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Science-Switzerland, August – September 2023

News on Swiss science, technology, education and innovation

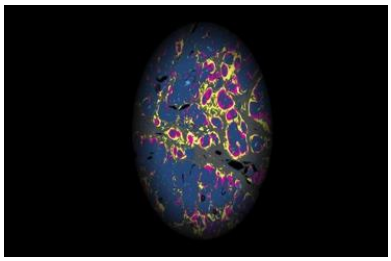
Table of Contents

1. Education 3
2. Life Science 3
3. Nano / Micro Technology / Material Science 15
4. Information & Communications Technology 17
5. Information & Communications Technology 19
6. Energy / Environment 20
7. Engineering / Robotics / Space 25
8. Physics / Chemistry / Math 26
9. Architecture / Design 28
10. General Interest 29
11. Calls for Grants/Awards 32

Upcoming Science and Technology Related Events 33

A Pair of Genes Could Predict Cancer Progression

(University of Geneva, August 17, 2023)



In a significant breakthrough at the University of Geneva (UNIGE), a team spearheaded by Full Professor Mikaël Pittet from the Centre for Translational Research in Onco-Hematology has illuminated the rules that orchestrate the tumor microenvironment—the ecosystem in which tumors develop. This project meticulously analyzed 52 head and neck tumors, each distinctly identifying a pair of macrophage-expressed genes—CXCL9 and SPP1. Their findings show that patients with a higher degree of CXCL9 expression compared to SPP1 exhibited improved clinical outcomes. Additionally, the polarity of these macrophage regulates overall tumor microenvironment activity. Paving the way for personalized cancer treatments, these findings underscore the importance of understanding intratumoral variations and interactions to devise more effective therapeutic interventions.
/web/2023/03-230817-d9

Robot Team on Lunar Exploration Tour

(ETH Zurich, August 09, 2023)

A collaborative team of researchers from ETH Zurich, including Philip Arm and Professor Marco Hutter, alongside the Universities of Basel, Bern, and Zurich, have recently developed a novel approach to lunar resource exploration. This breakthrough involves the use of a specialized team of legged robots to detect minerals on the Moon's surface, pushing the boundaries of existing lunar exploration techniques. This notable research entailed the usage of three ANYmal robots, a creation of ETH Zurich, each specifically equipped for either terrain mapping, geology classification or rock identification. The use of multiple robots not only enables specialist task distribution, but also ensures redundancy during mission malfunctions. Bringing home the European Space Resources Challenge award, this research signifies a profound step towards future lunar missions for the hunt of raw materials.
/web/2023/07-230809-5d

The World's Fastest Electric Vehicle: Achievement Unlocked

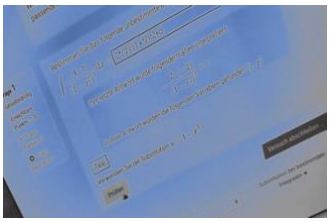
(ETH Zurich, September 12, 2023)

Student visionaries from ETH Zurich, together with academia from various Swiss educational institutions, have beautifully shattered the world acceleration record for electric vehicles. Led by Yann Bernard, the head of the motor at AMZ, this team of young pioneers has crafted their own vehicle components — from the printed circuit boards to the supremely lightweight chassis and battery — and harmoniously optimized them, resulting in a game-changing innovation in electric mobility. With its feathery carbon and aluminum honeycomb structure, the vehicle weighs just around 140 kilos. The real coup, however, was the stunning acceleration; going from 0 to 100km/h in just 0.956 seconds. Their achievement underscores the unrelenting power of student innovation, and the immense potential of clean, electric power.
/web/2023/13-230912-be

1. Education

Harnessing Computer Technology for Math Education at ETH Zurich

(University of St. Gallen, September 05, 2023)



A revolutionary method for math education is emerging from ETH Zurich under the leadership of Andreas Steiger. By employing STACK, a computer-based system that assesses math problems and provides feedback on errors, students are now benefiting from an exponentially enhanced learning experience. The importance of the STACK system lies in the flexibility it offers students, providing the opportunity to practice mathematical problems without any time constraints and garner immediate feedback. Initiated due to the increased needs during the pandemic, it has fast proven its value. Apart from its extensive collection of problems, the system also features an integral trainer that sets a platform for students to master integral computations. By delivering personalized tips and automated feedback, the integral trainer customizes the learning process to cater to each student's unique pace and understanding.
/web/2023/02-230905-9e

Breaking In the Black Box of Pedagogical Authority

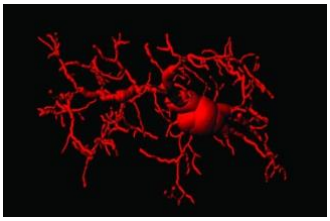
(University of Geneva, September 19, 2023)

Innovative research has recently been conducted at the University of Geneva (UNIGE) and the State of Vaud's University of Teacher Education (HEP Vaud). The research led by Associate Professor Valérie Lussi Borer of the Faculty of Psychology and Educational Sciences at UNIGE and Vanessa Joinel Alvarez at HEP Vaud, explored the dynamics of classroom interactions from multiple perspectives including medical, scientific, economic, legal and societal. The research adopted an inventive methodology for capturing classroom setup using a standalone wide-angle camera and a tracer worn around the teacher's neck. This allowed the research team to monitor the teacher's movements and interaction patterns within the classroom, further reflecting on the teacher's strategy in dealing with significant authority situations.
/web/2023/02-230919-b0

2. Life Science

Immunity Contributes to Aging and Neurodegeneration

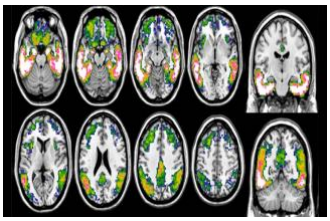
(EPFL, August 16, 2023)



Led by Andrea Ablasser at École Polytechnique Fédérale de Lausanne (EPFL), an insightful study has been embarked upon to comprehend the mechanics behind ageing-induced inflammation and neurodegeneration. Their breakthrough discovery unravels the critical role of the cGAS/STING molecular signaling pathway that drives chronic inflammation and functional decline as we age. By blocking the STING protein, the researchers managed to successfully suppress inflammatory responses in senescent cells and tissues, thereby enhancing tissue function. This in-depth study delineated how STING protein activation impacts the gene activity patterns in microglia, the brain's primary defensive immune cells. These patterns are seen in neurodegenerative ailments such as Alzheimer's and ageing, providing important clues to the neuroimmune interactions governing microglial-based neurotoxicity and potential strategies to slow cognitive decline in ageing-related neurodegeneration.
/web/2023/03-230816-4a

Revolutionizing Alzheimer's Disease Diagnosis with Tau PET Imaging

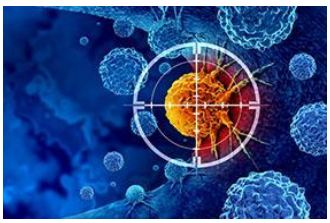
(University of Geneva, August 18, 2023)



A team from the University of Geneva (UNIGE) and the Geneva University Hospitals (HUG), including Cecilia Boccalini and led by Associate Professor Valentina Garibotto, has utilized tau PET imaging for early-stage diagnosis, propelling advancements in Alzheimer's disease management. This breakthrough enables the detection of brain tau proteins—precursors to cognitive decline in Alzheimer's patients—outperforming other imaging techniques in both accuracy and prediction. Through a comparative study involving around 90 participants, the research discovered that tau PET was the most effective in forecasting cognitive decline, shedding light on the variations in tau protein distribution and its influence on symptoms. The incorporation of tau PET into regular clinical assessment could significantly improve individual prognoses, enabling personalized therapeutic strategies. This progress holds promise for the discovery of new tau-targeting Alzheimer's treatments.
/web/2023/03-230818-62

Pioneering Advances in Prostate Cancer Therapy

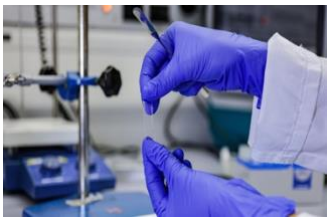
(University of Bern, August 10, 2023)



Researchers led by Dr. Anke Augspach from the Department for BioMedical Research (DBMR) at the University of Bern, Inselspital, and collaborating with the University of Connecticut, have made a significant breakthrough in prostate cancer therapy. Their innovative research revealed a unique vulnerability within prostate cancer cells that showcases the potential for significant therapeutic advancements. Utilizing 2D cell cultures and patient-derived organoids, the researchers focused on a crucial molecular device named the spliceosome, and discovered that the presence of a specific version of this device significantly increases in advanced prostate cancer. By intentionally inhibiting this component, they were able to significantly reduce prostate cancer growth, outperforming existing standard therapies. Supported by a substantial grant from the US Prostate Cancer Foundation, this finding holds promise for the development of new treatments for various types of cancer.
/web/2023/03-230810-05

Breakthrough Treatment for Tracheomalacia in Newborns

(EPFL, August 10, 2023)



A ground-breaking progress has been made in the treatment of tracheomalacia by a team of engineers from the Laboratory of Biomechanical Orthopedics at EPFL and pediatric airway surgeons from the Lausanne University Hospital (CHUV). Led by Professor Dominique P. Pioletti, the researchers have developed an adhesive hydrogel patch to effectively maintain the shape of a damaged trachea and restore airflow. Biocompatible and biodegradable, the hydrogel patch provides robust adhesion on moist tracheal surfaces, even supporting a completely collapsed trachea under negative pressure and increasing its volume by up to 50%. This innovative approach provides a beacon of hope for a more effective treatment of tracheomalacia. The collaboration continues its iterative process to introduce this solution to the operating room, promising a less invasive solution to this serious condition.
/web/2023/03-230810-45

Discovery of Meta-Loops: A Leap Forward in Understanding DNA Folding

(University of Lausanne, August 10, 2023)

A ground-breaking study led by Associate Professor Maria Cristina Gambetta from the Center for Integrative Genomics (CIG) at the University of Lausanne has identified a new form of DNA folding, termed "meta-loops". These genetic loops form when specific, far-apart regions of DNA interact, unveiling a novel insight into the inner workings of DNA. Performed in collaboration with EPFL, Princeton University, and the University of Warsaw, the study focused on fruit fly neurons to observe meta-loops' impact on nervous system development. The researchers discovered that meta-loops significantly influence DNA readings during development, with disruptions causing severe coordination difficulties and convulsions in the insects. The discovery of meta-loops introduces a new paradigm for understanding DNA, laying the groundwork for further exploration in the field of genetic research.
/web/2023/03-230810-e1

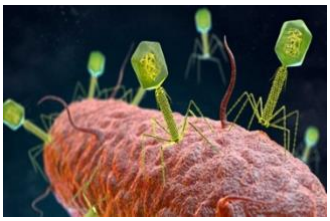
Harnessing AI in Drug Discovery for Rare Metabolic Disorder

