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#### ARCHITECTURE

### Spaces that Educate: The Role of Architectural Design on International Education Day



"Today, the International Day of Education serves as a reminder of the significant impact that architectural design has on learning environments. From flexible classrooms that adapt to diverse teaching methods to outdoor learning areas that integrate natural elements, the architecture of learning spaces embodies the principles of pedagogy, offering opportunities for exploration, collaboration and creativity, all while maintaining a focus on the safety and comfort of all users. This selection of articles explores the potential of design to enhance learning outcomes through spatial exploration, be it inside the classroom, in outdoor spaces or by encouraging larger communities to part-take in the learning process.

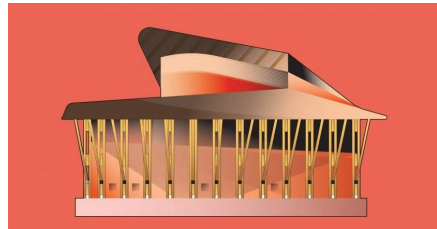
#### Balancing Flexibility and Safety

The architecture of learning spaces directly impacts learning outcomes. Flexible designs featuring adaptable partitions, movable furniture, and multi-use areas enable spaces to transform seamlessly to accommodate diverse teaching methods and student activities. Safety features, such as carefully considered circulation paths, age-appropriate furnishings, and robust materials, are seamlessly integrated, demonstrating that safety and stimulating design are not mutually exclusive. In essence, the architecture itself becomes a teaching tool, translating pedagogical principles into the built environment; the design's adaptability mirrors the fluidity of the learning process.."

Source: [ARCHDAILY](#) (24 Jan 2025)

#### ARCHITECTURE

### Anna Heringer's Anandaloy was the most significant building of 2020



"We continue our 21st-Century Architecture: 25 Years 25 Buildings series with the Anandaloy centre in Bangladesh by Studio Anna Heringer, a pioneering project for the revival of mud construction in contemporary architecture.

Housing both a disabilities centre and a textile studio, Anandaloy, meaning "place of great joy", became the second winner of the Obel Award the same year it opened.

The project was one of several socially engaged projects by German architect Heringer in the village of Rudrapur for the NGO Dipshikha, through which she sought to demonstrate her vision of architecture as a "tool to improve lives".."

Source: [Dezeen](#) (26 Jan 2025)

#### AI

### Dezeen Agenda features plans for a one-kilometre-wide solar farm in space



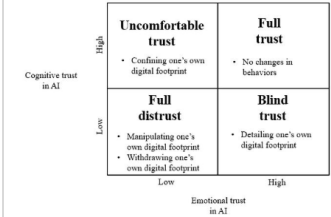
"The latest edition of our weekly Dezeen Agenda newsletter features China's plan to launch a solar farm into space.

China has begun constructing a giant celestial solar farm, which will be launched into space using heavy-lift rockets. The structure is expected to stretch one kilometre in width and continuously harvest renewable energy for Earth.."

Source: [Dezeen](#) (23 Jan 2025)

#### AI

### Why are 80 percent of companies failing to benefit from AI? It's about the people not the tech, says new study



"Successful uptake of new technology is a matter of emotions — and with the vast majority of companies saying they're failing to capitalise on its potential, managers need to know how to deal with them, say researchers from Aalto University..

AI has the potential to enhance decision-making, spark innovation and help leaders boost employees' productivity, according to recent research. Many large companies have invested accordingly, in the form of both funding and effort. Yet despite this, studies show that they are failing to achieve the expected benefits, with as many as 80 percent of companies reporting a failure to benefit from the new technology.

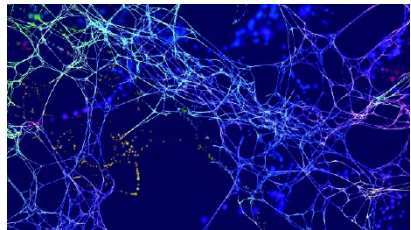
'Often employees fail to embrace new AI and benefit from it, but we don't really know why,' says Assistant Professor Natalia Vuori from Aalto University. Our limited understanding stems partly from the tendency to study these failings as limitations of the technologies themselves, or from the perspective of users' cognitive judgments about AI performance, she says.

