



# Science-Switzerland, April – May 2020

## News on Swiss science, technology, education and innovation



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## swissnex Network Annual Report 2019

(admin.ch, May 18, 2020)

In 2019 the swissnex Network ran over 340 activities and events throughout the world in conjunction with over 180 partner organizations. It also supported 58 Swiss start-ups to internationalize their business and promoted exchange between a range of players in different fields, which are of relevance to the Swiss education, research and innovation landscape, for example in space engineering. The swissnex Network's 2019 annual report is published on the website [www.annualreport.swissnex.org](http://www.annualreport.swissnex.org) and marks the launch of the organization's 20th anniversary celebrations.

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### 1. Policy

#### Meeting of G20 Health Ministers

(Admin.ch, April 19, 2020)

Switzerland took part in a meeting of G20 health ministers. Discussions focused on the COVID-19 pandemic and addressed in particular the importance of international cooperation and the major role played by the World Health Organization. The annual meeting of G20 health ministers took place on Sunday, 19 April. Switzerland took part in the video conference at the invitation of Saudi Arabia, which holds the G20 presidency this year. Discussions focused on the current health emergency, namely the coronavirus pandemic. The G20 countries, and indeed Switzerland, stressed the importance of combining efforts to fight against the disease. In this respect, Switzerland reaffirmed the key role of the World Health Organization (WHO) in managing and coordinating the international response to pandemics.

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#### Liquidity Support for Startups

(Admin.ch, May 04, 2020)

The Swiss Federal Council agreed to a guarantee scheme to support promising startups encountering liquidity problems caused by the coronavirus. Bodies appointed by the participating cantons (updated on an ongoing basis) will review loan guarantee applications, which can be submitted from 7 May up to 31 August 2020. Based on the existing loan guarantee scheme, a special guarantee procedure was created to secure bank loans for eligible startup companies. 65% of the loan guarantee is provided by the federal government and 35% is provided by the canton or third parties appointed by the canton. In this way, the federal government and the canton (or third party) jointly guarantee 100% of an amount of up to CHF 1 million per startup company.

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#### Strategic Field of Environment and Sustainability

(Admin.ch, May 15, 2020)

At its meeting on 13/14 May 2020, the ETH Board discussed the results of the internal consultation on its plans to create a federal research institute for the environment and sustainability by uniting WSL and Eawag. It decided to conduct an in-depth analysis and is requesting the ETH Domain institutions to put forward further solution proposals. The ETH Board also took note of the report on the implementation of equal opportunities. The positive trend of recent years is continuing.

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#### Securing Access to EU Research Cooperation and Funding Programs

(Admin.ch, May 20, 2020)

Horizon Europe, the EU's next Framework Program for Research and Innovation, is due to start in 2021. Along with three other European initiatives, Horizon Europe forms the '2021–2027 Horizon package'. On 20 May 2020 the Federal Council adopted a dispatch on funding requesting Parliament to approve CHF 6,154 million in funding to secure Switzerland's participation in the Horizon package. Provided Parliament

approves this funding, the Federal Council and the EU will be able to renew their bilateral research agreement and secure Switzerland's continued and uninterrupted participation in the Horizon package as an associated state.

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## 2. Education

### New Director Of Paul Scherrer Institute

(PSI.ch, April 01, 2020)

The Swiss Federal Council already elected him as PSI's new Director last November. Today (1 April), Christian Rüegg took over the helm at the Paul Scherrer Institute PSI in difficult times. The coronavirus pandemic is also a challenge for large organizations and employers like PSI. However, PSI's unique research facilities also offer opportunities for researching the virus and thus finding ways to combat it. Christian Rüegg already has plans for maintaining the Institute's leading position internationally. Such as, the Swiss Light Source SLS at PSI is to receive an upgrade to ensure that it will still be one of the best facilities of its kind in ten years' time, just as it is today.



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### New Director of Friedrich Miescher Institute for Biomedical Research

(University of Basel, April 20, 2020)

The Friedrich Miescher Institute for Biomedical Research (FMI) has appointed genome researcher Prof. Dr. Dirk Schübeler as its new director. Dirk Schübeler is an internationally renowned scientific leader in the field of gene regulation and has been acting as the FMI's co-director ad interim together with Professor Silvia Arber since March 2019. Dirk Schübeler replaces Professor Susan Gasser, who stepped down as the FMI's Director after 15 years leading the institute.



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### New President of Euresearch

(University of Basel, April 27, 2020)

The general assembly of Euresearch elected Professor Edwin Constable from the University of Basel to the role of President. Euresearch is a non-profit association supported by the Swiss federal government to inform, advise and connect researchers based in Switzerland about opportunities for European Union funding. Ed Constable, professor of chemistry at the University of Basel and previously Vice-President for Research at the University of Basel as well as member of the Management Board of Euresearch, comments: "It is an honor and a pleasure to be elected to this position. Nevertheless, I recognize that this will be a challenging role in view of the present uncertainties of the association of Switzerland with the European Union."



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### New Members to the National Academy of Sciences

(University of Basel, April 29, 2020)

The University of Basel can count amongst its staff two new members to the United States National Academy of Sciences (NAS). The neurobiologist Prof. Silvia Arber, Professor at the Biozentrum and the Friedrich Miescher Institute for Biomedical Research, and the developmental biologist Prof. Alex Schier, Director of the Biozentrum of the University of Basel, have been elected as new members in April 2020. A total of 146





scientists received this distinction this year for their outstanding and pioneering achievements, and NAS membership totals now 2,403 active and 501 nonvoting foreign associate members.

[/web/2020/02-200429-9c](#)

## Nine New Professors Appointed

(ETH Zurich, May 17, 2020)

Three men and three women have been appointed professors by the ETH Zurich Board, and the title of professor has been awarded to three other ETHZ researchers. The incoming professors work in a wide range of cutting-edge research fields: experimental epidemiology; bio-inspired micro- and nanorobotics; ultrafast processes in materials; forest resources management; construction heritage and preservation; social networks. The professors are: Professor Verena C. Griess, Full Professor of Forest Resources Management; Professor Steven L. Johnson, Full Professor of Physics; Professor Silke Langenberg, Full Professor of Construction Heritage and Preservation; Professor Metin Sitti, Affiliated Professor of Physical Intelligence; Professor Christoph Stadtfeld, Associate Professor of Social Networks; Dr Yuko Ulrich, Assistant Professor of Experimental Epidemiology. Dr Lukas Gallmann, Dr Martin Mächler and Dr René Rossi are now Adjunct Professors.

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## 3. Life Science

### Ideas For Potential Coronavirus Projects

(ETH Zurich, April 02, 2020)

Empty lecture halls, empty corridors, empty laboratories: ETH Zurich has been in lockdown since 17 March. Some key research infrastructure, such as the Swiss National Supercomputing Centre in Lugano and the Swiss Seismological Service, has to remain open. Laboratory animals are also continuing to be cared for. Then there is the COVID-19-related research, for which of course efforts are being ramped up rather than coming to a halt. Although some experts such as mathematicians and statisticians are able to support the government and cantonal authorities by working from home, other researchers require access to their laboratory infrastructure. As a result, researchers were asked to submit their ideas for potential “coronavirus projects”. The conditions were that the projects must offer immediate benefits in terms of the coronavirus pandemic and be able to be implemented promptly.

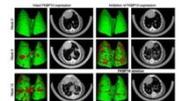


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### Novel Molecular Target For Aggressive Cancers

(University of Geneva, April 08, 2020)

Relevance, specificity and limitation of the risks of relapse: these three elements are essential when developing new cancer therapies. By deciphering the role of a protein called FKBP10, expressed in tumor cells of certain cancers (e.g. lung and colon cancers) but not in healthy cells, scientists from the University of Geneva (UNIGE), Switzerland, identify an innovative therapeutic target. Indeed, this particularly harmful protein seems to increase the aggressiveness of the cancer by promoting cancer-stem cells that are extremely resistant. By inhibiting this protein in an animal model of lung cancer, the Geneva team has succeeded in regressing the tumor in a spectacular manner.



