SINGAPORE UNIVERSITY OF TECHNOLOGY AND DESIGN

Weekly Discovery

We SHARE to inspire and ignite ideas!

16 Feb - 20 Feb 2026

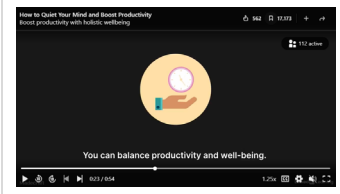
LinkedIn Learning Invest in Yourself

Did you know 1 cent doubled for 30 days = $5.368 Million

Similarly, your actions everyday can amount to much more!

Learn a new skill today with LinkedIn Learning and start investing in yourself!

Activate you free LinkedIn Learning Account and get started!



Featured Course

How to Quiet Your Mind and Boost Productivity

42m

Click Here to Start Learning

ARCHITECTURE

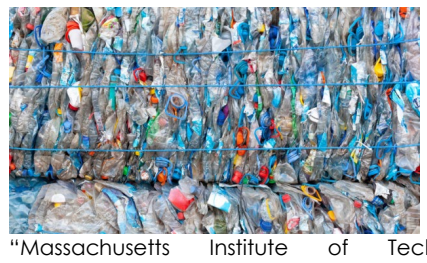
The Afterlife of Expo Osaka's Grand Ring: How the Timber Structure Is Being Reused Across Japan

"Exhibitions can be an opportunity to extend architectural discourse beyond professional circles, opening conversations with broader publics and serving as an interface between architecture and society. Within this concept, major international events such as the Osaka International Expo 2025 and the Venice Architecture Biennale have adopted the idea of the circular economy as one of their organizational objectives. The idea of circularity in events can be reflected in, for example, their energy consumption, the impact of the displacement they generate, their waste, or the useful life of their infrastructure. The site destined for the last World Expo, held in Osaka from 13 April to 13 October 2025, was surrounded by a massive timber structure designed by Sou Fujimoto Architects, one of the world's largest wooden constructions. The Japan Association for the 2025 World Exposition committed to reusing building materials "as much as possible," with concrete plans for their reuse to be finalized by March. In the meantime, some relocation alternatives are already emerging for the pieces of the World Expo structure.."

Source: Archdaily (18 Feb 2026)

ARCHITECTURE

MIT researchers developing process to make houses from recycled plastic



"Massachusetts Institute of Technology researchers have made recycled plastic into floor trusses for housing, arguing the waste stream could provide an abundant and sustainable structural building material.

The US-based researchers 3D printed a functional, construction-grade element using a composite material they developed from recycled polyethylene terephthalate (rPET) plastic – mostly derived from discarded drinks bottles – mixed with glass fibres.

In the future, they say the system could be used in place of wood for house frames, making residential building cheaper while avoiding the overexploitation of forests.

"We've estimated that the world needs about 1 billion new homes by 2050," said engineer and inventor AJ Perez, who led the project. "If we try to make that many homes using wood, we would need to clear-cut the equivalent of the Amazon rainforest three times over."

PET is "one of the most durable polymers"

To make the floor trusses, Perez and his collaborators 3D printed their polymer composite into a long rectangular element reinforced by an internal zigzag shape, similar to the structure of traditional wood and metal floor trusses.

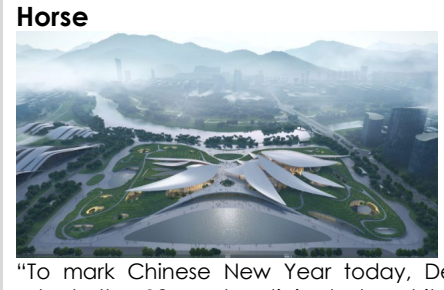
Four of these trusses were configured into a plywood-topped floor frame and bend-tested by placing concrete blocks on top.

According to the researchers, the trusses only began to buckle and crack under more than 4,000 pounds (1,814 kilograms) of weight, exceeding US building standards.."