(University of Zurich, August 10, 2023)

Under the leadership of Alessandro Luciani and Prof. Olivier Devuyst at the University of Zurich (UZH), a cooperative team of researchers has made strides in understanding the rare metabolic disease, cystinosis, using artificial intelligence. This groundbreaking research, in collaboration with the AI drug discovery company Insilico Medicine, brings a new hope for the nearly 1 in 200,000 babies globally affected by this disorder. This research harnesses Insilico Medicine's PandaOmics platform to delve into the cellular mechanisms behind the kidney disease symptoms seen in cystinosis. This led to the discovery of a critical link between the regulation of a protein, mTORC1, and the disease. Encouragingly, experimental studies confirmed the restorative effect of rapamycin on cellular functions.
/web/2023/03-230810-35

Treating Bladder Infections with Viruses

(ETH Zurich, August 11, 2023)



At the forefront of innovation in disease detection, researchers from ETH Zurich in partnership with Balgrist University Hospital have developed a rapid test to identify the pathogens causing urinary tract infections (UTIs). Led by Professor Martin Loessner from ETH Zurich's Food Microbiology research group, this groundbreaking method uses genetically modified bacteriophages – viruses that target bacteria. The new test not only hastens the identification of UTI-causing pathogens to under four hours but also enables the appropriate prescription of antibiotics, consequently curbing the risks of antibiotic resistance. The timely and reliable diagnosis offered by this method offers a significant breakthrough considering that UTIs, particularly cystitis, affect approximately half of all women during their lifetime.
/web/2023/03-230811-45

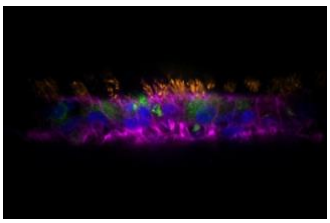
A New Sensor for Neurodegenerative Disease Detection

(EPFL, August 11, 2023)

A revolutionary biosensing tool, ImmunoSEIRA, has been unveiled by Professor Hatice Altug and her team at EPFL. ImmunoSEIRA stands at the junction of protein biochemistry, optofluidics, nanotechnology, and artificial intelligence, poised to revolutionize the detection of neurodegenerative diseases like Alzheimer's and Parkinson's. Utilizing Surface-Enhanced Infrared Absorption (SEIRA) spectroscopy, the ImmunoSEIRA sensor delivers high-precision detection of disease-associated biomarkers. This is paired with a specialized immunoassay for precise biomarker capture and gold nanorod arrays laden with antibodies for specific protein detection. Notably, the sensor employs artificial intelligence neural networks to identify particular misfolded protein forms, indicative of a disease's progress. Tested successfully in clinical settings, including complex biofluids like human cerebrospinal fluid, the ImmunoSEIRA sensor could massively improve early detection and vigilant monitoring of neurodegenerative diseases.
/web/2023/03-230811-da

Engineering Air Gels for Revolutionary Respiratory Infection Research

(EPFL, August 14, 2023)



A team at the Swiss Institute of Technology (EPFL), led by Alexandre Persat, has made a significant breakthrough in bioengineering research. Their innovative creation, organoids named AirGels developed by Tamara Rossy and her colleagues, can model the human respiratory tract opening a new chapter for infection research. AirGels, 3D tissue models grown from stem cells, accurately replicate the physiological properties of airway mucosa, including mucus secretion and ciliary beating. These models have been instrumental in studying bacterial biofilm formation, a crucial factor in antibiotic resistance, by pathogens like Pseudomonas aeruginosa. The researcher's novel discovery, funded by the Swiss National Science Foundation, bridges the gap between in vitro studies and clinical observations, potentially revolutionizing respiratory infection research.
/web/2023/03-230814-ee

Innovative 3D X-ray CT for Enhanced Breast Cancer Screening

(ETH Zurich, August 14, 2023)

A scientific revelation in early breast cancer detection comes from a team of researchers led by Marco Stampanoni, Professor of X-ray Imaging at ETH Zurich, and Michal Rawlik, first author of the publication. Bringing together expertise from ETH Zurich, Cantonal Hospital Baden, University Hospital Zurich, and the Paul Scherrer Institute, they developed an innovative type of 3D X-ray computed tomography (CT), known as grating interferometry CT. Superior to conventional CT in terms of resolution and contrast, this breakthrough allows for the earlier diagnosis of breast tumors, thus bolstering recovery chances for affected individuals. With breast cancer as the most common form of cancer globally, early detection is key. If proven effective, a commercial device could soon become a reality, offering precise tumor detection, reducing false alarms, and largely improving overall breast cancer diagnostics.
/web/2023/03-230814-7f

Deciphering Host Defenses through Microbiome Study

(EPFL, August 15, 2023)

At the forefront of a groundbreaking study are EPFL's dedicated researchers, led by now University of Exeter's Mark Hanson. Their research, entitled "Evolution of Antimicrobial Peptides Shapes Microbiome – Immune System Interface", intricately explores the immune defensive tactics of fruit flies against bacteria, thereby providing illuminating insights about evolutionary host defenses. Through examining the specific roles of antimicrobial peptides DptA and DptB in the flies' defense mechanism, they recognized patterns that could predict host immunity based on the AMP sequences. Further, they unearthed invaluable knowledge on how the fruit fly's immune arsenal evolves to counteract microbes prevalent in their environment. Funded by the Swiss National Science Foundation and the Novartis Foundation, the study offers a compelling model of antimicrobial peptide-microbiome evolution.
/web/2023/03-230815-07

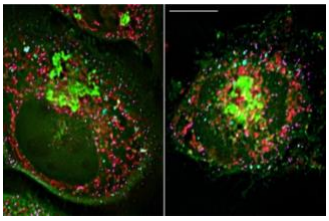
Discovery in HIV Defense Mechanism from African Genomes

(EPFL, August 15, 2023)

In an exemplary display of international collaboration, researchers from EPFL, Canada's National Microbiology Laboratory, and Imperial College London, led by Professor Jacques Fellay from EPFL's School of Life Sciences, have unearthed a critical HIV defense gene in the African population. This game-changing research stands to revolutionize future HIV treatment strategies. By employing a blend of computational analytics and experimental probes on approximately 4000 individuals of African ethnicity, the team identified a gene that hinders HIV replication within specific white blood cells. Backed by varied institutions, including the Swiss National Science Foundation, the research reinforces our understanding of HIV control via genetic factors, positioning us closer to devising highly effective treatments.
/web/2023/03-230815-59

Molecular Switch Controls Lipid Metabolism

(University of Basel, August 16, 2023)



Leading a pioneering study at the University of Basel, Professor Anne Spang and her team have made a significant breakthrough in lipid metabolism by identifying a molecular switch, Arf1, that regulates lipid storage and conversion to energy within our cells. By examining yeast and human cells, the research team discovered that Arf1 controls the transport of lipids from droplets to our mitochondria, where they are then converted into ATP—an essential energy supply. Essentially, when an energy requirement is signaled, Arf1 allows lipids to enter the mitochondria for conversion. Once needs are met, transport is halted. Overactivity or absence of this switch can result in systems imbalance, leading to inadequate ATP supply, fatty acid accumulations and increased risks of conditions like high cholesterol, obesity, or diabetes.
/web/2023/03-230816-70

Treating Inherited Anemia with Gene Scissors

(ETH Zurich, August 17, 2023)

A promising approach to treating inherited anemia has been developed by molecular biologist Mandy Boontanrart at ETH Zurich. Boontanrart's breakthrough lies in a novel treatment for beta-hemoglobinopathies, common types of inherited anemia. The research involved intricate engineering of the endogenous HBD promoter to increase HbA2 levels. Surge ahead, the objective is to conclude all clinical trials and present a product for treating beta-thalassemia by 2030. This approach is expected to undergo a swifter approval process in comparison to current gene editing techniques under review. This research has important implications for the world by offering a potential cure for beta-hemoglobinopathies.
/web/2023/03-230817-47

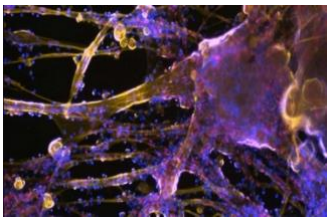
Plant Chemicals Boost Wheat Crop Yield

(University of Bern, August 17, 2023)

Professor Matthias Erb from the Institute of Plant Sciences at the University of Bern and his research team have made a remarkable discovery in crop science. Their research focuses on the influence of chemicals called benzoxazinoids, secreted by maize roots, on the subsequent growth and yield of wheat crops, producing groundbreaking data for sustainable farming. Field studies offered solid evidence that these benzoxazinoids enhance wheat growth metrics such as germination, tillering, and overall yield without negatively impacting grain quality, with the added benefit of reducing certain pest infestations. However, its influence was found to vary based on soil properties. Part of the Interfaculty Research Cooperation "One Health" at the University of Bern, these findings pave the way towards understanding how environment impacts crop health and promoting sustainable agriculture.
/web/2023/03-230817-b4

Stem Cell Research: Building Muscles in the Lab

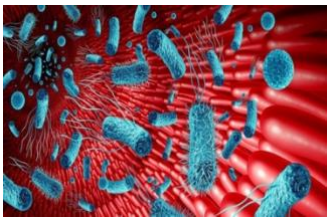
(ETH Zurich, August 18, 2023)



Leading the way in stem cell research, Professor Ori Bar-Nur and his team at ETH Zurich have developed a groundbreaking technique that enables large quantities of muscle stem cells to be obtained in cell culture. This innovative process involves transforming connective tissue cells into muscle stem cells sans genetic engineering, signifying a significant advance in the field. Tested on mice with Duchenne muscular dystrophy, the researchers found that the injected muscle stem cells could effectively repair muscle fibers. Impressively, the team took inspiration from mRNA vaccines for COVID-19, introducing the mRNA transcript of the MyoD gene into cells. This method expands its potential outside traditional medicinal applications to possibly revolutionize sectors like the meat industry and efficaciously treat muscle diseases.
/web/2023/03-230818-5b

How Salmonella Grow Together in the Gut and Exchange Antibiotic Resistance

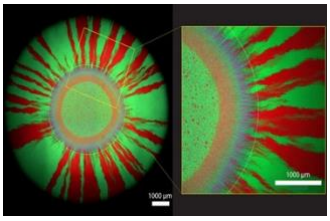
(ETH Zurich, August 22, 2023)



