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Switzerland.



Science-Switzerland, October – November 2020

News on Swiss science, technology, education and innovation



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swissnex Network Celebrates 20th Anniversary

(State Secretariat for Education, Research and Innovation, October 15, 2020)

Ever since the first location opened in Boston in October 2000, swissnex has been connecting Switzerland with the rest of the world in the fields of education, research and innovation (ERI). It fosters the international exchange of knowledge, ideas and talent, as well as promotes the excellence of Swiss research and innovation abroad. As it celebrates its anniversary, swissnex is looking into the future by engaging researchers, entrepreneurs, and visionary leaders to imagine the role of the Swiss ERI landscape on the global stage in 2040 during its "nex20 - connecting tomorrow" program. In this context, the swissnex Network will host various activities in different formats across four themes: Learning Tomorrow, Meeting Tomorrow, Working Tomorrow and Living Tomorrow.



[/web/2020/00-201015-42](#)

Switzerland Remains World's Top Talent Hub

(IMD Business School, November 17, 2020)

For the 7th year in a row, Switzerland retained its leading position in the IMD World Talent Ranking, which aims to capture the capacity of an economy to develop as well as attract talent to strengthen its competitiveness. In particular, Switzerland was praised for its high-quality education system and focus on apprenticeships, where it led the ranking in the effective implementation of apprenticeships and placed second in the total public expenditure on education per student. The report further highlighted that Switzerland remains very attractive to highly-skilled foreign professionals, due to its high quality of life and generous remuneration. The country also scored well in the efficiency of its health infrastructure and in the impact of brain drain in its economy.



[/web/2020/00-201117-47](#)

ETH Spin-Off Performance Study

(ETH Zurich, October 06, 2020)

With around 500 ETH Zurich spin-offs now in existence, these businesses play a key role in the transfer of knowledge to the Swiss economy. In order to estimate their performance and economic added value, a detailed analysis was recently performed for the third time. To highlight a few results, the group of 145 ETH spin-offs analyzed as part of the study was shown to have created around 4,500 full-time equivalent jobs and generated almost CHF 900 million in revenue in 2017, with the money multiple at 3.6 on average. Although pleased with how the spin-off culture continues to develop at ETH Zurich, Detlef Günther, Vice President for Research and Corporate Relations, nevertheless reiterated their priority to strive for gender equality and to continually improve their support services.



[/web/2020/00-201006-6a](#)

1. Policy

Parliament Sets Course for ETH Domain, ERI Dispatch, Horizon Europe

(Scienza, November 26, 2020)

During its upcoming winter session, the Federal Parliament will deal with various matters of great importance to the ETH Domain. First, it will debate the revision of the ETH Law, which forms the basic framework for the autonomy, mission and organization of the ETH Domain and its institutions. The amendments to the law relate in particular to corporate governance, personnel law and the implementation of recommendations proposed by the Swiss Federal Audit Office, but the National Council and Council of





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States do not agree on all points. Second, Parliament will adopt the so-called "ERI Dispatch," which deals with the finances, tasks and goals for the next four years of the ERI players that are (co-)financed by the federal government. Finally, the National Council is to debate Switzerland's contribution to the EU research program Horizon Europe.

[/web/2020/01-201126-95](#)

2. Education

World's First University of Applied Sciences Launches edX Courses

(Zurich University of Applied Sciences, October 06, 2020)

The Zurich University of Applied Sciences (ZHAW) recently launched its first two freely accessible online courses on edX. ZHAW is the first university of applied sciences worldwide and the third university in Switzerland to offer courses on edX, which, according to Minna Maria Koponen, the edX Production Process Project Leader, "offer an accessible opportunity to study versatile and high-quality courses."



The first two ZHAW online courses – "Global Business and Human Rights" from the School of Management and Law and "Aquaponics: The Circular Food Production System" from the Department of Life Sciences and Facility Management – are offered in English and will start on 1 March 2021. Further ZHAW online courses from various departments are already in planning or in production as well and will be offered in German or English.

[/web/2020/02-201006-17](#)

New ETH Building for Students and Entrepreneurial Talent

(ETH Zurich, October 05, 2020)

ETH Zurich is building a new center for student initiatives and entrepreneurial talent at its Hönggerberg campus. The new center will offer modern, versatile office space, multipurpose rooms and is going to accommodate the increasing student numbers as well. The concept reflects ETH Zurich's educational philosophy, which aims not only to give students fundamental expertise, but also to enable them to develop their own ideas and to transform them into projects. As explained by Ulrich Weidmann, Vice President for Infrastructure at ETH Zurich, the winning project "impressed the jury for the particular attention it pays to the locational quality of the Hönggerberg campus, while integrating the new building thoughtfully into the future campus development." Construction is going to begin in 2024.



[/web/2020/02-201005-6c](#)

New Data Science Bachelors Program

(Zurich University of Applied Sciences, October 22, 2020)

The University of Applied Sciences Zurich (ZHAW) recently introduced a new Data Science Bachelors program, which will cover a wide variety of topics, including data acquisition, data editing, data analysis, data-based machine learning, as well as the visualization and implementation of data products. Advanced aspects, such as the responsible handling of data, are also part of the curriculum, and in addition, the program offers a wide variety of electives in the final year in order to provide students with the opportunity to practically apply what they had previously learned. As a result, students will acquire both, expert skills in basic disciplines, such as computer science, statistics and mathematics, as well as a broad and interdisciplinary domain knowledge to develop innovative data products.

[/web/2020/02-201022-65](#)



Frédéric Herman Appointed Rector of the University of Lausanne

(University of Lausanne, November 19, 2020)

The Council of the State recently appointed Frédéric Herman as the new Rector of the University of Lausanne, who will succeed Nouria Hernandez, the current Rector, on 1 August, 2021. In particular, the Council of the State was impressed by Herman's excellent scientific background, his international academic experience, his managerial skills, as well as his ambitious and promising vision for the future of the University of Lausanne. In this context, Herman stated that he aims to build on his predecessors' efforts to develop fruitful cantonal and federal collaborations, especially with the CHUV and EPFL, to initiate interdisciplinary research centers dedicated to current issues and to better highlight the University of Lausanne's contributions to society.



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3. Life Science

Gender Medicine and Covid-19

(University of Zurich, October 01, 2020)

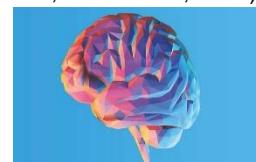
Although a coronavirus infection affects different people in different ways, the disparity is particularly striking between men and women, which, according to University of Zurich cardiologist and Catherine Gebhard, makes this pandemic a textbook example of the still little-known discipline of gender medicine. For example, men are more likely to be hospitalized, occupy more beds in the intensive care unit, and need more intensive and longer treatment than women, which is why Gebhard and her colleagues have recently developed a study to better understand the influence of sex and gender on the progression of Covid-19. However, Gebhard also underlined that "gender medicine looks not only at biological factors but also at cultural and social aspects," which is important, because their effects are not always the same. For example, after lockdown, more women were infected than men.

[/web/2020/03-201001-cf](#)

Precise Drug Delivery in the Brain Using Ultrasound

(ETH Zurich, October 05, 2020)

Researchers at ETH Zurich recently developed a method for concentrating and releasing drugs in the brain with pinpoint accuracy, which is set to enable treatment of psychiatric and neurological disorders and tumors with fewer side effects in the future. In order to prevent a drug from acting on the entire brain and body, the new method involves special drug carriers that wrap the drugs in spherical lipid vesicles attached to gas-containing ultrasound-sensitive microbubbles. After these drug carriers are injected into the bloodstream, the scientist employs low energy ultrasound waves to cause them to aggregate at the desired site within the brain, before using a higher level of ultrasound energy to get them to vibrate. Shear forces subsequently destroy the lipid membranes around the drugs, thereby releasing the drugs to be absorbed by the nerve tissue present at the site.



[/web/2020/03-201005-e8](#)

Crystallizing Membrane Proteins

(Paul Scherrer Institute, October 19, 2020)

In order to explore the function of proteins and, for example, develop drugs against viruses or bacteria, researchers first need precisely determine the structure of these molecules. Crystal structure analysis represents the most reliable way to do this, but unlike table salt or sugar, so-called membrane proteins – on which approximately a third of all currently approved drugs act – are not soluble in water, which makes it especially difficult to crystallize them. In order to circumvent this problem, Paul Scherrer Institute researchers, as well as external users who use the Swiss Light Source (SLS) to decipher the structure of



membrane proteins, therefore employ a particularly ingenious crystallization method, which was developed by Chia-Ying Huang, in cooperation with researchers at SLS, at Trinity College Dublin. In the meantime, Huang has been working as a crystallographer at SLS for four years.