'What we learned is that success is not so much about technology and its capabilities, but about the different emotional and behavioural reactions employees develop towards AI — and how leaders can manage these reactions,' says Vuori."

Source: [AALTO](#) (23 Jan 2025)

#### AI in BIOMED

### A key to analyzing millions of individual cells



"Our bodies are made up of around 75 billion cells. But what function does each individual cell perform and how greatly do a healthy person's cells differ from those of someone with a disease? To draw conclusions, enormous quantities of data must be analyzed and interpreted. For this purpose, machine learning methods are applied. Researchers at the Technical University of Munich (TUM) and Helmholtz Munich have now tested self-supervised learning as a promising approach for testing 20 million cells or more.

In recent years, researchers have made considerable progress with single-cell technology. This makes it possible to investigate tissue on the basis of individual cells and simply to determine the various functions of the individual cell types. The analysis can be used, for instance, to make comparisons with healthy cells to find out how smoking, lung cancer or a COVID infection change individual cell structures in the lung.

At the same time, the analysis is generating ever-increasing quantities of data. The researchers intend to apply machine learning methods to support the process of re-interpreting existing datasets, deriving conclusive statements from the patterns and applying the results to other areas.

Source: [TUM](#) (23 Jan 2025)

#### AI TRENDS

### AI Leads the Way in 2025 IEEE Tech Impact Study



"For the second year in a row, top tech leaders selected artificial intelligence as the most important current technology. IEEE surveyed 350 CIOs, CTOs, IT directors, and other global technology leaders for its now-annual report, "The Impact of Technology in 2025 and Beyond: An IEEE Global Study."

More than half ranked artificial intelligence—including predictive and generative AI, machine learning, and natural language processing—at the top. Cloud computing was second, and robotics came in third. Other technologies the experts say will make an impact in the coming year include extended reality, the industrial Internet of Things, quantum computing, and electric vehicles.

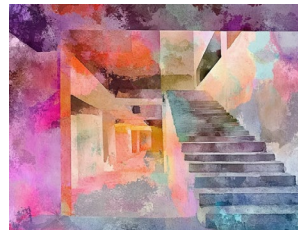
The tech leaders—from Brazil, China, India, the United Kingdom, and the United States—shared how their companies plan to use AI and what skills they will be looking for in new hires for related jobs.

The executives also reported that they plan to incorporate more robotics and quantum computing applications into their operations this year."

Source: [IEEE Spectrum](#) (22 Jan 2025)

#### GENAI

### 5 AI Image Generators You Can Use Now



"2024 was a relatively subdued year for AI image generation, at least when compared to the attention it gained in 2022 and 2023. Video generation, buoyed by high-profile releases like OpenAI's Sora, became the hot topic.

"I think a lot of tools are seeing the direction AI content creation is going, and just trying to stay up to date, trying to diversify [into video]," says Ross Symons, cofounder of the creative AI company ZenRobot. "But I find the tools that are sticking to what they're good at, like Midjourney, are dominating."

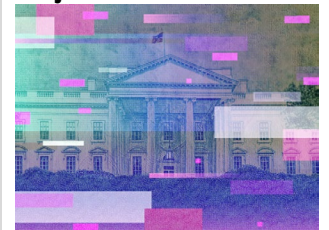
Most modern AI image generators continue to use a diffusion model. This type of AI model is trained by teaching a neural network to predict random noise as it's gradually added to images. Once training is complete, the process can be reversed to create unique images from random noise. The diffusion model is then paired with a text model, which converts the user's text prompt into tokens that guide the diffusion model's results.

Diffusion models have improved since 2022 but haven't fundamentally changed, and in the past year, the spotlight shifted from the models themselves to the software tools they power. The best AI image generators currently are quick, easy to use, and offer ways to more finely control image generation.."