ETH Zurich's research shedding light on the collective behavior of Salmonella bacteria in the gut is spearheaded by lead researcher Ersin Gül and Professor Wolf-Dietrich Hardt. Their research, published in Cell Host & Microbe, delves into how Salmonella bacteria proliferate in the gut in the presence of a related strain, fostering a conducive environment for exchanging antibiotic resistance. Elaborate experiments conducted on mice revealed that the coexistence of different Salmonella populations is heightened with the presence of a specific nutrient source, leading to a multi-fold increase in antibiotic-resistant bacteria. This valuable insight underscores the critical role that dietary components can play in either mitigating or propagating antibiotic-resistant genes, thus influencing overall gut health.
/web/2023/03-230822-83

Key Insights into Bacterial Antimicrobial Resistance

(Eawag, August 23, 2023)



A research team including Dr. Yinyin Ma, Dr. Josep Ramoneda and led by Dr. David Johnson at Eawag, the Swiss Federal Institute of Aquatic Science and Technology, has made a major leap towards understanding the spread of antibiotic resistance in bacterial colonies. This study's unique approach involved the use of genetically engineered bacteria that use different colors to mark the occurrence of genetic exchange, providing valuable insights. This research unraveled the crucial role timing plays in the administration of antibiotics, influencing bacteria's growth patterns and their antibiotic resistance transfer. When antibiotics were applied between 10-70 hours of growth, maximum plasmid transfer (mobile genetic elements carrying antibiotic resistance genes) occurred. This crucial discovery emphasizes the importance of understanding plasmid transfer dynamics in battling the global antibiotic resistance crisis.
/web/2023/03-230823-23

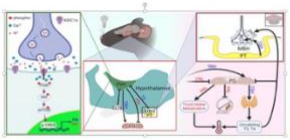
Cells with an Ear for Music Release Insulin

(ETH Zurich, August 24, 2023)

The Department of Biosystems Science and Engineering at ETH Zurich has taken a melodious turn in diabetes treatment research under the guidance of Prof. Dr. Martin Fussenegger and his dedicated team. Their groundbreaking research has identified sound, specifically music, as a stimulus for rapid insulin release from specially designed cells. In this novel experiment, the researchers equipped insulin-producing cells with an ion channel from a bacterium that reacts to mechanical stimuli, like sound waves. Upon sonic stimulation at the correct volume and pitch, a notable release of insulin is observed within minutes. These monumental findings could revolutionize future diabetes treatments, reducing dependence on external insulin supply and improving patients' quality of life.
/web/2023/03-230824-a4

How Body Temperature in Mice is Affected by Gene Deletion

(University of Lausanne, August 30, 2023)



An intriguing discovery has been made by lead researcher Zhong Peng and Dr. Stephan Kellenberger regarding the role of ASIC1a (acid-sensing ion channel 1a) in the regulation of body temperature. Through a meticulous study involving mice, it was determined that deleting ASIC1a disrupts the usual body temperature rhythm during parts of the night. To conduct this research, the focus was centered around the effects of ASIC1a deletion on the mice's body temperature. Interestingly, the observations showed suppressed nighttime temperatures and alteration of hypothalamus-pituitary-thyroid axis signaling rhythms in the modified mice. This signifies that ASIC1a could be a vital regulator of neuronal activity, thus impacting metabolism and energy expenditure. While the full mechanism is yet to be fully understood, these insights shed new light on our understanding of body temperature control.
/web/2023/03-230830-be

Insecticides Can Affect Fish Behavior

(Eawag, August 30, 2023)

Sarah Könemann, an ecotoxicologist at the Swiss Federal Institute of Aquatic Science and Technology (Eawag), has been archaeologically studying the effects of insecticides on the behavior of zebrafish larvae. Her groundbreaking study revealed that even banned insecticides persistently linger in the environment, potentially impacting aquatic life. Könemann's research has shown that exposure to insecticides can lead to structural changes in zebrafish larvae's nerve cells, affecting their peripheral nervous system and overall behavior. Interestingly, the study also established that modern insecticides, designed to target specific insect organs, had less impact on fish behavior. Awarded the Rifcon Early Career Scientist Award from SETAC, Könemann highlights the necessity of assessing behavioral changes in vertebrates when approving insecticides.
/web/2023/03-230830-0a

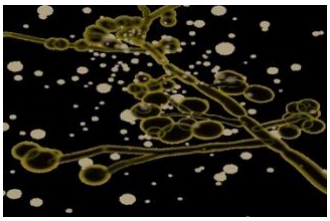
Study Challenges a Rule of Evolution

(University of Fribourg, August 31, 2023)

Researchers from the University of Fribourg, led by Bruna M. Farina, have conducted an insightful study, published in the journal 'Ecology and Evolution,' that challenges a long-standing evolutionary concept—the "Cope's rule," which suggests that animal species tend to evolve in size, becoming larger than their ancestors. Their comprehensive analysis of 795 turtle species, including 536 extinct species, found that unlike other species, turtles do not follow the rule of Cope. The study found no evidence of consistent evolutionary size progression towards larger or smaller sizes in turtles. In addition, habitat is identified as a significant factor in the size of turtles, with freshwater turtles maintaining similar dimensions over time, unlike their marine and terrestrial counterparts.
/web/2023/03-230831-ef

How Fungal Infections Cause Blood Poisoning

(University of Bern, September 01, 2023)



Led by Stefan Freigang from the Institute of Tissue Medicine and Pathology, researchers at the University of Bern have made a new discovery in the field of immune pathologies. They've identified the role of a specific protein, the Interleukin 1 Receptor Antagonist (IL-1Ra), in hastening the spread of Candida Albicans, a yeast fungus infamous for causing blood poisoning. The team achieved these findings through extensive experiments on genetically modified mice - mice lacking IL-1Ra production showed a potent arsenal of neutrophils, enabling successful infection combat. This stream of research, indicating the detrimental effect of IL-1Ra production on immune system resilience, marks a step towards new therapeutic strategies for yeast-induced blood poisoning and other invasive fungal afflictions.
/web/2023/03-230901-2d

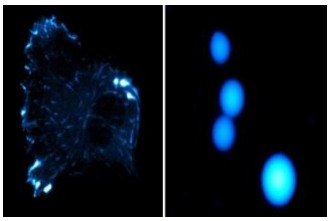
Reprogramming Immune Cells to Fight Cancer

(EMPA, September 01, 2023)

In a groundbreaking development led by biophysicist Katharina Hast of Empa in St. Gallen, an innovative hydrogel has been created for enhancing cancer therapy. This noteworthy effort involved collaborative inputs from researchers across Empa's "Particles-Biology Interactions," "Biointerfaces," and "Biomimetic Membranes and Textiles" laboratories in St. Gallen. This tailor-made, biodegradable hydrogel introduces active substances in nanoparticle form that attract and "reprogram" immune cells known as macrophages. The goal is to sensitize these cells to combat tumors more effectively, offering a precise, efficient, and targeted approach. Katharina Hast anticipates that this technique will lessen the side effects of treatments, enhancing their overall effectiveness. Funded entirely by the Uniscientia Foundation, this research promises a leap forward in cancer therapy and chronic wound treatment.
/web/2023/03-230901-08

Deciphering the "Highway Code" of our Cells

(University of Geneva, September 05, 2023)



A remarkable scientific breakthrough has been made by Julie Miesch and a team led by Assistant Professor Charlotte Aumeier of the Biochemistry Department at the University of Geneva (UNIGE) Faculty of Science. The team has identified a novel mechanism involving the proteins CLIP-170 and EB3 in governing the growth of microtubules, the critical internal communication pathways of our cells. The team's research strategy involved in vitro and in cellulo measurements, utilizing advanced microscopy techniques to observe the role of these proteins. It was discovered that these proteins stimulate microtubule growth rates while reducing decay events. This key understanding enhances our knowledge of diseases such as cancer and neurodegenerative disorders, and opens new avenues for developing treatments acting on cellular mechanisms.
/web/2023/03-230905-af

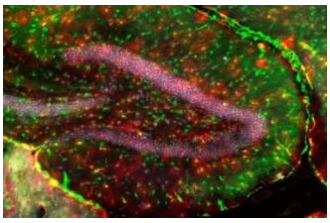
Reversing Aging in Blood and Immune Systems through Mitochondrial Modulation

(University of Lausanne, September 07, 2023)

A milestone breakthrough in age reversal has been achieved by researchers from the Department of Oncology at UNIL-CHUV, including Carine Dournes, and Led by Dr. Nicola Vannini, a scientist at the University of Lausanne and the Ludwig Institute. The team targeted the decline in functionality of hematopoietic stem cells (HSCs) - responsible for blood regeneration and immune health - that occurs with age. The crux of the research involved introducing a compound known as Urolithine-A, a mitochondrial modulator. It remarkably revitalized the fading mitochondrial function within HSCs when used as a dietary supplement. This enabled a rejuvenated blood reconstitution capacity in aged HSCs and consequently, an improved immune response in aged mice. These findings illuminate the potential of Urolithine-A in combatting age-related immune system decline and hold substantial promise in treating age-related health concerns.
/web/2023/03-230907-a3

Discovery of New Hybrid Cells Essential for Brain Function

(University of Lausanne, September 11, 2023)



Scientists from the University of Lausanne (UNIL) and the Wyss Center for Bio and Neuroengineering, Geneva have made an exciting breakthrough. Led by Professor Ludovic Telley and Professor Andrea Volterra, the team discovered a novel type of hybrid cell essential for brain functioning. Composed of both neuron and glial cells, this new type of cell has been found in multiple regions of the brain in both mice and humans. The researchers conducted the study by dissecting the molecular content of these cells using modern molecular biology techniques. Beyond their discovery, these cells were found to have a crucial role in memory and movement regulation and showed a protective effect against epileptic seizures. Identification of VGLUT protein transcripts, facilitating glutamate release, further substantiates their functionality.
/web/2023/03-230911-fb

Bacteria Generate Electricity from Wastewater

(EPFL, September 11, 2023)

The EPFL School of Basic Sciences, in a partnership with Gebert Rüf Stiftung and the Swiss National Science Foundation, accomplished a major advancement in harnessing bioelectric bacteria for electricity generation. Thanks to the work of lead author, Mohammed Mouhib, Melania Reggente, Professor Ardemis Boghossian and their team, an optimized pathway was built spanning the cell's inner and outer membranes, leading to a three-fold surge in electrical current production. Their research, using genetically engineered E. coli, exhibited remarkable performance across varied environments, even in wastewater from a local brewery. This technological breakthrough paves the way for large-scale organic waste treatment and energy generation. The adaptability of this process, thanks to the genetic flexibility of the engineered bacteria, suits it perfectly for tailored applications in specific environments and feedstocks.
/web/2023/03-230911-dc

How Muscles Change During Endurance Training

(University of Basel, September 13, 2023)