[/web/2020/03-201019-6a](#)

Bacteria Reinforce Their Protective Shield

(University of Basel, October 22, 2020)

In order for bacteria to ensure that their outer cell membrane, which protects them from external influences, remains intact and functional, they must be able to continuously replace damaged outer membrane proteins and adapt their arsenal of proteins to their specific needs. In this context, the bacterial protein Skp is of vital importance, as it "protects and transports newly synthesized, still unfolded membrane proteins from the inner to the outer membrane," as explained by Professor Sebastian Hiller. Based on its atomic structure, Hiller, along with his team of researchers from the University of Basel, in collaboration with Professor Dirk Bumann, recently uncovered how Skp modulates its activity for the first time, and demonstrated that Skp is important for the virulence and survival of pathogens in hostile host environments, which is relevant for the treatment of infectious diseases

[/web/2020/03-201022-0d](#)



Innovative Hadron Therapy Gantry Design

(EPFL, October 23, 2020)

Under the supervision of EPFL Professor Bertrand Dutoit, as well as the mentorship of Luca Bottura, who leads CERN's magnet group, Enrico Felcini has become the proud co-creator of GaToroid – a new hadron therapy gantry design, based on superconducting magnets, that has the potential to change the future of how we treat cancer. Hadron therapy, which makes use of charged particles to deliver a highly localized dose to a tumor, currently requires a complex assembly of magnets in giant machines – the size of a four-story building – to ensure that these particles go to exactly the right place in the patient. Therefore, by reducing the size and complexity of hadron therapy machines, this innovative technology aims to make hadron therapy far more accessible.

[/web/2020/03-201023-34](#)



Blocking Testosterone Can Limit Skin Cancer

(University of Lausanne, November 02, 2020)

Melanoma is the fifth most common tumor in the world and an example of primary clinical significance for investigating sex-related differences in cancer incidence and survival, as males have a greater susceptibility than females across all ages. It occurs when the cells that produce the pigment that gives the skin its color – the melanocytes – become cancerous and in this context, a study conducted at the University of Lausanne, in collaboration with the University of Zurich, recently revealed the essential role played by certain sex hormones called androgens, notably testosterone, in its development. Specifically, the researchers were able to demonstrate that suppressing the communication between these hormones and their receptors not only caused the diseased cells to proliferate less, but also activated the immune system to fight the tumor.

[/web/2020/03-201102-7d](#)

Significant Vulnerability in Prostate Cancer Detected

(University of Bern, November 03, 2020)

An international team, led by researchers at the University of Bern, recently identified a novel vulnerability in advanced prostate cancer that no longer responds to hormonal therapy. To achieve this, the scientists focused on so-called epigenetic changes, which do not involve alterations of the DNA genetic code, but often regulate gene activity and expression, and can be hijacked by cancer cells to "favor their growth over the surrounding normal cells," as explained by Professor Mark Rubin. In this context, the team was able

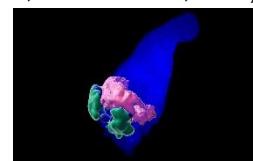


to identify a novel dependency of prostate cancer cells, called the SWI/SNF complex, which according to Anke Augspach, a post-doctoral fellow at the University of Bern, can be "explored as a vulnerability to developing new treatment approaches for advanced prostate cancers resistant to hormone treatment."
[/web/2020/03-201103-69](#)

Organoids Produce Embryonic Heart

(EPFL, November 11, 2020)

A team of EPFL bioengineers recently used organoids – lab-grown tissues and organs that are anatomically correct and physiologically functional – to mimic the early development of the heart in a mouse embryo. To achieve this, the researchers grew the organoids from mouse embryonic stem cells, which, under specific conditions, formed an aggregate called a “gastruloid,” which can follow the developmental stages of the mouse embryo. Most importantly however, the gastruloids developed a so-called “anterior cardiac crescent-like domain,” which produced a beating heart tissue, similar to the embryonic heart. This breakthrough work therefore opens up an entirely new dimension to organoids by demonstrating that they can also be used to mimic embryonic stages of development.



[/web/2020/03-201111-f6](#)

Viruses that Heal

(University of Zurich, November 13, 2020)

Despite the fact that bacterial infections continue to be one of the most challenging health problems and impose a tremendous burden on our health care system, the common treatment approach still consists of administrating antibiotics, which causes adverse medical and socioeconomic effects, including the development of antibiotic resistance and the disruption of the normal microbiome. Therefore, eight research groups of the University of Zurich, ETH Zurich, University Hospital Zurich, and Balgrist University Hospital recently joined forces to develop a fundamentally new therapeutic option in the context of the "ImmunoPhage" project. The aim is to equip bacteriophages – highly specialized viruses that attack and destroy bacteria – with elements that specifically support immune defenses in order to develop a generalizable, sustainable and tailored approach for the treatment of bacterial infections, and potentially also inflammatory diseases.

[/web/2020/03-201113-7b](#)

Center for Artificial Intelligence in Medicine

(University of Bern, November 17, 2020)

In order to give the Bern medical hub an edge for the future of digital medicine, the University of Bern and the Inselspital are founding the "Center for Artificial Intelligence in Medicine" (CAIM) – a research, teaching and translation platform for medical technology that will use AI to deliver better care to patients and facilitate the work of doctors and nurses. By bundling transdisciplinary know-how from the Bern Biomedical Engineering Network, CAIM will not only promote and expand projects dedicated to the potential of AI technology for healthcare, but it will also foster the commercialization of AI technology innovation, support startup incubation and create sustained value through best in class research, translation and economic growth. CAIM will be inaugurated in January 2021, with sitem-insel and the University Psychiatry Services (UPD) as partners.



[/web/2020/03-201117-5f](#)

Sulfur Molecule Blocks Uptake of SARS-CoV-2

(University of Geneva, November 18, 2020)

Although studies suggest that sulfur compounds play a role in a mechanism known as thiol-mediated uptake, which enables the very difficult passage from outside to inside the cell, there remains considerable skepticism from the scientific community, most likely due to the lack of inhibitors available to test it. However, researchers led by University of Geneva Professor Stefan Matile were recently able to identify



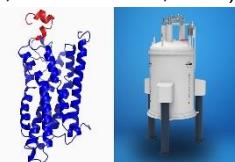
inhibitors that are up to 5,000 times more effective than Ellman's reagent, and, with the help of Neurix, discovered that one of the inhibitors was effective at blocking SARS-CoV-2's entry into cells in vitro. Although Matile stressed that it would be "entirely speculative" to say that they discovered an antiviral drug against coronavirus, he nevertheless contends that "thiol-mediated uptake could be an interesting line of enquiry for developing future antivirals."

[/web/2020/03-201118-31](#)

Cutting-Edge NMR-Based Structural Biology

(University of Zurich, November 19, 2020)

The University of Zurich recently joined forces with ETH Zurich and the University of Basel to acquire two new cutting-edge nuclear magnetic resonance (NMR) spectrometers, which, as explained by UZH chemist Oliver Zerbe, will allow them to analyze large molecules at unprecedented resolution. Although expensive, this high-tech device is essential for anyone wanting to play in the top league of structural analysis worldwide, as researchers in this discipline need to break down the three-dimensional structure and shape of macromolecules to the level of individual atoms in order to gain insights into how vital molecules function and fulfill their tasks in the cells of the body. These for example include membrane proteins, which regulate the movement of small molecules in and out of the cell, as well as DNA and RNA molecules, which contain genetic information.



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4. Nano / Micro Technology / Material Science

Highly Efficient and Stable Perovskite Solar Cells at 23%

(EPFL, October 01, 2020)

Perovskites are a class of materials made up of organic materials bound to a metal, which, thanks to their fascinating structure and properties, are being studied for use in a wide range of applications. Metal-halide perovskites are especially popular, and are being considered for use in solar cells, LED lights, lasers, and photodetectors. In this context, a team of EPFL researchers led by Michael Grätzel and Anders Hafgeldt was recently able to successfully overcome a limiting problem with stabilizing the best-performing formulation of metal-halide perovskite films, thereby turning the photoinactive FAPbI₃ perovskite films to the desired photosensitive ones. The scientists subsequently used the new FAPbI₃ films to make perovskite solar cells, which showed more than 23% power-conversion efficiency, as well as long-term operational and thermal stability.

[/web/2020/04-201001-f7](#)

Plug & Play Micromanufacturing

(Micronarc Magazine, October 01, 2020)

Following the successful development of the Micro5 – which consumes ten times less energy and takes up five times less floor area than conventional 5-axes milling machines – in 2016 by engineers at the Haute Ecole Arc (HE-Arc), the team recently introduced their newest breakthrough in smart and micro-manufacturing, called the “Microfactory.” This factory is not just a single milling machine, but includes the entire production system used by the micro-engineering industry, which, thanks to its “plug and play” technology bricks, can be designed to be exactly the right size for the components and finished products it manufactures. Furthermore, the factory’s efficient scaling not only helps minimize its energy consumption, but by allowing manufacturing to take place closer to the end user, it also reduces the need for energy intensive, global logistics with risky supply chains.



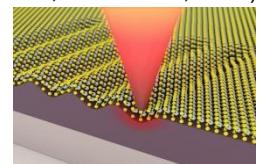
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Modifying 2D Materials with a Nanometric Tip

(EPFL, October 15, 2020)

Made up of just one or few layers of atoms, 2D materials are highly promising for the manufacture of next-generation electronic and optoelectronic devices. In this context, a team of EPFL researchers recently developed a new method to change the physical properties of these materials using thermal scanning probe lithography (t-SPL). To achieve this, the scientists placed a heated nanometric tip on the material and exerted pressure to create the desired shape – in this case, wavy – while carefully controlling the force and temperature. Compared to existing methods, this thermo-mechanic approach allowed the researchers to "create larger deformations and therefore produce wider variations in a material's physical properties," as explained by Ana Conde Rubio, a scientist at the EPFL lab.