Source: [IEEE Spectrum](#) (18 Jan 2025)

#### AI

### Experts Weigh in on \$500B Stargate Project for AI



"In a news conference on Tuesday, President Trump announced the Stargate Project, which he called "the largest AI infrastructure project, by far, in history."

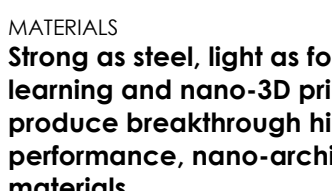
With the CEOs of OpenAI, Oracle, and Softbank at his side, Trump said that these companies and other private sector partners will invest up to US \$500 billion in building data centers across the United States, with the first \$100 billion coming this year. The announcement came the day after Trump rescinded former President Biden's executive order on AI, which aimed to increase safeguards for the technology.

While details about Stargate are scarce, experts in AI, energy, and data centers had a range of reactions to the news.."

Source: [IEEE Spectrum](#) (25 Jan 2025)

#### FOOD SUSTAINABILITY

### Understanding the science of meaty flavors could be key to sustainable diets, says academic



#### MATERIALS

### Strong as steel, light as foam: Machine learning and nano-3D printing produce breakthrough high-performance, nano-architected materials

#### ROBOTICS

### Just How Many Robots Can One Person Control at Once?

#### SOLAR

### Finding Better Photovoltaic Materials Faster with AI



"Understanding the science behind meaty tastes and textures could be the key for more people switch to a planet-friendly plant diet, researchers suggest.

Ole G. Mouritsen, a professor of gastrophysics, addresses the urgent need to make changes to culinary cultures where animal-based proteins play a central role.

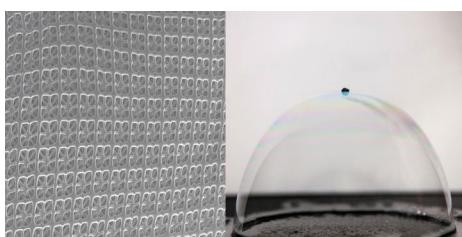
Replicating a little-known meaty flavour and a sensation of richness could encourage more plant-based eating, he explains.

"To ensure that there is enough food for a growing world population, to lessen the burden on the environment, and to promote healthier, sustainable eating patterns, it is crucial to transition to a diet that focuses primarily on plants as the key ingredients," he explains. "Yet, many people dislike the taste of plants because of their texture and lack of sweetness and umami."

'Umami' is the fifth, and often-overlooked, sister taste to the much more familiar sweet, salty, sour and bitter flavours. And 'koku' is what Japanese researchers have crowned the experience of food as 'mouthful', 'rich' and 'continuous'. When combined, these two could be game-changers for many people wanting to eat more plant-based foods but struggling with the tastes, Mouritsen suggests.

A new book offers key scientific descriptions of the physical characteristics of plants, mushrooms, algae, and fungi and their nutritional components, along with information about creation of texture and flavour to make plant-forward eating more palatable. Plant-Forward Cuisine is written by Mouritsen, Klavs Styrbæk, who is a chef and author, and Mariela Johansen, a translator..

Source: [EurekaAlert](#) (26 Jan 2025)



"Researchers at the University of Toronto's Faculty of Applied Science & Engineering have used machine learning to design nano-architected materials that have the strength of carbon steel but the lightness of Styrofoam.

In a new paper published in *Advanced Materials*, a team led by Professor Tobin Filleter (MIE) describes how they made nanomaterials with properties that offer a conflicting combination of exceptional strength, light weight and customizability. The approach could benefit a wide range of industries, from automotive to aerospace.