A study led by Prof. Dr. Christoph Handschin and first author Regula Furrer at the University of Basel has unlocked the mystery of how muscles adapt to regular endurance training over time. Their comparison of untrained and trained mice muscles disclosed a significant difference in the expression of genes, unveiling the mechanism that empowers trained muscles to endure prolonged workouts. Upon analyzing a significant change in around 250 genes at rest and up to 2,500 genes post-exercise, researchers found that exercise triggers a completely different program in trained muscles. Through chronic endurance training, an alteration occurs in the epigenetic pattern, and thus, trained muscles are primed for extended training sessions. This groundbreaking research holds potential in enhancing competitive sports training efficacy and opens new avenues for treating age or disease-related muscle wasting.
/web/2023/03-230913-e2

Why Some Lung Cancer Treatments Lose their Efficacy Over Time

(University of Fribourg, September 14, 2023)

A new study led by Professor Alessandra Curioni-Fontecedro from the Unité d'Oncologie at the HFR hospital and the University of Fribourg, Switzerland, opens up avenues to comprehend why some cancer treatments gradually lose effectiveness. Their research examined scenarios where patients initial response to therapies eventually transitioned to resistance. Key findings indicated that this resistance could be attributed to inadequate numbers of specialized immune cells within tumors, or due to excessive PD-L1 protein limiting immune cells' capabilities. In some instances, weakened signalling pathways were the culprits. These revelations pave the way for maximizing the potential of existing, efficient treatments for further patient benefits.
/web/2023/03-230914-ef

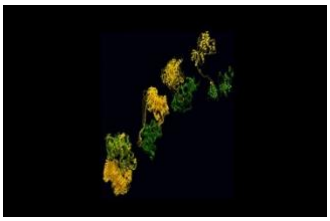
COVID-19 Immunity Reduces Contagiousness

(University of Geneva, September 15, 2023)

A study by Delphine Courvoisier, Assistant Professor at the University of Geneva (UNIGE) and Head of the data unit at the Cantonal Medical Service, in collaboration with the University Hospital of Geneva (HUG), has discovered that immunity to COVID-19 reduces contagiousness. The research analyzed extensive data of over 50,000 cases and 110,000 contacts recorded in the Canton of Geneva from June 2020 to March 2022. Incorporating information such as living area, age, weight, symptoms, vaccination status, and infection history, this comprehensive study offers valuable insights into the effectiveness of COVID-19 vaccines in reducing disease transmission and could potentially shape public health policies.
/web/2023/03-230915-16

Uncovering New Drug Target Sites Through Enzyme Interaction

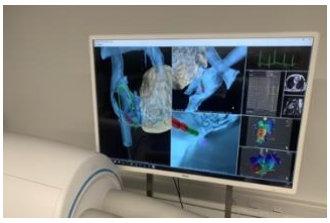
(University of Geneva, September 18, 2023)



The Gervasio Lab from the University of Geneva (UNIGE), led by Prof. Dr. Francesco Luigi Gervasio, has collaborated with Erika Pellegrini and Dr. Matthew Bowler from the European Molecular Biology Laboratory (EMBL) Grenoble. They made a groundbreaking discovery concerning the interaction of enzymes which might have profound implications for cancer and Alzheimer's disease treatment. The research highlighted a previously unknown docking site where two enzymes interact and form a face-to-face dimer. Using high-end technologies like cryo-electron microscopy (cryo-EM) and small-angle X-ray scattering (SAXS), they uncovered this 'dance' between two kinases, providing an alternative drug target site to explore. This finding opens possibilities for research on similar processes in two other families of MAP kinses, which are involved in cancer and Alzheimer's disease.
/web/2023/03-230918-07

Revolutionizing Cardiology Training with Augmented Reality

(EPFL, September 18, 2023)



In an ambitious project, the École polytechnique fédérale de Lausanne (EPFL) and the Interventional MRI Center of the CHUV have come together to advance the world of cardiology training. Led by Professor Pascal Fua, the project gave rise to the HEARTS (Heart Augmented Reality Training System) platform which is set to transform the future of cardiac interventions. With the aim of training future cardiologists, the HEARTS platform allows doctors to practice on virtual 3D models of real patients' hearts, akin to how pilots train using flight simulators. The platform was developed using a comprehensive dataset provided by the MRI Center of CHUV. This advancement could significantly reduce the training period for doctors, accelerating their readiness to perform life-saving cardiac interventions.
/web/2023/03-230918-09

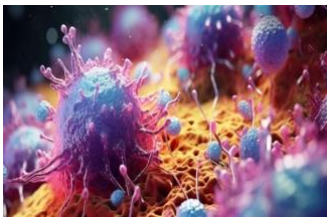
Genetically Modifying Individual Cells in Animals

(ETH Zurich, September 22, 2023)

Paradigm-shifting research by Antonia Santinha and led by Professor Randall Platt from ETH Zurich in Basel redefines what's possible in biological engineering. Their team has made an unparalleled breakthrough in genetic engineering, developing a method that uses CRISPR-Cas gene scissors to create 'mosaics' of multiple gene changes in single animals. The significant part is they have achieved this feat in living adult mice. They leveraged the adeno-associated virus (AAV) as a messenger to specify unique genes for the CRISPR-Cas scissors to modify. The AAVs were injected into the bloodstream, then entered the brains of the mice. This groundbreaking technique facilitates studying multiple gene variations in one go, enables cellular analysis within living organisms, and can target different organs to suit study needs.
/web/2023/03-230922-72

Strengthening Artificial Immune Cells to Fight Cancer

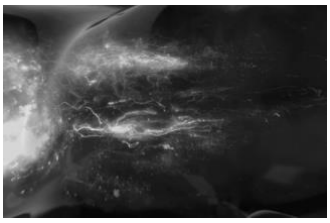
(University of Geneva, September 22, 2023)



The Swiss Cancer Center Léman (SCCL), encompassing the University of Geneva (UNIGE), the University of Lausanne (UNIL), the University Hospital of Lausanne (CHUV), and the University Hospital of Geneva (HUG), brings a possibly transformative angle to cancer treatment. Directed by Mathias Wenes, a research fellow at UNIGE, and Alison Jaccard, a Ph.D. student at UNIL-CHUV, the study investigates the potential of reprogramming cells to produce potent in-vitro CAR-T cells. Their research, published in Nature, reveals how the intensification of artificial immune cells can lead to more impactful cancer combat strategies. This project is set to advance to clinical trials, testing the efficiency and safety of these reinforced cells. This collaborative endeavor across the four participating institutions seeks to streamline efforts in tumor metabolism, oncoimmunology, and immune cell engineering, propelling advances in cancer treatment.
/web/2023/03-230922-c0

Regeneration Across Complete Spinal Cord Injuries Reverses Paralysis

(EPFL, September 25, 2023)

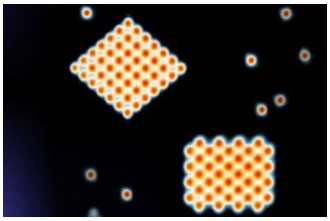


In an exciting development, Professors Grégoire Courtine from EPFL's Campus Biotech facilities in Geneva, Jordan Squair, and Jocelyne Bloch, spearheaded a study revealing a potentially impactful gene therapy for spinal cord injuries. Using sophisticated technologies and single-cell nuclear RNA sequencing, they managed to pinpoint specific neurons involved in natural spinal-cord repair following an injury. The team created a gene therapy aimed at activating growth programs within these identified neurons and stimulating specific proteins to facilitate their development in the lesion core. Impressively, when applied to mice with severe spinal cord injuries, this novel therapy helped them regain their walking abilities. The combination of this gene therapy with electrical stimulation methods is anticipated to provide a comprehensive treatment strategy for spinal cord injuries.
/web/2023/03-230925-6d

3. Nano / Micro Technology / Material Science

Constructing Superconductors Atom by Atom

(University of Zurich, August 10, 2023)



A pioneering work on superconductivity has been achieved through the collaboration of researchers from University of Zurich led by Professor Titus Neupert, and Max Planck Institute of Microstructure Physics, Germany. This groundbreaking study, published in Nature Physics, involves the creation of superconductors one atom at a time - a novel approach to harnessing and observing unexplored types of superconductivity. Utilizing a scanning tunneling microscope, the researchers precisely arranged and deposited chromium atoms onto superconducting niobium plane to pave way for two unprecedented types of superconductivity, confirming theoretical predictions and simultaneously broadening horizons for the exploration of potential new states of matter. As a promising frontier in quantum computing, these findings bear stirring implications on developing quantum materials designed for future computing applications.
/web/2023/04-230810-7a

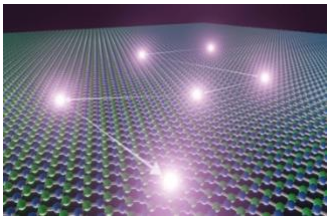
New Flame-Retardant Epoxy Resin Discovered

(EMPA, August 23, 2023)

Dr. Sabyasachi Gaan and his team from the "Advanced Fibers" laboratory at Empa, in collaboration with international partners, have pioneered a major breakthrough in the creation of an easily reshaped and recyclable epoxy resin. This revolutionary material, referred to as a vitrimer, has significant flame-retardant properties due to its phosphorus content. In terms of applications, the research could significantly impact several industries, offering the prospect of recyclable carbon fiber-reinforced plastics for constructing aircraft, vehicles, boats, and even bicycles. Furthermore, innovative uses of the resin could include self-healing coatings for wooden floors that resist fire. Bearing not only potential environmental benefits but also cost-effectiveness, this development represents a significant stride in material science.
/web/2023/04-230823-7c

Peering into Nanofluidic Mysteries One Photon at a Time

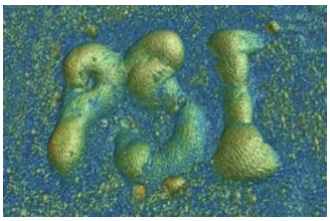
(EPFL, September 04, 2023)



Researchers at EPFL and the University of Manchester, including Nathan Ronceray, Professor Radha Boya and led by Professor Aleksandra Radenovic, have struck a significant stride in nanofluidics. They've introduced the use of a 2D material as a way to monitor individual molecules within nanofluidic structures. Through a blend of microscopy techniques, they discovered that light emitters discharge photons one at a time, divulging intricate details about their immediate nanoscale surroundings. This ground-breaking insight harnesses these emitters as nanoscale probes and illuminates the molecular arrangement in confined nanometric spaces. This novel approach, funded by an ERC grant, has immense potential for various applications, including optical imaging, sensing and providing unprecedented comprehension of molecules in confinement.
/web/2023/04-230904-75

3D Insights into an Innovative Manufacturing Process

(Paul Scherrer Institute, September 22, 2023)



