging with health sciences.

It also became clear during the COVID-19 pandemic that technology alone is not sufficient: public acceptance of technology is critical from the start.

Education in and for the 21st Century

Being a research university, there is a tight two-way link between our educational programs and our research agenda, as the following two examples demonstrate:

1. Our emphasis on fighting climate change will require all of our students to learn about climate science, how to engineer solutions, and what the implications for society and the economy are.

2. The boundaries between life sciences, engineering, computer science and health are fluid, and cross-fertilization has many benefits, as reflected in our flexible course offerings that span these fields.

The osmosis between research and teaching is a fantastic opportunity that benefits students and researchers alike. It also means that we at EPFL must constantly evolve our curriculum and teaching methods while maintaining the quality standards for which our School is known.

Learning by doing, or project-based learning, will remain an important part of the educational experience at EPFL, from semester projects to the Discovery Learning Labs. This approach is motivating for students – many of whom are engineers at heart wanting to solve real problems – and an excellent preparation for life outside our school.

When it comes to data science skills for our students, our computational thinking courses and emphasis on open science are the right training for the next generation of scientists and engineers.

The unusual situation in 2020 helped us see what works and what doesn't. Thanks to our early investments in MOOCs, EPFL was well-prepared for online teaching. The COVID-19 crisis matured our approach to teaching and indicated a path for the future, which will likely be hybrid, blending in-person and online courses.

As an organization with education as a core mission, we also plan to boost our continuing education programs across EPFL while ensuring that the digital transformation does not lead to a digital divide – a risk for EPFL and, more generally, our society.

Lab work
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Innovation

Several vaccines were developed in less than a year – what better proof is there that research and innovation go hand in hand? Another stunning feat was the development of an original protocol for digital contact tracing in less than two months!

At EPFL, our innovation ecosystem is alive and well. Recent initiatives have promoted programs including students, as the entrepreneurial spirit is widespread among them and needs to be nurtured. In addition, we have broadened the scope of innovation in Tech4Good and expanded our collaboration with NGOs, like the ICRC to take one example.

We have also strengthened our relationship with SMEs, a key component of the Swiss economy. Finally, our Innovation Park network continues to grow and remains a major attractor and interface with the business world.

Our startup and venture capital ecosystem is growing, and we expect many more research and innovation ideas to lead to companies in the years to come. The pipeline is full, and some of the mature spin-offs are on the way to great success, as unicorns or through IPOs.

Under our 2021–2024 strategy, we will keep building strong R&D partnerships and synergies with other Swiss universities, cantons and local businesses. Our satellite campuses in Neuchâtel, Geneva, Valais and Fribourg will play an important role in achieving this objective.

Our special relationship with ETHZ and the research institutes of the ETH domain will continue to grow, as the potential for collaborations and synergies is very interesting.

Soldiers testing SwissCovid app at EPFL © EPFL / J. Caillet

Campus operations and services

The pandemic has impacted our operations in unforeseen ways. Having to work remotely has pushed forward EPFL's digitalization in a substantial way, and the lessons learned will stay with us.

Our new organizational structure unifies all our operations – from running the campus to construction, HR and IT services – under a single vice presidency. This will make it easier to manage our campuses in a coherent and efficient way.

This new structure will also enable us to use our campuses as a laboratory to develop and implement sustainability-oriented initiatives in education, research, innovation and the energy transition.

Values

In an organization like EPFL, whose members have many diverse functions, commitment to a common purpose and shared values are key determinants.

Consistent with our public mission, EPFL's purpose is to advance knowledge, education and innovation for the good of society. Under our 2021–2024 strategy, our activities will be guided by a strong commitment to diversity, excellence, inclusiveness, integrity, mentorship and respect (these values are in alphabetical order, not order of importance, for they are all important). We will aim for participative governance, and we value the power of collaboration and mutual trust.

Let me conclude with the famous words of Helen Keller, American author, activist and lecturer: *«Alone we can do so little; together we can do so much.»* It is thus only together that we will be able to continue our School's fabulous trajectory!

Martin Vetterli, EPFL President

Academic start of EPFL students
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