SINGAPORE UNIVERSITY OF TECHNOLOGY AND DESIGN

Weekly Discovery

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26 Jan - 30 Jan 2026

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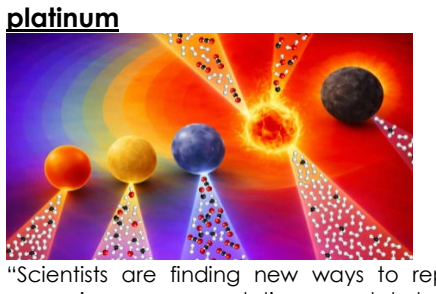
AI

New catalyst makes plastic upcycling 10x more efficient than platinum



"Scientists are finding new ways to replace expensive, scarce platinum catalysts with something far more abundant: tungsten carbide. By carefully controlling how tungsten carbide's atoms are arranged at extremely high temperatures, researchers discovered a specific form that can rival platinum in key chemical reactions, including turning carbon dioxide into useful fuels and chemicals. Even more promising, the same material proved dramatically better at breaking down plastic waste, outperforming platinum by more than tenfold."

Source: University of Rochester (24 Jan 2026)

AI

Researchers tested AI against 100,000 humans on creativity

"A massive new study comparing more than 100,000 people with today's most advanced AI systems delivers a surprising result: generative AI can now beat the average human on certain creativity tests. Models like GPT-4 showed strong performance on tasks designed to measure original thinking and idea generation, sometimes outperforming typical human responses. But there's a clear ceiling. The most creative humans — especially the top 10% — still leave AI well behind, particularly on richer creative work like poetry and storytelling."

Source: University of Montreal (25 Jan 2026)

AIRCRAFT

Vertical Aerospace debuts "electric flying taxi" in New York

"British tech company Vertical Aerospace has debuted its electric flying aircraft in New York City, which is designed to transport customers short distances around a city "in near silence, with zero emissions".

On 22 January, Vertical Aerospace showcased its electric "taxi" powered by a large, grey rechargeable battery that bolts to the belly of the aircraft and "slides off", according to Vertical Aerospace CEO Stuart Simpson.

The Valo aircraft reportedly reaches speeds of 150 miles per hour and will cost as much as an Uber Black to book and, according to the company, may be rolled out in cities as early as 2029.

The company sees the aircraft as a "mass transportation solution", spurred by experiences of gridlock around airports. It worked with transport design studio Of My Imagination on the aircraft's visible elements, as well as the spatial layout and passenger experience.

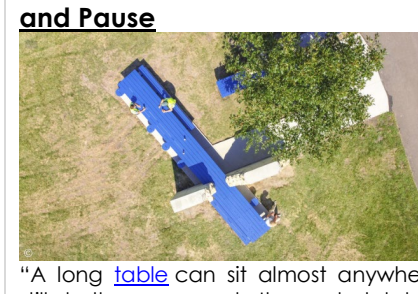
"We designed this to be mass transport," said Simpson. "Together, we have created an aircraft that can fly 100 miles and 150 miles an hour in near silence, with zero emissions."

The company intends to transport customers to and from airports, similar to a limousine service."

Source: Dezeen (23 Jan 2026)

ARCHITECTURE

The Long Table as a Spatial Protocol: Designing Conditions for Gathering and Pause



"A long table can sit almost anywhere and still do the same work. It can stretch beneath a market canopy, run along a school dining hall, or occupy the center of a shared living room, and it immediately changes the room's temperature.

That is why the long table is less an object than a spatial instrument. It does not guarantee a connection, and it rarely looks "inclusive" by default. Instead, it sets conditions: a shared edge, a common rhythm of arrival, a field of mutual visibility, or a rule that turns eating into a scene with others. Food studies describe this practice as commensality, the act of eating together and the social order it can create, reinforce, or contest. But what matters here is not a specific dimension or the table's function, but the way a long surface holds difference, conversation, and silence; intimacy and distance; the decision to join and the right to hesitate."