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## Serological Test Can Trace for Past Infections of COVID-19

(CSEM.ch, April 09, 2020)

Swiss startup Adamant Innotech in collaboration CSEM are developing a rapid, highly sensitive serological test to determine if a person has been previously infected with the SARS-CoV-2 virus (the causative agent of COVID-19) and other types of viruses. The device will be based on mature optical microarray technology already used in other medical applications. The new biosensor is intended to give results in one to two hours after simultaneously probing for up to 20 different types of antibodies while tracing for various past infections, such as COVID-19, Influenza or SARS. After the preparation of the biochips at CSEM Center Landquart, the system will be tested with patient samples by Adamant Innotech's partner laboratories in China. If the tests show a positive outcome, Adamant Innotech will start intensive work for validation and regulatory clearance. The company envisages future production of biosensors to take place in Switzerland and China.



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## Rapid Cancer Research Raises Hope

(University of Zurich, April 14, 2020)

Children need specially tailored therapy combinations because of the many rare types of cancer. In addition, the dose or intensity of treatment differs, as small children react highly sensitively to aggressive therapies. Added to this is the risk of long-term complications. Adolescents, on the other hand, can be more resistant to side effects than adults. In these cases, more invasive therapies can be considered. One example is the CAR-T immunotherapy. Developed a few years ago in the United States, its practice has been permitted in Europe since 2018. In this method, cells are removed from the body, they are genetically modified and finally reintroduced. So far, two patients have been treated with CAR-T immunotherapy in Switzerland.

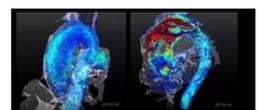


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## AI Accelerates Blood Flow MRI

(University of Zurich, April 14, 2020)

Imaging technology helps to detect cardiovascular diseases much earlier; however, precise examinations are still very time-consuming. Researchers from ETH and the University of Zurich have now presented a method that could greatly accelerate dynamic magnetic resonance imaging of blood flow. Thanks to this innovation, quantitative magnetic resonance imaging could make tremendous progress. At the moment, the recording and subsequent processing of a 4D flow MRI takes up to 30 minutes. The results show that this could be possible within five minutes in the future. The solution consists of elegant and efficient algorithms based on neural networks. Hence, the new method is called FlowVN.



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## Immune Cells Have Different Roles Depending on the Organ

(University of Basel, April 15, 2020)

Group 3 innate lymphoid cells are immune cells that function differently depending on the organ: in the intestines, they prevent certain immune responses, whereas in the spleen they stimulate them. Researchers from the University of Basel and the University Children's Hospital of Basel have discovered how signals from the surrounding tissue control this. These regulatory mechanisms are part of a delicate balance that the immune system must maintain: efficiently combatting pathogens and tumor cells on the one hand, and tolerating the body's cells and symbiotic microorganisms, such as the intestinal flora, on the other. The findings have been published in the scientific journal Nature Communications.



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## Researchers Fight Against Coronavirus

(University of Zurich, April 17, 2020)

With its strong track record in life sciences research, the University of Zurich (UZH) has an important contribution to make in tackling the Covid-19 pandemic. In the current situation, there is a pressing need for studies that will improve our understanding of the virus and the disease progression, and indicate possible ways out of the lockdown. Research resources are unfortunately limited. Therefore, the UZH Foundation has launched a fundraising campaign to finance three research projects tackling the Covid-19 pandemic. The aims of the selected projects are: predicting patients at high risk for severe Covid-19 and understanding the immune response to the virus.



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## Development of Coronavirus Tests

(ETH Zurich, April 17, 2020)

Even though the first wave of the COVID-19 pandemic has passed its peak in Switzerland, coronavirus diagnostic procedures are as important as ever. For one thing, the continuing aim is to test people who may have become infected so that, if infection is confirmed, they can isolate themselves. For another, it is now time to investigate how many people's immune systems have produced antibodies in response to the coronavirus SARS-CoV-2. Scientists suspect that once people have contracted the virus, they gain at least temporary immunity to re-infection. Although experimental research at ETH Zurich has been temporarily suspended, some scientists are working in coordination with the Vice President for Research on the further development of tests.



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## Genetically Modified Insects for Pest Control

(Admin.ch, April 21, 2020)

The use of genetically modified insects with gene drives for purposes of pest control is now the subject of international debate. This method could represent an attractive new approach for controlling pests efficiently, without pesticides. Researchers from Agroscope together with experts from the Netherlands and Britain have demonstrated that gene-drive technology does not pose any fundamentally new environmental risks compared to established pest-control methods that are also based on the release of living organisms. With these methods too, the released organisms can become established and spread. The environmental assessment of insects with gene drives can therefore build on the experience acquired with the established methods.

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## New Biosensor for Detecting COVID-19 Virus

(Admin.ch, April 21, 2020)

A team of researchers from Empa, ETH Zürich and Universitätsspital Zürich (Zurich University Hospital) led by Prof. Dr. Jing Wang has succeeded in developing a novel sensor for detecting the new coronavirus. The sensor will not necessarily replace the established laboratory tests, but could be used as an alternative method for clinical diagnosis, and more prominently to measure the virus concentration in the air in real time: For example, in busy places like train stations or hospitals. Fast and reliable tests for the new coronavirus are urgently needed to bring the pandemic under control as soon as possible.

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## Coronavirus Research

(ETH Zurich, April 21, 2020)

As yet, there is still no reliable treatment for Sars-CoV-2. Scientists across Switzerland and worldwide are engaged in an intensive search for an effective agent against the pathogen responsible for the Covid-19 pandemic. Selected research groups at ETH Zurich are also joining in these efforts. Despite the lockdown, the Executive Board gave them special permission to use the laboratories and infrastructure to fight the coronavirus. The participating researchers have adopted a range of approaches and methods in their projects, but all pursue the same overriding objective: to identify new active substances and vaccines that can mitigate the disease's progression or even prevent an infection.



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## Brain-Controlled Cybathlon

(ETH Zurich, April 21, 2020)

Samuel Kunz is hard at work on his training regimen. At the next Cybathlon, he will be up against 11 other athletes, competing in a virtual car race in which he controls the vehicle using only his thoughts. Samuel Kunz is the pilot of the ETH Zurich Brain Computer Interface (BCI) team. He has had tetraplegia since a swimming accident in the Limmat river in the summer of 2014. Despite his disability, he completed his degree in mechanical engineering at ZHAW and now works as a design engineer. "I'm a total technophile," he says. "When my therapist told me about the Cybathlon, I was immediately keen to take part." For this year's Cybathlon, Nicole Wenderoth, an ETH Professor at the Neural Control of Movement Lab, is working closely with Professor Cuntai Guan from Nanyang Technological University (NTU) in Singapore.



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## Therapeutic Target turns the Immune System against Lymphoma

(EPFL, April 23, 2020)

A team of researchers led by Elisa Oricchio at EPFL have now identified one of the mechanisms used by Non-Hodgkin lymphoma (NHL) to hijack the immune system. The scientists found that certain patients with NHL have a mutated and over-activated form of a protein called cathepsin S. This protein is responsible for cutting other proteins into small fragments that are then exposed on the surface of tumor cells. These fragments mediate communications between cancer and immune cells. When cathepsin S is active, cancer cells interact with immune cells called CD4+ T-cells, which help the tumor to grow, while they maintain social distance with CD8+ T-cells, which would attack and kill the tumor. The identification of this duplicitous relationship between cancer cells and T-cells prompted the researchers to genetically eliminate cathepsin S to understand how tumor growth would be affected.



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## Basel Pharmacists Produce Generic Drug to Treat Coronavirus

(University of Basel, April 23, 2020)

Since potential coronavirus medications are unobtainable on the international market, pharmacists from the University of Basel have developed a pharmaceutical procedure to manufacture generic hydroxychloroquine tablets to overcome supply bottlenecks. Hydroxychloroquine, which has anti-inflammatory, immunomodulatory and antiviral effects, is considered a potential drug for the prevention and treatment of Covid-19. Several ongoing clinical trials are assessing its suitability. Although predominantly an antimalarial drug, it is also used in Switzerland to treat rheumatic disease and experimentally to treat hospitalized patients with severe cases of Covid-19. However, given its limited availability and the risk of serious side effects, doctors are reluctant to prescribe the drug. Patients who rely on it for chronic rheumatic diseases are unable to obtain oral hydroxychloroquine tablets, so they could benefit from this Swiss-based supply.