At the Paul Scherrer Institute (PSI), part of the ETH Domain, a team of researchers led by Dr. Małgorzata Grażyna Makowska, Dr. Steven Van Petegem, and Dr. Federica Marone, made significant strides in our understanding of the ceramic 3D printing fabrication process. Utilizing tomograms, they successfully unveiled the intricate dynamics at a microscopic level, a breakthrough that has the potential to revolutionize the 3D printing industry. The research process involved an innovative laser technique to fabricate highly complex ceramic shapes. This ground-breaking discovery is pivotal to the aerospace and automotive industries, as it offers insights on how to enhance the manufacturing process, paving the way for more advanced and efficient production techniques.
/web/2023/04-230922-d2

4. Information & Communications Technology

Trailblazing Quantum Machine Learning with Quantum Neural Networks

(EPFL, August 10, 2023)

A groundbreaking study led by Professor Zoe Holmes at EPFL, in collaboration with eminent researchers from Caltech, the Free University of Berlin, and Los Alamos National Laboratory, has ushered in new capabilities for quantum computing. The team successfully developed a quantum machine-learning model, known as "quantum neural networks" (QNNs), that can comprehend and predict quantum systems' behavior through a select set of examples. Constructed with interconnected nodes operating on quantum mechanics principles, QNNs effectively harness the intricate dynamics of entangled quantum systems. This innovation anticipates a new era of quantum computing offering unprecedented simulation accuracy across complex materials or molecular dynamics, while ensuring improved efficiency and reliability. Funded by an assortment of esteemed organizations, this pioneering research symbolizes a considerable leap towards streamlined quantum computers.
/web/2023/05-230810-6a

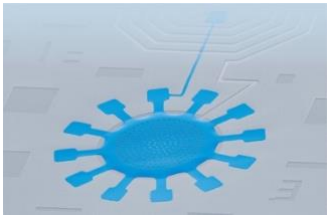
Computer Security: Unveiling Vulnerability on AMD Chips

(ETH Zurich, August 15, 2023)

Discovery by researchers Daniël Trujillo, Johannes Wikner, and Professor Kaveh Razavi at ETH Zurich has unravelled a profound vulnerability in AMD computer chips. Their paper, titled "Inception: Exposing New Attack Surfaces with Training in Transient Execution", sheds light on an unprecedented attack vector where an intruder can discreetly implant an "idea" into a computer system — potentially breaching any of the computer's memory. This ground-breaking research uncovers a security loophole in speculative computations, opening backdoors for illicit data extractions. Successful execution of this attack can enable undetected data leakage from various points in the computer's memory coordinate, rendering the system heavily compromised. Highlighting a pressing need for robust solutions, this research essentially champions the urgency of reinforcing security measures in computer systems.
/web/2023/05-230815-d4

A Quantum Leap in Mechanical Oscillator Technology

(EPFL, August 21, 2023)



Led by Professor Tobias Jan Kippenberg, a team of researchers at EPFL (École polytechnique fédérale de Lausanne) including Amir Youssefi, Shingo Kono, and Mahdi Chegnizadeh, have made a groundbreaking discovery in quantum technology using mechanical oscillators. This major achievement lies in considerably extending the quantum state lifetime of these oscillators, thereby significantly enhancing their potential in quantum computing and communication systems. The key point of this pioneering work is the development of a superconducting circuit optomechanical platform with ultra-low quantum decoherence and superior quantum control capabilities. The novel nanofabrication technique incorporated a vacuum-gap drumhead capacitor, which greatly diminished thermally induced decoherence, thereby ensuring an unprecedented lifetime of quantum state in a mechanical oscillator. This breakthrough, promising exciting applications in quantum storage and superconducting qubits interface, has been published in Nature Physics.
/web/2023/05-230821-1e

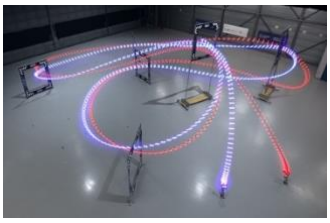
Computational Model Paves the Way for More Efficient Energy Systems

(EPFL, August 25, 2023)

A cutting-edge breakthrough on thermo-electric materials has been achieved by a research team from EPFL, including Enrico Di Lucente, Dr. Michele Simoncelli, and Prof. Dr. Nicola Marzari. The team's discovery involves newfound fundamental theories concerning key technologies to enhance thermo-electric conversion efficiency. Harnessing state-of-the-art computational modeling and simulation, their research spotlighted 'skutterudites', crystals known for their unique atomic cage structure and potential in thermo-electric conversion. This revelation of theoretical secrets within thermo-electric materials could expedite the design of new substances possessing ultra-low thermal conductivity, bypassing the need for costly empirical tests. Noteworthy was the unearthing of an unexpected quantum mechanism linked to heat conduction within these crystals.
/web/2023/05-230825-0e

AI Beats World Champions in Drone Racing

(University of Zurich, August 31, 2023)



Led by Elia Kaufmann and Davide Scaramuzza, researchers at the University of Zurich and at Intel have achieved an outstanding breakthrough: designing an AI system, named 'Swift', which outperforms world champions in drone racing. This cutting-edge AI was trained in a simulated environment using a machine learning method called reinforcement learning, enabling it to win against human pilots by completing the fastest lap. With the help of an onboard camera and an artificial neural network, Swift collected real-time data to navigate effectively on a race track, erected at Dübendorf Airport near Zurich. The significance of this achievement extends beyond the realm of racing - with potential applications in environmental monitoring, disaster response, and action scene filming.
/web/2023/05-230831-cf

Researchers Discover Thousands of New Transformable Knots

(EPFL, September 06, 2023)

At the Geometric Computing Laboratory of the EPFL (École Polytechnique Fédérale de Lausanne), a team including Michele Vidulis and led by Prof. Mark Pauly has made an unwavering contribution to the study of elastic knots. Deep-diving into knot theory and physical simulations, the team discovered thousands of new transformable knots, revealing fascinating geometric and topological patterns. The groundbreaking research blends randomized spatial sampling and physics simulation to pinpoint the stable equilibrium states of these knots, revealing three unique shapes of figure-eight knots. These newfound properties of elastic knots have implications for the design of versatile structures and in creating innovative metamaterials. With such a discovery, entire new research avenues are brought to light surrounding the role of elastic knots in various applications, even forming the basis for intriguing puzzles.
/web/2023/05-230906-25

Launch of A Swiss Made ChatGPT - A Trustworthy AI for Swiss Companies

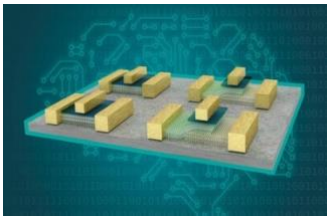
(ZHAW, September 06, 2023)

Swiss start-up AlpineAI, co-founded by Pascal Kaufmann, Professor Benjamin Grewe from ETH Zurich, and Professor Thilo Stadelmann, has broken new ground with the launch of "Swiss GPT", a Swiss made ChatGPT. This new platform is aimed at providing a secure and effective "GPT" for Swiss businesses. Developed alongside specialists from AI foundation Mindfire and the Center for AI at Zurich University of Applied Sciences, Swiss GPT enhances trust and prioritizes data safety, distinguishing it from other large language models. A key feature is its anonymizing communication software between end users and the language model for stringent data protection. This is a crucial step forward in equipping Swiss businesses with state-of-the-art AI technologies and solidifying Switzerland as a global AI hub.
/web/2023/05-230906-b0

5. Information & Communications Technology

A Leap Forward in Brain-inspired Computing

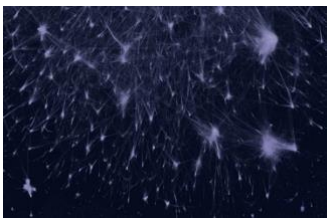
(EPFL, September 07, 2023)



A breakthrough in brain-inspired computing is taking shape thanks to a team at EPFL's School of Engineering, including Sadegh Kamaei, and led by Professor Adrian Ionescu. The new technology, as reported in Nature Electronics, blends the potential of continuous analog processing with the precision of digital devices. This revelation revolves around an intriguing mixture of two-dimensional semiconductors and ferroelectric materials. This blend leads to a fusion of digital and analog information processing, resulting in a substantial boost in energy efficiency and electronic device performance. This innovation is set to pave the way for digital information processing fused with neuromorphic functionalities. It opens up possibilities for creating devices that emulate the functionalities of human brains, reshaping the landscape of future computing.
/web/2023/05-230907-e6

Artificial Intelligence Tools Shed Light on Millions of Proteins

(University of Basel, September 22, 2023)



Led by Professor Torsten Schwede and his team at the Biozentrum, University of Basel, and the Swiss Institute of Bioinformatics (SIB), groundbreaking discoveries have been made about proteins. Joana Pereira, the research leader and Janani Durairaj, the first author, successfully constructed a vast interactive network of 53 million proteins featuring high-quality AlphaFold structures, leading to the identification of 290 new protein families and a flower-shaped protein fold. This exploratory endeavor has resulted in the creation of an interactive web resource called the "Protein Universe Atlas". Utilizing deep learning-enabled tools, the team has unlocked new avenues for innovation in life sciences, from basic to applied research. Supported by a 'kickstarter' grant from SIB for adopting AI in life sciences, this work is instrumental in understanding protein diversity, from structure to function, and evolution.
/web/2023/05-230922-45

Unveiling an AI-based Plant Observation Tool

(University of Zurich, September 25, 2023)

In a groundbreaking collaboration, the University of Zurich (UZH) and Kyoto University, led by Dr. Reiko Akiyama, Dr. Rie Shimizu-Inatsugi, and Prof. Dr. Kentaro Shimizu have advanced plant research methodology. Thanks to a project dubbed "PlantServation", a new AI-based technique for observing plants in their natural habitat has been developed with funding from the Swiss National Science Foundation (SNSF), UZH Global Affairs, and the Japan Society for the Promotion of Science (JSPS). This non-invasive method sees AI measuring the red pigmentation of Arabidopsis plants, a process yielding far more precision than traditional methods. Above offering a robust tool for plant research, this new method is vital in understanding how plants can adapt and flourish amidst climate change—a crucial step towards resilient ecosystems.
/web/2023/05-230925-ef

6. Energy / Environment

Advances in Pollen Forecasting and Aerosol Impact Understanding

(EPFL, August 09, 2023)

A cutting-edge research project has been initiated by the Swiss Institute of Technology (EPFL), Swiss Federal Office of Meteorology Climatology, National Technical University of Athens, and Foundation for Research and Technology - Hellas. Professors Alexandros Papagiannis and Athanasios Nenes from EPFL's Laboratory of Atmospheric Processes and their Impacts lead this effort in hopes to better pollen forecasting and understand the role of bioaerosols, smoke, and dust on climate change and cloud development. Supported by funding from the Swiss National Science Foundation, the European Research Council, and the PyroTRACH program, this initiative uses state-of-the-art LiDAR technology to detect varying types of pollen, spores, bacteria, and more in real-time. This research is instrumental in improving our global understanding of allergies, oxidative stress, and precipitation patterns.
/web/2023/06-230809-86