Source: Archdaily (28 Jan 2026)

ARCHITECTURE

From the Courtyard to the Neighborhood: Latin American Lessons on Collective Placemaking

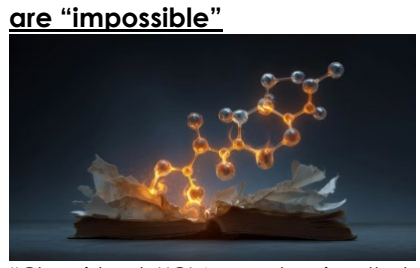
"In Latin America, encounters do not necessarily arise from grand architectural gestures or monumental urban plans. They emerge from the *in-between*, from intermediate spaces: the courtyard, the veranda, the sidewalk, the shared corridor. These areas, often considered residual or informal by the traditional architectural discipline, are precisely where everyday life builds bonds.

From this Latin American culture comes a spatial logic in which daily life is organized in a relational and expansive way. Practices such as sitting at the front door, occupying the sidewalk, and playing in the street produce a lived city that extends beyond the formal limits of design."

Source: Archdaily (26 Jan 2026)

CHEMISTRY

Scientists just overturned a 100-year-old rule of chemistry, and the results are "impossible"



"Chemists at UCLA are showing that some of organic chemistry's most famous "rules" aren't as unbreakable as once thought. By creating bizarre, cage-shaped molecules with warped double bonds—structures long considered impossible—the team is opening the door to entirely new kinds of chemistry.

Organic chemistry relies on long established rules that describe how atoms connect, how chemical bonds form, and how molecules take shape. These principles guide how scientists understand reactions and predict molecular behavior. While many of these rules are treated as fixed truths, researchers at UCLA are showing that chemistry has more flexibility than once believed.

In 2024, a research group led by UCLA chemist Neil Garg overturned Bredt's rule, a principle that had stood for more than a century. The rule states that molecules cannot form a carbon-carbon double bond at the "bridgehead" position (the ring junction of a bridged bicyclic molecule). Building on that breakthrough, Garg's team has now developed methods to create even stranger structures: cage-shaped molecules known as cubene and quadricyclene that contain highly unusual double bonds.."

Source: UCLA (23 Jan 2026)

CYBERSECURITY

Great Refactor Initiative Looks to AI to Harden Critical Code

"Many of the world's critical IT systems remain riddled with bugs, and AI tools threaten to make it easier than ever to exploit them. But AI could also be part of the solution: A new initiative aims to automatically convert vulnerable code into the security-focused language Rust, which would eliminate the vast majority of known software vulnerabilities.

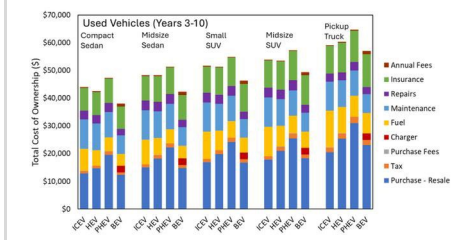
Rapid advances in AI coding tools have made it easier than ever to tackle software-engineering tasks that were previously too expensive or time-consuming to take on. The Institute for Progress think tank launched the Great Refactor initiative to use those tools in order to convert open source software written in C and C++ into Rust. Unlike the former languages, Rust is designed to prevent a dangerous class of bugs known as memory exploits.

Memory safety issues occur when software accesses or manipulates memory in an unintended way. These bugs are prevalent in older languages that provide developers with manual control over memory handling. Most newer languages incorporate guardrails to prevent these kinds of problems, but this typically comes at the cost of lower performance. As a result, memory-unsafe languages like C and C++ are still widely used, and memory-safety exploits still account for an estimated 70 percent of software vulnerabilities."

Source: IEEE Spectrum (29 Jan 2026)

ELECTRIC VEHICLES

Used EVs currently offer car buyers lowest lifetime cost of ownership



"Now is a great time for anyone who's shopping for a used car to consider an electric vehicle, according to new research from the University of Michigan.

In assessing the lifetime ownership costs of used vehicles with different body styles and powertrains, the researchers found that completely electrified candidates offered the greatest savings.

For example, compared with a new midsized SUV with an internal combustion engine, a 3-year-old used EV version offered a lifetime savings of $13,000, according to the new study published in Environmental Research Letters. Meanwhile, compared with that same new vehicle, a used internal combustion engine vehicle, or ICEV, would offer a lifetime savings of only $3,000.