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## Clinical Study for Peripheral Nervous System Disorder

(businesswire.com, April 27, 2020)

Polyneuron Pharmaceuticals AG – a clinical-stage company developing a new class of biodegradable glycopolymers to treat autoimmune diseases – has obtained approval from regulatory authorities in France, the Netherlands and the UK to launch a phase I/IIa study of PN-1007 in the treatment of anti-MAG neuropathy. This is a disabling, chronic disorder of the peripheral nervous system that currently has no approved treatment. The Basel-based company has obtained orphan drug designation from the European Medicines Agency for PN-1007 in anti-MAG neuropathy. PN-1007 targets the IgM autoantibodies that cause the disorder. The study will begin later this year and expects to deliver top-line safety, pharmacokinetic and biomarker data in early 2021. Additional pipeline programs include a second Antibody-Catch™ program to potentially treat multifocal motor neuropathy and severe subtypes of Guillain-Barré syndrome.

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## Genetic Basis of Rapid Evolution in Fish

(University of Basel, April 27, 2020)

Researchers from Basel have identified the genetic basis of rapid adaptation using a native fish species. They compared threespine stickleback fish, a model organism, from different habitats in the Lake Constance region. There, stickleback have adapted to lakes and rivers. To examine how quickly adaptation occurs across the genome, lake- and river-dwelling fish were crossed in the laboratory over several generations, mixing the genomes of the two ecotypes, resulting in a genetically diverse experimental population. The five-year study, which combined lab work, field experiments, mathematical modeling and genomic analysis, reveals that changes in the genome can be observed within a single generation. Such rapid evolution may help some organisms to cope with the current rapid environmental changes caused by humans. The study results are published in Nature Communications.

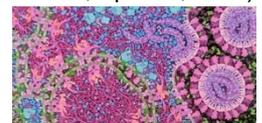


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## Why COVID-19 Affects Old People More Than Young People

(ETH Zurich, April 28, 2020)

The novel coronavirus affects both young and old - but the second group is affected much more severely. The reason for this is as yet unknown. Some scientists suspect that this may be related to the weakening of the immune system in the elderly. However, there may be other explanations. Scientists from the ETH Zurich are investigating another possible reason: As we grow older, the structure, mechanical properties and functions of the cells in our body change. It's known that the lung and respiratory tract tissue stiffens with age. This is partly due to the connective tissue cells in these organs, which deposit more protein fibres in the tissue with age. The stiffening in turn has an influence on the mechanical properties and processes inside the mucosal cells, and even on the genetic control of their cell functions. It's conceivable that SARS-CoV-2 takes advantage of these conditions and reproduces better in cells of older people, which in turn would lead to a more severe disease progression.



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## Analyzing Wastewater to Track the Course of COVID-19

(Admin.ch, April 30, 2020)

The novel coronavirus has been successfully detected in wastewater – even at low concentrations, in samples collected at an early stage of the outbreak. Researchers at EPFL and Eawag are now working to optimize the method. The aim is to develop a system which could warn of a resurgence of cases earlier



than clinical diagnostic tests. The researchers believe that they can use the samples from 20 large treatment plants distributed across Switzerland to monitor the wastewater of approximately 2.5 million people. If samples were rapidly analyzed, a resurgence of infections during the lockdown exit period could probably be detected earlier than with diagnostic tests – about a week earlier.

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## Swiss Coronavirus Clone Used by Labs Worldwide

(University of Bern, May 04, 2020)

Researchers in virology and veterinary bacteriology at the University of Bern have cloned the novel coronavirus (SARS-CoV-2). The synthetic clones are being used by research groups worldwide to test corona samples, find antiviral drugs and develop vaccines as quickly as possible. The method developed in Bern can also be used in future to combat other highly infectious viruses. The researchers successfully reconstructed the coronavirus from synthetic DNA (deoxyribonucleic acid). DNA copies containing parts of the coronavirus genome were introduced into yeast cells and assembled into a complete copy. The researchers then used this to produce infectious coronaviruses. The synthetic viruses cloned in Bern represent a major step forward in the diagnosis of patient samples and the development of new antiviral agents.



[/web/2020/03-200504-66](#)

## How Pathogens Withstand Acidic Environments in the Human Body

(University of Basel, May 04, 2020)

Certain bacteria, including the dangerous nosocomial pathogen MRSA, can protect themselves from acidic conditions in our body and thus ensure their survival. Researchers at the Biozentrum of the University of Basel have now elucidated the structure and function of a flippase transporter involved in the synthesis of lipoteichoic acids in the pathogen MRSA. This transport protein involved in cell wall biosynthesis plays a key role. The niches in the human body, which are preferentially colonized by some bacteria, usually have an acidic microclimate. The bacteria withstand these acidic conditions by simply building up a thicker protective layer of lipoteichoic acids.



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## Prostate Cancer Treatment May Protect from COVID-19

(ETH Zurich, May 07, 2020)

Androgen- deprivation therapy could protect against infection with SARS- CoV-2 and against severe disease progression. This is suggested by a study led by a professor from the Università della Svizzera Italiana and ETH Zurich. Male cancer patients have a 1.8- fold increased risk of COVID- 19 infection compared to the whole male population and develop a more severe disease. Interestingly, however, the study authors found an exception: men treated for prostate cancer with androgen- deprivation therapies (ADT) were less likely to develop COVID- 19 and, if they were infected, the disease was less severe. Of over 5200 men with prostate cancer on ADT in the Veneto region, very few developed COVID- 19, and none of these patients died of it. Among patients with prostate cancer, the risk of SARS- CoV-2 infection was four times lower when they received ADT. Research by other scientists has previously shown that a protein called TMPRSS2 helps the pandemic virus to infect human cells. TMPRSS2 levels are elevated in prostate cancer patients, and ADT can decrease these levels. This may suggest that those who become infected from COVID-19 could take ADT to reduce the severity of the symptoms.

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## Gel to Help Prevent Bone Fractures Caused by Osteoporosis

(EPFL, May 07, 2020)

250 million people around the world have osteoporosis – a disease that weakens the bone structure. EPFL scientists have developed a gel that can locally reinforce bones weakened by osteoporosis. The startup they created, called Flowbone, has just made it through the second round of the Venture Kick competition.

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## More Selective Elimination of Leukemia Stem Cells and Blood Stem Cells

(University of Zurich, May 08, 2020)

Hematopoietic stem cells from a healthy donor can help patients suffering from acute leukemia. However, the side effects of therapies are often severe. A group of researchers led by the University of Zurich have now shown how human healthy and cancerous hematopoietic stem cells can be more selectively eliminated using immunotherapy instead of chemotherapy in mice. The aim is to test the new immunotherapy in humans as soon as possible.

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## Drawing Patterns of Molecules Using Light to Guide Living Cells

(ETH Zurich, May 11, 2020)

Highly complex organisms can arise from a single cell, which is one of the true miracles of nature. Substances known as morphogens have an important role in this development, namely by signaling to cells where they should go and what they should do. These signal molecules guide biological processes such as the formation of body axes or the wiring of the brain. To investigate such processes in more detail, researchers have to be able to position the signal molecules among living cells in three-dimensional space. This was made possible by a new method developed by Nicolas Broguiere and his colleagues in the research group headed by Marcy Zenobi-Wong. Their approach makes it possible to distribute bioactive molecules in a hydrogel with a high degree of precision.

