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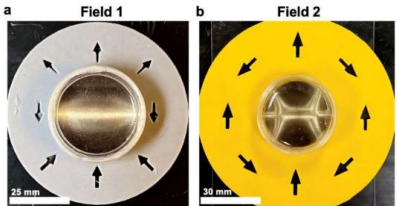
### Featured Course

Creating and Managing a YouTube Channel **3h 34m**

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#### 3D PRINTING

### New 3D Printing Approach Means Better Biomedical, Energy, Robotics Devices



"An Oregon State University researcher has helped create a new 3D printing approach for shape-changing materials that are likened to muscles, opening the door for improved applications in robotics as well as biomedical and energy devices.

The liquid crystalline elastomer structures printed by Devin Roach of the OSU College of Engineering and collaborators can crawl, fold and snap directly after printing."

Source: [Oregon State University](#) (2 Dec 2024)

#### AI

### Scientists Discover Key Protein That Could Reverse Vascular Aging



"A recent study published in the journal Aging by Julia Michalkiewicz, Tung D. Nguyen, and Monica Y. Lee from the University of Illinois at Chicago College of Medicine underscores the essential role of the protein Nucleoporin93 (Nup93) in preserving blood vessel health during aging. The authors discuss emerging research that identifies Nup93 as a potential therapeutic target for preventing or mitigating aging-related conditions such as heart disease and stroke.

Read the paper [here](#)."

Source: [SciTech Daily](#) (2 Dec 2024)

#### AI

### AI Dash Cams Give Wake-Up Calls to Drowsy Drivers: Innovative Tech Detects Driver Fatigue and Signals Them to Take a Break



"Increasingly, vehicles with advanced driver assistance systems are looking not only at the road but also at the driver. And for good reason. These systems can, paradoxically, make driving less safe as drivers engage in more risky behaviors behind the wheel under the mistaken belief that electronic equipment will compensate for lack of caution.

Attempting to ward off such misuse, automakers have for years used camera-based systems to monitor the driver's eye movement, posture, breathing, and hand placement for signs of inattention. Those metrics are compared with baseline data gathered during trips with drivers who were fully alert and focused on the road. The point is to make sure that drivers appear alert and ready to take control of the driving task if the suite of electronic sensors and actuators gets overwhelmed or misjudges a situation.

Now, several companies targeting commercial vehicle fleet operators, especially long-haul trucking companies, are introducing AI-enabled dashcam technology that takes driver monitoring a step further. These new dash cams use machine learning to pick up on the subtle behavioral cues that are signs of drowsiness. "Long-haul truckers are particularly at risk of driving drowsy because they often work long hours and drive lengthy routes," says Evan Welbourne, Vice president for AI and Data at Samsara, which recently introduced its drowsiness detection solution.

The driver monitoring tech developed by Samsara and Motive, both based in and San Francisco, and Nauto, headquartered in nearby Sunnyvale, Calif., deliver real-time audio alerts to a drowsy driver, giving them a prompt to take a break to reduce the risk of a fatigue-related accident. All are configured so that if a dash cam detects that a driver continues to operate the vehicle while displaying signs of drowsiness after the in-cab alert, it can directly contact fleet managers so they can coach the driver and reinforce safety measures."

Source: [IEEE Spectrum](#) (26 Nov 2024)

#### ARCHITECTURE

### From Modernism to Multiculturalism: The Historical Evolution of Student Housing



"Student housing has undergone a remarkable transformation over the last century. Once seen as a utilitarian necessity, providing shelter and basic amenities for students, this architectural typology has evolved to address increasingly complex societal, cultural, and urban demands. Starting with Le Corbusier's modernist approach at the Cité Universitaire in Paris, student housing has reflected broader trends in architecture, urbanism, and social change.

Today, these buildings must cater to a highly diverse and transient population, navigating the pressures of affordability, density, and the evolving living standards of young adults. With rapid urbanization and increasing student mobility, universities now face the challenge of designing housing that is not only functional but also adaptable to different cultural and social contexts. This has led to more flexible, innovative solutions that promote both privacy and community living.

