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Science-Switzerland, April – May 2026

News on Swiss science, technology, education and innovation

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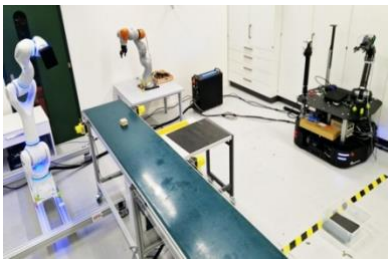
One Human Demo Now Programs Any Robot Design

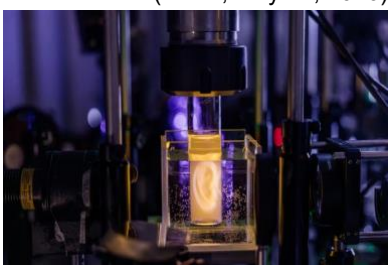
(EPFL, April 27, 2026)



Upgrading a robot in today's factories means discarding all its programming and starting over. EPFL researchers led by Prof. Aude G. Billard solved this problem with 'Kinematic Intelligence,' a framework that lets robots with different body designs learn the same skill from a single human demonstration. The team used motion-capture technology to record human object-manipulation tasks, then converted these recordings into general movement strategies that adapt to each robot's mechanical limits and stability requirements. Co-first authors Sthithpragya Gupta and Dr. Durgesh Salunkhe programmed three commercial robots with different designs to perform a multi-step assembly sequence from one demonstration. This breakthrough eliminates reprogramming when upgrading robot fleets, cuts deployment time, and removes the need for specialized programming expertise. The approach makes industrial automation more sustainable and cost-efficient while enabling seamless skill transfer across evolving robotic platforms.
/web/2026/00-260427-1e

Scientists 3D-Print Living Human Ear in Minutes Using Holographic Light

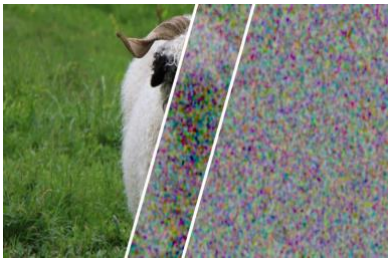
(EPFL, May 27, 2026)



Scientists 3D-printed a life-sized human ear with living cells using a 150-mW laser diode. EPFL researchers led by Dr. María Isabel Álvarez Castaño built a holographic volumetric printing platform 70 times more efficient than previous techniques. The system prints tissue-like structures at clinical scale in minutes. Their tomographic volumetric additive manufacturing controls laser light wave phase alignment through holograms, directing beams into photosensitive resin to solidify entire objects at once rather than layer-by-layer. The breakthrough prints centimeter-scale structures with embedded living cells that survive at least six days. EPFL's approach uses self-healing beam technology to maintain printing accuracy in light-scattering biological media while reducing speckle interference. Millimeter-scale objects form in seconds using low-power lasers. The printed cells formed organized networks, showing the platform can develop bioprinted implants and replacement tissues for reconstructive medicine and organ transplantation.
/web/2026/00-260527-af

ETH Zurich Creates First Certifiably Perfect Random Numbers

(ETH Zurich, May 29, 2026)



Random number generators have a critical flaw: systematic errors make certain numbers appear more often, creating cryptographic vulnerabilities. ETH Zurich researchers led by Dr. Renato Renner and Prof. Andreas Wallraff eliminated this weakness through quantum randomness amplification. Their system generates certifiably perfect random numbers by exploiting quantum entanglement between superconducting chips separated by 30 meters, achieving what classical physics cannot guarantee. The team cooled two quantum chips to near absolute zero and entangled their qubits via microwave photons. Bell-Test measurements on these separated qubits, spaced far enough to prevent light-speed information exchange, produced outcomes that a specialized algorithm amplified into perfect randomness. This breakthrough enables quantum-secure communications, unhackable encryption for sensitive data, and trustworthy public randomness for lotteries and blockchain systems.
/web/2026/00-260529-c0

2. Education

AI Creates Illusion of Knowledge Without Foundational Skills

(ETH Zurich, April 13, 2026)

Students must master core skills before AI becomes useful, warns ETH Zurich's Prof. Martina Rau. Her research reveals a critical trap: learners believe they understand AI-generated explanations when they don't, creating an 'illusion of knowing' that undermines genuine learning. Cognitive effort remains irreplaceable for retention, whether digital or analogue. Rau's framework recommends students formulate explanations independently before consulting AI, direct tools toward specific reputable sources, and analyze AI errors in class to build critical thinking. This transforms AI from a shortcut into a cognitive enhancement tool, but only after foundational skills exist. This shifts the debate from whether to use AI toward how to integrate it effectively, emphasizing that technology cannot replace the mental work required for true understanding.
/web/2026/02-260413-a4