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## Peptides That Can Be Taken As A Pill

(EPFL, May 11, 2020)

More than 40 peptides are already approved as drugs, generating revenues in the billions. There are several hundreds of peptide-based medications currently in clinical trials. But almost none of these drug-peptides can be taken orally. Since peptides are an important part of food, the stomach and intestines harbor countless enzymes that can degrade them, meaning that most peptide-based medication do not survive the passage through the gastrointestinal tract. With this method, the researchers have succeeded for the first time in evolving target-specific peptides that can resist breakdown in the gastrointestinal tract. For example, they gave mice a lead peptide that inhibits thrombin – an important anti-thrombosis target – in the form of a pill. The peptide remained intact in the stomach and intestines, and even though it reached the blood stream in rather small quantities, most of it remained fully intact across the entire gastrointestinal tract.

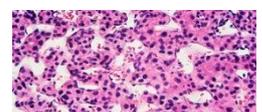
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## Influence of Hepatitis D in Liver Cancer

(University of Geneva, May 18, 2020)

Of all the hepatitis viruses, D is the most poorly known. This small virus, which can only infect people already infected with Hepatitis B, has so far been little studied. Hepatitis D is one of the most dangerous forms of chronic viral hepatitis because of its possible progression to irreversible liver diseases. Scientists from the University of Geneva (UNIGE) and the Geneva University Hospitals (HUG) have studied the most serious consequence





of chronic hepatitis: hepatocellular carcinoma, a particularly aggressive and often fatal liver cancer. By conducting a systematic review of the literature and a meta-analysis of all available data, they demonstrated that people infected with Hepatitis D have up to three times the risk of developing hepatocellular carcinoma compared to those infected only with Hepatitis B.

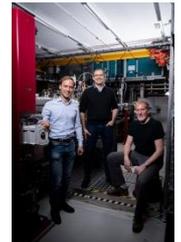
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## Mechanism of a Light-driven Sodium Pump

(PSI.ch, May 20, 2020)

Many cells build up a concentration gradient between their interior and the environment. For this purpose, special pumps in the cell membrane transport sodium out of the cell. With the help of such a concentration gradient, cells of the small intestine or the kidneys, for example, absorb certain sugars. Now, researchers at the Paul Scherrer Institute PSI have succeeded for the first time in recording, in action, a light-driven sodium pump from bacterial cells. The findings promise progress in the development of new methods in neurobiology. The researchers used the new X-ray free-electron laser SwissFEL for their investigations.

[/web/2020/03-200520-0e](#)



## Increased Usability and Precision in Vascular Imaging

(University of Zurich, May 26, 2020)

For the diagnosis and treatment of cardiovascular and other diseases, it is important to know the three-dimensional structure of blood vessels. This knowledge of the exact anatomy of the capillaries in humans and animals is also crucial for basic research. It enables researchers to investigate diseases that attack the blood vessels and evaluate new treatments. Researchers at the University of Zurich (UZH), the National Centre of Competence in Research Kidney.CH and the Biomaterials Science Center of the University of Basel have now developed a novel X-ray contrast agent called "XlinCA", with which capillaries can be made visible much more precisely using computer tomography. Additionally, this reduces the number of animals required in research experiments.

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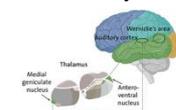


## Schizophrenia: Thalamus misleads Ear

(University of Geneva, May 26, 2020)

There is an extremely high probability that individuals with 22q11.2 micro deletion syndrome – a rare genetic disorder – will develop schizophrenia together with one of its most common symptoms, auditory hallucinations. Scientists at the University of Geneva (UNIGE) and the Synapsy National Centre of Competence in Research (NCCR) have been studying this category of patients. They have succeeded in linking the onset of this hallucinatory phenomenon with the abnormal development of certain substructures of a region deep in the brain called the thalamus. These thalamic nuclei have been identified using a combination of functional and structural magnetic resonance imaging. They are involved in processing memory and hearing among other things. The authors suggest that there might be an explanation for these auditory hallucinations that is almost "mechanical": the immaturity of the axon connections that bind the thalamic nuclei to the cortex areas responsible for hearing

[/web/2020/03-200526-cc](#)



## Electrical Stimulus to Regulate Gene

(ETH Zurich, May 28, 2020)

A team of researchers led by ETH professor Martin Fussenegger has succeeded in using an electric current to directly control gene expression for the first time. Their work provides the basis for medical implants that can be switched on and off using electronic devices outside the body. This is how it works: A device containing insulin-producing cells and an electronic control unit is implanted in the body of a diabetic. As soon as the patient



eats something and their blood sugar rises, they can use an app on their smartphone to trigger an electrical signal, or they can preconfigure the app do this automatically if the meal has been entered in advance. A short while afterwards, the cells release the necessary amount of insulin produced to regulate the patient's blood sugar level.

[/web/2020/03-200528-c9](#)

## 4. Nano / Micro Technology / Material Science

### Antiviral Treatment for Textiles

(ETH Zurich, April 03, 2020)

Recently, the ETH spin-off HeiQ Materials presented an innovative antiviral and antibacterial treatment for textiles, which has been tested effectively against coronavirus, for example. The technology can be used for products such as face masks. The technology is already scheduled to be used in the production of face masks from the start of April, as HeiQ announced in a press release. The first customers include a Chinese protective mask manufacturer. The treatment can be used on all types of textile fibers. The viruses that are deactivated include those with a lipid envelope, such as coronaviruses. In the test, the technology not only proved effective against the human coronavirus 229E, but also against various kinds of influenza viruses.

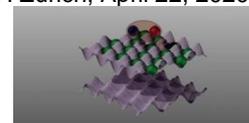


[/web/2020/04-200403-86](#)

### Behavior of Strongly Interacting Electrons

(ETH Zurich, April 22, 2020)

In a material made of two thin crystal layers that are slightly twisted with respect to each other, researchers at ETH Zurich have studied the behavior of strongly interacting electrons. Doing so, they found a number of surprising properties. To create strong interactions between electrons in a controlled way, Imamoğlu's research group at the Institute for Quantum Electronics used wafer-thin slices made of layers of a molybdenum diselenide crystal only one atom thick. Things get even more interesting, however, when two such slices are put on top of each other with their crystal directions slightly twisted. The twist between the two slices creates a kind of moiré-crystal lattice that amounts to a fictitious crystal with atoms that are farther apart than usual. Such a crystal has a much weaker influence on the motion of the electrons, meaning that the interactions between the electrons become more important by comparison.



[/web/2020/04-200422-ac](#)

### Carbon Fiber Reinforced Cables for 127-Meter-Long Railway Bridge

(Admin.ch, April 30, 2020)

Another milestone for an extremely versatile material with Swiss roots: A 127-meter-long railway bridge will be pushed over the A8 motorway near Stuttgart, its 72 suspension cables consisting entirely of carbon fiber-reinforced polymer (CFRP). This ultra-light yet extremely stable material was developed largely at Empa and has since been used in more and more structures.

[/web/2020/04-200430-fb](#)

### Inexpensive, Future OLED

(PSI.ch, May 01, 2020)

At the Paul Scherrer Institute PSI, researchers have gained insights into a promising material for organic light-emitting diodes (OLEDs). The substance enables high light yields and would be inexpensive to produce on a large scale – that means it is practically made for use in large-area room lighting. Researchers have been searching for such materials for a long time. The newly generated understanding will





facilitate the rapid and cost-efficient development of new lighting appliances in the future.

[/web/2020/04-200501-47](#)

## 5. Information & Communications Technology

### Digital Contact Tracing Project

(EPFL, April 21, 2020)

Over the past two months, researchers from EPFL and ETH Zürich have been developing technologies for digital contact tracing, together with KU Leuven, Technische Universiteit Delft, UCL, the Helmholtz Center for Information Security (CISPA), the University of Oxford, and the University of Turin, as well as Swiss software development experts Ubique and PocketCampus Sàrl. The collaborative development effort is called DP-3T (Decentralized Privacy-Preserving Proximity Tracing) and proposes a secure, decentralized, privacy-preserving proximity tracing system based on the Bluetooth Low Energy standard. Its goal is to simplify and accelerate the process of identifying people who have been in contact with someone infected with the SARS-CoV-2 virus, thus providing a technological foundation to help slow its spread.



