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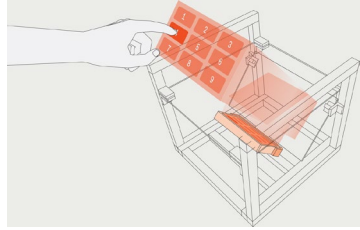
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AERIAL DISPLAYS

Build A Sci-Fi Aerial Display: Clever Optics Are Behind a Touchscreen That Floats in Midair



"On a star base far far away, a dashing hero presses a button on a control panel and a schematic appears in midair. Deftly touching her fingers to the ethereal display, the hero shuts down an energy shield and moves on with her secret mission. If you've watched any science fiction, you're probably familiar with this kind of scenario. But what you may not know is that while star bases and energy shields are still beyond us, floating displays are not.

By this I mean displays that produce two-dimensional images that truly float in empty air and can be interacted with, not displays based on the Pepper's ghost illusion, where an image is projected onto a transparent surface that has to be kept away from prying fingers. The optical principles to make floating images are well understood, and since the pandemic stoked interest in touch-free controls of all kinds, a number of companies such as Toppan and Kyocera have attempted to commercialize such aerial displays. However, rollouts have been slow, and the intended applications—elevator controls and the like—are not exactly cool.

I decided to build my own aerial display, one that would honor the sci-fi awesomeness of the concept.

I'm no stranger to building offbeat displays. In 2022 I presented in IEEE Spectrum's Hands On my color electromechanical display, which harked back to the very first days of television. This time, as I was going for something almost from the future, I decided to style my system after the kind of props seen in Star Wars movies. But first, I needed to get the optics working."

Source: [IEEE Spectrum](#) (20 Oct 2024)

AI

Study: AI Could Transform How Hospitals Produce Quality Reports

Large Language Models for More Efficient Reporting of Hospital Quality Measures

Authors: Aaron Branstetter, Ph.D., Rishvardhan Krishnamoorthy, M.S., Kimberly Quintero, R.N., M.S., J. Josh, M.D., Gabriel Wang, M.D., Hayden Poon, M.S., Nicholas Hillen, R.N., M.S.N., and Shan Ph.D. Author Info & Affiliations

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Abstract

Hospital quality measures are a vital component of a learning health system, yet they can

"A pilot study led by researchers at University of California San Diego School of Medicine found that advanced artificial intelligence (AI) could potentially lead to easier, faster and more efficient hospital quality reporting while retaining high accuracy, which could lead to enhanced health care delivery.

The study results, published in the October 21, 2024 online edition of the New England Journal of Medicine (NEJM) AI, found an AI system using large language models (LLMs) can accurately process hospital quality measures, achieving 90% agreement with manual reporting, which could lead to more efficient and reliable approaches to health care reporting.

Researchers of the study, in partnership with the Joan and Irwin Jacobs Center for Health Innovation at UC San Diego Health (JCHI), found that LLMs can perform accurate abstractions for complex quality measures, particularly in the challenging context of the Centers for Medicare & Medicaid Services (CMS) SEP-1 measure for severe sepsis and septic shock."

Source: [EurekaAlert!](#) (21 Oct 2024)

AI

AI Tool Helps People with Opposing Views Find Common Ground



"A chatbot-like tool powered by artificial intelligence (AI) can help people with differing views to find areas of agreement, an experiment with online discussion groups has shown.

The model, developed by Google DeepMind in London, was able to synthesize diverging opinions and produce summaries of each group's position that took different perspectives into account. Participants preferred the AI-generated statements to ones written by human mediators, suggesting that such tools could be used to help support complex deliberations. The study was published in Science on 17 October 1.

"You can see it as a sort of proof of concept that you can use AI, and, specifically, large language models, to fulfil part of the function that is fulfilled by current citizens' assemblies and deliberative polls," says Christopher Summerfield, a co-author of the study and research director at the UK AI Safety Institute. "People need to find common ground because collective action requires agreement."

Source: [Nature](#) (17 Oct 2024)

AR

Meta's New AR Glasses Come at A High Cost: Orion Forgoes Affordability for Innovation



"In the last decade, Meta has embarked on a quest to blend the physical and virtual realms. The tech giant is bringing that fusion to fruition with the recent unveiling of what it calls its first pair of "true" augmented reality (AR) glasses, named Orion.