Seismic Risks: Unlocking Geothermal Energy Potential Safely

(EPFL, August 10, 2023)

Associate professor Brice Lecampion heading EPFL's Laboratory of Geo-energy (GEL), alongside PhD student Alexis Sáez, have spearheaded crucial research on geothermal energy extraction's seismic risks. Their investigation focuses on developing models to elucidate the interaction between fluid flow and fractures in rocks, a key aspect of geothermal energy extraction. This study reveals significant insights into the physical mechanisms inducing seismicity during geothermal operations, specifically the risk of earthquakes even after fluid injection has ceased. The data obtained from their sophisticated 3D computer model play a vital role in mitigating seismic risks linked with subsurface fluid injections, making this research a crucial turning point in our understanding and management of geothermal energy extraction as we shift toward a carbon-free economy.
/web/2023/06-230810-4f

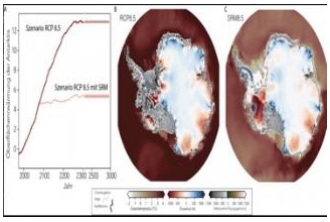
Innovating Carbon Capture in Industrial Productions

(EPFL, August 16, 2023)

A breakthrough study by Professor Francois Marechal researcher Rafael Castro-Amoedo from the Laboratory of Industrial Process and Energy Systems Engineering at EPFL (École polytechnique fédérale de Lausanne), offers transformative industry potential for CO2 reduction. The research proposes a system-wide integration of carbon capture and mineralization into the cement, steel, and waste incineration production processes, promising a pathway to both net-zero and net-negative emissions. The proposed solution involves process integration for CO2 capture and mineralization, leading to the production of carbonates—a long-term CO2 storage solution that can be used as a building material. This research not only presents a cost-effective approach to CO2 reduction in key industrial sectors but also contributes to net-negative emissions, promoting a circular economy model in these industries.
/web/2023/06-230816-14

Artificially Dimming the Sun Could Prevent Ice Melt

(University of Bern, August 18, 2023)



Leading scientist Dr. Johannes Sutter from the Oeschger Centre for Climate Change Research at the University of Bern spearheads a crucial study on Artificial Solar Dimming. The research aims to investigate if Solar Radiation Management (SRM), a radical method of reducing solar radiation to slow global warming, could potentially prevent the devastating melting of the West Antarctic ice sheet. Through the usage of ice model simulations, the research team compared the effectiveness of SRM under different greenhouse gas emission scenarios. Their study concluded that if emissions remain unchecked, mid-century SRM deployment would merely postpone rather than prevent the ice sheet's collapse. However, for moderate emission scenarios, timely SRM could significantly slow or possibly even avert the ice sheet collapse entirely.
/web/2023/06-230818-40

Collecting Clear Water from Fog

(ETH Zurich, August 21, 2023)

A ground-breaking advancement in securing clean water has been made by researcher Ritwick Ghosh and his team at ETH Zürich. They've ingeniously fused fog water harvesting with solar-powered water treatment, thus presenting a potentially game-changing source of clean water. This novel technology employs a lattice of metal wire, coated in a select blend of polymers and titanium dioxide. The polymers facilitate efficient water droplet accumulation on the mesh, while the titanium dioxide works as a catalyst to decompose organic pollutants. Having been tested in laboratories and a pilot plant in Zurich, this system not only has the power to help areas suffering from acute atmospheric pollution but also offers potential applications in recovering water from cooling towers.
/web/2023/06-230821-13

Two Thirds of the World's Biodiversity Lives in the Soil

(Swiss Institute for Forest, Snow and Landscape Research (WSL), August 22, 2023)

A Swiss team, led by Mark Anthony from the Swiss Federal Institute for Forest, Snow, and Landscape Research (WSL), delves into the rich domain of soil biodiversity, revealing that a staggering two-thirds of the world's biodiversity resides beneath our feet. Remarkably, their findings suggest that fungi — comprising about 86% of these species — dominate this ecosystem. The researchers pieced together their extensive study by meticulously analyzing scientific literature and re-assessing data sets pertaining to soil-dwelling species. Their results, published in PNAS, indicate that prior estimates were only a quarter of actual soil species richness. Acknowledging gaps in data collection, particularly in the global South, the study emphasizes the need for soil conservation in view of their significant role in nutrient recycling, carbon storage and supporting tree health.
/web/2023/06-230822-34

Future Novel Ecosystems Could Emerge from Glacier Retreat

(Swiss Institute for Forest, Snow and Landscape Research (WSL), August 24, 2023)

Dr. Jean Baptiste Bosson of the Conservatory of natural areas of Haute-Savoie and Dr. Matthias Huss of the Swiss Federal Institute for Forest, Snow and Landscape Research (WSL) have published a groundbreaking study highlighting a potential outcome amid the devastating impacts of climate change. Their study found that global warming could potentially reduce the area covered by glaciers outside of the Antarctic and Greenland ice sheets by half by the end of the century, giving rise to new ecosystems. This insightful research used a global glacier evolution model to predict how 650,000 square kilometers of glaciers outside of the major ice sheets would respond to climate change scenarios. Findings suggest that while the rapid ecological shift requires our attention, it also brings opportunities to protect and nurture these newly formed ecosystems.
/web/2023/06-230824-34

Biodiversity Protects Against Invasions of Non-native Tree Species

(ETH Zurich, August 24, 2023)

Researchers from ETH Zurich, including Dr. Camille Delavaux and Dr. Thomas Crowther have conducted the first worldwide analysis encompassing both human and ecological perspectives on non-native tree invasion. This new study has revealed that while human activity in global trade hotspots increases the likelihood of non-native tree invasions, a rich diversity of indigenous tree species can act as a natural defense barrier against the intensity of such invasions. This research involved the extensive utilization of global data provided by scientists from diverse regions. Findings have poignant implications in biodiversity conservation endeavors in alignment with COP 15's global biodiversity framework. They are also expected to influence future reports by the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services, thus having a direct impact on global policies to halt and reverse biodiversity loss.
/web/2023/06-230824-59

Heatwaves are Becoming More Frequent and More Deadly

(ETH Zurich, August 29, 2023)

Researchers from ETH Zurich, have undertaken a critical study led by Samuel Lüthi, shedding light on the precipitous rise in heat-related mortality risk due to increasingly frequent and severe heatwaves. The team achieved this projection by meticulously examining data gathered from 748 locations within 47 countries. Their fundamental discovery is that although the mortal risk is already high at a global warming level of 1.5 degrees Celsius, it is significantly lower than at 2 degrees Celsius. The study underscores the pressing need for society as a whole to adapt to escalating temperatures and necessitates immediate actions—most notably, the need to phase out fossil fuels. As heatwaves become an inevitable climate change consequence, the science community seeks to manage possible impacts while evading catastrophic scenarios.
/web/2023/06-230829-0e

How Trees Influence Cloud Formation

(Paul Scherrer Institute, September 11, 2023)

A team of researchers, led by Lubna Dada from the Laboratory for Atmospheric Chemistry at the Paul Scherrer Institute (PSI), a part of the ETH Domain, have unveiled a crucial cornerstone behind biogenic new particle formation - identified as "sesquiterpenes". The research, conducted in collaboration with ETH Zurich, EPFL Lausanne, Eawag, Empa, and WSL, reveals that this organic compound plays a pivotal role in such formations, and its impact will grow under future climate stress. The researchers also plan to delve deeper into the dramatic shifts during industrialization, when natural atmospheric compositions began to entangle with anthropogenic gases. Understanding the part sesquiterpenes play in new particle formation provides new perspectives for predicting cloud formation and furthering climatology, helping us to manage the future ramifications of climate change.
/web/2023/06-230911-30

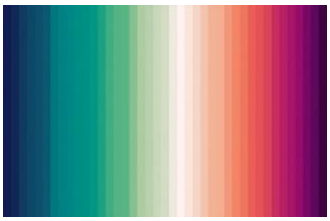
The First Climate Strikes had an Influence on Swiss Residents

(EPFL, September 12, 2023)

A groundbreaking study steered by Livia Fritz at the Laboratory on Human-Environment Relations in Urban Systems (HERUS) of EPFL's School of Architecture, Civil and Environmental Engineering (ENAC) has recently been published. This research focussed on investigating tangible influence by the Fridays for Future movement on the environmental habits of Swiss residents. The researchers surveyed over a thousand residents to gauge changes in environmental behavior post the strikes. Remarkably, about 30% reported significant shifts, like consuming more vegetarian meals and limiting plastic waste. The study underscores how collective action can inspire pervasive societal changes, adding weight to the importance of civic engagement. However, these changes are contingent on aligned political action. This study, published in Sustainability Science, vividly exhibits the necessity of both political participation and civic involvement in curbing global warming.
/web/2023/06-230912-84

Visualizing Ocean Acidification with a Web-Based Tool

(ETH Zurich, September 13, 2023)



A team led by Professor Nicolas Gruber from the Environmental Physics department at ETH Zurich has created a web-based graphic tool dubbed "Ocean Acidification Stripes". This tool leverages color-coded stripes to visualize the degree of ocean acidification in various parts of the globe over timely intervals, making environmental changes distinctively perceivable. The scientific groundwork of this inventive visualization is the observational data set, OceanSODA-ETHZ, crafted by Luke Gregor, a postdoctoral researcher under Gruber's guidance. This comprehensive data amalgamates ship-based measurements with satellite data, enabling them to investigate acidification trends and causes worldwide for the first time. The importance of this research cannot be overstated given the severe impact of ocean acidification, amplified by increased greenhouse gases and CO emissions, on marine ecosystems.
/web/2023/06-230913-b8

Understanding How Forests Regenerate without Human Intervention

(ETH Zurich, September 15, 2023)

A study led by doctoral student Yannek Käber in the Professorship of Forest Ecology at ETH Zurich, in collaboration with colleagues from ETH and WSL, along with the European Forest Research Initiative, has unveiled a fresh insight into natural forest regeneration. This first-ever study on protected European forests examines how regeneration processes advance without human influence. The research involved analyzing nearly 300 natural forest reserves across Europe, observing the complex relationship between tree species traits, forest density, disturbances, and climate. Findings suggest that protective interactions between trees only occur among a few species, rarer than previously surmised. Cold stress tends to induce more supportive interactions from trees than drought. On the other hand, water scarcity results in intense tree competition, often suppressing smaller trees.
/web/2023/06-230915-f4

Sustainable Waterway Monitoring System Unveiled by Swiss Researchers

(CSEM, September 22, 2023)