[/web/2020/05-200421-6f](#)

### New Center for Intelligent Systems

(EPFL, May 11, 2020)

EPFL's new Center for Intelligent Systems (CIS) will act as a research promotion platform for bringing together experts in machine learning, data science, computer vision, cyberphysical systems, and robotics. CIS will act as a point of contact with industry, as well as Swiss and international stakeholders, to create long-term partnerships and accelerate innovation in complex systems. The center also provides a list of EPFL courses for students interested in developing key competences in intelligent systems. As a first example of cross-disciplinary work, researchers at the CIS developed the "Coughvid" app, which aims to identify the telltale dry cough of a COVID-19 patient by using artificial intelligence to analyze sound waves. The team is currently working with the Lausanne University Hospital (CHUV), Unisanté, and the University Hospital of Bern (Inselspital) to medically validate the Coughvid protocol.



[/web/2020/12-200511-41](#)

### Swiss Tracing App goes on Trial

(ETH Zurich, May 25, 2020)

People in Switzerland are gradually returning to their everyday routines and their work now that the peak of the coronavirus crisis seems to have passed. But the easing of the lockdown also fuels fears about a second wave of infection. Strict adherence to health and safety rules is the best strategy for protecting ourselves against COVID-19 infection. In addition, the government intends to provide the Swiss population with a tracing app as soon as possible that should help to stem the spread of the virus. The app is being developed as part of the DP-3T project by ETH Zurich and EPF Lausanne, working together with international researchers.



[/web/2020/05-200525-45](#)



## 6. Energy / Environment

### Solar Tiles for New and Historic Buildings

(PV magazine, April 02, 2020)

The product costs around \$28 to \$30 per 0.1sqm although prices will vary depending on project complexity. Swiss manufacturer Freesuns says its tiles can be used on historic buildings and can cover 100% of rooftops. Every tile hosts an electrical safety circuit to help prevent fire-risk, the company said, adding the product is manufactured with double tempered glass. Solaris' standard tile is a 525mm by 460mm tile which reportedly delivers 154 W per square meter. It costs \$299 excluding VAT. The (more expensive) matte gray product has no visible lines and could be used to replace slate-style roofs on historic buildings, according to its developer.



[/web/2020/06-200402-88](#)

### New Perovskite Process for Thin-Film Solar Cells

(PV magazine, April 07, 2020)

A group of scientists at Switzerland's Federal Laboratories for Materials Science and Technology (EMPA) has demonstrated a new manufacturing process, based on slot die coating, for the production of perovskite thin-film solar cells. The laboratory has fabricated small perovskite modules using this process and has plans to move into the field-testing phase later this year. Many of these approaches use variations on slot die coating. The process developed by EMPA, working in conjunction with fellow Swiss company Solaronix, deposits layers using slot die coating – in which a liquid is coated onto a substrate via a thin slot positioned close to the substrate, to deposit the layers needed for the solar cell. This allows even more flexibility in determining the thickness of the layers.



[/web/2020/06-200407-7d](#)

### Synthetic Gas Instead of Fossil Energy

(EMPA, April 08, 2020)

There is one major challenge in converting our energy system to purely renewable energy sources: winter – or rather the supply gap at this time. The conversion of surplus summer electricity into synthetic gas offers a way of ensuring that renewable energy could be available in sufficient quantities during the winter months. It would also allow to operate long-distance trucks. A research project at Empa is looking into the production of synthetic methane. The Canton of Zurich is now supporting the project with a total of USD 500,000 from the framework credit to support pilot projects in the energy sector. Using existing transport systems Synthetic methane can be produced from renewable electricity and carbon dioxide and easily transported via the gas grid.



[/web/2020/06-200408-47](#)

### Air Pollution In Times Of Corona

(Admin.ch, April 09, 2020)

The sky is currently empty, and the roads are hardly frequented. The measures taken by the Swiss Federal Council not only have an impact on our everyday lives, but also on air quality. The 16 measuring stations of the National Air Pollution Monitoring Network (NABEL) monitor and analyze numerous pollutants in the atmosphere. These data show the state of air quality in Switzerland since the lockdown mid-March. The researchers at Empa's "Air Pollution/Environmental Technology" lab are particularly busy these days and are constantly updating their data. The weather as an important factor. However the analysis of this data is extremely complex. For the extent to which the air is polluted with pollutants does not only depend on their emission; the weather - especially wind and temperature conditions - plays a major role.

[/web/2020/06-200409-b1](#)



## ABB to supply High-Voltage Direct Current Technology

(Renewables Now, April 09, 2020)

ABB has secured several orders to supply advanced high-voltage direct current converter transformers and high-voltage equipment to Chinese state-owned electric utility State Grid Corporation of China (SGCC). The solution, which ABB will provide through its Power Grids business, will be employed in three 800-kV ultrahigh-voltage direct current (UHVDC) transmission links owned by the Chinese giant, ABB said today. The three links will transport up to 8,000 MW of electricity and enable the integration of hydro, wind and solar power. The 1,700-kilometre Yazhong-Nanchang link will transmit electricity from the hydro-rich Sichuan Province in the south-west to the load center in Jiangxi Province in east China.



[/web/2020/06-200409-7f](#)

## Fuel Cells for Ships

(Renewables Now, April 14, 2020)

ABB has teamed up with Hydrogene de France (HDF) to jointly produce big fuel cell systems that will be used in the shipping industry. They have signed a memorandum of understanding for the new product. It will be based on a megawatt-scale fuel cell power plant that ABB has developed. The new system will be produced at HDF's new factory in Bordeaux, France. The megawatt-scale product will be capable of powering ocean-going vessels. If renewables are used for the production of hydrogen, the entire energy chain can be clean, ABB said.



[/web/2020/06-200414-11](#)

## Cleaner Air With Geothermal Energy

(ETH Zurich, April 14, 2020)

Many Europeans have an idyllic view of Mongolia as a land of wide, empty spaces and pristine nature. But the truth is more complicated, especially in winter. That's the time of year when life is anything but idyllic for the people who live here. Their settlements are shrouded in thick, sooty smoke that makes it difficult to breathe. The inhabitants face levels of pollution that are up to 80 times higher than guideline values specified by the World Health Organization (WHO) – an unacceptable situation given that the dirty air causes severe health problems among local residents. ETH geophysicists are helping to develop geothermal energy as a clean alternative.



[/web/2020/06-200414-e9](#)

## High-Alpine Solar Plant

(PV magazine, April 15, 2020)

The race is on to install Switzerland's first high-alpine PV plant. With Axpo recently announcing it had secured approval for a 2 MW solar plant on the Mutsee dam, fellow publicly-owned utility EWZ has revealed similar plans. EWZ this month received approval for a 410 kW array on the Albigna dam in Bergell, 2,100m above sea level. The project, planned at an altitude almost 400m lower than the Mutsee facility, will involve the installation of more than 1,200 solar modules from July onwards and is expected to generate around 500 MWh of clean power per year.



[/web/2020/06-200415-c9](#)

## Additional \$47m for Solar Incentives

(PV magazine, April 20, 2020)

The government wants to see off a potential slump in the PV market as a result of the Covid-19 pandemic. The increase means \$388 million worth of rebates will be available for solar systems. Switzerland's Federal Office of Energy (SFOE) has allocated an additional \$47.5 million to its residential and commercial rooftop rebate





program. Although applications for incentives under the scheme rose significantly in the first quarter of 2020, demand is now falling back because of the Covid-19 crisis, the federal office said today. The government said the extra funds have been allotted to try and stimulate demand. Rebates are available to offset 30% of the cost of buying and installing small PV systems, with a generation capacity of up to 100 kW, and larger, 100 kW-50 MW facilities.

[/web/2020/06-200420-b2](#)

## Dramatic Loss of Food Plants for Insects

(University of Zurich, April 27, 2020)

The diversity of food plants for insects in canton Zurich has dramatically decreased over the last century. Researchers from the Universities of Bonn and Zurich and the Swiss Federal Institute for Forest, Snow and Landscape Research WSL have demonstrated that bees, flies and butterflies are increasingly deprived of their food base. The originally diverse landscape has become homogenized, resulting in the disappearance of many habitats, especially wetlands, which have shrunk by around 90 percent. As human settlements have spread, cultivated land has shrunk, and intensified pasture and arable farming has depleted meadows and arable habitats. The data collected by the research team, aided by 250 citizen scientists, show that about half of all species have decreased significantly, while only 10 percent of the species have increased.