[/web/2020/04-201015-c5](#)

Efficient Production of Fiber-Reinforced Plastics

(ETH Zurich, November 17, 2020)

Fiber-reinforced plastics have emerged as a promising lightweight construction material, as millions of wafer-thin fibers provide load-bearing capacity, while the plastic between them keeps the weight down. However, producing this high-tech material currently remains laborious and expensive, which is why ETH Zurich Pioneer Fellow Christoph Schneeberger has been developing a cheaper, more efficient production process, which consists of applying the plastics to the fibers while they are still being spun. This method not only makes fiber-reinforced plastics more attractive to manufacturers, but due to the fact that the fibers are clad in a meltable, recyclable plastic, it could also help make large construction components more sustainable, as these are traditionally made from glass fiber in combination with thermosetting plastics, which do not melt and therefore are not recyclable.

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New Fabrication Process for Soft Synthetic Materials

(EPFL, November 19, 2020)

Although we often take the fascinating set of mechanical properties of soft natural tissues, such as skin, cartilage and tendons – which are tough enough to support our bodyweight and movements, yet flexible enough that they do not crack easily – for granted, it is very difficult to replicate this unique combination in synthetic materials. However, by taking their cues from nature, a team of EPFL researchers recently developed a novel 3D printing approach to fabricate strong and tough composite polymers – called double network granular hydrogels (DNGHs) – that more closely mimic materials found in the natural world. This groundbreaking discovery not only has potential uses in soft robotics, but it could also be applied to develop biocompatible materials for cartilage prosthetic implants.

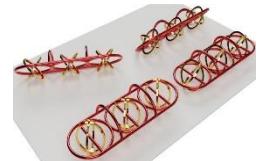


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Two-Component Microrobots for Precision Medicine

(ETH Zurich, November 24, 2020)

Researchers at ETH Zurich recently developed a technique for manufacturing micrometer-long machines that promise to revolutionize the field of medicine in the future. To achieve this, the ETH scientists first applied a high-precision 3D printing technique – known as 3D lithography – to produce a kind of mold or template for their micromachines, before subsequently using electrochemical deposition to fill some of the grooves with metal and others with polymers, and ultimately dissolving the template away with solvents. Following the successful creation of several proof-of-principle vehicles with plastic chassis and magnetic metal wheels, the scientists are now planning to refine their two-component micromachines, experiment with other materials, and attempt to create more complex shapes and machines, including some that can fold and unfold themselves.



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5. Information & Communications Technology

"Trust Valley" Promotes Digital Trust and Cybersecurity

(Trust Valley, October 08, 2020)

The Cantons of Vaud and Geneva recently joined forces in an unprecedented way to launch the "Trust Valley" – a public-private partnership aimed at promoting excellence in the Lake Geneva region in the field of digital trust and cybersecurity. Cooperation is built around three main areas – the influence of this unique ecosystem, innovation, and the networking of regional players in the field of digital trust and cybersecurity – and three flagship projects have already started. These include "Tech4Trust," which is an acceleration program for innovative startups committed to fostering digital trust in our society and economy; "Food by Trust Valley," which is an initiative that aims to develop trust and digital tracking solutions in the agritech and agrifood sector; and "Health by Trust Valley," which is a mapping initiative that is working on post-COVID-19 projects.

[/web/2020/05-201008-df](#)

First Swiss AI Award

(startupticker.ch, October 09, 2020)

Daedalean was recently announced as the winner of the first Switzerland-wide AI Award at AiCon2020 – a new festival for AI innovations that brings together science, industry, politics and society in order highlight the role that Switzerland can play as a leading center for AI. During the festival's first edition, whose motto was "Amazing AI Innovations," various players in the field presented the results of their work in keynotes, podium discussions and AI product demonstrations and jointly discussed how innovative AI developments and discoveries can be used to benefit humanity. The Swiss AI Award in turn is set to be held annually to promote the important topic of artificial intelligence. An expert jury had previously selected Daedalean, along with the other finalists – Gamaya and Typewise – from hundreds of different start-ups.

[/web/2020/05-201009-6d](#)

New ETH Zurich AI Research Center

(ETH Zurich, October 20, 2020)

ETH Zurich recently opened a new research center for artificial intelligence, which, according to Detlef Günther, Vice President for Research at ETH Zurich, aims to "intensify interdisciplinary dialogue with business, politics and society through the innovative and trust-building advancement of artificial intelligence." The ETH AI Center is made up of core members, which already comprise 29 professors from seven departments who specialize in fundamental AI topics, as well as associate members and AI fellows. In addition, the new research center will also become an incubator for AI startups, facilitate joint research projects with international experts in an Open Lab, and will become part of the European AI research network ELLIS.

[/web/2020/05-201020-24](#)

White Paper: Quantum Technology in Switzerland

(Swiss Science Council, October 27, 2020)

According to a recent White Paper published by the Swiss Science Council, Switzerland is in an excellent position to grow and foster a flourishing quantum technology ecosystem. In this context, one of the main challenges concerns early-stage knowledge and technology transfer from basic research conducted at Swiss universities to industry. This can be explained by the fact that some of the potential applications of quantum technology are still at an early stage of development and that knowledge about quantum technology among providers of venture capital in Switzerland appears to be scarce. As a result, the authors underlined the need for increased coordination and communication between academia, startups, potential capital donors and incumbent companies in industry sectors that are potentially affected by future developments in quantum technology.

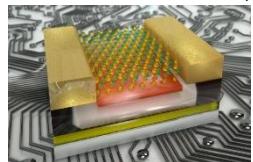
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Next-Generation Computer Chip for AI

(EPFL, November 05, 2020)

A team of EPFL engineers recently developed a next-generation circuit that allows for smaller, faster and more energy-efficient devices, which would have major benefits for artificial intelligence systems. Specifically, their revolutionary technology is the first to use a 2D material (MoS₂ to be exact), for what is called a "logic-in-memory architecture" – in other words, a single architecture that combines logic operations with a memory function. As explained by Professor Andras Kis, this circuit design has several advantages, such as "reduc[ing] the energy loss associated with transferring data between memory units and processors, cut[ting] the amount of time needed for computing operations and shrink[ing] the amount of space required," which "opens the door to devices that are smaller, more powerful and more energy efficient."



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Finding Logic Bugs in Database Management Systems

(ETH Zurich, November 11, 2020)

With database systems increasingly under pressure to become more and more powerful, reliability appears to be suffering as a result. To address this issue, a team of ETH Zurich computer scientists recently developed a tool that automatically detects logic errors – which are very difficult to find, because in contrast bugs that cause the system to crash, logic errors rarely have an obvious effect – in database systems using three different methods. This has already allowed the researchers to find over 450 unique, previously unknown programming defects in widely used database management systems, including "over 150 programming errors in the SQLite database systems, which runs on almost all smartphones and in many web browsers as well," as explained by Manuel Rigger, a postdoctoral researcher in the Advanced Software Technologies Lab.

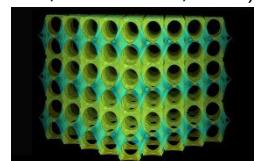
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6. Energy / Environment

Na-Based Hydroborates for Next-Generation Batteries

(University of Geneva, October 08, 2020)

Although lithium batteries are vital to powering our electronic devices and electric vehicles, they have a number of drawbacks. For one, lithium requires liquid electrolytes, which are highly explosive in the event of a leak. In addition, "lithium isn't found everywhere on earth, and it creates geopolitical issues similar to those surrounding oil," as explained by UNIGE postdoc Fabrizio Murgia. In this context, a team of crystallographers from the University of Geneva recently developed a non-flammable, solid electrolyte – in this case a hydroborate consisting of boron and hydrogen – that operates at room temperature and that transports sodium instead of lithium. This winning combination could also make it possible to manufacture more powerful batteries, and as such, the article provides battery developers with a real toolbox for manufacturing solid electrolytes.



[/web/2020/06-201008-7e](#)

Improving Enzymatic PET Degradation

(Zurich University of Applied Sciences, October 14, 2020)

Following the discovery of "PETase" – a protein that originates from the *Ideonella sakaiensis* bacteria and can break down PET – by Japanese scientists in 2016, a research team led by Zurich University of Applied Sciences Professor Rebecca Buller-Bloemberg has been working to improve the efficiency of the enzyme. To achieve this, the researchers are using the so-called "directed evolution" process,





which imitates the mechanisms of natural evolution in the laboratory to improve selected properties of enzymes, as well as a customized robotic platform and machine learning. The team has already observed significant improvements in enzyme activity after the first round of evolution, and according to Buller, these improved enzyme variants could be used in the treatment process for drinking water to break down microplastics, as well as in the biorecycling of PET waste

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Unequal Distribution of Research into Marine Resources

(Eawag, October 15, 2020)

According to a recent study that involved a team of current and former Eawag researchers, and which analyzed scientific literature on resources from the world's oceans published over the last 50 years, the exploration and utilization of resources from the world's oceans is not equally distributed across the globe. Although many of these resources originate in the Global South, they are predominately being researched by just a few countries from the Global North, and consequently, this is also where most of the benefits are generated – particularly for pharmaceutical applications, cosmetics or the food industry. According to co-author Moritz Lürig, "additional measures are [therefore] needed to ensure that the benefits, such as those arising from marine drug research, are distributed more fairly across the globe."