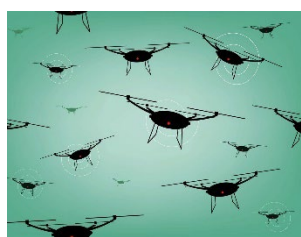
"Nano-architected materials combine high performance shapes, like making a bridge out of triangles, at nanoscale sizes, which takes advantage of the 'smaller is stronger' effect, to achieve some of the highest strength-to-weight and stiffness-to-weight ratios, of any material," says Peter Serles (MIE MASc 1T9, MIE PhD 2T4), the first author of the new paper.

"However, the standard lattice shapes and geometries used tend to have sharp intersections and corners, which leads to the problem of stress concentrations. This results in early local failure and breakage of the materials, limiting their overall potential.

"As I thought about this challenge, I realized that it is a perfect problem for machine learning to tackle."

Nano-architected materials are made of tiny building blocks or repeating units measuring a few hundred nanometres in size — it would take more than 100 of them patterned in a row to reach the thickness of a human hair. These building blocks, which in this case are composed of carbon, are arranged in complex 3D structures called nanolattices."

Source: [utoronto](#) (23 Jan 2025)



"Even if an android's appearance is so realistic that it could be mistaken for a human in a photograph, watching it move in person can feel a bit unsettling. It can smile, frown, or display other various, familiar expressions, but finding a consistent emotional state behind those expressions can be difficult, leaving you unsure of what it is truly feeling and creating a sense of unease.

Until now, when allowing robots that can move many parts of their face, like androids, to display facial expressions for extended periods, a 'patchwork method' has been used. This method involves preparing multiple pre-arranged action scenarios to ensure that unnatural facial movements are excluded while switching between these scenarios as needed.

However, this poses practical challenges, such as preparing complex action scenarios beforehand, minimizing noticeable unnatural movements during transitions, and fine-tuning movements to subtly control the expressions conveyed.

In this study, lead author Hisashi Ishihara and his research group developed a dynamic facial expression synthesis technology using "waveform movements," which represents various gestures that constitute facial movements, such as "breathing," "blinking," and "yawning," as individual waves. These waves are propagated to the related facial areas and are overlaid to generate complex facial movements in real time. This method eliminates the need for the preparation of complex and diverse action data while also avoiding noticeable movement transitions.

Furthermore, by introducing "waveform modulation," which adjusts the individual waveforms based on the robot's internal state, changes in internal conditions, such as mood, can be instantly reflected as variations in facial movements."

Source: [IEEE Spectrum](#) (26 Jan 2025)



"Perovskite solar cells are a flexible and sustainable alternative to conventional silicon-based solar cells. Researchers at the Karlsruhe Institute of Technology (KIT) are part of an international team that was able to find – within only a few weeks – new organic molecules that increase the efficiency of perovskite solar cells. The team used a clever combination of artificial intelligence (AI) and automated high-throughput synthesis. Their strategy can also be applied to other areas of materials research, such as the search for new battery materials. The researchers report their findings in *Science* (DOI: 10.1126/science.ads0901).

In order to find out which of a million different molecules would conduct positive charges and make perovskite solar cells particularly efficient, one would need to synthesize and test all of them – or do as the researchers headed by Tenure-track Professor Pascal Friederich, who specializes in the applications of AI in materials science at KIT's Institute of Nanotechnology, and Professor Christoph Brabec from the Helmholtz Institute Erlangen-Nürnberg (HI ERN). "With only 150 targeted experiments, we were able to achieve a breakthrough that would otherwise have required hundreds of thousands of tests. The workflow we have developed will open up new ways to quickly and economically discover high-performance materials for a wide range of applications," Brabec said. With one of the discovered materials, they increased the efficiency of a reference solar cell by approximately two percentage points to 26.2 percent. "Our success shows that enormous amounts of time and resources can be saved by applying skillful strategies for the discovery of new energy materials," Friedrich said.

The starting point at HI ERN was a database with structural formulae for approximately one million virtual molecules that could be synthesized from commercially available substances. From these virtual molecules, 13,000 were selected at random. The KIT researchers used established quantum mechanical methods to determine their energy levels, polarity, geometry and other properties.."

Source: [KIT](#) (Jan 2025)

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