[/web/2020/03-200427-54](#)

## Blockchain Energy Platform

(Ledger Insights, April 29, 2020)

April 2020 saw the launch of Equigy a new European energy crowd balancing platform that uses consumer batteries, electric vehicles and blockchain to balance the supply of energy to electricity grids. The consortium was founded by Terna, swissgrid and TenneT, which respectively operate electricity grids in Italy, Switzerland, Netherlands and Germany. The TSOs have partnered with BMW, Nissan, Fiat Chrysler and others to push forward their initiatives of storing excess renewable energy in batteries, so it can be released later when the renewable sources are insufficient to meet demand. The Equigy platform aims to both reduce the fluctuations in energy supply and replace some of the fossil fuels used with renewable energy. It describes itself as the crowd balancing platform.



[/web/2020/06-200429-33](#)

## Geothermal Project at Lake Geneva

(Think Geoenergy, May 03, 2020)

Initially searching for hydrocarbons, company Petrosvibri is now seeking a permit by the canton of Vaud for geothermal exploration at Noville at Lake Geneva. The local company requested the canton of Vaud to obtain the necessary authorizations. Petrosvibri S.A. has decided to develop a geothermal energy project on the Noville site, initially identified for the search for hydrocarbons. After several years of work and the drilling of an exploration well in the territory of the commune of Noville, the Board of Directors of Petrosvibri S.A. has opted for the development of a geothermal energy project. The next step consists of obtaining the necessary permits to develop this innovative project in terms of renewable energy.



[/web/2020/06-200503-be](#)

## Cooling of the Southern Ocean - Despite Global Warming

(ETH Zurich, May 06, 2020)

Climate and marine scientists are observing pervasive warming of the ocean and the land surfaces across the globe. Global warming has been most pronounced in the alpine regions and the Arctic. Over the period 1982 to 2011, however, a cooling trend was recorded in surface waters in some parts of the Southern Ocean around the





Antarctic continent, specifically in the area south of 55 degrees latitude. This cooling was strongest in the Pacific sector of the Southern Ocean, where the ocean surface cooled by around 0.1°C per decade, and the weakest in the Indian and parts of the Atlantic sectors. Now a group of scientists led by ETH Professor Nicolas Gruber has solved the puzzle with the help of simulations with a high- resolution ocean model.

[/web/2020/03-200506-e2](#)

## Wild Bees Fly for Research

(Admin.ch, May 26, 2020)

Of the total proceeds from agriculture in Switzerland, around CHF 350 million a year are only generated due to the pollination performance of honeybees and wild bees. Many of Switzerland's over 600 wild-bee species often make as important a contribution here, as do honeybees – hence, the protection of wild bees is also crucial for the farming sector. Insect numbers have declined worldwide in many regions, and wild-bee populations are also under pressure. But what exactly is harming wild bees? As part of an EU project and together with 42 partner organizations, Agroscope experts investigate possible stress factors and their interactions. The aim: to improve the applied scientific knowledge required to further develop and optimise measures for keeping honeybee and wild-bee populations healthy.

[/web/2020/03-200526-a8](#)

## 7. Engineering / Robotics / Space

### Six Planets In Rythm

(university of Geneva, April 16, 2020)

Almost visible to the naked eye in the Draco constellation, the star HD 158259 has been observed for the last seven years by astronomers using the SOPHIE spectrograph. This instrument, installed at the Haute-Provence Observatory in the South of France, acquired three hundred measurements of the star. The analysis of the data which was done by an international team lead by researchers from the University of Geneva (UNIGE), has lead to the discovery that the star HD 158259 has six planetary companions: a "super-Earth" and five "mini-Neptunes". These planets display an exceptionally regular spacing, which hints of how the system may have formed.



[/web/2020/07-200416-ee](#)

### CHEOPS Space Telescope Ready for Scientific Operation

(University of Bern, April 16, 2020)

The «CHaracterising ExOPlanet Satellite» CHEOPS has reached its next milestone and been declared ready for science by the European Space Agency ESA. After almost three months of extensive testing in Earth's orbit, and with part of it performed in home office during the corona lockdown, the international CHEOPS mission consortium can now start science operations. Judging from the first results, the space telescope easily surpasses its predefined requirements. CHEOPS has the purpose to detect exoplanets the size of planet Earth and to investigate known exoplanets to determine, among other things, whether they have conditions that are hospitable to life.



[/web/2020/07-200416-21](#)

### SKA as Biggest Radio Telescope ever built

(University of Geneva, April 20, 2020)

The Square Kilometre Array, or SKA, will be the biggest radio telescope ever built. EPFL became a member of the SKA Organisation (SKAO) beginning of April 2020, and will coordinate the contributions to the SKA on behalf of the Swiss Academic





Community comprising of University of Geneva, University of Zurich, University of Bern, ETH Zürich, CSCS, FHNW School of Life Sciences, HES-SO Haute école spécialisée de Suisse occidentale, Verkehrshaus der Schweiz and EPFL. The SKA is one of the biggest and most ambitious scientific tools of the 21st century, which will feature an array of 130 15m-diameter dish antennas in South Africa and an array of 130'000 TV-like antennas in Western Australia in the coming years. Thanks to this ambitious tool, some of the universe's greatest mysteries will be resolved. Prof. Jean-Paul Kneib of EPFL is leading the consortium of Swiss Scientists interested in the SKA project.

[/web/2020/07-200420-ca](#)

## ESPRESSO Confirms Presence of Planet around the Nearest Star

(University of Geneva, May 28, 2020)

An international team of scientists, including University of Geneva researchers, has confirmed the existence of the Proxima b extrasolar planet around the closest star in the solar system, Proxima Centauri. The study results, published in *Astronomy & Astrophysics*, reveal that Proxima b, similar in size to Earth, is located in the habitable zone of its star, which it orbits in 11.2 days. This breakthrough has been possible thanks to precise radial velocity measurements using ESPRESSO, the Swiss-manufactured spectrograph – the most accurate in operation – installed on the Very Large Telescope in Chile. Proxima b was first detected four years ago using an older spectrograph, HARPS – also developed by the Geneva-based team – which measured a low disturbance in the star's speed, suggesting the presence of a companion.



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## 8. Physics / Chemistry / Math

### Photonic Microwave Generation

(EPFL, April 20, 2020)

Publishing in *Nature Photonics*, an EPFL research team led by Tobias J. Kippenberg has now demonstrated integrated soliton microcombs with repetition rates as low as 10 GHz. This was achieved by significantly lowering the optical losses of integrated photonic waveguides based on silicon nitride, a material already used in CMOS micro-electronic circuits, and which has also been used in the last decade to build photonic integrated circuits that guide laser light on-chip. The scientists were able to manufacture silicon nitride waveguides with the lowest loss in any photonic integrated circuit. The resulting microwave signals feature phase noise properties on par with or even lower than commercial electronic microwave synthesizers. These microwave signals, as well as their optical carriers, could be used in radars, satellite communications and future 5G wireless networks.

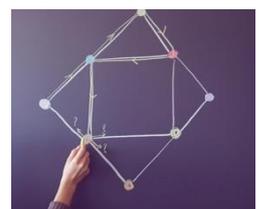


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### Matheminecraft

(EPFL, April 21, 2020)

Mathematician David Strütt, a scientific collaborator at EPFL, worked for four months to develop Matheminecraft, a math video game in Minecraft, where the gamer has to find a Eulerian cycle in a graph. Minecraft is a sandbox video game released in 2011, where the gamer can build almost anything, from simple houses to complex calculators, using only cubes and fluids. These countless possibilities are what lured David Strütt into Minecraft's universe: "the game might be first intended for kids but I was studying for my Bachelor's degree in mathematics when I discovered it. I fell in love with the game when I realized there is all the necessary blocks to build a Turing machine inside the





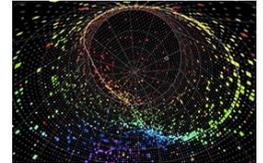
game. It was a long time ago, so I have since forgotten what a Turing machine is. But the gist of it is: anything is possible inside the game".