Source: Dezeen (16 Feb 2026)

ARCHITECTURE

Twelve upcoming Chinese projects to be completed in the Year of the Horse



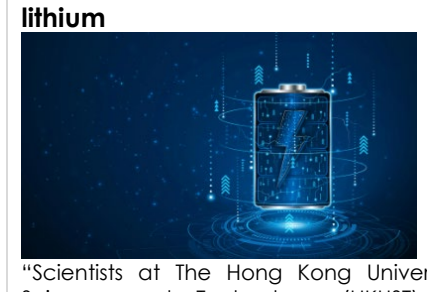
"To mark Chinese New Year today, Dezeen selects the 12 most anticipated architecture projects set to complete in China this year by studios including Snøhetta, Neri&Hu and Zaha Hadid Architects.

Among the projects to look out for are towering headquarters for two leading Chinese firms in Shenzhen, hotels on the site of a former porcelain factory and a linear museum.."

Source: Dezeen (17 Feb 2026)

BATTERIES

New calcium-ion battery design delivers high performance without lithium



"Scientists at The Hong Kong University of Science and Technology (HKUST) have reported a major advance in calcium-ion battery (CIB) research that could reshape how energy is stored and used in daily life. By incorporating quasi-solid-state electrolytes (QSSEs), the team developed a new type of CIB designed to improve both performance and sustainability. The technology could support applications ranging from renewable energy storage systems to electric vehicles. The work appears in Advanced Science under the title "High-Performance Quasi-Solid-State Calcium-Ion Batteries from Redox-Active Covalent Organic Framework Electrolytes."

As countries expand renewable energy production, the need for dependable and efficient battery storage continues to grow. Lithium-ion batteries (LIBs) currently dominate the market, but concerns remain about limited lithium resources and the practical limits of their energy density. These constraints have intensified the search for alternative battery chemistries that can meet long-term global energy demands.

Calcium-ion batteries are attracting attention because calcium is abundant and offers an electrochemical window comparable to that of LIBs. However, technical barriers have slowed progress. In particular, calcium ions can be difficult to move efficiently within a battery, and maintaining stable performance over repeated charge and discharge cycles has proven challenging. These issues have kept CIBs from competing directly with established lithium-based systems.."

Source: HKUST (13 Feb 2026)

HEALTHCARE & AI

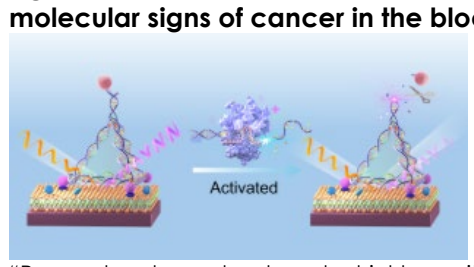
The exact speed that makes an AI prosthetic arm feel like your own

"As artificial intelligence powered prosthetic arms become more common, understanding how people respond to them will be essential. Acceptance depends not only on how well these devices function, but also on how natural they feel. In this study, researchers used virtual reality to create the illusion that a participant's own arm had been replaced with a robotic prosthetic. They then tested how different movement speeds influenced embodiment, including body ownership, sense of agency, usability, and social impressions such as competence and discomfort.

The findings showed a clear pattern. When the prosthetic arm moved too quickly or too slowly, participants felt less connected to it and rated it as less usable. However, when the arm moved at a moderate pace similar to natural human reaching, taking about one second to complete the motion, participants reported the strongest sense that the arm felt like part of their own body.."

OPTICS

Light-based sensor detects early molecular signs of cancer in the blood



"Researchers have developed a highly sensitive light-based sensor that can detect extremely low concentrations of cancer biomarkers in the blood. The new technology could one day make it possible to spot early signs of cancer and other conditions using a simple blood test.

Biomarkers such as proteins, DNA or other molecules can be used to reveal the presence, progression or risk of cancer and other diseases. However, one of the main challenges in early disease diagnosis is the extremely low concentration of biomarkers present at the onset.