[/web/2020/06-201015-ef](#)

Towards More Sustainable Data Centers

(EPFL, October 20, 2020)



With the demand for digital technology skyrocketing, particularly in response to the ongoing COVID-19 pandemic, so too have digital-related emissions. Although seldom discussed, some studies predict that digital technology will account for 8% of global electricity use by 2030 – up from 3-5% today – and 4% of CO₂ emissions. This includes data centers – those huge buildings that house the servers we use to store, process, analyze and transfer data on the cloud – as well as, in an equal measure, the telecommunication systems that transport those data. In this context, engineers at the EPFL EcoCloud have been working to make data centers more efficient, as well as reducing their carbon footprint, and in early 2020, along with the other members of the Swiss Datacenter Efficiency Association, introduced an energy-efficiency certification system called the "SDEA Label."

[/web/2020/06-201020-db](#)

Effects of Land-Use Intensity on Diversities, Functions and Services

(University of Bern, October 26, 2020)



An international team of researchers, including scientists from the University of Bern, recently assessed the effects of land management on the links between biodiversity, ecosystem functions and ecosystem services. In this context, the researchers were able identify thresholds of management intensity where these relationships change dramatically, which species groups were most important in driving services, and the ecosystem services that are at risk when management is intensified. As explained by Professor Eric Allan, their approach therefore not only provides a "new and comprehensive view of ecosystem functioning and can identify the key ecosystem attributes to monitor in order to prevent critical shifts in ecosystems," but "it can also be applied to analyze the effects of other global changes such as climate change."

[/web/2020/06-201026-18](#)

Investigating Geothermal Energy Production

(ETH Zurich, October 29, 2020)

Researchers from four leading European technical universities – all members of IDEA League – recently implemented the so-called "EASYGO project," which aims to investigate research questions throughout the entire chain of geothermal energy production. To achieve this, extensive research infrastructure will be made available to 13 doctoral students, who will have access to all facilities at the participating



universities as they aim to address questions such as "what is needed for the safe use of geothermal systems?" and "how can we operate geothermal plants efficiently?" from different perspectives, while integrating a wide variety of subjects during the research process. The EASYGO project will therefore focus on all aspects of geothermal energy production, from engineering design, extraction and injection to power plant operation.

[/web/2020/06-201029-be](#)

Soot Particles Alter Cloud Formation and the Climate

(Swiss National Supercomputing Centre, October 29, 2020)

A team of researchers from ETH Zurich recently used simulations on the CSCS supercomputer "Piz Daint" to investigate how two specific types of soot particles influence clouds, as well as the climate, and found out that when soot particles combine with ozone or sulfuric acid, their physical and chemical properties change. According to their results, soot particles aged by ozone form condensation nuclei in lower layers of the atmosphere, which help clouds to form. In higher layers of the atmosphere however, the soot particles aged by sulfuric acid act as ice nuclei and help cirrus clouds to form, whose warming effect increases and exacerbates global climate change. These findings are vital, because as explained by scientific programmer David Neubauer, "until now, it was assumed that these two types of soot ageing had little effect on cloud formation and climate."



[/web/2020/06-201029-8a](#)

5G Could Help Reduce Greenhouse Gas Emissions

(Empa, October 29, 2020)

Researchers from the University of Zurich and Empa recently published a study that contends that 5G technology could help curb greenhouse gas emissions. Specifically, the report argued that thanks to its greater energy efficiency, the 5G network in 2030 should cause around 85% fewer emissions per unit of data transported than today's mobile phone network. In addition, the team also pointed to indirect savings from new uses, such as smart grids, and suggested that the faster, more reliable, and larger data transmission supports flexible working, thereby reducing emissions generated by commuter traffic. 5G-enabled prospects, such as autonomous vehicles, tele-surgery or intelligent buildings were not included in the study however, because it is unlikely that they will come to fruition by 2030, as explained by Roland Hischier.

[/web/2020/06-201029-cc](#)

Software Facilitates Reuse of Construction Components

(EPFL, October 30, 2020)

In order to help the construction industry reduce its environmental footprint, Jan Brütting, who recently completed a PhD at EPFL's Structural Xploration Lab, has been developing a software application that enables users to design structures while conducting life-cycle assessments. To achieve this, the software not only performs an initial optimization of the structure's form, so as to use as little material as possible, but it also provides designers with alternative forms that meet various sustainability objectives. In addition, it can identify the optimal combination of new and recycled components that will minimize a structure's carbon footprint and supplies benchmark values, thereby enabling users to verify that reusing construction materials in new buildings can reduce greenhouse gas emissions by up to 60%, despite an up to 40% increase in a structure's mass.



[/web/2020/06-201030-9c](#)

Removing Impurities from Biogas

(Paul Scherrer Institut, November 02, 2020)

In order to be able to more effectively use raw biogas for the energy transition in the future, a team of Paul Scherrer Institut researchers stationed at the Swiss Farmer Power Inwil – a biogas plant near Lucerne –



has been precisely analyzing its composition and investigating how they can eliminate impurities as efficiently and economically as possible. Removing organic sulfur compounds in particular has been a focal point for the researchers, as these have, for example, prevented fuel cells from running on biogases, as explained by PSI group leader Serge Biollaz. In addition, the researchers have also been testing a new separation method to remove carbon dioxide from biogas with UniSieve, a spin-off from ETH Zurich, which could further reduce the costs of producing biomethane.

[/web/2020/06-201102-f5](#)

Steam is Effective Against Cereal Diseases

(admin.ch, November 10, 2020)

As part of the "Alternative Seed Treatments" project, researchers from Agroscope, in collaboration with fenaco, recently tested, among others, the efficiency of warm water and steam treatments of cereal seed in the laboratory and field. In this context, the researchers were not only able to demonstrate that the steam treatment is effective against diseases on the grain surface, but also highlighted several advantages over other methods, including its short treatment time and low cost. This is promising, because as explained by project head Karen Sullam, the "implementation of steam treatments paired with improved disease diagnostics will help further reduce synthetic chemical seed dressings while producing healthy crops." However, it is important to note that compared to the costly warm water bath, steam was relatively ineffective against diseases found inside the seed.

[/web/2020/06-201110-fb](#)

Particulate Matter of Anthropogenic Origin Is Most Harmful

(Paul Scherrer Institut, November 18, 2020)

Although particulate matter (PM) is one of the greatest health risks stemming from air pollution, it is not yet precisely known what makes it so dangerous. In this context, researchers at the Paul Scherrer Institut recently discovered that the amount of PM alone is not the greatest health risk, but rather, it could be the so-called oxidative potential, which is predominately generated by wood-burning fires and road traffic, that makes particulate pollution so harmful. As explained by PSI scientist Kaspar Dällenbach, these results therefore demonstrate that "regulating the amount of particulates alone might not be effective," – a conclusion that was also reflected in the findings of a partner study led by the University of Bern, which suggested that population groups with pre-existing illnesses could especially benefit from appropriate measures to reduce PM pollution.

[/web/2020/06-201118-32](#)

Safer Geothermal Energy Thanks to Supercomputers

(University of Lugano, November 23, 2020)

Although geothermal energy is seen as an important potential pillar of the Swiss Energy Strategy 2050, induced seismicity – earthquakes triggered by human activities – continues to be one of the major challenges of this attractive green energy source and has largely prevented further exploration on Swiss soil. However, since July 2020, researchers led by USI Professor Krause Rolf and ETH Zurich Professor Thomas Driesner, in collaboration with the SED and the CSCS, have been working to develop a supercomputer-based process to make geothermal energy safer. To achieve this, the "FASTER" project aims to reliably estimate the probability of artificial earthquakes during the hydraulic stimulation of the rock – when cracks in the stone are opened – within a time frame that allows for quick reactions to avoid these seismic events.



[/web/2020/06-201123-14](#)

Adaptive Structures Reduce Carbon Footprint of Buildings

(EPFL, November 25, 2020)

Scientists at EPFL recently developed new methods to design and control civil structures that can automatically adapt to changing loading conditions, which the researchers subsequently used to construct



a footbridge designed to be able to counteract the effects of loading through shape control. This innovative capability in turn led to a homogenization of stress under strong loading events, which allowed the structure to meet safety-critical requirements while requiring considerably less material and energy resources than stiffness-governed designs. As a result, the researchers contend that adaptive structures provide an environmentally friendly alternative to conventional passive structures, and in particular, constitute an attractive option for urban planners to optimize space in high-density cities.

[/web/2020/06-201125-92](#)

Federal Energy Research Concept 2021-2024

(admin.ch, November 27, 2020)

The Federal Energy Research Commission recently published the federal government's new research concept for 2021 to 2024, which acts as a planning instrument for all federal government funding bodies and serves as a guide for cantonal and municipal agencies. In particular, the report emphasized that energy research must be driven by a holistic way of thinking, be geared toward the principle of sustainable development and make a decisive contribution to efficient integrated energy, as well as to an energy system based on renewable energies. To achieve this, the report highlighted several priority fields and recommended the provision of unrestricted access to publications, improved access to data, plotting of longer time series, and simpler approval of experiments and field trials in order to facilitate the testing of new technologies, procedures and approaches.



[/web/2020/06-201127-da](#)

7. Engineering / Robotics / Space

Vaporized Metal Discovered in Ultra-Hot Exoplanet Atmosphere

(University of Bern, October 08, 2020)

An international team of researchers led by the National Centre of Competence in Research (NCCR) PlanetS of the University of Bern and the University of Geneva recently discovered a number of gaseous metals in the atmosphere of WASP-121b – an exoplanet located 850 light years from Earth. This is not only important because it provides us with more information about the atmosphere of ultra-hot planets – WASP-121b is about 40 times closer to its star than Earth to the Sun – but it also underlines the fact that this field of research is entering a new era. As explained by first author Jens Hoeijmakers: "After years of cataloguing what is out there, we are now no longer just taking measurements, [...] we are really beginning to understand what the data from the instruments show us."



