

# Weekly Discovery

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AI

12 May - 16 May 2025

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#### **3D PRINTING**

**Researchers Demonstrate 3-D Printing** Technology to Improve Comfort, **Durability of 'Smart Wearables'** 



"Imagine a T-shirt that could monitor your heart rate or blood pressure. Or a pair of socks that could provide feedback on your running stride.

It may be closer than you think, with new research from Washington State University demonstrating a particular 3-D ink printing method for so-called smart fabrics that continue to perform well after repeated washings and abrasion tests. The research, published in the journal ACS Omega, represents a breakthrough in smart fabric comfort and durability, as well as using a process that is more environmentally friendly.

Hang Liu, a textile researcher at WSU and the corresponding author of the paper, said that the bulk of research in the field so far has focused on building technological functions into fabrics, without attention to the way fabrics might feel, fit, and endure through regular use and maintenance, such as washing.

"The materials used, or the technology used, generally produce very rigid or stiff fabrics," said Liu, an associate professor in the Department of Apparel, Merchandising, Design and Textiles. "If you are wearing a T-shirt with 3-D printed material, for example, for sensing purposes, you want this shirt to fit snugly on your body, and be flexible and soft. If it is stiff, it will not be comfortable and the sensing performance will be compromised."

Initial methods of developing smart wearables involved gluing, weaving or sewing functional components such as conductive threads or sensors into fabrics. Newer approaches involving printing have shown promise, but have still faced problems with comfort and maintenance.'

'AI Models Are Capable of Novel **Research': OpenAl's Chief Scientist on** What to Expect



"OpenAl is best known for ChatGPT — the freeto-use, large language model-based chatbot that became a household name after its debut in 2022. The firm, in San Francisco, California, has since released a string of cutting-edge artificial intelligence (AI) tools, including 'reasoning' models that use step-by-step 'thought' processes to specialize in logical tasks.

These tools have helped researchers to polish prose, write code, review the literature and even generate hypotheses. But, like other technology rivals, OpenAI has faced criticisms over the energy demands of its models and the way in which data are exploited for model training. And unlike some firms, OpenAI has almost exclusively released proprietary models that researchers can use, but can't build on.

Jakub Pachocki has been the firm's chief scientist since 2024. He joined OpenAI in 2017 from academia, where he was a theoretical and competitive computer scientist programmer. Now, he leads the development of the company's most advanced AI systems, which are designed to tackle complex tasks in science, mathematics and coding.

Nature spoke to Pachocki about whether AI can generate original science, artificial general intelligence (AGI) and the firm's upcoming open-weight model."

**Prominent Chatbots Routinely Exaggerate Science Findings, Study** Shows



When summarizing scientific studies, large language models (LLMs) like ChatGPT and DeepSeek produce inaccurate conclusions in up to 73% of cases, according to a new study by Uwe Peters (Utrecht University) and Benjamin Chin-Yee (Western University, Canada/University of Cambridge, UK). The researchers tested the most prominent LLMs and analyzed thousands of chatbotgenerated science summaries, revealing that most models consistently produced broader conclusions than those in the summarized texts. Surprisingly, prompts for accuracy increased the problem and newer LLMs performed worse than older ones.

The study evaluated how accurately ten leading LLMs, including ChatGPT, DeepSeek, Claude, and LLaMA, summarize abstracts and full-length articles from top science and medical journals (e.g., Nature, Science, and Lancet). Testing LLMs over one year, the researchers collected 4,900 LLM-generated summaries. Six of ten models systematically exaggerated claims found in the original texts often in subtle but impactful ways, for instance, changing cautious, past-tense claims like "The treatment was effective in this study" to a more sweeping, present-tense version like "The treatment is effective." These changes can mislead readers into believing that findings apply much more broadly than they actually do.

Strikingly, when the models where explicitly prompted to avoid inaccuracies, they were nearly twice as likely to produce overgeneralized conclusions than when given a simple summary request. "This effect is Peters said: concerning," "Students, researchers, and policymakers may assume that if they ask ChatGPT to avoid inaccuracies, they'll get a more reliable summary. Our findings prove the opposite."

Source: Eurekalert! (13 May 2025)

**Featured Course** 

AR

ChatGPT: Crafting Exceptional **GPTs for Enhanced Productivity** and Innovation 2h 48m **Click Here to Start Learning** 

> The Quest to Ensure Nonspeaking **Autistic People Are Heard: The** Holoboard Augmented-Reality System Lets People Type Independently



"Jeremy is a 31-year-old autistic man who loves music and biking. He's highly sensitive to lights, sounds, and textures, has difficulty initiating movement, and can say only a few words. Throughout his schooling, it was assumed he was incapable of learning to read and write. But for the past 30 minutes, he's been wearing an augmented-reality (AR) headset and spelling single words on the HoloBoard, a virtual keyboard that hovers in the air in front of him. And now, at the end of a study session, a researcher asks Jeremy (not his real name) what he thought of the experience.