Scientists Recreate Dyslexia in AI to Unlock New Treatments

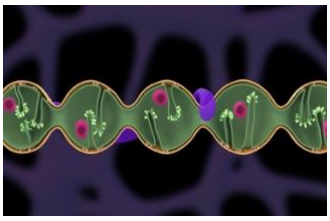
(EPFL, April 27, 2026)

Dyslexia affects up to 20% of people worldwide, making it the most common learning disorder. EPFL researchers led by doctoral assistant Melika Honarmand modeled dyslexia in artificial intelligence by identifying and deactivating visual word form areas in Vision Language Models. The AI showed reading difficulties while maintaining normal image and language comprehension, mirroring human dyslexia patterns. The digital brain performed better with dyslexia-friendly fonts and worse with problematic typefaces. Professor Martin Schrimpf's NeuroAI Lab applied cognitive neuroscience stimuli to map AI brain regions analogous to human visual processing centers, then performed targeted deactivations impossible to conduct ethically in people. This breakthrough enables mechanistic testing of dyslexia interventions and could accelerate development of optimized fonts and treatments. EPFL's framework marks the first neuro-AI modeling of a patient population rather than healthy subjects, with applications now extending to Parkinson's-related visual hallucinations and depression research.
/web/2026/02-260427-63

3. Life Science

Century-Old Cellular Mystery Reveals Mitochondrial DNA's Elegant Distribution System

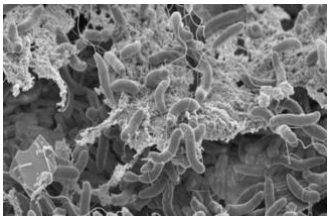
(EPFL, April 09, 2026)



A phenomenon sketched in 1915 and dismissed as cellular stress is the mechanism for distributing mitochondrial DNA. EPFL researchers led by Dr. Juan Cruz Landoni discovered that mitochondrial 'pearling,' where mitochondria form beads-on-a-string shapes, spaces DNA nucleoids throughout cells. Using super-resolution and electron microscopy, the team found calcium triggers evenly spaced constrictions that split larger DNA clusters into smaller units. This breakthrough solves a century-old puzzle and provides insights into metabolic and neurological diseases, aging, Alzheimer's, and Parkinson's. EPFL's live-cell imaging captured how cells harness physical forces alongside molecular machinery for efficient genome distribution.
/web/2026/03-260409-0a

Cholera Bacteria Steal Immunity from Dead Neighbors

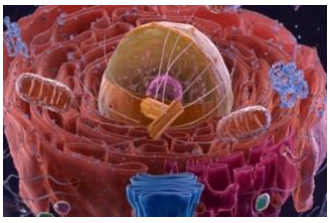
(EPFL, April 13, 2026)



EPFL researchers led by Prof. Dr. Melanie Blokesch found that Vibrio cholerae captures immune genes from DNA released by deceased bacteria in aquatic environments. When cholera bacteria contact chitinous surfaces like crustacean shells, they absorb gene cassettes from neighboring strains and insert them into their chromosomes for immediate activation against viral attacks. The team grew V. cholerae on chitin while supplying DNA from various Vibrio species, then tracked gene insertion and tested function against vibriophages. This horizontal gene transfer explains how cholera survives viral pressure in marine ecosystems through rapid adaptation.
/web/2026/03-260413-83

Scientists Create First Probe to Light Up Elusive Cell Structures

(EPFL, April 27, 2026)



Scientists solved a major challenge in cell biology: creating the first fluorescent probe that lights up centrioles and cilia in living cells. EPFL researchers led by Prof. Pierre Gönczy developed CenSpark, which binds to these structures without genetic manipulation. The engineered probe exploits unique micro-tubule arrangements in centrioles and cilia, validated through super-resolution and live-cell imaging across systems from human cells to unicellular organisms. This breakthrough enables real-time tracking of structures whose defects cause cancer, infertility, and ciliopathies. CenSpark revealed biphasic dynamics during primary cilium formation and captured centriole polarization at immunological synapses in CAR-T cells during immune responses.
/web/2026/03-260427-7e

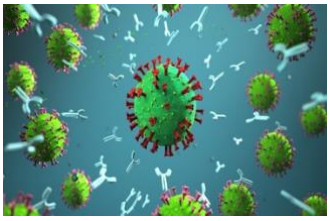
Oxygen Holds the Key to Unlocking Limb Regeneration in Mammals

(EPFL, May 07, 2026)