Scientists from the Swiss Center for Electronics and Microtechnology (CSEM) and the University of Neuchâtel, under the leadership of BlueArk, have created an eco-friendly waterway monitoring system. Tested successfully in the cantons of Neuchâtel and Valais, this technology assures the preservation of natural environment while measuring and observing water flow dynamics. This innovative system employs light and mobile devices to ascertain the flow rate of small streams, creating possibilities for optimized water usage and damage prevention. Its practical value is particularly evident in taking precautionary measures against climate-triggered extreme weather events. Revealed at the annual BlueArk Conference, the ingenuity of this system has already garnered considerable praise.
/web/2023/06-230922-98

Understanding and Overcoming Barriers to Clean Water Access

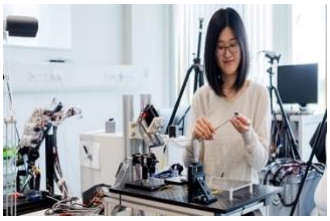
(Eawag, September 22, 2023)

A groundbreaking study led by George Wainaina from the Aquatic Research Institute Eawag, Switzerland, aims to shed light on inconsistent practices regarding water filter use in Northern Kenya. Their revealing research outlines influential factors, both environmental and individualistic, that determine the consistent use of these potentially life-saving tools. By involving family and neighbours, and examining diverse technical, social, and psychological components, Wainaina and his team identified the core barriers to consistent filter use. The implications of these findings are immense, laying a critical foundation for the development of programs and tools to overcome these barriers. Ultimately, these strides could significantly contribute to achieving a consistent, safe drinking water supply in affected regions in the long run.
/web/2023/06-230922-3b

7. Engineering / Robotics / Space

Innovative Pioneer in Surgical Robotics

(University of Basel, August 16, 2023)



A PhD student at the University of Basel, Yukiko Tomooka, is trailblazing in the field of surgical robotics under the guidance of Professor Georg Rauter at BIROMED-Lab. Thanks to the Swiss Government Excellence Scholarship and continued support from NCCR Robotics, Tomooka has been able to dedicate her efforts towards an innovative mechanism that could transform minimally invasive laser surgery. Tomooka's research primarily aims to develop an attachment mechanism for a mini-robot that assists surgeons by stabilizing the laser in accordance with the target tissue. Her remarkable innovation features inflatable balloons that create a stable unit between the tissue and robot.
/web/2023/07-230816-c2

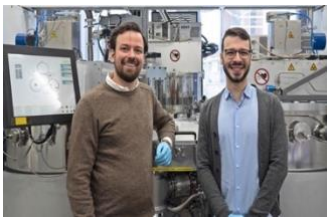
A Lab-on-a-Chip for T Cell Screening and Sorting

(EPFL, August 21, 2023)

Researcher Clémentine Lipp from EPFL has led a ground-breaking advancement in more cost-effective T cell screening and sorting. The research involves the development of a microfluidic device, or lab-on-a-chip, which allows for the independent control of T cells and tumor cells, thus significantly enhancing the understanding of cell to cell interactions. Adopting a combination of planar hydrodynamic and dielectrophoretic trapping, this innovative chip ensures spatial and temporal regulation over cell contact, facilitating high-throughput analysis of holistic cell interactions. This technological leap, in preserving cell integrity and receptor functions, is expected to drive the development of larger throughput and highly automated devices. This research breakthrough was published in the Lab On A Chip journal and has been recognized as a hot article for 2023.
/web/2023/07-230821-2b

Pioneering Thin-Film Solid-State Battery

(EMPA, August 29, 2023)

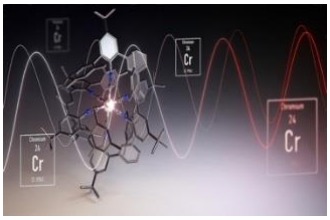


Leading researchers Abdessalem Aribia and Moritz Futscher from Empa's Thin Films and Photovoltaics laboratory have made a significant leap in rechargeable battery technology. They have devised a thin-film solid-state battery with superior energy storage to its predecessors, setting a new precedent for contemporary battery technology. Despite the high-precision vacuum coating production method elevating costs, the battery's benefits such as extended longevity, superior safety aspects, and environmental friendliness justify it. Their research has garnered support from Innosuisse and the European Space Agency, and their start-up BTRY is poised to commercialize the technology for application in smartphones, smartwatches, satellites, and more. The team is set to amplify the battery surface area and layers in the forthcoming years to showcase scalability.
/web/2023/07-230829-8e

8. Physics / Chemistry / Math

Substituting Costly Noble Metals with Chromium

(University of Basel, August 18, 2023)



Under the guidance of Professor Oliver Wenger from the University of Basel's Department of Chemistry, alongside researchers Dr. Narayan Sinha and Dr. Christina Wegeberg, a precious breakthrough has been accomplished by replacing rare noble metals in luminescent materials with Chromium. This cheaper and abundantly available element yields luminescent properties almost equivalent to noble metals osmium and ruthenium. Equipping Chromium atoms with an organic molecular structure, the novel materials unveil promising potential as catalysts for photochemical reactions, akin to photosynthesis. An enlargement of this research scope helps in achieving light emission in varied spectral colors and optimizing catalytic properties for sunlight-to-chemical-energy transformation. This innovative work propels strides in environment-friendly material science with cost-effective alternatives.
/web/2023/08-230818-37

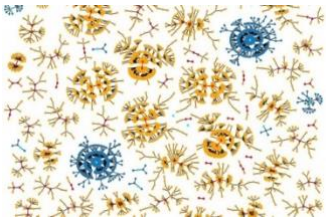
Atomic Precision in Graphene Nanoribbons: A Pioneering Step for Quantum Applications

(EMPA, August 22, 2023)

A pioneering breakthrough was made by an international team of researchers including Roman Fasel, Michel Calame, and Prof. Dr. Mickael Lucien Perrin from Empa's Transport at Nanoscale Interfaces laboratory, in collaboration with scientists from the University of Beijing and the University of Warwick. The team successfully attached electrodes to graphene nanoribbons with atomic precision, a pivotal development for understanding and utilizing this promising material in quantum technology. Graphene nanoribbons were fabricated by Empa's "nanotech@surfaces" laboratory. High-quality carbon nanotubes were produced by Jin Zhang's team at the University of Beijing, and the computational analysis of results was handled by Hatef Sadeghi's group at the University of Warwick. By attaching electrodes to graphene nanoribbons, a realm of possibilities for characterizing their electrical, magnetic, and optical properties open up.
/web/2023/08-230822-bb

Unraveling Complex Systems: The Backtracking Method

(EPFL, August 28, 2023)



In a new study, researchers from the EPFL (École Polytechnique Fédérale de Lausanne) and Charles University, including Freya Behrens, Barbora Hudcová, and Prof. Dr. Lenka Zdeborová, have unveiled an innovative technique dubbed the Backtracking Dynamical Cavity Method (BDCM). The BDCM is devised to analyse the dynamic, out-of-equilibrium properties of complexly disordered systems. The groundbreaking BDCM traces system behavior backward from stable endpoints, simplifying the study of any disordered system's specific component, denoted as the 'cavity.' This reversal approach offers vital insights into system dynamics, particularly when far from equilibrium. BDCM's experimental application to a disorderly array of magnets shed new light on how an arrangement's rapid cool-down affects energy and pattern formation, creating theoretical implications for the renowned Ising model of statistical physics.
/web/2023/08-230828-9e

New Approach to Predicting Volcanic Eruptions

(University of Geneva, September 01, 2023)

In a critical breakthrough, a team, including Oliver Higgins and led by Professor Luca Caricchi, from the University of Geneva (UNIGE) has developed an innovative approach to predicting volcanic eruptions. This research focuses on deciphering a volcano's internal structure using easily measurable parameters - volcano height, average magma composition, and the thickness of the separating rock layer. Using data from the Lesser Antilles volcanic arc, correlations between a volcano's height and magma production rate, and the link between crust thickness and magma explosiveness demonstrated that this model offers valuable insights. This information allows for a "snapshot" estimation of a volcano's potential for large-scale eruptions. This method delivers crucial implications for risk assessment and preventive measures in volcanic regions.
/web/2023/08-230901-03

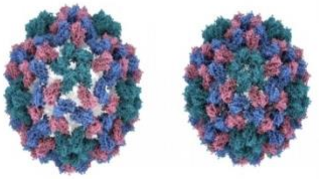
Seismic Research for Better Earthquake Awareness

(University of Lausanne, September 12, 2023)

Professor György Hetényi and researcher Shiba Subedi from the Institute of Earth Sciences at the University of Lausanne (UNIL) have taken a significant step forward in mitigating the risks of seismic disasters. They have just had an article published in the journal 'Seismica' on how seismic research could be leveraged to develop practical tools and strategies for the people of Nepal and ultimately save lives. The article proposes an actionable roadmap that includes incorporating earthquake-related content in educational materials at all levels, producing accessible educational content, and facilitating a coordinated training of teachers. It also suggests planning for effective communication strategies while respecting social and cultural context. This work is an integral part of a larger initiative to use seismic research to enhance public safety and is particularly important in earthquake-prone regions.
/web/2023/08-230912-bf

New Imaging Technique "Sees" Virus Move in Unprecedented Detail

(EPFL, September 22, 2023)



At EPFL, Professor Ulrich Lorenz's team has made a game-changing breakthrough in dynamic protein imaging. They've created a novel imaging technique, known as Microsecond Time-Resolved Cryo-EM, enabling the observation of rapid protein dynamics, especially viruses, with unprecedented detail. This revolutionary technique involves "freezing" and then "melting" a sample with a laser pulse, thus permitting the capture of protein movements at a microsecond scale. Used to study cowpea chlorotic mottle virus (CCMV), the technique unveiled large-amplitude motions crucial to its infection cycle. This advancement in imaging is instrumental in better understanding protein mechanics in their natural, liquid state within the cell, paving the way for further discoveries in cellular biology.
/web/2023/08-230922-6a

9. Architecture / Design

Using Satellite Imagery to Optimize Urban Coooling

(Eawag, August 23, 2023)

Led by Civil Engineer and Architect Lucas Gobatti under the supervision of Dr. João P. Leitão, a team from Eawag has recently leveraged satellite data to estimate the time it takes for blue-green infrastructures to produce measurable cooling effects in urban environments. The findings reveal that carbon-sequestering trees or climbing plants take approximately seven to ten years to create a notable shift in surface temperatures, while grasses or irrigated systems show a faster response, within one to three years. The results underpin how the selection of BGIs should be goal-specific and consider factors like temperature reduction, stormwater runoff, biodiversity, and recreational quality.
/web/2023/09-230823-6a

Neighbors Can Influence Your Decision to Buy Solar Panels

(EPFL, August 31, 2023)

A team led by Glòria Serra-Coch, a PhD student at EPFL's Laboratory for Human Environment Relations in Urban Systems (HERUS), has discovered that social and spatial proximity significantly shape the decision to install solar panels. Conducted in Vaud Canton, Switzerland, this pioneering study shines light on the role of neighbors in promoting renewable energy adoption. The team surveyed over 1000 people, finding that those who knew someone with solar panels or lived near residences with such installations were more likely to do the same. They also identified urban areas and housing density as key to solar panel installation. The results of this study highlight how local information campaigns can effectively foster renewable energy adoption, supporting policymakers in driving the energy transition.
/web/2023/09-230831-79

Local Energy Communities: A Concept for European Energy Transition?