Deliberately, poking one virtual letter at a time, he types, "That was good."

It was not obvious that Jeremy would be able to wear an AR headset, let alone use it to communicate. The headset we use, Microsoft's HoloLens 2, weighs 566 grams (more than a pound), and the straps that encircle the head can be uncomfortable. Interacting with virtual objects requires precise hand and finger movements. What's more, some people doubt that people like Jeremy can even understand a question or produce a response. And yet, in study after study, we have found that most nonspeaking autistic teenage and adult participants can wear the HoloLens 2, and most can type short words on the HoloBoard."

#### ARCHITECTURE **Olfactory Design: Spaces That** Awaken Memories



"With each of the more than 23,000 breaths we take per day, air travels through the respiratory system into the lungs, where vital gas exchange occurs: oxygen is absorbed, and carbon dioxide is expelled. This involuntary and essential act also triggers another, less visible but deeply impactful process-our perception of smell. As air passes through the nasal cavity, odor molecules come into contact with olfactory receptors located in the olfactory epithelium. These receptors send signals directly to the olfactory bulb, which is part of the limbic system-the area of the brain linked to memory and emotion. Far from being a secondary sense, smell acts as a direct bridge between the environment and our deepest emotional responses. Scents carry a unique power to evoke vivid memories. elicit comfort or immediate aversion, and influence our emotional state almost instantaneously.

This ability of scents to shape spaces, atmospheres, and memories is the foundation of what is known as olfactory design. The primary goal is to provoke emotional responses in physical environments—a sensory strategy gaining traction in architecture, retail, hospitality, and even institutional settings. It goes beyond simply adding fragrance to a space; it involves the intentional selection of scents that alian with a place's identity, elicit desired sensations in users, and often reinforce a brand's message or a project's purpose."

#### DESIGN

"The Touchscreen Has Been Mindlessly Applied to The Automobile" says **Norman Foster** 

Source: Nature (12 May 2025)



"The proliferation of touchscreens in cars is "dangerous" and designers will shift back to analogue switches, British architect Norman Foster tells Dezeen in this interview.

The Foster + Partners founder was speaking at the launch of a shimmering transportation hub at the Venice Architecture Biennale.

"The touchscreen – literally, ergonomically – has become almost a reflex." he said

"It's become a way of being, in terms of the screen that I'm holding in my hand like everybody else, and it's been, almost mindlessly, applied to the automobile."

As part of car brand Porsche's traveling art and design initiative Art of Dreams, Foster - together with the Norman Foster Foundation and the Porsche team - has designed a transportation hub that "serves as an exploration into future mobility in Venice and beyond".

According to the team, they sought to explore aspects of mobility - from individual vehicles to infrastructure.

Speaking on a panel on Thursday with Porsche's Michael Mauer, chaired by Deyan Sudjic, Foster predicted that "cars will revert to the analogue switch".

#### Screens in cars "not intuitive"

"I'm not saying that the touchscreen doesn't have its application in terms of automobiles," he explained in a follow-up interview with Dezeen.

"But if you're driving in an analogue car you can have your attention on the road, your hand can

#### ENVIRONMENT

**Mcgill Researchers Develop Practical New Tool for Detecting Nanoplastics** and Microplastics in the Environment



"A team of McGill University researchers has developed a cost-effective, high-throughput technology for detecting nanoplastics and microplastics in the environment.

These particles are pervasive, posing health and environmental risks, yet detecting them at the nanoscale has been difficult. The 3Dprinted HoLDI-MS test platform overcomes the limitations of traditional mass spectrometry by enabling direct analysis of samples without requiring complex sample preparation. The researchers say it also will work for detection of waterborne plastic particles. HoLDI-MS stands for hollow-laser desorption/ionization mass spectrometry.

'With HoLDI, we provide a method that is effective, quantitative, highly accurate and affordable, making it accessible to researchers worldwide," said Chemistry Professor Parisa Ariya, who led the study published last month in Nature's Communications Chemistry. "It requires little energy, is recyclable and costs only a few dollars per sample."

The new method will also advance international co-operation in fighting plastic pollution, in alignment with calls by the United Nations Environment Programme to improve methods, the researchers say.

"Until now, there have been no established universal protocols for nanoplastic detection within the complex environment," Ariya said.

"This technology allows us to pinpoint the major sources of nano and microplastics in the environment," she said. "More importantly, it

#### MATERIALS

**Researchers Develop Living Material** from Fungi



"Empa researchers from the Cellulose and Wood Materials laboratory have now developed a bio-based material that cleverly avoids this compromise. Not only is it completely biodegradable, it is also tearresistant and has versatile functional properties. All this with minimal processing steps and without chemicals – you can even eat it. Its secret: It's alive.