Salamanders regrow entire limbs while mammals cannot; the difference lies in oxygen sensing. EPFL researchers led by Can Aztekin found that amphibian cells maintain stable HIF1A protein activity regardless of oxygen levels, preserving regenerative programs after injury. Mammalian cells respond strongly to oxygen exposure, shutting down these pathways. When scientists cultured amputated mouse embryo limbs in low-oxygen conditions matching aquatic environments, the tissue behaved like regenerating amphibian cells, showing mammals retain latent regenerative capacity.
/web/2026/03-260507-54

How the Immune System Battles Lifelong Viral Infections Acquired at Birth

(University of Basel, May 07, 2026)



More than 250 million people live with lifelong viral infections acquired at birth that medicine cannot cure, and scientists misunderstand how the immune system responds. University of Basel researchers led by Dr. Katrin Martin, Dr. Peter Reuther, and Prof. Daniel Pinschewer found the immune system actively fights these perinatal infections throughout life rather than tolerating them. Using mouse models that replicate human perinatal infection, the team showed the body gradually produces virus-fighting antibodies supported by T helper cells, progressively reducing viral load despite limited cell diversity formed during early development. This finding reshapes chronic infection treatment strategies. The team showed that adding T helper cells enhances existing immune responses, offering a more practical approach than generating entirely new immunity.
/web/2026/03-260507-48

Scientists Engineer Precision Delivery System for Healthy Mitochondria

(University of Basel, May 11, 2026)

Mitochondrial dysfunction causes many untreatable diseases. Scientists have tried transplanting healthy mitochondria before but couldn't control where they went, until now. Researchers at the Institute of Molecular and Clinical Ophthalmology Basel and the University of Basel developed MitoCatch, a technology using engineered docking proteins to guide donor mitochondria to diseased cells. Tests across mouse and human neurons, retinal, heart, endothelial, and immune cells show the transplanted mitochondria remain functional and improve cell survival. The team created three approaches: equipping target cells with surface docking proteins to attract mitochondria, modifying donor mitochondria to seek specific cells, or using bispecific bridge proteins between unmodified components.
/web/2026/03-260511-58

Human Pollution Dominates Earth's Most Remote Waters

(ETH Zurich, May 13, 2026)

ETH Zurich researchers led by Dr. Tal Ben Altabet show that human-sourced zinc now dominates the South Pacific, Earth's most isolated ocean region. Fossil fuel combustion and industrial emissions transport zinc through atmospheric aerosols across thousands of miles, altering waters once considered pristine. The team analyzed zinc isotopic fingerprints across dissolved seawater, suspended particles, and atmospheric aerosols. They found essentially all zinc particles in upper South Pacific waters trace to human sources. Human emissions contain lighter isotopes like Zn-64, while natural oceanic zinc carries heavier isotopes like Zn-66. Rising concentrations of man-made metals threaten phytoplankton nutrient balance, potentially disrupting marine food chains and climate regulation.
/web/2026/03-260513-36

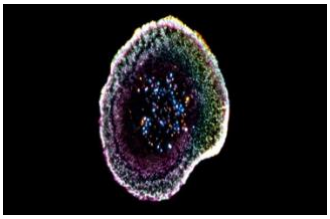
Intense Cycling Mobilizes Better Blood Stem Cells Than Standard Drugs

(University of Basel, May 15, 2026)

University of Basel researchers found that vigorous cycling mobilizes different blood stem cells than G-CSF medication, specifically recruiting platelet precursors and less mature 'early' cells with potentially superior engraftment capacity. Led by Dr. Julia Maria Kröpfl, the team tracked 10 donors through intensive ergometer cycling and conventional G-CSF treatment. Exercise pulled cells from blood vessel walls rather than bone marrow, producing a 1.5-2x increase versus G-CSF's 20-50x boost. While exercise generates smaller quantities, it targets more beneficial cell types.
/web/2026/03-260515-df

First 3D View Shows Killer Cells Form Precision Dome to Attack Cancer

(University of Geneva, May 19, 2026)



Scientists captured the first 3D images of the body's killer cells in action. University of Geneva and Lausanne University Hospital researchers led by Dr. Florent Lemaitre, visualized how cytotoxic T lymphocytes form a dome-shaped membrane at their contact point with target cells. This 'immune synapse' acts as a precision weapon, delivering toxic granules that destroy cancer cells while sparing healthy neighbors. The team revealed unprecedented detail of these granules, showing they contain variable numbers of molecular cores packed with cell-killing agents. Cryo-expansion microscopy enabled this breakthrough by flash-freezing cells into a glass-like state, then physically expanding them with absorbent hydrogel for observation.
/web/2026/03-260519-fb