[/web/2020/07-201008-ac](#)

Sensing Solution for Safer Human-Machine Interactions

(Venture Kick, October 16, 2020)

With over a half a million industrial robots expected to collaborate with humans by 2023, Bota Systems aims to contribute toward accessibility in automation by developing a state-of-the-art sensing solution for safer interactions between humans and machines. Founded by Klajd Lika, Ilias Patsiaouras, and Marco Hutter, the startup has created an innovative plug-and-play force-sensing solution that is scalable, modular, and that can be integrated into any robotic system that needs to sense the interaction force with their environment, such as service and household robots, robot-assisted surgery systems, or manufacturing robots. Several companies and laboratories are already using Bota Systems' sensors and in addition, the startup recently obtained CHF 150k from Venture Kick to promote and expand its product portfolio.



[/web/2020/07-201016-9e](#)



Deep Learning Algorithms for Space Debris Removal

(EPFL, October 29, 2020)

As part of the European Space Agency's first mission to remove space debris from orbit, EPFL spin-off ClearSpace has been at the forefront of developing cutting-edge technologies to capture and deorbit space debris. For example, in order for the robotic arms of a capture rocket to be able to approach the Vespa – the target of the company's first mission, which is set for 2025 – from the correct angle, a central focus for the team has been to "develop deep learning algorithms to reliably estimate the 6D pose (3 rotations and 3 translations) of the target from video-sequences," as explained by EPFL researcher Mathieu Salzmann. This is by no means an easy task however, as nobody has really seen the Vespa for seven years, due to the fact that it has been spinning in a vacuum in space.



[/web/2020/07-201029-40](#)

Understanding Giant Gas Planet's Interiors

(University of Zurich, November 03, 2020)

After reviewing new theoretical insights and space mission data, researchers from the University of Zurich were recently able to paint an updated picture of the giant gas planets of our solar system: Jupiter and Saturn. Specifically, their findings revealed that the interior of giant gas planets is more complex than previously thought, because instead of layered structures with distinct cores, they appear to have interiors that are made up of composition gradients with "fuzzy" dilute cores, as described by UZH Professor Ravit Helled. These new insights are not only relevant because they lead to a better understanding of the structure and formation processes of the giant gas planets themselves, but due to their critical role in planetary systems, it also helps the scientists to understand the evolution of the entire solar system.

[/web/2020/07-201103-c7](#)

Salamander-Inspired Model for Regenerating Spinal-Cords

(EPFL, November 06, 2020)

Salamanders have a unique superpower – they can regenerate their spinal cords and regain full functionality. In this context, a team of scientists led by EPFL Professor Auke Ijspeert, along with Professor András Simon from the Karolinska Institute (Sweden) and Assistant Professor Dimitri Ryczko from the Université de Sherbrooke (Canada), is looking into exactly how the process works by combining methods from genomics, neuroscience, computer modeling and biorobotics. Although this project focuses mainly on fundamental research, Ijspeert still sees potential applications in his field, and stated that they "hope that one day the concepts of robust mechanisms and regeneration can be transferred to robotics, so that engineers can build fault-tolerant machines that keep on working despite damages to their electronic and mechanical hardware."



[/web/2020/07-201106-3a](#)

Merging Machines with the Intelligence of Life

(Empa, November 11, 2020)

In order for robots to be able to achieve more than simple automated machines in the future, robotics researchers Mirko Kovac and Aslan Miriyev, who both work at Empa and the Imperial College London, postulate that artificial intelligence must be expanded to include the capabilities of a so-called Physical Artificial Intelligence (PAI). Specifically, the researchers contend that by merging the artificial intelligence of a digital "brain" with an intelligent body, new types of robots could be created that have properties comparable to those of intelligent living organisms. However, as explained by Kovac, "PAI robots will only become reality through the use of a variety of unconventional materials and by combining research methods from various disciplines," which is why the researchers hope that their work will encourage active discussion of the topic.



[/web/2020/07-201111-4a](#)



Ultra-Fast Fiber Optic Sensors

(EPFL, November 13, 2020)

A team of EPFL engineers recently developed an advanced encoding and decoding system that allows fiber optic sensors to send data up to 100 times faster and over a wider area. This is particularly useful for a wide range of safety applications, such as detecting fires in tunnels, pinpointing leaks in pipelines and predicting landslides, because unlike conventional sensors that take measurements at a given point, fiber optic sensors can take temperature readings everywhere a fiber is placed, thereby generating a continuous heat diagram of a given site. In addition, while other systems are either limited in scope or expensive, this novel system only requires users to add a software to their existing equipment, as explained by Professor Luc Thévenaz.



[/web/2020/07-201113-70](#)

Cybathlon 2020 Global Edition

(ETH Zurich, November 14, 2020)

After years of preparation, 51 teams from 20 countries recently put their assistive technologies and fighting spirit to the test during the Cybathlon 2020 Global Edition, which challenged the competitors to complete everyday tasks with the help of state-of-the-art assistance systems in six disciplines. These included a virtual race with mind-controlled tasks, a bike race with electronic muscle stimulation, and obstacle courses for those racing with arm prostheses, leg prostheses, robotic exoskeletons and motorized wheelchairs. Initiated by ETH Zurich, the Cybathlon provides a forum in which people with physical disabilities, technology developers, and the public can interact, thereby not only raising awareness, but also stimulating global synergies to further the current state of technology and promote inclusion.



[/web/2020/07-201114-bb](#)

8. Physics / Chemistry / Math

European Strategy for Particle Physics

(CERN, October 02, 2020)

CERN's governing body recently adopted the resolution to update the European Strategy for Particle Physics (ESPP), which provides a realistic and prudent approach to ambitious, visionary scientific objectives. In particular, the 2020 update of the ESPP identified the detailed study of the Higgs boson as the most pressing priority for the field, and in this context, recommended an electron-positron collider as the next facility to gain even deeper insights into the Higgs boson and its role in fundamental physics. In addition, the ESPP also identified a proton-proton collider reaching the highest energies allowed by technology (at least 100 TeV) as the most powerful tool for the exploration of uncharted territories, which for example could conclusively probe the existence of weakly interacting dark-matter particles of thermal origin, as well as precisely measure the Higgs boson's self-interaction.

[/web/2020/08-201002-1b](#)

Generating Variable Low-Noise Microwaves

(EPFL, October 02, 2020)

Low-noise microwave signals are of critical importance in numerous applications, such as high-speed telecommunication and ultrafast data processing. However, as such signals are conventionally generated with bulky and delicate microwave oscillators, physicists have been exploring a possible alternative: high-quality microwave generation using optical microresonator frequency combs. In this context, a team of researchers from EPFL, Trinity College Dublin and Dublin City University recently developed a novel technique for generating variable low-noise microwaves with a single optical microresonator. With





the ability to be miniaturized and mass-produced, a variable microwave oscillator and frequency comb generator like that could revolutionize the current surging market for portable low-noise microwave and frequency comb sources.

[/web/2020/08-201002-24](#)

New High-Tech Chemistry Lab

(University of Zurich, October 23, 2020)

François Chapuis, Vice President Real Estate and Facility Management of UZH, recently provided a comprehensive overview of the ongoing constructions projects on Irchel Campus, and announced that work on the first new university building in 20 years – the high-tech laboratory building for the Department of Chemistry, UZI 5 – is almost done. This new building features a multifunctional layout in the laboratory spaces, with labs that have been standardized in terms of equipment, and which have several connective appliances, thereby allowing researchers to easily change their workspaces as needed. The old chemistry building will subsequently be made available to three Zurich high schools, and preparations have already started for the next building project: a new two-story building for the Functional Genomics Center Zurich, which will stand next to UZI 5 and be completed in 2024.



[/web/2020/08-201023-01](#)

New Candidate Material for Quantum Spin Liquids

(EPFL, November 09, 2020)

A team of EPFL scientist led by Péter Szirmai and Balint Náfrádi recently produced and studied a quantum spin liquid (QSL) in a highly original material known as EDT-BCO. QSLs are particularly exciting because they have significant implications for future technologies, including quantum computing, superconductivity and spintronics, but with only a few materials on offer as QSL candidates, it has been difficult for researchers to gain a solid understanding of QSL states in order to be able to exploit them. Therefore, as explained by Náfrádi, this work is highly relevant because in addition to the "superb demonstration of the QSL state, [...] it provides a tool to obtain additional QSL materials via custom-designed functional rotor molecules."



[/web/2020/08-201109-27](#)

Decoding the Way Catalysts Work

(ETH Zurich, November 18, 2020)

Hydrogen is a key element for achieving sustainable mobility – especially “green” hydrogen, which is produced by splitting water using renewable power (electrolysis), which involves two partial reactions called “hydrogen evolution” and “oxygen evolution.” To make the whole process more energy-efficient, scientists are therefore investigating the use of new materials that act as catalysts and thus facilitate these partial reactions. In this context, a recent study, which also involved the participation of ETH Zurich, yielded fundamentally new insights into catalyst materials for the oxygen evolution reaction, as the researchers were able to demonstrate that good catalytic performance is driven chiefly by processes occurring on the catalyst’s surface – and not electrochemical processes. This could help develop higher-performance electrocatalysts and identify new, cheaper catalytic materials, leading to sustainable, energy-efficient and cost-effective hydrogen production.