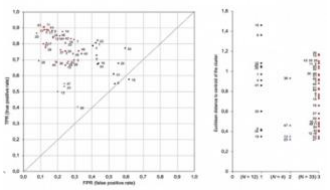
(University of St. Gallen, September 05, 2023)

In an insightful study led by Beatrice Petrovich and Merla Kubli, the spotlight is cast on the role of local energy communities for small and medium-sized enterprises (SMEs) in the broader European energy transition. By surveying over 800 executives from SMEs across Germany, Norway, Spain, and Romania, the researchers revealed a strong demand for local contact points and smart energy management alternatives. Energy communities, which are groups investing in renewable energy and distributing the yield among their members, offer a direct pathway for SMEs to reduce their carbon footprint, achieve price stability, and enhance awareness of energy and climate issues. A crucial takeaway from the study is the need for policy to foster this transition, with investment grants, reduced capital costs, and clear, stable rules governing local electricity usage.
/web/2023/09-230905-a1

10. General Interest

Innovative Approach in Associative Visual Learning

(University of Lausanne, August 30, 2023)



Elsa Raynal and her team at the BEAM laboratory at UNIL have successfully devised a novel method to study individual differences in associative visual learning. Their ground-breaking research, published in the "Behavioral Research Methods" journal, synergizes signal detection theory and clustering techniques, casting a fresh perspective on the complicated study of individualistic learning perceptions and decisions. Instead of relying on typical methods often challenged by practical and methodological limitations, the team's unique approach uses algorithmic clustering modelling to detect distinct learner groups from a given data set. These groups are then further analyzed using signal detection theory's sensitivity and bias parameters. This robust approach vividly displayed three distinctive learner groups, thereby validating its effectiveness.
/web/2023/12-230830-1b

Pioneering a New Class of Functional Food Materials

(University of Fribourg, September 04, 2023)

Establishing new grounds in both sustainability and nutritional relevance, a team including Rafael Freire, and led by Professor Stefan Salentinig from the Department of Chemistry at the University of Fribourg has achieved a significant breakthrough in food material research. The study, published in Advanced Functional Materials, centers around combining whey protein and buriti oil, extracted from the Amazon's buriti fruit. The team utilized advanced technologies to emulsify these two elements, creating an ingredient optimized for food and beverage production by enhancing nutrient accessibility during digestion. This research not only presents a circular economy solution by valorizing whey protein but also fosters socio-economic opportunities for Amazonian communities via buriti fruit usage. The findings propel the evolution of innovative food products that promote durable satiety and improve nutrient absorption.
/web/2023/12-230904-e9

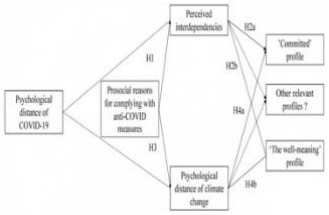
Enhancing Sleep Quality in Neurodegenerative Diseases with Innovative Device

(University of Zurich, September 04, 2023)

In a trailblazing endeavor, sleep researcher Angelina Maric, leading a consortium of experts from the University of Zurich (UZH), University Hospital Zurich (USZ), and the Swiss Federal Institute of Technology Zurich (ETH), has made a breakthrough in the field of sleep rehabilitation. Their team has conceptualized a novel device, SleepLoop, with potential to significantly enhance sleep quality for individuals suffering from conditions such as Parkinson's and Alzheimer's. SleepLoop operates through stimulation of deep sleep cycles, paving the way towards an individualized approach in sleep therapy. Its development is under progress and is bolstering hopes for a safer and more effective solution in tackling sleep disorders. With the promise of improved quality of life for several affected individuals, the ongoing research holds immense potential.
/web/2023/12-230904-53

Analyzing Prosocial Reasons for COVID-19 Compliance & Pro-Environmental Behaviors

(University of Lausanne, September 05, 2023)



Researchers led by Oriane Sarrasin and her team from the Laboratory of Social Psychology at the University of Lausanne, and Aurélien Graton from University Grenoble Alpes, have made a significant leap in understanding the connection between prosocial motivations for anti-COVID measures compliance and pro-environmental behaviors (PEB). Using latent class analyses of data from an online study across four countries and path models, the team discovered five distinct environmental profiles. Prosocial motivations were found to influence the profiles perceived as 'strongly committed' and 'strongly disengaged' via the psychological manipulation of climate change distance. This study reveals the importance of studying these behaviors from a profile-based approach, also shedding light on the significance of perceived interdependencies as predictors of PEB.
/web/2023/12-230905-4d

Regular Physical Activity Boosts Stress Management in Kids

(University of Basel, September 07, 2023)

Researchers from the University of Basel, led by Dr. Manuel Hanke and Dr. Sebastian Ludyga from the Department of Sport, Exercise, and Health, have unveiled a promising link between childhood physical activity and stress resilience. Through careful examination, the research discovered that children regularly engaging in physical activity exhibit a better capacity for stress management. Involving 110 children aged 10 to 13, the study employed sensor tracking of daily movement along with a laboratory-controlled task regimen involving stressful and non-stressful conditions. Notably, participants who engaged in over an hour of exercise daily - as advised by the World Health Organization - demonstrated a reduced cortisol output during the stress task compared to less active counterparts. These results suggest that regular physical activity could indeed mitigate physiological stress responses in children.
/web/2023/12-230907-cf

From Particle Accelerators to Brain Health: CERN's AI Algorithms Enhance Stroke Prevention

(CERN, September 15, 2023)

The International Agency for Research on Cancer (IARC) in collaboration with CERN has announced an exciting venture, the TRUSTroke Project, funded by the European Union. Luigi Serio, Principal Scientist at CERN's Technology Department, will take lead on this ground-breaking research to revolutionize stroke prevention. This project shines light on Federated Learning, a promising machine learning technique capable of analyzing data from diverse sources & devices. This exploration will aid in advancing AI-based solutions in medical applications, with a special focus on preventing strokes. A collaboration with universities & organizations, including SESAME in the Middle East, furthers this ambitious drive towards scientific synergy. The CERN Science Gateway is hosting public events to spread knowledge and encourage youth engagement.
/web/2023/12-230915-2f

Chocolate Production with Microorganisms and Mass Spectroscopy

(ETH Zurich, September 22, 2023)

Julie Lestang, a dedicated doctoral student from ETH Zurich, is making strides in the field of food biotechnology together with the Food Biotechnology Research Group at ZHAW. Their collaboration, extending to a network of producers in Central and South America, centers around the collection and analysis of over 13,000 microorganisms. Lestang's innovative methodology uses rapid evaporative ionisation mass spectroscopy (REIMS), traditionally associated with medical tests, to determine the chemical fingerprint of cacao beans. Her research promises a ripple effect of benefits, from enhanced quality of chocolate production to imposing sustainability in the process.
/web/2023/12-230922-91

Bridging Science and Creativity for Sustainability Education

(EMPA, September 22, 2023)

Dr. Harald Desing from Empa - Technology and Society, and Prof. Dr. Marion Rogalla from the Haute école pédagogique de Saint-Gall (PHSG) have embarked on an intriguing journey to create a children's book centered on the concept of a circular economy. Purposefully crafted to offer an accessible vision of a sustainable future, the book signifies a collaboration between impassioned researchers and imaginative schoolchildren. Providing the scientific backbone to the children's creative ideas, the team aims to instill sustainability principles in a digestible yet thought-provoking manner. This project, which is also featured in Empa Quarterly #80 issue, underscores the imperative role that researchers, entrepreneurs, apprentices, and students play in our quest for a sustainable future.
/web/2023/12-230922-c5

11. Calls for Grants/Awards

Using Drones to Monitor Rainforest Biodiversity

(ETH Zurich, August 10, 2023)

A pioneering team, ETH BiodivX, comprising researchers from ETH Zurich and the Swiss Federal Institute for Forest, Snow and Landscape Research (WSL), has made it to the finals of the XPRIZE Rainforest competition. This international competition seeks to develop transformative biodiversity assessment technologies for rainforest ecosystems. The multidisciplinary team used drones and autonomous vehicles to gather environmental DNA (eDNA) samples from the rainforest, achieving species identification without physical intrusion. This impressive feat during the semi-finals, held in the Singapore rainforest, successfully highlighted hundreds of varied plant and animal species. Advancing to the final round symbolizes a remarkable milestone, providing a platform for them to further refine their technologies for the 2024 final. The competition underscores the significance of understanding rainforest ecosystems and addressing the biodiversity crisis.
/web/2023/13-230810-d7

Upcoming Science and Technology Related Events

Quantum Industry Day
October 16, 2023
https://qidis23.b2match.io/
Electronics & Electrical Goods
Lausanne

St. Gallen Production Management Conference
October 17-18, 2023
https://is.gd/vHvnvf
Business & Economy
St. Gallen

3DBody.Tech Conference & Expo
October 17-18, 2023
https://www.3dbody.tech/
IT, Web & Electronic, Scientific, Research & Development
Lugano

INHSU 2023
October 17-20, 2023
https://www.inhsu.org/inhsu-2023/
Life Sciences, Health Care & Medical, Research & Development
Geneva

12th EPP Life Sciences Pricing Forum
October 18-19, 2023
https://is.gd/uspkb7
Business & Economy, Life Sciences, Health Care & Medical
Geneva

Congress of International Advanced HBP Surgery
October 18-21, 2023
https://is.gd/wb7ddu
Life Sciences, Health Care & Medical
Zurich

BaselOne23
October 18-19, 2023
https://baselone.ch/one?lang=en
IT, Web & Electronic
Basel

ICPD 30 Regional Meeting
October 19-20, 2023
https://unece.org/population/icpd30
Life Sciences, Health Care & Medical, Pharmaceutical & Biotechnology
Geneva

ISV Annual Congress
October 22-24, 2023
https://www.isvcongress.org/default.php
Life Sciences, Health Care & Medical
Lausanne

Annual Biocontrol Industry Meeting — ABIM
October 23-25, 2023
https://www.abim.ch/index.html
Scientific, Research & Development
Basel

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