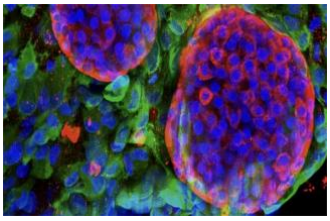
Sweat-Reading Patch Monitors High-Risk Pregnancies Without Needles

(EPFL, May 20, 2026)

Nearly half of Swiss pregnancies are high-risk, leaving parents anxious between check-ups. EPFL spin-off MoleSense, led by Dr. Gian Luca Barbruni, created a wearable patch that tracks pregnancy biomarkers in sweat. The device uses DNA-based biosensors to detect hormones and inflammatory proteins at concentrations conventional tests miss. The patch channels sweat through microscopic pathways to biosensors that convert biological signals into data. Algorithms analyze multiple signals to spot abnormalities. Early trials with Lausanne obstetrics specialists confirm the patch is comfortable for daily wear.
/web/2026/03-260520-08

Birth Tissue Gel Houses Living Insulin Factories for 100+ Days

(University of Geneva, May 20, 2026)



A gel made from birth tissue could end daily insulin injections for millions of diabetes patients, keeping blood sugar normal for months without medication. University of Geneva researchers led by Associate Professor Ekaterine Berishvili developed 'Amniogel,' a hydrogel from human amniotic membrane that housed insulin-producing pancreatic islet cells in diabetic mice. The transplanted cells maintained normal blood sugar for at least 100 days without immunosuppressive drugs or insulin injections. The team extracted material from placentas and created a gel matrix embedding pancreatic islets alongside vessel-forming cells. Before transplantation, these cells self-organized into microvascular networks surrounding the islets, creating pre-vascularized constructs 9mm in diameter.

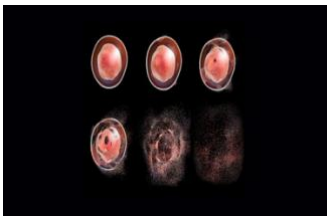
Fish Intestines Evolved at the Cellular Level to Match Their Diet

(University of Basel, May 20, 2026)

Around 250 cichlid species evolved rapidly in Lake Tanganyika, Africa. University of Basel researchers led by Dr. Antoine Fages found that diet shapes these fish at the cellular level, carnivorous species pack their intestines with specialized cells for absorbing fats and nutrients from energy-rich prey, while herbivores show different cellular compositions. This shows evolution operates invisibly inside digestive tissues, not just on external features like beaks. Using single-cell sequencing across 24 cichlid species, the team mapped how ecological niches directly influence cell type specification in gut tissue. The genes controlling these specialized intestinal cells operate independently from other body systems, creating what Prof. Walter Salzburger calls 'plenty of room for evolutionary adaptations.'
/web/2026/03-260520-05

Scientists Map How Cancer's Guardian Protein Disables Cell Death

(University of Geneva, May 20, 2026)

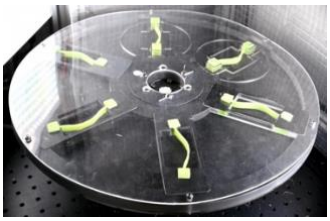


Cancer cells overproduce 'guardian' proteins that disable programmed cell death, but scientists lacked clarity on how these molecules block killer proteins. University of Geneva researchers led by Dr. Christina Elsner and Dr. Anton Hanke revealed that the guardian protein Bcl-xL anchors to mitochondrial membranes and sequesters a specific region of the killer protein tBid while leaving the rest flexible. Using electron paramagnetic resonance spectroscopy with molecular simulation, the team mapped which molecular segment locks tBid. This breakthrough enables design of anticancer therapies that target this interaction to restore programmed death in cancer cells. The molecular blueprint could guide development of small molecules that disrupt the guardian-killer binding to eliminate tumors or stabilize it to protect neurons in Parkinson's.
/web/2026/03-260520-1e

4. Nano / Micro Technology / Material Science

Scientists Write Data into Materials Using Only Rotation

(EPFL, May 11, 2026)



Scientists can now 'write' information into materials just by spinning them. EPFL researchers led by Eduardo Gutiérrez Prieto and Pedro Reis, with Dr. Martin van Hecke, program mechanical metamaterials through controlled rotation. Using the physics that makes slap bracelets snap, they mount five finger-sized silicone beams on a rotating platform. Each beam flips at a different rotation threshold. The method harnesses centrifugal and Euler forces to make elastic beams snap between stable states, encoding binary information without electronics. The team encoded all 26 alphabet letters using ASCII binary codes, with computer vision tracking beam positions during spinning. The approach eliminates individual bit control, enabling mechanical computing, soft robotics with bistable joints, centrifugal microfluidic diagnostics, and electronics-free systems for medical and underwater applications where traditional computing fails.
/web/2026/04-260511-74