[/web/2020/08-201118-a4](#)

Generating Random Numbers with DNA Synthesis

(ETH Zurich, November 20, 2020)

A team of ETH Zurich researchers led by Professor Robert Grass recently described, for the first time, a non-physical method of generating true random numbers, which are vital for data encryption, as well as a wide variety of other fields. Specifically, the researchers used DNA synthesis – an established chemical



research method frequently employed over many years – to produce a combination of approximately three quadrillion individual molecules, before subsequently determining the DNA sequence of five million of them. This resulted in 12 megabytes of data, which the researchers stored as zeros and ones on a computer. As explained by Grass, compared to other methods, this biochemical approach "has the advantage of being able to generate huge quantities of randomness that can be stored in an extremely small space, a single test tube."

[/web/2020/08-201120-f3](#)

9. Architecture / Design

3D Concrete Printing

(Bern University of Applied Sciences, October 22, 2020)

Although 3D printing has emerged as an effective method to rapidly manufacture a wide range of complex shapes from plastics or metals, it remains challenging to create three-dimensional objects made out of concrete. However, in order to address its unique limitations, BFH Institute for Print Technology has been developing a so-called "slicer" software designed especially for concrete printing, which is needed to control the robotic printer, as it represents the digital interface between the 3D model and the robotic printer. Using the CAD data of the model and taking into account the material properties and other parameters, it plans the printing path and sends commands to the robotic printer. This process is particularly attractive for one-off items or very small batches where the high cost of manufacturing a mold would push up the unit price.

[/web/2020/09-201022-ef](#)

Doubly Curved Concrete Roof Completed

(Empa, October 28, 2020)

Researchers at ETH Zurich recently achieved an important milestone in the implementation of their innovative concept for a reusable formwork for double-curved structures, which consists of a cable net and a membrane stretched over it, as they were able to complete the doubly curved roof shell of the NEST unit "HiLo." In this context, the weight of the wet concrete pushed the net into a predefined position – for which the researchers developed new design algorithms – and thus ultimately gave the roof its shape. By demonstrating the possibilities of this new technology, as well as the additional challenges that still need to be overcome, the HiLo roof therefore constitutes an inspiration for how the building envelope can be rethought and the new possibilities resulting from the combination of traditional knowledge and digital methods.



[/web/2020/09-201028-c0](#)

Swiss Architectural Award

(University of Lugano, November 17, 2020)

The Parisian architecture office Bruther, which was founded by EPFL architect Stéphanie Bru and her partner, Alexandre Theriot, from ETH Zurich, was recently announced as the winner of the Swiss Architectural Award – a biennial international architecture prize promoted since 2019 by the Fondazione Teatro dell'architettura. The seventh edition of the award brought together the three Swiss Schools of Architecture – Università della Svizzera italiana (Academy of Architecture), EPFL (ENAC, Section d'Architecture) and ETH Zurich (Departement Architektur) – and aimed to promote a kind of architecture that is sensitive to contemporary ethical, aesthetic and ecological issues and can facilitate public debate. The prize is awarded to architects not older than 50 years, without distinction of nationality, who have completed at least three significant works.



[/web/2020/09-201117-a5](#)



10. Economy, Social Sciences & Humanities

Mariano Corso Best Practical Implications Award

(University of Applied Sciences and Arts of Southern Switzerland, October 02, 2020)

University of Applied Sciences and Arts of Southern Switzerland Professor Leandro Bitetti was recently awarded the Mariano Corso Best Practical Implications Award at the 21st International CINet Conference for his article entitled "Cognitive Paths of Business Model Innovation in Small Traditional Firms: How Customers' Jobs to be Done are Processed by Small Businesses' Owners," which was co-authored by USI Professor Michael Gibbert. The study identified four cognitive mechanism – "anticipate", "stimulate", "dribble", and "overturn" – that are adopted by entrepreneurs to identify customer needs and translate them into innovative ideas. The practical contribution of this research lies in the fact that these processes can be stimulated and developed in all entrepreneurs through action-oriented trainings.



[/web/2020/10-201002-65](#)

Investigating the Factors that Shape our Identity

(University of Zurich, October 05, 2020)

In a thought-provoking article that was featured in the UZH Magazine, Professors Moritz Daum, Michael Shanahan and Alexandra Freund recently contemplated one of life's big questions, namely, "who am I"? To answer this question, the professors not only discussed the interaction between genes and the environment, but also touched on the effect that our life course has on shaping our identity, as well as the assumption that our self-concept is heavily influenced by society's expectations. Furthermore, the researchers also explored the interesting paradox that our sense of identity remains the same, even when we change completely, which, as stated by Alexandra Freund, can be explained by the fact that a "large part of our sense of identity comes from being able to see how we change." In other words, I am me precisely because I change.

[/web/2020/10-201005-e3](#)

G-VERSITY: Achieving Gender Diversity

(University of Bern, October 22, 2020)

A new European research project led by the University of Bern is investigating the factors influencing the educational and professional careers of women and men, including members of gender and sexual minorities, as well as developing scientifically sound measures to promote gender diversity in working life. To achieve this, the so-called "G-VERSITY – Achieving Gender Diversity" research project will receive EUR 4.1 million from the EU "Horizon 2020" funding program and will be coordinated by Professor Sabine Sczesny, an internationally renowned expert in research on stereotypes and prejudice. In addition to the targeted promotion of young researchers, the research network will organize workshops and summer schools, as well as an international conference to raise the profile and dissemination of its research results in science and society.



[/web/2020/10-201022-83](#)

Analyzing Corporate Social Responsibility

(University of Neuchâtel, October 22, 2020)

Ellen Hertz and Yvan Schulz from the Institute of Ethnology of the University of Neuchâtel recently published a new book entitled "Companies and Human Rights: The Limits of Goodwill," which analyzes the institutional and social framework that governs multinational companies, and in particular, focuses on corporate social responsibility. To achieve this, the authors presented the efforts that aimed to deal with the complex problems of political deregulation and economic globalization, which, since the 1980s, have radically transformed the legal framework for industrial production worldwide. The book concludes that in order to be effective, CSR must be reinforced by binding law and subject to the control of civil society.



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

State Secretariat for Education, Research and Innovation SERI
swissnex China
Innosuisse
Swiss Federal Office of Energy SFOE



However, the authors also stressed that finding the right balance between voluntary and mandatory standards is not a purely technocratic issue, but also requires societal choices.

</web/2020/10-201022-c8>

Green Fintech Network

(State Secretariat for International Finance, November 05, 2020)

Convinced of the promising combination of sustainable financial services and digital technology (green fintech), the State Secretariat for International Finance (SIF), together with industry representatives, recently launched the "Green Fintech Network" in order to ensure close cooperation between key specialists from the Swiss green fintech ecosystem and SIF. Specifically, the Network's mandate is to identify areas in which the conditions for green fintech in Switzerland could be improved, and to this end, the Network will submit concrete proposals to both the government and the private sector, as well as assist in the implementation of measures. The results of the Green Fintech Network's initial activities will be recorded in an action plan, which is due to be published in spring 2021.



</web/2020/10-201105-8c>

Ethno-Linguistic Diversity Can Predict Urban Evolution

(University of Lausanne, November 05, 2020)

Although urbanization has a significant impact on social and economic growth and prosperity, understanding the factors that influence the way urbanization evolves remains a complex and challenging task. However, according to a recent study by a team of researchers from the University Lausanne, the University of Basel, Princeton University, and the London School of Economics, the level of ethno-linguistic diversity, as represented by the different languages spoken, is a significant predictor of how urbanization is likely to evolve in a region. In addition, the authors also demonstrated that higher levels of ethno-linguistic diversity may be linked with social tension, conflict and specific patterns in urbanization, and emphasized the benefits of having strong democratic processes and institutions to counter any negative impact from ethno-linguistic diversity.



</web/2020/10-201105-c3>

Master of Science in Responsible Management

(University of Geneva, November 05, 2020)

In order to equip our future leaders with the necessary skills to tackle an organization's toughest strategic challenges, lead with greater confidence, inspire performance at all levels, and contribute to an organization of responsibility and integrity, the University of Geneva recently announced the launch of a new Master's program in "Responsible Management," which will start in September 2021. To achieve this, the program provides state-of-the-art knowledge on management tools, techniques, and best industry practices, while focusing on teaching how to manage effectively in pluralistic environments in which the needs of multiple stakeholder groups have to be balanced. Furthermore, the Master also offers students the option to specialize in Sustainable Business and Human Rights in their second semester. Admissions will open in January 2021.

</web/2020/10-201105-be>

Center for the Science of Sexuality

(University of Geneva, November 12, 2020)

The University of Geneva recently set up the "Maurice Chalumeau Centre for the Science of Sexuality," which not only aims to promote excellence in research and teaching, but also to respond to society's growing curiosity in the field. It will be scientifically independent from any other body, as well as have the support of a scientific committee made up of UNIGE professors appointed by the rectorate, who will represent a wide range of disciplines, including law, cultural studies, history, medicine, psychology,





sociology and political science. In addition to being a sign of academic innovation, the CMCSS is also the result of an evolution marked by the times and the social and cultural movements that have had an impact on sexual life and transformed knowledge about sexuality over the past 50 years.

