# Weekly Discovery
## We SHARE to inspire and ignite ideas!

8 Sep - 12 Sep 2025

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AI
### NUS Co-Leads Push to Build First Global Medical AI Foundation Model

"A global research consortium of over 100 study groups in more than 65 countries has launched the Global RETFound initiative, a collaborative effort to develop the first globally representative Artificial Intelligence (AI) foundation model in medicine, using 100 million eye images.

As described in Nature Medicine, the initiative is one of the largest medical AI collaborations ever undertaken, producing one of the most geographically and ethnically diverse medical datasets assembled for AI training purposes. The data will span Africa, the Middle East, South America, Southeast Asia, the Western Pacific, and the Caucasus region.

Led by researchers from the National University of Singapore Yong Loo Lin School of Medicine (NUS Medicine), Moorfields NHS Foundation Trust, University College London (UCL), and the Chinese University of Hong Kong (CUHK), the consortium will develop its model using an unprecedented dataset of over 100 million color fundus photographs (photos of the back of the eye), sourced from more than 65 countries. The global initiative builds on the success of RETFound, the first foundation model for retinal and systemic disease detection. Published in Nature in 2023, RETFound was originally developed by researchers at Moorfields Eye Hospital and UCL Institute of Ophthalmology in London. The proof-of-concept study involved a smaller scale of 1.6 million fundus photographs curated by the INSIGHT Health Data Research Hub at Moorfields."

Source: Eurekalert! (8 Sep 2025)

AI
### Can Researchers Stop AI Making Up Citations?

"Artificial intelligence (AI) models are known to confidently conjure up fake citations. When the company OpenAI released GPT-5, a suite of large language models (LLMs), last month, it said it had reduced the frequency of fake citations and other kinds of 'hallucination', as well as 'deceptions', whereby an AI claims to have performed a task it hasn't.

With GPT-5, OpenAI, based in San Francisco, California, is bucking an industry-wide trend, because newer AI models designed to mimic human reasoning tend to generate more hallucinations than do their predecessors. On a benchmark that tests a model's ability to produce citation-based responses, GPT-5 beat its predecessors. But hallucinations remain inevitable, because of how LLMs function.

"For most cases of hallucination, the rate has dropped to a level" that seems to be "acceptable to users", says Tianyang Xu, an AI researcher at Purdue University in West Lafayette, Indiana. But in particularly technical fields, such as law and mathematics, GPT-5 is still likely to struggle, she says. And despite the improvements in hallucination rate, users quickly found that the model errs in basic tasks, such as creating an illustrated timeline of US presidents.

OpenAI is making "small steps that are good, but I don't think we're anywhere near where we need to be", says Mark Steyvers, a cognitive science and AI researcher at the University of California, Irvine. "It's not frequent enough that GPT says 'I don't know'.""
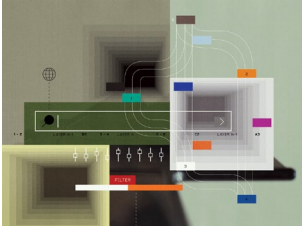
Source: Nature (8 Sep 2025)
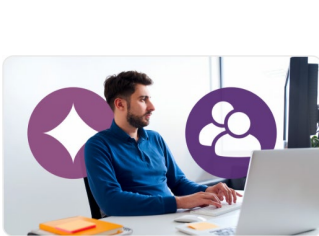
AI
### Digital Advertisers Will Soon Vie for AI Agents' Attention: Autonomous Agents on the Web Could Reorder the Online Economy

"The modern Internet is, for better or for worse, built on advertising. But the advent of autonomous AI agents that can search for information and execute tasks on behalf of users could soon upend this business model and transform the Web, say researchers.

Most of the platforms people rely on to find information online, including search engines and social media sites, make the bulk of their money from advertising, says Jun Wang, a professor of computer science at University College London. By harvesting data on user's browsing habits and interests they offer marketers the ability to precisely target individuals with personalized content, which has seen these websites corner a growing proportion of advertising spending.

But rapidly improving AI chatbots are quickly becoming people's go-to way to find information on the Web, says Wang. And the trend is only likely to accelerate as tech companies roll out AI agents, which can interface with external tools and APIs to autonomously carry out more complex online tasks for users, such as doing in-depth research or making purchases. This has led to predictions that we may soon see the emergence of an "agentic Web" where the primary users of the Internet become AI bots rather than humans."

Source: IEEE Spectrum (9 Sep 2025)

AI
### Light-powered chip makes AI 100 times more efficient
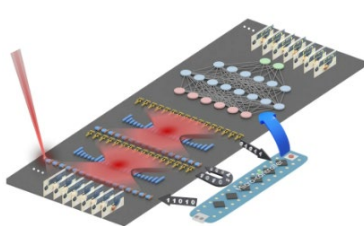
"Artificial intelligence is consuming enormous amounts of energy, but researchers at the University of Florida have built a chip that could change everything by using light instead of electricity for a core AI function. By etching microscopic lenses directly onto silicon, they've enabled laser-powered computations that cut power use dramatically while maintaining near-perfect accuracy."