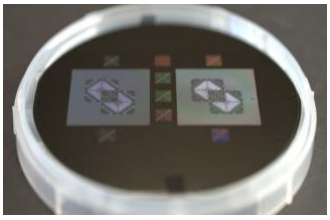
Swiss Plasma Technology Eliminates Forever Chemicals from Waterproof Clothing

(EMPA, May 21, 2026)

Modern waterproof clothing contains PFAS 'forever chemicals' that persist in the environment and accumulate in the body. Empa researchers led by Dr. Dirk Hegemann have developed plasma coating technology that creates PFAS-free water-repellent textiles using organosilicon compounds. Electric gas discharge generates reactive species at high energy but low temperatures, penetrating deep into yarn structures to coat individual fibers with thin layers. Studies show these organosilicon coatings surpass PFAS in durability while using less chemical material than conventional methods. This breakthrough lets manufacturers produce safer outdoor and industrial textiles without losing performance. The innovation won Techtextil's Innovation Award for sustainability and addresses regulatory pressures as PFAS faces worldwide bans. Empa's Safe and Sustainable by Design framework ensures the organosilicon alternative avoids becoming another harmful substitute.
/web/2026/04-260521-c5

Electricity-Free Computing: Silicon Chip Forces Vibrations Through Invisible Mazes

(ETH Zurich, May 29, 2026)

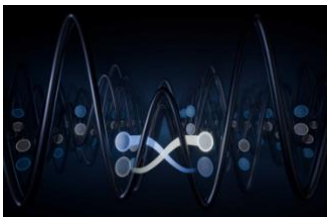


Scientists created an 'invisible maze' on a silicon chip that forces vibrations to follow predetermined paths, opening the door to computers that run on vibrations instead of electricity. ETH Zurich researchers led by Prof. Dennis Kochmann engineered a wafer-thin silicon membrane patterned with millions of microscopic unit cells containing four-pointed stars. Using custom simulations to predict wave behavior and photolithography to etch the design, the team created a phononic metamaterial that guides mechanical waves across a broad frequency range of 250-800 kilohertz, exceeding their 750 kilohertz target. This breakthrough enables mechanical signal processing without electrical power, potentially transforming remote sensors and infrastructure monitoring in areas lacking electricity. The metamaterial also harvests usable energy from ambient vibrations through piezoelectric conversion and improves vibration control in micro- and nanoelectronics. ETH Zurich's silicon-based approach surpasses polymer alternatives through dramatically lower damping, allowing vibrations to travel farther with minimal energy loss, a critical advantage for developing computer architectures that process information mechanically rather than electronically.
/web/2026/04-260529-97

5. Information & Communications Technology

Geometric Phase Trick Unlocks 99.9% Precision Across 17,000 Qubits Simultaneously

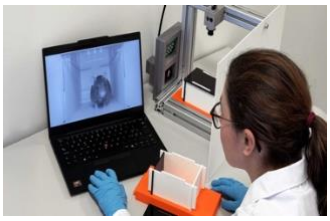
(ETH Zurich, April 15, 2026)



Researchers achieved quantum gates with over 99.9% precision on 17,000 qubits simultaneously using a geometric trick that makes operations immune to experimental noise. ETH Zurich's team led by Prof. Tilman Esslinger developed an ultra-stable quantum swap gate for neutral atom qubits that exploits geometric phases rather than dynamical phases, reaching 99.91% precision while operating on thousands of qubit pairs at once. This breakthrough overcomes the major limitation of tunnel effect-based gates, which suffer from extreme sensitivity to laser intensity variations. The method uses ultracold potassium atoms trapped in optical lattices as qubits, manipulating laser beams to bring atom pairs close enough for wavefunction overlap. Dr. Yann Kiefer and junior group leader Konrad Viebahn exploited fermion properties, particles cannot occupy identical quantum states, to generate geometric phases independent of manipulation speed and laser fluctuations.
/web/2026/05-260415-0a

AI Eliminates Subjective Pain Assessment in Laboratory Mice

(ETH Zurich, May 07, 2026)



Human experts rating identical mouse images gave wildly different pain scores, exposing dangerous subjectivity in animal welfare assessments. ETH Zurich researchers led by Oliver Sturman developed GrimACE, an AI system that detects pain through facial expressions and posture analysis. The standardized observation box uses dual infrared cameras capturing eye narrowing, ear position, whisker direction, and body angles. Machine learning algorithms trained on the Mouse Grimace Scale match or exceed human expert accuracy while removing rater bias that could cause unnecessary suffering or premature study termination. This breakthrough enables immediate, objective monitoring without additional animal stress from human observation. ETH Zurich's open-source design allows laboratories worldwide to implement identical assessment standards, ensuring consistent pain relief decisions across all facilities. The system improves as more institutions contribute data, advancing the 3R principles of animal experimentation.
/web/2026/05-260507-ff