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## Understanding the Matter-Antimatter Asymmetry

(University of Bern, April 23, 2020)

The dominance of matter over antimatter in the Universe is among the most relevant open science questions. The T2K experiment in Japan - with contributions from physicists from the University of Bern - has been searching for answers to this question in so-called neutrino oscillations. Neutrinos, elementary particles that travel through matter with almost no interactions, appear in three different types: electron-muon- and tau-neutrinos, and their respective antiparticles. In 2013, the international T2K collaboration discovered a new type of transformation among neutrinos, showing that muon-neutrinos transform (or oscillate) into electron-neutrinos while travelling in space and time. Using this data, a new study now shows that neutrinos play a role in the creation of the matter-antimatter asymmetry in the Universe, which helps the understanding of the dominance of matter over antimatter. For its research, T2K used neutrino beams generated at the Japan Proton Accelerator Research Complex and detected 295 km away at the Super-Kamiokande detector.



[/web/2020/08-200423-34](#)

## New Sponges to Filter Toxic Substances from Water

(EPFL, May 06, 2020)

Despite more and more guidelines and bans, water is still contaminated in many places on our planet. Chemists at EPFL have now developed energy-efficient sponges to capture certain toxic substances that are often found in water, such as hexavalent chromium. One gram of these sponges – which are actually porous crystals – can have a contact surface area as large as a football field, and extracts approximately 208 mg of hexavalent chromium. In addition, the sponges can also capture gold, mercury or lead. The development of efficient and cheap processes to rapidly clean water plays an important role in human health and environmental well-being.

[/web/2020/08-200506-dc](#)

## Long-Lived Pionic Helium

(PSI.ch, May 07, 2020)

To better understand quantum physics, some experiments try to create exotic atoms where electrons are replaced by other particles. After eight years of research, an international collaboration between the Paul Scherrer Institute, CERN, and the Max Planck Institute of Quantum Optics have succeeded in creating an artificial atom called "pionic helium". The pionic helium was formed at the pion source of the Paul Scherrer Institute by replacing an electron of a helium atom with a pion in a specific quantum state. The usually short-lived pion could then live a thousand times longer than it normally would, which allows scientists to measure the pion with more precision than ever before. Pions belong to the particle family of the so-called mesons, which consist of only two quarks, and are thus fundamentally different from protons and neutrons that are each made up of three quarks.



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## Coupling Quantum Systems with Laser Loops

(University of Basel, May 07, 2020)

For the first time, researchers have succeeded in creating strong coupling between quantum systems over a greater distance. Until now, sufficiently strong interactions were limited to short distances. Typically, two systems had to be placed close to each other on the same chip at low temperatures. But coupling them across larger distances is required for many applications such as quantum networks. A team of physicists led by the University of Basel and the Swiss Nanoscience Institute has now developed a novel method in



which a laser connects two systems, enabling nearly lossless exchange of information and strong interaction: The laser light behaves like a mechanical spring stretched between the systems and transmits forces between the two.

[/web/2020/08-200507-4a](#)

## Mathematics Saves Lives at Sea

(ETH Zurich, May 26, 2020)

Hundreds of people die at sea every year due to vessel and airplane accidents. Emergency teams have little time to rescue those in the water because the probability of finding a person alive plummets after six hours. Beyond tides and challenging weather conditions, unsteady coastal currents often make search and rescue operations exceedingly difficult. New insight into coastal flows gleaned by an international research team led by George Haller, Professor of Nonlinear Dynamics at ETH Zurich, promises to enhance the search and rescue techniques currently in use. Using tools from dynamical systems theory and ocean data, the team has developed an algorithm to predict where objects and people floating in water will drift.

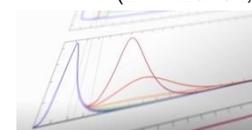


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## Forecast the Second Wave of the Coronavirus Pandemic

(ETH Zurich, May 27, 2020)

ETH Zurich researchers have developed a new mathematical model to a possible second wave of the Covid-19 pandemic in Switzerland. The newly infected would rise more slowly during this second wave, because has learnt from its experience and will act with greater caution than it did at the beginning of the pandemic. Even if the reproductive number should exceed 1 in the coming weeks and months, it will almost certainly not reach the high levels of the first wave of infection in early March. For this reason, it is unlikely that a second wave would overload Switzerland's healthcare system. Nevertheless, its death toll may turn out to be significantly higher, depending on the wave's extent and duration and on measures to lower the likelihood of transmission.



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## 9. Economy, Social Sciences & Humanities

### Crypto Finance AG raises CHF 14 Million

(Startupticker.ch, April 16, 2020)

Crypto Finance AG successfully completed its Series B funding round led by Swiss investor Rainer-Marc Frey and Asian-based Lingfeng Capital USD Fund, with significant investments from existing and several new investors, including Asian-based QBN Capital. With this new capital, the total funding raised for Crypto Finance is CHF 36 million, and the Crypto Finance Group can continue to grow despite current challenges posed by COVID-19. Crypto Finance AG, represented by Founder & CEO Jan Brzezek, participated in our Venture Leader Fintech 2019 co-organized with Venturelab. It was a hashtag#TOP100 Swiss Startups in both 2018 and 2019, and recently chosen as a Startup to Watch in 2020! Congratulations and we wish much success to Crypto Finance AG! This is an immense achievement and great testimony to the Crypto Finance track record and strategy.



[/web/2020/11-200416-3d](#)

### Five Swiss Startups Among Global Wealthtech100 Companies

(startupticker.ch, April 29, 2020)

The third edition of the "Wealthtech100" ranking showcases the top 100 most innovative WealthTech companies in the global investment industry. Five young Swiss startups made it into the ranking, which is curated yearly by a panel of industry experts. The listed Swiss startups are: Algotrader, offering a platform



for fully-integrated and automated quantitative trading with a new crypto-solution; Integration Alpha, a deep-tech data management platform for sales support, customer onboarding, compliance and regulatory reporting; ONE PM, offering cloud-based, API-driven financial services, such as asset- and portfolio management solutions; Taxdone, a web app to support clients with their taxes; and 3rd-eyes, enabling financial institutions to provide interactive, scenario- and goal-based investing.

[/web/2020/11-200429-01](#)

## Cryptocurrency Payments: Fast and Secure

(ETH Zurich, April 29, 2020)

Trading in digital currencies such as Bitcoin or Ether has become an established practice, but using them as a payment means is still a slow process. This is because the information is stored on many servers at the same time for safety and transparency reasons: Visible to all members of the network, the information cannot be manipulated by one single party. But this causes long waits. Bitcoin users have to wait up to an hour for a payment to be approved. In the case of Ether, a payment takes three minutes to be confirmed. For everyday shopping, this is too slow. ETH researchers have now developed a system called Snappy that makes cryptocurrency payments practical and fast. They designed a digital deposit system where customers place a deposit in addition to the purchase amount – but only until the seller confirms the payment. For Ether, the deposit would be held for three minutes. The seller, too, has to make a deposit, which serves as a safeguard against malicious behavior. In this way, Snappy protects against all risks.



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## 10. Start-ups / Technology Transfer / IPR / Patents

### Swiss Biotech Association Awards Venture Kick and Venturelab

(venturelab.ch, April 21, 2020)

Swiss biotech continues to thrive: The 2020 edition of the Swiss Biotech Report, launched by the Swiss Biotech Association in conjunction with EY and seven other partners, provides highlights and analysis of funding, M&A and collaborations, as well as a special focus on the exciting new artificial intelligence scene. Furthermore, each year, the Swiss Biotech Association awards companies or individuals in recognition of outstanding achievements. The award winners for 2020 include Venture Kick and Venturelab. Overall positive in tone, the report notes that fundamentals remained strong: research infrastructure delivered innovation, over 40 start-ups were founded, funding continued to flow, big pharma invested heavily in production capacity for cell therapies and biologics, and the talent pool was maintained.