"Our sensor combines nanostructures made of DNA with quantum dots and CRISPR gene editing technology to detect faint biomarker signals using a light-based approach known as second harmonic generation (SHG)," said research team leader Han Zhang from Shenzhen University in China. "If successful, this approach could help make disease treatments simpler, potentially improve survival rates and lower overall healthcare costs."."

SENSORS

Tomorrow's Smart Pills Will Deliver Drugs and Take Biopsies

"This dream of a do-it-all pill is driving a surge of research into ingestible electronics: smart capsules designed to monitor and even treat disease from inside the gastrointestinal (GI) tract. The stakes are high. GI diseases affect tens of millions of people worldwide, including such ailments as inflammatory bowel disease, celiac disease, and small intestinal bacterial overgrowth. Diagnosis often involves a frustrating maze of blood tests, imaging, and invasive endoscopy. Treatments, meanwhile, can bring serious side effects because drugs affect the whole body, not just the troubled gut.

If capsules could handle much of that work—streamlining diagnosis, delivering targeted therapies, and sparing patients repeated invasive procedures—they could transform care. Over the past 20 years, researchers have built a growing tool kit of ingestible devices, some already in clinical use. These capsule-shaped devices typically contain sensors, circuitry, a power source, and sometimes a communication module, all enclosed in a biocompatible shell. But the next leap forward is still in development: autonomous capsules that can both sense and act, releasing a drug or taking a tissue sample.

That's the challenge that our lab—the MEMS Sensors and Actuators Laboratory (MSAL) at the University of Maryland, College Park—is tackling. Drawing on decades of advances in microelectromechanical systems (MEMS), we're building swallowable devices that integrate sensors, actuators, and wireless links in packages that are small and safe enough for patients. The hurdles are considerable: power, miniaturization, biocompatibility, and reliability, to name a few. But the potential payoff will be a new era of personalized and minimally invasive medicine, delivered by something as simple as a pill you can swallow at home.."

SENSORS

Lidar Mobility Device Assists Navigation and Avoids Collisions

"At CES 2026 in Las Vegas, Singapore-based startup Strutt introduced the EV1, a powered personal mobility device that uses lidar, cameras, and onboard computing for collision avoidance. Unlike manually-steered powered wheelchairs, the EV1 assists with navigation in both indoor and outdoor environments—stopping or rerouting itself before a collision can occur.

Strutt describes its approach as "shared control," in which the user sets direction and speed, while the device intervenes to avoid unsafe motion.

"The problem isn't always disability," says Strutt cofounder and CEO Tony Hong. "Sometimes people are just tired. They have limited energy, and mobility shouldn't consume it."."

Source: TUT (13 Feb 2026)

SPINTRONICS

A simple discovery is shaking the foundations of spintronics

"One of the most striking findings in spintronics is unusual magnetoresistance (UMR). In this effect, the electrical resistance of a heavy metal changes when it is placed next to a magnetic insulator and the direction of magnetization rotates within a plane perpendicular to the flow of electric current. This behavior played a key role in shaping the concept of spin Hall magnetoresistance (SMR), which became the dominant explanation for UMR. Over time, SMR has been widely used to interpret results from many types of experiments, including magnetoresistance measurements, spin-torque ferromagnetic resonance, harmonic Hall voltage studies, magnetic field sensors, and switching of magnetization or Néel vectors.

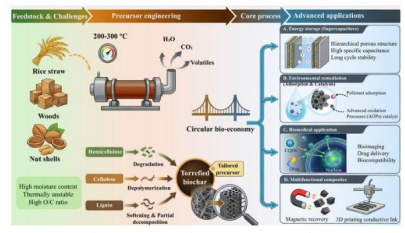
As more experiments were carried out, researchers noticed something puzzling. UMR showed up in nearly all magnetic systems, even in cases where no spin Hall material was present. The effect was also detected in systems where SMR theory clearly does not apply (e.g., those without a spin Hall effect). To address these inconsistencies, scientists proposed a growing list of alternative explanations tied to spin currents or related effects. These included Rashba-Edelstein MR, spin-orbit MR, anomalous Hall MR, orbital Hall MR, crystal-symmetry MR, orbital Rashba-Edelstein MR, and Hanle MR. Each was designed to account for the "SMR-like" signals observed in specific experimental setups.."