While the company notes that Orion is a product prototype, its future iteration could be available to consumers. But Meta has to first bring down Orion's manufacturing costs—reportedly at US \$10,000 per pair—to make it possible for people to actually purchase the AR glasses.

Orion's hardware consists of three parts: the actual glasses, a wristband for gesture control, and a wireless puck for low-latency computing. Embedded into the wristband are electromyography sensors that capture and process electric signals generated by hand and wrist muscle movements. The pocket-sized puck's dual processors carry part of the computing load, including some artificial intelligence (AI), graphics rendering, and machine perception, which is a device's ability to interpret sensory information from the surrounding environment. But the glasses themselves are the star, with a host of built-in technologies that allow them to shine—and drive up the price.

Custom chips running on Meta's AR glasses consume less power than conventional chips and are optimized for AI, graphics, and machine perception algorithms. The frames are crafted from magnesium, a lightweight material that efficiently dissipates heat. Miniature cameras and sensors surround the frame's rims, aiding in eye and hand tracking and mooring digital objects in the real world. MicroLED projectors beam holographic displays right through the transparent lenses."

Source: [IEEE Spectrum](#) (19 Oct 2024)

AI

UVA Researchers Engineer AI Breakthrough in Human Action Detection Technology



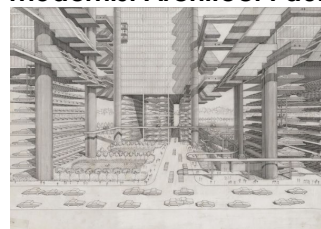
"What if a security camera could not only capture video but understand what's happening — distinguishing between routine activities and potentially dangerous behavior in real time? That's the future being shaped by researchers at the University of Virginia's School of Engineering and Applied Science with their latest breakthrough: an AI-driven intelligent video analyzer capable of detecting human actions in video footage with unprecedented precision and intelligence.

The system, called the Semantic and Motion-Aware Spatiotemporal Transformer Network (SMAST), promises a wide range of societal benefits from enhancing surveillance systems and improving public safety to enabling more advanced motion tracking in healthcare and refining how autonomous vehicles navigate through complex environments.

"This AI technology opens doors for real-time action detection in some of the most demanding environments," said professor and chair of the Department of Electrical and Computer Engineering, Scott T. Acton, and the lead researcher on the project. "It's the kind of advancement that can help prevent accidents, improve diagnostics and even save lives."

ARCHITECTURE

The MET Opens Exhibition on The Diverse Career of Underrecognized Modernist Architect Paul Rudolph



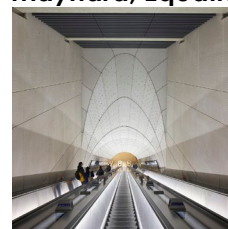
"The Metropolitan Museum of Art has opened a major exhibition focused on the diverse and innovative career of Paul Rudolph, a second-generation Modernist architect whose work stands alongside luminaries such as Eero Saarinen and I.M. Pei. Titled "Materialized Space: The Architecture of Paul Rudolph," the exhibition is on display from September 30, 2024, to March 16, 2025, covering a wide spectrum of Rudolph's architectural contributions, from his experimental houses in Florida, through civic projects, to visionary urban megastructures and mixed-use skyscrapers.

The exhibition presents over 80 diverse works encompassing various scales and media, including drawings, models, furniture, and material samples, many of which originate from Rudolph's own office. This comprehensive showcase is a collaboration between The Met and the Library of Congress's Paul Marvin Rudolph Archive. It aims to highlight Rudolph's radical contributions to Modernist architecture, providing insight into his complex artistic process, and emphasizing the importance of Rudolph's work in the dialogue of modern urban spaces.

Organized into thematic sections, the exhibition traces the evolving stages of Rudolph's career, spotlighting his work in housing, civic projects, and his commissions in Asia. It also examines key cultural and economic themes from the 20th century, such as urban renewal policies and post-war construction trends. One of the focal points is Rudolph's ambitious yet unrealized Lower Manhattan Expressway, reflecting his visions for urban infrastructure."