[/web/2020/10-201112-06](#)

11. Start-ups / Technology Transfer / IPR / Patents

Record Number of Companies Founded

(Institut für Jungunternehmen, October 01, 2020)

According to a new report by the Institut für Jungunternehmen (IFJ), despite the significant decline in new companies being founded in Switzerland in March (-5.4%), April (-25.1%) and May (-13.4%), due to the prescribed corona measures, more new companies were founded in the first nine months of 2020 than ever before. Specifically, a total of 33,617 new companies were founded in the first three quarters of 2020 (4.28 startups per 1,000 residents), which represents an increase of +2.5% compared to the record year 2019. Sectoral and geographic disparities nevertheless exist, as five sectors accounted for 50% of all startups – trades (17.4%), consulting (10%), retail trade (8.5%), real estate (7.7%) and catering and accommodation (6.5%) – and although Northwestern Switzerland enjoyed the greatest spirit of entrepreneurship, Schaffhausen and Ticino remain heavily in the red.



[/web/2020/11-201001-56](#)

Supporting Female Entrepreneurship

(University of Applied Sciences and Arts Northwestern Switzerland, October 07, 2020)

Gender is an omnipresent topic when it comes to entrepreneurship, as the international startup scene continues to be largely dominated by male actors. In this context, researchers from the University of Applied Sciences and Arts Northwestern Switzerland, in collaboration with Future.preneurship, recently conducted a study to identify the factors that drive females to become active in the entrepreneurial field, as well as to found their own companies. The major insights gained were that women tend to be much more hesitant when it comes to founding a company than men, and that the security concern is very high. As such, the authors recommended creating programs and initiatives specially and exclusively for women, prompting and presenting more female role models within existing programs and addressing the factors that lead to the hesitant attitude of females.



[/web/2020/11-201007-7a](#)

Impact Awards 2020

(University of St.Gallen, October 08, 2020)

The University of St.Gallen recently recognized three research projects for their recognizable impact on society by conferring them the coveted HSG Impact Award. These for example included the “Quartierstrom [district power] – a platform for sustainable district energy supply” project, which set up a local electricity market in St.Gallen, in which 37 households trade locally produced solar power. The second research project, entitled “Business Model Innovation for the Circular Economy,” offers companies a management tool for business model innovation that aims to link sustainability and business model innovation, as well as to develop sustainable, future-proof business models that rely on the circular economy. Finally, as already suggested by its title, “A Token Design for Decentralized Insurance on the Blockchain” offers an innovative, decentralized insurance model based on blockchain technology.

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Digital Future for Agriculture

(startupticker.ch, October 22, 2020)

The digital revolution is not exclusive to the secondary and tertiary sectors, as demonstrated during this year's "Premio Möbius Multimedia Lugano" (Möbius Multimedia Awards Lugano), organized by the Fondazione Möbius Lugano, which showcased Swiss quality innovation for the digital present and future of agriculture. At the full-digital ceremony, the Grand Prix Möbius 2020 was awarded to xFarm, which is the brainchild of Matteo Vanotti – a farmer with an ETH Zurich degree in Engineering, who embraced IoT and other modern digital technologies to develop a mobile SaaS (Software as a Service) platform for the farming sector. In addition, special mentions were also given to the other three finalists, which included: Dolphin Engineering, EnvEve, and Sarmap.



[/web/2020/11-201022-63](#)

Swiss Digital Days Startup Battle

(startupticker.ch, November 04, 2020)

During the fourth edition of the Swiss Digital Days, which was organized by digitalswitzerland and its partners in order to develop ideas and solutions for the sustainable development of a digital Switzerland, 15 companies recently presented their strategies for sustainable impact in a series of competitive startup pitching battles. In the end, Green-Y Energy impressed the jury most with its highly economical, clean and efficient energy storage system, which combines electricity storage with heating and cooling in one device. In addition, Swiss Vault, which develops environmentally sustainable data management systems, was selected as runner-up, while Exnaton, whose software creates local peer-to-peer energy communities for trading renewable energy in the neighborhood, won the public award. The other finalists included Droople and CompPair.

[/web/2020/11-201104-cb](#)

Pulse Incubator HES

(University of Applied Sciences Western Switzerland, November 05, 2020)

In order to mark the Pulse Incubator HES's first year of existence, several awards were recently presented to three outstanding startups. These included BoxUp, which was awarded the GENILEM HES-SO Geneva Prize, as well as the Raiffeisen Sustainability Prize, for its robust and elegant stations, which offer free access to sport and leisure equipment in a simple and secure way. Memory Sonore in turn received the "Coup de Coeur" (heart prize) for its innovative board game that uses sound instead of images in order to offer a fun, accessible and inclusive experience for visually impaired people, as well as for those without vision problems. Finally, the Aropoa project received the "Coup de -Pulse" award for its interior design and lighting studio.



[/web/2020/11-201105-87](#)

Forbes 30Under30 DACH

(startupticker.ch, November 11, 2020)

Following the reception of over 1,500 nominations, Forbes recently published this year's 30under30 DACH list, which features 90 outstanding young individuals from Germany, Austria and Switzerland who demonstrate the power of entrepreneurial thinking and innovative ideas to solve our problems. Among the 30 list-makers from Switzerland, 15 are startup founders, and include: Liliane Ableitner and Anselma Wörner (Exnaton); Florian Fallegger (Neurosoft Bioelectronics); Sandro Cilurzo (Sedimentum AG); Karim Saleh (Unicorn Labs); Ketevani Zaridze (Logmind); Fabian Staub (CASUS Technologies AG); Oliver Girstmair (Bravo Technologies); Alessandro Ofner (Microcaps AG); Fabian Hediger and Andrej Majcen (Bitcoin Suisse AG); Judith Wemmer (Planted); Fabian Walter (Unisers); and Adrian Boss and Léa Miggiano (Carvolution AG).



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Swiss Innovation Challenge Award Winners

(University of Applied Sciences and Arts Northwestern Switzerland, November 17, 2020)

Following the selection of 25 finalist from over 150 submissions, AgroSustain – which aims to reduce food waste and support organic food production by developing farm to fork solutions, such as biological fungicides and coatings – was recently crowned as the Swiss Innovation Challenge "Award Winner" during an online award ceremony. AgroSustain was followed by Resistell (2nd place and recipient of the "Life Sciences" special prize) and help2type (3rd place), while Tinamu Labs took home the special prize in the field of "Construction." The Swiss Innovation Challenge is an 8-month innovation support program with integrated award competition that was created in 2015 by the University of Applied Sciences and Arts Northwestern Switzerland, the Wirtschaftskammer Basel and BLKB.



[/web/2020/11-201117-13](#)

Swiss Technology Award

(startupticker.ch, November 20, 2020)

Bloom Biorenewables, Hemotune and HeiQ were recently presented the coveted Swiss Technology Award, which recognizes outstanding technology-based innovations and developments from startups, universities, technical institutions and established businesses in three categories: inventors, startups and innovation leaders. Bloom Biorenewables, which won the inventors category, provides groundbreaking chemical technologies to manufacture sustainable and cost competitive substitutes to petro-derived products. Hemotune, which won the startup category, is developing a disruptive blood purification technology based on nanoengineered magnetic beads. HeiQ, which won the innovation leaders category, creates some of the most effective, durable and high-performance textile technologies on the market today.



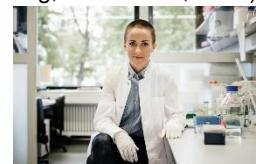
[/web/2020/11-201120-e8](#)

12. General Interest

Gender Inequality in Grant Peer Reviews

(University of Fribourg, October 26, 2020)

Despite the growing literature on gender inequality in academia, the question of whether these biases persist during the peer review process of research grant funding remains heavily debated. In this context, a team of researchers from the University of Fribourg and the University of Lausanne recently investigated the conflicting conclusions, and illustrated that although large-scale studies suggest that women and men have equal opportunities to obtain research funding, this does not amount to an absence of gender bias. Specifically, the team illustrated that the "path for women to seek and obtain research funding is fraught with barriers that men are unlikely to encounter," including "biases that emerge during specific peer review contexts, and biases that can impact the researcher prior to the actual submission of the grant application."



[/web/2020/12-201026-fd](#)

SNSF Funds 339 Independent Research Projects

(Swiss National Science Foundation, October 27, 2020)

Following the reception of over 1,000 applications in spring 2020, the Swiss National Science Foundation recently announced that 339 projects had been approved for funding, which corresponds to a success rate of 34%. In total, the SNSF is investing CHF 206 million in the new projects, which corresponds to about CHF 608k per project on average. These grants will be used to cover the salaries of doctoral





students, postdocs and other staff, as well as research costs. Of the 339 projects, 81 are led by women, who achieved a success rate of 33%, which is almost the same as the rate of men (34%). Furthermore, the approved projects are distributed almost evenly between the three main research areas: 38% are in biology and medicine, 32% in mathematics, natural and engineering sciences, and 30% in humanities and social sciences.