Source: SPIE (9 Sep 2025)

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ARCHITECTURE
### Nine Architectural Installations at Burning Man 2025

"Massive pyramids, slides and a temple resembling a giant, fragmented stone have been captured at this year's Burning Man event in Nevada, USA, by photographer Gurpreet Chawla.

Tens of thousands of visitors made camp in the Nevada desert, creating the temporary Black Rock City for a week earlier this month.

Volunteers, artists, and designers came together to create massive works to be enjoyed alongside the music, cultural activities, and other offerings of the festival, which is known for its DIY ethos and extravagant displays.

Every year, a massive temple and a pavilion for the eponymous man effigy are set up in the desert and designed by someone chosen by the Burning Man organisation.

These two massive pieces are always set on fire near the end of the event, and are both included in the assortment of installations below.

Read on for nine striking installations from this year's event..."

Source: Dezeen (9 Sep 2025)

ARCHITECTURE
### The Architect as Writer: Expanding the Discipline Beyond Buildings

"Architecture has always been more than bricks and mortar. It is equally constructed through words, ideas, and narratives. From ancient treatises to radical manifestos, from technical manuals to poetic essays, the written word has served as a spatial, pedagogical, and political tool within the field. Writing shapes how architecture is conceptualized, communicated, and critiqued — often long before, or even in the absence of, physical construction.

Historically, figures such as Vitruvius, Alberti, and Palladio employed writing to codify principles, project ideals, and legitimize architecture as a discipline. In the modern era, Le Corbusier, Adolf Loos, and Lina Bo Bardi wrote prolifically to expand the scope of architecture beyond form and function, often using publications as tools for persuasion and experimentation. The postwar period gave rise to new editorial strategies, as evident in the manifestos of Archizoom and Superstudio, and the polemical publications of Delirious New York and Oppositions, where writing served as both critique and project.

Today, architectural writing is published across a range of platforms, engaging voices from editors, theorists, practitioners, and students. In this way, writing continues to operate as a core architectural practice, not as a supplement to building, but as a means of constructing the discipline itself. In an increasingly interdisciplinary field, where architecture is often practiced beyond the construction site, writing offers a space of projection, critique, and invention, a way of imagining, organizing, and ultimately shaping the built and unbuilt world."

Source: Archdaily (4 Sep 2025)

CARBON
### 3D-Printed Boron-Nitrogen Doped Carbon Electrodes for Sustainable Wastewater Treatment Via MPECVD
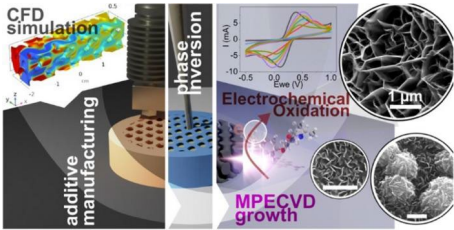
"As global concerns over emerging contaminants (such as pharmaceuticals) in wastewater grow, traditional treatment methods like ozone oxidation and activated carbon adsorption face limitations—from high energy consumption to reliance on critical raw materials. Now, a collaborative team of researchers from Gdansk University of Technology (Poland), Università Politecnica delle Marche (Italy), and Lund University (Sweden) has developed a game-changing solution: 3D-printed boron-nitrogen (B,N)-doped carbon electrodes fabricated via a synergistic combination of 3D printing, phase inversion, and microwave plasma-enhanced chemical vapor deposition (MPECVD). Published in Nano-Micro Letters, this technology delivers unprecedented performance in electrochemical oxidation (EO) of persistent pollutants, offering a scalable, metal-free path to sustainable water treatment."

Source: Eurekalert! (8 Sep 2025)

CARBON EMMISSIONS
### The Flawed Carbon Math That Lets Major Polluters Off the Hook
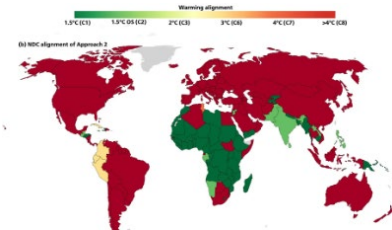
"Past climate assessments let big polluters delay action, placing more burden on smaller nations. A new method based on historical responsibility demands steep cuts from wealthy countries and more financial support for poorer ones. Courts are now stepping in, making climate justice not just political but also legal."