ARCHITECTURE

RIBA Awards The 2024 Stirling Prize to The Elizabeth Line by Grimshaw, Maynard, Equation, And AtkinsRéalis



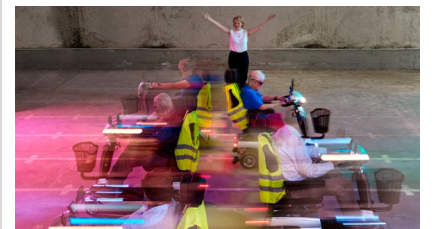
"The Royal Institute of British Architects (RIBA) has announced the Elizabeth Line, designed by Grimshaw, Maynard, Equation, and AtkinsRéalis, as the winner of the 2024 RIBA Stirling Prize. Since its inception in 1996, the prestigious annual award sets out to recognize UK's best new architecture. Named in honor of Queen Elizabeth II, the Elizabeth Line represents an important development for London's transportation network. Connecting Reading and Heathrow to Essex and South East London, the development spans 62 miles of track and 26 miles of tunnels, a complex and expansive undertaking accommodating 700,000 passengers every weekday.

According to the RIBA Stirling Prize Jury, the architecture of the Elizabeth Line stands out for its ability to manage this complexity and offer its passengers an intuitive navigating experience. The use of perforated cladding, sensitive lighting, and a coherent wayfinding system creates an atmosphere that is both calming and efficient. The design employs curvaceous, flowing lines that guide passengers seamlessly through the network, complemented by a sophisticated lighting system that subtly adjusts from warm to cool tones to accentuate different areas.

In addition to its logistical achievements, the development includes an extensive archeological endeavor. As the tunnels were dug beneath London's historic landscape, the project carefully navigated through existing underground infrastructures. This effort inadvertently led to the UK's largest archaeological dig, uncovering significant artifacts, including a Tudor bowling ball and a 55-million-year-old woolly mammoth remains."

DESIGN

Ten Emerging Dutch Designers to Look Out for At Dutch Design Week

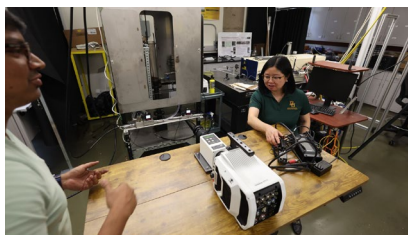


"On the eve of Dutch Design Week, 10 former recipients of the Dutch Design Awards have nominated 10 rising stars making waves across the Netherlands.

This year, the Dutch Design Awards (DDA) – an annual competition that celebrates the best of recent Dutch design – asked 10 former recipients of the awards to nominate an emerging designer practicing in the Netherlands who they believe is making impactful work across various design disciplines.

All of the spotlighted designers are exhibiting at Dutch Design Week's Microlab Hall. As the annual event kicks off in Eindhoven tomorrow, read on for the list of practitioners..."

ENERGY

Baylor Engineers Unveil Breakthrough in Ultra-Clean Biofuel Technology

"The future of wireless technology — from charging devices to boosting communication signals — relies on the antennas that transmit electromagnetic waves becoming increasingly versatile, durable and easy to manufacture. Researchers at Drexel University and the University of British Columbia believe kirigami, the ancient Japanese art of cutting and folding paper to create intricate three-dimensional designs, could provide a model for manufacturing the next generation of antennas.

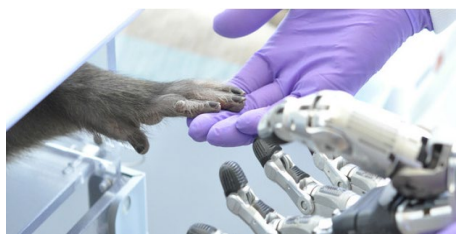
Recently published in the journal Nature Communications, research from the Drexel-UBC team showed how kirigami — a variation of origami — can transform a single sheet of acetate coated with conductive MXene ink into a flexible 3D microwave antenna whose transmission frequency can be adjusted simply by pulling or squeezing to slightly shift its shape.