Source: Science China Press(10 Feb 2026)

Source: OPTICA (12 Feb 2026)

SUSTAINABILITY

Turning agricultural waste into advanced materials: Review highlights how torrefaction could power a sustainable carbon future



"Synthetic materials are widely used across science, engineering, and industry, but most are designed to perform only a narrow range of tasks. A research team at Penn State set out to change that. Led by Hongtao Sun, assistant professor of industrial and manufacturing engineering (IME), the group developed a new fabrication technique that can produce multifunctional "smart synthetic skin." These adaptable materials can be programmed to perform a wide variety of tasks, including hiding or revealing information, enabling adaptive camouflage, and supporting soft robotic systems.

Using this new approach, the researchers created a programmable smart skin made from hydrogel, a soft, water-rich material. Unlike conventional synthetic materials with fixed behaviors, this smart skin can be tuned to respond in multiple ways. Its appearance, mechanical behavior, surface texture, and ability to change shape can all be adjusted when the material is exposed to external triggers such as heat, solvents, or physical stress."

Source: Shenyang Agricultural University (18 Feb 2026)

Source: IEEE (19 Feb 2026)

SUSTAINABILITY

We're Measuring Data Center Sustainability Wrong Current metrics optimize only 30% of IT emissions

"In 2024, Google claimed that their data centers are 1.5x more energy efficient than industry average. In 2025, Microsoft committed billions to nuclear power for AI workloads. The data center industry tracks power usage effectiveness to three decimal places and optimizes water usage intensity with machine precision. We report direct emissions and energy emissions with religious fervor.

These are laudable advances, but these metrics account for only 30 percent of total emissions from the IT sector. The majority of the emissions are not directly from data centers or the energy they use, but from the end-user devices that actually access the data centers, emissions due to manufacturing the hardware, and software inefficiencies. We are frantically optimizing less than a third of the IT sector's environmental impact, while the bulk of the problem goes unmeasured.

Incomplete regulatory frameworks are part of the problem. In Europe, the Corporate Sustainability Reporting Directive (CSRD) now requires 11,700 companies to report emissions using these incomplete frameworks. The next phase of the directive, covering 40,000+ additional companies, was originally scheduled for 2026 (but is likely delayed to 2028). In the United States, the standards body responsible for IT sustainability metrics (ISO/IEC JTC 1/SC 39) is conducting active revision of its standards through 2026, with a key plenary meeting in May 2026.

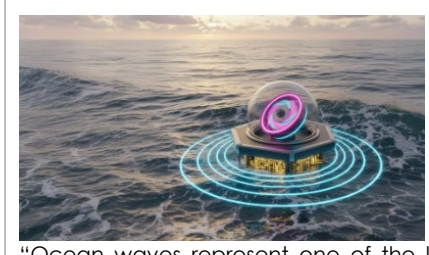
The time to act is now. If we don't fix the measurement frameworks, we risk locking in incomplete data collection and optimizing a fraction of what matters for the next 5 to 10 years, before the next major standards revision.."

Source: IEEE (17 Feb 2026)

Source: IEEE (17 Feb 2026)

SUSTAINABILITY

A spinning gyroscope could finally unlock ocean wave energy



"Ocean waves represent one of the largest and most consistent sources of renewable energy on Earth. Despite their promise, converting wave motion into usable electricity has proven difficult. Most existing wave energy devices perform well only under specific wave conditions, limiting their effectiveness in the constantly shifting environment of the open sea. This challenge has driven researchers to search for more adaptable and efficient technologies.

A researcher at The University of Osaka has taken a close look at a new approach known as a gyroscopic wave energy converter (GWEC). The study evaluated whether this design could realistically support large scale electricity generation. The results were published this month in the Journal of Fluid Mechanics.."

Source: University of Osaka (18 Feb 2026)

To view past Weekly Alerts CLICK HERE
For more articles or in-depth research, contact us at library@sutd.edu.sg