Gold-Patterned Filters Unlock Terahertz Revolution for 6G and Space

(EMPA, May 08, 2026)

Terahertz radiation could enable communication speeds far beyond 5G networks and revolutionize satellite data transmission. Empa researchers led by Dr. Elena Mavrona and Dr. Erwin Hack developed ultra-thin terahertz filters measuring one thousandth of a millimeter. Their patented technique patterns pure gold microstructures onto polymer film substrates, creating components that weigh almost nothing while precisely controlling terahertz radiation across the electromagnetic spectrum. This breakthrough enables practical applications in 6G mobile networks, satellite-to-satellite communication, and medical diagnostics including skin cancer detection. The filters mount on customizable 3D-printed frames, allowing engineers to build systems tailored for specific wavelengths. Empa's approach directly addresses the long-standing terahertz gap, transforming an underutilized frequency range into accessible technology for quantum computing, security screening, and space missions where every gram matters.
/web/2026/05-260508-23

AI Captures Dancing Proteins in Full Atomic Detail for First Time

(EPFL, May 19, 2026)

Proteins are tiny machines that dance. For the first time, AI has captured this complete molecular movie in full atomic detail. EPFL researchers led by Dr. Patrick Barth, Prof. Pierre Vandergheynst, and Dr. Aditya Sengar developed LD-FPG, the first framework that generates complete all-atom protein models including dynamic movements and side chain positions. Unlike AlphaFold, which produces static snapshots, this breakthrough solves a challenge that has stumped computational biology for decades. The framework uses a graph neural network that treats proteins as mathematical graphs, where atoms serve as nodes and bonds as edges. The system compresses protein structure data into simplified latent maps, trains AI to learn structural representations and movements, then reconstructs high-resolution proteins with complete dynamics. The team demonstrated success on complex drug targets like G-protein coupled receptors, including the dopamine D2 receptor. This shift enables drug design that targets protein dynamic behavior rather than static shape, accelerating pharmaceutical development for membrane proteins.
/web/2026/05-260519-9e

6. Energy / Environment

World's Treelines Tell Unexpected Story of Climate and Human Impact

(University of Basel, April 13, 2026)

A quarter of the world's treelines retreated downhill between 2000 and 2020 despite global warming. University of Basel researchers led by Dr. Tianchen Liang found that while 42% of treelines shifted upslope, 25% moved downward. Their satellite analysis shows human land use changes impact treeline dynamics as strongly as temperature, particularly in historically managed regions. This finding challenges the assumption that treelines act as simple thermometers of warming. The team linked 38% of downward shifts to fire events, showing that treelines reflect multiple environmental changes beyond temperature alone. Prof. Dr. Sabine Rumpf's method compares theoretical climate-based positions with observed shifts to separate human interventions from climate effects. This approach transforms how researchers interpret landscape changes and reveals that human activities shape mountain ecosystems through complex pathways.
/web/2026/06-260413-38

Human Pollution Dominates Earth's Most Remote Waters

(ETH Zurich, May 13, 2026)

ETH Zurich researchers led by Dr. Tal Ben Altabet show that human-sourced zinc now dominates the South Pacific, Earth's most isolated ocean region. Fossil fuel combustion and industrial emissions transport zinc through atmospheric aerosols across thousands of miles, altering waters once considered pristine. The team analyzed zinc isotopic fingerprints across dissolved seawater, suspended particles, and atmospheric aerosols. They found essentially all zinc particles in upper South Pacific waters trace to human sources. Human emissions contain lighter isotopes like Zn-64, while natural oceanic zinc carries heavier isotopes like Zn-66. Rising concentrations of man-made metals threaten phytoplankton nutrient balance, potentially disrupting marine food chains and climate regulation. These microscopic organisms absorb atmospheric CO2 and produce oxygen, making their health critical to planetary systems.
/web/2026/06-260513-36

AI Model Predicts Typhoons Despite 97% Missing Data

(ETH Zurich, May 20, 2026)

ETH Zurich researchers developed an AI model that forecasts weather accurately when 97% of satellite data is missing. Led by Dr. Firat Ozdemir, the Earth System Foundation Model (ESFM) learns fundamental relationships between atmosphere, land surface, and water cycle. The model processes satellite imagery, weather stations, and ground sensors separately, then tags them with spatial and temporal coordinates to identify recurring process chains across the ERA5 global dataset. ESFM reconstructs incomplete observations and integrates hard-to-compare datasets, transforming climate monitoring in data-sparse regions. The model predicted Super Typhoon Doksuri's wind strength, location, and movement without training on that storm, proving it understands underlying processes rather than memorizes patterns. The freely available tool fills critical gaps in agriculture, biodiversity, and hydrology applications, particularly improving extreme weather prediction in the Global South where observation networks are limited.
/web/2026/06-260520-38