Over time, student housing design has expanded beyond efficiency and affordability, becoming a platform for experimentation in community-building, cultural inclusivity, and sustainability. This shift mirrors changes in education itself, as universities strive to provide a holistic experience that supports students' well-being and personal growth. By tracing the evolution of student housing, from Modernist principles to today's diverse and adaptable models, this article explores how architects have continuously reimagined this typology to meet the changing needs of student populations."

Source: [Archdaily](#) (22 Nov 2024)

#### BIG DATA

### In The Big Data Era, Prioritize Statistical Significance in Study Design



"'Experimental design': these words signal a section of a research paper that many readers might be inclined to scan fleetingly, before moving on to the actual findings. But a study in Nature this week should make all researchers — both readers and writers of papers — consider dwelling a little more on the methods part of the scientific process.

The study, led by Simon Vandekar, a biostatistician at Vanderbilt University Medical Center in Nashville, Tennessee, is on how to make brain-wide association studies (BWAS) more. The core idea of BWAS is to study collections of brain images using statistical tools and machine-learning algorithms. This is to predict what specific brain features or patterns of activity are associated with traits or behaviours, for example an ability to reason abstractly or a tendency to experience particular negative emotions.

But BWAS have a perennial, and well-known, problem of low replicability: two studies on the same topic can come to different conclusions. Much of the problem is that some BWAS studies need huge sample numbers to reflect effects accurately. Small sample sizes can exaggerate the relationship of a certain brain feature to a behaviour or trait. In the similar field of genome-wide association studies — which seek to relate differences in DNA with traits in health or disease — the problem of unreliability is being overcome by gathering

#### DESIGN

### This Week We Revealed the Dezeen Awards 2024 Winners



"This week on Dezeen, we revealed all 52 Dezeen Awards 2024 winners including the architecture, interiors and design projects of the year.

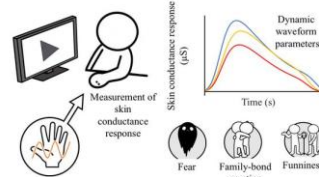
The Taiwan-Reyhanli Centre for World Citizens was named architecture project of the year, Aesop Diagonal best interior of the year and the Faneeri folding chair design project of the year.

We also announced the Dezeen Awards 2024 Designers of the Year and Fernando Laposse was named the winner of the Bentley Lighthouse Award 2024."

Source: [Dezeen](#) (2 Dec 2024)

#### DIGITAL DATA

### When Devices Can Read Human Emotions Without a Camera



"Tokyo, Japan – Researchers from Tokyo Metropolitan University have used measurements of skin conductance over time to tell emotions apart. Volunteers were shown videos depicting fearful scenes, family bonding, and humor, while their skin conductance trace was recorded. The team's analysis showed that traces could be used to make good guesses of which emotions were being felt. Advances like this help break down an over-reliance on facial data, bringing emotionally aware technologies closer to home.

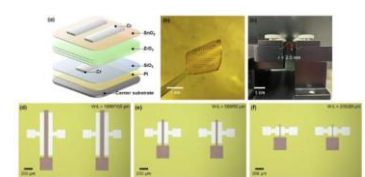
A new frontier is being pioneered in consumer electronics: one day, digital devices might be able to offer services depending on your emotional state. While this sounds amazing, this depends on whether devices can correctly tell what people are feeling. The most common methods depend on facial expressions: while these have had some success, such data may not always be available. This has led to researchers looking for different biological signals which could be interpreted to access emotional states, like brain wave measurements or cardiograms.

A team of scientists led by Professor Shogo Okamoto from Tokyo Metropolitan University have been using skin conductance as a doorway to human emotions. When people feel different things, the electrical properties of their skin change drastically due to

Source: [Nature](#) (26 Nov 2024)

#### ELECTRONICS

### Bendable Electronic Parts Can Heat Up by Themselves to Lower the Manufacturing Temperature Barrier



"A research team has developed a technology to manufacture high-performance liquid process-based electronic parts at lower temperatures than what was previously possible by harnessing the heat of combustion generated in materials.

The results of this study pave the way for expanded applications across various fields by dramatically reducing the process temperature of high-performance liquid-phase materials.

Read the full paper in [Nature](#)."