"Transportation is the second-largest portion of the average household's budget and, in the new vehicle market, EVs are usually more expensive," said Maxwell Woody, the lead author of the study. Woody is a research assistant at the U-M Center for Sustainable Systems, or CSS, and the School for Environment and Sustainability, or SEAS. "But 70% of all vehicle purchases are used, and used EVs have the lowest cost of ownership across vehicle classes."

Source: Eurekalert! (27 Jan 2026)

ELECTRONICS

Scientists twist tiny crystals to control electricity

MED TECH

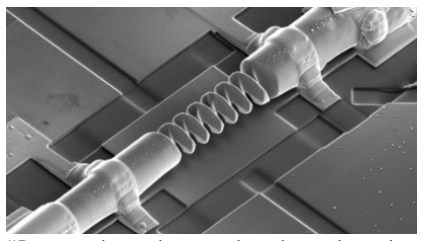
Implant provides lasting relief for treatment-resistant depression

ROBOTICS

Deep-sea robots will search for source of mysterious 'dark oxygen'

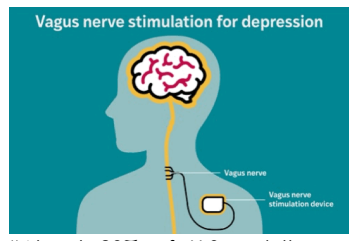
SUSTAINABILITY

This new building material pulls carbon out of the air



"Researchers have developed a technique that allows them to carve complex three dimensional nanodevices directly from single crystals. To demonstrate its power, they sculpted microscopic helices from a magnetic material and found that the structures behave like switchable diodes. Electric current prefers one direction, but the effect can be flipped by changing the magnetization or the twist of the helix. The findings show that geometry itself can be used as a tool for electronic design."

Source: RIKEN (25 Jan 2025)



"About 20% of U.S. adults experience major depression in their lifetime. For most people, symptoms improve within a few treatment attempts, but up to one-third of patients have treatment-resistant depression, for which standard antidepressant medication or psychotherapy isn't enough. Now, a study shows that a small, implanted device may provide substantial, long-lasting relief to people with the most severe treatment-resistant depression.

Researchers at Washington University School of Medicine in St. Louis supervised the large, multicenter clinical trial and found that the device, which stimulates the vagus nerve, produced improvements in depressive symptoms, quality of life and other measures, such as function, that were sustained for at least two years in the vast majority of patients who reported benefits after one year. On average, each patient had already tried 13 treatments that failed to help them, including interventions such as electroconvulsive therapy and transcranial magnetic stimulation, and had experienced depression for 29 years.

These new findings, reported from the ongoing RECOVER trial, were published Jan. 13 in the International Journal of Neuropsychopharmacology."

Source: Washington (13 Jan 2026)

"Researchers have unveiled plans to investigate the mysterious production of 'dark oxygen' on the sea floor — large amounts of the gas that seem to be coming from a region too deep for sunlight to power photosynthesis.

The discovery of the oxygen 4,000 metres below the surface of the Pacific Ocean was first published in 2024 in *Nature Geoscience*1. The team behind it is embarking on a fresh series of studies to verify their findings and establish what could be causing the phenomenon.

At a press conference in London last week, the researchers unveiled a suite of instruments specifically designed to look at oxygen production, either on the sea floor or in laboratory experiments that reproduce deep-sea conditions, including 400 atmospheres of pressure. The Nippon Foundation, a Tokyo-based charity, is funding the follow-up studies with a grant of US$5.2 million.

By May, project scientists will travel to the Clarion–Clipperton Zone — the region between Hawaii and Mexico where the original discovery was made — aboard the research vessel *Nautilus*. Speaking at the event, team leader Andrew Sweetman, a sea-floor ecologist at the Scottish Association for Marine Science in Oban, UK, described two probes — each with different capabilities — designed to land on the sea floor to take measurements and samples."

Source: Nature (28 Jan 2026)

"A new building material developed by engineers at Worcester Polytechnic Institute could change how the world builds. Made using an enzyme that turns carbon dioxide into solid minerals, the material cures in hours and locks away carbon instead of releasing it. It's strong, repairable, recyclable, and far cleaner than concrete. If adopted widely, it could slash emissions across the construction industry."

Source: Worcester Polytechnic Institute (21 Jan 2026)

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