[/web/2020/12-201027-85](#)

National Research Programs on Nutrition and Energy Completed

(Federal Department of Economic Affairs, Education and Research, October 28, 2020)

The Federal Council was recently briefed on the successful completion of three National Research Programs (NRP). NRP 69 "Healthy Food and Sustainable Food Production" analyzed the ways in which diet, health and the environment interact with each other, and in particular, advocated for the development of a holistic strategy for the Swiss food system, which should be drafted in collaboration with consumer representatives, reduce food waste, and improve food production, processing and distribution. The other two National Research Programs, "Energy Turnaround" (NRP 70) and "Managing Energy Consumption" (NRP 71), focused on the scientific, technological and socioeconomic aspects that are necessary for the successful transformation of Switzerland's energy system, which are summarized on the NRP Energy portal.

[/web/2020/12-201028-9f](#)

Extension of Successful Network Research

(University of Bern, November 02, 2020)

Sleep, religious conflicts and the health of the environment, plants, humans and animals: these are the topics of the three Interfaculty Research Cooperations (IRC) – network projects that aim to address complex contemporary problems in an interdisciplinary manner – that were launched by the University of Bern in 2018, following a competitive process. According to Daniel Candinas, Vice Rector for Research at the University of Bern, "all three projects have produced high-quality scientific work in the last two years," and as a result, the Executive Board of the University of Bern recently decided to extend all three IRCS for another two years. Each of these networking projects involves 9 to 13 research groups from at least two different faculties and are led by two people from different faculties.

[/web/2020/12-201102-01](#)

Swiss Researchers Among Most Cited in the World

(Clarivate, November 19, 2020)

Clarivate recently published its annual "Highly Cited Researchers" list, which recognizes influential researchers from around the world whose work ranks in the top 1% of cited scientific publications in their respective field. The 2020 list contains about 6,400 highly cited researchers – 154 of which are from a Swiss-based institution, thereby accounting for 2.4% of all the highly cited researchers on the list and placing Switzerland 9th in the country ranking. In addition, EPFL Professor Michael Grätzel was among the select group of nine researchers who were recognized as highly cited across three of the 21 Essential Science Indicator (ESI) fields. In the case of Professor Grätzel, these included chemistry, engineering and materials science.



[/web/2020/12-201119-e9](#)

Promoting Women Researchers in Academia

(Swiss National Science Foundation, November 19, 2020)

Launched in 2010 by the Robert Bosch Stiftung and Spektrum der Wissenschaft, and run by the Swiss National Science Foundation since January 2020, AcademiaNet is an online portal that aims to make women researchers more visible, as well as to increase the share of women in academic leadership. The database currently contains the profiles of over 3,000 outstanding female researchers from 44 countries





and all disciplines, who were nominated by more than 40 European science organizations, according to stringent criteria. Furthermore, in order to commemorate its tenth anniversary, researchers and senior administrators at European science organizations will look back on the success stories that AcademiaNet has helped to bring about using the hashtag #10yearsAcademiaNet.

[/web/2020/12-201119-e7](#)

13. Calls for Grants/Awards

Innosuisse Launches Flagship Initiative

(Innosuisse, October 22, 2020)

Innosuisse recently announced the launch of their "Flagship Initiative" – a new program to stimulate systemic innovation and to promote transdisciplinary project collaboration. As this initiative aims to find solutions to current or future challenges that concern several actors and/or can only be solved through collaborative work, Innosuisse will define specific but broad flagship topics, and consortia can subsequently submit proposals to execute a flagship within these topics. Flagships will have a minimum duration of three years and Innosuisse funding will amount to at least CHF 4 million per flagship. This new funding instrument is complementary to the purely bottom-up oriented and well-established regular innovation projects and the first call will be launched in January 2021.



[/web/2020/13-201022-f2](#)

Grants for Doctoral Thesis in Switzerland

(Swiss National Science Foundation, October 28, 2020)

Launched in 2013, the SNSF's Doc.CH funding scheme is targeted at talented researchers and allows them to write a doctoral thesis in Switzerland on a self-chosen topic in the humanities and social sciences. This year, the SNSF awarded 45 grants, worth CHF 225,000 on average, lasting two to four years. In 2019, an external study confirmed that Doc.CH had a positive effect on doctoral theses and research careers, and made several useful suggestions for the future, which led to a more in-depth analysis of the funding scheme, as well as a number of changes to the Doc.CH regulations. In particular, this means that as of 2021, funding conditions will be even more flexible, and the first call for this new version of Doc.CH will open on 15 December 2020.



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SNSF Eccellenza Professorial Fellowships

(Swiss National Science Foundation, November 02, 2020)

In order to support highly qualified researchers who aspire to a permanent professorship achieve their goals, the SNSF offers the so-called Eccellenza Professorial Fellowships, which allows selected researchers to lead a generously funded research project as an assistant professor with their team at a Swiss higher education institution. Specifically, Eccellenza covers the grantee's salary at the local rates applicable to assistant professorships and project funds of up to 1,000,000 Swiss francs for a five-year period. In this context, the SNSF recently updated the regulations of all career-funding schemes and as a result, various aspects were adapted, particularly the mobility requirements and the assessment criteria. However, the SNSF Eccellenza Grants, which were directed towards newly appointed tenure track assistant professors, will no longer be offered as of 2021.



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Postdoc Fellowships for Research Abroad

(Swiss National Science Foundation, November 02, 2020)

Postdoc.Mobility fellowships support postdocs who wish to conduct a research stay abroad and are aimed at researchers with a doctorate, as well as researchers who will complete their doctorate within nine months after the submission deadline (1 February 2021). Researchers with a medical degree that includes a doctorate are also eligible to apply. The fellowships are generally awarded for 24 months, but never for less than 12 months. Furthermore, the total duration of a Postdoc.Mobility fellowship and any other SNSF mobility fellowships for postdocs obtained by the recipient may not exceed 36 months. Recipients of a Postdoc.Mobility fellowship may apply for a return grant of 3 to 12 months. Finally, there will be no further calls for Early Postdoc.Mobility, as these have been integrated into Postdoc.Mobility.



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SNSF Scientific Image Competition

(Swiss National Science Foundation, November 10, 2020)

The Swiss National Science Foundation is inviting researchers throughout Switzerland to submit their photographs, images and videos to the SNSF Scientific Image Competition in order to share their vision of their working environment, their discoveries and their colleagues. The competition is open to all scientists working at a research institution in Switzerland and for work produced after 1 January 2020. The deadline for submissions is 31 January 2021. The winning projects, as well as a selection of the entries, will be exhibited at the Biel/Bienne Festival of Photography from 7 to 30 May 2021. In addition to the official jury, members of the public will also be able to choose their favorite works from among those submitted since 2017, during a public vote in March 2021.



</web/2020/13-201110-47>

Ethics & Trust in Finance Global Prize

(Observatoire de la Finance, November 14, 2020)

In order to encourage young professionals and academics to reflect on the role of ethics and trust in shaping a more sustainable and resilient financial system for the post-pandemic world, the Observatoire de la Finance recently launched the 8th edition of the "Ethics & Trust in Finance for a Sustainable Future" Global Prize. Candidates under the age of 35 are invited to submit creative, unpublished papers (maximum of 5,000 words) that examine the role of ethics and integrity in finance from various practical angles and disciplinary perspectives, thereby encouraging them to reimagine how financial institutions can provide a meaningful response to the changing needs of the communities in which they operate. The essay submission deadline is set for 31 May 2021 and an international jury will subsequently allocate USD 20,000 in prizemoney among the winners.



</web/2020/13-201114-49>

NTN Innovation Booster

(National Thematic Networks, November 25, 2020)

Innosuisse is calling on interested actors to apply for the implementation of a four-year NTN Innovation Booster, which aim to spur innovation activities around a theme through concrete ideas development and testing. Interested parties may submit questions in writing to Innosuisse (ktt.support@innosuisse.ch with the comment NTN IB) until to 14 December 2020, and applications using the pre-defined forms must be submitted by 26 March 2021. Innosuisse will be able to support five to eight thematically different initiatives from 2022-2025.



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"Innovation Strength Switzerland" Impulse Program

(Innosuisse, November 30, 2020)

Innosuisse recently published details about the eased financial terms for new, science-based innovation projects submitted in 2021 and 2022 within the framework of the "Innovation Strength Switzerland" program, which aims to stimulate innovation activities, to maintain innovative strength and to secure the long-term competitiveness of small to medium-sized companies and organizations in Switzerland in view of the ongoing Covid-19 pandemic. Specifically, Innosuisse is reducing the contributions of the implementation partners in comparison to the standard innovation projects and in this context, applicants will be able to choose between the following two measures when submitting new projects from the beginning of January 2021: "Stimulating new innovation projects" and "supporting structural change, disruptive or radical innovation."

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Upcoming Science and Technology Related Events

20th CIRP Conference

January 18-22, 2021

Electro-Physical and Chemical Machining

<https://is.gd/2TNS78>

Zürich Zentrum HG

Virtual Pitch Night 2021

January 21, 2021

<https://is.gd/LeXdMg>

Solve for Tomorrow, SDG10

Online

IMPACT Opening Event

January 22, 2021

<https://is.gd/viSrRi>

Health, Nursing, Medicine

Online

Quantum FutureX Hackathon

January 22-23, 2021

Art, Science, Engineering

<https://is.gd/xaCER1>

IdeaSquare, CERN

The Davos Agenda

January 25-29, 2021

<https://is.gd/5hFVNP>

Leadership, Policy, Partnerships

Online

Virtual Zurich Life Science Day 2021

February 4, 2021

<https://is.gd/DiRyxx>

Life Science, Network, Career Fair

Online

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