The proof of concept is significant, according to the researchers, because it represents a new way to quickly and cost-effectively manufacture an antenna by simply coating aqueous MXene ink onto a clear elastic polymer substrate material.

"For wireless technology to support advancements in fields like soft robotics and aerospace, antennas need to be designed for tunable performance and with ease of fabrication," said Yury Gogotsi, PhD, Distinguished University and Bach Professor in Drexel's College of Engineering, and a co-author of the research. "Kirigami is a natural model for a manufacturing process, due to the simplicity with which complex 3D forms can be created from a single 2D piece of material."

Source: [Baylor](#) (16 Oct 2024)

MED TECH

Controlling Prosthetic Hands More Precisely by The Power of Thought

"Researchers at the German Primate Center – Leibniz Institute for Primate Research in Göttingen have developed a novel training protocol for brain-computer interfaces in a study with rhesus monkeys. The method enables precise control of prosthetic hands using signals from the brain alone. For the first time, researchers were able to show that the neural signals that control the different hand postures in the brain are primarily important for this control, and not, as previously assumed, signals that control the movement's velocity. The results are essential for improving the fine control of neural hand prostheses, which could give paralyzed patients back some or all of their mobility (Neuron)."

Source: [DPZ](#) (17 Oct 2024)

PATENTS

A Patent Engineer's Advice for First-Time Inventors Know the Value of Your Intellectual Property and Don't Be Afraid To File

"Lesley-Ann Knee credits her father for introducing her to the world of patents. He's an engineer who specializes in application-specific integrated circuits (ASICs) and holds several patents on technologies he developed while working for Hewlett-Packard and Microsoft.

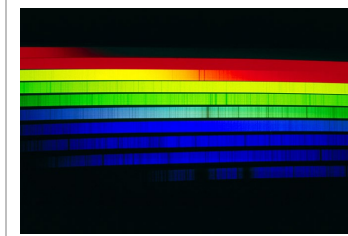
"I would hear stories of his experiences through the patent prosecution processes," Knee says, which taught her about different kinds of patents, the importance of documentation, and using detailed language. She remembers one litigation battle over a patent that went on for years, which her father's company lost because someone forgot to delete information in a patent claim.

Knee, an electrical engineer, now works as a patent engineer in the patent prosecution department at the law office of Husch Blackwell, headquartered in Chicago. Under the supervision of patent attorneys, Knee helps with writing, filing, and managing patent applications with the U.S. Patent and Trademark Office (USPTO).

She is currently studying for the patent bar exam, which would qualify her to be a licensed patent agent, registered with the USPTO to help prepare and prosecute patent applications. Assuming she passes, she then intends to go to law school to become a patent attorney."

Source: [IEEE Spectrum](#) (17 Oct 2024)

PHYSICAL SCIENCES

Visible Light Energy Yields Two-For-One Deal When Added to CO2 Recycling Process

"By combining visible light and electrochemistry, researchers have enhanced the conversion of carbon dioxide into valuable products and stumbled upon a surprising discovery. The team found that visible light significantly improved an important chemical attribute called selectivity, opening new avenues not only for CO2 conversion but also for many other chemical reactions used in catalysis research and chemical manufacturing.

One way that chemists recycle CO2 into valuable products is through a process called electrochemical reduction, where a stream of CO2 gas moves through an electrolysis cell that breaks the CO2 and water down into carbon monoxide and hydrogen, which then can be used to make new desired hydrocarbon products, said University of Illinois Urbana-Champaign chemistry professor Prashant Jain. "However, the reaction is sluggish, and the process requires large electrodes containing a lot of expensive catalyst material such as gold or copper, so our lab has been pursuing ways to speed up the process so that less catalyst material is required, making it a more viable option for the alternative fuels industry."

The new study, led by Jain and former graduate student Francis Alcorn and published in the Proceedings of the National Academy of Sciences, details a method that combines the action of visible light with electrodes coated in nanoparticles of gold-copper alloy to induce CO2 reduction at a much higher rate and allow for more controlled selectivity than seen with current methods.

"These new electrodes act like tiny antennae that seek out photons in the visible light range and couple them with the chemical reaction pathway," Jain said."

Source: [Illinois](#) (16 Oct 2024)

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