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### Oncology Startup secures EUR 10 Million

(Startupticker.ch, April 22, 2020)

Established in October 2019 in Basel, FoRx is developing a new generation of drugs against a unique target class for the treatment of cancer. The company's scientific foundations are built on the pioneering work of Professor Thanos Halazonetis, from the University of Geneva who discovered novel DNA repair pathways, such as Break Induced Replication (BIR) that enable cancer cells to overcome DNA Replication Stress, a prevalent feature in human cancers but absent in normal, healthy cells. For its seed round, the six months old company has raised CHF 10,5 million led by M Ventures Novartis Venture Fund and Omega Funds with contribution from Pfizer Ventures and Life Sciences Partners.



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## Innovative Start-Ups to receive additional Federal Support

(Admin.ch, April 22, 2020)

Innovative start-ups are an important factor in the success of the Swiss economy. To date, however, start-ups have had little or even no access to the Confederation's existing emergency aid. Therefore, as a supplement to the federal COVID-19 credits and cantonal support measures, the Confederation is planning to use the system of guarantees to shield start-ups from coronavirus-related insolvency. Under the Federal Council measures taken to date, specific business models had only been included to a limited extent. For them, access to the Confederation's existing emergency aid was either not possible or very restricted. Certain cantons have introduced supplementary measures in recent weeks. However, owing to the withdrawal of some investors and the resulting delays or cancellations of funding rounds, further action is needed. Therefore, the Federal Council has examined ways in which coronavirus-related insolvency can be avoided at promising start-ups.

</web/2020/11-200422-25>

## Swiss Startup Secures Maritime Communications for ESA

(Startupticker.ch, April 24, 2020)

The modern shipping industry heavily relies on automated navigation, cargo-tracking systems and digital platforms, which facilitate operations and trade. The mitigation of cybersecurity risks is therefore critical. In particular, the Global Navigation Satellite System (GNSS) provided by multiple satellite constellations has been the subject of spoofing and jamming attacks that led to a partial or total loss of the ability to locate ships at sea. The Swiss cybersecurity startup CYSEC has now been awarded a contract by the European Space Agency (ESA) to develop a solution mitigating the cyber risks related to ship tracking using satellite communications. For this, CYSEC has established a consortium with U-blox, a global provider of leading positioning and wireless communication technologies, and Gomspace, a leading designer, integrator and manufacturer of nanosatellites.



</web/2020/11-200424-9d>

## Five Swiss Startups Selected for SEIF Awards Tech for Impact Finals

(Startupticker.ch, April 30, 2020)

The SEIF Awards Tech for Impact target European impact entrepreneurs who develop or make innovative use of technologies to tackle social or environmental challenges and contribute to the UN Sustainable Development Goals (SDGs). The solutions aim e.g. at making plastics and building materials more sustainable or healthcare more equal. Out of the 365 applications coming from more than 30 different countries, ten finalists for the SEIF Awards 2020 Tech for Impact have been selected. Five of them are from Switzerland: DePoly, Green-Y Energy, MovementSciences, Oxara and Vatorex. The four winners will be announced at the SEIF Awards Ceremony on June 17th and receive CHF 10'000 each.



</web/2020/11-200430-f7>

## New Startup Launches Rapid COVID-19 Test

(startupticker.ch, May 07, 2020)

A recently founded Swiss diagnostics company, called Ender diagnostics, launched a novel rapid test kit for COVID-19, combining Swiss precision with rapid results. The test reliably recognizes SARS-CoV-2 specific RNA sequences and delivers the result within just 30 minutes. The test can be used with current laboratory devices, allowing the diagnosis of up to several hundred samples simultaneously. The startup also plans to develop - on the one hand - an enhanced test, which will significantly reduce workload and save resources, and - on the other hand - a mobile test kit, thought to be available in summer 2020.



</web/2020/11-200507-2f>



## Swiss ICT Start-Up Scene

(Startupticker.ch, May 25, 2020)

According to its 2020 annual report, SICTIC investors participated in 51 financing rounds of ICT startups in 2019, contributing a total of CHF 16 million and a median investment size of CHF 1million. The report also highlights how the ICT sector evolved, and provides insights about business models and the preferences of investors. In its Investment Report 2020, SICTIC demonstrates its growth and traction in the Swiss Startup and Investment Ecosystem. According to the report, SICTIC investors have participated in 51 startup financing rounds of Switzerland based ICT (incl. fintech) startups in 2019. This contribution represents almost half of all investments that were made in ICT startups in the same year – 52 seed and 46 early-stage financing rounds. Because of the high number of investments, the report provides not only insights about SICTIC but also about the Swiss ICT start-up scene in general and its evolution over the years.



[/web/2020/11-200525-90](#)

## Swiss Start-Ups Drive Covid-19 Research

(Startupticker.ch, May 27, 2020)

Swiss start-ups are very active in the quest for therapies against Covid-19. According to the weekly updated view of the Covid-19 product pipeline creates by BIO'a Industry Analysis Team, Swiss companies run 25 different therapeutic programs - more than companies from UK (22), Germany (21) or France (12). However the Swiss Life Sciences Industry is also very strong when it comes to tools for research programs. Three examples show how diverse the tools are that Swiss start-ups offer to support the fight against Covid-19.



[/web/2020/11-200527-d5](#)

## 11. General Interest

### #SheCanSTEM

(CSEM.ch, April 15, 2020)

Innovation in technology impacts all aspects of society and its development. A CSEM (Collaborate Share Empower Move) event is scheduled for December 2020 in Bern, Switzerland with the aim of bringing together pioneers, leaders, and entrepreneurs who want to enable discussions around underrepresented groups in the STEM (Science, Technology, Engineering, and Math) fields. The underlying idea is to move STEMs towards a more supportive, empowered and equal playing field. The round table event will answer important questions around the diversity debate. Keynote speakers are women, with impressive scientific or business careers. The day will conclude with a networking aperitif where you can connect within a creative environment.



[/web/2020/12-200415-65](#)

## 12. Calls for Grants/Awards

### CHF 120M For Research And Teaching

(ETH Zurich, April 03, 2020)

In 2019, private individuals, foundations and companies again made a significant difference to ETH Zurich by donating some 120 million CHF to the ETH Foundation. As the foundation's annual report shows, of the additional funding received, 29 percent came from more than 3,000 private individuals, 29 percent from companies





and 42 percent from other foundations or organizations. Most private individuals donate during their lifetime, but an increasing number of people are now including the ETH Foundation in their wills.

[/web/2020/12-200403-d1](#)

## Grant Program for Neuro Technology Entrepreneurs

(Startupticker.ch, May 22, 2020)

EPFL and the Wyss Center based at Campus Biotech in Geneva have launched a new support program for entrepreneurs developing a promising technology in the field of applied neuroscience or neurotechnology. The focusses on novel technology at the interface of neuroscience and the environment as well as novel technology to access or interact with the brain. The partnership will provide funds to selected entrepreneurial projects for up to CHF 100'000 per project. Applications can be submitted until September 15th.



[/web/2020/13-200522-b4](#)

## Upcoming Science and Technology Related Events

### [webinar] Café des Sciences: MaskTech – Science Revolution for Global Health

June 18, 2020

<https://is.qd/D74Bsx>

MaskTech, HealthTech

Online

### The 8th World Sustainability Forum

September 15-17, 2020

<https://is.qd/Simack>

Sustainability, Medicine, Energy, Agriculture

Geneva

### [webinar] Coding Together: Hackathons for a Sustainable Future

June 23, 2020

<https://is.qd/O60mR3>

IT, Education

Online

The **Science-Switzerland** newsletter is a bimonthly electronic publication keeping you updated on all the latest news on Swiss science, technology, education, innovation and the arts. It is an official publication in English from a single source, with executive summaries of top-highlights on education, of new discoveries in science, and of the latest top-of-the-line technologies and innovational strengths of Switzerland. The Science-Switzerland Newsletter is produced by [swissnex China](#) in collaboration with the [swissnex Network](#).

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