Powder Sunlight Reactor Slashes Green Hydrogen Costs

(EPFL, May 27, 2026)

Hydrogen-based liquid fuels cost five to ten times more than fossil fuel equivalents, blocking their use in transport decarbonization. EPFL researchers led by Prof. Kevin Sivula created a powder-form photoelectrolyzer that splits water into hydrogen and oxygen when mixed with water and exposed to sunlight. Their organic semiconductor system achieves 1% conversion efficiency; models show 10% would make large-scale fuel production economically viable. The Laboratory for Molecular Engineering of Optoelectronic Nanomaterials built this system using cheap, abundant materials that trigger water electrolysis through sunlight alone. This approach eliminates expensive infrastructure traditional hydrogen production requires, enabling aviation, shipping, and long-haul trucking to meet 2050 decarbonization targets. The powder-based system offers unprecedented scalability; deployment needs only adequate sunlight and water, transforming hydrogen fuel economics from prohibitively expensive to commercially competitive with fossil fuels.
/web/2026/06-260527-47

7. Engineering / Robotics / Space

Complex Scientific Simulations Now as Simple as Smartphone Apps

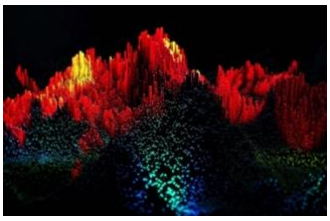
(Paul Scherrer Institute, May 12, 2026)

Scientists created a smartphone app experience for complex research simulations, letting researchers without coding expertise run advanced computational experiments with clicks. Paul Scherrer Institute researchers led by Dr. Giovanni Pizzi transformed AiiDAlab from a materials research tool into a universal platform supporting atmospheric studies, battery development, and experimental control. The web-based interface eliminates command-line complexity while automating simulation preparation, execution, and analysis across disciplines. The platform handles authentication and data orchestration automatically, letting scientists focus on interpreting results rather than managing technical infrastructure. Built on the AiiDA workflow manager framework developed since 2014, AiiDAlab proves equally effective as an educational tool, introducing students to computational research through intuitive graphical interfaces.
/web/2026/07-260512-b1

8. Physics / Chemistry / Math

Noise Still Limits Quantum Computing Capabilities

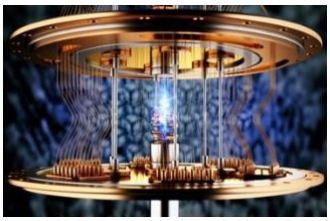
(EPFL, April 07, 2026)



Quantum computers hit a hard wall: noise makes only the last few steps of complex circuits matter. EPFL researchers led by Dr. Armando Angrisani and Assistant Professor Yihui Quek, with teams from Free University of Berlin and University of Copenhagen, proved that accumulated noise causes earlier quantum operations to fade from memory. Through mathematical analysis of large circuit families with realistic per-qubit noise, they tracked how layer influence propagates. Deep noisy circuits behave like shallow ones, regardless of total depth. This explains why current quantum machines handle only simple tasks: final layers retain activity while earlier computations vanish. Stacking more layers cannot unlock new power for measurement-based tasks. Progress requires either dramatically better noise suppression or designs that exploit specific noise characteristics. The work sets realistic expectations for near-term capabilities, redirecting focus from depth scaling to noise control as the critical bottleneck preventing quantum computers from delivering their theoretical potential.
/web/2026/08-260407-4a

Semiconductor Detector Captures 70% of Elusive Microwave Photons

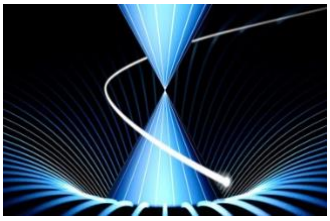
(EPFL, April 27, 2026)



Microwave photons carry 100,000 times less energy than optical photons, making individual detection extraordinarily difficult. EPFL researchers led by Assistant Professor Pasquale Scarlino achieved 70% detection efficiency using a semiconductor device that operates continuously without complex resets. The team combined a double quantum dot semiconductor with a superconducting microwave cavity, creating a resonant circuit that traps photons at 0.3-30 GHz and converts them into measurable electrical current. This breakthrough enables reliable continuous detection of faint microwave signals. The semiconductor design offers practical advantages over existing methods, potentially accelerating quantum computers and communication systems that depend on detecting individual photons across microwave frequencies.
/web/2026/08-260427-80