Source: [Nature](#) (26 Nov 2024)

data sets with tens of thousands of samples from participants. However, in the case of the brain, this is much more difficult, especially for researchers outside Europe and the United States. One hour of scanning in a molecular resonance imaging (MRI) machine costs about US\$1,000. The US National Institutes of Health distributes around \$2 billion for neuroimaging research each year, but few other countries have this level of resource.

Vandekar and his colleagues suggest that concentrating on quality, rather than quantity, could be one answer. They analysed more than 100,000 MRI scans from healthy adults and healthy children, as well as scans from children with mental-health conditions."

Source: [Nature](#) (27 Nov 2024)

perspiration, with signals showing up within one to three seconds of the original stimulus. Previous research has already shown that measurements of peak conductance, for example, can be correlated with certain emotions. In their most recent work, the team focused on the dynamics of the response i.e. how quickly the conductance trace following some stimulus reaches a peak, and how it decays back to normal."

Source: [EurekAlert!](#) (30 Nov 2024)

Source: [TechXplore](#) (2 Dec 2024)

#### HEALTHCARE TECHNOLOGY

### Temporary Scalp Tattoo Can Be Used to Record Brain Activity



"Scientists have invented a liquid ink that doctors can print onto a patient's scalp to measure brain activity. The technology offers a promising alternative to the cumbersome process currently used for monitoring brainwaves and diagnosing neurological conditions. It also has the potential to enhance non-invasive brain-computer interface applications.

The tattoo has been shown to work well on people with bald heads and buzz-cut hairstyles. 'While the method has not yet been tested extensively on long, thick, curly hair, modified nozzle designs or incorporating robotic fingers for hair parting could make it feasible in the future,' says Lu. Data transmitters embedded in the tattoos could also make the process fully wireless, according to the team.'

Read more [here](#)."

Source: [New Scientist](#) (2 Dec 2024)

#### QUANTUM PHYSICS

### Experiment Realizes Quantum Advantage in Data Storage with A Photonic Quantum Processor



"Researchers at Henan Key Laboratory of Quantum Information and Cryptography and the S. N. Bose National Center for Basic Sciences carried out an experiment aimed at establishing the quantum advantage of an elementary quantum system for information storage.

Their paper, published in Physical Review Letters, demonstrates that a single qubit can outperform a classical bit in a communication task that does not involve any shared randomness (i.e., classically correlated random variables between communicating parties)."

Source: [Phys.Org](#) (2 Dec 2024)

#### ROBOTICS

### Packaging And Robots: How AI And Sustainability Are Transforming the Journey from Click to Delivery at Amazon



"The journey of a package from the moment a customer clicks "buy" to the moment it arrives at their doorstep is one of the most complex and finely tuned processes in the world of e-commerce. At Amazon, this journey is constantly being optimized, not only for speed and efficiency, but also for sustainability. This optimization is driven by the integration of cutting-edge technologies like artificial intelligence (AI), machine learning (ML), and robotics, which allow Amazon to streamline its operations while working towards minimizing unnecessary packaging.

The use of AI and ML in logistics and packaging is playing an increasingly vital role in transforming the way packages are handled across Amazon's vast global network. In two interviews — one with Clay Flannigan, who leads manipulation robotics programs at Amazon, and another with Callahan Jacobs, an owner of the Sustainable Packaging team's technology products — we gain insights into how Amazon is using AI, ML, and automation to push the boundaries of what's possible in the world of logistics, while also making significant strides in sustainability-focused packaging."

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

#### ROBOTICS

### Smallest Walking Robot Makes Microscale Measurements



"Cornell researchers in physics and engineering have created the smallest walking robot yet. Its mission: to be tiny enough to interact with waves of visible light and still move independently, so that it can maneuver to specific locations — in a tissue sample, for instance — to take images and measure forces at the scale of some of the body's smallest structures.

Controlled by magnets making a pinching motion, the robots can inch-worm forward on a solid surface. They can also "swim" through fluids using the same motion. The combination of maneuverability, flexibility and sub-diffractive optical technology create a significant advance in the field of robotics, the researchers said."

Source: [Cornell Chronicle](#) (2 Dec 2024)

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