As the basis for their novel material, the researchers used the mycelium of the split-aill mushroom, a widespread edible fungus that grows on dead wood. Mycelia are root-like filamentous fungal structures that are already being actively researched as potential sources of materials. Normally, the mycelial fibers - known as hyphae - are cleaned and, if necessary, chemically processed, which brings about the above-mentioned trade-off between performance and sustainability.

The Empa researchers chose a different approach. Instead of treating the mycelium, they use it as a whole. As it grows, the fungus not only forms hyphae, but also a so-called extracellular matrix: a network of various fiberlike macromolecules, proteins and other biological substances that the living cells secrete. "The fungus uses this extracellular matrix to give itself structure and other functional properties. Why shouldn't we do the same?" explains Empa researcher Ashutosh Sinha. "Nature has already developed an optimized system," adds Gustav Nyström, head of the Cellulose and Wood Materials lab.'

Minerals			Communications Network
Minerals With roots in fundamental research conducted at Princeton, a new startup is upending decades-old approaches for the way the world extracts lithium and other materials, including nitrate and potash. The company, Princeton Critical Minerals (formerly PureLi), which emerged from the University's ecosystem for innovation and entrepreneurship, has developed a technology for boosting minerals production from evaporation ponds. These ponds currently generate around 40% of the world's lithium and most of its naturally occurring nitrate. The technology is a black disc with a special anti-fouling coating, and it floats on the ponds' surface like a Ily pad. It effectively doubles the amount of incoming sunlight converted to thermal energy, accelerating the evaporation prod, the solar energy is dissipated across the entire pond — the process is less than 50% efficient." soid Ren, who is also a co-founder and chief scientist at PCM. "Our technology is over 96% efficient at converting that incoming sunlight into thermal energy to speed up evaporation in a real-world environment."	<ul> <li>The United States population is older than it has ever been. Today, the country's median age is 38.9, which is nearly a decade older than it was in 1980. And the number of adults older than 65 is expected to balloon from 58 million to 82 million by 2050. The challenge of caring for the elderly, amid shortages in care workers, rising health care costs, and evolving family structures, is an increasingly urgent societal issue.</li> <li>To help address the eldercare challenge, a team of MIT engineers is looking to robotics. They have built and tested the Elderly Bodily Assistance Robot, or E-BAR, a mobile robot designed to physically support the elderly and prevent them from falling as they move around their homes.</li> <li>E-BAR acts as a set of robotic handlebars that follows a person from behind. A user can walk independently or lean on the robot's arms for support. The robot can support the person's full weight, lifting them from sitting to standing and vice versa along a natural trajectory. And the arms of the robot can catch them by rapidly inflating side airbags if they begin to fall.</li> <li>With their design, the researchers hope to prevent falls, which today are the leading cause of injury in adults who are 65 and older."</li> </ul>	<ul> <li>"MIT engineers are getting in on the robotic ping pong game with a powerful, lightweight design that returns shots with high-speed precision.</li> <li>The new table tennis bot comprises a multijointed robotic arm that is fixed to one end of a ping pong paddle. Aided by several high-speed cameras and a high-bandwidth predictive control system, the robot quickly estimates the speed and trajectory of an incoming ball and executes one of several swing types — loop, drive, or chop — to precisely hit the ball to a desired location on the table with various types of spin.</li> <li>In tests, the engineers threw 150 balls at the poot, one after the other, from across the ping pong table. The bot successfully returned the balls with a hit rate of about 88 percent across all three swing types. The robot's strike speed approaches the top return speeds of human players and is faster than that of other robotic table tennis designs."</li> </ul>	Communications Network For the second secon
			a reality."
Source: Princeton (9 May 2025)	Source: <u>MII</u> (13 May 2025)	Source: <u>MII</u> (8 May 2025)	Source: <u>Rochester</u> (6 May 2025)

move, and you can unconsciously touch a enables data comparison and validation

pollution."

ROBOTS

**Speed Precision** 

ROBOTS

continued.

eyes off the road.""

MINERALS Princeton Startup Tackles Soaring Demand for Lithium and Other Critical Stand, And Catches Them If They Fall

Source: Archdaily (13 May 2025)

# Eldercare Robot Helps People Sit and

Source: Dezeen (12 May 2025)

switch – and that's been taken for granted," he

"Then the screen comes along, but the screen doesn't have that manual immediacy, doesn't have that tactility, so you have to take your

Source: Mcgill (1 May 2025)

across laboratories worldwide, a crucial step

toward harmonizing global research on plastic

Ping Pong Bot Returns Shots with High-

Source: EMPA (13 May 2025)

## QUANTUM NETWORK

University Of Rochester and RIT **Develop Experimental Quantum** 

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