Scientists Measure 'Space Curvature' That Bends Electron Paths on Material Surfaces

(University of Geneva, May 28, 2026)



Topological insulators block electricity inside but conduct it freely on their surface, like an electrical one-way street. University of Geneva researchers led by Dr. Giacomo Sala and Prof. Andrea Caviglia measured the quantum metric in antimony-tellurium topological insulators, revealing how geometric space curvature controls electron movement on these surfaces. Their measurements show this property can be electrically tuned, building on their 2025 breakthrough with strontium titanate materials. This discovery enables precise control of electrical properties in next-generation quantum materials. The quantum metric provides researchers a new tool for understanding how geometric electron behavior reveals the nature of quantum systems. The approach could transform data transfer, processing, and storage technologies, with applications in quantum computing and ultra-fast information systems. By showing electrical control over quantum geometry, the team opened pathways for engineering topological materials with programmable electronic properties.
/web/2026/08-260528-58

10. Economy, Social Sciences & Humanities

Switzerland's Talent Paradox: World's Densest AI Expertise, Weakest Startup Investment

(Startupticker.ch, April 22, 2026)

AI models solve gold-medal math olympiad problems but fail reading analog clocks half the time. The Stanford Institute for Human-Centered Artificial Intelligence (HAI) reveals a similar paradox in Switzerland: the nation leads globally with 110.5 AI researchers per 100,000 people and ranks third worldwide with 43.6% PhD-level AI talent, yet attracts only $4.73 billion in startup investment since 2013. The 2026 AI Index Report, tracking talent density, investment flows, doctoral qualifications, and generative AI adoption, exposes critical misalignment between human capital and commercial innovation. Israel captured $18.54 billion and Sweden $8.24 billion in comparable periods, nearly four times Switzerland's totals despite smaller talent pools. This disconnect reveals policy failures in converting research excellence into entrepreneurial ecosystems, creating opportunities for nations that mobilize their AI workforce into scalable ventures.
/web/2026/10-260422-42

12. General Interest

Scientists Trigger Controlled Earthquakes in Swiss Tunnel to Crack Prediction Mystery

(Swissinfo.ch, April 21, 2026)

Scientists have triggered earthquakes in a Swiss underground tunnel, injecting thousands of cubic meters of water into rock fault lines to unlock earthquake prediction secrets. ETH Zurich researchers led by Dr. Stefan Wimmer conducted experiments at BedrettoLab, increasing water pressure between rock layers until a magnitude 1 earthquake occurs. The team controls experiments remotely from Zurich, conditions are too dangerous for human presence, with a 1 in 100 chance of tunnel damage. This approach allows direct measure-ments at the earthquake's origin point, capturing data on what happens immediately before and during seismic events. The method eliminates waiting for natural earthquakes in accessible locations. By studying how water pressure triggers fault movement, researchers aim to answer fundamental questions about earthquake initiation and termination. This breakthrough could enable improved earthquake prediction methods, a goal that has eluded scientists for decades.
/web/2026/12-260421-cb

Upcoming Science and Technology Related Events

Point Zero Forum
June 23-24
https://www.pointzeroforum.com
Finance & Insurance, IT, Web & Electronic, AI
The Circle Convention Center, Airport Zurich

19th European Powder Diffraction Conference EPDIC19
June 23-26
https://www.epdic19.com/page/informations/
Scientific, Research & Development
Crans Montana Congress Center

Swiss PGDay 2026
June 25-26
https://www.pgday.ch/2025/
IT, Web & Electronic, AI
Eastern Switzerland University of Applied Sciences, Rapperswil

ISSX IT-Security Swiss Conference
June 30
https://www.issxconference.ch/
IT, Web & Electronic, AI, Security & Defense
Seedamm Plaza, Pfäffikon

EFCF 2026 – 17th European SOFC & SOE Forum
June 30 - July 3
https://www.efcf.com/2026
Scientific, Research & Development
KKL Luzern

The PASC26 Conference
June 29 - July 1
https://pasc-conference.org/editions/pasc26/
IT, Web & Electronic, AI
University of Bern

Colloidal Semiconductor Nanocrystals
July 5-10
https://www.grc.org/
Nanoscience, Scientific, Research & Development
The Glacier Hotel, Les Diablerets

World Summit on the Information Society Forum 2026
July 6-10
https://www.itu.int/net4/wsis/forum/2026/
Business & Economy, IT, Web & Electronic, AI
Palexpo, Geneva

ITU Kaleidoscope Geneva 2026
July 7-9
https://www.itu.int/
IT, Web & Electronic, AI
Palexpo, Geneva

AI for Good Global Summit
July 7-10
https://aiforgood.itu.int/summit26/
IT, Web & Electronic, AI
Palexpo, Geneva

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