Source: Nature (3 Sep 2025)

## NANOPLASTICS

### Optical Sieve for Nanoplastic Detection, Sizing and Counting


Fig. 1: Nanoplastic detection using the optical sieve.
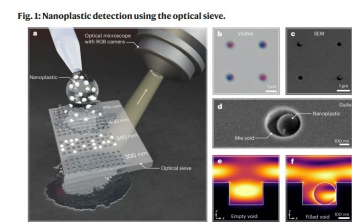
"Micro- and nanoplastic particles are ubiquitous environmental pollutants, threatening human health, aquatic and soil ecosystems. These minute synthetic fragments, persisting for centuries, infiltrate the food chain, posing potential health risks through bioaccumulation in various tissues, toxicity and exposure to associated chemicals. Although macro- and microplastics are intensively examined in environmental and biological research, information on nanoplastics with diameters below 1 µm is limited. Such particles can cross biological borders, including the blood–brain barrier, posing a greater health risk than microplastics. Apart from the mere detection of such particles, gaining an understanding of size distribution, numbers and size limits will be crucial in assessing their impact on global ecosystems and human health. Here we establish an optical sieve that uses Mie void resonances for nanoplastic detection and sizing. The optical sieve consists of arrays of optically resonant voids with different diameters that simultaneously serve as filtering and sorting elements, as well as all-optical reporters, requiring only an optical microscope and a standard camera with an RGB sensor in combination with colorimetric analysis. The system is evaluated using a synthesized real-world sample with a plastic particle mass concentration of 150 µg ml−1. Our approach consequently delivers statistical information on numbers, size and size distribution via the observation of distinct colour changes, overcoming the need for advanced techniques such as scanning electron microscopy. The proposed method offers a straightforward, highly accessible and mobile solution, making it an efficient and easily implemented tool for environmental and biological research."

Source: Nature (8 Sep 2025)

## QUANTUM COMPUTERS

### Building Blocks and Quantum Computers: New Research Leans on Modularity


Fig. 2: Fast sideband between qubit and high-Q detachable bus.
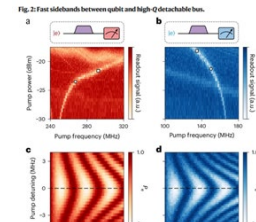
"What do children's building blocks and quantum computing have in common? The answer is modularity. It is difficult for scientists to build quantum computers monolithically – that is, as a single large unit. Quantum computing relies on the manipulation of millions of information units called qubits, but these qubits are difficult to assemble. The solution? Finding modular ways to construct quantum computers. Like plastic children's bricks that lock together to create larger, more intricate structures, scientists can build smaller, higher quality modules and string them together to form a comprehensive system.

Recognizing the potential of these modular systems, researchers from The Grainger College of Engineering at the University of Illinois Urbana-Champaign have presented an enhanced approach to scalable quantum computing by demonstrating a viable and high-performance modular architecture for superconducting quantum processors. Their work, published in Nature Electronics, expands on previous modular designs and paves the way toward scalable, fault-tolerant and reconfigurable quantum computing systems."

Source: illinois (18 Jul 2025)

## QUANTUM NEEDLES

### Growing A New, Pencil-Shaped Structure of Gold Named "Quantum Needles"
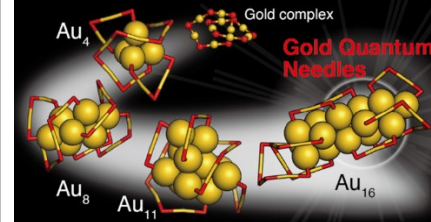


"Potential applications span from biomedical imaging to light energy conversion

Researchers Shinjiro Takano, Yuya Hamasaki, and Tatsuya Tsukuda of the University of Tokyo have successfully visualized the geometric structure of growing gold nanoclusters in their earliest stages. During this process, they also successfully "grew" a novel structure of elongated nanoclusters, which they named "gold quantum needles." Thanks to their responsiveness to light in the near-infrared range, these "needles" could enable much higher-resolution biomedical imaging and more efficient light-energy conversion. The findings were published in the Journal of the American Chemical Society."

Source: UTokyo (5 Sep 2025)

## SOLAR

### These Clear Windows Can Secretly Produce Solar Power
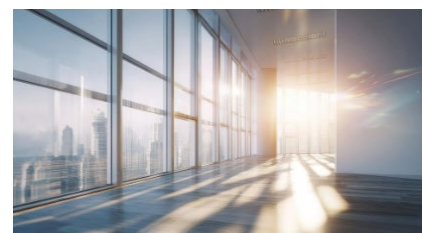


"Scientists have created a transparent solar coating that turns ordinary windows into clean energy generators without affecting clarity. Using cholesteric liquid crystal layers, the coating redirects polarized sunlight to the window edges where solar cells collect it. A small prototype already powered a fan, and full-sized windows could boost efficiency 50-fold while cutting the need for costly photovoltaic cells."

Source: Chinese Society for Optical Engineering (5 Sep 2025)